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Abstract.

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D06.1 Demonstration of the Telematic Infrastructure for a common resource for medical terminology and language for Europe including the designated segments of national classifications

Deliverable 6.1

WP06 Validation: Building National Classifications

D06.1 Demonstration of the Telematic Infrastructure for a common resource for medical terminology and language for Europe including the designated segments of national classifications

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EFCC, VUM, KUN
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Executive Summary

On average the outcome of the validation of the GALEN-In-Use methodology was above expectation. As a result the GALEN methodology is now becoming part of the development/maintenance of national classifications in at least France, UK, and The Netherlands. The systematic approach in analysing these procedure classifications have revealed that across Europe about 20% of all rubrics are either wrong or too ambiguous. It is not unlikely that similar figures can be found about disease classifications!

The validation sites have produced various results. The variations were mainly due to the pre-conditions. On the one extreme in France there was the unique situation that the development of a completely new procedure classification coincided with the GALEN-IN-USE project. On the other extreme in Belgium we were faced with the situation that the specifically planned work could not be carried out, because the CPT4 classification was not made available on time. When it finally was available in the extension of the project, the CPT and INAMI systems appeared to be different to be usefully mapped.

On the basis of this work some first rough estimates were made on the economic viability of the GALEN approach. It is expected that development cost of classifications using the GALEN methodology are in the same order of magnitude as the classical development. Unfortunately there was no room in this project to do a thorough comparison.

One of the major lessons learned from this validation is that experienced groups which were closer to the GALEN development centres seemed to be more successful than the remote centres. In future projects, nationally, or internationally, more resource and emphasis on regular support from the central development centres should be planned for.

An important construct for the successful co-operation has been the invention of the Intermediate Representation, or Categorical Structure. Both words are used interchangeably in the following texts. The intermediate representation is not just a representation, but a semi formal structure, which is sufficiently constrained to permit automatic transformation of analysis of terminological phrases into GRAIL concepts.

The deliverable extensively reports about the work done. Specifically the work of the Dutch and UK centres is spelled out here in some detail, because it is exemplary. In addition both centres have described here in detail variations of the central GALEN In Use work. As such it has demonstrated the usefulness of the approach not only in the strict GIU project sense of surgical procedures, but well beyond that scope.

The deliverable is deliberately made a wide collection of relevant material. It is expected to function as the basis for a book on the GALEN methodology for classification development and maintenance.

Towards the end of the GIU project in December 1998, the European Federation of Classification Centres has adopted the GALEN Categorical Structure for Surgical procedures as a standard. EFCC will be responsible for future maintenance and development of this standard. This is in accordance with the views of Working Group 2 of CEN TC251.

Kermanog BV is presently working on an industrial strength version of the GALEN Classification Management Workbench tool. The SPET part of this toolset implements the categorical structure.

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1 Introduction

GALEN-IN-USE is a response to specific user demands for improved terminologies for medical procedures to overcome the problems encountered in using traditional classifications and coding systems and to produce greater European harmonisation. The objectives are to produce:

- To demonstrate a methodology and telematic infrastructure for the cooperative development and maintenance of coherent multilingual medical terminologies capable of being scaled up Europe-wide to cover substantially all of medicine. This requires:
 - A Common Reference Model — the ‘grammar and lexicon of concepts’ — for medical procedures covering cardiac, gastro-intestinal, orthopaedic and neuro-surgery with sufficient to cover over 90% of the contents of the relevant sections of the national classification schemes plus mechanisms for *ad hoc* extensions to cover the remainder. (The precise clinical topics subject to confirmation in further consultation with the users in the EFCC and its constituent members in WP03.)
 - National or specialist classifications as required locally coherent with and mapped to the Common Reference Model for the participating national centres.
 - Tools, methodologies, and delivery software to develop and maintain the Common Reference Model and National Classifications.

The long term goal is 100% coverage within the Common Reference Model. Within the life of GALEN-IN-USE, the goal is to provide rapidly a broad coverage and harmonisation of the vast majority of procedures. Experience has shown that dealing the last five to ten per cent of items using general tools can be extremely resource intensive because it requires fine detail and complex definitions on which there is no overall clinical consensus. This final residue is better dealt with locally on an *ad hoc* basis. (The estimate of 90% is conservative due to the restricted resources available for the project.)

Overall a key measure of the project’s success will be how it is perceived by users’. If successful, the participating and collaborating centres of the EFCC will be enthusiastic users of the GALEN tools and models and will be actively seeking to continue their development and use. Likewise, the collaborating projects will have found the Terminology Servers of sufficient value within their architecture to be actively seeking to extend and replicate their use.

Present practice in classification development is that developments are taking place in ordinary text processors like Wordperfect, spreadsheets like Reflex, or database programs like Dbase, or freebase. The reason for that is that classifications are essentially still produced as books. This means that only rather rigid and flat organising principles can be used. Reaching consensus on classifications is a long and tedious chore. The development of the ICD10 notably has taken over 15 years, which strongly contradicts rapid developments in medicine.

The GALEN-IN-USE project will provide a set of much more powerful tools to construct, maintain and harmonise coding and classification schemes. A coherent set of European classifications on medical procedures is envisaged. In the project each participating country/language will develop their own classification related to a GRail-based Common Reference Model using the GALEN tools. The hypothesis in the project is that because of the flexible nature of Grail, consensus about this model is more easily reached, because there is no single purpose as in most current classifications. Binding the classification to this model enables the construction of a multitude of different (re)orderings of the original classification.

Furthermore, whereas translation of classification systems is now a manual task requiring major investment by each European country, the GALEN tools promise to provide semi-automatic assistance which will greatly speed the process. While idiomatic selection of ‘preferred terms’ must depend on local clinicians, text generators in each language should, eventually, be able to provide first approximations understandable to most clinicians.

Without GALEN, development will continue independently and manually. Development will be tedious and slow. Even closely related classifications such as the Dutch and German classifications of surgical procedures will continue to be incompatible. Translation will become an ever more burdensome expense. With GALEN, groups will be enabled to work together and build on each others work; communication will be enhanced; and the burden of translation eased, though not eliminated.

2 Methodology

In this section we reproduce some material that has been published in conference proceedings or elsewhere. Chapter 2 describes the basic methodology for co-operative working. An important construct for the successful cooperation has been the invention of the Intermediate Representation, or Categorical Structure. Both words are used interchangeably in the following texts. The intermediate representation is not just a representation, but a semi formal structure, which is sufficiently constrained to permit automatic transformation of analysis of terminological phrases into GRAIL concepts. This chapter summarizes the workflow of GALEN-In-Use.

2.1 A cooperative methodology to build conceptual models in medicine

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Abstract

We designed a methodology to perform distribute activities on conceptual modelling among cooperating centers. Our methodology assigns responsibilities and tasks and regulates interactions preserving coherence; it passes through the construction of unambiguous paraphrases to make explicit the context within the original sources, and through their compositional representation in an intermediate language.

The process is intrinsically iterative, with continuous feedbacks and refinements, alternating analytic view on details and synthetic view on regularities and structures.

Our methodology is based on requirements and experience made in the first GALEN project, and was applied in the GALEN-IN-USE project to coordinate modelling activities of three teams of surgeons in Rome with activities of other partners, during the production of an extensive model of surgical procedures.

2.1.1 Introduction

Terminological systems used in healthcare include thesauri, nomenclatures, classifications, local controlled vocabularies, formal models [Rossi Mori 1993]. Diffusion of clinical information systems is shifting application of terminological systems to routine management of patient record with multiple re-uses including health care organization, evaluation and planning [Nowlan 1994; Rector 1995; Rossi Mori 1995]. Advanced methods, as *formal models*, are therefore required, providing adequate representation of terminological phrases within computer systems [Rector 1994, Galeazzi 1996].

The stream of UE-funded projects evolving from *GALEN* (1992-1995) to *GALEN-IN-USE* (1996-1998) is creating an environment for the development of methodologies, skills, formalisms, software and awareness about conceptual modelling in healthcare.

Bulding large concept models is an ambitious and expensive task: effort cannot be afforded by a single institution; it requires a large amount of experts in various domains — trained in compositional modelling and in the usage of the GRAIL language, ie. the formalism used in GALEN — both to build the model and to validate it. Decentralization of modelling activities is mandatory, and the issues on coherence, uniformity and integrability of the various contributions are crucial. The cooperative development of a model implies frequent revisions and reconciliations towards a *common modelling style*, with explicit decisions that affect the previous work of each center. The process *must be iterative*, with different layers of agreements, from general to specific; the work on more specific items will refine the working agreements among the centers at the more generic layers. Moreover, it would be hard to integrate cooperative efforts without a *unique conceptual framework, ontologically based*.

Cooperative modelling should be therefore supported by a *methodology* to extract and represent knowledge in an uniform way, based on

- early discovery of potential sources for conflicts among modellers, by focusing on anticipated issues and early reconciliation;
- minimal interaction among cooperating experts (ie. maximal autonomy), preventing incoherence by adequate structured discussions based on precise intermediate documentation and by a consolidated set of rules and guidelines on a common modelling style.

We describe in this paper the methodology we worked out for the GALEN-IN-USE project; it was tested during 1996 in a cooperative effort by 4 "domain centers" in Europe (Italy — with 3 specialist teams —, Nederland, France, Sweden) interacting with a "GRAIL center" in Manchester, on more than 1000 phrases about surgical procedures. The final goal of the project is to demonstrate the feasibility of distributed modelling for a European nomenclature.

2.1.2 Working out a methodology for cooperative modelling

First in §2.1 we identify the kinds of skills of the various people involved in the analysis; then we outline in §2.2 the basic process of modelling an individual concept, from the expression in the original corpus to the canonical form in the GRAIL model. Finally, in §2.3 we describe the kind of activities to be performed in an iterative distributed process.

2.1.2.1 Define roles to assure effectiveness and quality

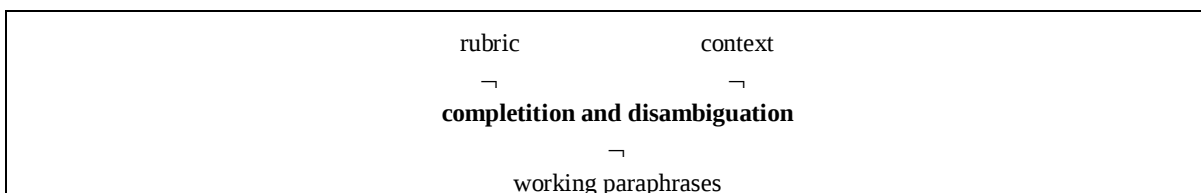
The first step was to identify the roles of the people that should interact; these roles correspond to skills that could be provided by one or more people; a person could have skills to perform different roles. We considered four different roles:

- the *specialists on the domain* that have to interpretate the corpora and gradually produce a structured representation of the rubrics;
- the *experts on terminologies and classifications* that have to organize, revise and homogenize the efforts of the specialists;
- the *GRAIL modellers* that produced or will produce the formal model (e.g. GRAIL model);
- the *coordinator* in each center.

We defined their responsibilities in a set of inter-related activities, and an iterative process of development, with products that they have to produce and gradually refine.

2.1.2.2 The basic process on individual rubrics

The modelling process should bring developers from a set of terminological phrases selected from an existing corpus to a set of representations of the related concepts into the formal model of GALEN, according to the GRAIL formalism used in the project (fig.1).



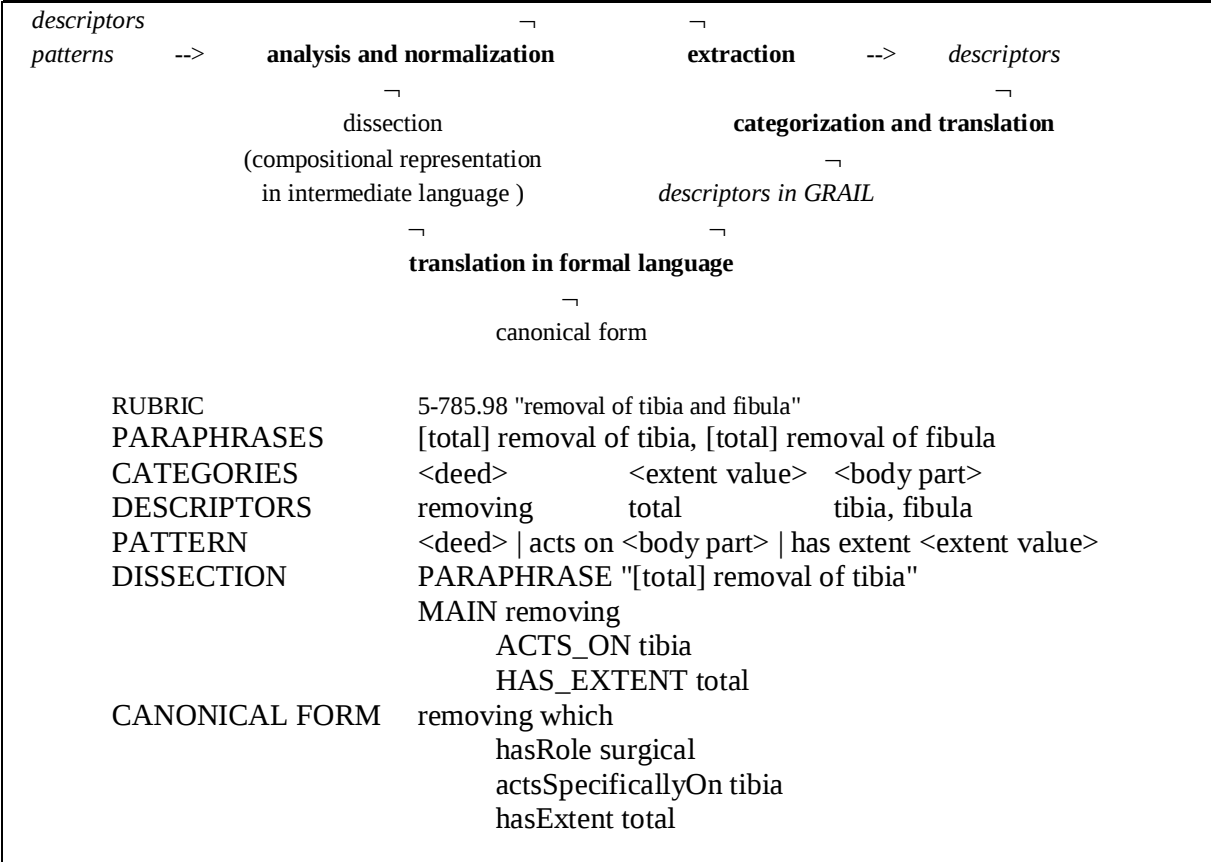


Figure 1. The modelling process and its application to an example (items in italics are re-usable for other corpora)

2.1.2.3 Detailed description of the cooperative process

The basic process regarding an individual entry (Figure 1) implies three major activities :

- construction of unambiguous and explicit paraphrases that grasp hidden meanings and the context of the entry in the original corpus,
- their compositional representation in an intermediate language, and
- a semiautomatic translation into the GRAIL formalism.

In parallel, we extract and translate the atomic concepts needed in the compositional representation, ie. the building blocks (called "descriptors").

A preparatory phase of selection of sources — and of phrases within the sources — is also needed, with mutual awareness of the decisions among the cooperating centers.

In consequence, our methodology distinguishes five kinds of activities embedded in an iterative process; they can be schematized as in table 1.

Table 1. Description of activities in the iterative process of cooperative modelling

Activity 1. Prepare the subset of expressions to be analyzed Each center specifies a corpus (one or more terminological systems) or collects a set of terminological phrases from patient files, textbooks, available paper forms or input layouts [Galeazzi 1994]. The domain specialist and the expert on terminological systems organize the corpus in "waves" (ie. they select a narrow subset of terminological phrases and harmonize them, by adding current phrases or removing too detailed or obsolete phrases). The results should be harmonized across centers.

Activity 2. Prepare working paraphrases

Each original terminological phrases in the wave should be checked for ambiguities, implicit information, errors, contextual information. From a rubric the expert can produce one or more "*paraphrases*", according to

- his/her interpretation of the meaning of the expression,
- the additional knowledge provided by the terminological system on that rubric, and
- the context of the rubric within the terminological system.

Paraphrases serve as reference for further modelling and do not replace rubrics in original sources. Each domain specialist should figure out — with the assistance of the expert — possible criteria to organize paraphrases of the current wave into medically meaningful clusters; each cluster suggests a concept ("*node label*" in the vocabulary of ISO TC46) that should be superordinate to all the elements of the cluster.

Activity 3. Extract candidate descriptors

Descriptors (activity 3) and dissections (activity 4) are strongly related. Within each working paraphrases, the domain specialist should separate the most general superordinate concept from differentiating characteristics that can be systematically expressed. Each superordinate concept is a candidate base concept (in our example, the descriptor "removing"). Each differentiating characteristic produces candidates for semantic links and associated concepts (in the example, the string "of tibia" produces the link "ACTS_ON" and the concept "tibia"). Descriptors belong to "*categories*" (eg. "removing" belongs to the category <deed>, tibia and fibula belong to <body part>). The domain specialist should systematize each descriptor under its own semantic category. The GRAIL expert should translate the set of descriptors using the GRAIL formalism.

Activity 4. Systematic production and harmonization of dissections

Starting from the paraphrase, the domain specialist uses (agreed) patterns and descriptors to dissect each paraphrase and to obtain an intermediate representation. The semi-formal representation in the intermediate language is called "*dissection*". A dissection is a semantic network made of a set of descriptors (eg. removing, tibia, fibula, total) related by means of semantic links (eg. ACTS_ON, HAS_EXTENT). Using the node labels (activity 2) domain specialists should verify that phrases within each cluster have similar dissections and harmonize the dissections in the whole wave. Local criteria for harmonization should be integrated into a common set of criteria across centers.

Activity 5. From dissections to canonical forms

The GRAIL expert translates the patterns into grammar-level statements in GRAIL; then, using the GRAIL descriptors already in the model (activity 3) he/she translates dissections into canonical forms. The feedback from this translation will assist not only in the discovering of errors and inconsistencies, but also in further harmonization among the representations of similar phrases (to increase the uniformity of style and to revise the common guidelines).

2.1.3 Discussion

The 'ideal' methodology should avoid as much re-modelling as possible by a preventive exercise (with timely reconciliations on problems), ie. it should:

- facilitate since the beginning interaction among teams working at different extensions;
- bridge between specialists and modellers.
- foster awareness and coherence in the modelling process.

To facilitate integration, the extensions produced by the individual teams have to use an explicit similar set of rules and the same "style", fully compatible with the ones already embedded in the model and compatible among them. These rules are partially enforced by the supporting software that is being developed by partners of the GALEN-IN-USE project, namely by the University of Nijmegen, the University of Manchester and CNR.

2.1.3.1 Requirements for a cooperative methodology

After our experience of direct GRAIL modelling in the first GALEN Project, it was clear that:

- the modelling effort requires a large amount of resources and different skills; therefore it had to be distributed among an adequate number of domain expert and terminological experts, and adequately coordinated;

- the GRAIL language has peculiar difficulties for "normal" physicians and cannot be used as the current formalism for distribute effort of analysis of expressions; therefore most of the experts should be enabled to focus on the issues of compositional modelling, independently from the additional difficulties of GRAIL modelling;
 - the different subdomains are not homogeneous and the level of details that could be represented about each concept depends too much on the modelling style of the expert; therefore modelling activities in a field should be based on existing systematic corpora (in our case, mainly terminological systems on surgical procedures) and experts should use them to decide how many concepts they have to model, and how many details they have to represent about each concept;
 - even if available corpora are systematic with respect to their needs, conceptual modelling requires a further systematization to obtain a set of phrase with homogeneous number of explicit details;
 - issues and problems raised by the experimental work tend to increase to unmanageable levels, because discussions tend to diverge on too many subtopics, and the amount of resources allocated to discussions must be balanced with the amount of resources to populated the model; therefore interaction among experts should be focussed on really crucial issues, and experts have to be aware of which decisions can be taken locally and which ones are for a common debate and consensus.
- Our methodology was designed in order to provide an answer to these requirements.

2.1.3.2 Separate semantic issues from GALEN-specific implementation

Our methodology is based on the idea of an "intermediate representation" of rubrics of terminological systems by descriptors, initially developed and refined by two of the Authors (EG, ARM) during the first GALEN project. This attitude is intended to:

- involve as much as possible of specialists in the first phases of analysis;
- separate "what has to be there" from "how to express it in GRAIL".

The goal is to separate what is related to *any compositional representation* (eg. according to the CEN approach [Rossi Mori, 1997]) from the peculiarities of the GRAIL formalism.

This attitude is motivated by cultural, organizational and practical reasons:

- decisions are taken in the most appropriate context;
- more domain specialists can be involved, not exposed to GRAIL;
- it allows to exchange experience and data with other "non-GALEN" initiatives;
- it allows to re-translate the intermediate representations according to different releases of the formalism and the model.

The intermediate representation is also more "tolerant" about initial contradictions and irregularities, and can be used in preliminary phases of structuring and refining a raw model.

2.1.4 Conclusions

Advanced terminological systems are urgently needed. Conceptual modelling will be a bottle-neck for the diffusion of clinical information systems in healthcare.

A methodology to assign responsibilities and tasks and to regulate interactions preserving coherence is a prerequisite to distribute modelling activities among cooperating centers.

Our methodology exploits 5 different constructs:

1. paraphrases to decouple terminological systems with their context from the subsequent work on modelling;
2. descriptors to detect issues of potential conflicts among centers;
 to prepare the translation into the formal model and to provide an early feedback to experts and domain specialists;

3. patterns to facilitate uniformity of style among centers and to prepare the grammar-level statements in the formal model;
4. dissections to manage a semi-formal intermediate representation, as a bridge between specialists and GRAIL modellers;
5. node labels to refine the previous analytical work by comparative views, thus facilitating comparison of potentially similar dissections and the extraction of patterns.

Our methodology was applied successfully to coordinate the modelling activities of three teams of surgeons in Rome with activities of other partners in the GALEN-IN-USE project.

Acknowledgements.

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2.2 Rubrics to Dissections to GRAIL to Classifications; The formalism

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Abstract. This paper summarises the process in the GALEN-IN-USE project by which rubrics from traditional medical coding schemes are analysed into an intermediate, relatively informal conceptual representation which is then automatically translated into the GRAIL formalism and its Common Reference Model.

2.2.1 Introduction

GALEN-IN-USE is an EU funded project, a major goal of which is the development of tools and methods to assist in the collaborative construction and maintenance of surgical procedure classifications. Techniques and tools developed in the previous GALEN project [1,2,3,4,5,6] will support this task. Taking part in the initial phase are four national coding and classification centres: WCC (Netherlands), SPRI (Sweden), CNR (Italy) and University of Ste. Etienne (France). The goal is to author, using the GRAIL formalism [6], conceptual representations of individual surgical procedures, with each centre covering roughly one quarter of the total surgical domain. A combined total of 15-20,000 individual representations will be authored by the end of the project. The resulting GRAIL representations will be integrated into the existing GALEN Common Reference Model (CRM) [1,3,4,5]. This will allow:

- an initial classification of the represented procedures to be automatically derived, based on the knowledge explicitly authored in the analyses and the knowledge already in the reference model;
- machine generation of natural language expressions for all representations, in five European languages;
- refinement, extension and reorganisation of the classification using new classification management tools.

More than 20 individual clinicians have been recruited to analyse original code rubrics into conceptual representations, but most have little or no prior experience of the GRAIL formalism or of the particular ontology and modelling style of the Common Reference Model (CRM). This presented a significant challenge to the project: how to reduce the need for training to occur in the complexities of GRAIL and the CRM before any work could begin.

2.2.2 An Intermediate Representation

The solution proposed to the training problem was to begin work using a simpler, intermediate conceptual representation [7]. This was originally conceived as a migration step towards eventually authoring directly in GRAIL. The representation was designed in such a way that conceptual representations authored using it might then be automatically, or semi-automatically, expanded into GRAIL. The representation also allows the authors to capture some concepts which the GRAIL formalism in its present form is unable to handle. Finally, the representation serves as the preferred format in which the centres examine and validate their own, and each other's work. The intermediate representation is broadly similar to those used by the CANON group or MEDS [8,9,10,11]. It is characterised by:

- a relatively small set of semantic links (ACTS_ON, IS_PART_OF), compared to the CRM;
- a two-tier domain ontology (known as the 'descriptor list') specific to the surgical domain. Descriptors (leg, excising, tumour) are explicitly typed by one of a small number of classes (e.g. anatomy, deed, lesion);
- a set of constraints, declaring which links may be used with which descriptor classes;
- a grammar defining a layout, or 'template', for well-formed representations.

Domain experts in the centres work using existing local coding schemes (WCC, NCSP etc.) to scope their task. The rubrics (text) and associated codes, but not the original hierarchy, are extracted from the scheme. Working on sections of a few hundred related rubrics at one time, each rubric is manually analysed to author a conceptual representation of its meaning, using the intermediate representation. The immediate result of this analysis and authoring is called a 'dissection' of the rubric.

The four centres produced more than 1200 'dissections' in the first four months. Figure 1 shows four completed dissections. Each has a header section, containing information about the original rubric and coding scheme, followed by the conceptual representation itself, introduced by the MAIN keyword. The semantic links are capitalised. Descriptors appear in lower case, preceded by their descriptor class. Initially, authoring involved directly editing an ASCII text file. Any convenience and familiarity which this afforded to the authors was, however, outweighed by the numerous spelling and formatting errors which resulted, preventing satisfactory parsing of the interchange file into the GRAIL expansion environment. Subsequent analyses will be authored using a purpose-built tool, the Surgical Procedure Editing Tool (SPET).

Figure 1.

RUBRIC "operations on papillary muscle"	RUBRIC "reattachment of papillary muscle"
CODE "35.31"	CODE "35.31.i2"
MAIN deed:surgical deed	MAIN deed:repairing
ACTS_ON anatomy:papillary muscle	ACTS_ON anatomy:papillary muscle

HAS_OTHER_FEATURE method VALUE induced arrest of heart	BY_TECHNIQUE deed:reattaching ACTS_ON anatomy:papillary muscle HAS_OTHER_FEATURE method VALUE induced arrest of heart
RUBRIC "dividing of papillary muscle" CODE "35.31.i1" MAIN deed:dividing ACTS_ON anatomy:papillary muscle HAS_OTHER_FEATURE method VALUE induced arrest of heart	RUBRIC "repair of papillary muscle" CODE "35.31.i3" MAIN deed:repairing ACTS_ON anatomy:papillary muscle HAS_OTHER_FEATURE method VALUE induced arrest of heart

2.2.3 Expanding dissections into GRAIL

Dissections authored in the intermediate representation are subsequently imported into an environment (TIGGER) built to manage the process of converting them into GRAIL, simultaneously translating them into both the ontology and the style of the CRM. Imported dissections are first parsed for syntax and for whether they comply with certain agreed modelling conventions (such as that all deeds must ACTS_ON something, a convention taken from CEN [12]). The final GRAIL produced is generally more complex than the dissection from which it comes - sometimes very much more so. The translation process is known as 'expanding' and the GRAIL produced from a single dissection as its GRAIL 'expansion'.

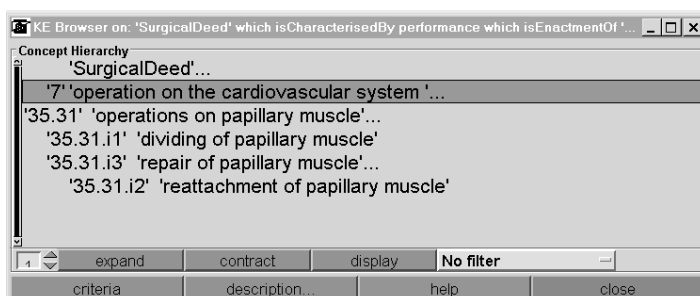
Figure 2 shows a dissection (left) and an automatically generated expansion (right). An expansion comprises a GRAIL representation of the concept at hand, and a series of statements attaching incidental, non-classificatory information to that GRAIL concept, such as the text of the original rubric or the name of the original source file. TIGGER automatically generates, in batches or individually, a GRAIL expansion for each original dissection. However, automatic expansions can only be considered candidate GRAIL conceptual representations of the original rubrics: some may be rejected as invalid when presented to a terminology server. This may occur, for example, if there is a cardinality conflict between CRM semantic links used in the expansion. Rejection may indicate a problem which requires alterations to the original dissection, or to the CRM. A few dissections whose expansions are rejected may require their GRAIL representation to be done manually, bypassing the intermediate representation completely.

Figure 2

Original Dissection	Generated GRAIL expansion
RUBRIC "dividing of papillary muscle" CODE "35.31.i1" MAIN deed:dividing ACTS_ON anatomy:papillary muscle HAS_OTHER_FEATURE method VALUE induced arrest of heart	(SurgicalDeed which isCharacterisedBy (performance whichG isEnactmentOf (Dividing whichG < playsClinicalRole SurgicalRole actsSpecificallyOn PapillaryMuscle hasSubprocess InducedCardiacArrest>))) extrinsically hasRubric 'dividing of papillary muscle'; extrinsically hasCode '35.31.i1'; extrinsically hasPhysicalSource 'cnr.txt'.

Sets of automatic expansions produced in this way are presented to the terminology server for classification. The resulting hierarchy of valid expansions may be browsed in a number of ways. The screenshot (figure 3) shows the automatic classification which is derived for the four dissections given in figure 1. The classification of 'operations on the papillary muscle' as a kind of 'operation on the cardiovascular system' occurs because the CRM 'knows' that the papillary muscle is part of the heart which is, in turn, a component of the cardiovascular system. The GRAIL refinement operation [4] is used to declare that actions on part of something are subsumed by actions on the whole. By contrast, the classification of 'reattachment of papillary muscle' as a child of 'repair of papillary muscle' instead of a sibling (as in the original coding scheme) comes from the knowledge explicitly authored in the

Figure 3.



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intermediate representation.

To do the automatic expansion of dissections, however, the TIGGER first requires explicit CRM mappings to be declared for both the descriptors and the links used in a given dissection.

2.2.3.1 Mapping the descriptors

This task of declaring mappings for descriptors is performed by modellers already familiar with the GRAIL formalism and the CRM ontology and style. Once declared, a mapping is presumed valid for all subsequent occurrences of the descriptor in any batch of dissections. As more dissections are processed, the list of already mapped descriptors grows. The accumulated, mapped descriptor list is made available via the SPET to all collaborating authors as a suggested core ontology for use in the next round of authoring dissections.

This approach has the advantage that the ontology with which the dissection authors must become familiar is initially quite small. Further, its growth is owned by the authors themselves but can be guided by those familiar with the GALEN ontology. This contrasts with the already large and complex ontology in the CRM, with which the authors would need to be familiar to author directly in GRAIL. Because the process of getting from dissections to GRAIL is planned to be unidirectional, this methodology also permits some redundancy or duplication of descriptors, as many descriptors can be mapped to the same CRM concept.

Mapping a given descriptor to the CRM is informed by inspection, using TIGGER, of all the dissections which employ it - either in the current batch or in all batches processed so far. Such inspection may provide clarification of what is meant by a descriptor, but may also reveal that one descriptor has been used with very different intentions by different authors. A mechanism exists for rejecting such ambiguous descriptors and their associated dissections at this stage, to invite re-authoring.

2.2.3.2 Mapping the Links

The links available to dissection authors were chosen such that each is equivalent in intention to the common parent of a range of more expressive links already present in the CRM. Figure 4, for example, shows the CRM links which are to be considered by TIGGER as possible default mappings for the dissection link IS_PART_OF. The mappings from dissection links to the CRM are, therefore, necessarily one-to-many and are declared by the same team of modellers undertaking the descriptor mapping.

To expand a dissection link, TIGGER must determine which, if any, of its candidate CRM link mappings is most appropriate. To achieve this, TIGGER 'translates' the descriptors either side of a dissection link into their declared CRM entity mappings. The candidate CRM link mappings are then tested in list order: the first one permitted to be used in the CRM between the two entities is chosen. Thus, the dissection fragment:

Figure 4.

Dissection Link	Default possible CRM mappings
IS_PART_OF	isSolidRegionOf
	isSpecificStructuralComponentOf
	isStructuralComponentOf
	isSpecificSolidDivisionOf
	isSolidDivisionOf
	isSpecificLinearDivisionOf
	isLinearDivisionOf
	isSpecificSurfaceDivisionOf
	isSurfaceDivisionOf
	isSpecificLayerOf
	isLayerOf

segment IS_PART_OF intestine

is expanded into the GRAIL:

Segment which isSpecificLinearDivisionOf Intestine.

because the CRM includes the constraint:

Segment sensibly isSpecificLinearDivisionOf TubularBodyStructure.

This mechanism can also be used to detect dissections which, whilst considered 'well formed' within the limited dissection grammar, are still semantically incorrect. For example:

MAIN excising

ACTS_ON tumour

IS_PART_OF liver

...can not be expanded: none of the candidate mappings of IS_PART_OF is permitted to be used in the CRM between

[Excising], a process, and [Liver], a structure. In future, some semantically incorrect dissections may be rejected at the authoring stage - the SPET will use both the dissection grammar and a limited constraint mechanism to prevent certain link-descriptor pairings being entered at all.

2.2.4 Limitations and Future extensions

Coding scheme rubrics frequently contain disjunctions (Excision of tumour or cyst) or conjunctions (Drainage and marsupialisation of cyst). To make the intermediate representation simple, bracketing was omitted from its syntax. As a result, it can only support relatively simple conjunctions or disjunctions. Rubrics with more complex relationships (e.g. partial or complete excision of tibia and fibula, with prosthesis) must be manually enumerated in all their logically and semantically correct conceptual forms. True negation also remains unsupported at present by the GRAIL formalism. However, most of the rubrics which might at first appear to require negation are exclusion or exception criteria. The intermediate representation includes mechanisms for identifying such criteria, which may then be handled within GRAIL by various modelling workarounds or future extensions to the formalism itself.

The relatively relaxed approach to building the descriptor list, with its rudimentary and ad hoc class hierarchy, risks it growing to unmanageable and un-navigable proportions. Imposing a more formal organisation would be to some extent to re-invent GRAIL. This may be obviated by offering navigation of the set of mapped descriptors via the hierarchy of their corresponding CRM conceptual mappings.

Both the descriptor list, and the CRM itself, are presently authored in English. This is not the first language of many dissection authors. The generation of natural language expressions for the final GRAIL concepts requires annotations in the destination languages for each CRM primitive. A mechanism to address both of these problems is being studied: dissections will be authored in the local languages, using a local language descriptor list. Each authoring centre will separately maintain a many-to-one translation table from the local terms to a common, English descriptor list shared between all centres. The various translation tables, and the explicit English descriptor to CRM mappings, may be read backwards to derive a list of possible linguistic annotations.

2.2.5 Discussion and Conclusion

Although originally conceived as a migration step towards full GRAIL authoring, the intermediate representation and automated expansion process have proved effective in their own right. A high proportion of rubrics can be represented and reliably expanded automatically, and it may be more efficient to author the small remainder directly in GRAIL than to make further enhancements. The success of the intermediate representation is such that, whilst it remains the intention of the project to export CRM modelling expertise from its current localised base, this is no longer on the critical path for the immediate task of building a surgical procedure classification. Further, adding an intermediate layer between knowledge authors and the final representation serves to insulate them from changes in the CRM, and allows those changes to take place more easily and with less disruption.

We are confident that much of the surgical procedure domain can continue to be captured using the intermediate representation, facilitating the involvement of many domain experts by deferring indefinitely any need for them to become familiar with GRAIL or the CRM. A useful by-product of the process is that the act of declaring link and descriptor mappings is building a partial meta-model description of the CRM ontology and style. This will form an important resource for the exporting of CORE modelling expertise, when that occurs.

*With thanks to the centres involved in dissection authoring, and others in the GALEN-IN-USE consortium
GALEN-IN-USE is funded as part Framework IV of the EC Healthcare Telematics research program.*

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2.3 Workprocess in detail

2.3.1 Collaborative Methodology & Workplan

2.3.1.1 Purpose of Document

This document proposes mechanisms and milestones for exchanging information for co-operative modelling between now and August 1996 for the first experiments.

2.3.1.2 Scope of Document

This document covers only the collaboration between the four participating centres, EFCC, and Manchester. It does not include the extra complexities of the natural language work in either Brussels or Geneva.

2.3.2 Workplan for collaboration

2.3.2.1 Objectives

Between now and August there is time only for one iteration of the co-operative loop — Plan-Implement-Review-Plan. Our goal is to drive the entire process through one revolution, even though parts will not be perfect or complete. What we need is a proof of concept on a significant number of procedure terms.

The immediate objective is to build and maintain four separate resources:

the list of Descriptors,

the list of templates

the set of completed procedure mapping representations,

the GRAIL model.

In the short term, some of the work will have to be done manually while the final tools are refined. In the longer term there will be more specialised tools.

2.3.2.2 Description of the work plan

The basic plan refers only to the public work shared between centres. We want to encourage as much sharing as possible, but we must also recognise practical realities. It sets out a simplified procedure in three stages:

Creation of initial drafts of analysed rubrics for public discussion and quality assurance, wherever possible in the agreed templates and descriptors.

Creation of a first version of analysed rubrics in the agreed templates using the agreed templates and descriptors.

Transformation of the first version into a GRAIL model and generation of validation and quality assurance documents for return to the originating centres.

(There may, of course, be brief iterations within each stage during the discussion.)

Each stage will be open for discussion and comments from all participants:

- a) On WIBIS (plus longer position or discussion papers made available elsewhere)
- b) By a quality assurance document for each centre's contribution. Each centre will perform quality assurance for the work of one other centre, and will be responsible for providing detailed comments on the content at each stage.

The procedure above will also produce additions and amendments to the descriptor list and templates list. After appropriate discussion, these will eventually feed back into the next cycles.

The process will be under the overall supervision of the EFCC. It will entail discussion managed by the WIBIS web server supplemented by an ftp repository for any longer discussion documents.

Figure 1 summarises the main 'milestones' and transfers of work which should take place between the participants before September. Each box represents an action, in which one participant sends the results of their work to another. The arrowed lines show who the work goes to. The letters A to K refer to the subsequent pages of this document which give detailed descriptions of the mechanics of each transfer— formats, ftp or web destinations, etc.

This is a deliberate simplification. Short iterations during discussion are omitted. The design and development of software tools (an important fourth resource) and updating of the templates are also omitted.

Further details are given in the sheets representing the individual letter actions.

what tools are required or available to allow a participant to get to a position where they are able to execute a particular action ?

who is ultimately responsible for executing each action ?

what is the agreed exchange format in each case ?

what is the precise mechanism of transfer ?

when should the transfer take place by ?

2.3.2.3 Repositories to be created

The detail of the structure of the repositories is contained in a separate document along with instructions for accessing and depositing information in them. Once the process is up and running, each resource will have available four versions or sets of contributions:

Current released integrated set

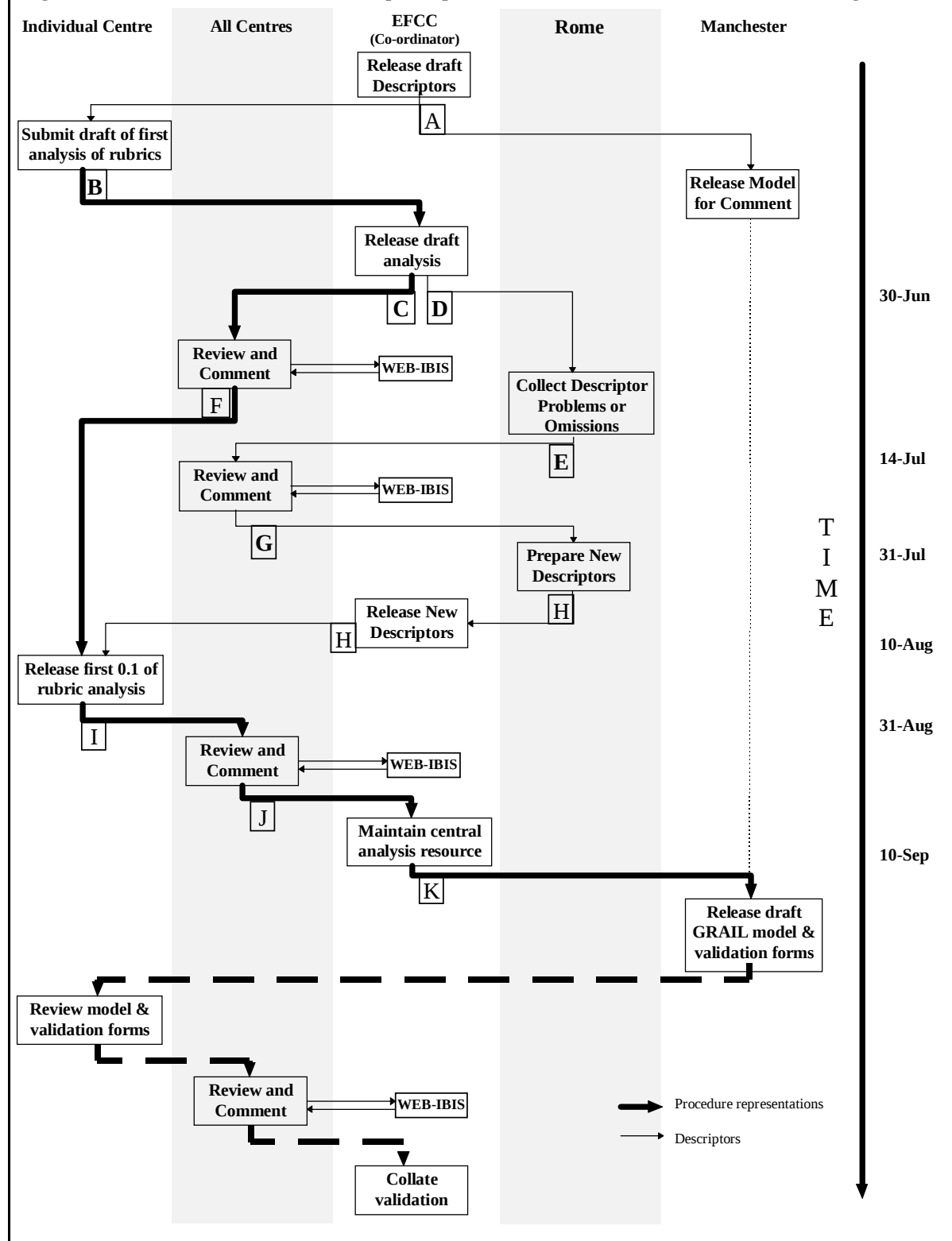
Previous

Under discussion

Accepted but not yet integrated

In addition, there will be at all times both the WIBIS set of multi-threaded discussions and a repository for longer position papers linked to issues discussed on WIBIS but too long to fit within that framework.

Figure 1: Lines of communication between participants in GALEN-IN-USE collaborative modelling



2.3.3 A: Initial Descriptor List

2.3.3.1 Event:

Data files constituting the initial common Descriptor list released from Rome to Classification Centres and to VUM.

2.3.3.2 Responsible Participant:

Rome

2.3.3.3 Enabling Tools:

Nil additional needed.

2.3.3.4 Agreed exchange format:

A delimited (comma or tab) ASCII text file, comprising six fields:

Unique identifier

Unique Descriptor Name

Original Language Name

Descriptor hierarchy position

Descriptor Interpretation

Comments

2.3.3.5 Mechanism of transfer:

File placed by Rome onto GIU FTP site (see appendix).

E-mail to GIU World Wide Web administrator site that list is released, and giving location of file.

WWW administrator makes file available via WWW and FTP, and sends e-mail notification to galen-modelling@cs.man.ac.uk

Participating sites individually collect copy of file either by direct FTP to GIU FTP site, or via the private GIU WWW pages.

2.3.4 B: Submission of Draft Analysis of Surgical Procedures

2.3.4.1 Event:

First version of an analysis of a section of surgical procedures is sent from individual centres to the EFCC for initial distribution. Will include some representations, identified as a separate group, which have been done with currently undefined, or not yet agreed, descriptors.

2.3.4.2 Responsible Participant:

Rome, WCC, Linkhoping, USE

2.3.4.3 Enabling Tools:

2.3.4.3.1 Requirement:

Tool or tools to allow electronic capture of representations. May include ability to spell-check or otherwise make the agreed descriptor list available to the user. Should include:

ability to keep track of to what degree individual rubrics from a source corpus have been successfully represented in the chosen entry form/template.

ability to distinguish analytic from empirical knowledge (c.f. Frank Flier)

space for comments

2.3.4.3.2 *Available Now:*

DEFINER, Word For Windows Template

2.3.4.3.3 *To be built:*

Data entry tool (Nijmegen)

2.3.4.4 Agreed exchange format(s):

to be specified, but must include a separate list of new descriptors required.

2.3.4.5 Mechanism of transfer:

Data file is placed on the GIU FTP site by individual collaborating site. (see appendix)

E-mail to GIU FTP administrator site that analysis is released, and giving location of file.

WWW administrator makes file available via FTP, and sends e-mail notification to the EFCC

EFCC collect file from the FTP site.

2.3.5 C: Release of Draft Analysis for Comment

2.3.5.1 Event:

Submitted drafts of analysis and representations of procedures are checked by EFCC to ensure they meet basic requirements, and are then passed out to all centres for quality assurance, review and comment.

2.3.5.2 Responsible Participant:

EFCC

2.3.5.3 Enabling Tools:

2.3.5.3.1 *Requirement:*

2.3.5.3.2 *Available Now:*

2.3.5.3.3 *To be built:*

2.3.5.4 Agreed exchange format(s):

2.3.5.5B: Submission of Draft Analysis of Surgical Procedures

2.3.5.6 Mechanism of transfer:

EFCC send e-mail to WWW administrator, requesting release of files (which are already on the FTP server) following (B).

WWW administrator makes file available via WWW and FTP, and sends e-mail notification to galen-modelling@cs.man.ac.uk

Participating sites individually collect copy of file either by direct FTP to GIU FTP site, or via the private GIU WWW pages.

2.3.6 D: Diversion of Representations with New Descriptors to Rome

2.3.6.1 Event:

EFCC sends to Rome:

Representations in first versions of procedure analysis which require new descriptors
lists of new descriptors

2.3.6.2 Responsible Participant:

EFCC

2.3.6.3 Enabling Tools:

2.3.6.3.1 Requirement:

A tool for comparing the descriptors used in submitted procedure representations with the agreed descriptor list distributed in (A). Representations which contain unknown descriptors, and also those otherwise flagged, are separated out for sending on to Rome.

2.3.6.3.2 Available Now:

2.3.6.3.3 To be built:

2.3.6.4 Agreed exchange format:

to be specified by Rome. List of new descriptors should include, for each new descriptor proposed, a corresponding SNOMED code and an equivalent word in the originators natural language.

2.3.6.5 Mechanism of transfer:

File placed by EFCC onto GIU FTP site (see appendix).

E-mail notification to Rome that file is available, and giving location.

Rome collects copy of file by direct FTP to GIU FTP site.

2.3.7 E: Proposals for New Descriptors

2.3.7.1 Event:

Proposals for new descriptors, or changes to existing descriptors, are sent from Rome to all centres (including VUM) for comment.

2.3.7.2 Responsible Participant:

Rome

2.3.7.3 Enabling Tools:

Tool to manage the descriptors as a resource, linking descriptor names to their interpretation, possibly also to information about current real usage. NB overlap with Linguistic Annotation work and requirement to have new descriptors annotated in all languages.

2.3.7.3.1 *Available Now:*

2.3.7.3.2 *To be built:*

2.3.7.4 Agreed exchange format:

to be specified by Collaborating Centres

2.3.7.5 Mechanism of transfer:

File placed by Rome onto GIU FTP site (see appendix).

E-mail to GIU World Wide Web administrator site that list is released, and giving location of file.

WWW administrator makes file available via WWW and FTP, and sends e-mail notification to galen-modelling@cs.man.ac.uk

Participating sites individually collect copy of file either by direct FTP to GIU FTP site, or via the private GIU WWW pages.

2.3.8 F: Comments on Draft Procedure Analysis

2.3.8.1 Event:

Classification centres send Quality Assurance comments on draft analyses directly to the authors at individual centres. Subsequent discussion of significant issues is via the WEB-IBIS tool.

2.3.8.2 Responsible Participant:

All centres may comment on contributions from all other centres, but each Classification Centre will have special responsibility to provide a detailed quality assurance commentary on the draft from one other centre. Pairings to be decided in Madrid.

2.3.8.3 Enabling Tools:

Interchange formats and viewing tools.

2.3.8.3.1 *Available Now:*

Wordprocessor

2.3.8.3.2 *To be built:*

2.3.8.4 Agreed exchange format:

(Quality Assurance) Free text documents, in English, in Rich Text File Format. These documents may be required to form part of a submission to the Technical Audit or other deliverables. A document template will be supplied.

Discussions will be hosted by WEB-IBIS.

2.3.8.5 Mechanism of transfer:

Quality Assurance document placed by commenting centres onto GIU FTP site (see appendix).

E-mail notification to centre from which draft originated giving location of comment file.

E-mail notification by site with special responsibility to EFCC.

Originating sites individually collect copy of file by direct FTP to GIU FTP site.

Discussions conducted via the WEB-IBIS server (see appendix)

2.3.9 G: Comments on Descriptor Proposals

2.3.9.1 Event:

Classification centres and VUM send comments on proposed alterations to the descriptor list to Rome, and conduct any significant discussion arising using the WEB-IBIS tool.

2.3.9.2 Responsible Participant:

All centres.

2.3.9.3 Enabling Tools:

2.3.9.3.1 *Available Now:*

Wordprocessor

2.3.9.3.2 *To be built:*

2.3.9.4 Agreed exchange format:

(Quality Assurance) Free text documents, in English, in Rich Text File Format. These documents may be required to form part of a submission to the Technical Audit or other deliverables. A document template will be supplied.

Discussions will be hosted by WEB-IBIS.

2.3.9.5 Mechanism of transfer:

Comment file placed by commenting centres onto GIU FTP site (see appendix).

E-mail notification to Rome giving location of comment file.

Rome collects copy of file by direct FTP to GIU FTP site.

2.3.10 H: Release of Revised Descriptor List

2.3.10.1 Event:

A revised descriptor list, together with information on problems still outstanding, is prepared by Rome and then forwarded to the EFCC. The EFCC releases this list to the Classification Centres for inclusion in final representations, and to VUM for modelling in GRAIL.

2.3.10.2 Responsible Participant:

Rome, EFCC

2.3.10.3 Enabling Tools:

2.3.10.3.1 *Available Now:*

2.3.10.3.2 *To be built:*

2.3.10.4 Agreed exchange format:

A delimited (comma or tab) ASCII text file, comprising at least eight fields:

Unique identifier

Unique Descriptor Name

Originating Language String

SNOMED Code

Pointer to relevant descriptor, or descriptors in previous versions of the list (to help automatic conversion)

Descriptor hierarchy position

Descriptor Interpretation

Comments

2.3.10.5 Mechanism of transfer:

File placed by Rome onto GIU FTP site (see appendix).

E-mail to GIU FTP administrator that list is released, and giving location of file.

FTP administrator makes file available via FTP, and sends e-mail notification to EFCC.

EFCC collects copy of file by direct FTP to GIU FTP site.

2.3.11 I: Submission of Version 0.1 of Individual Procedure Analysis

2.3.11.1 Event:

Release version of individual procedure representations sent from individual classification centres to all collaborating centres for final review and comment.

2.3.11.2 Responsible Participant:

Rome, WCC, Linkhoping, USE

2.3.11.3 Enabling Tools:

2.3.11.3.1 *Available Now:*

2.3.11.3.2 *To be built:*

2.3.11.4 Agreed exchange format:

as for B: Draft analysis of surgical Procedures

2.3.11.5 Mechanism of transfer:

File placed by centre onto GIU FTP site (see appendix).

E-mail to GIU World Wide Web administrator site that list is released, and giving location of file.

WWW administrator makes file available via WWW and FTP, and sends e-mail notification to galen-modelling@cs.man.ac.uk

Participating sites individually collect copy of file either by direct FTP to GIU FTP site, or via the private GIU WWW pages.

2.3.12 J: Review of version 0.1 of individual procedure analysis

2.3.12.1 Event:

Discussion arising from study of revised procedure analysis is conducted via WEB-IBIS. Commented version of procedure analysis and representations sent from individual classification centres to EFCC.

2.3.12.2 Responsible Participant:

Rome, WCC, Linkhoping, USE

2.3.12.3 Enabling Tools:

2.3.12.3.1 *Available Now:*

2.3.12.3.2 *To be built:*

2.3.12.4 Agreed exchange format:

(Quality Assurance) Free text documents, in English, in Rich Text File Format. These documents may be required to form part of a submission to the Technical Audit or other deliverables. A document template will be supplied.

Discussions will be hosted by WEB-IBIS.

2.3.12.5 Mechanism of transfer:

Discussion of points arising via WEB-IBIS

File placed by centre onto GIU FTP site (see appendix).

E-mail notification to EFCC that file is available, and giving location.

EFCC collects copy of file by direct FTP to GIU FTP site.

2.3.13 K: Central Release of Combined Procedure Analysis

2.3.13.1 Event:

Collected procedure representations sent in single format from EFCC to VUM for final representation in GRAIL model.

2.3.13.2 Responsible Participant:

EFCC with individual authoring centres

2.3.13.3 Enabling Tools:

A tool to transform the representation (or representations) provided by the centres into a single intermediate representation, which is suitable for automatic analysis at VUM.

2.3.13.3.1 *Available Now:*

2.3.13.3.2 *To be built:*

2.3.13.4 Agreed exchange format:

to be specified by VUM, but will be a single agreed analysis format using the revised, agreed descriptors only.

2.3.13.5 Mechanism of transfer:

File placed by centre onto GIU FTP site (see appendix).

E-mail notification by EFCC to VUM that file is available, and giving location.

VUM collects copy of file by direct FTP to GIU FTP site.

3 EFCC Representation Standard for Surgical Procedures

Towards the end of the project in December 1998, the European Federation of Classification Centres has adopted the GALEN Categorial Structure for Surgical procedures as a standard. EFCC will be responsible for future maintenance and development of this standard. This is in accordance with the views of Working Group 2 of CEN TC251.

Kermanog BV is presently working on an industrial strength version of the GALEN Classification Management Workbench tool. The SPET part of this toolset implements the categorial structure.

3.1 System of links and a categorial structure tested in manual dissections of 12,434 surgical procedure rubrics

3.2 Purpose of Document

The standard GALEN dissection of a surgical procedure rubric used by participating centres captures individual procedure dissections using a number of descriptors (arm, leg, inserting, suture) from a controlled, common descriptor list, combined by links from an agreed list of links.

This document presents a detailed account of the basic links actually used to manually author a total of 12,434 dissections during the lifetime of the GALEN-IN-USE project. It is intended as a reference document for experienced modellers and implementers and as a basis for extending and adapting the Guidelines and Recipes document (VUM02/96)

This document does not provide a full formal description of the dissection syntax or grammar - for formal description see Formal Template Grammar (<http://mighp0.cs.man.ac.uk:8008/launch/GALENTemplateInterface>). Nor are detailed recipes for individual cases presented here.

It has been agreed that all analyses for public discussion and integration into the Common Reference Model in GRAIL will be delivered using only those links given here. Proposals to add new links to the list will be handled in a similar way to proposals for new descriptors.

3.2.1 Related Documents and papers

'Levels of interpretation within surgical procedures' by Angelo Rossi Mori et al.

CEN ENV 12264:1995. Medical Informatics - Categorial structure of systems of concepts - Model for representation of semantics. Brussels: CEN, 1995

CEN ENV 1828:1995 Health care informatics - Structure for classification and coding of surgical procedures. Brussels: CEN, 1995

Rogers JE, Solomon WD et al. (1997) Rubrics to Dissections to GRAIL to Classifications. Fifteenth International Congress of the European Federation for Medical Informatics, MIE-97 Thessaloniki, Greece

3.2.2 Related Materials available on request from The GALEN Organisation

Formal Template Grammar and Template Exchange Format specification

Guidelines and Recipes for Completing Templates (VUM02/96),

Replacing the WITHOUT Link (VUM11/98)

Intermediate Representation Configuration File for Surgery - an interchange file which configures a software tool so that it captures dissections which comply with this document.

Corpus of >12000 dissections authored manually during GALEN-IN-USE project and which comply with this document

3.2.3 Conventions used in this document

Patterns for embedding of subprocedures and anatomical structures are recursive.

"..." indicates example list. See descriptor list for full indication of available values.

Where appropriate, underlining has been used to indicate items which are 'highly recommended'.

All embedding is indicated by tabs, as shown explicitly in appendix.

Whilst this document seeks to enumerate all the valid **links**, it does not necessarily use the agreed **descriptors**.

3.3 Introduction to dissections

3.3.1 Basic Dissection

The beginning of a dissection is indicated by the keyword “MAIN” and a Deed descriptor, on the same line. This is then followed by a set of linked procedures. Four broad categories, or levels, of procedures have been identified as occurring in typical descriptions of surgical procedures. These are identified as L1, L2, L3 and L4 below. Within a dissection, typically L2 or L1 procedures are the ‘main’ or head of the whole description, while other kinds of procedures might be linked to the dissection via BY_TECHNIQUE, TO_ACHIEVE_OVERALL and MOTIVATED_OVERALL_BY links:

See ‘*Levels of interpretation within surgical procedures*’ by ARM for further details. An adaptation of this original document is included in this document as section 10.

DISSECTION

MAIN L2 or L1 procedure
BY_TECHNIQUE L1 procedure
TO_ACHIEVE L3 process
MOTIVATED_OVERALL_BY L4 health care act

EXAMPLE

MAIN eliminating
BY_TECHNIQUE fragmenting
TO_ACHIEVE flow_of_bile
MOTIVATED_OVERALL_BY cure of cholelithiasis

3.3.2 Extended Dissection

In addition to the above scheme, other information about the main deed such as a Direct and/or Indirect Object may be linked to it. Below is a non-inclusive example of such an extended Dissection:

DISSECTION

MAIN L2_deed
ACTS_ON lesion / device
HAS_LOCATION anatomy
HAS_LATERALITY side
HAS_APPROACH approach_value
HAS_EXTENT extent_value
BY_TECHNIQUE L1_procedure
TO_ACHIEVE L3_physiologic_process
MOTIVATED_OVERALL_BY L4_care_act

EXAMPLE

MAIN Removing
ACTS_ON Stone
HAS_LOCATION Ureter
HAS_LATERALITY left
HAS_APPROACH abdominal
HAS_EXTENT total
TO_ACHIEVE Obstruction_Relieving
MOTIVATED_OVERALL_BY Curing

3.4 Dissection Descriptors and Descriptor Categories

Dissections are authored using a combination of **descriptors** and **links** between descriptors, plus a set of special **keywords**. The links are described in section 5, and the keywords in section 6.

Descriptors are text strings in lowercase. Examples of descriptors in the correct format are:

leg
ureter
excising
abscess
infection
lumbosacral spine
nissen rosetti method

All descriptors are, in addition, assigned a category taken from an ‘approved’ list of categories. Each descriptor may be a member of only one category. Categories are named with strings composed from alphanumeric characters. Spaces and underscores in category names are not permitted. A set of ‘approved’ categories, organised into a simple hierarchy, is maintained centrally. The purpose of the categorisation is to allow the link sanctions (described in section 5.5) to operate. The present recognised categories are:

Things

- Pathology
 - Lesion
- Approach
- Characteristic
 - Age
 - Feature
 - Extent
 - Method
 - Laterality
 - Position
 - Sex
 - TemporalMarker
- Process
 - BodyProcess
 - Deed
 - HealthCareAct
- Quantity
 - Number
 - OrdinalPosition
 - Range
- Substance
 - BodySubstance
 - Chemical

{Things}

- Structure
 - AbstractStructure
- Anatomy
 - AnatomicalConnection
 - AnatomicalPart
 - BodySpace
 - BodySystemAnatomy
 - CardiovascularSystemAnatomy
 - BloodVessel
 - PartOfHeart
 - DigestiveSystemAnatomy
 - EndocrineSystemAnatomy
 - Gland
 - GenitoUrinarySystemAnatomy
 - LymphoreticularSystemAnatomy
 - LymphNode
 - MusculoSkeletalSystemAnatomy
 - Bone
 - Joint
 - NervousSystemAnatomy

Nerve
 Oro dentalSystemAnatomy
 RespiratorySystemAnatomy
 SensorySystemAnatomy
 Graft
 Device
 Material
 Prosthesis
 Organism
 Person

Some examples of the kinds of descriptors found in each category follow:

SPET Category	Examples of descriptors
Things	multiple
Pathology	embolism, hypertension, priapism, myocarditis
Lesion	cyst, foreign body, exostosis,
Approach	trans-oral, open, closed, retrograde
Characteristic	
Age	
Feature	benign, big, congenital, j-shape, palpable, rigid
Extent	local, partial, hemi, radical, total, subtotal
Method	hampton method, nissen method, beating heart
Laterality	left, right, bilateral, ipsilateral, contralateral, unilateral
Position	medial, lateral, superior, anterior, proximal, upper
Sex	male, female
TemporalMarker	night, permanent, intraoperative, revised
Process	
BodyProcess	urination, circulation
Deed	excising, destroying, dividing, puncturing
HealthCareAct	management, treatment
Quantity	
Number	one, two, three
OrdinalPosition	first, second, third
Range	less than four, several
Substance	air, ionising ray
BodySubstance	urine, blood, exudate, bone marrow, mucosa, epithelium
Chemical	drug
Structure	cell, patch, wall, contents of body cavity
AbstractStructure	permanent record
Anatomy	face, finger, leg, spleen, part, abdomen
AnatomicalConnection	shunt, anastomosis
AnatomicalPart	sphincter, duct, lobe, sheath
BodySpace	lumen, mediastinum, pelvic cavity
BodySystemAnatomy	
CardiovascularSystemAnatomy	carotid body, heart
BloodVessel	artery, aorta, saphenous vein
PartOfHeart	ventricle, mitral valve, atrial septum, coronary artery

DigestiveSystemAnatomy	colon, jejunum, anal sphincter, liver, gall bladder
EndocrineSystemAnatomy	
Gland	adrenal gland, thyroid gland
GenitoUrinarySystemAnatomy	uterus, vagina, spermatic cord
	spleen, bone marrow
LymphoreticularSystemAnatomy	
LymphNode	aortic lymphnode, iliac lymphnode
	thoracic spine, sacrum, tendon, processus styloideus
MusculoSkeletalSystemAnatomy	
Bone	mandibula, ilium, sacral vertebra
Joint	glenohumeral joint, radioulnar joint
NervousSystemAnatomy	sympathetic nerve fibre
Nerve	vagus nerve, phrenic nerve
OrodentalSystemAnatomy	teeth, tongue
RespiratorySystemAnatomy	lung, alveolus, bronchus
SensorySystemAnatomy	ear, cornea, lens, tympanic membrane
Graft	arterial graft, autograft
Device	catheter, anoscope, clamp
Material	adhesive, cement, contrast medium
Prosthesis	hydraulic prosthesis, joint prosthesis
Organism	animal
Person	boy, child, man, patient donor

3.5 Dissection Links

3.5.1 Dissection header

The standard dissection interchange format will include an initial header section, in which the original rubric, a paraphrase and other relevant information are set out. It is mandatory, for each dissection, to include as a minimum the original language rubric in the RUBRIC field (which should always appear first) together, even if the original rubric was in English, with a PARAPHRASE in English of the meaning of the following dissection. The paraphrase is **not** a translation of the rubric, but a phrase which describes the actual dissection. If there is more than one dissection from one rubric, each dissection would have a different paraphrase. The keyword MAIN marks the end of the Header and the start of the dissection proper, and appears only once in each dissection. The first Deed to appear in the dissection will be on the same line as the MAIN keyword and following it.

RUBRIC "..."	Introduces the rubric, in the original language, in double quotes
PARAPHRASE "..."	Introduces the paraphrase of the rubric which will be represented
ENGLISH_RUBRIC "..."	English rubric (if available)
SOURCE "source" CODE "code"	Introduces the original code from the original coding scheme, if any
COMMENT "..."	Any other comment on the dissection
CODING_METACOMMENT "..."	Specific instructions to coding clerks, included with the rubric
MAIN or NO_MAIN	Introduces principal procedure (usually L1)

The NO_MAIN keyword is used to indicate that the following dissection of a specific rubric is considered to be 'broken' by the author. The keyword exists as a method by which authors may 'mark' or label difficult dissections. All the rubrics and dissections studied by the author may then be managed as a single resource, containing in one file both 'good' and 'bad' dissections together. Within any authoring environment (such as the SPET), inserting a NO_MAIN keyword should require a positive choice by the author, and should not become a default keyword. If an author chooses to label a dissection with the NO_MAIN keyword, then the precise reason for doing this may be entered in the COMMENT portion of the header, as free text.

The CODING_METACOMMENT field contains, as free text, any meta-comments which are contained in the original rubric, or otherwise attached to the rubric. For example, in the following (invented) rubric:

Endoscopic Procedure on Abdomen (includes sigmoidoscopy or other fibre-optic instrumentation)

...the information in brackets is included to advise coding clerks that it is not necessary for the particular device called an 'endoscope' to be the instrument actually used. If the operation was actually conducted using a Bronchoscope they do not need to look elsewhere for a better code. The CODING_METACOMMENT field provides a mechanism by which the text of this meta-comment can be attached to the GRAIL concept to which the procedure is mapped.

3.5.2 Dissection Body: Zero level of indenting

3.5.2.1 'Zero' level of indenting: Links between procedures

A single dissection may contain several 'principal' surgical deeds, in addition to the one following the MAIN keyword. To include further 'principal' deeds, use one of the links below.

WITH	conjunction (often appears in rubrics as "with") with MAIN deed being the most significant and others being subordinate
WITH_MAIN	As WITH, but both procedures are of equal importance
OR_WITH	disjunction see Section 3.7.2.3.1.2
WITH_OPTIONALLY	see section 3.7.2.1.2
OR_MAIN	see section 3.7.2.3.1.1
WITHOUT_ACTION	procedure not done (e.g. amputation WITHOUT_ACTION anaesthetic)
EXCLUDES_CONTEXT	Except in the context of another concurrent procedure e.g. female sterilisation EXCLUDES_CONTEXT during major surgery
OTHER_THAN	Explicitly excludes a subset of procedures which will have a different code (though this result should fall out of the GALEN approach) e.g. osteotomy of bone OTHER_THAN osteotomy of spine
WITH_GUIDANCE_BY	Short-cut, equivalent to WITH guiding procedure BY_MEANS_OF device
MOTIVATED_OVERALL_BY	Health care act, e.g. "curing", "managing", "preventing", "palliating", etc.
TO_ACHIEVE_OVERALL	Physiological process (e.g. "revascularisation") not requiring further intervention by surgeon (L3)

NOTE: 'OR_WITH' is, ideally, to be avoided as a connective between main procedures. All usage should be submitted as problems

The special links MOTIVATED_OVERALL_BY and TO_ACHIEVE_OVERALL would usually link to deeds classified as either L3 or L4, and refer to the goals of the procedure dissection as a whole, rather than the goals of any specific part of a procedure dissection. They should appear at the bottom of a dissection.

The links {WITH, WITH_MAIN, OR_WITH, OR_MAIN} are to be used as logical operators which are very roughly equivalent to conjunctions or disjunctions respectively. WITHOUT_ACTION, OTHER_THAN and EXCLUDES_CONTEXT are to be used as a very limited form of negation. See section 3.7.2.1.1. WITH and OR_WITH can **never** appear together in a single dissection.

Note that the GRAIL formalism does not support negation at any other place in the dissections.

The links above may only appear at the same level as the MAIN keyword and should never appear with any indenting. The deeds which they link to will appear on the same line after the link. These links can appear in any order, and more than once, in a dissection.

Example:

MAIN Deed1
WITH Deed2
WITHOUT Deed4
WITH Deed6
MOTIVATED_OVERALL_BY Deed3

3.5.2.2 'Zero' level of indenting: links to operator or subject

In dissections where it is necessary to include information regarding either the patient (such as their age, sex or body position used in surgery) or the operator, the following links may be used:

HAS_PERFORMER	person (doctor, nurse ...)
---------------	----------------------------

HAS_PATIENT	person (boy, child, adult) or person combined with other links to specify age, sex and so on.
-------------	---

Example:

```
RUBRIC "Cathétérisme transurétral isolé chez le garçon"
MAIN inserting
  ACTS_ON device:urinary_catheter
    HAS_DESTINATION anatomy:urinary bladder
    HAS_APPROACH anatomical:through_urethra route
  HAS_PATIENT boy
```

3.5.3 Dissection Body: Embedded Links

The following links can never appear at a 'zero' level of indenting, appearing only when embedded deeper in a dissection. They must always appear on a new line below the descriptor they link **from**, and be indented one level further than that preceding line. The descriptor they link **to** should be on the same line as the link, and following it.

3.5.3.1 Links between any deed and a sub-deed

Any deed descriptor, whether a 'principal' deed as above, or further embedded in a dissection, can be linked to another sub-deed (or sub-procedure) using one of the links below:

BY_TECHNIQUE	physical technique used as subprocedure (L1)
BY_APPROACH_TECHNIQUE	subprocedure used as approach for a subprocess of the overall procedure (simple approaches such as "open", "closed" etc. should be represented within the procedure using HAS_APPROACH)
MOTIVATED_BY	Health care act, e.g. "curing", "managing", "preventing", "palliating", etc.
TO_ACHIEVE	Physiological process (e.g. "revascularisation") not requiring further intervention by surgeon (L3)
CAUSES	deed or process
CAUSED_BY	deed or process

The special links MOTIVATED_BY and TO_OVERALL would usually link to deeds classified as either L3 or L4, and refer to the goals of the specific deed being linked from. This goal of a subprocedure may be different from the overall goal of the whole procedure.

Example

```
MAIN Deed1
  BY_APPROACH_TECHNIQUE Deed2
    BY_TECHNIQUE Deed3
  WITH Deed4
    CAUSES Deed5
    MOTIVATED_BY Deed6
    HAS_CAUSE Deed7
```

3.5.3.2 Links from deed to other kinds of descriptor

You may link from a deed descriptor to other kinds of descriptor using one of the links below:

ACTS_ON	anatomy or pathology or device or material
ACTS_ON_1	anatomy or pathology or device or material
ACTS_ON_2	anatomy or pathology or device or material

BY_MEANS_OF	device or prosthesis
HAS_APPROACH	approach value (e.g. open, closed, open_heart, anatomical_route ...)
	Complex approaches should be represented as subprocedures using BY_APPROACH_PROCEDURE
HAS_EXTENT	extent value (e.g. partial or total or hemi or radical ...)
HAS_TEMPORAL_MARKER	time value (e.g. temporary or permanent or intraoperative ...)
CAUSED_BY	deed or pathology or anatomy or device
CAUSES	deed or pathology or anatomy or device
HAS_LATERALITY	bilateral or unilateral or contralateral or ipsilateral
HAS_FEATURE	
HAS_OTHER_FEATURE feature VALUE	HAS_OTHER_FEATURE should be used to express any other modifiers which do not fit in basic pattern

These links should appear on a new line below the descriptor they link **from**, and indented one level further than that descriptor line. The descriptor they link **to** should be on the same line as the link, and following it.

Example:

```

MAIN Deed1
  BY_APPROACH_TECHNIQUE Deed2
    BY_TECHNIQUE Deed3
      ACTS_ON anatomy
      HAS_EXTENT partial
  WITH Deed4
    BY_TECHNIQUE Deed5
      BY_MEANS_OF device

```

3.5.4 Dissection Body: Embedded links

Note: All of these patterns are recursive where required. For details see examples and or informal grammar.

Anatomy, Pathology, Devices and certain other broad categories of descriptors (but **NOT** deeds) can be further qualified using a wide variety of further links, which are summarised in the table below. The complete set of permitted uses of these links is given in section 3.5.5.

BYPASSES	Relationship between structure achieving bypass and object being bypassed
CONNECTS	Relationship between e.g. body connection and things it connects
CONNECTS_1	As CONNECTS in (majority of) cases where more than one connection is
CONNECTS_2	As CONNECTS in (majority of) cases where more than one connection is
CONNECTS_3	As CONNECTS in (majority of) cases where more than one connection is
CONTAINS	Relationship between topologically hollow structure and object contained within, or between liquid and solute, or between admixture and ground.
FOLLOWED_BY	Temporal relationship
FOLLOWS	Temporal relationship
HAS_CAUSE	Causal relationship between pathology and deed, deed and deed <i>etc.</i>
HAS_DESTINATION	Destination site into which a structure being inserted or installed.
HAS_DONOR	Values: human, animal, patient relative <i>etc.</i>
HAS_FUNCTION	
HAS_LOCATION	Site of pathology; site from which a structure or device is removed.
HAS_LOCATION_1	As HAS_LOCATION in cases where one pathology is in more than one place
HAS_LOCATION_2	As HAS_LOCATION in cases where one pathology is in more than one place

HAS_METHOD	Links between Deed and either eponym (Bilroth) or physical principle
HAS_NUMBER	Numerical qualifier, links to a discrete value (5) rather than a range (less than
HAS_ORDINAL_POSITIO	Ordinal qualifier
HAS_PART	Inverse of IS_PART_OF
HAS_POSITION	Relationship between structures and positions such as medial, superior, distal
HAS_PROXIMITY	e.g. perianal tissue = tissue HAS_PROXIMITY anus
HAS_QUANTITY	Numerical qualifier, links to a range (more than two) rather than discrete value
HAS_ROUTE	
HAS_SIZE	
IS_ACTED_ON_BY	Inverse of ACTS_ON
IS_BRANCH_OF	Relationship between blood vessel or nerve and the parent structure branched
IS_CONTAINED_IN	Inverse of CONTAINS
IS_FEATURE_OF	Inverse of HAS_FEATURE
IS_LOCATION_OF	Inverse of HAS_LOCATION
IS_MADE_OF	Relationship between structure and the substance it is made of
IS_PART_OF	Part-whole relationship between two structures
IS_SERVED_BY	Inverse of SERVES
OCCURS_DURING	Temporal relationship
REPLACES	Relationship between a prosthesis and the anatomy it replaces
SERVES	Relationship between nerve, blood vessel etc. and anatomy supplied

3.5.5 Link Sanctions

The following table contains a sample complete set of rules, or sanctions, which determine which links are permitted to be used between which category of descriptors:

(October 12, 1998: surgery.txt version 4.10)

Structure HAS_DONOR Organism
 Structure HAS_TEMPORAL_MARKER TemporalMarker
 Structure HAS_DESTINATION Lesion
 Structure HAS_DESTINATION Structure
 Structure HAS_DESTINATION Substance
 Structure HAS_PROXIMITY Structure
 Structure HAS_PROXIMITY Substance
 Structure IS_ACTED_ON_BY Deed
 Structure IS_PART_OF Anatomy
 Structure HAS_FEATURE Characteristic
 Structure HAS_NUMBER Number
 Structure HAS_NUMBER Range
 Structure IS_CONTAINED_IN Structure
 Structure IS_LOCATION_OF Lesion
 Structure HAS_LOCATION Anatomy

Age HAS_NUMBER Number
 Age HAS_NUMBER Range
 Quantity IS_FEATURE_OF Deed

AnatomicalPart IS_PART_OF Lesion
 AnatomicalPart HAS_LOCATION Anatomy

AnatomicalConnection BYPASSES Structure
 AnatomicalConnection BYPASSES Lesion
 AnatomicalConnection CAUSED_BY Pathology
 AnatomicalConnection HAS_LOCATION Structure
 AnatomicalConnection HAS_LOCATION_1 Structure
 AnatomicalConnection HAS_LOCATION_2 Structure

Anatomy and Structure
 Anatomy and BodySubstance
 Anatomy CAUSES Process
 Anatomy CAUSES Structure
 Anatomy CAUSES Substance
 Anatomy CONNECTS Anatomy
 Anatomy CONNECTS Lesion
 Anatomy CONNECTS Structure
 Anatomy CONNECTS_1 Anatomy
 Anatomy CONNECTS_1 Lesion
 Anatomy CONNECTS_1 Structure
 Anatomy CONNECTS_2 Anatomy
 Anatomy CONNECTS_2 Lesion
 Anatomy CONNECTS_2 Structure
 Anatomy CONNECTS_3 Anatomy
 Anatomy CONNECTS_3 Lesion

Anatomy CONNECTS_3 Structure
 Anatomy CONTAINS Structure
 Anatomy CAUSED_BY Process
 Anatomy CAUSED_BY Structure
 Anatomy CAUSED_BY Substance
 Anatomy HAS_FUNCTION Process
 Anatomy HAS_LATERALITY Laterality
 Anatomy HAS_ORDINAL_POSITION OrdinalPosition
 Anatomy HAS_POSITION Position
 Anatomy HAS_SIZE Quantity
 Anatomy HAS_SIZE Characteristic
 Anatomy HAS_SIZE Range
 Anatomy IS_MADE_OF Substance
 Anatomy HAS_PART Substance
 Anatomy IS_PART_OF Structure
 Anatomy IS_SERVED_BY BloodVessel
 Anatomy IS_MADE_OF Graft
 Anatomy or Structure

BodySpace IS_PART_OF Lesion

Approach and Approach
 Approach or Approach

BloodVessel IS_BRANCH_OF BloodVessel
 BloodVessel SERVES Anatomy

BodySubstance and Pathology
 BodySubstance IS_PART_OF Anatomy
 BodySubstance IS_PART_OF Lesion
 BodySubstance HAS_DONOR Person
 BodySubstance or Pathology

Characteristic IS_ACTED_ON_BY Deed

Deed or Deed
 Deed BY_APPROACH_TECHNIQUE Deed
 Deed BY_MEANS_OF BodySubstance
 Deed BY_MEANS_OF Deed
 Deed BY_MEANS_OF Structure
 Deed BY_MEANS_OF Device
 Deed BY_MEANS_OF Method
 Deed BY_MEANS_OF Chemical
 Deed BY_MEANS_OF Substance
 Deed CAUSES Deed
 Deed CAUSES Structure
 Deed FOLLOWED_BY Deed
 Deed FOLLOWS Process

Deed HAS_APPROACH Approach	Device IS_PART_OF Device
Deed HAS_APPROACH Device	Device or Structure
Deed HAS_APPROACH Anatomy	Device REPLACES Anatomy
Deed CAUSED_BY Deed	Device HAS_FEATURE Feature
Deed CAUSED_BY Structure	Device CONTAINS Structure
Deed HAS_EXTENT Characteristic	
Deed HAS_EXTENT Extent	Extent or Extent
Deed HAS_FEATURE Feature	
Deed HAS_LATERALITY Laterality	Feature IS_FEATURE_OF Pathology
Deed HAS_LATERALITY Position	Feature IS_FEATURE_OF Process
Deed HAS_NUMBER Number	Feature IS_FEATURE_OF Structure
Deed HAS_NUMBER Range	Feature IS_FEATURE_OF Substance
Deed HAS_ROUTE Approach	Feature HAS_NUMBER Range
Deed HAS_ROUTE Lesion	Feature HAS_NUMBER Number
Deed HAS_ROUTE Structure	
Deed HAS_TEMPORAL_MARKER TemporalMarker	Graft BYPASSES Anatomy
Deed HAS_METHOD Method	Graft BYPASSES Pathology
Deed HAS_METHOD Characteristic	Graft HAS_LOCATION Anatomy
Deed MOTIVATED_BY Deed	
Deed MOTIVATED_BY HealthCareAct	Laterality or Laterality
Deed MOTIVATED_BY NonClinicalAct	
Deed OCCURS_DURING BodyProcess	Lesion HAS_DESTINATION Lesion
Deed OCCURS_DURING Deed	Lesion HAS_DESTINATION Structure
Deed OCCURS_DURING TemporalMarker	Lesion HAS_DESTINATION Substance
Deed TO_ACHIEVE Process	Lesion CONNECTS Lesion
Deed TO_ACHIEVE Feature	Lesion CONNECTS_1 Lesion
Deed WITH_GUIDANCE_BY Device	Lesion CONNECTS_2 Lesion
	Lesion IS_CONTAINED_IN Anatomy
Device and Structure	Lesion HAS_EXTENT Range
Device ASSISTS BodyProcess	Lesion HAS_NUMBER Range
Device CONNECTS Device	Lesion HAS_NUMBER Number
Device CONNECTS_1 Device	Lesion HAS_CAUSE BodyProcess
Device CONNECTS_2 Device	Lesion HAS_CAUSE Deed
Device CONNECTS_3 Device	Lesion HAS_CAUSE Pathology
Device CONNECTS Anatomy	Lesion HAS_SIZE Characteristic
Device CONNECTS_1 Anatomy	Lesion HAS_SIZE Range
Device CONNECTS_2 Anatomy	Lesion HAS_SIZE Quantity
Device HAS_FUNCTION Process	Lesion HAS_FEATURE Characteristic
Device HAS_LOCATION Anatomy	Lesion HAS_POSITION Position
Device HAS_LOCATION BodySubstance	
Device HAS_LOCATION Device	Material HAS_DESTINATION Pathology
Device HAS_LOCATION Pathology	Nerve IS_BRANCH_OF Nerve
Device HAS_LOCATION_1 Anatomy	Nerve SERVES Anatomy
Device HAS_LOCATION_1 Device	
Device HAS_LOCATION_1 Pathology	Number or Number
Device HAS_LOCATION_2 Anatomy	Number or Range
Device HAS_LOCATION_2 Device	
Device HAS_LOCATION_2 Pathology	Pathology and BodySubstance
Device HAS_PART Material	Pathology and Pathology
Device HAS_PART Device	Pathology and Structure
Device IS_MADE_OF Substance	Pathology ACTS_ON Structure
Device IS_MADE_OF Material	Pathology CAUSES Structure

Pathology CONNECTS Anatomy Pathology CONNECTS Structure Pathology CONNECTS_1 Anatomy Pathology CONNECTS_1 Structure Pathology CONNECTS_2 Anatomy Pathology CONNECTS_2 Structure Pathology CONNECTS_3 Structure Pathology CAUSED_BY Pathology Pathology CAUSED_BY Process Pathology CAUSED_BY Structure Pathology CAUSED_BY Substance Pathology HAS_LOCATION Anatomy Pathology HAS_LOCATION BodySubstance Pathology HAS_LOCATION Lesion Pathology HAS_LOCATION Structure Pathology HAS_LOCATION_1 Anatomy Pathology HAS_LOCATION_1 Structure Pathology HAS_LOCATION_2 Anatomy Pathology HAS_LOCATION_2 Structure Pathology HAS_LOCATION_3 Anatomy Pathology HAS_LOCATION_3 Structure Pathology HAS_NUMBER Number Pathology HAS_NUMBER Range Pathology HAS_ORDINAL_POSITION OrdinalPosition Pathology IS_ACTED_ON_BY Deed Pathology IS_CONTAINED_IN BodySpace Pathology OCCURS_DURING Process Pathology HAS_FEATURE Feature Pathology HAS_FEATURE Characteristic Pathology or BodySubstance Pathology or Pathology Pathology or Structure Person IS_CONTAINED_IN GenitoUrinarySystemAnatomy Person IS_CONTAINED_IN BodySpace Person HAS_NUMBER Number Person HAS_NUMBER Range Position or Position Process ACTS_ON Characteristic Process ACTS_ON Quantity	Process ACTS_ON Feature Process ACTS_ON Pathology Process ACTS_ON Process Process ACTS_ON Structure Process ACTS_ON Substance Process ACTS_ON_1 Characteristic Process ACTS_ON_1 Pathology Process ACTS_ON_1 Process Process ACTS_ON_1 Structure Process ACTS_ON_1 Substance Process ACTS_ON_2 Characteristic Process ACTS_ON_2 Pathology Process ACTS_ON_2 Process Process ACTS_ON_2 Structure Process ACTS_ON_2 Substance Process IS_FUNCTION_OF Anatomy Process IS_ACTED_ON_BY Deed Process BY_TECHNIQUE Deed Prosthesis HAS_FUNCTION Anatomy Quantity IS_FEATURE_OF Substance Substance and Substance Substance or Substance Substance CAUSES Process Substance HAS_DESTINATION Lesion Substance HAS_DESTINATION Structure Substance HAS_DESTINATION Substance Substance HAS_FUNCTION Process Substance HAS_LOCATION Structure Substance HAS_PROXIMITY Structure Substance IS_ACTED_ON_BY Deed Substance IS_CONTAINED_IN Structure Substance IS_MADE_OF Material Substance CONTAINS Substance HealthCareAct BY_MEANS_OF Deed Graft CONNECTS CardiovascularPathology
--	---

Notes:

HAS_OTHER_FEATURE should be used to express any other modifiers of the thing acted on which do not fit basic pattern.

HAS_DESTINATION is used instead of HAS_LOCATION for insertion acts including injection

HAS_LOCATION may be replaced where appropriate by HAS_DESTINATION or HAS_LOCATION_1,

HAS_LOCATION_2:

HAS_LOCATION_1 HAS_LOCATION_2 ... are used in those cases where some single piece of pathology is considered to be located simultaneously in two or more different structures. For example::

MAIN destroying

ACTS_ON pathology: endometriosis lesion

HAS_LOCATION_1 anatomy: pouch of douglas

HAS_LOCATION_2 anatomy: ovary

3.6 Special dissection keywords

3.6.1 Analytic versus Non-Analytic

It is intended that the dissection structure outlined above can be used to represent most surgical procedures. Within this structure, however, it is important to recognise that several different kinds of knowledge might be included in a single representation. The most important distinction is between analytic and non-analytic, or 'empirical', knowledge. For example, the rubric:

'Coronary Artery Thrombectomy'

might produce the following dissection:

MAIN Deed: excising

ACTS_ON Pathology: thrombus

HAS_LOCATION Anatomy: coronary artery

TO_ACHIEVE Deed: revascularisation

ACTS_ON Anatomy: heart

In this representation, the information that the procedure involves a thrombectomy of the coronary artery is analytic, because this information comes from a pure analysis of the words in the source rubric. The information that the operation is intended to achieve revascularisation is not analytic - it does not come from the rubric, but from knowledge external to the words of the rubric.

In GALEN-IN-USE, all dissections should explicitly identify which portions of their content are analytic and which not analytic. To do this, each link will be assumed to be analytic unless it is followed by the keyword NON-ANALYTICALLY. The NON-ANALYTICALLY keyword must only appear between a link and its related descriptor. Thus, the dissection above would be written:

MAIN Deed: excising

ACTS_ON Pathology: thrombus

HAS_LOCATION Anatomy: coronary artery

TO_ACHIEVE NON-ANALYTICALLY Deed: revascularisation

ACTS_ON Anatomy: heart

Any link, at any level of the representation, may take the NON-ANALYTICALLY keyword. The NON-ANALYTICALLY keyword always comes immediately after the link. The whole 'branch' of a dissection below an NON-ANALYTICALLY keyword will be considered as empirical.

In addition to the use of the NON-ANALYTICALLY keyword, it is suggested that the header portion of each representation (see below) should contain a paraphrase of the rubric which indicates explicitly:

which knowledge comes from the analysis of the rubric or the context of the rubric within the classification.

what non-analytic generalisations are included, e.g. the knowledge coming from authoring clinicians.

Rubrics and their classification context

The position of a rubric in a given classification may suggest that additional information beyond the pure analysis of the text of the rubric might be included in a representation. For example, the rubric 'Coronary Artery Thrombectomy' may exist in the source classification below a code with rubric 'Revascularisation Procedures'. In such situations, treat the revascularisation information as follows:

If the classification also includes elsewhere a rubric "coronary artery thrombectomy for reasons other than revascularisation" then include TO_ACHIEVE revascularisation as **analytic** knowledge. We assume that, in this scheme, the 'coronary artery thrombectomy' rubric does not explicitly include the text "to achieve revascularisation" for reasons only of convenience and to avoid repetition.

If the classification does not include such a rubric, then TO_ACHIEVE revascularisation should be included as **non-analytic** knowledge.

Use of NON-ANALYTICALLY keyword in examples

The dissection examples contained later in this document contain occasional appearances of the NON-ANALYTICALLY keyword. This is intended to give an idea of how to integrate its use in the wider dissection syntax.

3.6.2 'Other', 'Not otherwise specified' and 'Not elsewhere classified'

Rubrics in many coding schemes commonly include phrases such as:

Other operation on bone
Operation on bone NOS
Operation on bone NEC

In general these rubric elements - other, NOS and NEC - are meta-instructions to the coding clerks, and serve one of three distinct functions. These functions are to indicate that a particular code should be attributed if the object being coded:

is a kind of the parent code, but definitely **not** a kind of any of the other, immediate sibling codes

is a kind of the parent code, but is definitely **not** a kind of the other, immediate sibling codes **or** a kind of any other code anywhere else in the entire coding scheme

is a kind of the parent code but the information required to determine whether any of its sibling codes does or does not apply is not present. Such codes exist as a mechanism by which relatively imprecise terms can be coded using a code from the leaf of the coding hierarchy, and so satisfy a requirement that all coded entities use all digits of the scheme

There are, therefore, three different special rubric elements and three different possible interpretations. Most coding schemes use the special elements in the same way, such that function 1 (above) is indicated by an 'Other...' in the rubric, whilst function 2 is indicated by an 'NEC' in the rubric. 'NOS' usually serves to indicate function 3. However, these interpretations are not quite universal, and therefore it is necessary to know the precise coding scheme being considered before an interpretation of these rubrics may be given.

3.6.2.1 Other and Not Elsewhere Classified

Within the GRAIL modelling schema, automatic classification means that information included for function 1 or 2 (Other, or NEC) is always redundant. Authors in centres may, however, still wish to capture this information somehow within a dissection. Because of the similarity of Other and NEC, a common mechanism is proposed. Within the template formalism, a special OTHER keyword should be used to mark a dissection as relating to a rubric of this kind. Because the final implementation of the OTHER keyword requires knowing what the particular coding scheme is, it is mandatory that any dissection containing the OTHER keyword should also contain a completed SOURCE field in the dissection header.

The OTHER keyword can appear anywhere in a dissection, at any level of indenting. It must always appear between a link and its related descriptor. The OTHER keyword may appear more than once in a single dissection:

Example:

RUBRIC "Other procedure of other bone"
SOURCE "CODES-R-US INTERNATIONAL"
MAIN OTHER Deed:surgical deed
ACTS_ON OTHER Anatomy:bone

The OTHER keyword may not appear with the NON-ANALYTICALLY keyword: the 'other' part, and what it refers

to, must presumably be possible to be inferred from the rubric, in context, and therefore must always be analytic.

3.6.2.2 Not Otherwise Specified

NOS usually appears as an instruction to coders. It is a mechanism by which a leaf code may still be assigned to something even when the information provided is no more specific than a relatively abstract code. It is typically a problem especially when converting from information already encoded using another scheme. For example, the source data or code may state only that the concept is a 'Fracture'. The destination scheme may have more detailed leaf terms saying where the fracture is, and also what kind of fracture it is:

Source scheme

A	Trauma	
A1	Soft Tissue Trauma	
	...	
A2	Bony Trauma	
A21		Fracture of Bone
A211		Compound Fracture
A212		Simple Fracture

Destination scheme (being mapped to)

D1...	Fracture	
D11..	Fracture of Femur	
D111.	Fracture of neck of femur	
D1111		Transverse fracture of neck of femur
D1112		Oblique fracture of neck of femur
D112.	Fracture of shaft of femur	
...	...	
D12..	Fracture of humerus	
	...	

The source code {A212} provides only enough information to determine that, in the destination scheme, the code would be one of the codes below {D1...}. In some schemes, however, it is not permitted to record {D1...} itself as the final coding - three of its slots are still empty and a leaf node code must be used. The mechanism to avoid this problem is for the destination scheme to include also a special code:

D9999 Fracture NOS

Thus the source code {A212} becomes coded as {D9999}. This coding does not mean that we know the original data was definitely not, for example, a transverse fracture of the neck of the femur, but that we do not have the information to determine one way or the other.

In this usage, NOS is both an artefact of the way a particular coding scheme is supposed to be used, and is a meta-instruction to coders. Within GRAIL the parent code, and the NOS codes below, should all map to the same single concept. Therefore, the dissection for an NOS rubric should be identical to the dissection for its parent. The NOS information may be recorded as part of the CODING_METACOMMENT field in the dissection header.

3.7 Conjunction, disjunction and negation of items

3.7.1 Overview

The mechanisms for expressing conjunction, disjunction or negation in dissections are limited to the following permitted dissection links or operators:

WITH
 WITHOUT_ACTION
 EXCLUDES_CONTEXT
 OTHER_THAN
 OR_WITH
 OR_MAIN
 WITH_OPTIONALLY
 \
 &

Within the limits of the template syntax these can be used to represent many of the apparently logical relationships encountered commonly in coding scheme rubrics. However, it is not possible to represent all possible logical relationships which might be found. The following sections detail the correct use of each of these seven links or operators, with examples. Examples of rubrics which can NOT be given appropriate dissections within the current constraints are also included.

Conjunctions and disjunction should be used with caution. They cause complications in the eventual modelling, and as bracketing is not part of the template syntax, it is easy to create ambiguities which can not be automatically resolved.

3.7.2 Conjunction, Disjunction and Negation of procedures

3.7.2.1 Procedure Negation

3.7.2.1.1 *WITHOUT_ACTION*

Negation in dissections is strictly limited to representing exclusion criteria in original rubrics. These take the general form:

Procedure:A without procedure B

which may be dissected as:

MAIN Procedure:A
 WITHOUT_ACTION Procedure:B

Example:

RUBRIC "Ablation d'une lithiase coralliforme par abord pyélo-caliciel, sans néphrotomie"
 MAIN removal
 ACTS_ON Pathology:lithiasis
 HAS_OTHER_FEATURE Shape VALUE coral_like
 HAS_LOCATION Anatomy:kidney
 HAS_NUMBER one
 HAS_APPROACH anatomical:renal_pelvis route & calix
 WITHOUT_ACTION incising
 ACTS_ON Anatomy:kidney

Negation in rubrics is, however, a somewhat strange idea. Consider the example above; clinicians would, in real life, choose to record only what they **had** done, and would generally omit from the written record saying what they had **not** done. Therefore, they might record their operation as an ablation of a coral shaped renal stone via a transcalyceal route, but would not explicitly say that they did not perform a nephrotomy. As described by the real clinician, the procedure actually performed is **not** a kind of the procedure as described in the dissection, because the clinician did not state explicitly what they did **not** do. However, most coders would understand that the procedure, as described by the clinician, should be coded with this code.

The implication is that the negation information serves as a meta-instruction. It indicates to the coding clerk that there (probably) exists an alternative code in the scheme which is the same procedure, but with the addition of a nephrotomy. To reflect this, the actual GRAIL expansion of the example above would be to map the dissection code to:

RUBRIC "Ablation d'une lithiase coralliforme par abord pyélo-caliciel, sans néphrotomie"

MAIN removal

ACTS_ON Pathology:lithiasis

HAS_OTHER_FEATURE Shape VALUE coral_like

HAS_LOCATION Anatomy:kidney

HAS_NUMBER one

HAS_APPROACH anatomical:renal_pelvis route & calix

...but also to infer the existence of:

MAIN removal

ACTS_ON Pathology:lithiasis

HAS_OTHER_FEATURE Shape VALUE coral_like

HAS_LOCATION Anatomy:kidney

HAS_NUMBER one

HAS_APPROACH anatomical:renal_pelvis route & calix

WITH incising

ACTS_ON Anatomy:kidney

...and to label this concept as requiring its own code. A more detailed exposition of apparent negation found commonly in procedure rubrics is given in Appendix 3 of this document.

3.7.2.1.2 *WITH_OPTIONALLY*

Many coding schemes include rubrics containing 'with or without', which have the general form:

Procedure:A with or without procedure B

This may be dissected as:

MAIN Procedure:A

WITH_OPTIONALLY Procedure:B

Example:

RUBRIC "incision of bone with or without leaving of medication such as gentagrains without spondylotomy"

MAIN incising

ACTS_ON bone

WITHOUT_ACTION cutting

ACTS_ON spine

WITH_OPTIONALLY Insertion

ACTS_ON drug

HAS_DESTINATION Bone

'With or Without' is clearly a meta-instruction to coding clerks. It serves to indicate that the code applies whether or not the record includes mention of a specific sub-part of the procedure, which might otherwise suggest to the coder that they should also consider some other part of the scheme. The example above would result in the code being mapped to just:

MAIN incising
 ACTS_ON bone

The resulting GRAIL concept would have attached to it, as an extrinsic piece of information, the fact that the additional criteria

WITH Insertion
 ACTS_ON drug
 HAS_DESTINATION Bone

...was redundant meta-information. This fact might be displayed at run-time to a coder. Finally, the WITHOUT portion of the dissection would result in a GRAIL concept equivalent to:

MAIN incising
 ACTS_ON bone
 WITH cutting
 ACTS_ON spine

..being created, and labelled as requiring a code. The redundant meta-information is not attached to this second, inferred, concept.

3.7.2.2 Procedure Conjunction

3.7.2.2.1 Conjunction of principal procedures: WITH and WITH_MAIN

Conjunction (logical 'AND') between deeds is restricted to principal deeds, and uses the zero-level link WITH. Because AND is commutative and associative, you may use as many WITH in a single dissection as you wish, provided there are no OR_WITHs also present. Rubrics of the form:

Procedure:A with procedure:B and procedure:C

may be dissected as:

MAIN Procedure:A
 WITH Procedure:B
 WITH Procedure:C

Example:

RUBRIC "closed reduction of mandibular fracture, with intermaxillary fixation"
 MAIN Deed:reducing
 ACTS_ON fracture
 HAS_LOCATION mandible
 HAS_APPROACH Approach:closed
 WITH Deed:fixing
 ACTS_ON maxilla
 HAS_LATERALITY left
 ACTS_ON maxilla
 HAS_LATERALITY right
 BY_MEANS_OF fixation device

In such a structure, the deed which follows the MAIN link is ascribed a special status above the remaining WITH links: it is the principal deed of the procedure and can be selectively searched for. In cases where a procedure is comprised of

more than one deed which have equal importance, this can be indicated by use of the WITH_MAIN link. Deeds following this link carry the same significance as those following the MAIN link itself.

3.7.2.2.2 *Conjunction of embedded procedures*

The dissection AND operator, '&', may not be used with procedures. Rubrics such as, for example:

Procedure:A by means of (Procedure:B and Procedure:C)

should therefore NOT be dissected as:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B & Procedure:C

instead, you should enter (in this case):

MAIN Procedure:A

BY_TECHNIQUE Procedure:B

BY_TECHNIQUE Procedure:C

3.7.2.3 Procedure Disjunction

3.7.2.3.1 *Principal Procedures*

3.7.2.3.1.1 *Disjunction of principal procedures: OR_MAIN*

The zero-level link OR_MAIN may only be used between principal deeds. Rubrics of the form A or B, but not both:

(Procedure:A) OR (procedure B)

may be dissected as:

MAIN Procedure:A

OR_MAIN Procedure:B

Example:

RUBRIC "flexion or extension osteotomy"

MAIN cutting

ACTS_ON bone

TO_ACHIEVE flexing

ACTS_ON NON-ANALYTICALLY pathological posture

OR_MAIN cutting

ACTS_ON bone

TO_ACHIEVE extending

ACTS_ON NON-ANALYTICALLY pathological posture

It may at first appear that OR_MAIN should perform a logical 'exclusive or' (XOR) operation. This would mean that a procedure involving either of procedure A or procedure B on its own would be coded with the code, but that a procedure involving A and B performed together would not. At the present time, however, OR_MAIN will function as a logical 'inclusive or' (OR). It would be possible to implement OR_MAIN as an XOR, but we believe this to be unnecessary. In most cases it is not possible for A and B to be performed together, and when it is our expectation would be that the original rubric would have been interpreted as an inclusive OR.

3.7.2.3.1.2 *OR_WITH*

A common form of many rubrics is (A or (A and B)). This occurs much more often than a true inclusive OR, (A or B or (A and B)). To reflect this, a special link OR_WITH exists:

(Procedure:A) or (procedure:A and procedure:B)

may be dissected as:

MAIN Procedure:A

OR_WITH Procedure:B

This is currently expanded into GRAIL to be equivalent to two separate dissection:

MAIN Procedure:A

MAIN Procedure:A

WITH Procedure:B

Similarly,

MAIN Procedure:A

OR_WITH Procedure:B

OR_WITH Procedure:C

is expanded into GRAIL to be equivalent to three separate dissections:

MAIN Procedure:A

MAIN Procedure:A

WITH Procedure:B

MAIN Procedure:A

WITH Procedure:C

Note however that, in strict logic, A OR (A AND B) is precisely equivalent to A on its own. This suggests that the OR_WITH part is, again, a meta-instruction. In the case of:

MAIN Procedure:A

OR_WITH Procedure:B

you might infer that there might be another concept or concepts:

MAIN Procedure:A

WITH Procedure: (NOT (B))

...which has a different code, and also that:

MAIN Procedure:A

WITHOUT Procedure:B

...may have a different code.

Because (A OR (A AND B)) is equivalent to just (A), it may be that in future the GRAIL expansion should treat OR_WITH parts of a dissection as being the counterpart WITHOUT: A rubric containing 'WITHOUT' implies the existence of a different code, in which the clinician explicitly declares that an additional procedure was performed. A rubric containing 'WITH' implies the existence of a code where the clinician explicitly states that something was **not** done.

3.7.2.3.2 *Embedded Procedures*

3.7.2.3.2.1 *Inclusive Disjunction of embedded procedures*

Rubrics such as:

Procedure:A by means of ((Procedure:B) or (Procedure:C) or (Procedure:B and Procedure:C))

can **NOT** be dissected as:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B / Procedure:C / Procedure:B & Procedure:C

instead, you should enter two separate dissections:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B

MAIN Procedure:A

BY_TECHNIQUE Procedure:C

The third dissection representing the conjunction of B and C:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B

BY_TECHNIQUE Procedure:C

...does not need to be explicitly described, because in a GRAIL schema it is in any case a kind of both of the other two dissections, from which it may inherit the appropriate code.

3.7.2.3.2.2 *Exclusive Disjunction of embedded procedures*

Rubrics such as:

Procedure:A by means of (Procedure:B or Procedure:C)

can **NOT** be dissected as:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B / Procedure:C

Because of the way the GRAIL schema works (3.7.2.3.2.1) , it is sufficient to write only:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B

MAIN Procedure:A

BY_TECHNIQUE Procedure:C

...provided there exists another dissection for the conjunction:

MAIN Procedure:A

BY_TECHNIQUE Procedure:B

BY_TECHNIQUE Procedure:C

...which gives it the appropriate and different code. If this third dissection is not provided, then procedures representing the conjunction of B and C will also inherit the parent code.

3.7.3 Conjunction and Disjunction and Negation of non-procedure descriptors

3.7.3.1 Descriptor Negation (excluding procedures)

In GRAIL and in the template syntax, there is no mechanism for negation of descriptors, other than the limited form available for procedures (section 3.7.2.1). Rubrics of the form:

Procedure:A ACTS_ON NOT(category:B)

therefore, can not be explicitly represented in a dissection or in GRAIL. In most cases, however, the real intention behind such exclusions is to alert the coder that there exists a separate code for:

Procedure:A ACTS_ON category:B

In general, therefore, the negation information is included as a meta-instruction to coders. In a GRAIL implementation, the automatic coding system would find the correct code without needing the exclusion information. For this reason, we propose that the exclusion criteria are not represented in the body of a dissection, but included only as free text in the CODING_METACOMMENT field of the header:

Example:

```
ENGLISH_RUBRIC "removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)"
CODING_METACOMMENT "excludes removal of osteosynthetic material from vertebra (5-788.4)"
CODE "5-788.8"
MAIN removing
  ACTS_ON OTHER internal fixation device
  HAS_LOCATION bone
```

In the above example, the implied alternate code is actually given in the rubric. Indeed, further on in the dissections we find:

```
ENGLISH_RUBRIC "removal of osteosynthesis material from vertebrae"
CODE "5-788.40"
MAIN removing
  ACTS_ON fixation device
  HAS_LOCATION vertebra
```

3.7.3.2 Descriptor Conjunction (excluding procedures)

Conjunction (logical 'AND') can be used between non-procedure descriptors provided that the preceding descriptor and its link applies equally to both of the items connected. Because AND is an associative operator, any number of descriptors may be connected sequentially. The symbol for the operator is the ampersand '&':

Example:

RUBRIC: "Fixation of fracture of Tibia and Fibula"

MAIN fixation act

ACTS_ON fracture

HAS_LOCATION tibia & fibula

Any single dissection may contain more than one conjunctive sequence. The following dissection is also permitted:

MAIN Procedure:Q

ACTS_ON A & B & C

WITH Procedure:T

ACTS_ON A & B & C

NOTE: The current automatic expansion to GRAIL of a conjunction treats:

MAIN Procedure:Q

ACTS_ON A & B & C

as directly equivalent to:

MAIN Procedure:Q

ACTS_ON anatomy:generic structure

HAS_PART A

HAS_PART B

HAS_PART C

If one of A, B or C is a material (that is, it is a substance and not a structure) then this transformation will break at present.

3.7.3.3 Descriptor Disjunction (excluding Procedures)

3.7.3.3.1 *Inclusive Disjunction of non-procedures*

Inclusive disjunction (logical 'OR') can be used between any descriptors (except between deeds) provided that the remainder of the dissection applies equally to both of the items connected. Any number of descriptors may be connected sequentially. The symbol for the operator in the dissections is the forward slash '/':

e.g. Fixation of Fracture of arm or leg

MAIN fixation act

ACTS_ON fracture

HAS_LOCATION arm / leg

The formal expansion to GRAIL of an inclusive disjunction is to treat:

MAIN Procedure:A

ACTS_ON A /B /C

as directly equivalent to:

MAIN Procedure:Q
ACTS_ON A

MAIN Procedure:Q
ACTS_ON B

MAIN Procedure:Q
ACTS_ON C

The code for the original dissection is then attached to three separate GRAIL concepts, equivalent to the three dissections given above. Note that, in GRAIL:

MAIN Procedure:Q
ACTS_ON A

...will always subsume (for example)

MAIN Procedure:Q
ACTS_ON A
ACTS_ON B

This means that a procedure Q, which acts on A or B or C, or any combination of those three, will acquire the same code. This is the mechanism by which the disjunction must be treated as an inclusive OR.

Any single dissection may only contain one disjunctive sequence. The following dissection:

MAIN Procedure:Q
ACTS_ON A /B /C
WITH Procedure:T
ACTS_ON A/B/C

is not permitted, because its cross product can not be replied uponto always give the correct GRAIL expansion of the original dissection.

3.7.3.3.2 *Exclusive Disjunction of non-procedures*

Exclusive disjunction (logical 'XOR') is not available at the present time through a dedicated operator. An XOR operation would imply that there exists one or more combinations of anatomy for which there is a different, more precise code. This effect can be achieved in GRAIL by ignoring the exclusion criteria in the rubric (see exclusive disjunction of procedures) and subsequently mapping the more specific, implied concept explicitly to its more appropriate code. The exclusion information may be attached as a CODING_METACOMMENT:

MAIN Procedure:Q
ACTS_ON A or B but not both

should be written as:

CODING_METACOMMENT "excludes Q acting on A and B together"
CODE "XYZ"
MAIN Procedure:Q
ACTS_ON A / B

For the exclusion information to be coherent within the context of the source coding scheme, there must also exist a rubric in the scheme somewhere else which will result in a dissection:

CODE "QRS"
 MAIN Procedure:Q
 ACTS_ON A
 ACTS_ON B

If this second rubric does not exist then either the coding scheme is incoherent, or it is not possible for Q to act on A and B together in which case the exclusion criteria are redundant. If the second rubric is not mapped to the GRAIL model, then a procedure (Q with A and B) will inherit the code for (Q with (A OR B) AND NOT with (A AND B)).

3.7.4 Combinations of conjunction and disjunction

The template syntax does not include brackets which might be used to remove ambiguity in sets of logical operators. For this reason, it is not permitted to mix the & operator with the / operator within a single logical sequence. This means that the following is not permitted:

MAIN Procedure:A
 ACTS_ON A & B & C / D

There is no limit to the number of separate, purely conjunctive sequences that may appear in a single dissection. Only one disjunctive sequence may appear. A number of conjunctive sequences may appear in the same dissection as a single disjunctive sequence. Thus:

Permitted	Not permitted	Not permitted
MAIN Procedure:A ACTS_ON A & B & C	MAIN Procedure:A ACTS_ON A & B & C	MAIN Procedure:A ACTS_ON A / B
WITH Procedure:B ACTS_ON A & B & C	WITH Procedure:B ACTS_ON A / B	WITH Procedure:B ACTS_ON A / B / C
WITH Procedure:C ACTS_ON D / E / F	WITH Procedure:C ACTS_ON D / E / F	

Because there are already complex logical operations available at the zero-level (OR_WITH, OR_MAIN, WITH etc.) it could be confusing to have the & or / operators able to combine embedded procedures. Therefore procedures may not be used together with & or /.

Logical OR, and logical AND, are not associative across each other. (A or (B and C)) is not the same as ((A or B) and C). For this reason, the following dissection would be ambiguous:

MAIN Procedure:A
 OR_WITH Procedure:B
 WITH Procedure:C

A legal dissection, therefore, may take the form of:

MAIN plus unlimited numbers of WITH and WITH_MAIN, but no OR_WITH

MAIN plus unlimited numbers of OR_WITH, but no WITH or WITH_MAIN

Rubrics which require any combinations of WITH and OR_WITH must be expanded fully by hand into all the valid, separate dissections.

3.8 Additional guidelines and rules

3.8.1 Normalising subprocedures to CEN standard if possible

Devices or lesions acted on should have a location if possible

Corresponds to CEN rule concerning always including anatomy in either direct or indirect object.

Injection (and other insertion deeds) must always ACT_ON the object being injected which HAS_DESTINATION the

target anatomy (or occasionally device). Inserting deeds can not act directly on the target anatomy.
 “injection of joint” should be represented as “injection of substance into joint”

```

MAIN injection
  ACTS_ON substance
    HAS_DESTINATION joint
  
```

3.8.2 Approaches

Simple approaches such as ‘open’ and ‘closed’ will be represented, for the time being, using the ‘has approach’ field. A list of suitable descriptors will be found in the descriptor list.

Complex approaches will be represented using separate subprocedures introduced using WITH_APPROACH_TECHNIQUE. The special descriptor “Approaching” may be used following WITH_APPROACH_TECHNIQUE for complex approaches where no other procedure is appropriate.

3.8.3 Endoscopes

The special descriptor “Observing” may be used for complex endoscopic or radiographically controlled procedures: e.g.

```

MAIN Deed
  BY_TECHNIQUE observing
    BY_MEANS_OF endoscope
  
```

3.8.4 Explicitly omitted at this stage

Repetitions which are not revisions

Transplants or grafts

Complex cardiac procedures

Diagnostic procedures with ‘results’

The link list includes the option to use a small number of links denoting temporal relationships, such as FOLLOWS and FOLLOWED_BY. In theory, other temporal links such as PRECEDED_BY or WITH_SIMULTANEOUSLY are also possible. At the present time, GRAIL is not able to make the sophisticated temporal inferences which would be required to produce a ‘coherent’ classification of concepts which also took proper account of such temporal information. Originally, it was proposed that NO temporal relationships be included in the dissection link list. However, this has not been possible in all cases.

3.9 Appendix 1: Summary dissections showing tabs visibly to demonstrate exchange format.

The dissection structure is intended to be recursive, so that some links may appear more than once in a single dissection and at different levels of indentation. It is extremely important to correctly identify which descriptors are actually being linked. Within GRAIL this binding is declared by means of bracketing. At present, the suggested mechanism within dissections is to use tabbed indenting in the final public exchange format. Below is an example of dissections where the tabs have been translated into visible characters. Provided the final exchange format uses TABS, centres may consider alternative means to identify bindings during authoring, if they choose.

In the two illustrations below left, for example, all tab characters have been replaced with “+”. The final exchange format, submitted to EFCC, however, must be as below right **AND MUST BE PURE ASCII. No other format, not even RTE, is acceptable.** To generate pure ASCII from most wordprocessors, use ‘SAVE as text, including line breaks’.

```

RUBRIC “...”
7PARAPHRASE “...”
SOURCE “source” CODE “code”
MAIN Deed1
  
```

BY_TECHNIQUE Deed2
 TO_ACHIEVE Deed3
 MOTIVATED_BY Deed4

RUBRIC "..."
 ENGLISH_RUBRIC "....."
 PARAPHRASE "..."
 SOURCE "source" CODE "code"
 MAIN Deed1

+ACTS_ON lesion / device
 ++HAS_LOCATION anatomy
 +++HAS_LATERALITY side
 +HAS_APPROACH approach_value
 +HAS_EXTENT extent_value

WITH NON-ANALYTICALLY Deed2

+ACTS_ON lesion / device
 ++HAS_LOCATION anatomy

+BY_MEANS_OF device
 WITHOUT Deed3

+ACTS_ON lesion / device
 ++HAS_LOCATION anatomy & anatomy

RUBRIC "..."
 ENGLISH_RUBRIC "....."
 PARAPHRASE "..."
 SOURCE "source" CODE "code"
 MAIN Deed1
 BY_TECHNIQUE Deed2
 TO_ACHIEVE Deed3
 MOTIVATED_BY Deed4

RUBRIC "..."
 ENGLISH_RUBRIC "....."
 PARAPHRASE "..."
 SOURCE "source" CODE "code"
 MAIN Deed1

ACTS_ON lesion / device
 HAS_LOCATION anatomy
 HAS_LATERALITY side
 HAS_APPROACH approach_value
 HAS_EXTENT extent_value

WITH NON-ANALYTICALLY Deed2

ACTS_ON lesion / device
 HAS_LOCATION anatomy

BY_MEANS_OF device
 WITHOUT Deed3

ACTS_ON lesion / device
 HAS_LOCATION anatomy & anatomy

3.10 Appendix 2: Levels of interpretation within surgical procedures

Adapted from:

‘Levels of interpretation within surgical procedures’

Authors: Angelo Rossi Mori, Elena Galeazzi, Fabrizio Consorti, Annamaria Errera

Version: 1.0

3.10.1 History

Historically, CNR encountered a problem of different levels of interpretation when they began trying to assemble a basic ontology of "deeds" to include in the original GALEN-IN-USE descriptor list. For example, they had the feeling that a "repair" is a different sort of thing from "cutting" or "inserting". In saying "repair" we have no information at all about what sort of instrument the surgeon is using or what sort of structural changes he might be making to do the repair. This contrasts with "cutting" where it is likely that the surgeon is using something sharp - probably a scalpel - and is certainly making an incision. In "repair" we only know that there is a general morphological or functional goal which requires an (unspecified) manipulation of a physical object. Often, the rubric may say in addition how the repairing was actually achieved. For example:

```
MAIN repairing
  ACTS_ON body structure
BY_TECHNIQUE inserting
  ACTS_ON patch
  HAS_DESTINATION body structure
```

Similarly, "replacement" is more than just the combination of "take out something" and "inserting something else". When you replace, there is a strong relation between:

the function that the second thing is going to perform and

the function that was performed (in the healthy person) by the thing that was removed.

Therefore the complex action "replacement" involves a functional goal (which may be specified) as well as being actually obtained by the combination of "removing" and "inserting".

Another hint came from lysis of adhesions; for example:

```
MAIN releasing
  ACTS_ON bowel
BY_TECHNIQUE lysing
  ACTS_ON adhesions
  HAS_LOCATION peritoneum
```

Note that in this example the direct objects of the two actions (releasing and lysing) are different.

3.10.2 Four levels of interpretation

A surgical procedure typically contrasts a pathological process. Surgeons manipulate physical objects (body parts, substances, or devices), to alter their morphology, to restore or partially fix damaged functions, or to induce reactions from the organism. A particular expression related to a "surgical procedure" — depending on the context — can be characterised by:

the structure involved and its direct manipulation

the function directly altered by the surgeon (e.g. revascularisation) or indirectly induced by the activity (process of sclerosis triggered by an injection)

the pathological process faced by the surgeon and more in general to the whole health care process in which the surgical procedure is embedded (e.g. managing or preventing a disease, perform a more precise diagnosis).

In other words, to present synthetically a given process about a surgical procedure, speakers can generate terminological phrases with a variable amount of interpretation. For example, the following four phrases might all be used to describe the same actual procedure:

'relocation' of mammary artery

coronary artery shunt

myocardial revascularisation

heart surgery (i.e. surgery dealing with heart-related pathologies).

In fact, speakers can construct phrases according to four different 'levels' or axes of abstraction:

- L1. Elementary Deed: What you actually did, with no apparent interpretation (e.g. cutting, removal, insertion);
- L2. A topographical or morphological interpretation of what your L1 deed created (e.g. drainage, a shunt, repairing, reshaping);
- L3. A functional interpretation of what should be achieved by the operation as a whole (e.g. inducing a body reaction (sclerosis) or assisting , improving or restoring a body function (revascularisation));
- L4. A description of the change which the intervention was trying to produce in a particular health problem (e.g. caring for or controlling a <disease>, or a damaged <body structure>).

The same surgical procedure may be expressed at one or more levels. Sometimes the actual way to perform a procedure is not specified e.g. "heart revascularisation" may be performed according to various techniques; "control of postoperative haemorrhage of anus" (ICD-9-CM 49.95), may even involve non-surgical actions.

3.10.3 Normalisation issues

The main goal of the previous discussion is to establish a solid and ontologically robust base by which we can discuss how to normalise the concepts to be represented in our model and, as a result, the expressions (systematic names) in our future "European Nomenclature".

3.10.3.1 Constructs depend on focus

Most activities using devices may be considered, and so described, from two points of view. For example, the phrase "insert 2 pins in femur" focuses on the device (pin) and expresses a very simple action (insert); the phrase "repair femur with 2 pins" focuses on the body location (femur) and expresses a goal (repair); the device has become a means, rather than the direct object. It would have been possible as a third option to focus on the medical problem which required the repair (e.g. a fracture).

The actual verb (or the "deverbal noun") chosen for a rubric, and its direct object , depends on the focus or point of view chosen by the author. Phrases produced from different view points may be "semantically" very similar and their "syntactically" different constructs are often (but not always) easily transformable into each other. In medical coding scheme rubrics, various kinds of contrasts and choices are encountered, including:

- direct target (L1 - removing a tear) vs. morphological outcome (L2 - smoothing a surface);
- substance (L1 - injecting neurolytic fluid) vs. functional goal (L2 - destroying a nerve by neurolytic fluid);
- required function on structure (L2 - revascularisation of heart) vs. deed on its context (L1- aortocoronary bypass);
- deed on device (L1 - insertion of balloon catheter) vs. affect on structure (L2 - dilatation of artery) vs. fixing a problem (L4 - correction of stenosis of artery).

3.10.3.2 Normalising data capture in dissections

Given the choices identified above, it is clear that different authors are very likely to represent semantically very similar procedures in significantly different ways. If one author chooses to dissect:

RUBRIC "Internal mammary coronary bypass"

as:

```

MAIN creating
  ACTS_ON bypass structure
    CONNECTS coronary artery
      CONNECTS internal mammary artery
  
```

whilst another author dissects:

RUBRIC "Femoral-popliteal bypass"

as:

```

MAIN Revascularisation
  ACTS_ON Leg
    BY_MEANS_OF creating
      ACTS_ON bypass structure
        CONNECTS femoral artery
          CONNECTS popliteal artery

```

..then there is no method by which both of these dissection can later both become classified as kinds of ‘revascularising procedure’.

Ideally, computer-based processing should be able to support an appropriate systematic and automatic transformation of dissections into a unique, preferred (normalised) form. However, this can only be done if all the necessary information is recorded from the start. Thus, the author of the first dissection above needs to have at least captured the L2 information (why the operation was done: to revascularise) even if it does not appear as the main deed, as in the second dissection. Unless the first dissection contains this information, there is no transformation possible which could produce the desired classification with both rubrics being kinds of ‘revascularising procedure’.

The implication for GALEN-IN-USE is that, even if we do not yet agree on a normalised structure (such as the one being adopted by CNR and described below) we should aim at least to normalise the data being captured. The L1-L4 distinction is offered as a way of identifying some of the different ‘views’ of rubrics which we might aim to ensure were captured for every dissection.

3.10.4 CNR’s normalised dissection structure: Main focus on structure and related L2-deed

For the moment, CNR have additionally decided to perform the structural normalisation manually, using as far as possible representations and systematic names constructed according to the following frame, built on a "normalised" perspective:

Structural pattern

L2	MAIN	concrete actions performed on body structures
L1	BY_TECHNIQUE	elementary deed, directly using devices, substances of grafts
L3	TO_ACHIEVE_OVERALL	a direct or induced functional effect on body structures
L4	MOTIVATED_OVERALL_BY	an activity on pathological processes

CNR’s normalised form always takes in preference an L2 deed as the nucleus (MAIN) and tries to normalise where appropriate L1 into the means by which L2 was achieved, L3 into functional effects and L4 into a motivation. Of course there are problems in putting L3 and L4 perspectives into the frame, since they represent a type of knowledge different from L1 and L2, and in general it might be hard to represent them uniquely (if the level of interpretation increases, also the subjective input in the interpretation increases). The only possible strategy for the modellers — at the moment — is the following:

remain with the details that are already explicit in the source corpus.

In this way we assure at least that they are representable in the final model, and thus that coding conversion is possible. We cannot assure a complete coherence of the normalisations, and that the classifier will work properly (it cannot exploit non-regularised representations). After modelling an adequate number of concepts, a global review could allow for a further step of normalisation (a posteriori), with a suitable re-writing of portions of the model itself according to more precise normalisation rules.

3.10.5 Further details and minor issues

3.10.5.1 L1 and L2 are "slots", not "categories"

In principle any deed can appear as either L1 or L2, depending on the context and on the author’s point of view. The decision as to which ‘deed’ in a rubric should become the L1 or L2 deed of a dissection must, therefore, still depend on the interpretation of the author. It is not possible to provide a list dictating which ‘words’ are L1 and which are L2. You can only determine whether the word “inserting” is L1 or L2 by looking at the concept the word refers to, in the context

of a particular dissection.

Bearing in mind this proviso, it is still possible to give some guidelines. For instance, there are some deeds that are by default L2 (e.g. "repair") and some deeds that are typically L1 (e.g. "cutting").

Deeds like "insert" can be considered in both positions, but:

- 1/ "inserting a patch" will usually be considered as an elementary act L1, for a "repair" L2
- 2/ "inserting a pacemaker" will probably be considered as L2

The same problem, of concepts whose role depends on their context, is commonly encountered in concept representation. For example, it applies often to body parts: depending on the context of a phrase, they can be the thing acted on, or its location, or a means.

Ultimately, the L1 deed is what an individual author considers as the elementary act. Determining this may be easier if you first determine what, in the same expression, is the "real" L2 intervention.

3.10.6 WARNING: Phases and variants vs. levels of interpretation

Levels of interpretation should not be confused with phases of a procedure (e.g. approach). Any phase can be expressed by its own levels of interpretation, independently from the main deed.

3.10.6.1 Number of codes for a procedure.

Phases can be expressed by independent phrases, or by modifications of another phrase. In fact, sometimes a phase deserves its own particular code, e.g. "heart massage" in MeSH E4.752, "aspiration of bone marrow from donor for transplant" (ICD-9-CM 41.91) or "ventriculographie per-opératoire" (CDAM F148). The actual number of codes is a design choice; examples of complex phrases corresponding to a single code are instead: "thoracotomy...with cardiac massage" (CPT 32160); "endarterectomy with temporary bypass during procedure" (ICD-9-CM 38.1).

3.10.6.2 Only a few phases can be explicit in the expression

Any organised human activity can be subdivided into phases: preparation, initial phase, main phase, final phase, follow-up. Each phase can have variants and can also be recursively divided in turn into sub-phases. Phases can be partially or totally overlapping. For any phase of an activity, the particular relevance or importance to the process as a whole should determine whether it might become part of a phrase or dissection describing the whole process synthetically.

Usually an activity is designated by its 'main' phase only, either because this is sufficient to infer precisely how all the other phases can be performed, or more commonly because variants are considered irrelevant. However, often a variant phase heavily affects usage of resources or consequences on the patient. For this reason, in coding scheme rubrics, other phases may appear in the name of the activity, in addition to the main phase. In particular we have encountered phases related:

- to the approach (e.g. re-sternotomy, a procedure which involves very high risks),
- to dangerous intra-operative techniques (e.g. cardiopulmonary bypass),
- to the use of expensive devices (e.g. disposable staplers, for suture in minimally invasive surgery)
- to post-operative consequences (e.g. the colostomy in Hartmann operation influences the comfort of the patient and the planning of post-operative stay).

3.10.6.3 Double main phase.

Double main phases are often only suggested or implied by the choice of words used to describe the procedure. For example, replacement is removal plus insertion; advancement is detachment plus reattachment; transplant is excision plus graft. In some real rubrics, two different phases appear which apparently have the same importance to the procedure as a whole. Both have equal right to being "main procedure". For example, the phrase

"total gastrectomy with esophagojejunostomy" [ENV1828, annex G1]

...is considered by ICD-9-CM as a kind of "total gastrectomy" 43.9, but with the permuted name

"esophagojejunostomy with complete gastrectomy"

So we might consider them as two connected L2, perhaps (though the current template syntax does not allow for this):

```

L2  MAIN excising
    ACTS_ON stomach
    HAS_EXTENT total
L2  WITH_MAIN creating
    ACTS_ON stoma
    CONNECTS oesophagus
    CONNECTS jejunum
  
```

3.11 Appendix 3: The WITHOUT link

3.11.1 Summary

Document VUM03/96 introduced the WITHOUT link and its usage in dissections. It was asserted that the WITHOUT link should only be used for procedure negation i.e. to dissect rubrics in the form:

Procedure:A without (performing Procedure:B during Procedure:A)

for example,

Bilateral Mastectomy without (performing Axillary Lymph Node Clearance during the Mastectomy)

However, many dissections have been produced that extend the use of the WITHOUT link in an attempt to capture coding meta-information such as:

Procedure:A unless it is performed during Procedure:B

e.g.

Removal of Endometriotic Plaques unless it is performed during Another Abdominal Procedure

and:

Procedure:A the code for which does not include Procedure:B

e.g.

Removal of Internal Fixation Devices the code for which does not include Removal of Internal Fixation Devices from vertebrae

Removal of Internal Fixation Devices the code for which does not include Code 5-788.8

It is undesirable to capture this meta-information in the body of the dissections in this way for two reasons. Firstly, because it prevents the correct automatic classification of concepts; and secondly, because it is impossible to automatically infer the intent behind the differing uses of the WITHOUT link.

It is clear however, that this coding meta-information confers significant 'added value' to the dissections, for example to supply coding information and for language generation, and should not simply be discarded. It was suggested in VUM03/96 that the meta-information should be captured in the COMMENT or CODING_METACOMMENT field in the header, however this practice is not being followed, possibly because there is the belief that the 'added value' will somehow be 'lost' unless it appears within the body of the dissection.

3.11.1.1 Proposal

This document proposes to replace the WITHOUT link with three new links in order to ensure both that the meta-information can be captured in a way that seems intuitive (i.e. within the body of the dissections) but in a way that does not disturb the classification. Having separate links for the different uses of WITHOUT will also help to clarify the meaning of the dissections.

The three new links would be:

3.11.1.1.1 *WITHOUT_ACTION*

which is used to dissect:

Procedure:A *without* (performing Procedure:B during Pcedure:A)

e.g.

'Bilateral Mastectomy'

WITHOUT_ACTION 'Axillary Lymph Node clearance'

3.11.1.1.2 *EXCLUDES_CONTEXT*

which is used to dissect:

Procedure:A unless it is performed during Procedure:B

e.g.

'Removal of Endometriotic Plaques'

EXCLUDES_CONTEXT Another Abdominal Procedure

3.11.1.1.3 *OTHER_THAN*

which is used to dissect:

Procedure:A the code for which does not include Procedure:B

e.g.

'Removal of Internal Fixation Devices'

OTHER_THAN 'Removal of Internal Fixation Devices from vertebrae'

or:

'Removal of Internal Fixation Devices'

OTHER_THAN 'Code 5-788.8'

3.11.2 Uses of the WITHOUT link

In document VUM03/96 the problems of using conjunctions, disjunction and negations were outlined. There was the guideline that they should be used with caution not only because they cause complications in the eventual modelling, but also because they create ambiguities that cannot be resolved automatically, nor even by comparison with the original rubric.

3.11.2.1 The WITHOUT link in Procedure negation

The use of the WITHOUT link for procedure negation was described in VUM03/96. It was stated that 'negation in dissections is strictly limited to representing exclusion criteria in original rubrics'. Thus dissections in the form:

Procedure:A without Procedure:B

May be dissected as:

MAIN Procedure:A

WITHOUT Procedure:B

Example:

RUBRIC "Bilateral Mastectomy without Lymph Node Clearance"

MAIN removal

ACTS_ON breast

HAS_LATERALITY bilateral

WITHOUT removing

ACTS_ON Axillary lymph nodes

The WITHOUT link, however is used in certain dissections in an attempt to capture coding meta-information, typically where the intention is to convey the meaning 'other than in the context of...'

For example:

RUBRIC "Förstoring av bröst med protes"

PARAPHRASE "Enlarging operation on breast with use of prosthetic material"

ENGLISH_RUBRIC "Augmentation of breast using prosthesis"

SOURCE "NCSP"

CODE "HAD10"

MAIN augmenting

ACTS_ON breast

BY_TECHNIQUE implanting

ACTS_ON prosthetic implant

WITHOUT plastic surgery

ACTS_ON breast

HAS_TEMPORAL_MARKER after

IS_ACTED_ON_BY excising

ACTS_ON breast

Which is intended to convey the concept of the insertion of a breast prosthesis other than where this occurs after a mastectomy. This type of information is clearly outside the definition of the procedure, but is an instruction to the coder that certain combinations of procedures are disallowed.

In this case, the intent is presumably to ensure that the concept:

"Mastectomy plus insertion of breast implant"

is represented by the single dissection (and code):

RUBRIC "Rekonstruktion av bröst med protes"

PARAPHRASE "Reconstruction of breast using prosthesis"

ENGLISH_RUBRIC "Reconstruction of breast using prosthesis"

SOURCE "NCSP"

CODE "HAE00"

MAIN reconstructing

ACTS_ON breast

HAS_TEMPORAL_MARKER after

IS_ACTED_ON_BY excising

ACTS_ON breast

BY_TECHNIQUE implanting

ACTS_ON prosthetic implant

Rather than by the combination of two codes, namely HAD10 and HAC20 i.e.

RUBRIC "Förstoring av bröst med protes"
 PARAPHRASE "Enlarging operation on breast with use of prosthetic material"
 ENGLISH_RUBRIC "Augmentation of breast using prosthesis"
 SOURCE "NCSP"
 CODE "HAD10"
 MAIN augmenting
 ACTS_ON breast
 BY_TECHNIQUE implanting
 ACTS_ON prosthetic implant

And...

RUBRIC "Mastektomi"
 PARAPHRASE "Total removal of breast"
 ENGLISH_RUBRIC "Total mastectomy"
 SOURCE "NCSP"
 CODE "HAC20"
 MAIN removing
 ACTS_ON breast
 HAS_EXTENT total

There are cases where the intention of the WITHOUT link is less clear, for example:

RUBRIC "Exérèse de lésion endométriosique pelvienne profonde, sans exérèse viscérale, par laparotomie"
 PARAPHRASE "Exérèse de lésion endométriosique pelvienne profonde, sans exérèse viscérale, par laparotomie"
 SOURCE ""
 CODE "G111"
 MAIN excising
 ACTS_ON endometriosis lesion
 HAS_LOCATION peritoneum viscerale
 BY_APPROACH_TECHNIQUE incising
 ACTS_ON abdominal wall
 WITHOUT excising
 ACTS_ON splanchnic organ
 BY_APPROACH_TECHNIQUE incising
 ACTS_ON abdominal wall

In this case the WITHOUT link not only represents the concept of :
 ‘the removal of an area of endometriosis without the removing of an organ’
 but is also intended to represent the notion of:

‘Removal of an area of endometriosis, OTHER than during another abdominal procedure’

A solution, to avoid ambiguity and allow the capture of meta-information to is to replace the current WITHOUT link with two new separate links,

WITHOUT_ACTION which would be used to capture the sense of Procedure:A without Procedure:B

EXCLUDES_CONTEXT which would be used to capture Procedure:A other than in the context of Procedure:B.

The above examples would become:

RUBRIC "Bilateral Mastectomy without Lymph Node Clearance"

MAIN removal

ACTS_ON breast

HAS_LATERALITY bilateral

WITHOUT_ACTION removing

ACTS_ON Axillary lymph nodes

RUBRIC "Förstoring av bröst med protes"

PARAPHRASE "Enlarging operation on breast with use of prosthetic material"

ENGLISH_RUBRIC "Augmentation of breast using prosthesis"

SOURCE "NCSP"

CODE "HAD10"

MAIN augmenting

ACTS_ON breast

BY_TECHNIQUE implanting

ACTS_ON prosthetic implant

EXCLUDES_CONTEXT plastic surgery

ACTS_ON breast

HAS_TEMPORAL_MARKER after

IS_ACTED_ON_BY excising

ACTS_ON breast

RUBRIC "Exérèse de lésion endométriosique pelvienne profonde, sans exérèse viscérale, par laparotomie"

PARAPHRASE "Exérèse de lésion endométriosique pelvienne profonde, sans exérèse viscérale, par laparotomie"

SOURCE ""

CODE "G111"

MAIN excising

ACTS_ON endometriosis lesion

HAS_LOCATION peritoneum viscerale

BY_APPROACH_TECHNIQUE incising

ACTS_ON abdominal wall

WITHOUT_ACTION excising

ACTS_ON splanchnic organ

EXCLUDES_CONTEXT excising

ACTS_ON splanchnic organ

BY_APPROACH_TECHNIQUE incising

ACTS_ON abdominal wall

3.11.2.2 The WITHOUT link and Descriptor Negation

Document VUM03/96 described the preferred representation for Descriptor Negation at paragraph 7.3.1 **Descriptor Negation (excluding procedures)** as follows:

In GRAIL and in the template syntax, there is no mechanism for negation of descriptors, other than the limited form available for procedures. Rubrics of the form:

Procedure:A ACTS_ON NOT(category:B)

therefore, can not be explicitly represented in a dissection or in GRAIL. In most cases, however, the real intention behind such exclusions is to alert the coder that there exists a separate code for:

Procedure:A ACTS_ON category:B

In general, therefore, the negation information is included as a meta-instruction to coders. In a GRAIL implementation, the automatic coding system would find the correct code without needing the exclusion information. For this reason, we propose that the exclusion criteria are not represented in the body of a dissection, but included only as free text in the CODING_METACOMMENT field of the header:

Example:

```
ENGLISH_RUBRIC "removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)"
CODING_METACOMMENT "excludes removal of osteosynthetic material from vertebra (5-788.4)"
CODE "5-788.8"
MAIN removing
  ACTS_ON OTHER internal fixation device
  HAS_LOCATION bone
```

In the above example, the implied alternate code is actually given in the rubric. Indeed, further on in the dissections we find:

```
ENGLISH_RUBRIC "removal of osteosynthesis material from vertebrae"
CODE "5-788.40"
MAIN removing
  ACTS_ON fixation device
  HAS_LOCATION vertebra
```

However, several dissections have been produced which use the WITHOUT link to try to capture this meta-information, in the form:

```
ENGLISH_RUBRIC "removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)"
CODE "5-788.8"
MAIN removing
  ACTS_ON OTHER internal fixation device
  HAS_LOCATION bone
WITHOUT removing
  ACTS_ON fixation device
  HAS_LOCATION vertebra
```

Dissections in this form do not prevent the automatic coding system from finding the correct code for 'the removal of osteosynthetic material from vertebrae (5-788.4), however, they do prevent the correct classification and sorting of other concepts. In this case, the intention is for the code 5-788.8 to include procedures such as:

EXAMPLE_RUBRIC "removal of other internal fixation device from femur"
 CODE "?????"
 MAIN removing
 ACTS_ON OTHER internal fixation device
 HAS_LOCATION femur

However, the GRAIL expansion of:

ENGLISH_RUBRIC "removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)"
 CODE "5-788.8"
 MAIN removing
 ACTS_ON OTHER internal fixation device
 HAS_LOCATION bone
 WITHOUT removing
 ACTS_ON fixation device
 HAS_LOCATION vertebra

would not include this unless:

EXAMPLE_RUBRIC "removal of other internal fixation device from femur"
 CODE "?????"
 MAIN removing
 ACTS_ON OTHER internal fixation device
 HAS_LOCATION femur
WITHOUT removing
 ACTS_ON fixation device
 HAS_LOCATION vertebra

...was explicitly stated. It would be necessary to include the WITHOUT clause in all similar cases, which is not only impracticable, but also somewhat defeats the purpose of an automatic classificatory system. The aim of such systems is to classify concepts automatically in the correct place, while making the minimum amount of explicit assertions about that concept. Thus, it would be desirable for:

‘The removal of other internal fixation device from femur.’ Etc.

to be automatically classified under:

‘Removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)’

without having to explicitly state that the ‘removal of an internal fixation device from the femur does not include the removal of osteosynthetic material from a vertebra’.

In the VUM03/96 it was suggested that the preferred way to dissect this coding meta-information was to place the exclusion criteria in the CODING_METACOMMENT area of the header. It is clear from the many examples where the WITHOUT link is used to try to include such information in the body of the dissections that there is a reluctance to do this, possibly because there is the feeling that the exclusion clause is ‘too important’ to be consigned to the header. As a possible solution to this problem, a new link should be introduced: OTHER_THAN:

Thus, the above example would become:

ENGLISH_RUBRIC "removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)"

CODE "5-788.8"

MAIN removing

ACTS_ON OTHER internal fixation device

HAS_LOCATION bone

OTHER_THAN removing

ACTS_ON fixation device

HAS_LOCATION vertebra

Or:

ENGLISH_RUBRIC "removal of other internal fixation device. Excludes: osteosynthetic material from vertebrae (5-788.4)"

CODE "5-788.8"

MAIN removing

ACTS_ON OTHER internal fixation device

HAS_LOCATION bone

OTHER_THAN Code 5-788.4

3.11.2.3 The GRAIL expansion of the EXCLUDES_CONTEXT and OTHER_THAN links

It may superficially appear that all that has been changed is the naming of the without link to reflect its different meaning in different situations. However, the links will be expanded differently into GRAIL.

The WITHOUT_ACTION link will be expanded explicitly in the same way as the WITHOUT link is expanded at present. It should therefore only be used where the omission of an act would be explicitly stated in the clinical notes e.g. Bilateral Mastectomy without axillary lymph node clearance.

The EXCLUDES_CONTEXT and OTHER_THAN links, however, will be treated differently. The information in the dissection following the link will not be expanded into GRAIL, but captured separately and attached extrinsically to the resulting GRAIL, in a similar way to the CODE and RUBRIC links. This allows the coding meta-information to be captured, and later retrieved (for use in e.g. language generation) while allowing the correct classification of concepts.

3.11.3 The scale of usage of the WITHOUT link

Of approximately 6500 dissections, from all centres, 240 (3.7%) use the WITHOUT link.

Of these, the link was used correctly i.e.

Procedure:A without (performing Procedure:B during Pcedure:A)

127 times (53%).

The link was used to include the meta-information "excludes context" 15 times (6%) and to include the meta-information "other than code/rubric" 36 times (15%).

There were 61 occurrences (25%) where the meaning of the without link was ambiguous, i.e. it was not obvious whether the intention was to convey the meaning "without action", "excludes context" or "other than code/rubric"

Although the number of dissections incorrectly or ambiguously using the WITHOUT link is relatively small (only 1.7% of all the dissections), this is enough to prevent the successful classification of many other concepts. The WITHOUT link is found in dissections from all centres almost equally, and so the task of correcting and clarifying these dissections should be relatively quick and easy.

4 Tools

For a more detailed description of the tools, the reader is referred to the other GIU deliverables

4.1 Using GRail for Classification Management

Abstract. This paper describes a novel approach in classification management where a formal model of medical semantics is being used for manipulations on existing classification systems. The paper addresses the issue of semi-automatically making specialist classifications that are compatible with the source classification. The examples in this paper are from a limited domain. At the time of the presentation results will be shown of the present modelling work within the GALEN-In-Use project. The model will then contain several thousands of medical procedures from four different classification centres.

4.1.1 Introduction

In medicine, standard classifications, such as ICD and ICPM, are typically intended for a wide range of users and settings. Consequently they are not adapted to the needs of any particular user or the circumstances of any particular setting. To make standard classifications more attractive to users, they often have to be adapted in some way. Adaptation may involve selection of relevant classes, refinement of the classification by adding relevant subclasses, and rearrangement of classes in a more appealing order. Rearrangement, in particular, has to be done with care, to avoid breaching the compatibility with the standard classification. To date, production of compatible adaptations is mainly done manually, by means of a word processor, which can be a very time-consuming and thus costly task. The last version of ICD has taken 15 years to come to deployment. The translation and local adaptation takes an additional number of years, and a lot of effort. Consequently new ways are being sought to support this presently mainly manual craftsmanship.

Within the GALEN-In-Use-project a Classification Manager (ClAM) is being developed to assist Classification centres with their task of producing compatible adaptations and reliable conversions between different classifications. In addition the ClAM will support the translation of classifications.

In the third year of the GALEN-In-Use project a major validation of this approach will take place by nine Classification Centres in nine different countries

4.1.2 The Core Reference Model

GALEN aims to build a compositional generative model for medical terminology. This model comprises a well defined ontology of atomic medical entities with rules to combine these entities such that all and only sensible medical expressions can be generated. This means that with a relatively small model in principle billions of medically sensible expressions about patients can be made. Ultimately it is the intention that GALEN covers all of medicine. The language in which this knowledge is represented is called GRail, the GALEN Representation And Integration Language. The model of this knowledge is called the Common Reference Model, or CRM for short. The present version of the CRM comprises some 7000 elementary entities with about 15000 links. It is expected that to cover a general layer of medicine some 25000 elementary entities are required. [1,2,3]

4.1.3 Classification Schemes

The ClAM stores a classification scheme in a hierarchy consisting of *classes*. Each class consists of a *code* and one or more rubrics. A rubric can be further specified by its *kind* (e.g. *preferred*, *includes*, *excludes*) and a *language* (e.g. *Dutch*, *English*). For example the ICD-10 class A18.61 could have the rubrics:

Dutch preferred "Tuberculeuze otitis media"

Dutch synonym "Tuberculeuze middenoorontsteking"

Dutch note "Not sure whether the Dutch synonym is OK"

English preferred "Tuberculosis of ear"

A class in one classification scheme can reference a class in another classification scheme. This can, for example, be used to link a class in an existing classification scheme to a specialist classification scheme. Similarly, a class in a classification scheme can reference a concept in the CRM. The latter references are called *mappings* to differentiate them from references between classes in classification schemes. Both *references* and *mappings* are specified by their *kind*, e.g. *isEquivalentTo*, *isBroaderThen*, etcetera.

The ClaM supports the following functionality:

- *Activities involving a single classification scheme*
 - Creation of complete new systems (views)
 - creating, modifying, moving and/or deleting classes
- *Activities involving multiple classification schemes*
 - creating and maintaining relationships between different classification schemes and/or different versions of one classification scheme
 - copying classes from one classification scheme to another
- *Activities involving a classification scheme and the GALEN CRM*
 - mapping classes of a classification scheme to concepts in the CRM
 - making selections of existing classification schemes knowledge in the CRM
 - extending existing classification schemes using knowledge in the CRM
 - rearranging existing classification schemes using knowledge in the CRM

4.1.4 Operations on a Classification Scheme

Medical specialists have specific requirements for the terminologies they use. They find the existing systems mostly not sufficiently detailed, or having a lack of precision. They also do not want to be bothered by terminology outside their own field of specialty, at least they do not want all the high detail outside their own domain. Making specialist classifications is tedious and therefore expensive, as it mostly can not be performed solely on the basis of the classifications own structure, nor by simple string matching procedures. Experience at WCC has shown that such approaches yield only 60% of the target specialist classification scheme (5). The remaining parts are gathered by hard work.

Below we will outline a number of operations that are performed using the CRM as a backbone for manipulations. The examples here are meant to be illustrative for the kind of operations that are possible with this formalism. In the presentation we will show real examples of manipulations on the classifications of medical procedures. At the time of this writing four classification centres are working on the analysis of those classifications.

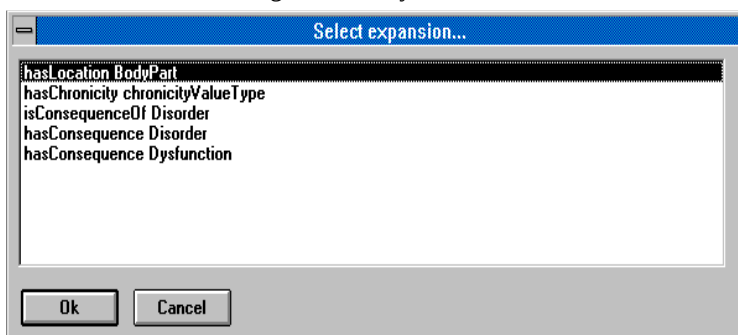


figure 1. The sensible statements for the refinement of the concept *Cellulitis of the external ear* (ICD-10) according to the GALEN CRM.

4.1.4.1 Refinement of a Classification Scheme

The ClaM can automatically create sub-classes for a class in a classification scheme based upon the concept in the CRM to which the class is mapped, and its sensible particularisation's in the CRM. For example suppose the class *H60.1 Cellulitis of the external ear* (ICD10) is mapped to the concept (*Cellulitis which < hasLocation ExternalEar >*) in the CRM. You can then select a statement from the list of sensible statements for the concept (figure 1) which will be used to create refined sub-classes for *H60.1*.

The entry *hasChronicity chronicityValueType* for example means that it is sensible for the concept (*Cellulitis which < hasLocation ExternalEar >*) to be refined using criteria of the form *hasChronicity chronicityValueType*. Upon selection of *hasChronicity chronicityValueType* the ClaM will generate the corresponding refinements e.g.,

- (Cellulitis which < hasLocation ExternalEar hasChronicity chronic >)
- (Cellulitis which < hasLocation ExternalEar hasChronicity acute >)

- (Cellulitis which < hasLocation ExternalEar hasChronicity subacute >)

In addition, the ClaM will generate subclasses below *H60.1 Cellulitis of the external ear* and map them to the new concepts. The rubrics of these new classes will be generated by the ClaM's natural language generator. This will result in these classes:

- H60.1.0 Chronic cellulitis of the external ear
- H60.1.1 Acute cellulitis of the external ear
- H60.1.2 Subacute cellulitis of the external ear

4.1.4.2 Selection from a Classification Scheme

The ClaM can select a number of classes from an existing classification scheme and copy them into a new classification scheme. An example of making a selection is to copy all the classes in the ICD10 that involve a disorder of the ear (figure 2) to a new classification. The ClaM collects all the descendants of e.g., (*Disorder which < hasLocation Ear >*) from the CRM, this will all be disorders that involve the ear or parts of the ear. Then the ClaM looks up all the classes in the source classification that map to any of these concepts. These classes and their ancestors will be copied to the target classification. The ClaM will also create the mappings between the classes in the new classification scheme and the CRM. You can modify the new classification as required, e.g., by adding or removing classes and rubrics.

4.1.4.3 ReArranging a Classification Scheme

This is similar to the previous operation, the main difference is that in *Selection from a classification scheme* the hierarchical structure of the original classification scheme is preserved in the new classification scheme. When the ClaM rearranges a classification scheme, the hierarchical structure of the new classification scheme reflects the structure in the CRM. For example, you could rearrange all the classes of the ICD10 that involve disorders of the ear. In ICD10 you will find such classes in several chapters. Again, the ClaM first collects all the descendants of (*Disorder which < hasLocation Ear >*). The hierarchical structure of these concepts is copied to the new classification scheme. Then the ClaM looks up the classes in the source classification that map to these concepts, and copies their codes and rubrics to the new classification scheme.

In the example all the classes involving disorders of the ear from the ICD10 have been re-arranged on the basis of the subsumption hierarchy in the CRM. Note that this is a multi-axial hierarchy. It contains a hierarchy by type of disorder (A18.6+; D09.7; D36.9), and a hierarchy by topography (H60-H62; H65-H75; H80-H83).

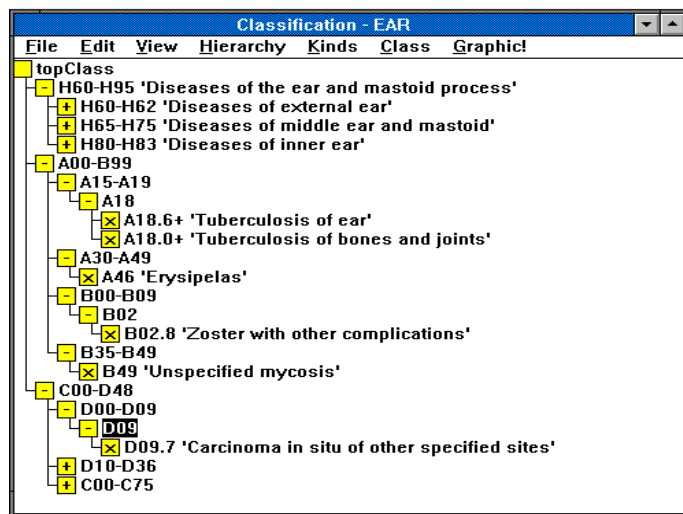


figure 2. An example of a selection from ICD10 based upon (Disorder which hasLocation ear). In the hierarchy an 'x' in the square box means this is a leaf node. Squares having a '+' mean that they have children underneath, which may be shown with a single click of the mouse on that box.

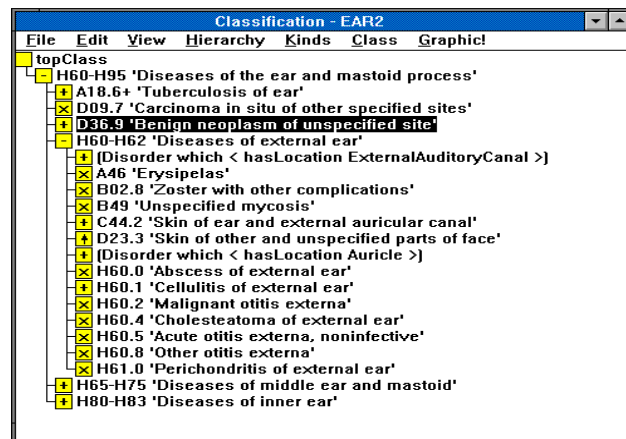


figure 3. An example of a re-arranged part of the ICD10 based upon the concept hierarchy below 'Disorder which hasLocation Ear'. Where there is no rubric in the original classification ClaM fills in the Grail concept (e.g.(Disorder which <hasLocation Auricle)). The next version will generate a natural language string for that GRAIL concept

4.1.5 Conclusions and Future Developments

The results given in this paper suggest that the GALEN CRM can be used for selection and refinement of specialist classification schemes. It must however be realised that the present CRM is only covering a small portion of medicine. Also there are only small sections of systems like ICD and SNOMED being mapped to the CRM. Therefore it is too early now to draw final conclusions. Present work on medical procedures in the GALEN-In-Use project should however give the answers of the usefulness of the GALEN approach for classification management purposes.

Future developments in the ClaM are that it will support the generation and analysis of natural language expressions. Natural language generation will take place in the present project period, analysis is pending on separate funding. Later this year the ClaM will be integrated with existing GRAIL based natural language generators. In the second quarter of 1997 we will assess the first results of language generation with the individual centres. By the end of 1997 natural language generation is planned for Dutch, English, Finnish, French, German, and Italian. This will allow the ClaM to automatically translate a classification scheme from one language into another.

4.1.6 References:

1. Rector, A. (1994). Compositional models of medical concepts: towards re-usable application-independent medical terminologies. in Knowledge and Decisions in Health Telematics P. Barahona and J. Christensen (ed.). IOS Press. 133-142.
2. Rector, A., W. Solomon, W. Nowlan; T. Rush; W. Claassen; and P.E. Zanstra (1995). A Terminology Server for Medical Language and Medical Information Systems. Methods of Information in Medicine, Vol. 34, 147-157
3. Rector, A. and W.A. Nowlan (1993). The GALEN Representation and Integration Language (GRAIL) Kernel, Version 1. The GALEN Consortium for the EC AIM Programme. (Available from Medical Informatics Group, University of Manchester).
4. Anonymous (1995) Draft WCC Methodology for the development of specialist classifications.(in Dutch)
5. Anonymous(1993) Draft WCC standard classification on behalf of Ear, Nose and Throat Medicine, adaptation of the ICD-10 (in Dutch)

5 Training

In the summer of 1998 a workitem for the GALEN Organisation Ltd was planned to produce additional teaching material. For various reasons it appeared not to be possible to subcontract this work. We here give the global outlines for the training material as it was at the planning stage. The material is likely to be worked out further by KUN and VUM.

5.1 SPET+ Course: Working with SPET and Claw

Introduction

Course material

Prerequisites

Scope of the Course

Related courses from GOL

5.1.1.1 Installing and customising SPET+

Overview

Preparing for installation

Requirements

The SPET+ installation process

Building of the Dictionary

Short explanation of GRAIL

Customising SPET+

The structure of the SPET+ on the hard-disk

In this chapter the installation process will be explained guided by the items above

5.1.1.2 Starting up

Overview

The login window

The SPET main window

Explanation of the menu bar and buttons

This chapter deals with how SPET opens, the email address fill-in box and an explanation of the functionality of the bar and buttons in the main window of SPET

5.1.1.3 The Dissection Editing Form

Overview

The different working areas

The header of the form

The editing area

The semiformal representation area (resulting in the dissection of the original rubric)

The controlled vocabulary area

The categories area

The descriptor area

This chapter will handle the different areas in the editing window. It will include an example of a dissection.

5.1.1.4 The use of the Paraphrase

Overview

How to use the paraphrase

In this chapter the function of the paraphrase will be explained. Argumentation for not replacing the own paraphrase by

the generated paraphrase will be given.

5.1.1.5 Making a dissection

Overview

The CEN ENV 1828 as a starting point

Why dissecting?

What is dissected?

What is the purpose of it?

The process of making a dissection

- Decomposing

- Composing

In this chapter the dissecting of a rubric will be explained in detail. This is probably the largest chapter.

As a reference to chapter 1 there will be an explanation of the why the what and the how of the dissection.

5.1.1.6 Making a new system of concepts (from scratch)

Overview

Building a new knowledge base

- Naming of the knowledge base

- Remarks concerning the knowledge base

- Opening the dissection editing form

This chapter should deal with the development of a new, flat list. Like the French classification for procedures

5.1.1.7 8. The classification browser

Overview

Handling the classification browser

- Opening a .cla file

- Navigating in a .cla file

- Functionality of menu bar and buttons

Making a .cla file (as an appendix)

In this chapter the focus will be on the functions of the classification browser and how to navigate in a .cla file

5.1.1.8 Analysing an existing system of concepts

Overview

Building a new knowledge base

Working from a text processor readable Classification

Working from a ClaM based source file

This chapter deals with existing classifications, for creating a knowledge base against which the existing classification can be compared, for improvement of the structure and for future version control and updating

5.1.1.9 Extending the list of descriptors

Overview

When to add new descriptors

How to add new descriptors

This chapter deals with the way descriptors can be added, one by one, or several at a time, by first scoping a document. It will also handle the categories and the descriptor search function

5.1.1.10 Mapping to GRAIL

Overview

Mapping one rubric to GRAIL

Mapping all rubrics to GRAIL

This chapter deals with the aspects of how rubrics are mapped to GRAIL. What this mapping means. That the local model is an extension of the central model. GOL.

5.1.1.11 Mapping to GRAIL with Test Classification

Overview

Configuring SPET for the functionality Test Classification

This chapter shows the functionality of 'test classification' and how it can be used in the process of structuring the classification

5.1.1.12 The use of 'OTHER' in a rubric

Overview

The use of 'other' in a classification scheme

The use of 'other' in SPET

The chapters deals with the phenomenon 'other'. The way it is used in most classification schemes and how it is handled in TIGGER(ke)

5.1.1.13 The use of 'non-analytical' in a rubric

Overview

Short explanation of the meaning of 'non-analytical'

How to use 'non-analytical'

An explanation will be given how this functionality can be used in SPET .

5.1.1.14 The use of Gold Standard

Overview

Explanation of the status of Gold Standard

How to make use of the Gold Standard

Limitations

5.1.1.15 The copy function within SPET

Overview

How to use the copy function

This chapter deals with time saving aspects of the copy function within SPET, but also with the easy to make mistakes when using it.

5.1.1.16 Making your own special purpose system of concepts

Overview

Inventing your own structure

In this chapter the constructing of a special purpose classification will be explained, using the 'endoscopic' example.)

5.1.1.17 Maintenance/QA

Overview

Opening an existing dissection (.dis) file

Adding rubrics to the dissection file

Handling the status of the rubric

Interaction with GOL descriptors

This chapters deals with the maintenance of SPET files, how to add to a file, repair errors and how to work with the status of rubrics as a part of QA.

5.1.1.18 Managing SPET files

Overview

Kinds of SPET files

.dis and .txt files for knowledge base files

.txt files for descriptors

This deals with the management of SPET files. How to export and import files, etc

A referral will be made to the structure of the files in the directory structure in chapter 2

5.1.1.19 Printing a file from SPET+/CLAM

Overview

How to make a selection

Copying to a text processing program

5.1.1.20 FAQ

Overview

Specific questions

5.2 Typical SPET/ClaW Workshop programme

LOCATION

University of Nijmegen

Faculty of Medical Sciences

Department of Medical Informatics, Epidemiology and Statistics

Kapittelweg 54

6525 EP Nijmegen

Tel: +31-24-3616976; Fax: +31-24-3613505; E-mail: H.TenNapel@mie.kun.nl

5.2.1 General Goal

The generic goal of the course/workshop is to get familiar with the formal decomposing of classifications.

5.2.2 General Information

The workshop is held in Nijmegen at the Faculty of Medical Sciences. The Faculty is easy to reach by train or by car. The Faculty is a 5 minute walk from the railwaystation 'Heyendaal'.

5.2.3 Preparations and requirements

It is advisable to bring your own notebook-pc with you, with Windows 95 installed on it. The SPET+-tool only works in this environment (Windows 95 or higher). You can also bring your own classification scheme on (surgical) procedures, if you have one, and an English medical dictionary.

After you have received the Galen Organisation Information CD-Rom, view the complete Claw-film and read the VUM-03 document and try to read at least the mie97. (5) documents. All files are included, either in the files wich are on the CD-Rom or where sent to you by E-mail in the attached Zip-file.

5.2.4 Agenda for the Workshop

5.2.4.1 First day of the Workshop

The focus of the first day is that you learn to understand the SPET-tool as a part of the GALEN-environment. You will have a global understanding of what to do with SPET and how to handle some of its features. At the end of day 1, you will be able to start working on your own with analysing classification schemes, using the GALEN methodology.

1 hour	Introduction in SPET, if needed, in Galen-In-Use project, installing SPET+ on notebooks, checking functionality of installation
15 min.	Break
1h.30 min.	Demonstration of functionality of Spet+
1 hour	Break
2 hours	Hands on Classroom training on the SPET+ (Surgical Procedure Entry Tool) Objective is for each participant to analyse (dissect in GALEN jargon) 9 to 10 rubrics
15 min.	Break
1hour	Continued hands on SPET+
15 min.	Evaluation of day 1 End of day 1

5.2.4.2 Second day of the Workshop

The focus of the second day is:

- Now you can master the tool on your own, how can you control quality and coherent modelling style across a group
- How does the classification you have analysed map to the formal GALEN structure. How does SPET+ and ClaW help you in building your own classification and assist you in daily practice? What functionalities are there in SPET+ for this purpose?
- After this day you should at least be able to continue working with the GALEN-tools on your own and verbalise what GALEN means for classification management in your situation.

1 h. 15 min.	Exercise in QA and coherence across a group
15 min.	Break
1 hour	Assessment of the participants dissections of yesterday. Role of paraphrase and translation. Style, quality of dissections.
30 min.	Demonstration of Claw as QA tool: the functionality of “test classification”
1 hour	Break
2 hours	Hands on Classroomtraining on the SPET+ with “test classification” option. Objective is for each participant to make 10-20 additional dissections of different complexity and map to GRAIL.
15 min.	Break
1 hour	Continued hands on SPET
15 min.	Evaluation of day 2, Assessment of usefulness for own practice Workshop closure

5.2.5 Organisational issues

The table below summarizes the persons attending the Workshop, when they are expected to arrive, the day of departure from the hotel, and the name of the hotel.

Participant	Arrival day/time	Departure	Hotel
-------------	------------------	-----------	-------

The Workshop will take place in the colloquiumroom at the Kapittelweg.

5.2.6 Preparations and requirements for the staf

5.2.6.1 Number of participants

5 persons per trainer is manageable and advisable

5.2.6.2 Instructional devices / equipment

- 2 workstations with Windows 95 installed and networkconnection
- CDROM with SPET+ (SPET + Classification browser, mappings to GRail)
- 17/19 inch monitor for demonstration purposes or LCD projector
- Medical Dictionary like Dorland's on CDROM, or Web
- Hardcopy of Dorland's, Kerkhof's Medical Dictionary EN/NE, Feneis Anatomical Zakboek, ICPM & ICPM-DE hardcopy
- List of 9 to 10 preselected rubrics
- List of 9 to 10 dissections of the same rubrics
- List of 20 rubrics with different levels of abstraction
- Vum03 document (irconfig.rtf)
- GALEN Information CDROM with ClaWfilm

5.2.6.3 Time schedule

- Information delivery 1 week before Workshop
- Reservation of trainingroom 1week before training?
- Preparation/inspection of trainingroom the day before the workshop or early day 1
- Installation of software on the first morning/hour of the Workshop

6 Quality assurance of analysis work

6.1 A skeleton about QA in GALEN-IN-USE

authors:	A. Rossi Mori, F. Consorti, E. Galeazzi, A. Errera
circulation:	Alan Rector, Pieter de Vries Robbè, Jochen Bernauer
date:	97-04-15
goal of this release:	list the potential (top) criteria
action required:	check if major criteria were considered
following actions:	expand criteria into detailed rules with examples (Jochen, Pieter: do you like to take some part to expand it ?)

We try to have a top-down approach to derive QA rules from principles.

We used the following starting points:

1. the goals of GALEN on phrases
2. the goals of GALEN on coding systems
3. the goals of GALEN on language
4. the process of modelling (the methodology)

We intend to use the same framework also to specify the framework for internal QA, after each major phase within each center.

In this version of the document we expand them for a couple of levels, up to a set of "commands", in order to set up the framework. We need to know if we missed some starting point for our framework, and if the expansions are correct and complete.

Potential repetitions will occur. First, we have to clarify if they are really repetitions (and to characterize the differences). Second, we have to realize if we have to repeat some activity twice, within different contexts. Note that redundant controls can be methodologically correct.

In the next versions — possibly with the contribution of the other partners — we intend to expand and refine the present "commands" further up to the level of individual rules, with examples.

For the moment, we limit ourselves to the process of revision, and to qualitative aspects; we don't face the problem of the comprehensive evaluation of the outcome of the QA process, ie. the definition of quantitative indicators and thresholds for acceptance.

6.1.1 Goals of GALEN on concepts

The model in GALEN has to be complete and correct. It should also be parsimonious, but this feature is difficult to be checked from the outside of the model (it is an internal feature to be checked otherwise).

One of the major features of GALEN is the ability to classify the concepts behind the phrases in a multiple hierarchy. Finally, we consider that the model should be robust, "universal" and purpose-independent. We try to express that in a need for regularity across the sections of the model, and in the need for accurate normalization (similar constructs represented in similar way).

Therefore, from the goals of GALEN about phrases we have:

- it has to model all and only the sensible phrases
 - check for missing phrases
 - compare if a sub-domain is more "rich" than another
 - check if all modelled phrases are meaningful

-
- it has to classify concepts behind the phrases properly
 - check if the overall structure of the taxonomy is correct
 - look, for each node, if different dimensions (criteria) were used
 - check, for each node and each uniform criterion, if the present children are correct
 - check, for each node and each uniform criterion, if some children are "missing" (see note below)
 - check, for each node, if additional dimensions (criteria) could be "relevant"
 - check, for each node, if the present parents are correct
 - check, for each node, if some parents are missing
 - model has to be balanced
 - look for similar nodes in different positions
 - check if both have children
 - compare set of children and check if differences are justified
 - check for missing nodes you could expect
 - model has to be "normalized"
 - look for similar phrases expressed in different ways
 - look for similar details expressed in different ways within different phrases

NOTE: We are aware that most questions will involve the subjectivity of the domain experts, both the ones populating the model, and the ones performing the QA revision.

In consequence the context of each center (principles, scope, limits, purposes) must be very clearly stated and revision should be performed according to that context.

6.1.2 Goals of GALEN on coding systems

Each portion of the model should correspond at least to the coding system that was used as a source for its massive population.

We first consider the difficulty to understand the precise meaning of a rubric, in order to model it by a very pedantic formalism. Then we have to render that precise meaning into concepts of the model, and to mirror the original hierarchy (with its imprecisions) into the taxonomy of the model.

We introduce the idea of "semi-analytical", to tell that there is a lot of evidence that a detail should be considered, even if it does not appear in the phrase (eg. in phrases with multiple deeds, repetition of the direct object is normally avoided).

The set of criteria about coding systems could be the following;

- interpretation of original rubrics should be correct
 - check for proper rendering of the context
 - check for strongly implied details (semi-analytical)
 - check if non-analytical details are marked
- modelling of interpreted rubrics should be correct
 - check if all details are present in the dissection
 - check if descriptors correspond to the real meaning of the words used
 - check if each detail is linked to the proper concept in the phrase
 - check if the choice of each semantic link fit with the original phrase
- original hierarchy should be considered in the model
 - check if correct is-a relations are mirrored in the model
 - check if correct part-of relations are mirrored in the model
 - check if incorrect relations are managed otherwise by the model

6.1.3 Goals of GALEN on language

In the present version of the methodology, centers will use phrases generated back from canonical forms by a natural language generator. We do not pretend that reconstruction is perfect, but it should be at least acceptable by experts (and in future by end-users).

Therefore we can establish the following criteria:

- generation of phrases should be acceptable (ie. tolerable)
 - check if generation of each phrase is correct
 - check for spelling errors
 - check for proper rendering of descriptors
 - check for proper use of prepositions
 - check for adequate order of words
 - check for concordance between nouns and adjectives
- check if generation of each phrase is redundant

6.1.4 Process of modelling (the methodology)

This section deals with the experimental evaluation of the appropriateness and completeness of the rules and of their application.

Here by "rule" we mean each suggestion, constraint or recipe that was suggested in the different documents about the methodology (the VUM series, the Methodology Document, the new ones in preparation, ...). Of course, when the new series of documents will be adopted, the QA will be performed against them.

The rules include, for example, how to model the bypass, which is the set of semantic links that can be used and the domains that can be linked.

Perhaps the QA document has not to repeat all the rules, but just to cross-reference them; perhaps it could be useful to have here specialized recommendation for a subset of peculiar rules.

In our mind, in this section we have two levels of assessment:

- the degree of application of existing rules by the centers;
- the correctness and the completeness of the rules themselves.

In general:

- the set of rules should be complete
 - look for suggestions from centers
 - look for unhappiness from centers on particular dissections or descriptors
- rules should be correct and coherent
 - check from examples of application if each rule is correctly conceived (are we suggesting a wrong behaviour ?)
- each rule should be applied when needed
 - check if each rule was correctly applied
 - look if non-application is justified
 - check if justification is reasonable
 - (do we need to modify the rule ?)
 - (do we need to add a rule ?)
- rules should be clear (well written) and not misleading
 - check if each rule was improperly applied
 - check if it was applied in the wrong situation
 - check if it was used in an improper way

Other issues to consider regard the compliance with a stated process:

- the local adaptation of the reference methodology is accurately described ?
- were the phases performed, as stated in the local adaptation of the methodology ?
- were the intermediate documents produced as described in the local adaptation of the methodology ?
- were information and document exchanges timely performed, as agreed among centers ?
- were crucial deadlines respected ?

6.1.5 Additional considerations

We could add a specific section on **dissections**, but perhaps it is "automatically" included in the section 4 on the process, if we analyze the consequences for QA of particular rules.

Perhaps it could be appropriate to stress the QA on **descriptors** by a specific section; at the moment they are scattered in the other sections. This is a case of redundancy that could have a large benefit.

Precise finalization of the details of this document (and the complete expansions of the rules and examples) can be made only when the revision of the other two streams (problems and recipes) is complete. Additional input will come from the revision of the methodology book.

Of course also the benefit of a new, deep QA exercise (with this document in mind) has not to be underestimated.

6.2 Periodical QA exercise (december 1996)

Subject:	<i>QA exercise.</i>
Action Requested:	<i>read</i>
By Whom:	<i>all</i>
By When:	<i>before the workshop at Werner's (6/2/97)</i>
Objective of this document:	<i>To compile the exercise results and provide some comment by FF.</i>
Status of this document	<i>second draft (no gold standard is proposed yet).</i>
Reference of this document	<i>KUN9701 version 1.1</i>
Response to	<i>exercise results sent in by LIU, CNR, VUM and USE</i>
Summary:	<i>The results show large variety in the dissection of the same rubric by different coding centres. All dissections contain mistakes or questionable solutions.</i>

6.2.1 QA exercise 1:

1. surgical procedures on the blood supply of the heart
 - 1.1: revascularisation of the heart, by means of arterial implant
 - 1.1.1: free graft of mammary artery, singular
 - 1.1.1.1. FREE GRAFT OF MAMMARY ARTERY, SINGULAR, LEFT

6.2.1.1 LIU (first attempt)

RUBRIC "Free graft of mammary artery, singular, left"

PARAPHRASE "By-pass from aorta to coronary artery, by graft from mammary artery followed by closing of mammary artery"

SOURCE "Frank FLier" CODE "QA1.1.1.1"

MAIN surgical deed

ACTS_ON graft
 IS_ACTED_ON_BY removing
 HAS_SOURCE Anatomy: mammary artery
 IS_ACTED_ON_BY closing
 TO_ACHIEVE NON-ANALYTICALLY bypassing
 ACTS_ON graft
 HAS_DESTINATION coronary artery
 HAS_LATERALITY left
 HAS_SOURCE aorta
 HAS_NUMBER 1

Comment by ff: The construct “surgical deed which acts on graft which is acted on by removing” seems rather cumbersome. Is it any different from “removing which acts on graft”? And is the mammary artery already a graft at the time that it is acted on by removing, or does it become a graft only after removal?

The bypassing is indeed non-analytical. But the revascularisation appears to be analytical, and this is now missing from the dissection.

6.2.1.2 LIU (second attempt, AT1.1.)

1. surgical procedures on the blood supply of the heart
- 1.1: revascularisation of the heart, by means of arterial implant
- 1.1.1: free graft of mammary artery, singular

CODE "1.1.1.1"

RUBRIC "FREE GRAFT OF MAMMARY ARTERY, SINGULAR, LEFT"

PARAPHRASE Connection from aorta to coronary artery to provide lumen for blood flow, using a free graft of left internal mammary artery

MAIN surgically creating

ACTS_ON connection
 FROM aorta
 TO coronary artery
 BY_MEANS free graft
 HAS_SOURCE mammary artery
 HAS_LATERALITY left
 TO_ACHIEVE revascularization
 ACTS_ON heart

Comment by ff: This takes into account the recommendation of VUM1097. But now we have some indenting problems. I would rather indent like this:

MAIN surgically creating

ACTS_ON connection
 FROM aorta
 TO coronary artery
 BY_MEANS free graft
 HAS_SOURCE mammary artery
 HAS_LATERALITY left
 TO_ACHIEVE revascularization
 ACTS_ON heart

6.2.1.3 LIU (third attempt, AT1.2)

RUBRIC "Free graft of mammary artery, singular, left"

PARAPHRASE "Connecting aortic root with one coronary artery, by means of a single free graft of the left mammary artery."

SOURCE "FF" CODE "1.1.1.1"

MAIN connecting

ACTS_ON_1 Anatomy: aortic root

ACTS_ON_2 coronary artery

BY_MEANS_OF free arterial graft

HAS_SOURCE Anatomy: mammary artery

HAS_NUMBER 1

Comment by ff: The aortic root and the coronary artery are non-analytical. The information about the purpose of revascularisation has got lost.

6.2.1.4 CNR

1. surgical procedures on the blood supply of the heart

1.1: revascularisation of the heart, by means of arterial implant

1.1.1: free graft of mammary artery, singular

1.1.1.1. FREE GRAFT OF MAMMARY ARTERY, SINGULAR, LEFT

(Paraphrase): aortocoronary bypass using a free graf of singular left mammary artery, for revascularisation of heart

MAIN bypassing

ACTS_ON artery

SERVES heart

BY_TECHNIQUE implanting

ACTS_ON graf

HAS_SOURCE mammary artery

HAS_LATERALITY left

HAS_NUMBER singular

HAS_OTHER_FEATURE free

CONNECTS_1 coronary artery

CONNECTS_2 aorta

TO_ACHIEVE revascularization

ACTS_ON heart

Comment by ff: The "bypassing" should probably be treated as non-analytical. Also the coronary artery and the aorta are non-analytical.

Here too are some indenting problems, which can be avoided by using the SPET. I would rather indent as follows:

MAIN bypassing

ACTS_ON artery

SERVES heart

BY_TECHNIQUE implanting

ACTS_ON graf

HAS_SOURCE mammary artery

HAS_LATERALITY left

HAS_NUMBER singular

HAS_OTHER_FEATURE free

CONNECTS_1 coronary artery

CONNECTS_2 aorta

TO_ACHIEVE revascularization

ACTS_ON heart

6.2.1.5 VUM

RUBRIC "Free graft of mammary artery, singular, left"

PARAPHRASE "By-pass from aorta to coronary artery, using a segment of the left mammary artery as a graft followed by closing of mammary artery"

SOURCE "Frank FLier" CODE "QA1.1.1.1"

MAIN creating

ACTS_ON bypass structure

CONNECTS_1 NON-ANALYTICALLY aorta

CONNECTS_2 NON-ANALYTICALLY coronary artery

HAS_NUMBER 1

BY_MEANS_OF segment

IS_PART_OF mammary artery

HAS_LATERALITY left

WITH NON-ANALYTICALLY closing

ACTS_ON mammary artery

HAS_LATERALITY left

Comment by ff: This dissection is well indented, but it does not mention revascularisation as the purpose. And it uses the non-analytical information that only a segment of the mammary artery is involved, without marking it as non-analytical.

6.2.1.6 USE

RUBRIC "free graft of mammary artery,singular,left"

PARAPHRASE "revascularisation of the heart by means of free graft of mammary artery,singular,left"

SOURCE "QA 1.1.1.1" CODE "ff.001"

MAIN bypassing

ACTS_ON Anatomy: coronary_artery

BY_MEANS_OF graft

HAS_SOURCE Anatomy: mammary_artery

HAS_LATERALITY left

HAS_NUMBER 1

TO_ACHIEVE Deed: revascularisation

ACTS_ON heart

Comment by ff: This seems pretty good, although it does not comply with VUM1097. Unfortunately the "free" of free graft is missing in the dissection. Maybe I would have linked the HAS_NUMBER link to "graft" rather than to "mammary artery".

6.2.2 QA exercise 2:

2. partial resection of the colon

2.2. sigmoid resection

2.2.2. SIGMOID RESECTION WITH COLOSTOMY AND BLIND CLOSURE; INCLUDES: HARTMANN

Hartmann's procedure, you may wish to know, is defined by Dorland's thus: "resection of a diseased portion of the colon, with the proximal end of the colon brought out as a colostomy and the distal stump or rectum being closed by suture. Bowel continuity can later be restored."

6.2.2.1 LIU (first attempt)

RUBRIC "Sigmoid resection with colostomy and blind closure; includes: Hartmann"

PARAPHRASE "Removal of sigmoid colon, temporal colostomy and blind closure of rectum or distal stump"

SOURCE "Frank FLier" CODE "QA2.2.2"

MAIN surgical deed

ACTS_ON sigmoid

IS_ACTED_ON_BY removing

IS_PART_OF Anatomy: colon

ACTS_ON Anatomy: colon

IS_ACTED_ON_BY creating

ACTS_ON colostomy

HAS_TEMPORAL_MARKER TemporalMarker: impermanent

ACTS_ON rectum

IS_ACTED_ON_BY closing

HAS_TEMPORAL_MARKER TemporalMarker: impermanent

BY_TECHNIQUE suturing

Comment by ff: Here we have again the awkward construct "deed which acts on something which is acted on by deed". The fact that the sigmoid is normally part of the colon should probably be treated as empirical (non-analytical) knowledge in general. But here it can be inferred analytically from the superordinate rubric. The construct "colon is acted on by creating" is clearly a mistake. The temporal marker should be non-analytical, because the stoma and the closure are not by definition impermanent.

6.2.2.2 LIU (second attempt, AT2.1)

2. partial resection of the colon

2.2. sigmoid resection

CODE "2.2.2"

RUBRIC "SIGMOID RESECTION WITH COLOSTOMY AND BLIND CLOSURE; INCLUDES: HARTMANN"

PARAPHRASE "resection of sigmoid colon with colostomy and proximal closure of the rectum"

MAIN resecting

ACTS_ON sigmoid colon

WITH surgically creating

ACTS_ON connection

FROM descending colon

CONNECTION preformed

TO abdominal skin

CONNECTION stoma

BY_MEANS distal colon

WITH closing

ACTS_ON proximal end

HAS_LOCATION rectum

Comment by ff: Again some indenting mistakes. FROM and TO should be indented one step further. Moreover they do not exist as links, and should probably be replaced by HAS_LOCATION_1 and HAS_LOCATION_2. I do not understand "CONNECTION preformed" and "CONNECTION stoma". "Distal colon" should be treated as "part which is part of colon and has position distal".

"Proximal end of rectum" should be treated as "part which is part of rectum and has position proximal". I am not sure whether "closure of proximal part of rectum" should be treated as analytical.

6.2.2.3 CNR

2. partial resection of the colon

2.2. sigmoid resection

2.2.2. SIGMOID RESECTION WITH COLOSTOMY AND BLIND CLOSURE; INCLUDES: HARTMANN

(Paraphrase 1): resection of sigmoid colon with left colostomy and blind closure of the rectum

MAIN resecting

ACTS_ON sigmoid colon

WITH stomizing

ACTS_ON left colon

WITH closing

ACTS_ON stump

HAS_LOCATION rectum

Comment by ff: The "left" in "left colon" is probably non-analytical. In the rare case of situs inversus it would be the right colon, or at least the part of the colon which is on the right side.

(Paraphrase 2): resection of sigmoid colon with left colostomy and blind closure of the rectum according to hartmann method

MAIN resecting

ACTS_ON sigmoid colon

HAS_OTHER_FEATURE method VALUE Hartmann method

WITH stomizing

ACTS_ON left colon

WITH closing

ACTS_ON stump

HAS_LOCATION rectum

Comment by ff: I would think that the information about stomizing and closing is now redundant, because it can be inferred analytically from "Hartmann method". The Hartmann method by definition involves stomizing the colon and closing the stump.

6.2.2.4 VUM

RUBRIC "Sigmoid resection with colostomy and blind closure; includes: Hartmann"

PARAPHRASE "Removal of sigmoid colon, with colostomy and blind closure of rectum"

SOURCE "Frank FLier" CODE "QA2.2.2"

CODING_METACOMMENT "includes Hartmann's operation"

MAIN excising

ACTS_ON sigmoid colon

WITH creating

ACTS_ON stoma

CONNECTS_1 colon

HAS_LATERALITY proximal

CONNECTS_2 skin

WITH closure

ACTS_ON colon

HAS_LATERALITY distal

Comment by ff: I always thought that resection meant partial excision. I would rather link proximal and distal to HAS_POSITION than to HAS_LATERALITY. The stoma, I believe, involves the distal colon, not the proximal colon,

and the closure involves the proximal rectum, not the distal colon. Maybe "colon" is a bit ambiguous. Maybe VUM uses "colon" in the meaning of "large intestine". But VUM probably means proximal and distal from the surgical transection of the bowel, rather than proximal and distal colon.

6.2.2.5 USE

RUBRIC "sigmoid resection with colostomy and blind closure includes Hartmann"

PARAPHRASE "sigmoid resection with colostomy of the proximal end and and blind closure of the distal stump"

SOURCE "QA 2.2.2" CODE "ff.002"

MAIN resecting

ACTS_ON Anatomy: sigmoid_colon

WITH creating

ACTS_ON Pathology: stoma

HAS_LOCATION_1 Anatomy: colon

HAS_POSITION Position: proximal

HAS_LOCATION_2 Anatomy: skin

WITH closing

ACTS_ON rectum

BY_TECHNIQUE suturing

ACTS_ON Anatomy: sectio

IS_PART_OF Anatomy: digestive_tract

HAS_POSITION Position: distal

Comment by ff: Here again we have the problem of the ambiguity of "proximal colon". It can mean either the colon ascendens (right colon), or the part of the colon proximal of the surgical transsection. And in this case the surgical transsection is at the distal or left colon..

The information that the closure is done by suturing is non-analytical. Reading the dissection it seems that the distal section of the digestive tract (i.e. the anus) was closed, whereas in fact the distal section of the digestive tract (distal from the surgical transsection) was closed on the proximal side. At least that is what I understand from this rubric.

After the surgical transsection you could say there are two colons: a proximal and a distal colon. Both have proximal and distal parts. In the Hartmann procedure the proximal part of the distal colon is closed. The stoma is located at the distal part of the proximal colon.

7 Validation plans

Since one of the major goals of the GIU-project is to develop methods and tools for co-operative modelling, developed models need to be evaluated and assessed with respect to similar or related parts developed within other centres.

National terminology projects could benefit from co-operation in a European framework. Within this framework exchange of knowledge and reuse of developed models could be profitable to all partners. This presumption also needs to be evaluated and assessed within the centres.

To structure the validationwork to be done in the third year, these issues will be addresses as two different parts:

- Part A evaluation of the GIU methodology for co-oprative modelling
- Part B relationship between the GIU and the National project

This structure will also serve as a frame for the report of the individual centres

Regarding Part A and B the following issues and aspects could be addressed:

7.1.1 Part A evaluation of the GIU methodology for co-operative modelling

- Co-operative modelling of new parts of National classifications.
- Evaluation of the Spet modelling environment including tools for linguistic annotations by national modelling groups (when working in domains such as the cardiovascular field, breast cancer, or disease classification).
- Reuse and extension of National/GIU models by European partners when analysing similar or new parts of systems of concepts.
- Reuse and extension of National/GIU models when developing application demonstrators within the area.
- Evaluation of Clam functionality such as Speciality selection (e.g. anatomy view), Rearranging (e.g. new ordering principles), Extension (e.g. refinement of anatomical terms).
- Code conversion between National and other European classifications within the same domain.

7.1.2 Part B relationship between the GIU and the National project

- Test and evaluation of different health domains in a controlled modelling environment (scoping), eg. for Diagnose classifications, Health status classifications, such as the ICDH, etc.
- Establishing of a top-level ontology, possible categories and descriptors within these domains.
- Evaluating the possible reuse of GIU top-level and lower-level ontology.
- Identifying the differences and similarities between the National and the GIU models.
- Identifying the possibilities, problems and possible solutions in the exchange and reuse of developed models.
- Feedback in relation to the GIU models and tools could also be gained from other projects funded by national research foundations.

In the beginning of the third year the centres were requested to submitt a validationplan. An example of a structured validationplan was sent to all centres.

7.2 Participating Centres

7.2.1 KERMANOG/NPi (WCC/CSIZ), NL, (1998-1999)

Due to organisational changes in Dutch Health Care Classification and Information Centres (WCC and CSIZ), the third year validation activities needed to be transferred to a new partner. After careful consideration with the Dutch Council for Healthcare (RVZ), KERMANOG took responsibility for coordination of these activities. The Dutch National Institute of Allied Health Professions (NPI) was approached and agreed to perform the third year validation activities.

The NPI resources within the GIU-project, in the third year, will be spent on two parts. These parts are:

- Part A evaluation of the GIU methodology for co-operative modelling
- Part B relationship between GIU and Npi projects

The NPI will be further referred to as the 'Dutch centre'.

The process of analysis and modelling of rubrics was undertaken within in the following framework:

Training of the project members

First modelling phase- learning to master the tool and the GALEN- methodology

Second modelling phase – QA and agreement on version control

- Internal QA
 - controlled modelling environment (SPET+)
 - groupmembers/expert consultation
- External QA
 - counseling/expert consultation (by KERMANOG)
 - monitoring of analysing process (by KERMANOG)
 - consultation of experts in Manchester
- Version control of dissections:
 - Status 0 – analysed and viewed by the first modeller
 - Status 1 – viewed, discussed and agreed by group members
 - Status 2 – viewed and commented on by external expert
 - Status 3 – corrected or/and discussed and agreed by group members

7.2.1.1 Part A evaluation of the GIU methodology for co-operative modelling

The activities of the Dutch centre is concentrated on:

- analysing and modelling parts of the Dutch version of ICPM.

The analysing started in 1996 and 1997 with the WCC-Standaardclassificatie van medisch specialistische Verrichtingen versie 2.3 and is continued in the third year with the latest version 2.4. (ICPM-DE). For this purpose a .cla file has been made available.

The following parts of three chapters of the the ICPM-DE will be modelled:

	Approx.
Chapter I Diagnostic procedures	220
Chapter V Surgical procedures	
nose and sinus nasalis	130
mouth	200
throat	150
lung and bronchi	140
heart	160
bloodvessels	950
nervous system	220
Chapter VIII Other Therapeutic procedures (non surgical)	475

- testing and evaluating the SPET+-tool.

This is a special version of the classification-rubric-analysing tool (in jargon called 'dissecting'). The SPET+ holds the possibility to have a temporarily look where a rubric will be placed in the classification under development/ analysis. The SPET+-tool will be evaluated on different aspects:

User friendliness: is it easy to handle? How much time does it take to master the tool? Are there specific to be added?

User requirements: does it meet the needs of the classification centre? Is it assisting and facilitating the regular workprocess? Is it improving the skills and knowledge that is needed for development of systems of concepts?

Does this reflect on the ongoing projects, where systems of concepts are developed in the traditional way (by consensus)? (This is partly an overlap with Part B)

-testing and evaluating the GRAIL model.

Testing of the co-operative modelling done so far (year 1 and 2) by the different European centres, as reflected in the latest GRAIL model.

This will be done by evaluating the reusability of categories and descriptors in the present model.

Counting errors and unexpandables with modelling to give an overview of correctly performed dissections. This

Will give inside information about the reliability of GRAIL and SPET for surgical procedures.

7.2.1.2 Part B relationship between the GIU and NPI projects

To establish if the NPI terminology projects could benefit from GIU, two research area's were addresses:

- Investigate possibilities in SPET en GRAIL to dissect, model and analyse draft classification of procedures from oral hygienists. Approximately 200 classes of the draft classification of procedures for Oral Hygienists will be dissected, modelled and analysed.

This exercise will be undertaken after the experiences in dissecting and analysing several thousands of 'surgical procedures in medicine' (according to ICPM).

- Investigate the possibility to create a basis for the development of a version of SPET useful to dissect functions /shape and impairments of the ICIDH (International Classification of Impairments, Activities and Participation; WHO, June 1997). This part of the validation will be based on a scoping exercise of chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dieticians (approximately 320 classes).

7.2.2 SPRI/LIU, Linkoping/Stockholm, SE

The LiU/Spri resources within the GIU-project during 1998, which is approximately ten man months, will be spent on two equally large parts, here denoted as: A evaluation of the GIU methodology for co-operative modelling, and B relationship between the GIU and Spriterm projects

7.2.2.1 Part A - evaluation of the GIU methodology for co-operative modelling

The Swedish modelling activity has concerned parts of the Nordic Classification of Surgical Procedures (NCSP), particularly within the cardiovascular field but also other parts such as procedures relating to the mammary glands, the endocrine system and peripheral vessels. The following chapters will be modelled:

F	Heart and major thoracic vessels
P	Peripheral vessels and lymphatic system
B	Endocrine system
H	Mammary glands
T	Minor surgical procedures
L	Female genital organs
N	Musculoskeletal system
M	Obstetric procedures
Int. Paediatric Cardiac Surgery Catheterisation	

Since one of the major goals of the GIU-project is to develop methods and tools for co-operative modelling, developed models need to be evaluated and assessed with respect to similar or related parts developed within other centres. The following issues and aspects could be addressed.

- Code conversion between NCSP and other European classifications within the same domain.
- Evaluation of Clam functionality such as Speciality selection (e.g. cardiovascular view), Rearranging (e.g. new ordering principles), Extension (e.g. refinement of anatomical terms).
- Reuse and extension of NCSP/GIU models by the Finnish partner when developing application demonstrators within the area.
- Co-operative modelling of new parts of NCSP by the Swedish and Finnish partners.
- Evaluation of the Spet modelling environment including tools for linguistic annotations by Swedish modelling groups (when working in domains such as the cardiovascular field, breast cancer, or disease classification).

Important feedback in relation to the GIU models and tools could also be gained from other LiU-projects funded by national research foundations such as the FORSS-project which aims at a data entry system based on the GIU models within the field of cardiovascular diseases, the TellMe project which aims at a telematics consulting system for patients

with breast cancer, and the Huddinge-project where co-operative modelling methodology will be used when working through the hospitals need for structured terminology.

7.2.3 Part B relationship between the GIU and Spriterm projects

Part B will focus on the differences and similarities between the GIU and the Spriterm models, with the objective of identifying problems and possible solutions to exchange and reuse of developed models within the two environments. The hypothesis is that the two projects could gain mutually from a close co-operation in that the GIU model is based on a formal representation which might prove to be very powerful with respect to applications and important for long term maintenance, and that large scale models is expected within a European framework.

The Spriterm project has developed to a large national effort, with participants from both professional health care organizations, system vendors, health care providers, and research organizations. The aim of the project is to develop a clinically oriented, large scale terminology database, accessible from next generation of medical information systems and particularly be a basis for the electronic medical record. The Spriterm server has, from the Swedish health care perspective, a large coverage of useful nomenclatures and classifications but has so far made use of only hierarchical links, although the Spriterm model is rich enough to hold also other types of semantic relations between concepts.

Major activities of the Spritermproject during 1998 will be:

- Test of transfer functions from GIU dissections and GRAIL code to Spriterm. The target domain would be the cardiovascular part of NCSP where descriptors and links could be reused within Spriterm. Test of both the intermediate form (as dissections) and the formal GRAIL code would allow for a two level analysis of prerequisites for the Spriterm model, where in the latter also low-level operators for subsumption, part-whole, rules for inheritance, transitive relations, and composition will be covered. The work would also include test of the Spriterm import and export format and comparison of the GIU and Spriterm APIs.
- Evaluation and possible reuse of the GIU top-level ontology together with the set of links offered in the modelling guidelines for the intermediate form,
- Establishment of a top-level ontology. Since Spriterm so far contains only the traditional classifications with their inherent hierarchical structure, a top-level set of semantic categories will be needed when incorporating richer semantic models. Evaluation of the GIU top-level ontology from a Swedish health care perspective would then be of interest (although the top-level ontology is not that crucial see ref. Rector),
- Test, evaluation and establishment of a modelling environment together with modelling guidelines for a set of medical domains within the domain of diagnose classification, rubrics and records item complexes for the electronic medical record, patient administrative terms, etc. In an ongoing national project we are modelling the Swedish primary health care version of ICD10 (KSH97-P). The result is a concept model with the inherent hierarchical structure extended with relations for location, type of health care problem, origin, inclusion and exclusion criteria. When continuing the modelling of the Swedish primary and secondary health care versions of ICD10, the Spet modelling environment might be evaluated. The evaluation would report on the work needed for setting up the Spet environment in a new domain including descriptor lists, set of links, templates, and modelling guidelines, and thereby indicate the generality of the GIU modelling tools and methodology. Output from Spet would be dissections with a syntax suitable for the Spriterm import format,
- Reuse of the anatomical model within the GIU Common Reference Model (CRM). One of the interesting possibilities when extending the KSH97-P model is to refine the anatomical axes which is now quite course grained. Reuse and possible refinement of the detailed anatomical model in the CRM within the KSK97 project might provide essential feedback for the proposed co-operative modelling methodology. (Pieter whether reuse of the anatomical model should be in the form of detailed lists of anatomical descriptors in Spet only, or we should also produce GRAIL code and thereby make use of the CRM, I don't know),
- Evaluation and extension of the Spriterm concept representation system, e.g. the need for mechanisms for compositional construction and sanctioning,
- Development of teaching material, tutorials etc.

The national development (funded by national contracts) might gain substantially from the GALEN experiences and evaluation of GALEN technology could be foreseen in the following areas:

- Establishment of co-operative modeling methodology in different medical domains,
- Evaluation of flexible and configurable modeling tools supporting constrained modeling guidelines,
- Establishment of sanctioning and compositional mechanisms in the Spriterm server,
- Establishment of a set of links

7.2.4 USE, St Etienne, F

7.2.4.1 Part A evaluation of the GIU methodology for co-operative modelling

No plans received

7.2.4.2 Part B relationship between the GIU and USE projects

No plans received

7.3 Collaborating Centres

7.3.1 Berlin, ID

The ID resources within the GIU-project, in the third year, will be spent on two large parts (1 and 2) with an additional part of ID (3). These parts are: A

There are three different areas of work for ID in the third year of GIU.

1. Harmonization of two classifications of the same family
2. Rearranging of the currently used german Procedure-classification (ICPM)
3. Language annotations

7.3.1.1 Part A evaluation of the GIU methodology for co-operative modelling

Is not relevant for ID.

7.3.1.2 Part B relationship between the GIU and ID projects

The German validation activity concerns:

ad 1.

The german ICPM is mainly based on the dutch version of ICPM. The starting point was the WCC-Standardclassificatie van medisch specialistische Verrichtingen versie 2.0. This version was translated and then extended and in more than one chapter rearranged according to the suggestions of the Medical Associations in Germany. So both classifications have been developed in different directions although they stem from the same basis. Some chapters of ICPM are very special in their development e.g. Neurosurgery, plastic surgery, surgery on blood vessels.

But the area with the main changes seems to be the surgery on the musculoskeletal system. So we will try a harmonization in this field. Only dissections on the 6digit level of ICPM will be used for that purpose. The following questions are probably the most interesting:

How many and what kind of descriptors have to be added?

We expect that there are still some more descriptors for fixation material are needed. Or some descriptors to describe the diagnosis that is part of the procedure.

How long does it take to dissect the 6digit rubrics of that chapter?

Which classification is the more specific?

Where are the more specific rubrics sorted in?

Is it really possible to get one new classification with mappings to the two classifications the new classification is build on?

ad 2.

On the other hand it should be possible to make a rearrangement of the chapter of surgery on musculoskeletalsystem based on the grail-model. But this time just using the rubrics coming from ICPM. Or the new harmonized and completely new classification. This rearrangement should presented to clinicians to evaluate their view. (Is this now a more usable classification? What changes are still necessary? What would they like to be added?)

Also the new classification which contains both developments should be presented to them.

ad 3.

There are already some german annotations available. We would like to reuse these and add some more. But the work

finally done will depend on how much time it will take to make the annotations. For the generation of German some German grammar should be added as well and probably will there be not enough time to do this.

7.3.2 Stakes, Helsinki, FI

The Finnish National Research and Development Centre for Welfare and Health, Stakes works with the GIU-project for the year 1998. Finnish language has a lot of features that are different from the languages now participating in the project.

7.3.2.1 Part A evaluation of the GIU methodology for co-operative modelling

We will participate in the modelling work within the project on the following issues.

- We will begin the modelling work with the Galen tools. Our interest is particularly in the cardiovascular terminology.
- Our dissections will be based also to the Nordic Classification of Surgical Procedures (NCSP). We can compare the dissections made in Sweden from the same classification. This will support our work in analysing the tool when using the Finnish language.
- The evaluation of the tools will be done without previous experience, because we are using the tools for the first time. We see this as an advantage.

7.3.2.2 Part B relationship between the GIU and Stakes projects

Stakes has a mandate from the Social Ministry to publish and update the ICD-10 national version.

In doing this work we have faced the semantic problems this work has. Finland is bilingual. All official reports and terminology must be in Swedish and in Finnish. We need a tool such as Galen in order to make exact terminological work. Our work will support our projects on the following fields:

- Finnish grammar differs very much from the languages now participating in the Galen project. We will evaluate how the Finnish grammar with its numerous noun cases can be used with the Galen technology.
- We will also find out how Galen technology could be used in Finnish terminological work.
- Interesting part of the project will be the implementation of the Galen technology into Finnish and trying to produce a Finnish language generator.
- If we succeed in producing a working Finnish language generator we will evaluate the possibilities of integrating it to Electronic Health Records or terminological tools.

7.3.3 CCC, UK

7.3.3.1 Part A evaluation of the GIU methodology for co-operative modelling

Not relevant to CCC

7.3.3.2 Part B relationship between the GIU and CCC projects

The validation activities of CCC are:

- Cross validation of 2500 decomposed surgical procedure concepts from the Clinical Terms Version 3. (including: cardiovascular, gynaecology, ear, endocrine, lymphatic, spleen, bone marrow, male genital) against the GALEN model.*
- Implementation of improvements to the Clinical Terms for Cardiovascular procedures on the basis of feedback received, for the September 1998 release.
- Provision of 500 partially semantically-defined disease concepts to MIG in Manchester.
- Contribution to a paper on Cross Validation to be presented at AMIA in November 1998.

7.3.4 CIM, Brussels, BE

7.3.4.1 Part A evaluation of the GIU methodology for co-operative modelling

No validation plans received

7.3.4.2 Part B relationship between the GIU and CIM projects

No validation plans received

7.3.5 CMITD, Athens, GR

The Greek centre is participating in the GIU project with own resources. The goal of the centre is to develop a version of the ICD9 in Greek.

7.3.5.1 Part A evaluation of the GIU methodology for co-operative modelling

Not relevant to CMITD?

7.3.5.2 Part B relationship between the GIU and CMITD projects

There isn't in Greek a classification scheme so CMITD will try to develop one while using the GALEN tools and the classification provided by them.

8 Validation Reports from National Centres

The validation sites have produced various results. The variations were mainly due to the pre-conditions. On the one extreme in France there was the unique situation that the development of a completely new procedure classification coincided with the GALEN-IN-USE project. On the other extreme in Belgium we were faced with the situation that the specifically planned work could not be carried out, because the CPT4 classification was not made available on time. When it finally was available in the extension of the project, the CPT and INAMI systems appeared to be too different to be usefully mapped.

On average the outcome of the validation was above expectation. As a result the GALEN methodology is becoming part of the development/maintenance of national classifications in at least France, UK, and The Netherlands. The systematic approach in analysing these procedure classifications have revealed that across Europe about 20% of all rubrics are either wrong or too ambiguous. It is not unlikely that similar figures can be found about disease classifications!

One of the major lessons learned from this validation is that experienced groups which were closer to the GALEN development centres seemed to be more successful than the remote centres. In future projects, nationally, or internationally, more resource and emphasis on regular support from the central development centres should be planned for.

On the basis of this work some first rough estimates were made on the economic viability of the GALEN approach. It is expected that development cost of classifications using the GALEN methodology are in the same order of magnitude as the classical development. Unfortunately there was no room in this project to do a thorough comparison.

Below we describe reports from individual sites. This material is complementary to the dissection material which has been produced mostly in electronic format. The texts below describe in rather much detail the work at the dutch centre, and that in cooperation with CCC. The reason for describing it in detail was because:

- The work with CCC did not follow the full pathway, but rather started at dissections of their own, called 'atomisations' These atomisations were different from the GIU categorial structure
- The work of NPI/Kermanog described in full detail here are so-called extended scoping exercises, to see what is needed if the methodology is extended in other areas (ICIDH and Oral Hygiene).

8.1 Kermanog/NPI/(WCC/CSIZ) (Netherlands)

REPORT OF THE ACTIVITIES OF THE DUTCH NATIONAL INSTITUTE OF ALLIED HEALTH PROFESSIONS AS SUBCONTRACTOR OF THE GALEN-IN-USE PROJECT

Y. F. Heerkens PhD, C.W.M. van der Steen Msc and W. Zuidweg Msc

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Annex 4 Scoping chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dieticians

- 4a Global scoping of chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dieticians
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Annex 5 Dissecting, modelling and analysing the Draft Classification of Procedures for Oral Hygienists (chapter 2)

- 5a Draft Classification of Procedures for Oral Hygienists (chapter 2)
- 5b Dissected and modelled Draft Classification of Procedures for Oral Hygienists (chapter 2)
- 5c Analysis of the dissected and modelled Draft Classification of Procedures for Oral Hygienists (chapter 2)

8.1.1 Introduction

In the period August 1998 to May 1999 several activities were performed by three members of the Dutch National Institute of

Allied Health Professions as subcontractor of the Galen-in-Use project. In Paragraph 2 a short overview is given of the involvement of the Dutch National Institute of Allied Health Professions (further indicated as NPi, the Dutch acronym) in the development of classifications and in the Galen-in-Use project. In Paragraph 3 the period of involvement in the Galen-in-Use project is subdivided in several smaller periods. In Paragraph 4 the results of this involvement is indicated. In Paragraph 5 some experiences are presented. Paragraph 6 contains some concluding remarks.

8.1.2 Short overview

The Dutch National Institute of Allied Health Professions is an institute that supports the ten allied health professions in the Netherlands (These are chiropractors, dieticians, exercise therapists according to Cesar, exercise therapists according to Mensendieck, physical therapists, occupational therapists, oral hygienists, orthoptics, radiological laborants, speech therapists.) in enhancing and maintaining quality of care. Uniformity of language is an important aspect of this task. Several NPi-members are involved in the development of classifications for the different allied health professions. These classifications are often adapted versions of existing classifications; e.g. four adapted versions of the ISO 9999 (technical aids) are made for different allied health professions. Also of the ICIDH (International Classification of Functioning and disablement) several adapted versions have been made. Two NPi-members participate in the WHO Dutch Collaborating Centre for the ICIDH. As the Dutch Classification of Medical Procedures - an adapted version of the ICPM - contains only a very

limited amount of procedures relevant for allied health professions, draft classifications of procedures are made for several professions, with the intention to include them in a latter stage in the national classification. The Dutch Classification of Medical Procedures together with the ICD-10 were used to make draft classifications of 'medical' terms to classify elements of the referral diagnosis and of the medical history of patients referred to allied health professionals. This short summary of classification related activities of the NPi indicates that at the start of the GIU-activities experience was present in developing classification on the 'old fashioned way', meaning that experts are consulted, that consensus meetings are being held and that in a 'step-by-step' approach classifications are developed. After two consultation meetings, the activities of the NPi-members started at the end of week 31 of 1998. Although at the start of the project appointments were made for 1998 only, later on in the project it was decided to add additional hours in 1999 (expected end of the project: week 13). The total amount of hours agreed upon was 1258. In Annex 1 an overview is given of the hours spent. As one of the NPi-members started a new job, and some other activities (not related to this project) took more time than expected, the activities in the GIU-project were finished in week 22, which was approximately 2 months later than planned.

8.1.3 Activities

- start, including the selection of project members
- training in the use of the SPET program (approximately 20 hours)

On July 31 a coworker of the Nijmegen University has installed the relevant programs on three of the computers of the NPi (version 1.30.00, model 5r). Directly thereafter an instruction in using the SPET program for dissecting classes from the Dutch Classification of Medical Procedures - an adapted and extended version of the ICPM - was given. All three NPi-members of the project participated in this instruction session.

first analysing phase (approximately 500 hours)

A selection was made of the ICPM classes to be dissected. In making this choice the classes already dissected and the preference of the NPi-members was taken into account. After approval by Nijmegen dissection with the SPET program started.

The following procedure was used to maintain the consistency of the procedures and to indicate the 'status' of the dissection

- dissecting of 20-100 classes by a NPi-member (status 0) (one file)
- a discussion of the results, including the problems, with the other two members (status 1). This discussion was very important to learn from one another the method used, the arguments for choosing special solutions in composing the dissection and some synchronisation in the way of dissecting.
- mailing of the file to Nijmegen for comments
- a check by Nijmegen (status 2) and return of the file to the NPi
- correction by the NPi-member (status 3), whenever necessary after consultation with the other two NPi-members
- mailing of the file to Nijmegen

In this first dissecting phase approximately 2000 classes were dissected and sent to Nijmegen for comments (overview: Annex 2).

Several new descriptors were added to the dictionary, especially to indicate anatomical structures. It was decided - in consultation with Nijmegen - to use terms from the Nomina Anatomica (Latin terms) - to indicate new anatomical structures.

training in the use of GRAIL (approximately 6 hours)

On October 15 coworkers of the University of Nijmegen have installed the relevant programs (including version 1.30.00, model 5s), has given the NPi-members the document 'Links and templates summary' (ID: VUM 03/96, version 3.0) - which was very useful - and has given an instruction in using GRAIL.

modelling phase with analysis of some additional files: modelling the classes already dissected and analysing and modelling some additional classes (approximately 475 hours)

in the period since October 15 most of the classes which were already dissected were modelled. As can be seen in Annex 3 modelling of already dissected files resulted several times in many errors and unexpandable items. By recomposing some of these items the amount of errors and unexpandables could be reduced. Still many remain and these were sent to Nijmegen for comments. As the work in Manchester on the GIU-project was hampered by lack of money a reaction of Manchester on these files can not be given.

Except the classes already dissected some new classes were analysed with SPET, 850 classes related to blood vessels and some additional 75 classes from chapter 1, including diagnostic procedures.

Because of lack of time 263 classes are dissected during the first dissecting phase but are not being modelled.

scoping of a chapter - approximately 320 classes - of the Draft Classification of Health Status (ICIDH) for Dieticians (based on the Beta-1 draft of ICIDH-2) (approximately 72 hours)

Although the products of the Galen project till now are directly coupled to the international classification of procedures, more applications seem possible. To investigate the possibilities and knowing recent developments with respect to the ICIDH, it was decided to explore possibilities of the GALEN-technology with respect to the ICIDH (the International Classification of Impairments, Activities and Participation; WHO, June 1997). As an example a chapter was chosen from a recently developed draft version of the beta-1 draft of the ICIDH-2 for dieticians. This classification is developed on the 'traditional way' by the NPi in close cooperation with the professional organisation of dieticians in the Netherlands.

At first it was the intention to make a global version on paper as a basis for Manchester to develop a SPET-version that could be used to dissect classes from the ICIDH. With this new version of SPET all classes from the selected chapter should then be dissected and the following questions should be answered:

- is this new SPET-version useful in dissecting ICIDH classes?
- how many classes of this chapter which was made on the traditional way (consensus meetings, consultation and expert influence) have to be changed when the results of the GIU technology are used?
- how much time does it cost to make a model of this chapter using GIU-technology?

In January 1999 a global version was made on paper and was sent to Nijmegen. However from the communication of Nijmegen with Manchester it becomes clear that Manchester did not have the time to make a new version of SPET to dissect classes from the ICIDH. For this reason it was decided to elaborate the paper version of the scoping exercise by adding 'paper dissections' in which use is made of the added groups of descriptors and new links, with existing groups and between new groups of descriptors included in the global version. This exercise resulted in several new descriptors and some adaptations in the links found in the global dissecting procedure. The questions indicated above could not be answered however in this way.

dissecting and modelling a chapter of the Draft Classification of Procedures for Oral hygienists (approximately 126 hours)

To consider the possibility to use GALEN-technology for other classifications of procedures, a chapter of the Draft Classification of Procedures of Oral Hygiene was used. This classification is also made on the 'traditional way' and is not an adaptation of an existing classification. Within the chapter chosen of the Draft classification (containing about 220 classes), the highest level of detail is six levels. It was decided to dissect all classes of the classification with SPET as far as possible and to see whether or not the necessary additional descriptors correspond with descriptors in the scoping of the chapter of the draft classification of Health Status for Dieticians.

reporting (approximately 20 hours)

additional activities, like visiting the Galen Workshop on the International Working Conference on Electronic Patient Records in Medical Practice EPRiMP/EMD98 on October 6, 1998 (two persons), writing two small articles for the journal of the Institute and coordination activities (approximately 26 hours)

8.1.4 results

During the project the NPi-members registered the hours they spend on the project; the results are present in Annex 1; relevant is the comparison between the amount of hours spent in the first dissecting phase and the amount of hours spent in the first modelling phase; although the classes were dissected already the modelling takes again many hours. The person who has done the major work in dissecting and modelling has dissected 1650 classes in about 369 hours and has dissected about 2500 classes (approximately 1400 already dissected classes and 1100 new classes) in 382 hours. It is difficult to make conclusions from these figures; first of all her experience in dissecting was growing, but on the other hand in the 1100 new classes dissected in the second period there were some big but relatively easy files as they contain many classes that were almost the same (the name of the blood vessel was the only change to be made).

The 'dissection on paper' of the chapter of the Draft ICIDH for dieticians was time consuming (6% of the total amount of hours available), especially because of the new terminology to be added as new descriptors as was the dissection of the chapter of the Draft Classification of Procedures for Oral Hygienists (10%).

As can be seen in Annex 2, 2680 classes from the ICPM were dissected and modelled in the modelling phase. The number of unexpandables and errors were counted in the first dissecting phase (after control by Nijmegen) and after modelling. The results are presented in Annex 3. It is important to notice that reactions of Manchester on our modelling activities is not included. Furthermore it is important to know that several of the problems with 'unexpandables' can be ascribed to missing descriptors in the model. Although these descriptors were added - during the dissection - to the dictionary and consequently can be used in dissecting, the model could not handle them at that moment.

In Annex 4 the results of the ‘Scoping’ of the chapter of the Draft ICIDH for dieticians are presented.

Based on a global Scoping of the approximately 320 classes of chapter 6 (Digestion, Nutrition, and Metabolic Functions) of the Classification of Functions and Shape of the Draft ICIDH for Dieticians (Beens & Heerkens, January 1999) new classes of descriptors and several new links are indicated. The results of this global scoping are presented in Annex 4a.

Annex 4b represents the results of the extended scoping, the ‘paper’ dissection of the 320 classes of chapter 6. In this paper dissection the new groups of descriptors (indicated in Annex 4a), the new descriptors (indicated in Annex 4c) and the new links (indicated in Annex 4a) are used. Problems with the dissection and suggestions for adaptation of the present SPET are given as well. One result of the extended scoping, a list of new descriptors, is given in Annex 4c; approximately 110 new descriptors are indicated.

Most classes of the classification could be dissected making use of already existing descriptors and links and the added descriptors and links. There were some smaller mistakes within the classification which were noted during the paper dissection. These errors are indicated in the text.

As modelling of the dissected files can not be done at this moment it is not possible to get an impression of the differences between the resulting model and the classification.

In Annex 5 the results of the dissecting and modelling for the draft classification of procedures of oral hygienists is presented. In Annex 5a the draft classification is presented. In Annex 5b the results are given of the dissecting and modelling activities. An analysis of the results of these activities is given in Annex 5c. Annex 5d present a list of all the dissected classes. The dissection could not be completed for a relatively small amount of classes because of the lack of relevant (groups of) descriptors and/or links. Some of the (groups of) descriptors necessary to finish the dissecting are already formulated in Annex 4a.

8.1.5 experiences

- dissecting of classes during a larger period without modelling at the same time is inefficient. Looking back ‘the first dissecting phase’ was too long. We propose to instruct new ‘SPET-users’ in the modelling technique approximately 2-3 weeks after the SPET-instruction. The document ‘Links and templates summary’ is crucial for newcomers to understand GIU-technology. Some items became only clear to us after reading that document.
- we prefer a rather detailed dissection, implicating that we are not so happy with terms like ‘cerebrospinal fluid bypassing device’ as a descriptor. According to our experiences it must be possible to dissect such complex items in more elementary ones. This has the advantage of avoiding very specialistic terms. The possible disadvantages are that sometimes the dissection becomes somewhat artificial and it might be that the complex term has additional meaning in comparison to the sum of the separate elements.
- we still have problems in deciding what should be the primary part of a procedure. We know from experience that when the terms of the ‘umbrella’ classes are used as primary terms in the dissection of subclasses the model can model these classes rather well. However, as the ICPM is a classification of procedures it was sometimes better to start with the procedure as such and not with the ‘goal of the procedure’ as is included in the title of the umbrella class. By knowing the umbrella class there is a tendency to dissect more detailed classes in such a way that they became indeed children when these classes are modelled.
- as the dissection program is based on surgical procedures the dissecting of diagnostic procedures was sometimes very difficult and requested the introduction of several new descriptors.
- the golden standard was not used at all during the dissecting procedure
- we had several problems with the programs; several times the program became corrupt and the ‘status’ of the dissection was often lost due to to us very unclear reasons.

8.1.6 concluding remarks

Although we have given some critical comments in this report we are satisfied with the counseling we received from the University of Nijmegen. The project showed us the chances the GALEN technique offers in maintaining, updating and revising classifications.

However much work has still to be done to adapt GALEN technology to other kinds of classifications both with respect to the model as well as to the (groups of) descriptors to be added.

8.1.7 references

Beens MC en YF Heerkens. Classificaties en codelijsten voor de Diëtetiek. Amersfoort: Nederlands Paramedisch Instituut & Oss: Nederlandse Vereniging van Diëtisten, januari 1999



D06.1 Demonstration of the Telematic Infrastructure for a common resource for medical terminology and language for Europe including the designated segments of national classifications

Corbeij-Verheggen MJH en YF Heerkens. Classificaties en codelijsten voor Mondhygiëne. Amersfoort: Nederlands Paramedisch Instituut & Bunnik: Nederlandse Vereniging van Mondhygiënist, maart 1999

Galen in Use. Links and templates summary' ID: VUM 03/96, version 3.0

WHO. Beta-1 draft of the ICDH-2. Geneva: World Health Organization, June 1997

8.1.8 ANNEX 1 Hours spend to Galen-in-Use related activities

Annex 1 represents the number of hours spend to the Galen-in-Use project by the three project members. According to the agreement 1245 hours had to be spend to the project and the Table gives account of these 1245 hours.

Activities	hours spend (see Paragraph 3)	C.W.M. van der Steen*	W. Zuidweg*	Y.F. Heerkens*
Training / SPET (week 31)	20	8	6	6
First dissecting phase (week 32 to 41)	500	371	77	52
Training / Grail (week 42)	6	3	-	3
modelling phase (week 43 to the end of project)	475	383	64	28
Scoping / dieticians (week 48 to the -end of project)	72	-	-	72
Dissecting & modelling / oral hygienists (week 1 to the end of project)	126	42	84	-
Reporting (week 20 to 22)	20	4	-	16
Additional activities	26	10	-	16
hours spend	1245	821	231	193

* In giving account for the amount of hours we have only mentioned the primary activities; e.g. the time necessary to give comments on the global scoping by C.W.M. van der Steen and W. Zuidweg and to give suggestions and comments on the dissecting and modelling by Y.F. Heerkens are not registered separately.

8.1.9 ANNEX 2 Classes of the ICPM dissected and modelled (Modelling phase)

Annex 2 represents the number of classes dissected and modelled in the modelling phase. Status of the classes is presented also. Status '3' means that the classes and the modelling is discussed with Nijmegen University; status '1' means that classes are not yet discussed with Nijmegen university, but only within the project team at the Dutch National Institute of Allied Health Professions (NPI).

Because of lack of time some files which were dissected in the first dissecting phase are not modelled anymore. These are the following '.dis' or '.txt' files:

- npik501: (parts of ICPM 5-01: Incision and excision of cranium, brain and meninges); 87 classes
- npik502: (parts of ICPM 5-02: Other surgical procedures of cranium, brain and meninges); 58 classes
- npik581a and npik581b (later together as npik581): (parts of ICPM 5-81 Repair and plastic surgery of joint structures); 74 classes
- npik110; diagnostic injection for local assisting (together 263 classes).

SPET- file	ICPM surgical procedures of....	Number of	status
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(*.dis) (*.txt)		dissections	
Npik52a	Nose and sinus nasalis 5-21 ... nose 5-22 ... sinus nasalis	136	3
Npik52b	Mouth 5-23 ... dens 5-24 ... gingivae and alveoli 5-25 ... tongue	78	3
Npik52c	5-26 ... glandula and ductus 5-27 ... other parts of mouth	110	3
Npik52d	Throat 5-28 ... tonsils and adenoïd 5-29 ... pharynx	63	3
Npik53a	5-30 excision and resection of (disorder of) larynx 5-31 ... trachea and other larynx	93	3
Npik53b	Lung and bronchi 5-32 ... lung en bronchi 5-33 ... lung en bronchi [other] 5-34 ... thorax-wall, pleura, mediastinum and diaphragm	143	3
Npik53c	Heart 5-35 ... valves and septa 5-36 ... bloodvessels	102	3
Npik53d	5-37 other ... heart and pericard	67	3
Npik5380	Bloodvessels (5-38 Incision, excision and occlusion of blood vessels) 5-380 Incising blood vessels	106	3
Npik5381	5-381 Endarterectomy	84	3
SPET- file (*.dis) (*.txt)	ICPM surgical procedures of....	Number of dissections	status
Npik5382	5-382 Resection of blood vessel with reanastomosis	102	3
Npik5383	5-383 Resection of blood vessel with replacement	91	3
Npik5385	5-385 Other excision of (disorder of) blood vessels	94	3
npik5387	5-387 Other surgical occlusion of blood vessels	94	3
npik538x	5-384 Occlusion, excision and stripping of varices 5-386 Ligation or plication of vena cava 5-388 Other incision, excision and occlusion of blood vessels	42	3
npik539	(5-39 Other surgical deeds of blood vessel) 5-390 Constructing shunt between pulmonary and systemic circulation 5-391 Constructing of intra-abdominal veneus shunt 5-394 Revision of vascular surgery 5-396 Methods assisting open heart surgery 5-397 Peri-arterial sympathectomy 5-398 Surgery of glomus caroticum and other glomus 5-399 Other surgery of blood vessels	94	3
npik5392	5-392 Constructing shunt or bypass of blood vessels	56	3
npik5393	5-393 Suturing blood vessel	102	3

npik5395	5-395	Other repair - and plastic surgery of blood vessels	88	3
npik82	8-2	Repositioning, redressing, correction, dilatation (8-208, 8-21 t/m 8-25)	108	3
npik84	8-4	Skeletal traction and other traction	41	3
npik85	8-5	Other mechanical (supporting) techniques	123	3
npiy860	8-60 6-61 8-62 8-63 8-64 8-65 8-66 8-69	Applying thermotherapy Applying cold therapy Applying light therapy Applying ultra violet therapy Changing cardiac rhythm Pacing action of heart Electrical stimulating Applying other treatment using physical agents	61	3
npiy504a	5-04	Surgical deeds on nerves, plexus and ganglia (5-040 + 5-041)	47	3
npiy504b	5-04	Surgical deeds on nerves, plexus and ganglia (5-042 to 5-049)	61	3
npiy121	(1-21 + 1-22) 1-21 1-22	Examining eye Other examining eye	41	3
npiy120	1-20	Neurological assesment	36	3
npiy123	1-23	Assesment of hearing function and vestibular function	69	3
npiy125	1-25	Assesment of cardiovascular system	77	1
SPET- file (* .dis) (* .txt)	ICPM surgical procedures of....		Number of dissections	status
npiw870	8-70 8-71 8-72 8-73 8-74 8-75 8-76 8-77 8-78	Endotacheal intubating Mechanical support resuscitating Other methods for resuscitating causing pneumothorax treating pneumothorax respiratory medication applying oxygen Other treatment by means of atmospheric pressure and air pressure Other surgical deeds respiration	49	3
npiw830	8-3 8-30 8-31 8-32 8-33 8-34 8-35 8-36 8-37 8-38	Immobilisation and support (8-300 t/m 8-389) Immobilisation and support by means of bandage or sling Immobilisation by means of plaster cast or plaster bandage Immobilisation by means of splint Other immobilising and fixation Compression Other immobilising devices Internal support Support of body Removing fixation or supporting	108	3
npiw503	5-03	 spinal cord and spinal cord and spinal canal	114	3
number of dissections <i>modelling phase</i>			2680	

8.1.10 ANNEX 3: Unexpandables and Errors with Modelling

Goal: Counting errors and unexpandables with modelling to give an overview of correctly performed dissections. This will give inside information about the reliability of GRAIL and SPET for surgical procedures.

Gray: those files which are problematic, for instance because all or almost all items had errors (e.g. file Npik5381), because data are lacking (n.k. = not known) or because the file was not dissected during the first dissecting phase (file Npiy125).

In the last row the total numbers of errors and unexpandables are given as percentage of the total amount of items (without the items of the 'gray' files).

		first modelling (model 5r)					final modelling (model 5s)						
		unexpandables (unexp!)		errors (error!)			unexpandables (unexp!)		errors (error!)		Analysis		
SPET- file (*.dis) (*.txt)	Number of dissections	number of unexpan- dables	number of <i>different</i> unexpan- dables	number of errors	number of different errors	number of dissections	number of unexpan- dables	number of <i>different</i> unexpan- dables	number of errors	number of different errors	Number of different Errors in Grail	Number of different Errors in ICPM	number of unclear errors
Npik52a	136	0	0	21	1	136	15	1	0	0	6	5	1
Npik52b	78	0	0	5	2	78	7	4	0	0	4	2	1
Npik52c	110	5	2	7	1	110	10	3	7	1	9	6	1
Npik52d	63	1	1	1	1	63	15	3	0	0	6	4	2
Npik53a	93	0	0	0	0	93	25	5?	0	0	n.k.	n.k.	n.k.
Npik53b	143	0	0	0	0	143	9	2?	0	0	8	5	3
Npik53c	102	0	0	10	8	102	19	5	0	0	2	5	3
Npik53d	67	0	0	2	2	67	6	3	2	2	1	5	0

Npik5380	106	0	0	0	0	106	63	n.k.	0	0	6	3	2
Npik5381	84	0	0	84	1	84	0	0	84	1	n.k.	n.k.	n.k.
Npik5382	102	0	0	0	0	102	102	n.k.	0	0	8	2	1
Npik5383	91	11	1	62	n.k.	91	62	n.k.	18	1	n.k.	n.k.	n.k.
Npik5385	94	0	0	0	0	94	64	1	0	0	1	0	0
Npik5387	94	28	2	0	0	94	21	2	0	0	1	0	1
Npik538x	42	5	1	0	0	42	1	1	0	0	1	2	1
npik539	94	0	0	2	1	94	1	1	2	1	6	3	1
npik5392	56	2	1	2	1	56	46	n.k.	0	0	1	0	0
npik5393	102	n.k.	n.k.	n.k.	n.k.	102	65	n.k.	0	0	2	1	0
npik5395	88	1	1	23	1	88	0	0	25	1	2	1	1
npik82	108	7	1	6	3	108	0	0	0	0	2	6	0
npik84	41	1	1	7	5	41	0	0	0	0	1	3	0
npik85	123	2	1	16	2	123	20	3	0	0	3	5	1
Npiy860	61	1	1	2	2	61	0	0	0	0	n.k.	n.k.	n.k.
Npiy504a	47	3	1	1	1	47	5	1	0	0	1	2	0
Npiy504b	61	2	1	11	4	61	0	0	0	0	5	1	0
Npiy121	41	0	0	0	0	41	0	0	0	0	5	3	0
Npiy120	36	1	1	0	0	36	0	0	0	0	4	2	0
Npiy123	69	1	1	5	4	69	0	0	0	0	8	1	1
npiy125	--	--	--	--	--	77	10	2	0	0	8	1	1
npiw870	49	n.k.	n.k.	n.k.	n.k.	49	3	1	0	0	1	1	0

npiw830	108	n.k.	n.k.	n.k.	n.k.	108	0	0	1	1	14	4	0
npiw503	114	n.k.	n.k.	n.k.	n.k.	114	7	3	29	3	7	n.k.	n.k.
Number	2603	-	-	-	-	2680	-	-	-	-	-	-	-
number without 'gray' files	2055	60	16	121	39	1871	206	33	37	6	99*	67*	18*
% of number without 'gray' files		2,9%	0,8%	5,9%	1,9%		11,0%	1,7%	2,0%	0,3%			

* the indication of an error is rather subjective and there are many errors which appear in several files. For this reason it seems not correct to give percentages.

8.1.11 ANNEX 4: Scoping chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dieticians

Goal: to create a basis for the development of a version of SPET useful to dissect functions / shape and impairments of the ICIDH (International Classification of Impairments, Activities and Participation; WHO, June 1997).

Tool: chapter 6 Digestion, nutrition and metabolic functions of the Classification of Functions and Shape of the Draft ICIDH for Dieticians (Beens & Heerkens, January 1999), an adapted version of the beta-1 draft of ICIDH-2 (WHO, June 1997).

Both a global scoping as well as an extended scoping of the chapter indicated above has been done.

Based on the global scoping of the approximately 320 classes of chapter 6 new classes of descriptors and several new links are indicated. An overview of the global scoping procedure is given in Annex 4a.

Annex 4b represents the 'paper' dissection of the 320 classes mentioned above. In this paper dissection the new descriptors (indicated in Annex 4b) and the new links (indicated in Annex 4a) are used. Problems with the dissection and suggestions for adaptation of the present SPET are given as well.

One result of the extended scoping, a list of new (groups of) descriptors is given in Annex 4c.

The global scoping done in January 1999 (an earlier version of Annex 4A) costed about 20 hours; the more detailed scoping as presented in Annex 4b, together with adaptation of Annex 4a and development of Annex 4c about 52 hours.

8.1.12 ANNEX 4a: Global scoping of chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dietitians

Present SPET	Remarks	New links	Necessity for new link
The for the functions / structure / impairments of the digestive system relevant categories of the present SPET-version are indicated in fat print. These categories must be included in the SPET-version to be developed for the dissection of functions / structure / impairments as well as the necessary links between these categories. Categories to be added are printed in italics		Links which are not available in the present SPET-version, but which are needed for the dissection of chapter 6.	
- Pathology & Impairment	'Pathology' as such is too small; descriptors included in this category are also impairments, like pain and nausea. Of course it is possible to have two separate classes, one for pathology and one for impairment. But as each descriptor can be only in one category we propose to take pathology & impairment as one category as it is difficult / impossible to decide whether pain or deformity have to be included in the category pathology or in the category impairment.	pathology & impairment HAS LEVEL level pathology & impairment HAS TEMPORAL MARKER temporal marker pathology & impairment CAUSED BY food (or: FOLLOWS food) pathology & impairment CAUSED BY foodproductgroup pathology & impairment CAUSED BY foodproduct pathology & impairment CAUSED BY chemical (incl. nutrient and ingredient) pathology & impairment CAUSED BY environmental factor	To indicate the presence of an impairment and may be also the severity of the impairment To indicate that some impairments take place at certain moments in time to indicate e.g. foodallergy, with inclusion of the kind of food
X Lesion			
- Approach			

- Characteristic - Feature X Colour X Composition X Consistency X Level X DrugFeature X Extent X Method x Laterality x Position x Sex x Temporal marker	To be added are descriptors related to characteristics of anatomical structures like continuity, length, etc. Body length will be dissected as 'length IS FEATURE OF body'. Furthermore classes of descriptors have to be added related to colour, composition, consistency and level. Level have to be added to indicate the presence of e.g. an impairment or a body process, but also to indicate the severity of an impairment. By the introduction of new subcategories some of the items which are directly situated under Feature have to be shifted; e.g. increased and decreased can be shifted to the category Level.	feature IS FEATURE OF anatomy substance HAS COLOUR colour substance HAS COMPOSITION composition sustance HAS CONSISTENCY consistency	e.g. to indicate that length is a feature of the body
		feature HAS LEVEL level body proces HAS LEVEL level pathology & impairment HAS LEVEL level body substance HAS LEVEL level pathology & impairment HAS TEMPORAL MARKER temporal marker body process HAS TEMPORAL MARKER temporal marker	e.g. to indicate that the length, or another characteristic, is too big, too small or in another way deviating from 'normal' e.g. to indicate that a process is too slow or impaired or absent to indicate when a process takes place; e.g. eating on a strange moment in time
- Process	In this class all functions relevant for dieticians have to be incorporated,	body process HAS TEMPORAL MARKER temporal marker	to indicate when a process takes place; e.g. eating on a

x BodyProcess	this means that things like digestion and growth have to be added. Remark: within the present category there are several items which we would to shift from BodyProcess to Pathology & Impairment. Examples are e.g. anuria, dehydration.	body process HAS LEVEL level body process IS FUNCTION OF person body process HAS TEMPORAL MARKER temporal marker body process HAS QUANTITY quantity body process IS FUNCTION OF body process	strange moment in time this links is necessary to link functions to special groups of persons to indicate relations between body processes
- x Deed - x HealthCareAct - x NonHealthCareAct	Some of the deeds in SPET, like absorption and sensation, can better be shifted to body process. Deed indicates a voluntary act of a person; absorption and sensation are functions of organs. To indicate the Deed 'absorbing' and ssensing' or other alternative terms can be used.		
- Quantity - x Number - x Ordinal position - x Range			
- Substance - x BodySubstance - Chemical	The category 'body substance' includes, besides 'products' like sweat and feces, also the tissues. In the category Chemical some of the substances included in food are already present. For this reason we	body substance HAS FEATURE feature body substance HAS LEVEL level body substance CONTAINS environmental	e.g. to indicate the consistence, amount or colour of e.g. faeces

x Nutrient x Ingredient	propose to make Nutrient and Ingredient as subcategories of Chemical. This implies that some of the descriptors already included in Chemical have to be shifted to nutrient (e.g. calcium and vitamine). An alternative is to include Nutrient and Ingredient as subcategories of Food	factor body substance HAS QUANTITY quantity nutrient IS PART OF foodproduct nutrient CAUSES pathology & impairment nutrient HAS QUANTITY quantity ingredient IS PART OF foodproduct ingredient CAUSES pathology & impairment ingredient HAS QUANTITY quantity	
- Structure x Abstract structure - Anatomy x AnatomicalConnection x AnatomicalPart	Some of the AbstractStructures like 'phonation' and 'speech' can be shifted to BodyProcess; 'low fat diet' can be shifted to Food For us it is still unclear which descriptors are part of the category AanatomicalPart; we expected an item like 'muscle' in this category.	anatomy HAS FEATURE feature	e.g. to indicate continuity of intestines or dimensions of an organ

- x BodySpace - BodySystemAnatomy - CardiovascularSystemAnatomy - x Blood vessel - x Part of heart - x DigestiveSystemAnatomy - EndocrineSystemAnatomy - x Gland - x GenitoUrinarySystemAnatomy - LymphoreticularSystemAnatomy - x LymphNode - MusculoSkeletalSystem Anatomy - X Bone - X Joint - NervousSystemAnatomy - x Nerve - Oro dentalSystemAnatomy - RespiratorySystemAnatomy - SensorySystemAnatomy	but 'muscle' is part of MusculoSkeletalSystem Anatomy. On the other hand a descriptor like 'meniscus' is included in the category AnatomicalPart.		
- Device - x Material - x Prosthesis			
- Organism - x Person			

- Contextual factor - x Personal factor - Environmental factor - Food	added to be able to include food In the beta-1 draft of ICDH-2 food is a subclass of environmental factors	environmental factor CAUSES pathology & impairment environmental factor HAS FEATURE feature environmental factor HAS QUANTITY quantity food 'CAUSES' pathology & impairment (of: FOLLOWED BY pathology & impairment) food HAS FEATURE feature food HAS CONSISTENCY consistency	e.g. the consumption of food can result in an allergic reaction
--	--	--	--

x	Foodproductgroup	Foodproductgroups Descriptors, e.g. * fruit * vegetables	food HAS COLOUR colour food HAS QUANTITY quantity foodproductgroup CONSISTS OF foodproduct foodproductgroup CAUSES pathology & impairment foodproductgroup HAS QUANTITY quantity foodproductgroup IS PART OF food	e.g. to indicate the different characteristics of food
x	Foodproduct	specific products Descriptors, e.g. * chocolate * wine	foodproduct IS PART OF foodproductgroup foodproduct CONSISTS OF nutrients foodproduct CONSISTS OF ingredients foodproduct CAUSES pathology & impairment foodproduct HAS QUANTITY quantity	

8.1.13 ANNEX 4b Extended scoping of chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dieticians

SCOPING for items with three or more digits

All Dutch items are translated in English terms (underlined)

additional descriptors (mentioned in Annex 4b) are indicated in italics

for the classes which are identical to the beta-1 draft the beta-1 codes are added in brackets []

✂ indicates the dissection

on several places remarks are made; some of the remarks apply more than once, but they are just indicate one time

t.c. = type of characteristic

Classificatie Functies & Structuur (Stoornissen) voor de Diëtetiek

Classification of Functions & Shape (Impairments) for Dieticians

f6 SPIJSVERTERING, VOEDING EN METABOLE FUNCTIES [i50100-i59999]

DIGESTION, NUTRITION AND METABOLIC FUNCTIONS [i50100-i59999]

excl. samenstelling bloed (f502)

composition of blood (f502)

f600 Voeding [i50100]

De algemene aspecten van voeding die zijn vereist om het normale functioneren te handhaven.

Nutrition [i50100]

The general aspects of nourishment required to maintain normal functioning.

✂ DEEDnutrition (Deed)

Remark

Nutrition is a deed in SPET. In dissecting ICIDH it would be better to have 'feeding' or a synonymous term as 'Deed' and to shift nutrition to 'BodyProcess'.

f6000 Voedselallergie [i50110]

Allergy to food [i50110]

✂ PATH & IMP allergy (Pathology)

CAUSED BY *food (EnvironmentalFactor)*

f60000 Allergie voor kippen-ei-eiwit

Allergy for chicken egg protein

✂ PATH & IMP allergy (Pathology)

CAUSED BY *chicken egg protein (Nutrient)*

f60001 Allergie voor koemelkeiwit

Allergy for cow's milk protein

✂ PATH & IMP allergy (Pathology)

CAUSED BY *cow's milk protein (Nutrient)*

f60002 Allergie voor soja-eiwit

	<u>Allergy for soya protein</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<i>soya protein (Nutrient)</i>
f60003	Allergie voor tarwe-eiwit	
	<u>Allergy for wheat protein</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<i>wheat protein (Nutrient)</i>
f60004	Allergie voor fruit	
	<u>Allergy for fruit</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<i>fruit (FoodProductGroup)</i>
f60005	Allergie voor nikkel	
	<u>Allergy for nickel</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<i>nickel (Nutrient)</i>
f60006	Allergie voor noten	
	<u>Allergy for nuts</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<i>nuts (FoodProductGroup)</i>
f60007	Allergie voor pinda's	
	<u>Allergy for peanuts</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<i>peanuts (FoodProduct)</i>
f60008	Allergie voor anders gespecificeerd(e) voedingsstof(fen) / voedingsmiddel(en)	
	<u>Allergy for other specified nutrients / food products</u>	
	<i>2e en volgende digits na decimale punt voor klasse f60008</i>	
	<u>Second en following digits after decimal point for class f60008</u>	
	<i>k.t. produktgroep, voedingsmiddel, voedingsstof [NEVO-tabel]</i>	
	<u>t.c. foodproductgroup, foodproduct, nutrient</u>	
	✂ PATH & IMP allergy (Pathology)	
	CAUSED BY	<u>other</u> <i>foodproductgroup (EnvironmentalFactor) or foodproduct (EnvironmentalFactor) or nutrient (Chemical)</i>
f60009	Niet gespecificeerd	
	<u>Unspecified</u>	
	<i>1e digit achter de decimale punt voor klasse f6000</i>	
	<u>first digit after decimal point for class f6000</u>	
.0	Geen allergie	
	<u>No allergy present</u>	
	✂ PATH & IMP allergy (Pathology)	
		
	HAS LEVEL	<i>absent (Level)</i>

- .1 *Wel allergie*
Allergy present
 ✕ PATH & IMP allergy (Pathology)

 HAS LEVEL *present (Level)*
- .8 *Anders gespecificeerd*
Other specified
 ✕ PATH & IMP allergy (Pathology)

 HAS FEATURE other level (Feature)

- .9 *Niet gespecificeerd*
Unspecified

- f6001 Voedselintolerantie [i50120]**
Intolerance to food [i50120]
 ✕ PATH & IMP *intolerance (Impairment)*
 CAUSED BY *food (EnvironmentalFactor)*

Remark

In dissecting this class we have seen that it might be better to rename this class 'Tolerance to food' (neutral wording) and to indicate the presence of intolerance with a qualifier. Tolerance should be added to the BodyProcess.

- f60010 Intolerantie voor conserveermiddelen
Intolerance to preservatives
 ✕ PATH & IMP *intolerance (Impairment)*
 CAUSED BY *preservative (Ingredient)*
- f60011 Intolerantie voor benzoaten
Intolerance to benzoates
 ✕ PATH & IMP *intolerance (Impairment)*
 CAUSED BY *benzoate (Ingredient)*
- f60012 Intolerantie voor AZO-kleurstoffen
Intolerance for colouring agents (colourings)
 ✕ PATH & IMP *intolerance (Impairment)*
 CAUSED BY *colouring agent [colouring] (Ingredient)*
- f60013 Intolerantie voor geur- en smaakstoffen
Intolerance for aromatic substances (artificial odours) and flavourings
 ✕ PATH & IMP *intolerance (Impairment)*
 CAUSED BY *aromatic substance [artificial odours] and flavouring (Ingredient)*
- f60014 Intolerantie voor smaakversterkers
Intolerance for taste booster

✕ PATH & IMP *intolerance (Impairment)*
CAUSED BY *taste booster (Ingredient)*

f60015 Intolerantie voor anti-oxidanten
Intolerance for antioxidants

✕ PATH & IMP *intolerance (Impairment)*
CAUSED BY *antioxidant (Ingredient)*

f60016 Lactose intolerantie
Intolerance for lactose

✕ PATH & IMP *intolerance (Impairment)*
CAUSED BY *lactose (Nutrient)*

Remark

Glucose tolerance is a descriptor in SPET. As tolerance exists for a large amount of substances it is better to add tolerance to BodyProcess. Doing so you can make every combination you like, e.g. combinations with a nutrient, ingredient or foodproduct.

f60018 Intolerantie voor anders gespecificeerd(e) voedingsstof(fen) / voedingsmiddel(en)
Intolerance for other specified nutrient(s) / product(s)

2e en volgende digits na decimale punt voor klasse f60018

Second en following digits after decimal point for class f60008

k.t. produktgroep, voedingsmiddel, voedingsstof [NEVO-tabel]

t.c. foodproductgroup, foodproduct, nutrient

✕ PATH & IMP *intolerance (Impairment)*
CAUSED BY *other foodproductgroup (EnvironmentalFactor) or foodproduct (EnvironmentalFactor) or nutrient (Chemical) or ingredient (Chemical)*

Remark

The description given in the classification was too small, only nutrients, foodproducts and foodproductgroups. For this reason we added in the dissecting ingredient. This mistake comes back several times but we indicate it only once.

f60019 Niet gespecificeerd
Unspecified

1e digit achter de decimale punt voor klasse f6001

First digit after decimal point for class f6001

.0 Geen intolerantie

No intolerance present

✕ PATH & IMP *intolerance (Impairment)*

.....
HAS LEVEL *absent (level)*

.1 Wel intolerantie

Intolerance present

✕ PATH & IMP *intolerance (Impairment)*

.....

	HAS LEVEL	<i>present (level)</i>
.8	Anders gespecificeerd <u>Other specified</u> ✕ PATH & IMP <i>intolerance (Impairment)</i> HAS FEATURE <u>other</u> <i>level (feature)</i>	
.9	Niet gespecificeerd <u>Unspecified</u>	
f6002	Absorptie van voedingsmiddelen [i50130] <u>Absorption of nutrients [i50130]</u> ✕ DEEDabsorption (Deed) ACTS ON <i>nutrient (Chemical)</i>	
Remark Absorption is a deed in SPET. In dissecting ICDH it would be better to have 'absorbing' or a synonymous term as 'Deed' and to shift absorption to 'BodyProcess'.		
f60020	Absorptie van voedingsmiddelen in het algemeen <u>Absorption of nutrients in general</u> ✕ DEEDabsorption (Deed) ACTS ON <i>nutrient (Chemical)</i> HAS FEATURE <i>general (Feature)</i>	
f60020.0	Normale absorptie van voedingsmiddelen in het algemeen <u>Normal absorption of nutrients in general</u> ✕ DEEDabsorption (Deed) ACTS ON <i>nutrient (Chemical)</i> HAS FEATURE <i>general (feature)</i> HAS LEVEL <i>normal (Level)</i>	
f60020.1	Afwijkende absorptie van voedingsmiddelen in het algemeen <i>incl. slechte resorptie, malabsorptie</i> <u>Impaired absorption of nutrients in general</u> <i>incl. malresorption, malabsorption</i> ✕ DEEDabsorption (Deed) ACTS ON <i>nutrient (Chemical)</i> HAS FEATURE <i>general (Feature)</i> HAS LEVEL <i>impaired (Level)</i>	
f60020.8	Anders gespecificeerd <u>Other specified</u> ✕ DEEDabsorption (Deed) ACTS ON <i>nutrient (Chemical)</i> HAS FEATURE <u>other</u> <i>level (Feature)</i>	
f60020.9	Niet gespecificeerd	

Unspecified

f60021 Absorptie van specifieke voedingsstof(fen)

Absorption of specific nutrients

✂ DEEDabsorption (Deed)

ACTS ON *nutrient (Chemical)*

HAS FEATURE *specific (Feature)*

f60021.0 Normale absorptie van specifieke voedingsstof(fen)

Normal absorption of specific nutrient

✂ DEEDabsorption (Deed)

ACTS ON *nutrient (Chemical)*

HAS FEATURE *specific (Feature)*

HAS LEVEL *normal (Level)*

f60021.1 Stoornis in absorptie van specifieke voedingsstof(fen)

Impairment in absorption of specific nutrient

✂ DEEDabsorption (Deed)

ACTS ON *nutrient (Chemical)*

HAS FEATURE *specific (Feature)*

HAS LEVEL *impaired (Level)*

f60021.8 Anders gespecificeerd

Other specified

✂ DEEDabsorption (Deed)

ACTS ON *nutrient (Chemical)*

HAS FEATURE *specific (Feature)*

HAS FEATURE other level (Feature)

f60021.9 Niet gespecificeerd

Unspecified

2e en volgende digits na decimale punt voor klasse f60021

Second en following digits after decimal point for class f60021

k.t. produktgroep, voedingsmiddel, voedingsstof (NEVO-tabel)

t.c. foodproductgroup, foodproduct, nutrient

✂ DEEDabsorption (Deed)

ACTS ON other *foodproductgroup (EnvironmentalFactor) or foodproduct (EnvironmentalFactor) or nutrient (Chemical) or ingredient (Chemical)*

f60028 Anders gespecificeerd

Other specified

✂ DEEDabsorption (Deed)

CAUSED BY other nutrient (Chemical)

f60029 Niet gespecificeerd

Unspecified

f6003 Transport van voedsel [i50140]
 De mechanische passage van voedsel door het spijsverteringskanaal.
excl. oesofagale dysfagie (f60101)
excl. gastro-oesofagale reflux (f6014)
Transport of food [i50140]
 The mechanical passage of food through the digestive channel.
excl. oesophageal dysphagia (f60101)
excl. gastro-oesophageal reflux (f6014)
 ✕ BODY PROC *transport (BodyProcess)*
 ACTS ON food (EnvironmentalFactor)

Remark

Transport is added as a body process. An alternative might be the use of the descriptor 'passing through' ('Deed').

f60030 Transport van voedsel in het algemeen
Transport of food in general
 ✕ BODY PROC *transport (BodyProcess)*
 ACTS ON food (EnvironmentalFactor)
 HAS FEATURE general (Feature)

f60030.0 Geen afwijkend transport van voedsel in het algemeen
No abnormal transport of food in general
 ✕ BODY PROC *transport (BodyProcess)*
 ACTS ON food (EnvironmentalFactor)
 HAS FEATURE general (Feature)
 HAS LEVEL normal (Level)

f60030.1 Afwijkend transport van voedsel in het algemeen
Impairment in transport of food in general
 ✕ BODY PROC *transport (BodyProcess)*
 ACTS ON food (EnvironmentalFactor)
 HAS FEATURE general (Feature)
 HAS LEVEL impaired (Level)

f60030.8 Anders gespecificeerd
Other specified
 ✕ BODY PROC *transport (BodyProcess)*
 ACTS ON food (EnvironmentalFactor)
 HAS FEATURE general (feature)
 HAS FEATURE other level (Feature)

f60030.9 Niet gespecificeerd
Unspecified

f60031 Transport van specifieke voedingsstof(fen)
Transport of specific nutrient(s)
 ✕ BODY PROC *transport (BodyProcess)*
 ACTS ON nutrient (EnvironmentalFactor)
 HAS FEATURE specific (Feature)

f60031.0 Geen afwijkend transport van specifieke voedingsstof(fen)

No abnormal transport of specific nutrient(s)

✂ BODY PROC *transport (BodyProcess)*

ACTS ON *nutrient (EnvironmentalFactor)*

HAS FEATURE *specific (Feature)*

HAS LEVEL *normal (Level)*

f60031.1 Stoornis in transport van specifieke voedingsstof(fen)

Impairment in transport of specific nutrient(s)

✂ BODY PROC *transport (BodyProcess)*

ACTS ON *nutrient (EnvironmentalFactor)*

HAS FEATURE *specific (Feature)*

HAS LEVEL *impaired (Level)*

f60031.8 Anders gespecificeerd

Other specified

✂ BODY PROC *transport (BodyProcess)*

ACTS ON *nutrient (EnvironmentalFactor)*

HAS FEATURE *specific (feature)*

HAS FEATURE other *level (Feature)*

f60031.9 Niet gespecificeerd

Unspecified

2e en volgende digits na decimale punt voor klasse f60031

Second and following digits after decimal point for class f60031

k.t. produktgroep, voedingsmiddel, voedingsstof (NEVO-tabel)

t.c. foodproductgroup, foodproduct, nutrient

✂ BODY PROC *transport (BodyProcess)*

ACTS ON other *foodproductgroup (EnvironmentalFactor) or foodproduct (EnvironmentalFactor) or nutrient (Chemical) or ingredient (Chemical)*

f60032 Braken

Vomit

✂ PATH & IMP vomiting (Pathology)

f60038 Anders gespecificeerd

Other specified

✂ BODY PROC *transport (BodyProcess)*

ACTS ON other *food (EnvironmentalFactor)*

f60039 Niet gespecificeerd

Unspecified

f6004 Vertering [i50150]

Afbraak van opgenomen voedsel in eenvoudiger bestanddelen voor absorptie in het spijsverteringskanaal.

Digestion [i50150]

The breakdown of ingested to simpler compounds for absorption in the digestive tract.

✕ PATH & IMP *digestion (body proces)*
ACTS ON *food (EnvironmentalFactor)*

f60040 Vertering van voedsel in het algemeen

Digestion of food in general

✕ BODY PROC *digestion (BodyProcess)*
ACTS ON *food (EnvironmentalFactor)*
HAS FEATURE *general (Feature)*

f60040.0 Geen afwijkende vertering van voedsel in het algemeen

No abnormal digestion of food in general

✕ BODY PROC *digestion (BodyProcess)*
ACTS ON *food (EnvironmentalFactor)*
HAS FEATURE *general (Feature)*
HAS LEVEL *normal (Level)*

f60040.1 Afwijkende vertering van voedsel in het algemeen

Impairment in digestion of food in general

✕ BODY PROC *digestion (BodyProcess)*
ACTS ON *food (EnvironmentalFactor)*
HAS FEATURE *general (Feature)*
HAS LEVEL *impaired (Level)*

f60040.8 Anders gespecificeerd

Other specified

✕ BODY PROC *digestion (BodyProcess)*
HAS FEATURE *other level (Feature)*

f60040.9 Niet gespecificeerd

Unspecified

f60041 Vertering van specifieke voedingsstof(fen)

Digestion of specific nutrient(s)

✕ BODY PROC *digestion (BodyProcess)*
ACTS ON *nutrient (Chemical)*
HAS FEATURE *specific (Feature)*

f60041.0 Geen afwijkende vertering van specifieke voedingsstof(fen)

No abnormal digestion of specific nutrient(s)

✕ BODY PROC *digestion (BodyProcess)*
ACTS ON *nutrient (Chemical)*
HAS FEATURE *specific (Feature)*
HAS LEVEL *normal (Level)*

f60041.1 Afwijkende vertering van specifieke voedingsstof(fen)

Impairment in digestion of specific nutrient(s)

✕ BODY PROC *digestion (BodyProcess)*

	ACTS ON <i>nutrient (Chemical)</i> HAS FEATURE <i>specific (Feature)</i> HAS LEVEL <i>impaired (Level)</i>
f60041.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>digestion (BodyProcess)</i> HAS FEATURE <u>other level (Feature)</u>
f60041.9	Niet gespecificeerd <u>Unspecified</u>
<i>2e en volgende digits na decimale punt voor klasse f60041</i> <i>second and following digits after decimal point for class f60041</i>	
k.t.	<u>produktgroep, voedingsmiddel, voedingsstof (NEVO-tabel)</u>
t.c.	<u>foodproductgroup, foodproduct, nutrient</u>
	✂ BODY PROC <i>digestion (BodyProcess)</i> ACTS ON <u>other</u> <i>foodproductgroup (EnvironmentalFactor) or foodproduct (EnvironmentalFactor) or nutrient (Chemical) or ingredient (Chemical)</i>
f60048	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>digestion (BodyProcess)</i> ACTS ON <u>other</u> <i>food (EnvironmentalFactor)</i>
f60049	Niet gespecificeerd <u>Unspecified</u>
f6005	Behoeftte van specifiek(e) voedingsstof(fen) en energie <u>Need of specific nutrient(s) and energy</u> ✂ BODY PROC <i>need (BodyProcess)</i> ACTS ON 1 <i>nutrient (Chemical)</i> HAS FEATURE <i>specific (Feature)</i> ACTS ON 2 <i>energy (EnvironmentalFactor)</i>
f60050	Energiebehoefte <u>Energy requirement</u> ✂ BODY PROC <i>need (BodyProcess)</i> ACTS ON <i>energy (EnvironmentalFactor)</i>
f60050.0	Normale energiebehoefte <u>Normal energy requirement</u> ✂ BODY PROC <i>need (BodyProcess)</i> ACTS ON <i>energy (EnvironmentalFactor)</i> HAS LEVEL <i>normal (Level)</i>
f60050.1	Verhoogde energiebehoefte <u>Increased energy requirement</u>

✂ BODY PROC *need (BodyProcess)*
 ACTS ON *energy (EnvironmentalFactor)*
 HAS FEATURE *increased (Feature)*

Remark

Increased and decreased are descriptors within 'Feature'. By introducing the subcategory Level (see Annex 4a) these descriptors can be shifted to Level.

f60050.2 Verminderde energiebehoefte
Decreased energy requirement
 ✂ BODY PROC *need (BodyProcess)*
 ACTS ON *energy (EnvironmentalFactor)*
 HAS FEATURE *decreased (Feature)*

f60050.8 Anders gespecificeerd
Other specified
 ✂ BODY PROC *need (BodyProcess)*
 HAS FEATURE other level (*Feature*)

f60050.9 Niet gespecificeerd
Unspecified

f60051 Behoefte aan specifieke voedingsstof(fen)
Need of specific nutrient(s)
 ✂ BODY PROC *need (BodyProcess)*
 ACTS ON 1 *nutrient (Chemical)*
 HAS FEATURE *specific (Feature)*

f60051.0 Normale behoefte aan specifieke voedingsstof(fen)
Normal need of specific nutrient(s)
 ✂ BODY PROC *need (BodyProcess)*
 ACTS ON *nutrient (Chemical)*
 HAS FEATURE *specific (Feature)*
 HAS LEVEL *normal (Level)*

f60051.1 Verhoogde behoefte aan specifieke voedingsstof(fen)
Increased level of specific nutrient(s)
 ✂ BODY PROC *need (BodyProcess)*
 ACTS ON *nutrient (Chemical)*
 HAS FEATURE *specific (Feature)*
 HAS FEATURE *increased (Feature)*

f60051.2 Verminderde behoefte aan specifieke voedingsstof(fen)
Decreased level of specific nutrient(s)
 ✂ BODY PROC *need (BodyProcess)*
 ACTS ON *nutrient (Chemical)*
 HAS FEATURE *specific (Feature)*
 HAS FEATURE *decreased (Feature)*

f60051.8 Anders gespecificeerd

Other specified

✂ BODY PROC *need (BodyProcess)*
 ACTS ON *nutrient (Chemical)*
 HAS FEATURE *specific (Feature)*
 HAS FEATURE other *level (Feature)*

f60051.9 Niet gespecificeerd

Unspecified

2e en volgende digits na decimale punt voor klasse f60051

second and following digits after decimal point for class f60051

k.t. produktgroep, voedingsmiddel, voedingsstof (NEVO-tabel)

t.c. foodproductgroup, foodproduct, nutrient

✂ BODY PROC *need (BodyProcess)*
 ACTS ON other *foodproductgroup (EnvironmentalFactor) or foodproduct (EnvironmentalFactor) or nutrient (Chemical) or ingredient (Chemical)*

f60058 Anders gespecificeerd

Other specified

✂ BODY PROC *need (BodyProcess)*
 ACTS ON other *nutrient (Chemical)*

f60059 Niet gespecificeerd

Unspecified

f6006 Boeren

Burp

✂ BODY PROC *burp (BodyProcess)*

f6006.0 Boeren niet aanwezig

No burp present

✂ BODY PROC *burp (BodyProcess)*
 HAS LEVEL *absent (Level)*

f6006.1 Boeren wel aanwezig

Burp present

✂ BODY PROC *burp (BodyProcess)*
 HAS LEVEL *present (Level)*

f6006.8 Anders gespecificeerd

Other specified

✂ BODY PROC *burp (BodyProcess)*
 HAS FEATURE other *level (Feature)*

f6006.9 Niet gespecificeerd

Unspecified

f6008' Anders gespecificeerd

Other specified

✂ DEED other nutrition (*Deed*)

f6009 Niet gespecificeerd

Unspecified

f601 Kauwen / slikken en gerelateerde functies [i50200]

excl. pijn tijdens kauwen of slikken (f402x3/4) [i303x4]

excl. salivatie / speekselfunctie / speekselvorming (f6071) [i50220]

Chew / swallow and related functions

excl. pain during chewing or swallowing (f402x3/4) [i303x4]

excl. salivation / functions of salivatory glands / sputum production (f6071) [i50220]

✂a BODY PROC chew (BodyProcess) & swallow (BodyProcess)

✂b BODY PROC other function (BodyProcess)

IS FUNCTION OF chew (BodyProcess) & swallow (BodyProcess)

Remark

It is difficult to dissect the phrase 'related functions'. The term functions is used in SPET in different combinations within BodyProcess, e.g. renal function. As such it is seen as a body process and can be added as descriptor in BodyProcess. In the ICIDH there are many classes starting with 'function', e.g. functions of heart, functions of respiratory muscles. These items can be dissected as 'function IS FUNCTION OF heart'; which seems a little bit superfluous but is theoretically probably right. By making it possible to relate several body processes the new link 'function IS FUNCTION OF body process' is added; which also sounds a little bit superfluous.

f6010 Dysfagie

Dysphagia

✂ PATH & IMP *dysphagia (Impairment)*

f60100 Orofagale dysfagie

Orophageal dysphagia

✂ PATH & IMP *dysphagia (Impairment)*

IS FUNCTION OF oropharynx (*DigestiveSystemAnatomy*)

f601000 Kauwen

Chew

✂ BODY PROC chew (BodyProcess)

f601001 Slikken

Swallow

✂ BODY PROC swallow (BodyProcess)

f6010010 Slikken van dun vloeibare voeding

Swallow thin liquid food

✂ BODY PROC swallow (BodyProcess)

	ACTS ON	<i>food (EnvironmentalFactor)</i>
	HAS CONSISTENCY	<i>thin liquid (Consistency)</i>
f6010011	Slikken van dunne voeding	
	<u>Swallow thin food</u>	
	✂ BODY PROC	swallow (BodyProcess)
	ACTS ON	<i>food (EnvironmentalFactor)</i>
	HAS CONSISTENCY	<i>thin (Consistency)</i>
f6010012	Slikken van dikke voeding	
	<u>Swallow thick food</u>	
	✂ BODY PROC	swallow (BodyProcess)
	ACTS ON	<i>food (EnvironmentalFactor)</i>
	HAS CONSISTENCY	<i>solid (Consistency)</i>
f6010013	Slikken van vaste voeding	
	<u>Swallow solid food</u>	
	✂ BODY PROC	swallow (BodyProcess)
	ACTS ON	<i>food (EnvironmentalFactor)</i>
	HAS CONSISTENCY	<i>solid (Consistency)</i>
f6010018	Anders gespecificeerd	
	<u>Other specified</u>	
	✂ BODY PROC	swallow (BodyProcess)
	ACTS ON	<i>food (EnvironmentalFactor)</i>
	HAS FEATURE	<i>consistency (feature)</i>
f6010019	Niet gespecificeerd	
	<u>Unspecified</u>	
f601008	Anders gespecificeerd	
	<u>Other specified</u>	
	✂ PATH & IMP	<u>other dysphagia (Impairment)</u>
	IS FUNCTION OF	<i>oropharynx (DigestiveSystemAnatomy)</i>
f601009	Niet gespecificeerd	
	<u>Unspecified</u>	
f60101	Oesofagale dysfagie	
	<i>incl. oesofagale passagestoornis</i>	
	<u>Oesophageal dysphagia</u>	
	<i>incl. impairment in oesophageal passage</i>	
	✂ PATH & IMP	<u>other dysphagia (Impairment)</u>
	IS FUNCTION OF	<i>oesophagus (DigestiveSystemAnatomy)</i>
f60108	Anders gespecificeerd	
	<u>Other specified</u>	
	✂ PATH & IMP	<u>other dysphagia (Impairment)</u>

- f60109 Niet gespecificeerd
Unspecified
- f6011 **Aspiratie [i50240]**
Het terechtkomen van voedsel of vocht in de luchtwegen; treedt meestal op bij mensen met een veranderd bewustzijn of bij wie de hoestreflex niet normaal functioneert.
Aspiration [i50240]
The drawing of food or drink in the respiratory tract; is usually occurring in people who are in an altered consciousness or whose cough reflex is not functioning normally.
✂ PATH & IMP *aspiration (Impairment)*
- f6012 **Kwijlen**
Slaver
✂ PATH & IMP *slaver (Impairment)*
- f6013 **Rumineren**
Rumination
✂ PATH & IMP *rumination (Impairment)*
- f6014 **Gastro-oesofagale reflux**
Gastro-oesophageal reflux
✂ PATH & IMP *gastro-oesophageal Reflux (impairment)*
- f6015 **Verslikken**
Choke
✂ PATH & IMP *choke (impairment)*
- f6018 **Anders gespecificeerd**
Other specified
- f6019 **Niet gespecificeerd**
Unspecified

1e digit achter decimale punt voor klasse f601

first digit after decimal point for class f601

- .0 *Stoornis niet aanwezig / functie normaal*
Impairment not present / function normal
✂ b BODY PROC other function (BodyProcess)
 IS FUNCTION OF chew (BodyProcess) & swallow (BodyProcess)

 HAS LEVEL *normal (Level)*
- .1 *Stoornis wel aanwezig / functie niet normaal*
Impairment present / function not normal
✂ b BODY PROC other function (BodyProcess)
 IS FUNCTION OF chew (BodyProcess) & swallow (BodyProcess)

 HAS LEVEL *impaired (Level)*

.8 *Anders gespecificeerd*

Other specified

✂ b BODY PROC other function (BodyProcess)

IS FUNCTION OF chew (BodyProcess) & swallow (BodyProcess)

.....

HAS FEATURE other level (Feature)

.9 *Niet gespecificeerd*

Unspecified

f602 Andere functies gerelateerd aan voeding [i50400]

Other functions related to nutrition [i50400]

f6020 Hoeveelheid en frequentie van ingenomen voedsel / drinken

Amount and frequency of food / drink intake

✂ BODY PROC intake (BodyProcess)

ACTS ON 1 food (EnvironmentalFactor)

HAS QUANTITY amount (quantity)

ACTS ON 2 drink (EnvironmentalFactor)

HAS QUANTITY amount (quantity)

HAS QUANTITY frequency (Quantity)

f60200 Hoeveelheid en frequentie van ingenomen voedsel / drinken bij adolescenten en volwassenen

Amount and frequency of food / drink intake in adolescents and adults

✂ BODY PROC intake (BodyProcess)

ACTS ON 1 food (EnvironmentalFactor)

HAS QUANTITY amount (Quantity)

ACTS ON 2 drink (EnvironmentalFactor)

HAS QUANTITY amount (Quantity)

HAS QUANTITY frequency (Quantity)

IS FUNCTION OF adolescent & adult (Person)

f60200.0 Geen afwijkende hoeveelheid en/of frequentie van ingenomen voedsel / drinken

No abnormal amount and/or frequency of food / drink intake

✂ BODY PROC intake (BodyProcess)

ACTS ON 1 food (EnvironmentalFactor)

HAS QUANTITY amount (Quantity)

ACTS ON 2 drink (EnvironmentalFactor)

HAS QUANTITY amount (Quantity)

HAS QUANTITY frequency (Quantity)

IS FUNCTION OF adolescent & adult (Person)

HAS LEVEL normal (Level)

f60200.1 In het algemeen te veel eten

Eat too much in general

✂ BODY PROC intake (BodyProcess)

		ACTS ON 1	<i>food (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>amount (Quantity)</i>
		HAS LEVEL	<i>more [than usual] (Level)</i>
		ACTS ON 2	<i>drink (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>amount (Quantity)</i>
		HAS LEVEL	<i>more [than usual] (Level)</i>
		HAS QUANTITY	<i>frequency (Quantity)</i>
		HAS LEVEL	<i>more [than usual] (Level)</i>
		IS FUNCTION OF	<i>adolescent & adult (Person)</i>
		HAS FEATURE	<i>general (Feature)</i>
f60200.2	Eetbuien		
	<u>Fits of eating</u>		
	✂	BODY PROC	<i>intake (BodyProcess)</i>
		ACTS ON 1	<i>food (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>excessive (Quantity)</i>
		ACTS ON 2	<i>drink (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>excessive (Quantity)</i>
		IS FUNCTION OF	<i>adolescent & adult (Person)</i>
		HAS T.MARKER	<i>recurrent (TemporalMarker)</i>
f60200.3	Eetbuistoornis		
	<u>Binge eating</u>		
	✂	BODY PROC	<i>intake (BodyProcess)</i>
		ACTS ON 1	<i>food (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>excessive (Quantity)</i>
		ACTS ON 2	<i>drink (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>excessive (Quantity)</i>
		IS FUNCTION OF	<i>adolescent & adult (Person)</i>
		HAS T.MARKER	<i>recurrent (TemporalMarker)</i>
Remark The difference between item f60200.2 and f60200.3 is not so easy to explain. Fits of eating can be a part of binge eating but also of other eating disorders (such as anorexia nervosa and bulimia nervosa). Based on this scoping procedure the exact position of these classes will be discussed again in the commentary phase for this classification.			
f60200.4	In het algemeen te weinig eten		
	<u>Eat too less in general</u>		
	✂	BODY PROC	<i>intake (BodyProcess)</i>
		ACTS ON 1	<i>food (EnvironmentalFactor)</i>
		HAS QUANTITY	<i>amount (Quantity)</i>
		HAS LEVEL	<i>less [than usual] (Level)</i>

	ACTS ON 2 <i>drink (EnvironmentalFactor)</i> HAS QUANTITY <i>amount (Quantity)</i> HAS LEVEL <i>less [than usual] (Level)</i> HAS FEATURE <i>frequency (Quantity)</i> HAS LEVEL <i>less [than usual] (Level)</i> IS FUNCTION OF <i>adolescent & adult (Person)</i> HAS FEATURE <i>general (Feature)</i> HAS LEVEL <i>less [than usual] (Level)</i>
f60200.5	Anorexie <u>Anorexia</u> ✂ BODY PROC <i>intake (BodyProcess)</i> ACTS ON 1 <i>food (EnvironmentalFactor)</i> HAS QUANTITY <i>amount (Quantity)</i> HAS FEATURE <i>reduced (Feature)</i> ACTS ON 2 <i>drink (EnvironmentalFactor)</i> HAS QUANTITY <i>amount (Quantity)</i> HAS FEATURE <i>reduced (Feature)</i> IS FUNCTION OF <i>adolescent & adult (Person)</i> or ✂ PATH & IMP anorexia (Pathology)
Remark Anorexia is a term which is used as a diagnosis in the DSM-IV, which is more than just a reduced amount of food intake.	
f60200.6	Onregelmatig eten <u>Irregular food intake</u> ✂ BODY PROC <i>intake (BodyProcess)</i> ACTS ON 1 <i>food (EnvironmentalFactor)</i> ACTS ON 2 <i>drink (EnvironmentalFactor)</i> IS FUNCTION OF <i>adolescent & adults (Person)</i> HAS T.MARKER <i>irregular (TemporalMarker)</i>
f60200.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>intake (BodyProcess)</i> ACTS ON 1 <i>food (EnvironmentalFactor)</i> HAS QUANTITY <u>other</u> <i>amount (Quantity)</i> ACTS ON 2 <i>drink (EnvironmentalFactor)</i> HAS QUANTITY <u>other</u> <i>amount (Quantity)</i> HAS QUANTITY <u>other</u> <i>frequency (Quantity)</i> IS FUNCTION OF <i>adolescent & adult (Person)</i>
f60200.9	Niet gespecificeerd <u>Unspecified</u>
f60201	Hoeveelheid en frequentie van ingenomen voedsel / drinken bij kinderen

Amount and frequency of food / drink intake in children

✂ BODY PROC *intake (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*
 HAS QUANTITY *amount (Quantity)*
 ACTS ON 2 *drink (EnvironmentalFactor)*
 HAS QUANTITY *amount (Quantity)*
 HAS QUANTITY *frequency (Quantity)*
 IS FUNCTION OF *child (Person)*

f60201.0 Geen afwijkende hoeveelheid en/of frequentie van ingenomen voedsel / drinken bij kinderen

No abnormal amount and/or frequency of food / drink intake in children

✂ BODY PROC *intake (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*
 HAS QUANTITY *amount (Quantity)*
 ACTS ON 2 *drink (EnvironmentalFactor)*
 HAS QUANTITY *amount (Quantity)*
 HAS QUANTITY *frequency (Quantity)*
 IS FUNCTION OF *child (Person)*
 HAS LEVEL *normal (Level)*

f60201.1 Eetstoornis bij kinderen

Abnormal amount and/or frequency of food / drink intake in children

✂ BODY PROC *intake (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*
 HAS QUANTITY *amount (Quantity)*
 ACTS ON 2 *drink (EnvironmentalFactor)*
 HAS QUANTITY *amount (Quantity)*
 HAS QUANTITY *frequency (Quantity)*
 IS FUNCTION OF *child (Person)*
 HAS LEVEL *impaired (Level)*

f60201.8 Anders gespecificeerd

Other specified

✂ BODY PROC *intake (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*
 HAS QUANTITY other *amount (Quantity)*
 ACTS ON 2 *drink (EnvironmentalFactor)*
 HAS QUANTITY other *amount (Quantity)*
 HAS QUANTITY other *frequency (Quantity)*
 IS FUNCTION OF *child (Person)*

f60201.9 Niet gespecificeerd

Unspecified

f60208 Anders gespecificeerd

Other specified

✂ BODY PROC *intake (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*

		HAS QUANTITY	<u>other amount</u> (Quantity)
		ACTS ON 2	<i>drink</i> (EnvironmentalFactor)
		HAS QUANTITY	<u>other</u> amount (Quantity)
		HAS QUANTITY	other <i>frequency</i> (Quantity)
f60209	Niet gespecificeerd		
	<u>Unspecified</u>		
f6021	Lichaamsgewicht		
	<u>Body weight</u>		
	✂	FEATURE	<i>weight</i> (Feature)
		IS FEATURE OF	body (Anatomy)
	or		
	✂	ANATOMY	body (Anatomy)
		HAS FEATURE	<i>weight</i> (Feature)
Remark Body weight can be seen as a process and therefore added as the descriptor 'body weight' to BodyProcess. However we prefer to dissect this item; because otherwise items like body length, leg length etc. should be added to the model also. When dissecting body weight there are two possibilities, one starting with Feature and one starting with body. Although the first one sounds a little bit strange and needs a new link (feature IS FEATURE OF anatomy; see Annex 4a) we prefer this option.			
f6021.0	Gezond lichaamsgewicht		
	<u>Healthy body weight</u>		
	✂	FEATURE	<i>weight</i> (Feature)
		IS FEATURE OF	body (Anatomy)
		HAS LEVEL	<i>healthy</i> (Level)
f6021.1	Ondergewicht / laag gewicht [i50410]		
	<i>incl. cachexie</i>		
	<u>Underweight / low body weight [i50410]</u>		
	<i>incl. cachexia</i>		
	✂	FEATURE	<i>weight</i> (Feature)
		IS FEATURE OF	body (Anatomy)
		HAS LEVEL	<i>less [than usual]</i> (Level)
f6021.2	Overgewicht [i50430]		
	<i>excl. stoornissen in groei bij kinderen / te zwaar voor lengte (f60812)</i>		
	<u>Overweight [i50430]</u>		
	✂	FEATURE	<i>weight</i> (Feature)
		IS FEATURE OF	body (Anatomy)
		HAS LEVEL	<i>more [than usual]</i> (Level)
k.t.	ernst		
t.c.	<u>severity</u>		

f6021.20 Overgewicht graad I, Quetelet Index 25,0-29,9
Overweight level I, Quetelet Index 25,0-29,9
 ✂ FEATURE *weight (Feature)*
 IS FEATURE OF body (Anatomy)
 HAS LEVEL *more [than usual] (Level)*

Remark

There is no possibility yet to indicate the 'severity'. For overweight there are three levels indicated based on the Quetelet Index. This might be indicated with a qualifier on the first digit after the decimal point. May be severity can be include within Level (which incorporates already items related to severity). Dissecting of the classes under f6021.2 is not finished yet.

f6021.21 Overgewicht graad II, Quetelet Index 30,0-39,9
incl. zoals bij adipositas
Overweight level II, Quetelet Index 30,0-39,9
incl. such as in adipositas
 ✂ FEATURE *weight (Feature)*
 IS FEATURE OF body (Anatomy)
 HAS LEVEL *more [than usual] (Level)*

f6021.22 Overgewicht graad III, Quetelet Index > 40,0
incl. zoals bij morbide adipositas
Overweight level III, Quetelet Index > 40,0
incl. such as in adipositas
 ✂ FEATURE *weight (Feature)*
 IS FEATURE OF body (Anatomy)
 HAS LEVEL *more [than usual] (Level)*

f6021.28 Anders gespecificeerd
Other specified
 ✂ FEATURE *weight (Feature)*
 IS FEATURE OF body (Anatomy)
 HAS LEVEL *more [than usual] (Level)*

f6021.29 Niet gespecificeerd
Unspecified

f6021.8' Anders gespecificeerd
Other specified
 ✂ FEATURE *weight (Feature)*
 IS FEATURE OF body (Anatomy)

	HAS FEATURE	<u>other level (Feature)</u>
f6021.9	Niet gespecificeerd <u>Unspecified</u>	
f6022	Gewichtsverandering <u>Change in body weight</u> ✂ DEEDchange (Deed) ACTS ONweight (Feature) IS FEATURE OF body (Anatomy)	
Remark We are not satisfied with this dissection. Weight change is not a voluntary act of a person but a body process. Change as a descriptor within the group 'Deed' should therefore be changed in 'changing', giving the possibility to add change to body process, or, still better, to a general group 'process' (there can also occur a (involuntary) change in e.g. the environment).		
f6022.0	Geen grote gewichtsveranderingen <u>No big changes in body weight</u> ✂ DEEDchange (Deed) ACTS ONweight (Feature) IS FEATURE OF body (Anatomy) HAS LEVEL minor (Level)	
f6022.1	Gewichtsverlies [i50420] <u>Loss of body weight [i50420]</u> ✂ FEATURE weight (Feature) IS FEATURE OF body (Anatomy) HAS FEATURE decreased (Feature)	
f6022.2	Gewichtstoename [i50440] <u>Weighth gain [i50440]</u> ✂ FEATURE weight (Feature) IS FEATURE OF body (Anatomy) HAS FEATURE increased (Feature)	
Remark Weight gain is included in the category Anatomy in SPET. This seems to be a rather peculiar position. For this reason we have chosen to dissect 'weight gain' in the same manner as 'loss of body weight'.		
f6022.8'	Anders gespecificeerd <i>incl. jojo-effect</i> <u>Other specified</u> <i>incl. jo-jo effect</i> ✂ DEED <u>other</u> change (Deed) ACTS ONweight (Feature) IS FEATURE OF body (Anatomy)	

f6022.9	Niet gespecificeerd <u>Unspecified</u>
f6023	Voedingstoestand <u>Nutritional state</u> ✂ BODY PROC <i>nutritional state (BodyProcess)</i>
f6023.0	Goede voedingstoestand <u>Healthy nutritional state</u> ✂ BODY PROC <i>nutritional state (BodyProcess)</i> HAS LEVEL <i>healthy (Level)</i>
f6023.1	Verminderde voedingstoestand / ondervoeding <u>Reduced nutritional state / malnutrition</u> ✂ BODY PROC <i>nutritional state (BodyProcess)</i> HAS FEATURE <i>decreased (Feature)</i>
f6023.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>nutritional state (BodyProcess)</i> HAS FEATURE <i>other level (Feature)</i>
f6023.9	Niet gespecificeerd <u>Unspecified</u>
f6024	Vetpercentage lichaam <u>Percentage of body fat</u> ✂ BODY SUBS fat (BodySubstance) HAS QUANTITY <i>percentage (Quantity)</i>
f6024.0	Normaal vetpercentage lichaam <u>Normal percentage of body fat</u> ✂ BODY SUBS fat (BodySubstance) HAS QUANTITY <i>percentage (Quantity)</i> HAS LEVEL <i>normal (Level)</i>
f6024.1	Verhoogd vetpercentage lichaam <u>Increased percentage of body fat</u> ✂ BODY SUBS fat (BodySubstance) HAS QUANTITY <i>percentage (Quantity)</i> HAS FEATURE <i>increased (Feature)</i>
f6024.2	Verlaagd vetpercentage lichaam <u>Decreased percentage of body fat</u> ✂ BODY SUBS fat (BodySubstance) HAS QUANTITY <i>percentage (Quantity)</i> HAS FEATURE <i>decreased (Feature)</i>

f6024.8 Anders gespecificeerd
Other specified
 ✕ BODY SUBS fat (BodySubstance)
 HAS QUANTITY *percentage (Quantity)*
 HAS FEATURE other level (Feature)

f6024.9 Niet gespecificeerd
Unspecified

f6025 Vetverdeling lichaam
Distribution of body fat
 ✕ BODY PROC *distribution (BodyProcess)*
 ACTS ON fat (BodySubstance)
 ✕ BODY SUBS fat (BodySubstance)
 HAS FEATURE *distribution (Feature)*

f6025.0 Abdominale vetverdeling
Abdominal distribution of body fat
 ✕ BODY SUBS fat (BodySubstance)
 HAS FEATURE *distribution (Feature)*
 ✕ BODY PROC *distribution (BodyProcess)*
 ACTS ON fat (BodySubstance)
 HAS FEATURE?? abdominal ??

f6025.8 Anders gespecificeerd
Other specified
 ✕ BODY PROC *distribution (BodyProcess)*
 ACTS ON fat (BodySubstance)

f6025.9 Niet gespecificeerd
Unspecified

f6026 Aandacht voor eten / voeding
Attention for food / nutrition
 ✕ BODY PROC *attention (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*
 ACTS ON 2 *nutrition (Deed)*

Remark

Attention-action is a Deed. We have chosen to add attention as a descriptor in the category BodyProcess.

f6026.0 Normale aandacht voor eten / voeding
Normal attention for food / nutrition
 ✕ BODY PROC *attention (BodyProcess)*
 ACTS ON 1 *food (EnvironmentalFactor)*
 ACTS ON 2 *nutrition (Deed)*

	HAS LEVEL	<i>normal (Level)</i>
f6026.1	Altijd bezig met eten / dieet <u>Continuous attention for food / diet</u> ✂ BODY PROC <i>attention (BodyProcess)</i> ACTS ON 1 <i>food (EnvironmentalFactor)</i> ACTS ON 2 <i>nutrition (Deed)</i> HAS T.MARKER <i>continuous (TemporalMarker)</i>	
f6026.2	Vergeten te eten <u>Forgetting to eat</u> ✂ BODY PROC <i>attention (BodyProcess)</i> ACTS ON 1 <i>food (EnvironmentalFactor)</i> ACTS ON 2 <i>nutrition (Deed)</i> HAS LEVEL <i>minor (Level)</i>	
Remark This is the dissection of the intention of the class, not of the class as such.		
f6026.3	Gedachteloos / overhaast eten <u>Eat thoughtless / hasted</u> ✂ DEEDeating (Deed) HAS LEVEL <i>too fast (Level)</i>	
f6026.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>attention (BodyProcess)</i> ACTS ON 1 <i>food (EnvironmentalFactor)</i> ACTS ON 2 <i>nutrition (Deed)</i> HAS FEATURE <u>other level (Feature)</u>	
f6026.9	Niet gespecificeerd <u>Unspecified</u>	
f6028'	Anders gespecificeerd <u>Other specified</u>	
f6029	Niet gespecificeerd [i50490] <u>Unspecified [i50490]</u>	
f603	Defecatie [50300] <i>excl. pijn gedurende defecatie (f402x.21/25) [i303x4]</i> <u>Defecation [50300]</u> ✂ BODY PROC <i>defecation (BodyProcess)</i>	
f6030	Productie van faeces	

Production of feces

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)

f60300 Consistentie van faeces [i50310]

Consistency of feces [i503010]

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS FEATURE *consistency (Feature)*

f60300.0 Normale consistentie faeces

Normal consistency of faeces

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS FEATURE *consistency (Feature)*
 HAS LEVEL *normal (Level)*

f60300.1 Dunne faeces

incl. zoals bij diarree

Thin faeces

incl. such as in diarrhea

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS CONSIST. *thin (Consistency)*

f60300.2 Waterdunne faeces

incl. zoals bij diarree

Watery faeces

incl. such as in diarrhea

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS CONSIST. *watery (Consistency)*

f60300.3 Brijige faeces

Mashy feces

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS CONSIST. *mashy (Consistency)*

f60300.4 Zachte faeces

Soft faeces

✂ BODY PROC *production (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS FEATURE *soft (Feature)*

f60300.5 Harde faeces

Firm faeces

✂ BODY PROC *production (BodyProcess)*

	ACTS ON faeces (BodySubstance)
	HAS CONSIST. <i>firm (Consistency)</i>
f60300.6	Keutelige faeces
	<u>Pellets</u>
	✂ BODY PROC <i>production (BodyProcess)</i>
	ACTS ON faeces (BodySubstance)
	HAS CONSIST. <i>firm (Consistency)</i>
	HAS FEATURE <i>round (Feature)</i>
f60300.7	Lintvormige faeces
	<u>Ribbon-shaped faeces</u>
	✂ BODY PROC <i>production (BodyProcess)</i>
	ACTS ON faeces (BodySubstance)
	HAS FEATURE <i>soft (Feature)</i>
	HAS FEATURE <i>ribbon-shaped (Feature)</i>
Remark The classes f60300.6 and f60300.7 not only include the consistency of the faeces but also the shape. It is an option to make a separate group of descriptors related to Shape under the heading Characteristic. At this moment we have put 'round' and 'ribbon-shaped' under Feature (see Annex 4b).	
f60300.8	Anders gespecificeerd
	<u>Other specified</u>
	✂ BODY PROC <i>production (BodyProcess)</i>
	ACTS ON faeces (BodySubstance)
	HAS FEATURE <u>other</u> <i>consistency (Feature)</i>
f60300.9	Niet gespecificeerd
	<u>Unspecified</u>
f60301	Hoeveelheid faeces
	<u>Amount of faeces</u>
	✂ BODY PROC <i>production (BodyProcess)</i>
	ACTS ON faeces (BodySubstance)
	HAS QUANTITY <i>amount (Quantity)</i>
f60301.0	Normale hoeveelheid faeces
	<u>Normal amount of faeces</u>
	✂ BODY PROC <i>production (BodyProcess)</i>
	ACTS ON faeces (BodySubstance)
	HAS QUANTITY <i>amount (Quantity)</i>
	HAS LEVEL <i>normal (Level)</i>
f60301.1	Weinig / geen faeces
	<u>Little / no faeces</u>
	✂ BODY PROC <i>production (BodyProcess)</i>

	ACTS ON faeces (BodySubstance) HAS QUANTITY <i>amount (Quantity)</i> HAS LEVEL <i>minor (Level)</i>
f60301.2	Veel faeces <u>Much faeces</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) HAS QUANTITY <i>amount (Quantity)</i> HAS LEVEL <i>more [than usual] (Level)</i>
f60301.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) HAS QUANTITY <i>amount (Quantity)</i> HAS FEATURE <i>other level (Feature)</i>
f60301.9	Niet gespecificeerd <u>Unspecified</u>
f60302	Samenstelling faeces <i>incl. afwijkende geur faeces</i> <u>Composition faeces</u> <i>incl. abnormal smell of faeces</i> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) HAS FEATURE <i>composition (Feature)</i>
f60302.0	Normale samenstelling faeces <u>Normal composition of faeces</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) HAS FEATURE <i>composition (Feature)</i> HAS LEVEL <i>normal (Level)</i>
f60302.1	Verhoogde vetuitscheiding met faeces <u>Increased amount of fat in faeces</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) CONTAINS fat (BodySubstance) HAS LEVEL <i>more [than usual] (Level)</i>
f60302.2	Slijmerige faeces <u>Slimy faeces</u>

	✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) CONTAINS mucus (BodySubstance) HAS LEVEL <i>more [than usual] (Level)</i>
f60302.3	Verhoogde uitscheiding van onverteerbare voedselresten met faeces <u>Increased excretion of undigestible remnants of food with faeces</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) CONTAINS <i>food (EnvironmentalFactor)</i> HAS LEVEL <i>more [than usual] (Level)</i>
f60302.4	Verhoogde eiwituitscheiding met faeces <i>incl. rottende faeces</i> <u>Increased excretion of protein with faeces</u> <i>incl. rotting faeces</i> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) CONTAINS <i>protein (Nutrient)</i> HAS LEVEL <i>more [than usual] (Level)</i>
f60302.5	Verhoogde koolhydraatuitscheiding met faeces <i>incl. gistende faeces</i> <u>Increased excretion of carbohydrate with faeces</u> <i>incl. rotting faeces</i> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) CONTAINS <i>carbohydrate (Nutrient)</i> HAS LEVEL <i>more [than usual] (Level)</i>
f60302.8	Anders gespecificeerd <u>Other specified</u> ✂ DEED <i>production (BodyProcess)</i> ACTS ON faeces (BodySubstance) HAS FEATURE <u>other composition (Feature)</u>
f60302.9	Niet gespecificeerd <u>Unspecified</u>
f60308	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <u>other production (BodyProcess)</u> ACTS ON faeces (BodySubstance)
f60309	Niet gespecificeerd <u>Unspecified</u>
f6031	Frequentie van defecatie [i50320]

Frequency of defecation [i50320]

✂ BODY PROC *defecation (BodyProcess)*
HAS QUANTITY *frequency (Quantity)*

f6031.0 Normale frequentie van defecatie

Normal frequency of defecation

✂ BODY PROC *defecation (BodyProcess)*
HAS QUANTITY *frequency (Quantity)*
HAS LEVEL *normal (Level)*

f6031.1 Afgenomen frequentie van defecatie

incl. zoals bij obstipatie

Reduced frequency of defecation

incl. such as in obstipation

✂ BODY PROC *defecation (BodyProcess)*
HAS QUANTITY *frequency (Quantity)*
HAS FEATURE *decreased (Feature)*

f6031.2 Toegenomen frequentie van defecatie

incl. zoals bij diarree

Increased frequency of defecation

incl. such as in diarrhea

✂ BODY PROC *defecation (BodyProcess)*
HAS QUANTITY *frequency (Quantity)*
HAS FEATURE *increased (Feature)*

f6031.8 Anders gespecificeerd

Other specified

✂ BODY PROC *defecation (BodyProcess)*
HAS QUANTITY *frequency (Quantity)*
HAS FEATURE *other level (Feature)*

f6031.9 Niet gespecificeerd

Unspecified

f6032 Lozing van ontlasting [#i50330]

incl. contractie van de buikspieren

Discharge of excrements [#i50330]

✂ BODY PROC *discharge (BodyProcess)*
ACTS ON *faeces (BodySubstance)*

f6032.0 Normale lozing van ontlasting

Normal discharge of excrements

✂ BODY PROC *discharge (BodyProcess)*
ACTS ON *faeces (BodySubstance)*
HAS LEVEL *normal (level)*

f6032.1 Stoornis in lozing van ontlasting

incl. onvolledige ontlasting

Impairment in discharge of excrements

✂ BODY PROC *discharge (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS LEVEL *impaired (level)*

f6032.8 Anders gespecificeerd

Other specified

✂ BODY PROC *discharge (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS FEATURE other level (Feature)

f6032.9 Niet gespecificeerd

Unspecified

f6033 Faecale continentie [i50340]

Willekeurige controle over de uitscheidingsfunctie.

Faecal continence [i50340]

Voluntary control of excrementary function.

✂ BODY PROC *continence (BodyProcess)*

ACTS ON faeces (BodySubstance)

Remark

In SPET 'continence' and 'urinary continence' are descriptors within BodyProcess. One solution for dissecting f6033 might be to add faecal continence (in correspondence to urinary continence); the other solution is to dissect faecal continence as done above. When the second solution is chosen urinary continence is superfluous.

f6033.0 Geen afwijkende faecale continentie

No abnormal faecal continence

✂ BODY PROC *continence (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS LEVEL *normal (Level)*

f6033.1 Faecale incontinentie

Faecal incontinence

✂ BODY PROC *continence (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS LEVEL *impaired (Level)*

f6033.8 Anders gespecificeerd

Other specified

✂ BODY PROC *continence (BodyProcess)*
 ACTS ON faeces (BodySubstance)
 HAS FEATURE other level (Feature)

f6033.9 Niet gespecificeerd

Unspecified

f6034 Flatulentie [i50350]

De aanwezigheid van grote hoeveelheden lucht of gasen in de maag of in de darmen, leidend tot uitdrijving van lucht en gasen.

Flatulence [i50350]

The presence of excessive amounts of air or gases in the stomach or intestine, causing expulsion of air and gases.

✂ PATH & IMP *flatulence (impairment)*

f6034.0 Geen flatulentie aanwezig

No flatulence present

✂ PATH & IMP *flatulence (impairment)*

HAS LEVEL *absent (level)*

f6034.1 Flatulentie aanwezig

Flatulence present

✂ PATH & IMP *flatulence (impairment)*

HAS LEVEL *present (level)*

f6034.8 Anders gespecificeerd

Other specified

✂ PATH & IMP *flatulence (impairment)*

HAS FEATURE *other level (Feature)*

f6034.9 Niet gespecificeerd

Unspecified

f6035 Aandrang

excl. negeren van aandrang (f6041.2)

Urge

excl. neglecting urge (f6041.2)

✂ BODY PROC *urge (BodyProcess)*

ACTS ON *defecation (BodyProcess)*

f6035.0 Normale aandrang

Normal urge

✂ BODY PROC *urge (BodyProcess)*

ACTS ON *defecation (BodyProcess)*

HAS LEVEL *normal (level)*

f6035.1 Verminderde aandrang

Decreased urge

✂ BODY PROC *urge (BodyProcess)*

ACTS ON *defecation (BodyProcess)*

HAS FEATURE *decreased (Feature)*

f6035.2 Verhoogde aandrang

Increased urge

✂ BODY PROC *urge (BodyProcess)*

ACTS ON *defecation (BodyProcess)*

HAS FEATURE *increased (Feature)*

- f6035.8 Anders gespecificeerd
Other specified
 ✂ BODY PROC *urge (BodyProcess)*
 ACTS ON *defecation (BodyProcess)*
 HAS FEATURE *other level (Feature)*
- f6035.9 Niet gespecificeerd
Unspecified
- f6038 Anders gespecificeerd**
Other specified
 ✂ BODY PROC *other defecation (BodyProcess)*
- f6039 Niet gespecificeerd**
Unspecified
- f604 Andere functies gerelateerd aan ontlasting**
Other functions related to defecation
 ✂ b BODY PROC *other function (BodyProcess)*
 IS FUNCTION OF *defecation (BodyProcess)*
- f6041 Aandacht voor ontlasting**
Attention for defecation
 ✂ BODY PROC *attention (BodyProcess)*
 ACTS ON *defecation (BodyProcess)*
- f6041.0 Geen afwijkende aandacht voor ontlasting
No abnormal attention for defecation
 ✂ BODY PROC *attention (BodyProcess)*
 ACTS ON *defecation (BodyProcess)*
 HAS LEVEL *normal (Level)*
- f6041.1 Vergeten naar toilet te gaan
Forget to go to toilet
 ✂ BODY PROC *attention (BodyProcess)*
 ACTS ON *defecation (BodyProcess)*
 HAS LEVEL *minor (Level)*

Remark

This is the dissection of the intention of the class, not of the class as such.

- f6041.2 Negeren van aandrang
Neglection of urge
 ✂ BODY PROC *attention (BodyProcess)*
 ACTS ON *defecation (BodyProcess)*
 HAS LEVEL *absent (Level)*

- f6041.3 Ophouden ontlastings
Hold one's faeces
 ✕ BODY PROC *hold (BodyProcess)*
 ACTS ON defecation (*BodyProcess*)
- f6041.8 Anders gespecificeerd
Other specified
 ✕ BODY PROC *other attention (BodyProcess)*
 ACTS ON defecation (*BodyProcess*)
- f6041.9 Niet gespecificeerd
Unspecified
- f6048 Anders gespecificeerd**
Other specified
- f6049 Niet gespecificeerd**
Unspecified
- f605 Gewaarwordingen gepaard gaande met spijsvertering [i50500]**
Sensations related to digestion
 ✕ DEED sensation (Deed)
 IS FUNCTION OF digestion (*BodyProcess*)

Remark

Sensation is a Deed in SPET. By enlarging the category BodyProcess we propose to shift sensation to BodyProcess and to include 'sensing' or an alternative '-ing' term in Deed.

- f6050 Misselijkheid / zich ziek voelen [i50510]**
Nausea / feeling ill
 ✕ PATH & IMP nausea (Pathology)
- f6051 Globus gevoel [i50520]**
 Het gevoel een prop in de keel te hebben die het slikken belemmert.
Globus feeling [i50520]
The feeling of having a lump in the throat obstructing swallowing.
 ✕ BODY PROC *globus feeling (BodyProcess)*
- f6052 Zuurbranden**
Pyrosis
 ✕ PATH & IMP pyrosis (*Impairment*)
- f6053 Opgeblazen gevoel [i50530]**
 Het subjectieve gevoel dat de maag of de buikholte is uitgerekt.
incl. vol gevoel; gevoel van opgezette buik
Feeling bloated [i50530]

	<u>The subjective feeling of distension of the stomach or abdomen.</u> <u>incl. feeling of having had (more than) enough food; feeling of distended belly</u> ✂ BODY PROC <i>feeling bloated (BodyProcess)</i>
f6054	Gevoel van kramp / spasme De onwillekeurige, spasmodische, pijnlijke contractie van de gladde spieren van het spijsverteringskanaal. <u>Cramp / spasm</u> <u>The involuntary, spasmodic, painful contraction of the smooth muscles of the alimentary tract.</u> ✂ PATH & IMP spasm (Pathology)
f60540	Maagkramp / maagspasme [i50540] <u>Cramp / spasm of stomach [i50540]</u> ✂ PATH & IMP spasm (Pathology) HAS LOCATION stomach (DigestiveSystemAnatomy)
f60541	Darmkramp <u>Cramp / spasm of intestines</u> ✂ PATH & IMP spasm (Pathology) HAS LOCATION intestines (DigestiveSystemAnatomy)
f60548	Anders gespecificeerd <u>Other specified</u> ✂ PATH & IMP <u>other</u> spasm (Pathology)
f60549	Niet gespecificeerd <u>Unspecified</u>
f6055	Gewaarwordingen mond <u>Sensations mouth</u> ✂ DEED sensation (Deed) IS FUNCTION OF mouth (OroidentalSystemAnatomy)
f60550	Jeuk in mond <u>Itching mouth</u> ✂ PATH & IMP itching (Pathology) HAS LOCATION mouth (OroidentalSystemAnatomy)
f60551	Droge mond <u>Dry mouth</u> ✂ DEED sensation (Deed) HAS FEATURE dryness (Feature) IS FUNCTION OF mouth (OroidentalSystemAnatomy)
f60552	Gevoel van overmatige speekselproductie <u>Feeling of superfluous production of saliva</u> ✂ DEED sensation (Deed)

f60553 Vieze smaak in mond
Bad taste in the mouth
 ✂ DEED sensation (Deed)
 ACTS ON taste (Deed)
 IS FUNCTION OF mouth (OrodentalSystemAnatomy)

Remark

Taste have to be shifted to BodyProcess

f60554 Gevoel van slijmvorming in mond
Feeling of slime production in mouth
 ✂ DEED sensation (Deed)
 ACTS ON production (BodyProcess)
 ACTS ON mucus (BodySubstance)
 IS FUNCTION OF mouth (OrodentalSystemAnatomy)

f60558 Anders gespecificeerd
Other specified
 ✂ DEED other sensation (Deed)
 IS FUNCTION OF mouth (OrodentalSystemAnatomy)

f60559 Niet gespecificeerd
Unspecified

f6058 Anders gespecificeerd
Other specified
 ✂ DEED other sensation (Deed)
 IS FUNCTION OF *digestion* (BodyProcess)

f6059 Niet gespecificeerd
Unspecified

1e digit achter decimale punt voor klasse f605

first digit after decimal point for class f605

k.t. aanwezigheid gewaarwording

t.c. presence of sensation

.0 Niet aanwezig

Not present

✂ DEED sensation (Deed)

.....
 HAS LEVEL *absent (Level)*

.1 Wel aanwezig

Present

✂ DEED sensation (Deed)

.....
 HAS LEVEL *present (Level)*

.8	<i>Anders gespecificeerd</i> <u><i>Other specified</i></u> ✂ DEEDsensation (Deed)
	 HAS FEATURE <u>other level (Feature)</u>

.9 Niet gespecificeerd
Unspecified

f606	Metabole functies [i50600]
	<u>Metabolic functions</u>
✂	BODY PROC <i>metabolism (BodyProcess)</i>

f6062 **Eiwitmetabolisme [i50630]**
Metabolism of protein
 ✂ BODY PROC *metabolism (BodyProcess)*
 ACTS ON *protein (Nutrient)*

f6062.0 Normaal eiwitmetabolisme
Normal metabolism of protein
 ✂ BODY PROC *metabolism (BodyProcess)*
 ACTS ON *protein (Nutrient)*
 HAS LEVEL *normal (Level)*

f6062.1 Afwijkend eiwitmetabolisme

Abnormal metabolism of protein

✂ BODY PROC *metabolism (BodyProcess)*
ACTS ON *protein (Nutrient)*
HAS LEVEL *abnormal (Level)*

f6062.8 Anders gespecificeerd
Other specified
 ✂ BODY PROC *metabolism (BodyProcess)*
 ACTS ON *protein (Nutrient)*

f6062.9	Niet gespecificeerd <u>Unspecified</u>
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f6063 **Vetmetabolisme [i50640]**
Metabolism of fat [o50640]
 ✂ BODY PROC *metabolism (BodyProcess)*
 ACTS ONfat (BodySubstance)
 HAS LEVEL *abnormal (Level)*

Remark

In SPET fat is a BodySubstance. In relation to food it is more a nutrient. A solution might be to change 'fat' in 'body fat' in the category BodySubstance, which will make it possible to include 'fat' as a nutrient.

- f6063.0 Normaal vetmetabolisme
Normal metabolism of fat
 ✕ BODY PROC *metabolism (BodyProcess)*
 ACTS ONfat (BodySubstance)
 HAS LEVEL *normal (Level)*
- f6063.1 Afwijkend vetmetabolisme
Abnormal metabolism of fat
 ✕ BODY PROC *metabolism (BodyProcess)*
 ACTS ONfat (BodySubstance)
 HAS LEVEL *abnormal (Level)*
- f6063.8 Anders gespecificeerd
Other specified
 ✕ BODY PROC *metabolism (BodyProcess)*
 ACTS ONfat (BodySubstance)
 HAS FEATURE other level (Feature)
- f6063.9 Niet gespecificeerd
Unspecified
- f6064 Waterbalans [i50650]**
Waterbalans
 ✕ BODY PROC *balans (BodyProcess)*
 ACTS ONwater (Chemical)
- f6064.0 Normale waterbalans
Normal waterbalans
 ✕ BODY PROC *balans (BodyProcess)*
 ACTS ONwater (Chemical)
 HAS LEVEL *normal (Level)*
- f6064.1 Water retentie
Waterretention
 ✕ BODY PROC *retention (BodyProcess)*
 ACTS ONwater (Chemical)
- f6064.2 Dehydratie
Dehydration
 ✕ ANATOMY body (Anatomy)
 HAS FEATURE dehydration (Feature)

Remark

In SPET 'dehydration' is a Feature. We propose to shift it to BodyProcess.

- p6064.8 Anders gespecificeerd
-
- Other specified
-
- ✂ BODY PROC
- other
- balans (BodyProcess)
-
- ACTS ONwater (Chemical)

p6064.9 Niet gespecificeerd
-
- Unspecified
- f6065 Mineraal en elektrolyt balans [i50660]**
-
- Mineral and electrolyt balans**
-
- ✂ BODY PROC balans (BodyProcess)
-
- ACTS ONmineral (Nutrient) & electrolyt (Chemical)

p6065.0 Normale mineraal en elektrolyt balans
-
- Normal mineral and electrolyt balans
-
- ✂ BODY PROC balans (BodyProcess)
-
- ACTS ONmineral (Nutrient) & electrolyt (Chemical)
-
- HAS LEVEL normal (Level)

p6065.1 Afwijkende mineraal en elektrolytbalans
-
- Abnormal mineral and electrolyt balans
-
- ✂ BODY PROC balans (BodyProcess)
-
- ACTS ONmineral (Nutrient) & electrolyt (Chemical)
-
- HAS LEVEL impaired (Level)

p6065.8 Anders gespecificeerd
-
- Other specified
-
- ✂ BODY PROC balans (BodyProcess)
-
- ACTS ONmineral (Nutrient) & electrolyt (Chemical)
-
- HAS FEATURE
- other
- level (Feature)

p6065.9 Niet gespecificeerd
-
- Unspecified
- f6068' Anders gespecificeerd**
-
- Other specified**
-
- ✂ BODY PROC
- other
- metabolism (BodyProcess)
- f6069 Niet gespecificeerd**
-
- Unspecified**
- f607 Functies van structuren betrokken bij spijsvertering**
-
- Functions of structures involved in digestion

	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF organ (Anatomy) HAS FUNCTION <i>digestion (BodyProcess)</i>
f6070	Functies kauwspieren <u>Functions of masticatory muscles</u>
	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF <i>mm. masticatorii (MusculoSkeletalSystemAnatomy)</i>
f6070.0	Normale functies kauwspieren <u>Normal functions of masticatory muscles</u>
	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF <i>mm. masticatorii (MusculoSkeletalSystemAnatomy)</i> HAS LEVEL <i>normal (Level)</i>
f6070.1	Stoornis in functies kauwspieren <u>Impairment in functions of masticatory muscles</u>
	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF <i>mm. masticatorii (MusculoSkeletalSystemAnatomy)</i> HAS LEVEL <i>impaired (Level)</i>
f6070.8	Anders gespecificeerd <u>Other specified</u>
	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF <i>mm. masticatorii (MusculoSkeletalSystemAnatomy)</i> HAS FEATURE <u>other level</u> (Feature)
f6070.9	Niet gespecificeerd <u>Unspecified</u>
f6071	Salivatie / speekselklierfunctie / speekselvorming [i50220] <u>Salivation / functions of salivary glands / production of sputum</u>
	✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON <i>sputum (BodySubstance)</i>
f6071.0	Normale speekselvorming <u>Normal production of sputum</u>
	✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON <i>sputum (BodySubstance)</i> HAS LEVEL <i>normal (Level)</i>
f6071.1	Te geringe speekselvorming <u>Too little production of sputum</u>
	✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON <i>sputum (BodySubstance)</i> HAS FEATURE <i>decreased</i> (Feature)
f6071.2	Overmatige speekselvorming / speekselvloed

	<u>Too much production of sputum</u>
	✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON <i>sputum (BodySubstance)</i> HAS FEATURE <i>increased (Feature)</i>
f6071.8	Anders gespecificeerd <u>Other specified</u>
	✂ BODY PROC <i>production (BodyProcess)</i> ACTS ON <i>sputum (BodySubstance)</i> HAS FEATURE <i>other level (Feature)</i>
f6071.9	Niet gespecificeerd <u>Unspecified</u>
f6072	Werking slokdarm <u>Function of oesophagus</u>
	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF <i>oesophagus (DigestiveSystemAnatomy)</i>
f60720	Druk onderste slokdarmsfincter <u>Pressure of lower sphincter of oesophagus</u>
	✂ ANAT PART <i>sphincter (AnatomicalPart)</i> HAS POSITION <i>lower (AnatomicalPart)</i> IS PART OF <i>oesophagus (DigestiveSystemAnatomy)</i> HAS FEATURE <i>pressure (Feature)</i>
Remark In SPET there is available the descriptor 'lower esophageal sphincter'; we have chosen to dissect it as done above.	
f60720.0	Normale druk onderste slokdarmsfincter <u>Normal pressure of lower sphincter of oesophagus</u>
	✂ ANAT PART <i>sphincter (AnatomicalPart)</i> HAS POSITION <i>lower (AnatomicalPart)</i> IS PART OF <i>oesophagus (DigestiveSystemAnatomy)</i> HAS FEATURE <i>pressure (Feature)</i> HAS LEVEL <i>normal (Level)</i>
f60720.1	Verlaagde druk onderste slokdarmsfincter <u>Decreased pressure of lower sphincter of oesophagus</u>
	✂ ANAT PART <i>sphincter (AnatomicalPart)</i> HAS POSITION <i>lower (AnatomicalPart)</i> IS PART OF <i>oesophagus (DigestiveSystemAnatomy)</i> HAS FEATURE <i>pressure (Feature)</i> HAS FEATURE <i>decreased (Feature)</i>
f60720.8	Anders gespecificeerd <u>Other specified</u>

	✂ ANAT PART sphincter (AnatomicalPart) HAS POSITION lower (AnatomicalPart) IS PART OF oesophagus (DigestiveSystemAnatomy) HAS FEATURE pressure (Feature) HAS FEATURE <u>other level</u> (Feature)
f60720.9	Niet gespecificeerd <u>Unspecified</u>
f60728	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <u>other function</u> (BodyProcess) IS FUNCTION OF oesophagus (DigestiveSystemAnatomy)
f60729	Niet gespecificeerd <u>Unspecified</u>
f6073	Werking maag <u>Functions of stomach</u> ✂ BODY PROC <i>function</i> (BodyProcess) IS FUNCTION OF stomach (DigestiveSystemAnatomy)
f6073.0	Normale werking maag <u>Normal functions of stomach</u> ✂ BODY PROC <i>function</i> (BodyProcess) IS FUNCTION OF stomach (DigestiveSystemAnatomy) HAS LEVEL <i>normal</i> (Level)
f6073.1	Dumping <u>Dumping / increased speed in voiding stomach</u> ✂ PATH & IMP<i>dumping</i> (Impairment)
f6073.2	Vertraagde maagontleding <u>Decreased speed in voiding stomach</u> ✂ DEED emptying (BodyProcess) ACTS ON stomach (DigestiveSystemAnatomy) HAS FEATURE increased (Feature)
f6073.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <u>other function</u> (BodyProcess) IS FUNCTION OF stomach (DigestiveSystemAnatomy)
f6073.9	Niet gespecificeerd <u>Unspecified</u>
f6074	Werking lever <u>Functions of liver</u>

	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF liver (DigestiveSystemAnatomy)
f60740	Productie gal <u>Production of bile</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance)
f60740.0	Normale productie gal <u>Normal production of bile</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance) HAS LEVEL <i>normal (Level)</i>
f60740.1	Stoornis in productie gal <u>Impairment in production of bile</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance) HAS LEVEL <i>impaired (Level)</i>
f60740.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance) HAS FEATURE <u>other level (Feature)</u>
f60740.9	Niet gespecificeerd <u>Unspecified</u>
f60741	Samenstelling gal <u>Composition of bile</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance) HAS FEATURE <i>composition (Feature)</i>
f60741.0	Normale samenstelling gal <u>Normal composition of bile</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance) HAS FEATURE <i>composition (Feature)</i> HAS LEVEL <i>normal (Level)</i>
f60741.1	Stoornis in samenstelling gal <u>Impairment in composition of bile</u> ✂ BODY PROC <i>production (BodyProcess)</i> ACTS ONbile (BodySubstance) HAS FEATURE <i>composition (Feature)</i>

HAS LEVEL *impaired (Level)*

f60740.8 Anders gespecificeerd

Other specified

✂ BODY PROC production (BodyProcess)

ACTS ON bile (BodySubstance)

HAS FEATURE *composition (Feature)*

HAS FEATURE other level (Feature)

f60740.9 Niet gespecificeerd

Unspecified

f60748 Anders gespecificeerd

Other specified

✂ BODY PROC other function (BodyProcess)

IS FUNCTION OF liver (DigestiveSystemAnatomy)

f60749 Niet gespecificeerd

Unspecified

f6075 Werking pancreas

Functions of pancreas

✂ BODY PROC *function (BodyProcess)*

IS FUNCTION OF pancreas (DigestiveSystemAnatomy)

f6075.0 Normale werking pancreas

Normal functions of pancreas

✂ BODY PROC *function (BodyProcess)*

IS FUNCTION OF pancreas (DigestiveSystemAnatomy)

HAS LEVEL *normal (Level)*

f6075.1 Stoornis in werking pancreas

Impairment in functions of pancreas

✂ BODY PROC *function (BodyProcess)*

IS FUNCTION OF pancreas (DigestiveSystemAnatomy)

HAS LEVEL *impaired (Level)*

f6075.8 Anders gespecificeerd

Other specified

✂ BODY PROC *function (BodyProcess)*

IS FUNCTION OF pancreas (DigestiveSystemAnatomy)

HAS FEATURE other level (Feature)

f6075.9 Niet gespecificeerd

Unspecified

f6076 Werking darm

Functions of intestines

	✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF intestines (DigestiveSystemAnatomy)
f6076.0	Normale werking darm <u>Normal functions of intestines</u> ✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF intestines (DigestiveSystemAnatomy) HAS LEVEL <i>normal (Level)</i>
f6076.1	Versnelde darmpassage <u>Increased speed in passaging of intestines</u>
f6076.8	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <i>function (BodyProcess)</i> IS FUNCTION OF intestines (DigestiveSystemAnatomy) HAS FEATURE <u>other level (Feature)</u>
f6076.9	Niet gespecificeerd <u>Unspecified</u>
f6078	Anders gespecificeerd <u>Other specified</u> ✂ BODY PROC <u>other function (BodyProcess)</u> IS FUNCTION OF organ (Anatomy) HAS FUNCTION <i>digestion (BodyProcess)</i>
f6079	Niet gespecificeerd <u>Unspecified</u>
f608	Anders gespecificeerd <u>Other specified</u>
f6080	Groei bij kinderen <u>Growth in children</u> ✂ DEEDgrowth (Deed) IS FUNCTION OF child (Person)

Remark

We propose to shift growth from the category Deed to BodyProcess or to a more neutral category Process. It might have been better to start with child and to link growth to child, but no link is available to do so.

f60800	Lichaamslengte bij kinderen <u>Body length in children</u> ✂ FEATURE <i>length (Feature)</i> IS FEATURE OF body (Anatomy)
--------	--

IS FUNCTION OF child (Person)

- f60800.0 Lichaamslengte passend bij leeftijd
Body length in correspondence with age
 ✂ FEATURE *length (Feature)*
 IS FEATURE OF body (Anatomy)
 IS FUNCTION OF child (Person)
 HAS LEVEL *normal (Level)*
- f60800.1 Te groot voor leeftijd
Too long for age
 ✂ FEATURE *length (Feature)*
 IS FEATURE OF body (Anatomy)
 IS FUNCTION OF child (Person)
 HAS LEVEL *more [than usual] (Level)*
- f60800.2 Te klein voor leeftijd
Too small for age
 ✂ FEATURE *length (Feature)*
 IS FEATURE OF body (Anatomy)
 IS FUNCTION OF child (Person)
 HAS LEVEL *less [than usual] (Level)*
- f60800.8 Anders gespecificeerd
Other specified
 ✂ FEATURE *length (Feature)*
 IS FEATURE OF body (Anatomy)
 IS FUNCTION OF child (Person)
 HAS FEATURE other level (Feature)
- f60800.9 Niet gespecificeerd
Unspecified
- f60801 Lichaamsgewicht bij kinderen in relatie tot lichaamslengte
Body weight in children in relation to body length
 ✂ FEATURE *weight (Feature)*
 IS FEATURE OF body (Anatomy)
 IS FUNCTION OF *length (Feature)*
 IS FEATURE OF body (Anatomy)
 IS FUNCTION OF child (Person)

Remark

It is difficult to dissect relations or comparisons between items, like the relation between body weight and body length. We have chosen to dissect this as 'weight IS FUNCTION OF length, although this is not exactly the same.

- f60801.0 Lichaamsgewicht passend bij lichaamslengte
Body weight in correspondence with body length

	✂	FEATURE	<i>weight (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	<i>length (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	child (Person)
		HAS LEVEL	<i>normal (Level)</i>
f60801.1		Te zwaar voor lengte	
		<i>excl. overgewicht (f6021.2) [i50430]</i>	
		<u>Too heavy for lenght</u>	
		<i>excl. overweight</i>	
	✂	FEATURE	<i>weight (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	<i>length (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	child (Person)
		HAS FEATURE	increased (Feature)
f60801.2		Te licht voor lengte	
<i>excl.</i>		<i>ondergewicht / laag gewicht (f6021.1) [i50410]</i>	
		<u>Too light for length</u>	
		<i>excl. underweight / low weight</i>	
	✂	FEATURE	<i>weight (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	<i>length (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	child (Person)
		HAS FEATURE	decreased (Feature)
f60801.8		Anders gespecificeerd	
		<u>Other specified</u>	
	✂	FEATURE	<i>weight (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	<i>length (Feature)</i>
		IS FEATURE OF	body (Anatomy)
		IS FUNCTION OF	child (Person)
		HAS FEATURE	<u>other</u> level (Feature)
f60801.9		Niet gespecificeerd	
		<u>Unspecified</u>	
f60808		Anders gespecificeerd	
		<u>Other specified</u>	
	✂	DEED	growth (Deed)
		IS FUNCTION OF	child (Person)
f60809		Niet gespecificeerd	
		<u>Unspecified</u>	

- f6088** **Anders gespecificeerd**
 Other specified
- f609** **Niet gespecificeerd [i5900]**
 Unspecified

st6 **STRUCTUUR ORGANEN EN ORGAANDELEN BEHORENDE TOT SPIJS-
VERTERINGSSYSTEEM EN BETROKKEN BIJ METABOLISME [i50100-i59999]**
**STRUCTURE OF ORGANS AND PARTS OF ORGANS WHICH BELONG TO THE
DIGESTIVE SYSTEM AND ARE INVOLVED IN METABOLISM [i50100-i59999]**

st60 **Structuur slokdarm (oesophagus) [s50200]**

Shape of oesophagus

✂ CHARACT *shape (Characteristic)*

IS FEATURE OF oesophagus (digestiveSystemAnatomy)

Remark

Shape or structure is a difficult concept to introduce in SPET. It is not possible to add 'shape' to the present subdivision analogous to 'function', which - as general term - was added to BodyProcess. The only category in which there are already several descriptors related to shape is Feature (like Position). Therefore we have chosen to include 'shape' as a general term directly under Characteristic. May be it should be a class of descriptors, but then descriptors like 'round' (which are now included in Feature) should be shifted.

st60.0 Normale structuur slokdarm

Normal shape oesophagus

✂ CHARACT *shape (Characteristic)*

IS FEATURE OF oesophagus (DigestiveSystemAnatomy)

HAS LEVEL *normal (Level)*

st60.1 Obstructie slokdarm

Obstruction of oesophagus

✂ PATH & IMP obstruction (Lesion)

HAS LOCATION oesophagus (DigestiveSystemAnatomy)

HAS LEVEL *present (Level)*

st60.8 Anders gespecificeerd

Other specified

✂ CHARACT *other shape (Characteristic)*

IS FEATURE OF oesophagus (DigestiveSystemAnatomy)

st60.9 Niet gespecificeerd

Unspecified

st61 **Structuur maag (gaster) [s50300]**

Shape of stomach

✂ CHARACT *shape (Characteristic)*

IS FEATURE OF stomach (DigestiveSystemAnatomy)

st61.0 Normale structuur maag

Normal shape of stomach

✂ CHARACT *shape (Characteristic)*

IS FEATURE OF stomach (DigestiveSystemAnatomy)

HAS LEVEL *normal (Level)*

st61.1	Obstructie maag <u>Obstruction of stomach</u> ✂ PATH & IMP obstruction (Lesion) HAS LOCATION stomach (DigestiveSystemAnatomy) HAS LEVEL <i>present (Level)</i>
st61.8	Anders gespecificeerd <u>Other specified</u> ✂ CHARACT <u>other</u> <i>shape (Characteristic)</i> IS FEATURE OF stomach (DigestiveSystemAnatomy)
st61.9	Niet gespecificeerd <u>Unspecified</u>
st62	Structuur darm [s50400] <u>Shape of intestines [s50400]</u> ✂ CHARACT <i>shape (Characteristic)</i> IS FEATURE OF intestines (DigestiveSystemAnatomy)
st620	Hoeveelheid darmvlokken <u>Amount of villi</u> ✂ ANAT PART villi (AnatomicalPart) IS PART OF intestine (DigestiveSystemAnatomy) HAS QUANTITY <i>amount (Quantity)</i>
st620.0	Normale hoeveelheid darmvlokken <u>Normal amount of villi</u> ✂ ANAT PART villi (AnatomicalPart) IS PART OF intestine (DigestiveSystemAnatomy) HAS QUANTITY <i>amount (Quantity)</i> HAS LEVEL <i>normal (Level)</i>
st620.1	Verminderde hoeveelheid darmvlokken <u>Decreased amount of villi</u> ✂ ANAT PART villi (AnatomicalPart) IS PART OF intestine (DigestiveSystemAnatomy) HAS QUANTITY <i>amount (Quantity)</i> HAS FEATURE <i>decreased (Feature)</i>
st620.8	Anders gespecificeerd <u>Other specified</u> ✂ ANAT PART villi (AnatomicalPart) IS PART OF intestine (DigestiveSystemAnatomy) HAS QUANTITY <i>amount (Quantity)</i> HAS FEATURE <u>other</u> <i>level (Feature)</i>
st620.9	Niet gespecificeerd <u>Unspecified</u>

- st621 Obstructie darm**
Obstruction of intestines
Obstruction of stomach
 ✂ PATH & IMP obstruction (Lesion)
 HAS LOCATION intestines (DigestiveSystemAnatomy)
- st621.0 Geen obstructie darm
No obstruction intestines
 ✂ PATH & IMP obstruction (Lesion)
 HAS LOCATION intestines (DigestiveSystemAnatomy)
 HAS LEVEL *absent (Level)*
- st621.1 Obstructie darm

Obstruction of intestines
 ✂ PATH & IMP obstruction (Lesion)
 HAS LOCATION intestines (DigestiveSystemAnatomy)
 HAS LEVEL *present (Level)*
- st621.8 Anders gespecificeerd
Other specified
 ✂ PATH & IMP obstruction (Lesion)
 HAS LOCATION intestines (DigestiveSystemAnatomy)
 HAS FEATURE other level (Feature)
- st621.9 Niet gespecificeerd
Unspecified
- st628 Anders gespecificeerd**
Other specified
 ✂ CHARACT other shape (Characteristic)
 IS FEATURE OF intestines (DigestiveSystemAnatomy)
- st629 Niet gespecificeerd**
Unspecified
- st68 Anders gespecificeerd**
Other specified
- st69 Niet gespecificeerd**

8.1.14 ANNEX 4c: New (groups of) descriptors based on the extended scoping of chapter 6 of the Draft Classification of Functions and Shape of the Draft ICIDH for Dieticians

In this annex the new descriptors are presented (in small print) within the group (in capitals) to which they belong; all the new items are indicated in italics.

PATHOLOGY & IMPAIRMENT

aspiration
choke
dumping
dysphagia
flatulence
gastro-oesophageal reflux
intolerance
itching
pyrosis
rumination
slaver
 LESION

CHARACTERISTIC

shape

FEATURE

continuity
consistency (also a subgroup)
colour (also a subgroup)
general
level (also a group)
liquid
location
ribbon-shaped
round
specific
weight

COLOUR

COMPOSITION

CONSISTENCY

firm
mashy
solid
thick
thin
thin fluid

LEVEL

absent
difficult
healthy
impaired
impossible
less [than usual]
more [than usual]
much more [than usual]
normal
partly present
possible

present

too fast

POSITION

TEMPORAL MARKER

continuous

irregular

PROCESS

BODY PROCESS

attention

burp

chew

defecation

digestion

discharge

distribution

feeling bloated

function

globus feeling

intake

metabolism

need

nutritional state

production

retention

salivation

swallow

tolerance

transport

urge

DEED

QUANTITY

amount

excessive

frequency

percentage

SUBSTANCE

BODY SUBSTANCE

sputum

CHEMICAL

elektrolyt

NUTRIENT

(to structure the items a hierarchical subdivision is given for the nutrients; in the model they can be presented as a flat alphabetical ordered list)

carbohydrate

monosaccharide

glucose
disaccharide
lactose
polysaccharide
fibres

fat / fatty acid
mineral

kalium
natrium

nickel
protein

chicken egg protein
cow's milk protein
soya protein
wheat protein

vitamine

INGREDIENT

antioxidant
aromatic substance [artificial odour] and flavouring
benzoate
preservative
colouring agent [colouring]
taste booster

STRUCTURE

ANATOMY

ANATOMICALCONNECTION

ANATOMICALPART

villi

BODYSYSTEMANATOMY

DIGESTIVESYSTEMANATOMY

oropharynx

MUSCULOSKELETALSYSTEMANATOMY

ORODENTALSYSTEMANATOMY

DEVICE

ORGANISM

PERSON

adolescent

CONTEXTUAL FACTOR

PERSONAL FACTOR

ENVIRONMENTAL FACTOR

drink

energy

food (also a subgroup)

FOOD

FOODPRODUCTGROUP

cereals

fish

fruit

meat

nuts

milk and milk products

vegetables

FOODPRODUCT

chocolate

peanuts

8.1.15 ANNEX 5: Dissecting, Modelling and Analysing the Draft Classification of Procedures for Oral Hygienists (Chapter 2)

Goal: Investigate possibilities in SPET en GRail to dissect, model and analyse draft classification of procedures from oral hygienists.

Tool: Draft Classification of Procedures for Oral Hygienists (Corbey and Heerkens, march 1999).

Based on experiences in dissecting and analysing several thousands of 'surgical procedures in medicine' (according to ICPM), approximately 200 classes of the draft classification of procedures for Oral Hygienists are dissected, modelled and analysed.

In annex 5a the classes of chapter 2 of the Draft Classification of Procedures for Oral Hygienist are given in Dutch and English. English classes are second. Annex 5b represents the dissected classes modelled in Grail. Annex 5c shows the analysis of the modelled classes. This includes suggestions for adaptations in SPET for presenting problems. Finally, annex 5d shows a list of the dissections made.

Time spend for this phase: approximately 126 hours.

8.1.16 ANNEX 5a Draft Classification of Procedures for Oral Hygienists(chapter 2)

topClass

20 INSPECTEREN EN OBSERVEREN

20 Inspecting and observing

200 Inspecteren extraoraal

200 Inspecting extra-oral

2000 Inspecteren asymmetrieën

2000 Inspecting asymmetry

2001 Inspecteren regionale lymfeklieren

2001 Inspecting local lymph-nodes

2002 Inspecteren (mond)ademhaling

2002 Inspecting (oral) breathing

2003 Inspecteren lippen (buitenzijde)

2003 Inspecting lips (outside)

2008 Overig

2008 Other

201 Inspecteren intra oraal

201 Inspecting intra-oral

2010 Inspecteren intra-oraal met gebruik hulpmiddelen

2010 Inspecting intra-oral by means of devices

201000 Inspecteren van lippen (binnenzijde)

201000 Inspecting lips (inside)

201001 Inspecteren van slijmvliesen

201001 Inspecting mucosa

201002 Inspecteren van wang, omslagploo

201002 Inspecting of wrinkle of cheek

201003 Inspecteren van tong

201003 Inspecting tongue

201004 Inspecteren van tonsillen / farynx

201004 Inspecting tonsils / pharynx

201005 Inspecteren en observeren van speeksel / speekselklieren

201005 Inspecting and observing saliva / salivary gland

201006 Inspecteren van frenulum

201006 Inspecting frenulum

201007 Inspecteren van palatum

201008 Inspecting palatum

201008 Inspecteren van mondbodem

201008 Inspecting bottom of mouth

201009 Inspecteren en observeren van gingiva

201009 Inspecting and observing gingiva

2010090 Kleur

2010090 Colour

2010091 Zwelling

2010091 Swelling

2010092 Aanwezigheid aandoeningen

	2010092 Presence of disorders
	2010093 Lachlijn
	2010093 Smiling line
	2010098 Overig
	2010098 Other
	201010 Inspecteren en observeren van gebitselementen
	201010 Inspecting and observing teeth
	2010100 Stand gebitselementen
	2010100 Position teeth
	2010101 Aanwezige restauraties
	2010101 Presence restorations
	2010102 Aanwezigheid cariës
	2010102 Presence caries
	2010103 Aanwezigheid partiele prothese / frame prothese
	2010103 Presence partial prosthesis / frame prosthesis
	2010104 Aanwezigheid implantaten
	2010101 Presence implants
	2010108 Overig
	2010108 Other
	201011 Inspecteren occlusie
	201011 Inspecting occlusion
	201018 Overig
	201018 Other
	2011 Inspecteren intra oraal door middel van kleuring
	2011 Inspecting intra-oral by means of colouring
	20110 Inspecteren vóórkomen plaque na plaquekleuring
	20110 Inspecting presence plaque after plaque-colouring
	20118 Overig
	20118 Other
	2018 Overig
	2018 Other
	202 Observeren van psychische functies
	202 Observing psychological functions
	203 Observeren van woon/groepssituatie
	203 Observing living situation/group situation
	208 Overig
	208 Other
21 PALPEREN, PERCUTEREN	
21 PALPATING, PERCUSSING	
	210 Palperen
	210 Palpating
	2100 Palperen van regionale lymfeklieren
	2100 Palpating local lymph nodes
	2101 Palperen van speekselklieren
	2101 Palpating salivary glands
	2102 Palperen van lippen
	2102 Palpating lips

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- 2103 Palperen van kaakgewricht
 - 2103 Palpating joint of jaw (articulatio temporomandibularis)
 - 2108 Overig
 - 2108 Other
 - 211 Percuteren
 - 211 Percuss
 - 2110 Percuteren van gebitselementen
 - 2110 Percussion of teeth
 - 2111 Percuteren van implantaten
 - 2111 Percussion of implants
 - 2118 Overig
 - 2118 Other
 - 218 Overig
 - 218 Other
 - 22 NEMEN VAN MONSTERS TEN BEHOEVE VAN BACTERIEEL ONDERZOEK
 - 22 TAKING PLAQUE SAMPLES TO ACHIEVE BACTERIOLOGY TESTING
 - 220 Nemen van plaque monsters
 - 220 Taking plaque samples
 - 221 Nemen van speeksel/mondvloeistof monsters
 - 221 Taking saliva/mouth fluid samples
 - 228 Overig
 - 228 Other
 - 23 TESTEN, METEN EN ANALYSEREN (EN VASTLEGGEN)
 - 23 TESTING, MEASURING, ANALYSING (AND REPORTING)
 - 230 Meten en analyseren van afzettingen op elementen
 - 230 Measuring and analysing deposition on teeth
 - 2300 Meten en analyseren van plaque
 - 2300 Measuring and analysing plaque
 - 2301 Meten en analyseren van tandsteen
 - 2301 Measuring and analysing tartar
 - 2302 Meten en analyseren van aanslag
 - 2302 Measuring and analysing scale
 - 2308 Overig
 - 2308 Other
 - 231 Meten en analyseren van afwijkingen aan tandvlees en parodontium
 - 231 Measuring and analysing of disorders of gingiva and parodontium
 - 2310 Meten en analyseren van bloeding
 - 2310 Measuring and analysing bleeding
 - 2311 Meten en analyseren van gingiva zwelling
 - 2311 Measuring and analysing gingiva swelling
 - 2312 Meten en analyseren van pocketdiepte
 - 2312 Measuring and analysing depth of pouch
 - 23120 Meten en analyseren van pocketdiepte via zespuntsmeting
 - 23120 Measuring and analysing depth of pouch by means of six-points-measuring
 - 23128 Overig
 - 23128 Other
 - 2313 Meten en analyseren van botafbraak

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- 2313 Measuring and analysing bone destruction
 - 2314 Meten en analyseren van recessies
 - 2314 Measuring and analysing recessions
 - 2315 Meten en analyseren van aanhechtingsverlies
 - 2315 Measuring and analysing loss of attachment
 - 2316 Meten en analyseren van furcaties
 - 2316 Measuring and analysing furcations
 - 2317 Meten en analyseren van mobiliteit
 - 2317 Measuring and analysing mobility
 - 2318 Overig
 - 2318 Other
 - 232 Testen, meten en analyseren van afwijkingen aan elementen
 - 232 Testing, measuring and analysing disorders of teeth
 - 2320 Testen vitaliteit element
 - 2320 Testing vitality tooth
 - 23200 Testen vitaliteit element met behulp van koud/warmth
 - 23200 Testing vitality tooth by means of cold/warm
 - 23201 Testen vitaliteit element met behulp van stroom
 - 23201 Testing vitality tooth by means of electricity
 - 23208 Overig
 - 23208 Other
 - 2321 Meten en analyseren van occlusale slijtage
 - 2321 Measuring and analysing occlusal abrasion
 - 2322 Meten en analyseren van cervicale abrasie
 - 2322 Measuring and analysing cervical abrasion
 - 2323 Meten en analyseren van DMF getal
 - 2323 Measuring and analysing DMF-index
 - 2324 Meten en analyseren van fluorose
 - 2324 Measuring and analysing fluorosis
 - 2325 Meten en analyseren van verkleuring
 - 2325 Measuring and analysing discoloration
 - 2326 Meten en analyseren van slijpfacetten
 - 2326 Measuring and analysing polish facets
 - 2328 Overig
 - 2328 Other
 - 233 Functieonderzoek naar occlusie en articulatie
 - 233 Assessment (function) of occlusion and articulation
 - 2330 Onderzoeken van kaakrelatie
 - 2330 Assessing jaw-relation
 - 23300 Horizontale / verticale relaties
 - 23300 Horizontal / vertical relations
 - 23301 Maximale occlusie
 - 23301 Maximum occlusion
 - 23302 Articulatie
 - 23302 Articulation
 - 23303 Deviatie van de onderkaak tijdens opening naar rechts/links
 - 23303 Deviation mandibula during right/left opening
 - 23308 Overig

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- 23308 Other
 - 2331 Onderzoeken van kaakgewricht
 - 2331 Assessing joint of jaw (articulatio temporomandibularis)
 - 2338 Overig
 - 2338 Other
 - 234 Analyseren (interpreteren) van röntgenfoto's
 - 234 Analysing (interpret) x-rays
 - 2340 Beoordelen aanwezigheid elementen
 - 2340 Assessing presence teeth
 - 2341 Beoordelen groei elementen
 - 2341 Assessing growth teeth
 - 2342 Beoordelen stand elementen
 - 2342 Assessing position teeth
 - 2343 Beoordelen mate van resorptie
 - 2343 Assessing measure of resorption
 - 23430 Mate van resorptie bot
 - 23430 Extent of resorption bone
 - 23431 Mate van resorptie elementen
 - 23431 Extent of resorption teeth
 - 23438 Overig
 - 23438 Other
 - 2344 Beoordelen furcatie
 - 2344 Assessing furcation
 - 2345 Beoordelen cariës
 - 2345 Assessing caries
 - 2346 Beoordelen retentiefactoren
 - 2346 Assessing retention factors
 - 2347 Beoordelen periapicale afwijkingen
 - 2347 Assessing peri-apical disorders
 - 2348 Beoordelen wortelvorm
 - 2348 Assessing shape of dental radix
 - 2349 Overig
 - 2349 Other
 - 235 Analyseren van gebitsmodellen
 - 235 Analysing (plaster) models of set of teeth
 - 236 Analyseren en interpreteren van voedingsanamnese
 - 236 Analysing and interpreting feeding history
 - 2360 Tellen aantal suikermomenten
 - 2360 Counting number of glucose moments
 - 2361 Tellen aantal etsmomenten
 - 2361 Counting number of etch moments
 - 2368 Overig
 - 2368 Other
 - 237 Testen monsters
 - 237 Testing samples
 - 2370 Speekseltest
 - 2370 Saliva testing

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- 2371 Plaquetest
 - 2371 Plaque testing
 - 2372 Ademtest
 - 2373 Breathing testing
 - 2378 Overig
 - 2378 Other
 - 238 Overig
 - 238 Other
 - 2380 Meten en bepalen van bandenmaat
 - 2380 Measuring and determining measure of measure of band
 - 2388 Overig
 - 2388 Other
 - 24 VERVAARDIGEN VAN HULPMIDDELEN t.b.v. DIAGNOSTIEK en REGISTRATIE
 - 24 CONSTRUCTING OF DEVICES TO ACHIEVE DIAGNOSIS AND REGISTRATION
 - 240 Maken van röntgenfoto's
 - 240 Taking x-ray
 - 2400 Maken van bite wings
 - 2400 Taking bite-wings
 - 2401 Maken van solo's
 - 2401 Taking solo's
 - 2402 Maken van orthopantomogram
 - 2402 Taking orthopantomogram
 - 2403 Maken van röntgenschedelprofiel
 - 2403 Taking skull profile (x-ray)
 - 2404 Maken van handfoto
 - 2404 Taking hand-photograph
 - 2405 Maken van opbeetfoto
 - 2405 Taking bite-photograph
 - 2408 Overig
 - 2408 Other
 - 241 Ontwikkelen van röntgenfoto's
 - 241 Developing x-ray
 - 242 Tracen van röntgenfoto's
 - 242 Tracing x-rays
 - 2420 Beoordelen krooncontouren
 - 2420 Assessing crown contours
 - 2421 Beoordelen wortelcontouren
 - 2421 Assessing radix contours
 - 2422 Beoordelen lokatie glazuur-cementgrens
 - 2422 Assessing location glaze cement border
 - 2423 Beoordelen contouren restauraties
 - 2423 Assessing restoration contours
 - 2424 Beoordelen meest apicaal niveau van interdentaal botniveau
 - 2420 Assessing most apical level of interdental bone level
 - 2425 Beoordelen afbraak van interradiculair bot
 - 2425 Assessing destruction interradicular bone
 - 2426 Beoordelen peri-apicale radioluenties

- 2426 Assessing peri-apical radio-illuminations
- 2428 Overig
- 2428 Other
- 243 Maken van gebitsafdrukken
- 243 Making moulage set of teeth
 - 2430 Maken van gebitsafdrukken voor het vastleggen van recessies
 - 2430 Making moulage set of teeth to achieve reporting recessions
 - 2431 Maken van gebitsafdrukken voor studiemodellen
 - 2431 Making moulage set of teeth to achieve obtaining study-models
 - 2438 Overig
 - 2438 Other
- 244 Opnemen van gebitsdiagram
- 244 Making dental diagram
- 245 Maken van mondfoto's
- 245 Taking mouth-photographs
- 248 Overig
- 248 Other
- 28 OVERIG
- 28 OTHER

8.1.17 ANNEX 5b: Dissected and Modelled Draft Classification of Procedures for Oral Hygienists (chapter 2)

SurgicalProcedure

surgery using device

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- mondhyg 20B inspecting patient
 - mondhyg 20A inspecting patient with observing patient
 - mondhyg 28 other inspecting patient with observing patient
 - mondhyg 208A other inspecting patient with observing patient
 - mondhyg 208B other inspecting patient
- mondhyg 20C observing patient
 - mondhyg 208C other observing patient
- mondhyg 20E inspecting body part
 - mondhyg 20D inspecting body part with observing body part
 - mondhyg 208D other inspecting body part with observing body part
 - mondhyg 201000 inspecting lip of intra-oral cavity using device
 - mondhyg 201002 inspecting wrinkle of cheek of oral region using device has approach transoral access
 - mondhyg 201004b inspecting pharynx using device has approach transoral access
 - mondhyg 201004a inspecting tonsil of pharynx using device has approach transoral access
 - mondhyg 201003 inspecting tongue of oral region using device has approach transoral access
 - mondhyg 201007 inspecting palate of oral region using device has approach transoral access
 - mondhyg 208E other inspecting body part
 - mondhyg 2003 inspecting lip of oral region has approach extra-oral
 - mondhyg 2008 inspecting other body part of oral region has approach extra-oral
- mondhyg 20F observing body part
 - mondhyg 201005f observing salivary gland of oral region using device has approach transoral access
 - mondhyg 2010090c observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region
 - mondhyg 2010091c observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region
 - mondhyg 208F other observing body part
- mondhyg 200 inspecting oral region has approach extra-oral
 - mondhyg 2000 inspecting oral region has approach extra-oral to achieve investigating asymmetry is feature of oral region
 - mondhyg 2001 inspecting lymphnode oral region has approach extra-oral
 - mondhyg 2002 inspecting oral region has approach extra-oral to achieve investigating respiration
 - mondhyg 2003 inspecting lip of oral region has approach extra-oral
 - mondhyg 2008 inspecting other body part of oral region has approach extra-oral
- mondhyg 201 inspecting oral region has approach transoral access
 - mondhyg 2010 inspecting oral region using device has approach transoral access
 - mondhyg 2018 other inspecting oral region has approach transoral access
 - mondhyg 2011 inspecting oral region using colouring oral region has approach transoral access

mondhyg 20110	inspecting oral region using colouring plaque oral region has approach transoral access to achieve presenting plaque oral region
mondhyg 20118	other inspecting oral region using colouring oral region has approach transoral access
mondhyg 201001	inspecting mucosa of oral region using device has approach transoral access
mondhyg 201002	inspecting wrinkle of cheek of oral region using device has approach transoral access
mondhyg 201003	inspecting tongue of oral region using device has approach transoral access
mondhyg 201006	inspecting frenulum of oral region using device has approach transoral access
mondhyg 201007	inspecting palate of oral region using device has approach transoral access
mondhyg 201008	inspecting bottom of mouth of oral region using device has approach transoral access
mondhyg 201010b	inspecting set of teeth of oral region using device has approach transoral access
mondhyg 201010a	inspecting set of teeth of oral region using device has approach transoral access with observing set of teeth of oral region using device has approach transoral access
mondhyg 2010102a	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries
mondhyg 2010103d	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis
mondhyg 2010104a	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant
mondhyg 2010103a	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial
mondhyg 2010108a	other inspecting set of teeth of oral region using device has approach transoral access with observing set of teeth of oral region using device has approach transoral access
mondhyg 2010102b	inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries
mondhyg 2010102a	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries
mondhyg 2010103e	inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis
mondhyg 2010103d	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis
mondhyg 2010104b	inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant
mondhyg 2010104a	'inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant

mondhyg 2010103b	inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial
mondhyg 2010108b	other inspecting set of teeth of oral region using device has approach transoral access
mondhyg 201011	inspecting occlusion oral region using device has approach transoral access
mondhyg 201018	other inspecting oral region using device has approach transoral access
mondhyg 201009a	inspecting gingiva of oral region using device has approach transoral access with observing gingiva of oral region using device has approach transoral access
mondhyg 2010090a	'inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region
mondhyg 2010091a	'inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder swelling gingivae of oral region
mondhyg 2010092a	'inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingivae of oral region
mondhyg 2010093a	inspecting gingiva of oral region using device has approach transoral access to achieve checking - action smiling with observing gingiva of oral region using device has approach transoral access to achieve checking - action wrinkle smiling
mondhyg 2010098a	other inspecting gingiva of oral region using device has approach transoral access with observing gingiva of oral region using device has approach transoral access
mondhyg 2010090b	inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region
mondhyg 2010090a	'inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking
mondhyg 2010091b	inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region
mondhyg 2010091a	'inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region
mondhyg 2010092b	inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region
mondhyg 2010092a	'inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region
mondhyg 2010093b	inspecting gingiva of oral region using device has approach transoral access to achieve checking - action wrinkle smiling
mondhyg 2010093a	inspecting gingiva of oral region using device has approach transoral access to achieve checking - action smiling with observing gingiva of oral region using device has approach transoral access to achieve checking - action wrinkle smiling
mondhyg 2010098b	other inspecting gingiva of oral region using device has approach transoral access
mondhyg 201005b	inspecting saliva using device has approach transoral access
mondhyg 201005a	inspecting saliva using device has approach transoral access

mondhyg 201005e	inspecting salivary gland of oral region using device has approach transoral access
mondhyg 201005d	inspecting salivary gland of oral region using device has approach transoral access
mondhyg 201005c	inspecting saliva using device has approach transoral access
mondhyg 201009c	observing gingiva of oral region using device has approach transoral access
mondhyg 2010090c	observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region
mondhyg 2010091c	observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region
mondhyg 2010092c	observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region
mondhyg 2010093c	observing gingiva of oral region using device has approach transoral access to achieve checking - action wrinkle smiling
mondhyg 2010098c	other observing gingiva of oral region using device has approach transoral access
mondhyg 201010c	observing set of teeth of oral region using device has approach transoral access
mondhyg 2010102c	observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries
mondhyg 2010103f	observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis
mondhyg 2010104c	observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant
mondhyg 2010103c	observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial
mondhyg 2010108c	other observing set of teeth of oral region using device has approach transoral access
mondhyg 202	observing psychological functions

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mondhyg 210	palpate - action body structure
mondhyg 21	palpate - action body structure with percuss body structure
mondhyg 218A	other palpate - action body structure with other percuss body structure
mondhyg 2100	palpate - action lymph node structure region of jaw neck
mondhyg 2101	palpate - action salivary gland
mondhyg 2102	palpate - action lip
mondhyg 2103	palpate - action articulation temporomandibularis
mondhyg 2108	palpate - action other body structure
mondhyg 218B	other palpate - action body structure
mondhyg 211	percuss body structure
mondhyg 2110	percuss tooth of oral region
mondhyg 2111	percuss implant of oral region
mondhyg 2118	percuss other body structure
mondhyg 218C	other percuss body structure

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mondhyg 22a	sampling - action structure to achieve bacteriology testing
mondhyg 220	sampling - action plaque oral region to achieve bacteriology testing
mondhyg 228a	other sampling - action structure graft to achieve bacteriology testing
mondhyg 22b	sampling - action substance to achieve bacteriology testing
mondhyg 221	sampling - action saliva to achieve bacteriology testing
mondhyg 228b	other sampling - action substance to achieve bacteriology testing

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mondhyg 23D	analyzing process patient
mondhyg 23C	measuring process patient
mondhyg 23F	measuring process patient with analyzing process patient
mondhyg 23B	testing process patient
mondhyg 23G	testing process patient with measuring process patient with analyzing process patient
mondhyg 23A	testing process patient with measuring process patient with analyzing process patient with reporting process patient
mondhyg 23E	reporting process patient
mondhyg 23I	testing process body part
mondhyg 2320	testing vitality is feature of tooth
mondhyg 23200	testing vitality is feature of tooth by technique applying thermotherapy
mondhyg 23201	testing vitality is feature of tooth by technique applying electricity
mondhyg 23208	other testing vitality is feature of tooth
mondhyg 23N	testing process body part with measuring process body part with analyzing process body part
mondhyg 23H	testing process body part with measuring process body part with analyzing process body part with reporting process body part
mondhyg 23J	measuring process body part
mondhyg 23M	measuring process body part with analyzing process body part
mondhyg 2311a	measuring swelling gingivae with analyzing swelling gingivae
mondhyg 2313a	measuring destruction bone of parodontium with analyzing destruction bone of parodontium
mondhyg 2315a	measuring losing attaching gingivae with analyzing losing attaching gingivae
mondhyg 2317a	measuring mobility is feature of gingivae with analyzing mobility is feature of gingivae
mondhyg 2321	measuring abrading tooth occluding with analyzing abrading tooth occluding
mondhyg 2310a	measuring bleeding gingivae parodontium with analyzing bleeding gingivae parodontium
mondhyg 23K	analyzing process body part
mondhyg 2340	analyzing x-ray to achieve assessing presenting tooth
mondhyg 2341	analyzing x-ray to achieve assessing growth tooth
mondhyg 2342	analyzing x-ray to achieve assessing positioning tooth
mondhyg 23430	analyzing x-ray to achieve assessing resorbing bone of oral cavity
mondhyg 23431	analyzing x-ray to achieve assessing resorbing tooth
mondhyg 2347	analyzing x-ray to achieve assessing disorder apex radialis dentis
mondhyg 23L	reporting process body part
mondhyg 230b	measuring depositing set of teeth
mondhyg 230a	measuring depositing set of teeth with analyzing depositing set of teeth
mondhyg 2300a	measuring depositing plaque set of teeth with analyzing depositing plaque set of teeth
mondhyg 2301a	measuring depositing tartar set of teeth with analyzing depositing tartar set of teeth
mondhyg 2302a	measuring depositing scale set of teeth with analyzing depositing scale set of teeth
mondhyg 2308a	other measuring depositing set of teeth with analyzing depositing set of teeth
mondhyg 230c	analyzing depositing set of teeth
mondhyg 231b	measuring disorder gingivae parodontium
mondhyg 231a	measuring disorder parodontium gingivae with analyzing disorder parodontium gingivae
mondhyg 231a	other measuring disorder parodontium gingivae with other analyzing disorder parodontium gingivae
mondhyg 231c	analyzing disorder gingivae parodontium

mondhyg 2312a	measuring depth is feature of pouch of gingivae with analyzing depth is feature of pouch of gingivae
mondhyg 23120a	measuring depth is feature of pouch of gingivae using six-points measuring with analyzing depth is feature of pouch of gingivae using six-points measuring
mondhyg 23128a	other measuring depth is feature of pouch of gingivae with analyzing depth is feature of pouch of gingivae
mondhyg 2314a	measuring recessing gingiva parodontium with analyzing recessing gingiva parodontium
mondhyg 2316a	measuring furcation oral region with analyzing furcation oral region
mondhyg 232a	testing disorder tooth with analyzing disorder tooth with measuring disorder tooth
mondhyg 2328a	other testing disorder tooth with analyzing disorder tooth with measuring disorder tooth
mondhyg 2322	measuring abrading cervix dentis with analyzing abrading cervix dentis
mondhyg 2324	measuring fluoride oral cavity is acted on by poisoning
mondhyg 2325	measuring disorder tooth color with analyzing disorder tooth color
mondhyg 2331	assessing articulatio temporomandibularis
mondhyg 233b	assessing occluding articulatio temporomandibularis
mondhyg 233a	assessing occluding articulatio temporomandibularis with assessing articulating articulatio temporomandibularis
mondhyg 2338a	other assessing occluding articulatio temporomandibularis with assessing articulating articulatio temporomandibularis
mondhyg 233c	assessing articulating articulatio temporomandibularis
mondhyg 234	analyzing x-ray
mondhyg 2340	analyzing x-ray to achieve assessing presenting tooth
mondhyg 2341	analyzing x-ray to achieve assessing growth tooth
mondhyg 2342	analyzing x-ray to achieve assessing positioning tooth
mondhyg 2343	analyzing x-ray to achieve assessing resorbingbody structure
mondhyg 23430	analyzing x-ray to achieve assessing resorbing bone of oral cavity
mondhyg 23431	analyzing x-ray to achieve assessing resorbing tooth
mondhyg 23438	analyzing x-ray to achieve assessing resorbing other body structure
mondhyg 2345	analyzing x-ray to achieve assessing caries
mondhyg 2346	analyzing x-ray to achieve assessing retention substance
mondhyg 2347	analyzing x-ray to achieve assessing disorder apex radicis dentis
mondhyg 2348	analyzing x-ray to achieve assessing shape is feature of radix dentis
mondhyg 2349	other analyzing x-ray
mondhyg 236	analyzing history is acted on by feeding
mondhyg 2371	testing plaque
mondhyg 2372	testing breathing
mondhyg 237	testing sample
mondhyg 2378	other testing sample
mondhyg 238	other testing process with analyzing process with measuring process

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mondhyg 24a	constructing device has function diagnosing
mondhyg 248a	constructing other device has function diagnosing
mondhyg 24b	constructing device has function registering
mondhyg 248b	constructing other device has function registering
mondhyg 240	taking x-ray

mondhyg 241	developping x-ray
mondhyg 242	tracing x-ray
mondhyg 2420	tracing x-ray to achieve assessing contour is feature of Crown of Tooth
mondhyg 2421	tracing x-ray to achieve assessing contour is feature of radix dentis
mondhyg 2423	tracing x-ray to achieve assessing correcting contour is feature of tooth
mondhyg 2424	tracing x-ray to achieve assessing apex of interdental bone
mondhyg 2425	tracing x-ray to achieve assessing destroying interradicular bone
mondhyg 2428	other tracing x-ray
mondhyg 243	taking moulding set of teeth
mondhyg 2430	taking moulding set of teeth to achieve rappingorting recessing set of teeth
mondhyg 2431	taking moulding set of teeth to achieve obtaining study-model
mondhyg 2438	other taking moulding set of teeth
mondhyg 244	constructing diagram by technique rappingorting presenting tooth
mondhyg 245	photographing mouth

8.1.18 ANNEX 5c Analysis of the Dissected and Modelled Draft Classification of Procedures for Oral Hygienists (chapter 2)

Amount of dissections	197	
Amount of classes not able to dissect	<u>19</u> +	
TOTAL amount of possible dissections oral hygiene	216	(100%)
Amount of unexpandables	9	(4%)
Amount of classes not able to dissect (see above)	19	(9%)

Unexpandable are:

2010100a, b, c

2010101a, b, c

2370

2422

2426

Not dissected are:

203

2223

2326

2330

23300

23301

23302

23303

23308

2344

235

2380

2400

2401

2402

2403

2404

2405

2408

(A few dissections are modelled twice)

20

20 Is dissected in 2 ways (patient / body part) to try different structures in modelling this dissection. Just like in ICPM dissections; we separate dissections in an 'a', 'b' and 'c' version if there are two or more procedures in it.

We expect 200 as 'child' of 20E. Maybe we should have used 'inspecting body region' in a 20G-dissection.

201009: It's not clear from the dissections if it is meant to find a disorder or to inspect the disorder which is already present

(2010100 and 2010101 are unexpandable)

I used HAS EXTENT presence, because HAS FEATURE didn't give the possibility to add 'presence'

2010103a shows sixth branch / level!

203 Observing of living / group situations handles about an environmental factor (see Dieticians). It's not possible to dissect it right now.

21

I only dissected 21 'palpating with percussing body structure', because 210 and 211 represent the other dissections of the headclass.

22

no remarks

23

230 testing and measuring gingivae and parodontium can be splitted into 9 different dissections; I left it to three (because of lack of time); you know the idea of 9 dissections

I didn't split nor create 2300b and c; 2301b and c; 2303b and c; 2308b and c, etc

2323 (measuring and analysing DMF-index) and 2328 (measuring and analysing polish-facets) are too difficult to dissect

2330 is unexpandable by trying to dissect 'relation'

Suggestion:

MAIN assesment

 ACTS ON relation

 ACTS ON 1 mandibula

 ACTS ON 2 maxilla

It's not possible to do this at this moment

236 In scoping for dieticians 'food' is added as 'environmental factor' in a new group of descriptors; It's suitable here too.

2370 is unexpandable; I suggest another (impossible at this moment) dissection:

MAIN testing

 ACTS ON sample

 CONTAINS saliva

2371 and 2372 are better in this manner, too; possible they will be children of 237.

24

no remarks

conclusion:

Only four percent is unexpandable and nine percent cannot be dissected. This means that 13 percent of the classes give problems. Dissections of surgical procedures have approximately the same percentages. It can be concluded that it is

possible to dissect *procedures* of at least one allied health profession, oral hygiene. It can be expected that it's also possible for other allied health professions.

For oral hygiene many terms could be added to the category 'Oro dental System Anatomy'. For other professions, like physical therapy and exercise therapy the category 'Musculo Skeletal System Anatomy' is possibly very useful as will be the category 'Digestive System Anatomy' for dieticians. New categories should possibly be added to indicate e.g. participation items.

The model shows branches until a sixth level.

8.1.19 ANNEX 5d List of Dissected Procedures of the Draft Classification of Procedures for Oral Hygienists (chapter 2)

::Date: 1999-06-04
 ::Author: Karin
 ::Description:
 ::Generated by: Spet

20

RUBRIC "INSPECTEREN EN OBSERVEREN"
 AUTHOR "Karin"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "inspecting patient with observing patient"
 ENGLISH_RUBRIC "inspecting and observing"
 SOURCE "mondhyg" CODE "20A"
 MAIN inspecting
 ACTS_ON patient
 WITH Deed: observing
 ACTS_ON patient

RUBRIC "INSPECTEREN "
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "inspecting patient"
 ENGLISH_RUBRIC "inspecting patient"
 SOURCE "mondhyg" CODE "20B"
 MAIN inspecting
 ACTS_ON patient

RUBRIC "OBSERVEREN"
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "observing patient"
 ENGLISH_RUBRIC "observing patient"
 SOURCE "mondhyg" CODE "20C"
 MAIN Deed: observing
 ACTS_ON patient

RUBRIC "INSPECTEREN EN OBSERVEREN"
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "inspecting body part with observing body part"
 ENGLISH_RUBRIC "inspecting and observing"
 SOURCE "mondhyg" CODE "20D"
 MAIN inspecting

ACTS_ON body part
 WITH Deed: observing
 ACTS_ON body part

RUBRIC "INSPECTEREN "
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "inspecting body part"
 ENGLISH_RUBRIC "inspecting "
 SOURCE "mondhyg" CODE "20E"
 MAIN inspecting
 ACTS_ON body part

RUBRIC "OBSERVEREN"
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "observing body part"
 ENGLISH_RUBRIC "observing patient"
 SOURCE "mondhyg" CODE "20F"
 MAIN Deed: observing
 ACTS_ON body part

RUBRIC "Inspectoreren extraoraal"
 AUTHOR "Karin"
 HISTORY "19981208,Karin,0;"
 PARAPHRASE "inspecting oral region has approach extra-oral"
 ENGLISH_RUBRIC "extraoral inspection"
 SOURCE "mondhyg" CODE "200"
 MAIN inspecting
 ACTS_ON Anatomy: oral region
 HAS_APPROACH extra-oral

RUBRIC "Inspectoreren asymmetrieÛn"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "inspecting oral region has approach extra-oral to achieve investigating asymmetry is feature of oral region"
 ENGLISH_RUBRIC "inspecting asymmetry"
 SOURCE "mondhyg" CODE "2000"
 MAIN inspecting
 ACTS_ON Anatomy: oral region
 HAS_APPROACH extra-oral
 TO_ACHIEVE investigating
 ACTS_ON Feature: asymmetry
 IS_FEATURE_OF Anatomy: oral region

RUBRIC "Inspectoreren regionale lymfeklieren"

AUTHOR "Karin"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting lymphnode oral region has approach extra-oral"

ENGLISH_RUBRIC "inspecting regional lymphnodes"

SOURCE "mondhyg" CODE "2001"

MAIN inspecting

ACTS_ON lymphnode

HAS_LOCATION Anatomy: oral region

HAS_APPROACH extra-oral

RUBRIC "Inspecteren (mond)ademhaling"

AUTHOR "Karin"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting oral region has approach extra-oral to achieve investigating respiration"

ENGLISH_RUBRIC "Inspecting (oral) respiration"

SOURCE "mondhyg" CODE "2002"

MAIN inspecting

ACTS_ON Anatomy: oral region

HAS_APPROACH extra-oral

TO_ACHIEVE investigating

ACTS_ON BodyProcess: respiration

RUBRIC "Inspecteren lippen (buitenzijde)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting lip of oral region has approach extra-oral"

ENGLISH_RUBRIC "Inspecting lip (extra-oral)"

SOURCE "mondhyg" CODE "2003"

MAIN inspecting

ACTS_ON lip

IS_PART_OF Anatomy: oral region

HAS_APPROACH extra-oral

RUBRIC "Overig"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting other body part of oral region has approach extra-oral"

ENGLISH_RUBRIC "Other extra-oral inspection"

SOURCE "mondhyg" CODE "2008"

MAIN inspecting

ACTS_ON OTHER body part

IS_PART_OF Anatomy: oral region

HAS_APPROACH extra-oral

RUBRIC "Inspecteren intra oraal"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "inspecting oral region has approach transoral access"

ENGLISH_RUBRIC "Inspecting intra-oral"

SOURCE "mondhyg" CODE "201"

MAIN inspecting

ACTS_ON Anatomy: oral region

HAS_APPROACH transoral access

RUBRIC "Inspecteren intra-oraal met gebruik hulpmiddelen"

AUTHOR "Karin"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting oral region using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting intra-oral by means of device"

SOURCE "mondhyg" CODE "2010"

MAIN inspecting

ACTS_ON Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren van lippen (binnenzijde)"

AUTHOR "Karin"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting lip of intra-oral cavity using device"

ENGLISH_RUBRIC "Inspecting lip (internal) "

SOURCE "mondhyg" CODE "201000"

MAIN inspecting

ACTS_ON lip

IS_PART_OF Oro dentalSystemAnatomy: intra-oral cavity

BY_MEANS_OF device

RUBRIC "Inspecteren van slijmvliezen"

AUTHOR "Karin"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting mucosa of oral region using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting mucosa"

SOURCE "mondhyg" CODE "201001"

MAIN inspecting

ACTS_ON mucosa

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren van wang, omslagplooi"

AUTHOR "Karin"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting wrinkle of cheek of oral region using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting of plica of cheek"

SOURCE "mondhyg" CODE "201002"

MAIN inspecting

ACTS_ON wrinkle

IS_PART_OF cheek

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren van tong"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981208,Karin,0;"

PARAPHRASE "inspecting tongue of oral region using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting tongue"

SOURCE "mondhyg" CODE "201003"

MAIN inspecting

ACTS_ON tongue

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren van tonsillen"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981214,Karin,0;"

PARAPHRASE "inspecting tonsil of pharynx using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting tonsils"

SOURCE "mondhyg" CODE "201004a"

MAIN inspecting

ACTS_ON tonsil

IS_PART_OF pharynx

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren van pharynx"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990519,Karin,0;"

PARAPHRASE "inspecting pharynx using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting pharynx"

SOURCE "mondhyg" CODE "201004b"

MAIN inspecting

ACTS_ON pharynx

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren en observeren van speeksel / speekselklieren"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981214,Karin,0;"

PARAPHRASE "inspecting saliva using device has approach transoral access with observing saliva using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting and observing salivary gland and saliva"

SOURCE "mondhyg" CODE "201005a"

MAIN inspecting

ACTS_ON BodySubstance: saliva
 BY_MEANS_OF device
 HAS_APPROACH transoral access

WITH Deed: observing

ACTS_ON BodySubstance: saliva
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "Inspecteren van speeksel / speekselklieren"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990519,Karin,0;"

PARAPHRASE "inspecting saliva using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting salivary gland and saliva"

SOURCE "mondhyg" CODE "201005b"

MAIN inspecting

ACTS_ON BodySubstance: saliva
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "observeren van speeksel / speekselklieren"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990519,Karin,0;"

PARAPHRASE "observing saliva using device has approach transoral access"

ENGLISH_RUBRIC "observing salivary gland and saliva"

SOURCE "mondhyg" CODE "201005c"

MAIN Deed: observing

ACTS_ON BodySubstance: saliva
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "Inspecteren en observeren van speeksel / speekselklieren"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "inspecting salivary gland of oral region using device has approach transoral access with observing salivary gland of oral region using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting and observing salivary gland and saliva"

SOURCE "mondhyg" CODE "201005d"

MAIN inspecting

ACTS_ON salivary gland
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

WITH Deed: observing

ACTS_ON salivary gland
 IS_PART_OF Anatomy: oral region

BY_MEANS_OF device
HAS_APPROACH transoral access

RUBRIC "Inspecteren van speeksel / speekselklieren"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990602,Karin,0;"
PARAPHRASE "inspecting salivary gland of oral region using device has approach transoral access"
ENGLISH_RUBRIC "Inspecting salivary gland and saliva"
SOURCE "mondhyg" CODE "201005e"
MAIN inspecting
 ACTS_ON salivary gland
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "observeren van speeksel / speekselklieren"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990602,Karin,0;"
PARAPHRASE "observing salivary gland of oral region using device has approach transoral access"
ENGLISH_RUBRIC "observing salivary gland and saliva"
SOURCE "mondhyg" CODE "201005f"
MAIN Deed: observing
 ACTS_ON salivary gland
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "Inspecteren van frenulum"
AUTHOR "Karin"
HISTORY "19981214,Karin,0;"
PARAPHRASE "inspecting frenulum of oral region using device has approach transoral access"
ENGLISH_RUBRIC "inspecting frenulum"
SOURCE "mondhyg" CODE "201006"
MAIN inspecting
 ACTS_ON frenulum
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "Inspecteren van palatum"
AUTHOR "Karin"
HISTORY "19981214,Karin,0;"
PARAPHRASE "inspecting palate of oral region using device has approach transoral access"
ENGLISH_RUBRIC "inspecting palatum"
SOURCE "mondhyg" CODE "201007"
MAIN inspecting
 ACTS_ON palate

IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "Inspecteren van mondbodem"
 AUTHOR "Karin"
 HISTORY "19981214,Karin,0;"
 PARAPHRASE "inspecting bottom of mouth of oral region using device has approach transoral access"
 ENGLISH_RUBRIC "Inspecting bottom of mouth"
 SOURCE "mondhyg" CODE "201008"
 MAIN inspecting
 ACTS_ON Oro dentalSystemAnatomy: bottom of mouth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "Inspecteren en observeren van gingiva"
 AUTHOR "Karin"
 HISTORY "19981214,Karin,0;"
 PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access with observing gingiva of oral region using device has approach transoral access"
 ENGLISH_RUBRIC "Inspecting and observing gingiva"
 SOURCE "mondhyg" CODE "201009a"
 MAIN inspecting
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

WITH Deed: observing
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "(Inspecteren van gingiva) KLEUR"
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region"
 ENGLISH_RUBRIC "(Inspecting gingiva) COLOR"
 SOURCE "mondhyg" CODE "2010090b"
 MAIN inspecting
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON disorder
 HAS_LOCATION gingivae
 HAS_FEATURE Feature: color
 IS_PART_OF Anatomy: oral region

RUBRIC "observeren van gingiva"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "observing gingiva of oral region using device has approach transoral access"

ENGLISH_RUBRIC "observing gingiva"

SOURCE "mondhyg" CODE "201009c"

MAIN Deed: observing

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "(Inspectoren en observeren van gingiva) KLEUR"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region"

ENGLISH_RUBRIC "(Inspecting and observing gingiva) COLOR"

SOURCE "mondhyg" CODE "2010090a"

MAIN inspecting

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON disorder

HAS_LOCATION gingivae

HAS_FEATURE Feature: color

IS_PART_OF Anatomy: oral region

WITH Deed: observing

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON disorder

HAS_LOCATION gingivae

HAS_FEATURE Feature: color

IS_PART_OF Anatomy: oral region

RUBRIC "(observeren van gingiva) KLEUR"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting disorder gingivae color of oral region"

ENGLISH_RUBRIC "(observing gingiva) COLOR"

SOURCE "mondhyg" CODE "2010090c"

MAIN Deed: observing

ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON disorder
 HAS_LOCATION gingivae
 HAS_FEATURE Feature: color
 IS_PART_OF Anatomy: oral region

RUBRIC "(Inspecteren en observeren van gingiva) ZWELLING"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region"

ENGLISH_RUBRIC "(Inspecting and observing gingiva) SWELLING"

SOURCE "mondhyg" CODE "2010091a"

MAIN inspecting

 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON swelling
 ACTS_ON gingivae
 IS_PART_OF Anatomy: oral region

WITH Deed: observing

 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON swelling
 ACTS_ON gingivae
 IS_PART_OF Anatomy: oral region

RUBRIC "(inspecteren van gingiva) ZWELLING"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region"

ENGLISH_RUBRIC "(inspecting gingiva) SWELLING"

SOURCE "mondhyg" CODE "2010091b"

MAIN inspecting

 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device

HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON swelling
 ACTS_ON gingivae
 IS_PART_OF Anatomy: oral region

RUBRIC "(observeren van gingiva) ZWELLING"
 AUTHOR "Karin"
 HISTORY "19990519,Karin,0;"
 PARAPHRASE "observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting swelling gingivae of oral region"
 ENGLISH_RUBRIC "(observing gingiva) SWELLING"
 SOURCE "mondhyg" CODE "2010091c"

MAIN Deed: observing
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON swelling
 ACTS_ON gingivae
 IS_PART_OF Anatomy: oral region

RUBRIC "(Inspecteren en observeren van gingiva [op] AANWEZIGHEID VAN AANDOENINGEN)"
 AUTHOR "Karin"
 HISTORY "19990521,Karin,0;"
 PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region with observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region"
 ENGLISH_RUBRIC "(Inspecting and observing gingiva) presentation of impairments"
 SOURCE "mondhyg" CODE "2010092a"

MAIN inspecting
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON Pathology: impairment
 HAS_LOCATION gingiva
 IS_PART_OF Anatomy: oral region

WITH Deed: observing
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting

ACTS_ON Pathology: impairment
 HAS_LOCATION gingiva
 IS_PART_OF Anatomy: oral region

RUBRIC "(Inspecteren van gingiva [op] AANWEZIGHEID VAN AANDOENINGEN"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region"

ENGLISH_RUBRIC "(Inspecting gingiva) presentation of impairments"

SOURCE "mondhyg" CODE "2010092b"

MAIN inspecting

ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON Pathology: impairment
 HAS_LOCATION gingiva
 IS_PART_OF Anatomy: oral region

RUBRIC "(observeren van gingiva [op] AANWEZIGHEID VAN AANDOENINGEN"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "observing gingiva of oral region using device has approach transoral access to achieve checking - action presenting impairment gingiva of oral region"

ENGLISH_RUBRIC "(observing gingiva) presentation of impairments"

SOURCE "mondhyg" CODE "2010092c"

MAIN Deed: observing

ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON Pathology: impairment
 HAS_LOCATION gingiva
 IS_PART_OF Anatomy: oral region

RUBRIC "(Inspecteren en observeren van gingiva) lachlijn"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action wrinkle smiling with observing gingiva of oral region using device has approach transoral access to achieve checking - action wrinkle smiling"

ENGLISH_RUBRIC "(Inspecting and observing gingiva) smiling line"

SOURCE "mondhyg" CODE "2010093a"

MAIN inspecting

ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON wrinkle
 CAUSED_BY Deed: smiling
 WITH Deed: observing
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON wrinkle
 CAUSED_BY Deed: smiling

RUBRIC "(Inspecteren van gingiva) lachlijn"
 AUTHOR "Karin"
 HISTORY "19990521,Karin,0;"
 PARAPHRASE "inspecting gingiva of oral region using device has approach transoral access to achieve checking - action smiling"
 ENGLISH_RUBRIC "(Inspecting gingiva) smiling line"
 SOURCE "mondhyg" CODE "2010093b"
 MAIN inspecting
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON Deed: smiling

RUBRIC "(observeren van gingiva) lachlijn"
 AUTHOR "Karin"
 HISTORY "19990521,Karin,0;"
 PARAPHRASE "observing gingiva of oral region using device has approach transoral access to achieve checking - action smiling"
 ENGLISH_RUBRIC "(observing gingiva) smiling line"
 SOURCE "mondhyg" CODE "2010093c"
 MAIN Deed: observing
 ACTS_ON gingiva
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON Deed: smiling

RUBRIC "OVERIG (Inspecteren en observeren van gingiva) "
 AUTHOR "Karin"
 HISTORY "19990521,Karin,0;"
 PARAPHRASE "other inspecting gingiva of oral region using device has approach transoral access with observing gingiva of oral region using device has approach transoral access"
 ENGLISH_RUBRIC "OTHER (Inspecting and observing gingiva) "

SOURCE "mondhyg" CODE "2010098a"

MAIN OTHER inspecting

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

WITH OTHER Deed: observing

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "OVERIG (Inspecteren van gingiva)"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "other inspecting gingiva of oral region using device has approach transoral access"

ENGLISH_RUBRIC "OTHER (Inspecting gingiva)"

SOURCE "mondhyg" CODE "2010098b"

MAIN OTHER inspecting

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "OVERIG (observeren van gingiva) "

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "other observing gingiva of oral region using device has approach transoral access"

ENGLISH_RUBRIC "OTHER (observing gingiva) "

SOURCE "mondhyg" CODE "2010098c"

MAIN OTHER Deed: observing

ACTS_ON gingiva

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren en observeren van gebitselementen"

AUTHOR "Karin"

HISTORY "19981214,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access with observing set of teeth of oral region using device has approach transoral access"

ENGLISH_RUBRIC "Inspecting and observing (set of) teeth"

SOURCE "mondhyg" CODE "201010a"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

WITH Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region
BY_MEANS_OF device
HAS_APPROACH transoral access

RUBRIC "Inspecteren van gebitselementen"
AUTHOR "Karin"
HISTORY "19990519,Karin,0;"
PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access"
ENGLISH_RUBRIC "Inspecting (set of) teeth"
SOURCE "mondhyg" CODE "201010b"
MAIN inspecting
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "observeren van gebitselementen"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990519,Karin,0;"
PARAPHRASE "observing set of teeth of oral region using device has approach transoral access"
ENGLISH_RUBRIC "observing (set of) teeth"
SOURCE "mondhyg" CODE "201010c"
MAIN Deed: observing
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "(Inspecteren en observeren van) stand van gebitselementen"
AUTHOR "Karin"
STATUS "10000"
HISTORY "19990521,Karin,0;"
PARAPHRASE "inspecting set of teeth position of oral region using device has approach transoral access with observing set of teeth position of oral region using device has approach transoral access"
ENGLISH_RUBRIC "(Inspecting and observing) of position of set of teeth"
SOURCE "mondhyg" CODE "2010100a"
MAIN inspecting
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 HAS_FEATURE Position: position
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
WITH Deed: observing
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 HAS_FEATURE Position: position
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access

RUBRIC "(Inspecteren van) stand van gebitselementen"

AUTHOR "Karin"

STATUS "10000"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth position of oral region using device has approach transoral access"

ENGLISH_RUBRIC "(Inspecting of) position of set of teeth"

SOURCE "mondhyg" CODE "2010100b"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

HAS_FEATURE Position: position

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "(Observeren van) stand van gebitselementen"

AUTHOR "Karin"

STATUS "10000"

HISTORY "19990521,Karin,0;"

PARAPHRASE "observing set of teeth position of oral region using device has approach transoral access"

ENGLISH_RUBRIC "(Observing of) position of set of teeth"

SOURCE "mondhyg" CODE "2010100c"

MAIN Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

HAS_FEATURE Position: position

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "(Inspecteren en observeren van gebitselementen op) aanwezige restauraties"

AUTHOR "Karin"

STATUS "10000"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action
presence restoring with observing set of teeth of oral region using device has approach transoral access to achieve checking - action
presence restoring"

ENGLISH_RUBRIC "(Inspecting and observing (set of) teeth on) presentating restorations"

SOURCE "mondhyg" CODE "2010101a"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON restoring

HAS_EXTENT presence

WITH Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON restoring
HAS_EXTENT presence
RUBRIC "(Inspecteren van gebitselementen op) aanwezige restauraties"
AUTHOR "Karin"
STATUS "10000"
HISTORY "19990521,Karin,0;"
PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presence restoring"
ENGLISH_RUBRIC "(Inspecting (set of) teeth on) presentating restorations"
SOURCE "mondhyg" CODE "2010101b"
MAIN inspecting
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON restoring
 HAS_EXTENT presence

RUBRIC "(observeren van gebitselementen op) aanwezige restauraties"
AUTHOR "Karin"
STATUS "10000"
HISTORY "19990521,Karin,0;"
PARAPHRASE "observing set of teeth of oral region using device has approach transoral access to achieve checking - action presence restoring"
ENGLISH_RUBRIC "(observing (set of) teeth on) presentating restorations"
SOURCE "mondhyg" CODE "2010101c"
MAIN Deed: observing
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON restoring
 HAS_EXTENT presence

RUBRIC "(Inspecteren en observeren van gebitselementen op) aanwezigheid caries"
AUTHOR "Karin"
HISTORY "19990521,Karin,0;"
PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries"
ENGLISH_RUBRIC "(Inspecting and observing (set of) teeth on) presentation caries"
SOURCE "mondhyg" CODE "2010102a"
MAIN inspecting
 ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting

ACTS_ON Pathology: caries

WITH Deed: observing

ACTS_ON OrodentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON Pathology: caries

RUBRIC "(Inspecteren van gebitselementen op) aanwezigheid caries"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries"

ENGLISH_RUBRIC "(Inspecting (set of) teeth on) presentation caries"

SOURCE "mondhyg" CODE "2010102b"

MAIN inspecting

ACTS_ON OrodentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON Pathology: caries

RUBRIC "(observeren van gebitselementen op) aanwezigheid caries"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting caries"

ENGLISH_RUBRIC "(observing (set of) teeth on) presentation caries"

SOURCE "mondhyg" CODE "2010102c"

MAIN Deed: observing

ACTS_ON OrodentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON Pathology: caries

RUBRIC "(Inspecteren en observeren van gebitselementen op) aanwezigheid partiele prothese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial"

ENGLISH_RUBRIC "(Inspecting and observing (set of) teeth on) presentation partial prosthesis"

SOURCE "mondhyg" CODE "2010103a"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON prosthetic implant
 HAS_FEATURE partial

WITH Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON prosthetic implant
 HAS_FEATURE partial

RUBRIC "(Inspecteren van gebitselementen op) aanwezigheid partiele prothese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial"

ENGLISH_RUBRIC "(Inspecting (set of) teeth on) presentation partial prosthesis"

SOURCE "mondhyg" CODE "2010103b"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON prosthetic implant
 HAS_FEATURE partial

RUBRIC "(observeren van gebitselementen op) aanwezigheid partiele prothese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting prosthetic implant partial"

ENGLISH_RUBRIC "(observing (set of) teeth on) presentation partial prosthesis"

SOURCE "mondhyg" CODE "2010103c"

MAIN Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth
 IS_PART_OF Anatomy: oral region
 BY_MEANS_OF device
 HAS_APPROACH transoral access
 TO_ACHIEVE checking - action
 ACTS_ON presenting
 ACTS_ON prosthetic implant

HAS_FEATURE partial

RUBRIC "(Inspector en observeren van gebitselementen op) aanwezigheid frame prothese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis with observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis"

ENGLISH_RUBRIC "(Inspecting and observing (set of) teeth on) presentation frame prosthesis"

SOURCE "mondhyg" CODE "2010103d"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON Prosthesis: frame prosthesis

WITH Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON Prosthesis: frame prosthesis

RUBRIC "(Inspector van gebitselementen op) aanwezigheid frame prothese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis"

ENGLISH_RUBRIC "(Inspecting (set of) teeth on) presentation frame prosthesis"

SOURCE "mondhyg" CODE "2010103e"

MAIN inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON Prosthesis: frame prosthesis

RUBRIC "(observeren van gebitselementen op) aanwezigheid frame prothese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting frame prosthesis"

ENGLISH_RUBRIC "(observing (set of) teeth on) presentation frame prosthesis"

SOURCE "mondhyg" CODE "2010103f"

MAIN Deed: observing

ACTS_ON OrodentalSystemAnatomy: set of teeth
IS_PART_OF Anatomy: oral region
BY_MEANS_OF device
HAS_APPROACH transoral access
TO_ACHIEVE checking - action
ACTS_ON presenting
ACTS_ON Prosthesis: frame prosthesis

RUBRIC "(Inspecteren en observeren van gebitselementen op) aanwezigheid implantaten"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action
presenting implant with observing set of teeth of oral region using device has approach transoral access to achieve checking - action
presenting implant"

ENGLISH_RUBRIC "(Inspecting and observing (set of) teeth on) presentation implants"

SOURCE "mondhyg" CODE "2010104a"

MAIN inspecting

ACTS_ON OrodentalSystemAnatomy: set of teeth
IS_PART_OF Anatomy: oral region
BY_MEANS_OF device
HAS_APPROACH transoral access
TO_ACHIEVE checking - action
ACTS_ON presenting
ACTS_ON implant

WITH Deed: observing

ACTS_ON OrodentalSystemAnatomy: set of teeth
IS_PART_OF Anatomy: oral region
BY_MEANS_OF device
HAS_APPROACH transoral access
TO_ACHIEVE checking - action
ACTS_ON presenting
ACTS_ON implant

RUBRIC "(Inspecteren van gebitselementen op) aanwezigheid implantaten"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "inspecting set of teeth of oral region using device has approach transoral access to achieve checking - action
presenting implant"

ENGLISH_RUBRIC "(Inspecting (set of) teeth on) presentation implants"

SOURCE "mondhyg" CODE "2010104b"

MAIN inspecting

ACTS_ON OrodentalSystemAnatomy: set of teeth
IS_PART_OF Anatomy: oral region
BY_MEANS_OF device
HAS_APPROACH transoral access
TO_ACHIEVE checking - action
ACTS_ON presenting
ACTS_ON implant

RUBRIC "(observeren van gebitselementen op) aanwezigheid implantaten"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "observing set of teeth of oral region using device has approach transoral access to achieve checking - action presenting implant"

ENGLISH_RUBRIC "(observing (set of) teeth on) presentation implants"

SOURCE "mondhyg" CODE "2010104c"

MAIN Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

TO_ACHIEVE checking - action

ACTS_ON presenting

ACTS_ON implant

RUBRIC "OVERIG (Inspecteren en observeren van gebitselementen)"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "other inspecting set of teeth of oral region using device has approach transoral access with observing set of teeth of oral region using device has approach transoral access"

ENGLISH_RUBRIC "OTHER (Inspecting and observing (set of) teeth)"

SOURCE "mondhyg" CODE "2010108a"

MAIN OTHER inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

WITH OTHER Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "OVERIG (Inspecteren van gebitselementen)"

AUTHOR "Karin"

HISTORY "19990521,Karin,0;"

PARAPHRASE "other inspecting set of teeth of oral region using device has approach transoral access"

ENGLISH_RUBRIC "OTHER (Inspecting (set of) teeth)"

SOURCE "mondhyg" CODE "2010108b"

MAIN OTHER inspecting

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "OVERIG (observeren van gebitselementen)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990521,Karin,0;"

PARAPHRASE "other observing set of teeth of oral region using device has approach transoral access"

ENGLISH_RUBRIC "OTHER (observing (set of) teeth)"

SOURCE "mondhyg" CODE "2010108c"

MAIN OTHER Deed: observing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

IS_PART_OF Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren occlusie"

AUTHOR "Karin"

HISTORY "19981215,Karin,0;"

PARAPHRASE "inspecting occlusion oral region using device has approach transoral access"

ENGLISH_RUBRIC "inspecting occlusion"

SOURCE "mondhyg" CODE "201011"

MAIN inspecting

ACTS_ON occlusion

ACTS_ON Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Overig (inspecteren intra-oraal met gebruik hulpmiddelen)"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "other inspecting oral region using device has approach transoral access"

ENGLISH_RUBRIC "Other (inspecting intra-oral by means of device)"

SOURCE "mondhyg" CODE "201018"

MAIN OTHER inspecting

ACTS_ON Anatomy: oral region

BY_MEANS_OF device

HAS_APPROACH transoral access

RUBRIC "Inspecteren intra oraal door middel van kleuring"

AUTHOR "Karin"

HISTORY "19981215,Karin,0;"

PARAPHRASE "inspecting oral region using colouring oral region has approach transoral access"

ENGLISH_RUBRIC "Inspecting intra-oral by means of colouring"

SOURCE "mondhyg" CODE "2011"

MAIN inspecting

ACTS_ON Anatomy: oral region

BY_MEANS_OF Deed: colouring

ACTS_ON Anatomy: oral region

HAS_APPROACH transoral access

RUBRIC "Inspecteren voorkomen van plaque na plaquekleuring"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "inspecting oral region using colouring plaque oral region has approach transoral access to achieve presenting plaque oral region"

ENGLISH_RUBRIC "Inspecting presentation of plaque after plaque-colouring"

SOURCE "mondhyg" CODE "20110"

MAIN inspecting

ACTS_ON Anatomy: oral region

BY_MEANS_OF Deed: colouring

ACTS_ON Pathology: plaque

HAS_LOCATION Anatomy: oral region

HAS_APPROACH transoral access

TO_ACHIEVE presenting

ACTS_ON Pathology: plaque

HAS_LOCATION Anatomy: oral region

RUBRIC "OVERIG (Inspecteren intra oraal door middel van kleuring)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other inspecting oral region using colouring oral region has approach transoral access"

ENGLISH_RUBRIC "OTHER (Inspecting intra-oral by means of colouring)"

SOURCE "mondhyg" CODE "20118"

MAIN OTHER inspecting

ACTS_ON Anatomy: oral region

BY_MEANS_OF Deed: colouring

ACTS_ON Anatomy: oral region

HAS_APPROACH transoral access

RUBRIC "OVERIG (Inspecteren intra oraal)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other inspecting oral region has approach transoral access"

ENGLISH_RUBRIC "OTHER (Inspecting intra-oral)"

SOURCE "mondhyg" CODE "2018"

MAIN OTHER inspecting

ACTS_ON Anatomy: oral region

HAS_APPROACH transoral access

RUBRIC "Observeren van psychische functies"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "observing psychological functions"

ENGLISH_RUBRIC "Observing psychological functions"

SOURCE "mondhyg" CODE "202"

MAIN Deed: observing

ACTS_ON BodyProcess: psychological functions

RUBRIC "OVERIG (INSPECTEREN EN OBSERVEREN)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other inspecting patient with observing patient"

ENGLISH_RUBRIC "OTHER (inspecting and observing)"

SOURCE "mondhyg" CODE "208A"

MAIN OTHER inspecting

ACTS_ON patient

WITH OTHER Deed: observing

ACTS_ON patient

RUBRIC "OVERIG (INSPECTEREN)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other inspecting patient"

ENGLISH_RUBRIC "OTHER (inspecting patient)"

SOURCE "mondhyg" CODE "208B"

MAIN OTHER inspecting

ACTS_ON patient

RUBRIC "OVERIG (OBSERVEREN)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other observing patient"

ENGLISH_RUBRIC "OTHER (observing patient)"

SOURCE "mondhyg" CODE "208C"

MAIN OTHER Deed: observing

ACTS_ON patient

RUBRIC "OVERIG (INSPECTEREN EN OBSERVEREN)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other inspecting body part with observing body part"

ENGLISH_RUBRIC "OTHER (inspecting and observing)"

SOURCE "mondhyg" CODE "208D"

MAIN OTHER inspecting

ACTS_ON body part

WITH OTHER Deed: observing

ACTS_ON body part

RUBRIC "OVERIG (INSPECTEREN)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other inspecting body part"

ENGLISH_RUBRIC "OTHER (inspecting)"

SOURCE "mondhyg" CODE "208E"

MAIN OTHER inspecting

ACTS_ON body part

RUBRIC "OVERIG (OBSERVEREN)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other observing body part"

ENGLISH_RUBRIC "OTHER (observing patient)"

SOURCE "mondhyg" CODE "208F"

MAIN OTHER Deed: observing

ACTS_ON body part

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RUBRIC "PALPEREN, PERCUTEREN"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "palpate - action body structure with percuss body structure"

ENGLISH_RUBRIC "palpating, percussing"

SOURCE "mondhyg" CODE "21"

MAIN Deed: palpate - action

ACTS_ON body structure

WITH Deed: percuss

ACTS_ON body structure

RUBRIC "Palperen"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981216,Karin,0;"

PARAPHRASE "palpate - action body structure"

ENGLISH_RUBRIC "palpating"

SOURCE "mondhyg" CODE "210"

MAIN Deed: palpate - action

ACTS_ON body structure

RUBRIC "Palperen van regionale lymfeklieren"

AUTHOR "Karin"

HISTORY "19981216,Karin,0;"

PARAPHRASE "palpate - action lymph node structure region of jaw neck"

ENGLISH_RUBRIC "Palpate regional lymph nodes"

SOURCE "mondhyg" CODE "2100"

MAIN Deed: palpate - action

ACTS_ON lymph node structure

HAS_LOCATION region

IS_PART_OF jaw / neck

RUBRIC "Palperen van speekselklieren"

AUTHOR "Karin"

HISTORY "19981216,Karin,0;"

PARAPHRASE "palpate - action salivary gland"

ENGLISH_RUBRIC "Palpate salivary glands"

SOURCE "mondhyg" CODE "2101"

MAIN Deed: palpate - action

ACTS_ON salivary gland

RUBRIC "Palperen van lippen"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "palpate - action lip"

ENGLISH_RUBRIC "Palpate lips"

SOURCE "mondhyg" CODE "2102"

MAIN Deed: palpate - action

ACTS_ON lip

RUBRIC "Palperen van kaakgewricht"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981216,Karin,0;"

PARAPHRASE "palpate - action articulatio temporomandibularis"

ENGLISH_RUBRIC "Palpate joint of jaw"

SOURCE "mondhyg" CODE "2103"

MAIN Deed: palpate - action

ACTS_ON Joint: articulatio temporomandibularis

RUBRIC "Overig (palperen)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19981216,Karin,0;"

PARAPHRASE "palpate - action other body structure"

ENGLISH_RUBRIC "Other (palpating)"

SOURCE "mondhyg" CODE "2108"

MAIN Deed: palpate - action

ACTS_ON OTHER body structure

RUBRIC "Percuteren"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990126,Karin,0;"

PARAPHRASE "percuss body structure"

ENGLISH_RUBRIC "percussing"

SOURCE "mondhyg" CODE "211"

MAIN Deed: percuss

ACTS_ON body structure

RUBRIC "Percuteren van gebitselementen"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "percuss tooth of oral region"

ENGLISH_RUBRIC "percuss of dental elements"

SOURCE "mondhyg" CODE "2110"

MAIN Deed: percuss

ACTS_ON tooth

IS_PART_OF Anatomy: oral region

RUBRIC "Percuteren van implantaten"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "percuss implant of oral region"

ENGLISH_RUBRIC "percuss of implants"

SOURCE "mondhyg" CODE "2111"

MAIN Deed: percuss

ACTS_ON implant

IS_PART_OF Anatomy: oral region

RUBRIC "Overig (Percuteren)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "percuss other body structure"

ENGLISH_RUBRIC "Other (percuss)"

SOURCE "mondhyg" CODE "2118"

MAIN Deed: percuss

ACTS_ON OTHER body structure

RUBRIC "OVERIG (PALPEREN, PERCUTEREN)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other palpate - action body structure with percuss body structure"

ENGLISH_RUBRIC "OTHER (palpate, percuss)"

SOURCE "mondhyg" CODE "218A"

MAIN OTHER Deed: palpate - action

ACTS_ON body structure

WITH OTHER Deed: percuss

ACTS_ON body structure

RUBRIC "OVERIG (PALPEREN)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other palpate - action body structure"

ENGLISH_RUBRIC "OTHER (palpate)"

SOURCE "mondhyg" CODE "218B"

MAIN OTHER Deed: palpate - action

ACTS_ON body structure

RUBRIC "OVERIG (PERCUTEREN)"

AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "other percuss body structure"
 ENGLISH_RUBRIC "OTHER (percussing)"
 SOURCE "mondhyg" CODE "218C"
 MAIN OTHER Deed: percuss
 ACTS_ON body structure

22

RUBRIC "Nemen van monsters ten behoeve van bacterieel onderzoek"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "sampling - action structure to achieve bacteriology testing"
 ENGLISH_RUBRIC "Taking plaque samples to achieve bacteriology testing"
 SOURCE "mondhyg" CODE "22a"
 MAIN sampling - action
 ACTS_ON structure
 TO_ACHIEVE bacteriology testing

RUBRIC "Nemen van monsters ten behoeve van bacterieel onderzoek"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990604,Karin,0;"
 PARAPHRASE "sampling - action substance to achieve bacteriology testing"
 ENGLISH_RUBRIC "Taking plaque samples to achieve bacteriology testing"
 SOURCE "mondhyg" CODE "22b"
 MAIN sampling - action
 ACTS_ON substance
 TO_ACHIEVE bacteriology testing

RUBRIC "Nemen van plaque monsters"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990126,Karin,0;"
 PARAPHRASE "sampling - action plaque oral region to achieve bacteriology testing"
 ENGLISH_RUBRIC "Taking plaque samples"
 SOURCE "mondhyg" CODE "220"
 MAIN sampling - action
 ACTS_ON Pathology: plaque
 HAS_LOCATION Anatomy: oral region
 TO_ACHIEVE bacteriology testing

RUBRIC "Nemen van speeksel/mondvloeistof monsters ten behoeve van bacterieel onderzoek"
 AUTHOR "Karin"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "sampling - action saliva to achieve bacteriology testing"
 ENGLISH_RUBRIC "Taking saliva/oral fluid samples to achieve bacteriology testing"

SOURCE "mondhyg" CODE "221"

MAIN sampling - action

ACTS_ON BodySubstance: saliva

TO_ACHIEVE bacteriology testing

RUBRIC "OVERIG Nemen van monsters ten behoeve van bacterieel onderzoek"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990604,Karin,0;"

PARAPHRASE "other sampling - action structure to achieve bacteriology testing"

ENGLISH_RUBRIC "OTHER Taking plaque samples to achieve bacteriology testing"

SOURCE "mondhyg" CODE "228a"

MAIN OTHER sampling - action

ACTS_ON structure

TO_ACHIEVE bacteriology testing

RUBRIC "OVERIG Nemen van monsters ten behoeve van bacterieel onderzoek"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990604,Karin,0;"

PARAPHRASE "other sampling - action substance to achieve bacteriology testing"

ENGLISH_RUBRIC "OTHER Taking plaque samples to achieve bacteriology testing"

SOURCE "mondhyg" CODE "228b"

MAIN OTHER sampling - action

ACTS_ON substance

TO_ACHIEVE bacteriology testing

23

RUBRIC "TESTEN, METEN EN ANALYSEREN (en vastleggen)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990531,Karin,0;"

PARAPHRASE "testing process patient with measuring process patient with analyzing process patient with reporting process patient"

ENGLISH_RUBRIC "testing, analyzing, measuring (and reporting)"

SOURCE "mondhyg" CODE "23A"

MAIN testing

ACTS_ON process

ACTS_ON patient

WITH measuring

ACTS_ON process

ACTS_ON patient

WITH analyzing

ACTS_ON process

ACTS_ON patient

WITH Deed: reporting

ACTS_ON process

ACTS_ON patient

RUBRIC "TESTEN"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "testing process patient"

ENGLISH_RUBRIC "testing"

SOURCE "mondhyg" CODE "23B"

MAIN testing

ACTS_ON process

ACTS_ON patient

RUBRIC "METEN"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "measuring process patient"

ENGLISH_RUBRIC "measuring"

SOURCE "mondhyg" CODE "23C"

MAIN measuring

ACTS_ON process

ACTS_ON patient

RUBRIC "ANALYSEREN"

AUTHOR "Karin"

HISTORY "19990519,Karin,0;"

PARAPHRASE "analyzing process patient"

ENGLISH_RUBRIC "analysing"

SOURCE "mondhyg" CODE "23D"

MAIN analyzing

ACTS_ON process

ACTS_ON patient

RUBRIC "VASTLEGGEN"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990519,Karin,0;"

PARAPHRASE "reporting process patient"

ENGLISH_RUBRIC "reporting"
 SOURCE "mondhyg" CODE "23E"
 MAIN Deed: reporting
 ACTS_ON process
 ACTS_ON patient

RUBRIC "METEN EN ANALYSEREN "
 AUTHOR "Karin"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "measuring process patient with analyzing process patient"
 ENGLISH_RUBRIC "measuring and analysing"
 SOURCE "mondhyg" CODE "23F"
 MAIN measuring
 ACTS_ON process
 ACTS_ON patient
 WITH analyzing
 ACTS_ON process
 ACTS_ON patient

RUBRIC "TESTEN, METEN EN ANALYSEREN "
 AUTHOR "Karin"
 HISTORY "19990126,Karin,0;"
 PARAPHRASE "testing process patient with measuring process patient with analyzing process patient"
 ENGLISH_RUBRIC "testing, analyzing, measuring "
 SOURCE "mondhyg" CODE "23G"
 MAIN testing
 ACTS_ON process
 ACTS_ON patient
 WITH measuring
 ACTS_ON process
 ACTS_ON patient
 WITH analyzing
 ACTS_ON process
 ACTS_ON patient

RUBRIC "TESTEN, METEN EN ANALYSEREN (en vastleggen)"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990603,Karin,0;"
 PARAPHRASE "testing process body part with measuring process body part with analyzing process body part with reporting process body part"
 ENGLISH_RUBRIC "testing, analyzing, measuring (and reporting)"
 SOURCE "mondhyg" CODE "23H"
 MAIN testing
 ACTS_ON process
 ACTS_ON body part
 WITH measuring
 ACTS_ON process
 ACTS_ON body part
 WITH analyzing

ACTS_ON process
 ACTS_ON body part
WITH Deed: reporting
 ACTS_ON process
 ACTS_ON body part

RUBRIC "TESTEN"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990603,Karin,0;"
PARAPHRASE "testing process body part"
ENGLISH_RUBRIC "testing"
SOURCE "mondhyg" CODE "23I"
MAIN testing
 ACTS_ON process
 ACTS_ON body part

RUBRIC "METEN"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990603,Karin,0;"
PARAPHRASE "measuring process body part"
ENGLISH_RUBRIC "measuring"
SOURCE "mondhyg" CODE "23J"
MAIN measuring
 ACTS_ON process
 ACTS_ON body part

RUBRIC "ANALYSEREN"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990603,Karin,0;"
PARAPHRASE "analyzing process body part"
ENGLISH_RUBRIC "analysing"
SOURCE "mondhyg" CODE "23K"
MAIN analyzing
 ACTS_ON process
 ACTS_ON body part

RUBRIC "VASTLEGGEN"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990603,Karin,0;"
PARAPHRASE "reporting process body part"
ENGLISH_RUBRIC "reporting"
SOURCE "mondhyg" CODE "23L"
MAIN Deed: reporting
 ACTS_ON process
 ACTS_ON body part

RUBRIC "METEN EN ANALYSEREN "

AUTHOR "Karin"

STATUS "0"

HISTORY "19990603,Karin,0;"

PARAPHRASE "measuring process body part with analyzing process body part"

ENGLISH_RUBRIC "measuring and analysing"

SOURCE "mondhyg" CODE "23M"

MAIN measuring

ACTS_ON process

ACTS_ON body part

WITH analyzing

ACTS_ON process

ACTS_ON body part

RUBRIC "TESTEN, METEN EN ANALYSEREN "

AUTHOR "Karin"

STATUS "0"

HISTORY "19990603,Karin,0;"

PARAPHRASE "testing process body part with measuring process body part with analyzing process body part"

ENGLISH_RUBRIC "testing, analyzing, measuring "

SOURCE "mondhyg" CODE "23N"

MAIN testing

ACTS_ON process

ACTS_ON body part

WITH measuring

ACTS_ON process

ACTS_ON body part

WITH analyzing

ACTS_ON process

ACTS_ON body part

RUBRIC "Meten en analyseren van afzettingen op elementen"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring depositing set of teeth with analyzing depositing set of teeth"

ENGLISH_RUBRIC "Measuring and analysing deposit on teeth "

SOURCE "mondhyg" CODE "230a"

MAIN measuring

ACTS_ON Deed: depositing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

WITH analyzing

ACTS_ON Deed: depositing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Meten van afzettingen op elementen"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring depositing set of teeth"

ENGLISH_RUBRIC "Measuring deposit on teeth "

SOURCE "mondhyg" CODE "230b"

MAIN measuring

ACTS_ON Deed: depositing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Analyseren van afzettingen op elementen"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "analyzing depositing set of teeth"

ENGLISH_RUBRIC "Analysing deposit on teeth "

SOURCE "mondhyg" CODE "230c"

MAIN analyzing

ACTS_ON Deed: depositing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Meten en analyseren van plaque"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring depositing plaque set of teeth with analyzing depositing plaque set of teeth"

ENGLISH_RUBRIC "Measuring and analysing plaque"

SOURCE "mondhyg" CODE "2300a"

MAIN measuring

ACTS_ON Deed: depositing

ACTS_ON Pathology: plaque

HAS_LOCATION Oro dentalSystemAnatomy: set of teeth

WITH analyzing

ACTS_ON Deed: depositing

ACTS_ON Pathology: plaque

HAS_LOCATION Oro dentalSystemAnatomy: set of teeth

RUBRIC "Meten en analyseren van tandsteen"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring depositing tartar set of teeth with analyzing depositing tartar set of teeth"

ENGLISH_RUBRIC "Measuring and analysing tartar"

SOURCE "mondhyg" CODE "2301a"

MAIN measuring

ACTS_ON Deed: depositing

ACTS_ON Pathology: tartar

HAS_LOCATION Oro dentalSystemAnatomy: set of teeth

WITH analyzing

ACTS_ON Deed: depositing

ACTS_ON Pathology: tartar

HAS_LOCATION Oro dentalSystemAnatomy: set of teeth

RUBRIC "Meten en analyseren van aanslag"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring depositing scale set of teeth with analyzing depositing scale set of teeth"

ENGLISH_RUBRIC "Measuring and analysing scale"

SOURCE "mondhyg" CODE "2302a"

MAIN measuring

ACTS_ON Deed: depositing

ACTS_ON Pathology: scale

HAS_LOCATION Oro dentalSystemAnatomy: set of teeth

WITH analyzing

ACTS_ON Deed: depositing

ACTS_ON Pathology: scale

HAS_LOCATION Oro dentalSystemAnatomy: set of teeth

RUBRIC "OVERIG (Meten en analyseren van afzettingen op elementen)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other measuring depositing set of teeth with analyzing depositing set of teeth"

ENGLISH_RUBRIC "OTHER (Measuring and analysing deposit on teeth)"

SOURCE "mondhyg" CODE "2308a"

MAIN OTHER measuring

ACTS_ON Deed: depositing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

WITH OTHER analyzing

ACTS_ON Deed: depositing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Meten en analyseren van afwijkingen aan tandvlees en parodontium"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990126,Karin,0;"

PARAPHRASE "measuring disorder parodontium gingivae with analyzing disorder parodontium gingivae"

ENGLISH_RUBRIC "Measuring and analysing disorders of gingivae and parodontium"

SOURCE "mondhyg" CODE "231a"

MAIN measuring

ACTS_ON disorder

HAS_LOCATION Oro dentalSystemAnatomy: parodontium & gingivae

WITH analyzing

ACTS_ON disorder

HAS_LOCATION Oro dentalSystemAnatomy: parodontium & gingivae

RUBRIC "Meten van afwijkingen aan tandvlees en parodontium"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring disorder gingivae parodontium"

ENGLISH_RUBRIC "Measuring disorders of gingivae and parodontium"

SOURCE "mondhyg" CODE "231b"

MAIN measuring

ACTS_ON disorder

HAS_LOCATION gingivae & Oro dentalSystemAnatomy: parodontium

RUBRIC "analyseren van afwijkingen aan tandvlees en parodontium"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "analyzing disorder gingivae parodontium"
 ENGLISH_RUBRIC "analysing disorders of gingivae and parodontium"
 SOURCE "mondhyg" CODE "231c"
 MAIN analyzing
 ACTS_ON disorder
 ACTS_ON gingivae & Oro dentalSystemAnatomy: parodontium

RUBRIC "Meten en analyseren van bloeding aan tandvlees en parodontium"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "measuring bleeding gingivae parodontium with analyzing bleeding gingivae parodontium"
 ENGLISH_RUBRIC "Measuring and analysing bleeding of gingivae and parodontium"
 SOURCE "mondhyg" CODE "2310a"
 MAIN measuring
 ACTS_ON bleeding
 ACTS_ON gingivae & Oro dentalSystemAnatomy: parodontium
 WITH analyzing
 ACTS_ON bleeding
 ACTS_ON gingivae & Oro dentalSystemAnatomy: parodontium

RUBRIC "Meten en analyseren van gingiva zwelling"
 AUTHOR "Karin"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "measuring swelling gingivae with analyzing swelling gingivae"
 ENGLISH_RUBRIC "Measuring and analysing swelling gingiva"
 SOURCE "mondhyg" CODE "2311a"
 MAIN measuring
 ACTS_ON swelling
 ACTS_ON gingivae
 WITH analyzing
 ACTS_ON swelling
 ACTS_ON gingivae

RUBRIC "Meten en analyseren van pocketdiepte"
 AUTHOR "Karin"
 HISTORY "19990527,Karin,0;"
 PARAPHRASE "measuring depth is feature of pouch of gingivae with analyzing depth is feature of pouch of gingivae"
 ENGLISH_RUBRIC "Measuring and analysing pocket depth"
 SOURCE "mondhyg" CODE "2312a"
 MAIN measuring
 ACTS_ON Feature: depth
 IS_FEATURE_OF pouch
 IS_PART_OF gingivae
 WITH analyzing
 ACTS_ON Feature: depth

IS_FEATURE_OF pouch
IS_PART_OF gingivae

RUBRIC "Meten en analyseren van pocketdiepte via zespuntsmeting"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring depth is feature of pouch of gingivae using six-points measuring with analyzing depth is feature of pouch of gingivae using six-points measuring"

ENGLISH_RUBRIC "Measuring and analysing pocket depth by means of six- point measuring"

SOURCE "mondhyg" CODE "23120a"

MAIN measuring

ACTS_ON Feature: depth

IS_FEATURE_OF pouch

IS_PART_OF gingivae

BY_MEANS_OF Deed: six-points measuring

WITH analyzing

ACTS_ON Feature: depth

IS_FEATURE_OF pouch

IS_PART_OF gingivae

BY_MEANS_OF Deed: six-points measuring

RUBRIC "OVERIG (Meten en analyseren van pocketdiepte)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other measuring depth is feature of pouch of gingivae with analyzing depth is feature of pouch of gingivae"

ENGLISH_RUBRIC "OTHER (Measuring and analysing pocket depth)"

SOURCE "mondhyg" CODE "23128a"

MAIN OTHER measuring

ACTS_ON Feature: depth

IS_FEATURE_OF pouch

IS_PART_OF gingivae

WITH OTHER analyzing

ACTS_ON Feature: depth

IS_FEATURE_OF pouch

IS_PART_OF gingivae

RUBRIC "Meten en analyseren van botafbraak"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring destruction bone of parodontium with analyzing destruction bone of parodontium"

ENGLISH_RUBRIC "Measuring and analysing destruction of bone"

SOURCE "mondhyg" CODE "2313a"

MAIN measuring

ACTS_ON destruction

ACTS_ON bone

IS_PART_OF Oro dentalSystemAnatomy: parodontium

WITH analyzing

ACTS_ON destruction

ACTS_ON bone

IS_PART_OF Oro dentalSystemAnatomy: parodontium

RUBRIC "Meten en analyseren van recessies"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring recessing gingiva parodontium with analyzing recessing gingiva parodontium"

ENGLISH_RUBRIC "Measuring and analysing recessions"

SOURCE "mondhyg" CODE "2314a"

MAIN measuring

ACTS_ON recessing

ACTS_ON_1 gingiva

ACTS_ON_2 OrodentalSystemAnatomy: parodontium

WITH analyzing

ACTS_ON recessing

ACTS_ON_1 gingiva

ACTS_ON_2 OrodentalSystemAnatomy: parodontium

RUBRIC "Meten en analyseren van aanhechtingsverlies"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring losing attaching gingivae with analyzing losing attaching gingivae"

ENGLISH_RUBRIC "Measuring and analysing attachment loss"

SOURCE "mondhyg" CODE "2315a"

MAIN measuring

ACTS_ON Deed: losing

ACTS_ON Deed: attaching

ACTS_ON gingivae

WITH analyzing

ACTS_ON Deed: losing

ACTS_ON Deed: attaching

ACTS_ON gingivae

RUBRIC "Meten en analyseren van furcaties"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990604,Karin,0;"

PARAPHRASE "measuring furcation oral region with analyzing furcation oral region"

ENGLISH_RUBRIC "Measuring and analysing furcations"

SOURCE "mondhyg" CODE "2316a"

MAIN measuring

ACTS_ON Pathology: furcation

HAS_LOCATION Anatomy: oral region

WITH analyzing

ACTS_ON Pathology: furcation

HAS_LOCATION Anatomy: oral region

RUBRIC "Meten en analyseren van mobiliteit"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "measuring mobility is feature of gingivae with analyzing mobility is feature of gingivae"

ENGLISH_RUBRIC "Measuring and analysing mobility"

SOURCE "mondhyg" CODE "2317a"

MAIN measuring

ACTS_ON Feature: mobility

IS_FEATURE_OF gingivae

WITH analyzing

ACTS_ON Feature: mobility

IS_FEATURE_OF gingivae

RUBRIC "Meten en analyseren van afwijkingen aan tandvlees en parodontium"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990604,Karin,0;"

PARAPHRASE "other measuring disorder parodontium gingivae with analyzing disorder parodontium gingivae"

ENGLISH_RUBRIC "Measuring and analysing disorders of gingivae and parodontium"

SOURCE "mondhyg" CODE "2318a"

MAIN OTHER measuring

ACTS_ON disorder

HAS_LOCATION Oro dentalSystemAnatomy: parodontium & gingivae

WITH OTHER analyzing

ACTS_ON disorder

HAS_LOCATION Oro dentalSystemAnatomy: parodontium & gingivae

RUBRIC "Testen, meten en analyseren van afwijkingen aan de elementen"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "testing disorder tooth with analyzing disorder tooth with measuring disorder tooth"

ENGLISH_RUBRIC "Testing, measuring and analysing disorders of teeth "

SOURCE "mondhyg" CODE "232a"

MAIN testing

ACTS_ON disorder

HAS_LOCATION tooth

WITH analyzing

ACTS_ON disorder

HAS_LOCATION tooth

WITH measuring

ACTS_ON disorder

HAS_LOCATION tooth

RUBRIC "Testen vitaliteit van een element"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "testing vitality is feature of tooth"

ENGLISH_RUBRIC "Testing vitality element"

SOURCE "mondhyg" CODE "2320"

MAIN testing

ACTS_ON Feature: vitality

IS_FEATURE_OF tooth

RUBRIC "Testen vitaliteit van een element mbv koud/warm"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "testing vitality is feature of tooth by technique applying thermotherapy"

ENGLISH_RUBRIC "Testing vitality element by means of cold/ warmth"

SOURCE "mondhyg" CODE "23200"

MAIN testing

ACTS_ON Feature: vitality
IS_FEATURE_OF tooth
BY_TECHNIQUE applying
ACTS_ON thermotherapy

RUBRIC "Testen vitaliteit van een element mbv stroom"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "testing vitality is feature of tooth by technique applying electricity"

ENGLISH_RUBRIC "Testing vitality element by means of electricity"

SOURCE "mondhyg" CODE "23201"

MAIN testing

ACTS_ON Feature: vitality
IS_FEATURE_OF tooth
BY_TECHNIQUE applying
ACTS_ON electricity

RUBRIC "OVERIG (Testen vitaliteit van een element)"

AUTHOR "Karin"

HISTORY "19990527,Karin,0;"

PARAPHRASE "other testing vitality is feature of tooth"

ENGLISH_RUBRIC "OTHER (Testing vitality element)"

SOURCE "mondhyg" CODE "23208"

MAIN OTHER testing

ACTS_ON Feature: vitality
IS_FEATURE_OF tooth

RUBRIC "Meten en analyseren van occlusale slijtage"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "measuring abrading tooth occluding with analyzing abrading tooth occluding"

ENGLISH_RUBRIC "Measuring and occlusal abrasion"

SOURCE "mondhyg" CODE "2321"

MAIN measuring

ACTS_ON abrading
ACTS_ON tooth
CAUSED_BY occluding

WITH analyzing

ACTS_ON abrading
ACTS_ON tooth
CAUSED_BY occluding

RUBRIC "Meten en analyseren van cervicale abrasie"

AUTHOR "Karin"
STATUS "0"
HISTORY "19990531,Karin,0;"
PARAPHRASE "measuring abrading cervix dentis with analyzing abrading cervix dentis"
ENGLISH_RUBRIC "Measuring and cervical abrasion"
SOURCE "mondhyg" CODE "2322"
MAIN measuring
 ACTS_ON abrading
 ACTS_ON OrodontalSystemAnatomy: cervix dentis
WITH analyzing
 ACTS_ON abrading
 ACTS_ON OrodontalSystemAnatomy: cervix dentis

RUBRIC "Meten en analyseren van fluorose"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990531,Karin,0;"
PARAPHRASE "measuring fluoride oral cavity is acted on by poisoning"
ENGLISH_RUBRIC "Measuring and analysing of fluorosis"
SOURCE "mondhyg" CODE "2324"
MAIN measuring
 ACTS_ON Chemical: fluoride
 HAS_LOCATION oral cavity
 IS_ACTED_ON_BY Deed: poisoning

RUBRIC "Meten en analyseren van verkleuring"
AUTHOR "Karin"
HISTORY "19990527,Karin,0;"
PARAPHRASE "measuring disorder tooth color with analyzing disorder tooth color"
ENGLISH_RUBRIC "Measuring and analysing discolouring"
SOURCE "mondhyg" CODE "2325"
MAIN measuring
 ACTS_ON disorder
 HAS_LOCATION tooth
 HAS_FEATURE Feature: color
WITH analyzing
 ACTS_ON disorder
 HAS_LOCATION tooth
 HAS_FEATURE Feature: color

RUBRIC "OVERIG (testen, meten en analyseren van afwijkingen aan de elementen)"
AUTHOR "Karin"
HISTORY "19990527,Karin,0;"
PARAPHRASE "other testing disorder tooth with analyzing disorder tooth with measuring disorder tooth"
ENGLISH_RUBRIC "OTHER (Testing, measuring and analysing disorders of teeth)"
SOURCE "mondhyg" CODE "2328a"
MAIN OTHER testing
 ACTS_ON disorder
 HAS_LOCATION tooth
WITH OTHER analyzing

ACTS_ON disorder
 HAS_LOCATION tooth
 WITH OTHER measuring
 ACTS_ON disorder
 HAS_LOCATION tooth

RUBRIC "Functieonderzoek naar occlusie en articulatie"
 AUTHOR "Karin"
 HISTORY "19990531,Karin,0;"
 PARAPHRASE "assessing occluding articulatio temporomandibularis with assessing articulating articulatio temporomandibularis"
 ENGLISH_RUBRIC "Assessing function occlusion and articulation"
 SOURCE "mondhyg" CODE "233a"
 MAIN assessing
 ACTS_ON occluding
 IS_FUNCTION_OF Joint: articulatio temporomandibularis
 WITH assessing
 ACTS_ON Deed: articulating
 IS_FUNCTION_OF Joint: articulatio temporomandibularis

RUBRIC "Functieonderzoek naar occlusie "
 AUTHOR "Karin"
 HISTORY "19990531,Karin,0;"
 PARAPHRASE "assessing occluding articulatio temporomandibularis"
 ENGLISH_RUBRIC "Assessing function occlusion "
 SOURCE "mondhyg" CODE "233b"
 MAIN assessing
 ACTS_ON occluding
 IS_FUNCTION_OF Joint: articulatio temporomandibularis

RUBRIC "Functieonderzoek naar articulatie"
 AUTHOR "Karin"
 HISTORY "19990531,Karin,0;"
 PARAPHRASE "assessing articulating articulatio temporomandibularis"
 ENGLISH_RUBRIC "Assessing function articulation"
 SOURCE "mondhyg" CODE "233c"
 MAIN assessing
 ACTS_ON Deed: articulating
 IS_FUNCTION_OF Joint: articulatio temporomandibularis

RUBRIC "onderzoeken van kaakgewricht"
 AUTHOR "Karin"
 HISTORY "19990531,Karin,0;"
 PARAPHRASE "assessing articulatio temporomandibularis"
 ENGLISH_RUBRIC "Assessing articulatio temporomandibularis"
 SOURCE "mondhyg" CODE "2331"
 MAIN assessing
 ACTS_ON Joint: articulatio temporomandibularis

RUBRIC "OVERIG (Functieonderzoek naar occlusie en articulatie)"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "other assessing occluding articulatio temporomandibularis with assessing articulating articulatio temporomandibularis"

ENGLISH_RUBRIC "OTHER (Assessing function occlusion and articulation)"

SOURCE "mondhyg" CODE "2338a"

MAIN OTHER assessing

ACTS_ON occluding

IS_FUNCTION_OF Joint: articulatio temporomandibularis

WITH OTHER assessing

ACTS_ON Deed: articulating

IS_FUNCTION_OF Joint: articulatio temporomandibularis

RUBRIC "Analyseren (interpreteren) van röntgenfoto's"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "analyzing x-ray"

ENGLISH_RUBRIC "Analysing (interpret) x-rays"

SOURCE "mondhyg" CODE "234"

MAIN analyzing

ACTS_ON Device: x-ray

RUBRIC "Beoordelen van aanwezigheid elementen "

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing presenting tooth"

ENGLISH_RUBRIC "assessing present elements"

SOURCE "mondhyg" CODE "2340"

MAIN analyzing

ACTS_ON Device: x-ray

TO_ACHIEVE assessing

ACTS_ON presenting

ACTS_ON tooth

RUBRIC "Beoordelen van groei elementen "

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing growth tooth"

ENGLISH_RUBRIC "assessing growth elements"

SOURCE "mondhyg" CODE "2341"

MAIN analyzing

ACTS_ON Device: x-ray

TO_ACHIEVE assessing

ACTS_ON growth

ACTS_ON tooth

RUBRIC "Beoordelen van stand elementen "

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing positioning tooth"

ENGLISH_RUBRIC "assessing position elements"

SOURCE "mondhyg" CODE "2342"

MAIN analyzing

 ACTS_ON Device: x-ray

 TO_ACHIEVE assessing

 ACTS_ON positioning

 ACTS_ON tooth

RUBRIC "Beoordelen van mate van resorptie"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing resorbing body structure"

ENGLISH_RUBRIC "assessing resorption"

SOURCE "mondhyg" CODE "2343"

MAIN analyzing

 ACTS_ON Device: x-ray

 TO_ACHIEVE assessing

 ACTS_ON Deed: resorbing

 ACTS_ON body structure

RUBRIC "Beoordelen van mate van resorptie bot"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing resorbing bone of oral cavity"

ENGLISH_RUBRIC "assessing resorption bone"

SOURCE "mondhyg" CODE "23430"

MAIN analyzing

 ACTS_ON Device: x-ray

 TO_ACHIEVE assessing

 ACTS_ON Deed: resorbing

 ACTS_ON bone

 IS_PART_OF oral cavity

RUBRIC "Beoordelen van mate van resorptie elementen"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing resorbing tooth"

ENGLISH_RUBRIC "assessing resorption elements"

SOURCE "mondhyg" CODE "23431"

MAIN analyzing

 ACTS_ON Device: x-ray

 TO_ACHIEVE assessing

 ACTS_ON Deed: resorbing

ACTS_ON tooth

RUBRIC "OVERIG (Beoordelen van mate van resorptie)"
AUTHOR "Karin"
STATUS "0"
HISTORY "19990531,Karin,0;"
PARAPHRASE "analyzing x-ray to achieve assessing resorbing other body structure"
ENGLISH_RUBRIC "OTHER (assessing resorption)"
SOURCE "mondhyg" CODE "23438"
MAIN analyzing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON Deed: resorbing
 ACTS_ON OTHER body structure

RUBRIC "Beoordelen caries"
AUTHOR "Karin"
HISTORY "19990531,Karin,0;"
PARAPHRASE "analyzing x-ray to achieve assessing caries"
ENGLISH_RUBRIC "assessing caries"
SOURCE "mondhyg" CODE "2345"
MAIN analyzing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON Pathology: caries

RUBRIC "Beoordelen retentiefactoren"
AUTHOR "Karin"
HISTORY "19990531,Karin,0;"
PARAPHRASE "analyzing x-ray to achieve assessing retention substance"
ENGLISH_RUBRIC "assessing retention factors"
SOURCE "mondhyg" CODE "2346"
MAIN analyzing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON Deed: retention
 ACTS_ON substance

RUBRIC "Beoordelen periapicale afwijkingen"
AUTHOR "Karin"
HISTORY "19990531,Karin,0;"
PARAPHRASE "analyzing x-ray to achieve assessing disorder apex radicis dentis"
ENGLISH_RUBRIC "assessing peri-apical disorders"
SOURCE "mondhyg" CODE "2347"
MAIN analyzing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON disorder

HAS_LOCATION apex radialis dentis

RUBRIC "Beoordelen wortelvorm"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing x-ray to achieve assessing shape is feature of radix dentis"

ENGLISH_RUBRIC "assessing radix shape"

SOURCE "mondhyg" CODE "2348"

MAIN analyzing

 ACTS_ON Device: x-ray

 TO_ACHIEVE assessing

 ACTS_ON shape

 IS_FEATURE_OF OrofacialSystemAnatomy: radix dentis

RUBRIC "OVERIG (Analyseren (interpreteren) van röntgenfoto's)"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "other analyzing x-ray"

ENGLISH_RUBRIC "Other (Analysing (interpret) x-rays)"

SOURCE "mondhyg" CODE "2349"

MAIN OTHER analyzing

 ACTS_ON Device: x-ray

RUBRIC "Analyseren & interpreteren van voedingsanamnese"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990531,Karin,0;"

PARAPHRASE "analyzing history is acted on by feeding"

ENGLISH_RUBRIC "Analysing and interpret food anamnesis"

SOURCE "mondhyg" CODE "236"

MAIN analyzing

 ACTS_ON history

 IS_ACTED_ON_BY feeding

RUBRIC "Testen monsters"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "testing sample"

ENGLISH_RUBRIC "testing sample"

SOURCE "mondhyg" CODE "237"

MAIN testing

 ACTS_ON Structure: sample

RUBRIC "speekseltest"

AUTHOR "Karin"

STATUS "10000"

HISTORY "19990531,Karin,0;"

PARAPHRASE "testing saliva in sample"

ENGLISH_RUBRIC "testing saliva sample"

SOURCE "mondhyg" CODE "2370"

MAIN testing

ACTS_ON BodySubstance: saliva

IS_CONTAINED_IN Structure: sample

RUBRIC "plaquetest"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "testing plaque"

ENGLISH_RUBRIC "testing plaque sample"

SOURCE "mondhyg" CODE "2371"

MAIN testing

ACTS_ON Pathology: plaque

RUBRIC "ademtest"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "testing breathing"

ENGLISH_RUBRIC "testing breathing sample"

SOURCE "mondhyg" CODE "2372"

MAIN testing

ACTS_ON breathing

RUBRIC "OVERIG Testen monsters"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "other testing sample"

ENGLISH_RUBRIC "OTHER testing sample"

SOURCE "mondhyg" CODE "2378"

MAIN OTHER testing

ACTS_ON Structure: sample

RUBRIC "Overig"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "other testing process with analyzing process with measuring process"

SOURCE "mondhyg" CODE "238"

MAIN OTHER testing

ACTS_ON process

WITH OTHER analyzing

ACTS_ON process

WITH OTHER measuring

ACTS_ON process

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RUBRIC "VERVAARDIGEN VAN HULPMIDDELEN t.b.v. DIAGNOSTIEK"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "constructing device has function diagnosing"

ENGLISH_RUBRIC "constructing of device has function diagnosing "

SOURCE "mondhyg" CODE "24a"

MAIN constructing

ACTS_ON device

HAS_FUNCTION Deed: diagnosing

RUBRIC "VERVAARDIGEN VAN HULPMIDDELEN t.b.v. REGISTRATIE"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "constructing device has function registering"

ENGLISH_RUBRIC "constructing of device has function registering"

SOURCE "mondhyg" CODE "24b"

MAIN constructing

ACTS_ON device

HAS_FUNCTION Deed: registering

RUBRIC "Maken van röntgenfoto's"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "taking x-ray"

ENGLISH_RUBRIC "Taking x-ray"

SOURCE "mondhyg" CODE "240"

MAIN Deed: taking

ACTS_ON Device: x-ray

RUBRIC "Ontwikkelen van röntgenfoto's"

AUTHOR "Karin"

HISTORY "19990126,Karin,0;"

PARAPHRASE "developping x-ray"

ENGLISH_RUBRIC "developping x-ray"

SOURCE "mondhyg" CODE "241"

MAIN Deed: developping

ACTS_ON Device: x-ray

RUBRIC "tracing van röntgenfoto's"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"

PARAPHRASE "tracing x-ray"

ENGLISH_RUBRIC "tracing x-ray"

SOURCE "mondhyg" CODE "242"

MAIN Deed: tracing

ACTS_ON Device: x-ray

RUBRIC "beoordelen krooncontouren"

AUTHOR "Karin"

HISTORY "19990531,Karin,0;"
 PARAPHRASE "tracing x-ray to achieve assessing contour is feature of Crown of Tooth"
 ENGLISH_RUBRIC "assessing crown contour"
 SOURCE "mondhyg" CODE "2420"
 MAIN Deed: tracing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON Feature: contour
 IS_FEATURE_OF Crown of Tooth

RUBRIC "beoordelen wortelcontouren"
 AUTHOR "Karin"
 HISTORY "19990531,Karin,0;"
 PARAPHRASE "tracing x-ray to achieve assessing contour is feature of radix dentis"
 ENGLISH_RUBRIC "assessing wortelcontour"
 SOURCE "mondhyg" CODE "2421"
 MAIN Deed: tracing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON Feature: contour
 IS_FEATURE_OF Oro dentalSystemAnatomy: radix dentis

RUBRIC "beoordelen lokatie glazuur-cement-grens"
 AUTHOR "Karin"
 STATUS "10000"
 HISTORY "19990602,Karin,0;"
 PARAPHRASE "tracing x-ray to achieve assessing border of glaze of cementum position"
 ENGLISH_RUBRIC "assessing location glaze-cementum border"
 SOURCE "mondhyg" CODE "2422"
 MAIN Deed: tracing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON Structure: border
 IS_PART_OF Oro dentalSystemAnatomy: glaze
 IS_PART_OF Oro dentalSystemAnatomy: cementum
 ACTS_ON Position: position

RUBRIC "beoordelen contouren van restauraties"
 AUTHOR "Karin"
 STATUS "0"
 HISTORY "19990602,Karin,0;"
 PARAPHRASE "tracing x-ray to achieve assessing correcting contour is feature of tooth"
 ENGLISH_RUBRIC "assessing contours of corrections"
 SOURCE "mondhyg" CODE "2423"
 MAIN Deed: tracing
 ACTS_ON Device: x-ray
 TO_ACHIEVE assessing
 ACTS_ON correcting
 ACTS_ON Feature: contour

IS_FEATURE_OF tooth

RUBRIC "beoordelen meest apicaal niveau van interdentaal botniveau"

AUTHOR "Karin"

HISTORY "19990602,Karin,0;"

PARAPHRASE "tracing x-ray to achieve assessing apex of interdental bone"

ENGLISH_RUBRIC "assessing most apical level of interdental bone-level"

SOURCE "mondhyg" CODE "2424"

MAIN Deed: tracing

ACTS_ON Device: x-ray

TO_ACHIEVE assessing

ACTS_ON apex

IS_PART_OF Oro dentalSystemAnatomy: interdental bone

RUBRIC "beoordelen afbraak van interradiculair bot"

AUTHOR "Karin"

HISTORY "19990602,Karin,0;"

PARAPHRASE "tracing x-ray to achieve assessing destroying interradicular bone"

ENGLISH_RUBRIC "assessing destruction of interradicular bone"

SOURCE "mondhyg" CODE "2425"

MAIN Deed: tracing

ACTS_ON Device: x-ray

TO_ACHIEVE assessing

ACTS_ON destroying

ACTS_ON Oro dentalSystemAnatomy: interradicular bone

RUBRIC "beoordelen peri-apicale radio-lucenties"

AUTHOR "Karin"

STATUS "10000"

HISTORY "19990602,Karin,0;"

PARAPHRASE "tracing x-ray to achieve assessing illumination structure apex radicis dentis"

ENGLISH_RUBRIC "assessing peri-apical radio-illumination"

SOURCE "mondhyg" CODE "2426"

MAIN Deed: tracing

ACTS_ON Device: x-ray

TO_ACHIEVE assessing

ACTS_ON Deed: illumination

ACTS_ON structure

HAS_PROXIMITY apex radicis dentis

RUBRIC "OVERIG tracing van röntgenfoto's"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "other tracing x-ray"

ENGLISH_RUBRIC "OTHER tracing x-ray"

SOURCE "mondhyg" CODE "2428"

MAIN OTHER Deed: tracing

ACTS_ON Device: x-ray

RUBRIC "Maken van gebitsafdrukken"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990126,Karin,0;"

PARAPHRASE "taking moulding set of teeth"

ENGLISH_RUBRIC "Taking moulding set of teeth"

SOURCE "mondhyg" CODE "243"

MAIN Deed: taking

ACTS_ON moulding

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Maken van gebitsafdrukken voor het vastleggen van recessies"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "taking moulding set of teeth to achieve rapping set of teeth"

ENGLISH_RUBRIC "Taking moulding set of teeth to achieve rapping recession"

SOURCE "mondhyg" CODE "2430"

MAIN Deed: taking

ACTS_ON moulding

ACTS_ON Oro dentalSystemAnatomy: set of teeth

TO_ACHIEVE Deed: rapping

ACTS_ON recessing

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Maken van gebitsafdrukken voor studiemodellen"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "taking moulding set of teeth to achieve obtaining study-model"

ENGLISH_RUBRIC "Taking moulding set of teeth to achieve getting study-models"

SOURCE "mondhyg" CODE "2431"

MAIN Deed: taking

ACTS_ON moulding

ACTS_ON Oro dentalSystemAnatomy: set of teeth

TO_ACHIEVE Deed: obtaining

ACTS_ON Material: study-model

RUBRIC "OVERIG (Maken van gebitsafdrukken)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "other taking moulding set of teeth"

ENGLISH_RUBRIC "OTHER (Taking moulding set of teeth)"

SOURCE "mondhyg" CODE "2438"

MAIN OTHER Deed: taking

ACTS_ON moulding

ACTS_ON Oro dentalSystemAnatomy: set of teeth

RUBRIC "Opnemen van gebitsdiagram"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "constructing diagram by technique rapporting presenting tooth"

ENGLISH_RUBRIC "Making of dental diagram "

SOURCE "mondhyg" CODE "244"

MAIN constructing

ACTS_ON Device: diagram

BY_TECHNIQUE Deed: rapporting

ACTS_ON presenting

ACTS_ON tooth

RUBRIC "Maken van mondfoto's"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "photographing mouth"

ENGLISH_RUBRIC "Taking pictures of mouth"

SOURCE "mondhyg" CODE "245"

MAIN Deed: photographing

ACTS_ON mouth

RUBRIC "OVERIG (VERVAARDIGEN VAN HULPMIDDELEN t.b.v. DIAGNOSTIEK)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "constructing other device has function diagnosing"

ENGLISH_RUBRIC "OTHER (constructing of device has function diagnosing)"

SOURCE "mondhyg" CODE "248a"

MAIN constructing

ACTS_ON OTHER device

HAS_FUNCTION Deed: diagnosing

RUBRIC "OVERIG (VERVAARDIGEN VAN HULPMIDDELEN t.b.v. REGISTRATIE)"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990602,Karin,0;"

PARAPHRASE "constructing other device has function registering"

ENGLISH_RUBRIC "OTHER (constructing of device has function registrating)"

SOURCE "mondhyg" CODE "248b"

MAIN constructing

ACTS_ON OTHER device

HAS_FUNCTION Deed: registering

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RUBRIC "OVERIG"

AUTHOR "Karin"

STATUS "0"

HISTORY "19990126,Karin,0;"

PARAPHRASE "other inspecting patient with observing patient"

ENGLISH_RUBRIC "OTHER"

SOURCE "mondhyg" CODE "28"

MAIN OTHER inspecting

ACTS_ON patient

WITH OTHER Deed: observing

ACTS_ON patient

8.2 SPRI (Sweden)

Validation Report Linköping University

Mats Carlsson, Hans Ålhfeldt

8.2.1 Introduction

A common problem with classifications in the domains of diseases or medical interventions and procedures is their sheer size, making maintenance more difficult. Another, and probably more serious, problem is the structure of the traditional classifications used within medicine, namely the strict hierarchical classification. The limitations of hierarchical medical terminologies as abstracting systems is well documented in the literature [Cim95]. Traditional hierarchical classification systems have been developed with a specific purpose in mind and are not well suited for reuse, which becomes a necessity if clinical information should be used not only for direct patient care, but also support seamless care, overcoming health care organisational barriers, provide health statistics reporting, and facilitate follow-up and medical audit. Advanced terminological systems such as the GALEN terminology server [Rec95], based on formal description of medical concepts and their relations with support for sanctioning mechanisms for composition of complex medical statements from atomic ones, promise sound solutions to the basic problems that arises from abstracting systems in the shape of traditional classifications.

The objective of this validation study was to evaluate GALEN methods and tools with respect to the problem of health statistics reporting in the domain of thoracic surgery. Thoracic surgery, which is resource intensive, has increased in volume these last years [SoS97]. In order to evaluate these procedures a national database was created. By necessity this database has a more coarse grained classification than the regular classification of surgical procedures [NOM96]. The interest lays in mortality rates and complication rates for types of procedures rather than for the individual procedures themselves. One example is the distinction between procedures involving only coronary surgery and coronary surgery combined with other procedures.

Since there are many demands to use classifications for diverse purposes there is a need for different groupings of the individual classification codes. Some are more interested in what body parts are operated upon, and some are more focussed on what kind of procedures are performed. This leads to many different levels of granularity. There is therefore a need of being able to generate new aggregation levels from time to time. This issue is compounded by the fact that new procedures are created and old ones are evolving over time.

The goal for GIU has been to assist and facilitate collaborative work when constructing and maintaining classifications of surgical procedures [Gal97]. maintaining classifications such as those of surgical procedures, and to allow for automatic reclassification using the knowledge embedded in the GALEN core model (CRM). Other objectives of the project were generation of natural language phrases, and to facilitate reorganisation, extension and refinement of existing classifications. These functions can also be used to generate and test new aggregated levels appropriate e.g. for follow-up and quality assurance programmes.

The classification in this report is the Nordic classification of surgical procedures. The focus is on thoracic surgery, chapter F, and on a national follow-up data base for statistical reporting concerning thoracic surgery.

Much of this report has been submitted to AMIA 1999 Annual Symposium [Car99].

8.2.2 The GALEN approach

8.2.2.1 The core of GALEN

In GALEN the CRM is a central model of high level concepts that is used as a start (or base) for the total medical modeling[Rec96]. A set of top level concepts, such as *structures*, *substances* and *processes*, has been defined. These concepts have then been utilized as a core for building the ever growing model of medical knowledge represented in GRAIL (the GALEN Representation And Integration Language)[Rec97]. The result is a compositional and generative model for medical terminology. The CRM also contains knowledge intended to restrict expressivity to that which is sensible to say, and thereby reject nonsense compositions.

8.2.2.2 The intermediade language

It was soon apparent that modeling directly in GRAIL[Rec97] was too cumbersome for the majority of physicians[Gal97]. They could do it, but only after a significant learning effort. Therefore an intermediate representation (ImR) was created[Rec98, Rec97]. This conceptual representation is easier to learn and use than

GRAIL, being both less expressive and more relaxed. It can be (semi-)automatically expanded into GRAIL expressions. The ImR, and its GRAIL expansion algorithm, seeks to achieve a compromise between the requirement of computer systems for rigid formal representations and the human knowledge worker's preference for semi-formal, or completely informal, representations. The ImR is also suitable for validation work, both of modeling done in a particular center and between centers. It is a way to use the simplicity of what Rossi Mori[RosWG6] calls a 'second generation' system while still having the power of a 'third generation' system.

One advantage this representation has over GRAIL is that it is able to capture some concepts that the otherwise more powerful GRAIL to this date can not[Rec98, Rog97]. For example negation and the 'other' concept in the context of a certain classification.

Even though 'other' has a clear *conceptual* meaning in the GRAIL-model - it stands for a highly specialized and rather strange kind of negation, directly equivalent to the meaning of 'other' in a rubric. The problem is that 'other'-type rubrics need to behave in a magical way when trying to automatically derive a classification. In the current classification engine - i.e. in the current specification of GRAIL - there is no mechanism to achieve this magical functionality, so that although the meaning of 'other' is represented it does not behave as it should[Rec97, Rec98]. In GRAIL, children form a disjoint non-exhaustive partition of the level above[Rec98] unlike a classification where the children must form an exhaustive partition of the level above[Ing98]. Hence the latter captures the pragmatic information such as 'other', NOS (not otherwise specified) and NES (not elsewhere specified). This is not represented in GRAIL itself but in the way the specific classification is mapped to GRAIL.

The trade off is making the intermediate representation formal enough to allow the almost automatical translation to GRAIL without making it too convoluted for human authors.

```
RUBRIC "Transponering med intraatrial patch"
PARAPHRASE "Transposition of the pulmonary veins to treat partially anomalous connection to the right atrium
using an intraatrial patch"
ENGLISH_RUBRIC "Transposition of partially anomalous pulmonary veins using intraatrial patch"
SOURCE "NCSP" CODE "FFF00"
MAIN constructing
    ACTS_ON malformation
        HAS_FEATURE partial
        HAS_LOCATION pulmonary vein
    BY_TECHNIQUE transposing
    BY_MEANS_OF prosthetic patch
        HAS_LOCATION heart atrium
    TO_ACHIEVE circulation
        ACTS_ON blood
            HAS_DESTINATION left atrium
```

This corresponds to the GRAIL-code below.

```
Constructing which
hasSpecificSubprocess SurgicalTransposing
involves Phenomenon which
    involves PulmonaryVein
hasPathologicalStatus pathological
hasFeature organPartial
hasAcquisitionMode congenital
hasSpecificGoal Circulation which
    involves Blood which
        isActedOnSpecificallyBy Displacement which
            isAlphaPartitiveConnectionOf LeftHeartAtrium
hasPhysicalMeans Device which
    hasFunction HeartAtrium
---extrinsic---
hasDissectionRubric extrinsic 'NCSP FFF00 Transponering med intraatrial patch'
```

An example of how 'other' is handled is shown below.

```
RUBRIC "Andra bypass-operationer på intrathorakala vena cava"
PARAPHRASE "Other bypass surgery on the thoracic part of the vena cava"
ENGLISH_RUBRIC "Other bypass operations on thoracic vena cava"
SOURCE "NCSP" CODE "FAD96"
```

```
MAIN creating
  ACTS_ON OTHER bypass structure
  CONNECTS thoracic vena cava
```

This translates to the following GRAIL expression.

```
CreatingProcess which
  involves BypassStructure which
    isPartitiveConnectionOf ThoracicVenaCava
    hasDissectionCodingArtefact CodingOtherness
---extrinsic---
hasDissectionRubric extrinsical 'NCSP FAD96 Andra bypass-operationer på intrathorakala vena cava'
```

The statement "hasDissectionCodingArtefact CodingOtherness" has no real meaning in GRAIL. It is so far just a placeholder for the possibility of being able to say things in a context of a specific classification in the future. At the moment it makes the GRAIL-code for the rubric more specific than one lacking it. Compare to:

```
RUBRIC "Bypass-operation på vena cava"
PARAPHRASE "Bypass surgery on the thoracic part of vena cava"
ENGLISH_RUBRIC "Bypass operations on thoracic vena cava"
SOURCE "NCSP" CODE "FAD"
MAIN creating
  ACTS_ON bypass structure
  CONNECTS thoracic vena cava
```

Which in GRAIL becomes...

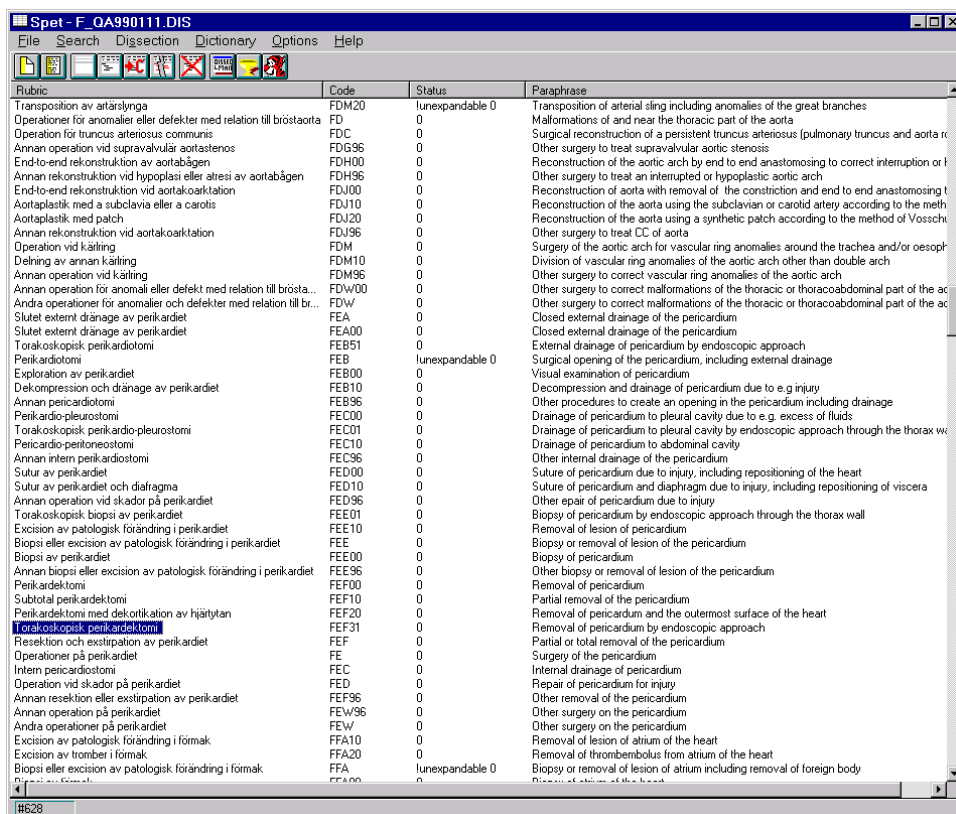
```
involves BypassStructure which
  isPartitiveConnectionOf ThoracicVenaCava
---extrinsic---
hasDissectionRubric extrinsical 'NCSP FAD Bypass-operation på vena cava'
```

8.2.2.3 Tools

The two most useful tools for the work described in this paper are the Surgical Procedure Editing Tool (SPET) and the Classification Manager (Clam). Both are parts of the Classification Workbench (Claw), which furthermore consist of the Humpty and the GCE (GALEN Case Environment). Humpty is a tool for handling the natural language files that can be connected to a GRAIL-model. The GCE handles the GRAIL-model itself. The SPET is used for modelling the rubrics in the intermediate representation. The Clam is used for managing the structure of classifications [GIU97]. That is how the hierarchy of a classification would be organised.

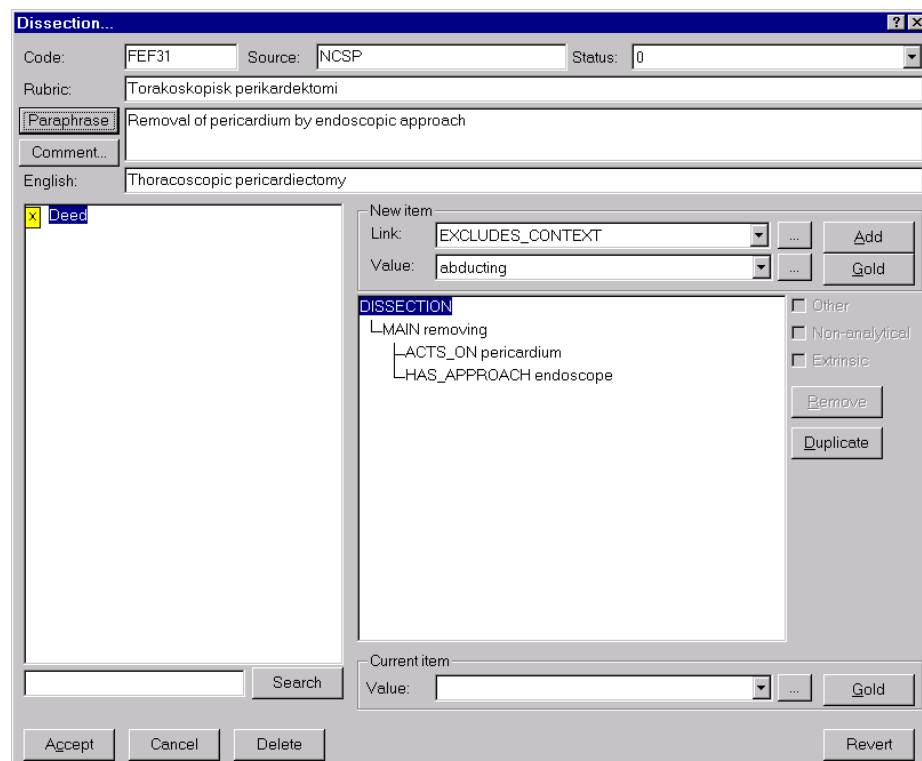
To reclassify, the Claw is used. The Claw is using an old classification in the Clam, and a GRAIL-model, into which the rubrics from the old classification has been compiled through the SPET, to create a new classification. The new classification will use the old rubrics, but organise them according to the structure that have been obtained in the GRAIL-model.

Figures 1 to 5 shows (the same rubric in) some of the tools.



Rubric	Code	Status	Paraphrase
Transposition av artärslynga	FDM20	Unexpandable 0	Transposition of arterial sling including anomalies of the great branches
Operationer för anomalier eller defekter med relation till bröståorta	FD	0	Malignancies of and near the thoracic part of the aorta
Operation för truncus arteriosus communis	FDC	0	Surgical reconstruction of a persistent truncus arteriosus (pulmonary truncus and aorta)
Annan operation vid supravulvular aortstenos	FDG96	0	Other surgery to treat supravulvular aortic stenosis
End-to-end rekonstruktion av aortabågen	FDH00	0	Reconstruction of the aortic arch by end-to-end anastomosing to correct interruption or i
Annan rekonstruktion vid hypoplasti eller atresi av aortabågen	FDH96	0	Other surgery to treat an interrupted or hypoplastic aortic arch
End-to-end rekonstruktion vid aortakoarktation	FDJ00	0	Reconstruction of aorta with removal of the constriction and end-to-end anastomosing t
Aortaplastik med a subclavia eller a carotis	FDJ10	0	Reconstruction of the aorta using the subclavian or carotid artery according to the meth
Aortaplastik med patch	FDJ20	0	Reconstruction of the aorta using a synthetic patch according to the method of Vossch
Annan rekonstruktion vid aortakoarktation	FDJ96	0	Other surgery to treat CC of aorta
Operation vid kärlring	FDM	0	Surgery of the aortic arch for vascular ring anomalies around the trachea and/or oesoph
Delning av annan kärlring	FDM10	0	Division of vascular ring anomalies of the aortic arch other than double arch
Annan operation vid kärlring	FDM96	0	Other surgery to correct vascular ring anomalies of the aortic arch
Annan operation för anomalier eller defekter med relation till bröstå...	FDW00	0	Other surgery to correct malformations of the thoracic or thoracoabdominal part of the ac
Andra operationer för anomalier och defekter med relation till br...	FEA	0	Other surgery to correct malformations of the thoracic or thoracoabdominal part of the ac
Slutet externt dränering av perikardiet	FEA00	0	Closed external drainage of the pericardium
Slutet externt dränering av perikardiet	FEA00	0	Closed external drainage of the pericardium
Torakoskopisk perikardiotomi	FEB51	0	External drainage of pericardium by endoscopic approach
Perikardiotomi	FEB	Unexpandable 0	Surgical opening of the pericardium, including external drainage
Exploration av perikardiet	FEB00	0	Visual examination of pericardium
Dekompression och dränering av perikardiet	FEB10	0	Decompression and drainage of pericardium due to e.g injury
Annan perikardiotomi	FEB96	0	Other procedures to create an opening in the pericardium including drainage
Perikardio-pleurostomi	FECD00	0	Drainage of pericardium to pleural cavity due to e.g. excess of fluids
Torakoskopisk perikardio-pleurostomi	FECD01	0	Drainage of pericardium to pleural cavity by endoscopic approach through the thorax w
Perikardio-peritoneostomi	FECD10	0	Drainage of pericardium to abdominal cavity
Annan intern perikardiotomi	FECD96	0	Other internal drainage of the pericardium
Sutur av perikardiet	FED000	0	Suture of pericardium due to injury, including repositioning of the heart
Sutur av perikardiet och diaphragma	FED10	0	Suture of pericardium and diaphragm due to injury, including repositioning of viscera
Annan operation vid skador på perikardiet	FED96	0	Other repair of pericardium due to injury
Torakoskopisk biopsi av perikardiet	FEF01	0	Biopsy of pericardium by endoscopic approach through the thorax wall
Excision av patologisk förändring i perikardiet	FEF10	0	Removal of lesion of pericardium
Biopsi eller excision av patologisk förändring i perikardiet	FEF	0	Biopsy or removal of lesion of the pericardium
Biopsi av perikardiet	FEF00	0	Biopsy of pericardium
Annan biopsi eller excision av patologisk förändring i perikardiet	FEF96	0	Other biopsy or removal of lesion of the pericardium
Perikardektomi	FEF00	0	Removal of pericardium
Subtotal perikardektomi	FEF10	0	Partial removal of the pericardium
Perikardektomi med dekontikation av hjärtytan	FEF20	0	Removal of pericardium and the outermost surface of the heart
Torakoskopisk perikardektomi	FEF31	0	Removal of pericardium by endoscopic approach
Resektion och exstirpation av perikardiet	FEF	0	Partial or total removal of the pericardium
Operationer på perikardiet	FE	0	Surgery of the pericardium
Intern perikardiotomi	FECD	0	Internal drainage of pericardium
Operation vid skador på perikardiet	FED	0	Repair of pericardium for injury
Annan resection eller exstirpation av perikardiet	FEF96	0	Other removal of the pericardium
Annan operation på perikardiet	FEW96	0	Other surgery on the pericardium
Andra operationer på perikardiet	FEW	0	Other surgery on the pericardium
Excision av patologisk förändring i förmak	FFA10	0	Removal of lesion of atrium of the heart
Excision av tromber i förmak	FFA20	0	Removal of thrombolus from atrium of the heart
Biopsi eller excision av patologisk förändring i förmak	FFA	Unexpandable 0	Biopsy or removal of lesion of atrium including removal of foreign body
Biopsi eller excision av patologisk förändring i förmak	FFA00	0	Biopsy or removal of lesion of atrium including removal of foreign body

Figure 1. The Spet main window



Dissection...

Code: FEF31 Source: NCSP Status: 0

Rubric: Torakoskopisk perikardektomi

Paraphrase: Removal of pericardium by endoscopic approach

Comment:

English: Thoracoscopic pericardiectomy

Deed

New item

Link: EXCLUDES_CONTEXT Value: abducting

DISSECTION

MAIN removing

ACTS_ON pericardium

HAS_APPROACH endoscope

Other

Non-analytical

Extrinsic

Remove

Duplicate

Current item

Value:

Accept Cancel Delete Revert

Figure 2. The Spet dissection window.

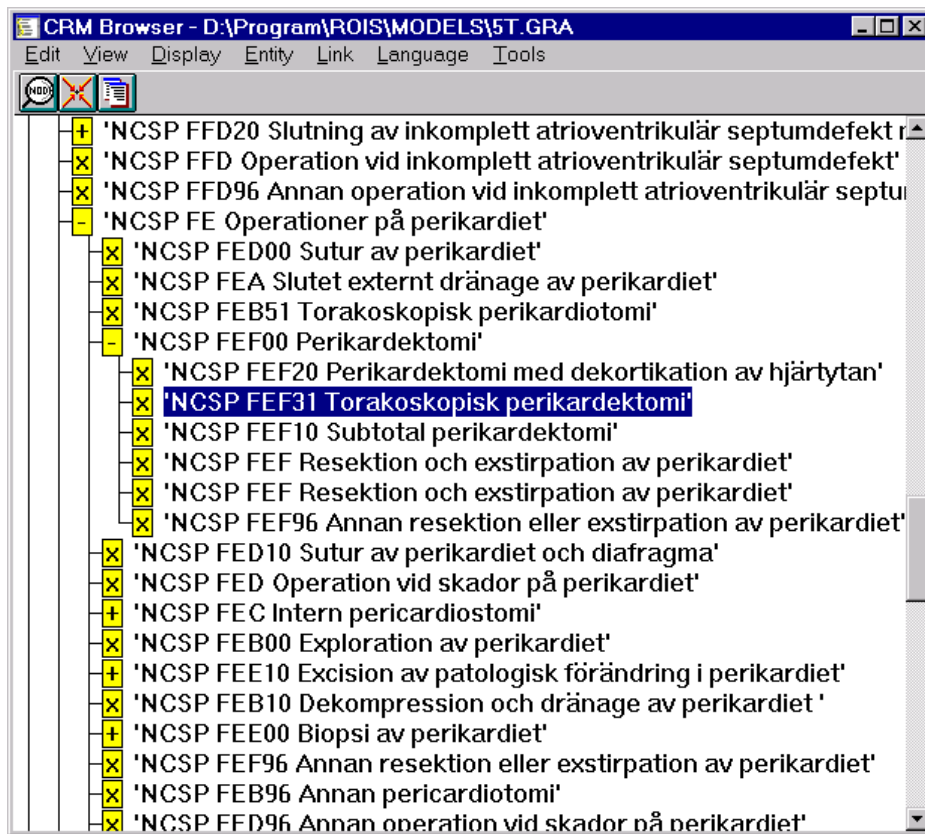


Figure 3. The CRM browser window

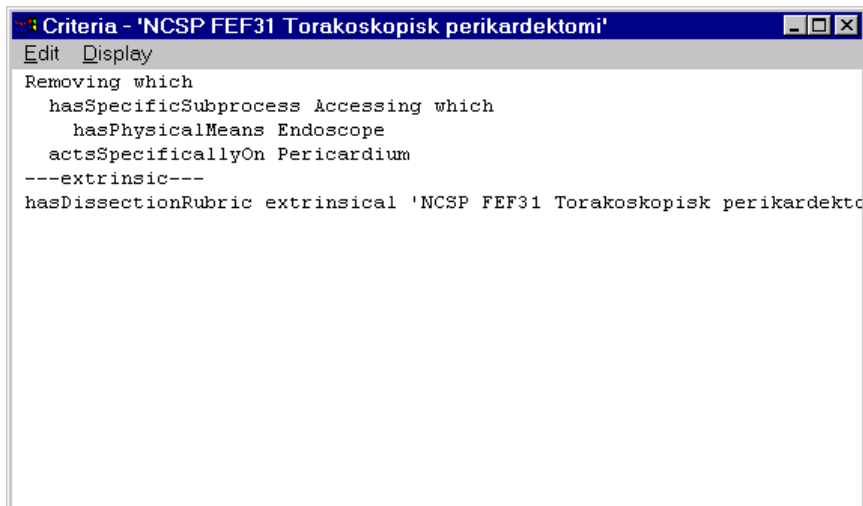


Figure 4. The criteria window, shows GRAL-code

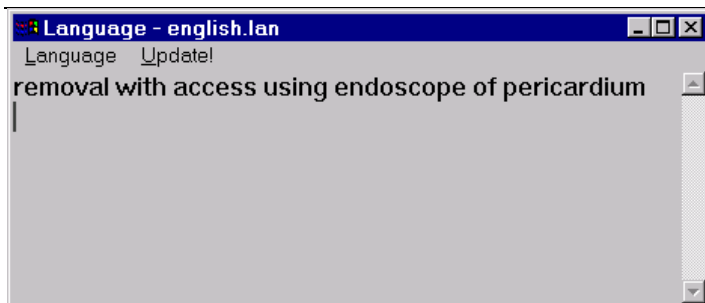


Figure 5. The language window - shows the natural language (if any) for a dissection.

The higher degree of control sometimes makes it harder to say what one wants to say, and the dissections can therefore occasionally become fairly large and somewhat unintuitive. On the whole the dedicated tool has raised the quality, and also to some extent increased the level conformity of modelling style over the centres. Also guidelines on how to model certain concepts, such as bypass procedures, has after discussions been agreed upon in the consortium as a whole.

8.2.3 The Nordic Classification of Surgical Procedures

As an example of a classification in a specific domain the Nordic surgical procedures (NCSP) has been chosen in this paper. In the early 1980's a study comparing surgical frequencies and activities was initiated by NOMESCO (Nordic Medico-Statistical Committee). This resulted in an abbreviated Nordic list of surgical procedures for Denmark, Finland, Norway and Sweden in 1989 [NOM96]. There are 20 chapters of which 15 are main chapters (A-Q), 4 are subsidiary chapters (T-U) and one is supplementary (Z). In the main chapters the codes are structured in five levels (positions):

1. The functional-anatomical body system group
2. The functional-anatomical region within the body system in question.
3. The method of the procedure, or groups of procedures.
- 4, 5. Identifies the specific procedure within the procedure group, including surgical technique and precise anatomical location.

In the subordinate chapters the body system and anatomical region are denoted by positions 2 and 3. Thus what would be shown in positions 1 and 2 in the main chapters is denoted by positions 2 and 3 in the subsidiary chapters, e.g.: UDAQ - Laryngoscopy corresponds to DQ - Larynx. Positions 4 and 5 in the subsidiary chapters are used to represent method and technique (procedure).

There is also a supplementary chapter of general qualifiers. They are applicable to almost all main and subsidiary chapters. In position 2 an X, Z or S stands for an unspecified region. These are the only groups thus far developed for the classification:

- ZX codes represent circumstances and events surrounding procedures located in the main and subsidiary chapters.
- ZZ codes denote reconstructive use of tissue. They specify where the tissue is taken from and what its nature is. Some alternatives to tissue transplantation are also represented.
- ZS codes represent a link between a current procedure and previous surgery, where position 3 in the code indicates which of the main or subsidiary chapters represent the previous surgery.

Codes from this chapter are never to be used alone.

The authors hope that the codes are representative and descriptive of the procedures used in Nordic surgical medicine, but as they say: "The code texts are however not intended to be normative for the terminology used in patient records." [NOM96].

Chapter F, which is the focus in this report, contains the procedures dealing with heart and major thoracic vessels. There are 616 rubrics and the four levels are used. Most rubrics are about surgery on valves and blood vessels in, or connected to, the heart. There are also procedures for correcting arrhythmia and problems with impulse propagation.

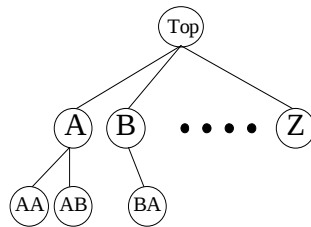


Figure 6. Structure of NCSP

8.2.4 Aggregation for follow-up and statistical reporting

A national follow-up database related to thoracic surgery was planned in 1991 and started 1992 [SoS97]. This database covers all clinics and units that perform heart surgery assisted by heart-lung machines. There are about 9000 patients and procedures per year. There are 12 units performing this kind of procedures in Sweden, and the reporting rate is 100%.

The surgeons has to report their deeds using eight fairly broad rubrics:

1. Valve surgery only
2. Coronary surgery only
3. Coronary surgery in other surgery
4. Congenital surgery
5. Transplanting surgery
6. Surgery for arrhythmia
7. Aorta-aneurysm surgery
8. Other heart surgery

To this date the years 1992-1995 have been reported. The patients are registered at the point of release from the care-unit. Half of the participating units reports by computer media. The report comes out annually, and has so far taken one year and three months to complete. The largest factor in the long completion time is that some units are late in reporting their data to the data base.

The data base is used for, and had as goal when created, to follow up and evaluate the result of heart surgery. The number of heart surgery procedures had been growing rapidly, and it was felt that some quality assurance was needed. It was necessary to get a grip on how the situation looked like in the country as a whole. Every patient is followed from the first heart surgery procedure throughout the rest of their lives. This is in order to catch the long time results of the different procedures, survivability, mortality and such.

The follow-up codes could be categorized into three types. (I) the code covers one subchapter totally and only. (II) the code covers part of a subchapter, and finally (III) the code cover parts of more than one subchapter. Type I does not cause any problems when using NCSPs structure (figure 6). It is type III that is problematic and where a concept system as such CRM could be of help. Type II is not unproblematic but positions itself between I and III and can benefit from a concept system.

8.2.5 Results

8.2.5.1 The reclassified classification

The process of modeling into the ImR is fairly straight forward. The English and the Swedish rubrics were entered. Then the paraphrase was decided upon and the modeling done from that. The paraphrase is an attempt to formulate what the rubrics really means. The SPET can generate a paraphrase in natural language from the for checking if the modeling is sensible.

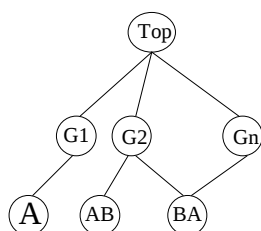


Figure 7. The CRM structure.

To reclassify, the ClaW is used. The hierarchical structure of NCSP was presented to the system (through the notion of chapters, subchapters and codes), where after all rubrics of chapter F were modeled and compiled into the GRAIL model. After these steps, analysis of NCSP could be performed, allowing the GRAIL classification engine to reclassify the NCSP codes according to their position within the CRM. The new follow-up rubrics could then be modeled and compiled into the GRAIL model with the assumption that they would subsume the expected number of NCSP codes according to the intention of the follow-up categories.

Most of the F-chapter was unproblematic, but the follow-up-rubrics did cause some problems. The 'only' statement was possible to represent in the ImR (see figure 8), but this has no meaning in GRAIL and would be expanded to figure 9. The 'only' just results in a specification of figure 10.

```

RUBRIC "Endast klaffkirurgi"
PARAPHRASE "surgical deed valve of heart, surgical deed"
ENGLISH_RUBRIC "Valve surgery only"
SOURCE "NCSP" CODE "FU1"
COMMENT "Quality assurance"
MAIN surgical deed
  ACTS_ON valve
  IS_PART_OF heart
EXCLUDES_CONTEXT OTHER surgical deed
  
```

Figure 8. ImR.

```

Process which
  involves Valve which
    isSolidRegionOf Heart
  isCharacterisedBy NON Process which
    hasDissectionCodingArtefact CodingOtherness
  --extrinsic--
  hasDissectionRubric extrinsic 'NCSP FU1 Endast klaffkirurgi'
  
```

Figure 9. The corresponding GRAIL-code.

```

Process which
  involves Valve which
    isSolidRegionOf Heart
  
```

Figure 10. GRAIL-code.

The 'isCharacterisedBy NON Process which hasDissectionCodingArtefact CodingOtherness' statement does not mean anything in GRAIL. Just as 'other' it has yet to be defined. Also, negation 'NON' is not implemented. The 'only' part of the follow-up codes has been ignored thus making follow-up code two and three equivalent, for the purpose of this study.

8.2.5.2 The new aggregated levels

The follow-up rubrics (Fu-rubric in table 1) were modeled and compiled into the GRAIL model. This was done after the F-chapter had been compiled. Following this a reclassification was done. The result is shown in table 1. A thoracic surgeon was asked to give an interpretation of how the follow-up codes are used locally by grouping the subchapters in NCSP, on the three character level, under the eight follow-up rubrics. The 'miss' and 'extra' columns in table 1 are related to the local usage (LU).

Fu-rubric	Catch	Miss	Extra	LU	Type
1	100	4	15	78	III
2	59	4	9	55	I
4	50	125	0	175	III
5	14	2	0	16	I
6	13	15	1	27	II
7	6	46	5	47	I
8	-	-	-	-	III

Table 1. Result of the comparison

The SPET also has the option of generating a paraphrase in natural language from the model made in the tool. This can be used for checking if the modelling is sensible.

8.2.6 Discussion

The follow-up rubrics did get varying results. Number one did well, with only four missed NCSP-codes. Furthermore three of those was not in the GRAIL-model at all due to the missing mapping for the ImR link WO ('WITH_OPTIONALLY' it lacked a mapping into GRAIL). The 15 extra where in accordance with the GRAIL-model since they all concerned surgical deeds on heart valves, so they could be said to be correct also from a medical perspective. The one doubtful code is FCE00 which concerns not a valve itself but a valve cavity.

Follow-up rubric two also managed well. Two of the missed codes were caused by the WO-link. The other two were procedures peripherally connected to coronary arteries: circumflex of the coronary artery branch, and artery connected to the left anterior descending coronary artery. The extras were all, except one, procedures for making a bypass to the coronary artery, and consequently arguably should be in this group. The last one was related to the coronary sinus.

For follow-up rubric three it became obvious that there is also the problem of interpreting the original follow-up rubrics. The semantics are not always clear. This is reflected by the fact that our surgeon did not group anything under this rubric.

Nine of the misses for follow-up rubric number four were caused by the WO-link cause, but the rest were caused by other things. Phenomenons like stenosis and chronic lesion, as also planar defect was not subsumed by the rubric, probably because they do not have to be congenital. But also congenital lesion was missed.

The two missed by rubric five was due to the modeling in ImR. They where modeled as surgery that occurs *during* transplanting, not as transplanting as such, thus not being subsumed by the follow-up rubric.

Rubric six had only one extra code as compared to the surgeons model. But this is due only to the fact that this code was explicitly excepted from the group that the rubric should catch. From the GRAIL-model point of view the subsumation was correct. The aggregation missed cardiac dysrhythmia and atrail fibrillation plus 'EctopicCardiacDepolarisingFocus' and 'DisorderOfMyocardialConduction'.

The poor result of rubric seven is due to how the NCSP codes concerning aneurysms have been modeled in SPET. Often the descriptor 'aneurysm' has not been used, thus causing the follow-up rubric to fail to subsume. This is a case of semantic omission when the NCSP-codes either state or imply by their position in the classification that they concern aneurysms, but the modeler has not taken this into account. Of the extra ones only one is correct, the other are aneurysms in the heart. They were subsumed due to the necessity to construct a more general follow-up rubric in order to subsume anything at all.

The fact that rubric eight did not catch anything is due to the handling of 'other' in GRAIL. This was known and was thus ignored for the scope of this study.

Some NCSP rubrics were subsumed by more than one follow-up rubric. This follows logically from how the GRAIL model is built and was also the case in the local usage of the follow-up codes.

The main difference comes from the fact that NCSP and CRM have different structures. The classification is structured by organs and organ systems, mostly. But there are also chapters especially for endoscopic procedures and minor surgery[NOM96]. The CRM is structured according to anatomic structure[Rec]. Therefore it is natural that some differences occurs (compare figure 1 and 2).

One problem in the original classification (NCSP) besides the sometimes unintuitive structure is the granularity. It does not always correspond with what the physicians want to express. Sometimes the granularity is insufficient and sometimes it is too detailed. On the other hand, the CRM can be hard to understand without training. On a superficial level it is quite easy to understand, but on a deeper level, the subtleties can be very hard to grasp.

On the whole it can be said that what was captured by the follow-up rubrics seems reasonable, but there was a significant set missed. It seems like the sensitivity of how rubrics were modeled were great. Also, since many factors are influenced by how the CRM is modeled it can be hard to know which modeling strategy will yield what result. A certain amount of trial and error is involved, if the modeler does not have insight into how the CRM is modeled.

One interesting thing is the modeling of heart valve in follow-up rubric one. Three different modelings where used,

with varying results. At a superficial level these three modelings may seem analogous:

- 1 Valve HAS_LOCATION heart
- 2 Valve IS_PART_OF heart
- 3 Heartvalve

becomes in GRAIL:

- 1 Valve which <involves Heart>
- 2 Valve which <isSolidRegionOf Heart>
- 3 MajorHeartValve

However, when looked at closely there are some semantic differences:

valve IS_PART_OF heart

...would subsume all of the major heart valves, plus the in utero one, and all mechanical or biological implant valves. The common thread is that they are all valves, and they are all in some way 'part of' the heart.

valve HAS_LOCATION heart

...would not subsume any of the above, but might subsume the notion of an artificial venous valve originally sited somewhere else in the body but which has become dislodged, floated up the venous system until it enters the heart and becomes stuck there. In such a situation, such a valve would be located in, but not part of, the heart.

Some NCSP rubrics having the (apparent) same GRAIL code end up as separate nodes in the GRAIL model. If looked upon in the full GRAIL-notation it becomes clear they have slightly different contexts. I.e. 'hasContextOfCodeNamed 'FGW96"' and 'hasContextOfCodeNamed 'FGW"'. This might seem irrelevant at first glance, but the relevance becomes apparent when the place of the rubrics in the classification is taken into account. The information might not be useful in GRAIL itself, but can be used by an application utilizing a terminology server build on GRAIL. So even if the 'context' attribute does not change anything in how the GRAIL code is handled by the terminology server, the information is useful for a classification application.

One way to use the GALEN tools is to devise new follow-up rubrics, starting from the structure in the CRM. Finding alternative follow-up rubrics can be a fairly complicated task, since the knowledge embedded in the CRM is not always readily accessible without deeper insight in how the model is built.

The ImR works well, specially in conjunction with the dedicated tool. The problems that arise might have more to do with the SPET than the ImR per se. Descriptors may only be placed at one position in the descriptor hierarchy, which sometimes leads to problems of expressional power. It becomes cumbersome to say what you want to say in some cases. Most of the time this is a case of keeping to a certain style in order for the classification codes to be compiled into the correct place in the GRAIL-model. But there are also examples of when the ImR becomes unnecessarily hard to do. The benefits of structure and mapping to GRAIL outweighs this. In the few cases where it is relevant the mapping from ImR to GRAIL can be made by hand, by an individual so trained.

The exercise of finding which style is most beneficial to model in is an iterative process, and will be reached by discussions between coding centers. An example of this is the bypass procedure. First it was modeled by some as a surgical deed ('bypassing') that acted on some coronary blood vessel. But this caused problems with the procedures for removing bypasses. So it was agreed that the deed is 'creating' a bypass structure, which then can be removed.

There seems to be a general agreement that formal systems are a good thing, but there is also an assumption that those formal systems are going to have to represent faithfully all the existing systems. The fact is that the existing systems can not be represented faithfully because they are informal, inconsistent or use logical constructs like negation that are basically extremely difficult to compute in the worst case. 'other' is an obvious example of this. I.e. in Read 3 such things as NOS are marked 'optional' and can be filtered out. This since they are deemed not clinically useful by the specialty working groups[Cam97]. These concepts usually are remnants from earlier versions and especially residuals from formal classifications.

There is a movement towards removing NOS, NES, and 'other' from classifications[Cam97, Rob97]. But all do not agree, some argue that the classifications are complementary to concept systems and due to their different purpose classifications need NOS, NES and 'other'[Ing98]. This is because they are used statistically and to answer specific questions.

8.2.7 Conclusion

In regard to the aggregation of new follow-up codes, or validating old ones, the GALEN tools are helpful. This especially for type III, for which there are no support in classical classifications, like NCSP. Also when devising new follow-up codes the kind of facilities the GALEN tools provide are of help.

The reasons for NCSP codes to end up in the wrong place in the GRAIL-model and the follow-up rubrics not subsuming what could be expected are several.

Firstly, modelers make mistakes when modeling in the ImR, i.e. by semantic omission as for follow-up rubric seven. There might also be a certain amount of inconsistency in their modeling.

Secondly, negation in different forms, such as 'other', 'only' and 'not' causes problems for formal systems, but are useful for statistical classifications.

Thirdly, the mapping from ImR to GRAIL is opaque for the modelers, making it hard to predict the behavior of the modeled codes.

Lastly, the CRM is not easy to grasp in all its glory and complexity. This leading to misunderstandings and misinterpretations from the ImR-modelers side.

In spite of these problems our study indicates the potential power of the GALEN tools in that they provide modelers with methods for handling of some of the inherent problems with strict traditional classifications; lack of multiple views and flexibility in generation of new aggregation levels.

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8.3 USE (France)

Quality Assurance GALEN-IN-USE application in the French co-operative centre University of Saint Etienne (USE)

8.3.1 BACKGROUND

The French co-operative centre applies the Galen methodology in tool in a context different from the 3 other initial centres

1.1. CCAM (French eponym for Classification Commune des Actes Médicaux) is a new coding system developed since 1994 by a joint effort of the ministry of health and of the national agency of the mandatory health insurance system. It is planned to be implemented for the year 2001.

It is a very complex process with traditional steps based on the consensus of clinical experts and one step devoted to the semantic analysis to insure quality, consistency and clear meaning before being mapped to relative value units necessary to fix the fee of the physician doing such procedure on a fee for service basis

1.2. Natural language generation tools (LNAT Geneva) is used to return the results of the Galen representation with the claw (mainly *spet* and *tiggerke*) to the French experts of the CCAM group

8.3.2 PROCESS

The GALEN Methodology for classification management is designed to reconcile users' needs for simplicity with the requirements for a re-usable harmonised set of classifications across Europe. The basic strategy is to separate user tools and representations in the individual collaborating centres from the knowledge engineering tools and representations provided by the GALEN central.

This basic strategy has been adapted to the needs of each of the four collaborating centres and five participating centres. The flexibility is best illustrated by the procedures used by the French centre at University of St Etienne in its coordinating role in developing the new French classification of surgical procedures, CCAM. The complete flow is shown in Figure 6.

University of St Etienne is itself acting as a coordinating centre for a number of other French efforts who provide them with the basic material which they process using the Classification Workbench. They must maintain communication both with the other French centres and also with GALEN central services in Manchester and Geneva.

The result is to produce two different outcomes:

- An agreed and validated French classification for procedures

- Additional material to be incorporated into the Common Reference Model and additional descriptors and templates for the Intermediate Representation.

The French experience demonstrates the flexibility and importance of the loose coupling in the GALEN-IN-USE approach. The generation of natural language expressions has been particularly important to the French sites. The generated natural language provides a means by which the independent clinical experts can check the results without having to have any knowledge of even the Intermediate Representation.

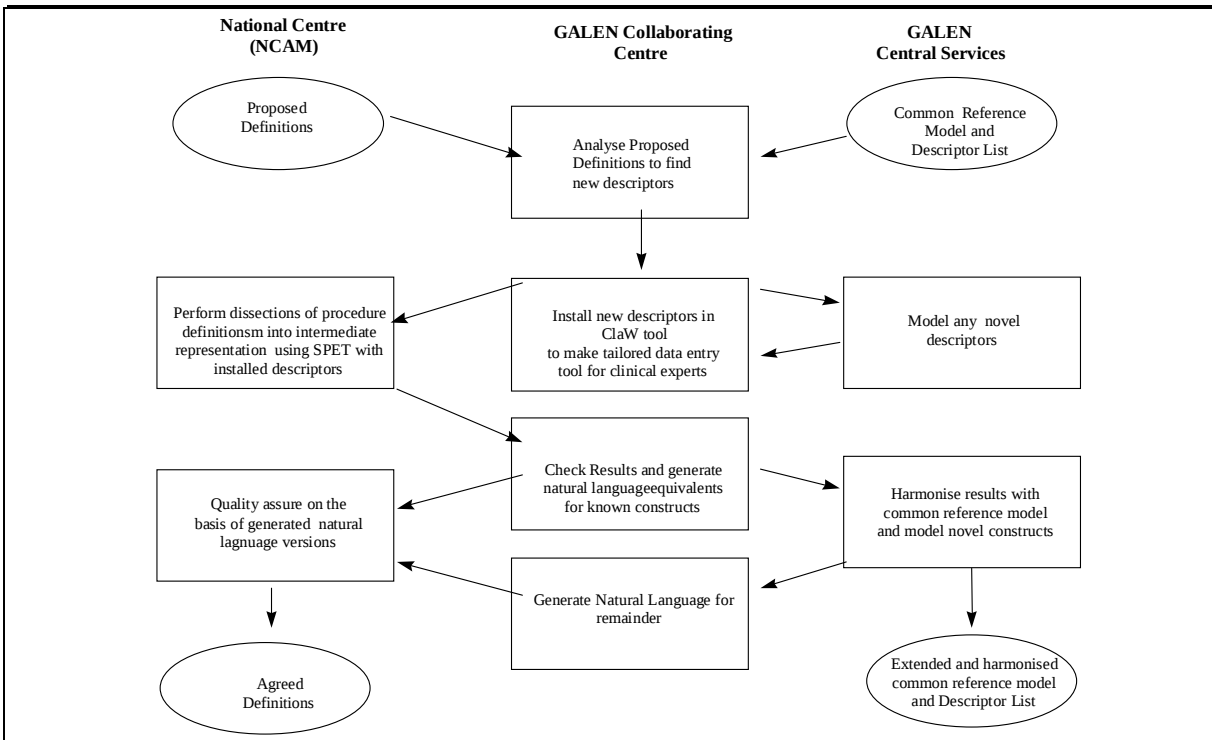


Figure1: Diagrammatic summary of the work flow in the French adaptation of the GALEN methodology. This diagram illustrates how the use of the Intermediate Representation for input and natural language for output allows tasks to be allocated to those best able to perform them. The national centre's usual panel of experts can participate fully but require only modest training because they have no need to know the details of the formal GALEN Common Reference Model. They need only understand the intermediate representation in Classification Workbench and check the natural language output (in French) to determine if the result captures the intended meaning. The GALEN national centre can co-ordinate the activities and provide a complete service except where novel material is produced which cannot be accommodated within the existing model. When this occurs, the material is referred to the GALEN Central Services group who update the model appropriately.

8.3.2.1 INTERMEDIATE REPRESENTATION

3 Steps

2.1.1. Training of junior physicians to dissect and the goals of CCAM: 12 persons have been trained with a one day program

2.1.2. Dissection by the junior physicians

2.1.3. Review of all the dissections (6000 since 1996) by Pr J.M Rodrigues (JMR) and corrections (10 % major, 50 % minor)

2.1.4. Review of all the dissections by VUM (5 % major corrections, 20 % minor corrections)

8.3.2.2 GRAIL MAPPING

2.2.1. Grail mapping with tiggerke

2.2.2. Review of the grail representation and corrections of the invalid sanctions (5 %)

8.3.2.3 NATURAL LANGUAGE GENERATION

2.3.1. Production of the new annotations with NLP LNAT in USE

2.3.2. Generation of the rubrics from the grail representations and the annotations in Geneva

8.3.2.4 COMPARATIVE ANALYSIS between Initial rubrics and generated rubrics(USE ,Geneva and CCAM)

- It is the most important QA.

- In 3 % there is NO RELATION between initial meaning and the generated one : in most of the cases this is related to inconsistencies from the initial rubrics
- For a decreasing figure around 30 % there are important differences between initial and generated rubrics:
- For 1/3 of cases (10 % of the rubrics represented in grail) there is a mistake related to the dissection (90 %) or to the grail representation (10 %)
- For 2/3 of cases (20 % of the rubrics represented in grail) the differences are related to ambiguities or inconsistencies of the initial rubrics
- There 20 % additional cases where the differences are minor due to the explicit and pedantic description of the generated rubrics
- A little bit less than half of the cases (47 %) are not showing real differences between the initial and the generated rubrics
- 3 chapters to 14 are finalised to day
 - Neuro-surgery
 - Ear Nose and Throat
 - Urology surgery

8.3.2.5 CONCLUSION

The association of NLP (LNAT) linguistic tools to the artificial intelligence tools of Galen has strongly facilitated the QA of the process for 2 reasons

- 1 The assessment can be done by the final users (CCAM experts and Clinical experts) different from the people involved in the process . They have no difficulties to analyse the generated rubrics
- 2 The comparison of natural language has a strong discriminating power to assess the differences and to find even minimal mistakes of the artificial intelligence tools.
- 3 The QA done by USE Geneva and CCAM can considerably increase the quality of the Galen core model

8.4 ID GMBH (Germany)

The currently in Germany used procedure classification is the German version of the ICPM Version 1.1 . The mandatory part of that classification is called ,Operationenschlüssel according to § 301 SGB V (OPS-301)‘. The editor of the mandatory part is the DIMDI (Deutsches Institut für medizinische Dokumentation und Information). The editor of the complete classification is the Friedrich-Wingert-Foundation. The OPS contains mainly the chapters of ICPM needed for the german reimbursement system. Most of that stays on a 5digit level even in areas where the ICPM offers a more detailed information on 6digit level. The development of the german version of ICPM was carried out by ID on behalf of the Friedrich-Wingert-Foundation. Until 1998 ID was maintaining both classifications (ICPM including OPS) on behalf of DIMDI and Friedrich-Wingert-Foundation. Now the responsibility for the OPS has moved to the DIMDI, but the complete ICPM is still edited and even further developed by the Friedrich-Wingert-Foundation which has transmitted the work to ID.

The starting point for the development of the german ICPM was the ,WCC-Standaardclassificatie van medisch specialistische verrichtingen versie 2.0‘ because this was considered the most useful procedure-classification of this time by the AIM project SESAME. First it was translated into German and then the whole classification was restructured and extended where needed and finally revised by the german medical associations. Especially the chapters on diagnostic, preventive, other therapeutic and ancillary procedures have been heavily extended. The chapter on surgical procedures has been restructured and rearranged and extended in a lot of different areas e.g. neurosurgery, procedures on blood vessels, plastic surgery and the operations on musculoskeletal system.

In the meantime the WCC classification has been revised too. Now available is the version 2.4. The main structure of the classification has not been changed although it has been extended for new procedures e.g. surgery with laparoscopic approach. Mainly have been codes added with new value instead of changing the value of already existing codes.

The main goal of the validation was to harmonize both classifications which are build on the basis but with different developments and main emphasis. For the validation work within Galen-in-use we choose the chapter of operations on the musculoskeletal system and there the part of reduction of fractures and dislocations. This was for more than one reason. First a lot of changes have been carried out during the development of the german ICPM and even the opinions of the different medical associations involved in this process have been divided. And there are still discussions going on over the usability of this chapter of ICPM and what changes are needed to make the structure more transparent. The ICPM uses four different levels for the differentiation of the reduction of a fracture. On 4digit level there are the open and closed reduction, simple and multifragmentary fractures, long bones and short bones, a special section for fractures of talus, calcaneus, pelvic rim, pelvic ring, acetabulum and head of femur. On the 5digit level follows always the device used for fixation and finally the 6digit level gives a second information of the anatomical site. Not included in this area of the ICPM are the fractures of the vertebral column, skull and thorax.

The second reason for choosing this area was that the musculoskeletal system was one of the first areas covered by the Galen-model and a lot of manually authored dissections on that chapter of the dutch classification have been already carried out and made available for further work. So it was expected that there the model itself would be mostly complete and the main number of descriptors needed to dissect the rubrics were already available.

We focused the work on the codes and rubrics under the header of the 3digit code 5-79 in the dutch and the german version of ICPM. At least this 3digit groupcode is the still the same. The group 5-79 of the german ICPM contains 832 different medical sensible codes. To represent all the rubrics covered by this 6digit codes 995 dissections had to be authored. The same codearea of the dutch classification is covered by 503 rubrics which represent 358 different codes. Because of the differentiation of the fixation material on the 5digit level in the german ICPM, it was expected that there not yet all descriptors needed would be available. We had to add 5 descriptors for different fixation devices. The time needed to complete the 995 dissections was about two weeks for one person with not working all day on the dissections. To author one dissection took less than five minutes. The main problem encountered was finding the right descriptor within the plenty of available descriptors or to add a descriptor in the most appropriate category. And it was rather difficult to decide whether a new descriptor is really needed or whether it is already available as synonym or slightly different word especially for users with English as a foreign language. After dissecting the first rubric of one 5digit code the rest of the dissections followed rather easy because it was then just changing the anatomical site. To describe all anatomical sites within the rubrics 5 more descriptors were needed and added. But after adding a descriptor the expanding of the dissections to GRAIL is not working anymore properly because of the missing mappings. To get the full usefulness of the tools and the model without being dependent on someone else is just to learn the modelling and Grail yourself.

The plan was to create a complete collection of all surgical procedures on fractures and build a new harmonized classification on that collection. But by simply examine the same area of codes it is not to fulfill. The dutch classification includes other localisations then the german version e.g. the reposition of fractures of the vertebral column. So it would be necessary to dissect a lot of different parts of different parts of both classifications to obtain all

informations needed to create a complete new classification. And probably only a examination of both classifications in complete would give us the opportunity to spot the areas of real differences of the schemes and not only the detection of rubrics added or deleted in one of the two.

8.5 STAKES (Finland)

8.5.1 General

Our task in the Galen-in-use -project was to test the Galen technology. Additionally we have investigated the possibilities for implementation to the Finnish language. The first tutorial was arranged in December 97 in Belgium and a second in April 98 in Manchester. At these meetings the goals of the project were discussed. The persons working with the Galen-in-use project were Martti Virtanen and Mikko Mattila.

We are the newest co-workers in the project. The Galen-in-use project introduces new aspects into the classification work. Classification protocols are always one step behind the medical progress. The Galen technology may give an opportunity to speed up the development of the classifications.

We find Galen technology very promising. It is designed to serve many groups: researchers, clinicians and people creating classifications. The protocol is intelligent and is not a dumb and passive catalogue of words.

In every sense the short experience we have had with the Galen technology has proven rich and promising. Still a lot of work has to be done and a lot of checking and testing is obviously under task.

8.5.2 Windows 95

We work presently operating with Windows 95, which has proven to be unstable. The problems of the operating system gravely influence the reliability of the Galen technology. The unstable operating system requires more stability from the software than normally. One of the biggest problems we faced was the situation where Windows 95 crashed and the models got corrupted. This happened several times and meant that the software had to be installed from the beginning and the work was lost. This is still a big problem. Backup copies cannot be made when the model is open. Exporting the work for backup several times daily slows the work.

8.5.3 The Finnish Language

Finnish language is part of the Finno-Ugrian language family. It has developed under the influence of Russian and Germanic languages. Particularly we Finns have been clever in keeping the language unique. As in any other language the development of the language has features that make the language independent.

Finnish is a language where noun cases expressed in suffix form make the structure of the grammar. This particular feature makes the language difficult to master especially in computer programs. Suffix structures don't have an exact paradigm. Exceptions to the rules are more than common. In order to create a specific protocol in language conversion, it means that a grammatical conversion generator should be created or implemented. Such converters are already available. Our language has 27-29 cases in nouns, which are used in order to replace prepositions. The cases are expressed with suffixes. The same suffixes are also used in describing adjectives.

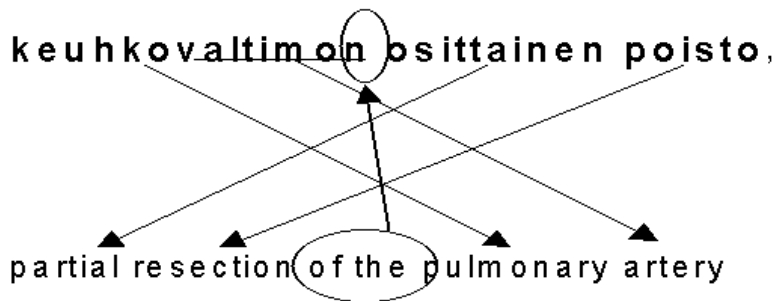
Kaunis tyttö	pretty girl	nominative or basic case
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Kauniin tytön	pretty girl's	genitive
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Kauniille tytölle	to a pretty girl	allative
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Word order is less strict than in English. In this respect the implementation of the terminological protocol of Galen technology is less complicated in Finnish. Because of the non-prepositional feature of the language the word order has however certain unique features.

Example :



This example demonstrates how the word order is altered and how the suffixes work in Finnish. Pulmonary artery gets the genitive form when used in a phrase that expresses "owning" a feature or structure.

Another typical feature of the Finnish language is the use of compound words. Many terms expressed in English with two or three words are expressed in Finnish with one compound word.

Example:

Pulmonary artery keuhkovaltimo

This particular feature is also found helpful in the Grail language. One concept, which is expressed, with two or three words are joined to form compound words.

English Finnish Grail language

Pulmonary artery keuhkovaltimo PulmonaryArtery

This common feature makes the implementation of Galen technology to Finnish easier.

8.5.4 The Learning Procedure in working with the Galen technology

We have also focused our work to efficiency and user friendliness of the Galen technology. One of the key issues has been how the user learns the protocol of the tool. If the protocol is easy to learn, it means an easy access to the tool and better popularity. We have to struggle for WYSIWYL, "what you see is what you learn"!

Computer software users are forced in a union with the Microsoft Company without proper marriage settlement. Because Microsoft is clearly the market leader in software products, it is obvious that habits and working methods are Microsoft bound. A new product coming to market is facing a dilemma: should the product have features well known to the public or is it worth taking the risk and creating a better protocol. The creators of the Galen technology have also faced this problem. Most common user facilities are provided in the Microsoft protocol: shortcut keys, clipboards, and outlook of the tool.

Because of several problems our introduction to the Galen technology has happened without proper first hand tutoring. Martti Virtanen got a hasty view in Belgium on two days in December 97. Additionally we had only the manuals of the β-version that were included in the CD-ROM of the model 5n. Therefore we Finns had an excellent a priori field testing of the tool.

The first problem was of course assembling the program. With the manual coming along with the CD-ROM the set-up was easily accessed. The assembling procedure was certainly in a common user level. The manual still clearly lacked instructions in how to actually make a dissection. Detailed information from the lexicons and from their development within the work was missing. Also we found that updates were causing problems, both in installing and actually working with the tool. More detailed information should be included with the updates. Updating the version had logical errors; e.g. the newer versions did not support previous versions, which creates unexpected problems.

Most of the problems were generated from the export and import features. The exporting of the file is difficult because the program doesn't save the unfinished work. Only the ready-made dissections could be exported. The backup got corrupted far too often.

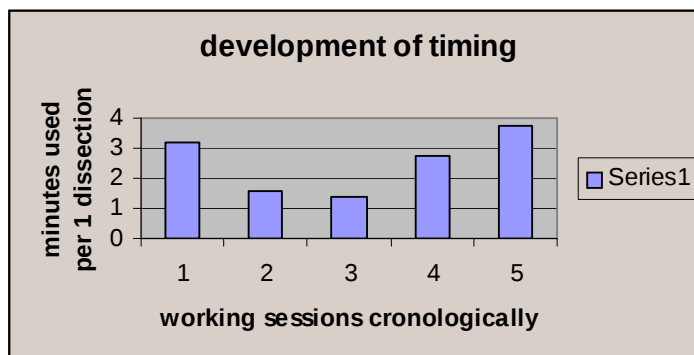
Clearly these are problems that must be solved before a public release.

8.5.4.1 Dissections

We started our work with the dissections. We dissected terms from the Nomesco classification of surgical procedures

and translated them into Grail language. The quality of the dissections will determine directly how well the ROIS generator works. One issue under discussion was the speed. How fast the dissections could be made? We made timings on several occasions. The time spent on one dissection varied vastly. On the chart below is described some averages on dissections preceding each other. Experience doesn't necessarily mean shorter dissection periods. Also it should be noticed that when the time gets shorter the quality gets worse. This means that more time is spent to corrections.

In Manchester, in April 98, the issues discussed were on the levels of terminology, the faults found in the program,



changes that would make the tool more reliable and user-friendly. We had made dissections with the tool version 5n and later on different versions up to 5q.

Already at the beginning of the work it was obvious that we were working with a tool that would benefit the user if tutoring was provided. Many of the features were left unrecognised, when working with the method of "trying and getting it wrong". After tutoring many helpful features were found. Using the β -version quickly gave us the impression that the tool could be a useful in making e.g. classification analyses. It is obvious that proper manuals are available after the programming is finished and the tool is tested.

Manuals as they are generally found difficult to read and understand (ref. Pirsig RM, Zen and The Art of Motorcycle Maintenance).

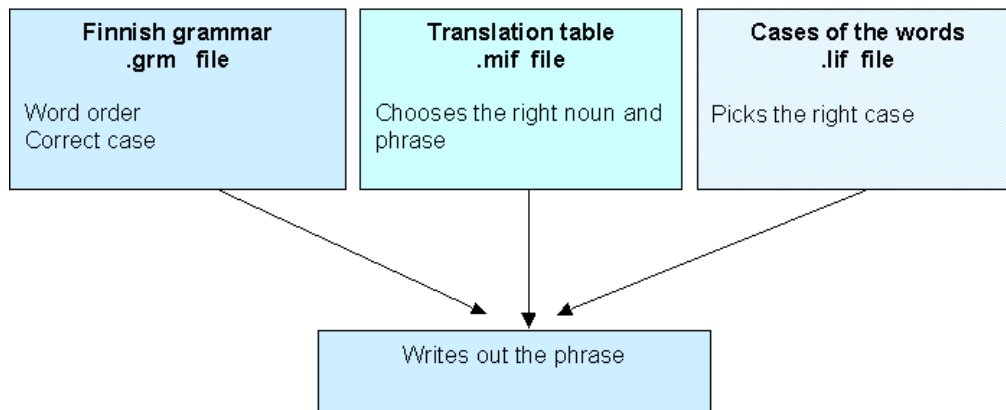
8.5.4.2 The translation

Our other main goals in the Galen-in-use project was the translation of the Grail into Finnish and implementation of our "non prepositional" language into the Galen technology. Now after the preliminary work and doing comparisons with the LEIKE project and its already working grammar concept, we are convinced that the ROIS generator is suitable also for Finnish.

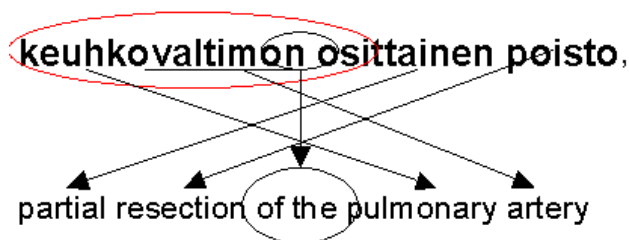
The ROIS generator works with the translation links in the **.mif** file, the descriptions of the words in the **.lif** file, and the grammar in the **.grm** file. The **.mif** file includes translation and phrase information.

The ROIS generator uses the Grail language and implements the Finnish grammar in following order:

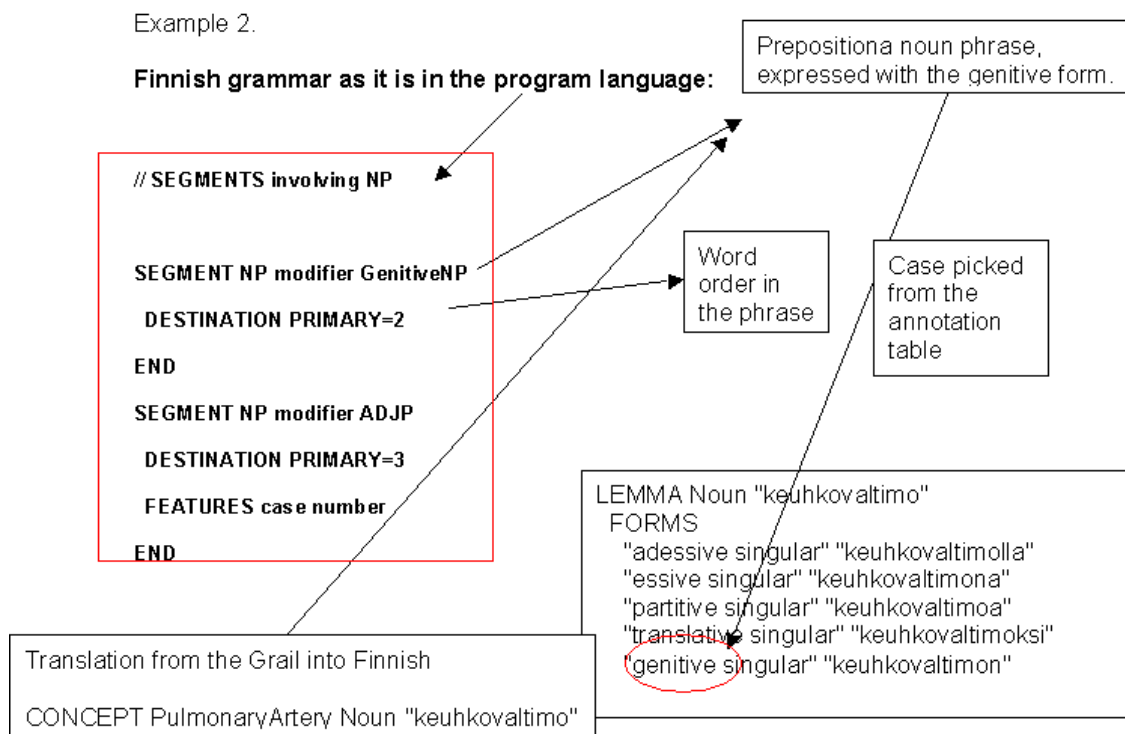
1. ROIS takes the appropriate noun from the translation.
2. ROIS chooses the right phrase.
3. ROIS chooses the correct noun case.
4. ROIS checks the word order.
5. ROIS writes the phrase out.



Example 1.



ROIS generator selects the noun case from a list of all possible noun cases in .lif file. This causes the problem that the .lif file will eventually grow 27-29 times bigger compared to the English lexicon, due to the fact that Finnish has so many noun cases. Also updating requires grammatical work every time a new term is interpreted. We have done some preliminary discussions with Finnish software companies working with language programs in order to solve this problem.



These examples show how the phrase "resection of the pulmonary artery", and the particularly the phrase "of the pulmonary artery" is translated.

The example is an easy one. When the phrases get more complicated the terminological protocol of the Galen technology becomes dominating, and the translated Finnish tends to get more Anglo-Saxic. This is not necessarily a bad feature. One could say that the Galen technology is enriching the expression. Grammatically the Galen modified Finnish is quite legible, somewhat awkward but perhaps, when the program is working as it should, more logical in structure.

8.5.4.3 Summary

The implementation of the technology into Finnish surroundings requires a lot of grammatical research and a stable platform. It is necessary to develop the Finnish concept to Galen technology in a surrounding which is not changing all the time.

Terminological work is a puzzle of many bits. Terms are developed to express administrative, clinical or for example social needs. The Galen technology is a good tool in unifying similar terms, creating new ones or studying old ones.

Big step forward in creating an electronic patient record (EPR) is also being taken. The EPR development needs tools like in Galen technology. A bulk compound of phrases is the model patient records have been shared for years. The development of a record in electronic form with the same concept is not wise and hardly satisfies the visions of the modern teletechnical society.

8.6 CIM (Belgium)

By this message, I wish to inform you that a diskette with "dissected" CPT4 and INAMI Codes" in orthopedics has been sent to you by mail, as a result of our work in Galen in use.

Furthermore, we had planned in supplement to the project, to try to map INAMI Codes in order to apply them to APGs. We had to abandon this exercise because of a too great gap between the content of these two coding systems, that were built with too different objectives, with too diverse updating schemes.

The complexity of this mapping has been studied by Dr. Renato BARRIOS, has produced a report in French, that is annexed.

Results of such mapping are now expected to be inadequate for further use.

A direct use of CPT4 cannot be proposed in Belgium, given the local INAMI Code, and a modification of this local code would require agreement by official instances.

We have therefore limited our work to the dissection of terms, as expected by the contract "Galen in Use" and could not go much further. This exercise proved to be possible but our mapping goal could not be reached

If you need more information, please contact me.

Yours sincerely,

Prof. F.H. ROGER FRANCE
President de l'Ecole de Sante Publique
President of the School of Public Health

Editors remark: The report of the mapping exercise was not received at the closing date for this document. The interested reader should contact Professor Roger directly

8.7 CMITD (Greece)

GALEN IN USE

Validation Report from the Greek Classification Center

Our participation in the GIU project begun with the translation of the CORE model into Greek, in order to have this database available in our language. Most of the model has been translated but there are still some parts remaining due to the lack of corresponding phrases used in Greek.

The second step was to analyze the Greek language both grammatically and syntactically. This has been the most challenging part since the Greek language is quite complicated. Many grammatical and syntactical rules have been used in order to generate phrases into Greek. The result is very impressive and phrases that have been generated are grammatically and syntactically correct.

Another task was to dissect the ICD classification of diseases into Greek. Our interest has focused on the Cardiological part of the classification. The Greek dissection cover all the diseases of Cardiovascular system and have been sent to Manchester for corrections and suggestions. As a result the part of the ICD classification concerning the Cardiovascular system is now translated into Greek.

Calen In Use suggests an alternative way to overcome the lack of standard representation of medical information across Europe. It provides a common model of concepts which can be used by many different countries. Additionally, the multilingual dimension of the model makes it easier to be adapted by each country and thus used by information and medical specialists. It is very promising to see a specific concept being translated into different European languages.

This common background could be part of the systems developed to serve different needs such as medical records, bibliographic retrieval and decision making.

8.8 CCC (United Kingdom): Analysis of similarities and differences between the Read and Galen ontologies

8.8.1 Summary

This document is a follow-up to Appendix 2 of the GALEN-IN-USE Deliverable 9.2 (TeleKnoME Knowledge Management and Version Control Environment with Telematic Support) and to a draft preliminary report submitted to CCC in June 1998. It represents the analysis of the results of comparisons between the Read and Galen hierarchies in the domains of Cardiovascular Surgery, Ear Procedures, Male Genitourinary Procedures, Gynaecological Procedures, Endocrine Procedures and Lymphatic Procedures. The aims of the analysis are to highlight similarities and differences between the hierarchies, and to see whether an analysis of these differences could provide useful information to allow the validation and extension of both schemes.

8.8.2 Background

GALEN is involved in mapping existing coding & classification schemes to Grail (a formal compositional system) as part of the GALEN-IN-USE project. The Grail classifier automatically infers a classification hierarchy based on the declared structure and properties of elements in the Grail model. By mapping elements from other coding schemes to GRAIL, therefore, it is possible to organise and classify them formally. This formal approach can help to validate manually asserted hierarchies by easily highlighting inconsistencies or omissions. The Grail modelling language is necessarily complicated, and for this reason a simpler intermediate representation language was introduced to allow clinicians to represent the elements of existing coding/classification schemes in a form that can be easily translated into Grail ['Dissections'], while protecting them from bewildering complexity.

The Read codes have a manually asserted hierarchy, but is also introducing a structural description of its codes by means of 'templates' with the aim of providing additional information to aid querying of the terminological database. Thus, both Read templates and GALEN dissections attempt to represent the structure of a code or term.

The results of the preliminary experiments (detailed in Galen-In-Use Deliverable 9.2) show that it is possible to semi-automatically transform Read templates (with their corresponding Read codes) into dissections, and that comparisons are possible between the Grail model and the Read hierarchy which could be potentially useful to both organisations. The primary experiments were on a limited scale discovering 425 parent-child relationship from an initial template set equivalent to 162 dissections, and one issue raised from these experiments is whether the process of comparison can be successfully scaled. The draft document circulated in June 1998 described further experiments involving the translation of 1376 Read templates into Grail during the analysis of which 4762 parent-child relationships were discovered on comparison with the Grail hierarchy. Thus, the sample size was approximately ten times that of the initial experiments. As a result of those experiments, approximately 150 changes were made to the Read ontology in the domain of Cardiovascular Procedures.

After the analysis of the Cardiovascular procedures and the ensuing discussions, a number of issues were identified relating to the aims and benefits hoped to be gained by Read and Galen as a result of their collaboration. For example, the asserted Read hierarchy uses a single axis based on anatomy, and CCC are particularly interested in differences between their classification and the Galen classification where this is the result of different underlying anatomical models. In addition, CCC is interested to identify concepts with different Read codes that they feel are adequately and uniquely represented in their atomisations, but which compile into the same concept when translated into Grail.

8.8.3 Method

Read codes and templates were imported and transformed into the Galen intermediate representation language, expanded into Grail and compiled into the Galen model. Then the asserted Read hierarchy was compared with the automatically generated hierarchy inferred by the Galen classifier based on the asserted information in the read templates.

The tools required to perform this analysis were initially developed in July 1997 to perform the initial feasibility experiments. They exist within the overall environment of the KnoME (the Grail Knowledge Modelling environment). The tools were further developed to increase their power and ease of use.

The process for the current work is similar to that of the initial experiments:

8.8.3.1 Loading Read templates from file

The CCC provided three files within each procedure sub-domain. One represents the templates themselves, the second represents the 'editorial status' of each of the templates, and the third represents the asserted Read hierarchy relating the templates to each other.

8.8.3.2 Converting Read codes to dissections within the GALEN Intermediate Representation.

The CCC provided a subsection of their current working database in a standard ASCII relational database format. The KnoME parses this into an object-oriented structure for further examination and processing. Read codes used within the templates are extracted and maintained. This approach provides a convenient way of being able to interactively explore the structure and usage of the templates and codes.

8.8.3.3 Converting dissections to Grail, and compiling them into the GALEN Common Reference Model (CRM).

As previously described in the Deliverable 9.2 the process of translating the Read atomisations into Grail is identical to that used to support the work of the participating Galen-in-Use classification centres. It consists of three steps, managed within a specifically designed tool-set called the Tigger. The Tigger creates 'dissections' in an intermediate representation to allow clinicians to author semantic representations of medical concepts without having to endure the complexities of Grail. In the Galen-in-Use classification centres, dissections are authored in a purpose-built tool. Once the Read templates have been imported in to the Read tool, they can be treated as dissections in the Galen Intermediate Representation, notwithstanding the different authoring environment. The three steps are as follows:

Link mapping

The links between descriptors must be mapped to appropriate Grail attributes or attribute-concept-attribute chains. There may be multiple context-dependant mappings for each link. This stage is done manually.

Descriptor mapping

The Read descriptors are mapped to appropriate Grail concepts. This task is semi-automatic because certain concepts already exist within the Grail model and so mapping may already exist. However, where concepts do not exist within the Grail model, additional modelling must be performed to support the new descriptors.

Translating the dissections into Grail

Once the first two steps have been completed, this process is completely automatic.

Once these steps have been completed, the Read codes are represented as elements with the Grail model (typically, as large and complex composite Grail concepts) mapped back to Read codes.

8.8.3.4 Importing the Read hierarchy

In order to compare the classification of the Read-derived concepts in Grail, and their native (manually asserted) classification the native Read classification (which is again provided by CCC as an ASCII dump from their database) is imported.

8.8.3.5 Comparing the Read and Grail Hierarchies

Once all the data is in place, the system tries to find discrepancies and similarities between the classifications. These are stored in an internal form, ready to be further examined.

8.8.3.6 Analysis of the Differences in classification

To examine and compare the two classifications, a tool was developed to help examine the comparison between the two classifications. This tool has been modified from its initial incarnation, to add more features to facilitate the comparison between the schemes. This tool automatically separates the differences between the hierarchies into:

- Those where a parent-child relationship exists in Read only
- Those where a parent-child relationship exists in Grail only
- Those where the relationships are contradictory between the two hierarchies
- Those where different Read templates compile into the same Grail concept

-
- Those where there is a parent-child relationship common to both hierarchies
 - Those which couldn't be compared.

Once this automatic process was complete, each broad category was further sub-categorised manually into categories that it is hoped would interest CCC and help them to highlight omissions or inconsistencies in their classification based on their anatomical model.

The details of how the results were sub-classified and the results within each domain are presented below.

8.8.4 Results of the Read / Grail comparison

8.8.4.1 Analysis of the complete set of Read templates provided

8.8.4.1.1 Overview

The total set of dissections represents a set of dissections derived from the Read templates within the following domains:

- Cardiovascular procedures
- Male Genitourinary procedures
- Lymphatic procedures
- Ear procedures
- Gynaecological procedures
- Endocrine procedures

This total set contains 2768 Dissections of which 2526 compiled into Grail. Analysis of the Endocrine procedures was not possible because the Read hierarchical information was not available in a form that could be used.. A quick analysis of the whole set was performed as a gauge of the task as a whole, however given the large size of the set it was felt that it would be more useful to analyse each domain individually, as this would be a more efficient way to identify problems and suggestions.

8.8.4.1.2 Results

The results of the quick analysis of the entire set (excluding Endocrine procedures) are as follows:

There were 11914 kind-of relationships examined in the comparison between the hierarchies.

Of the relationships analysed:

- 2626 were found only in the Grail hierarchy
- 363 were found only in the Read hierarchy
- 6 were contradictory
- 112 were separate in the Read hierarchy but were the same in Grail
- 1549 were common
- 223 couldn't be compared.

CCC indicated that they were particularly interested in certain types of differences between the hierarchies which are as follows:

8.8.4.1.2.1 Atomisations with different Read codes, but the same Grail concept

CCC aims to have a unique representation of each concept within their hierarchy. However, in some cases the Grail derived from templates that represent different Read codes is identical. In the majority of cases, this is because the dissections were identical, which implied that the corresponding original atomisations were also identical. Of these, 37 pairs contained atomisations both of which were classed as 'fully atomised' and the remaining 75 pairs contained at least one atomisation that was not 'not fully atomised'. These results are presented in detail below.

8.8.4.1.2.2 *Differences between the Read and Grail Hierarchies due to differences in the underlying anatomical model.*

As discussed above, there are three possible types of difference between the Read and Grail hierarchies: Relationships either:

- Exist in only the Read hierarchy but not in the Grail hierarchy,
- Exist in only the Grail hierarchy but not in the Read hierarchy, or
- Are contradictory i.e. Relationships are reversed.

CCC are particularly interested where there are differences due to a difference between the underlying anatomical hierarchies of the Galen model and the Read ontology. As an example, the following relationships were inferred by the Grail classifier that did not exist in the Read hierarchy.

Firstly some relationships were inferred by the Grail classifier because the Grail child concept contained a non-anatomical term that was a child of a non-anatomical term in the parent concept. Examples of non-anatomical terms include pathology, devices, temporal markers, and motivations.

For example:

```
RUBRIC "Excision of lesion of testis"
ENGLISH_RUBRIC "Excision of lesion of testis"
SOURCE "READ"
CODE "7C040"
STATUS "a"
MAIN excision - action
    ACTS_ON unspecified surgical lesion
        HAS_LOCATION testis structure
```

Is a parent of:

```
RUBRIC "Excision of strangulated testis"
ENGLISH_RUBRIC "Excision of strangulated testis"
SOURCE "READ"
CODE "X30Gx"
STATUS "a"
MAIN excision - action
    ACTS_ON torsion of testis
        HAS_LOCATION testis structure
```

In the Grail hierarchy because torsion of testis is a kind-of unspecified surgical lesion in the Grail model.

In other cases, the Grail classifier inferred a relationship between the concepts because the child concept contained an anatomical term that is a child of an anatomical term in the parent concept.

For example:

RUBRIC "Excision of lesion of testis"
 ENGLISH_RUBRIC "Excision of lesion of testis"
 SOURCE "READ"
 CODE "7C040"
 STATUS "a"
 MAIN excision - action
 ACTS_ON unspecified surgical lesion
 HAS_LOCATION testis structure

Is a parent of:

RUBRIC "Excision of lesion of epididymis"
 ENGLISH_RUBRIC "Excision of lesion of epididymis"
 SOURCE "READ"
 CODE "X30H6"
 STATUS "a"
 MAIN excision - action
 ACTS_ON unspecified surgical lesion
 HAS_LOCATION epididymis structure

In the Grail hierarchy because epididymis structure is a kind-of testis structure in the Grail model. It is this latter category of relationships that particularly interests CCC.

8.8.4.2 Results of Analysis of Male Genitourinary Procedures

All the results below are presented in a similar way for each procedure subdomain. First an overview of the process involved in translating the templates into Grail is given then each category of result is presented. Within each section the number of subsumption relationships in each category is presented, followed by any comments, and then followed by a list of the subsumption relationships to which the comments apply.

Translating the Read templates into Grail:

- 213 Atom templates
- 199 Compile into Grail
- 14 Templates do not compile into Grail (the reasons are discussed in the Can't Compare section below)

Comparison of Hierarchies:

The analysis found and examined 1012 kind-of relationships which yielded the following subsumption relationships:

- Only in Grail hierarchy 77
- Only in Read hierarchy 43
- Contradictory 2
- Same Grail concept with different Read codes 8
- Common to both hierarchies 179
- Can't compare the relationships 16

8.8.4.2.1 Common to both hierarchies (179)

The common relationships between the two hierarchies are listed in Appendix 1.

8.8.4.2.2 Same Grail concept (8)

Of the eight atom templates pairs that compiled into the same Grail, only one contained templates that were classed as 'fully atomised'.

Xa9IL Aspiration of epididymis <--- 7C10F Aspiration of epididymal contents

The other seven contained at least one template that was either 'reviewable' or 'impossible'.

Xa0FM Circumcision <--- 7C242 Standard circumcision
 7C261 Collection of sperm <--- X30HW Electro-ejaculation
 7C... Male genital organ procedure <--- X30HV Procedure for male sexual function disorder
 XE2tz Plastic operation on penis <--- 7C221 Reconstruction of penis
 X30HV Procedure for male sexual function disorder <--- Ua1J1 Chemical male castration
 X30Gq Repair or reconstruction of scrotum <--- X30Gr Repair of scrotum without skin graft
 7C120 Reversal of vasectomy <--- 7C123 Non-microsurgical reversal of vasectomy

8.8.4.2.3 Only In Grail (77)

8.8.4.2.3.1 Child contains additional specialisations (19)

In these relationships, there is the same anatomy, deed, etc but there are additional specifications added to the child concept in the form of:

Parent concept
 ADDITIONAL_LINK(S) additional concepts

Where the additional links are:

BY_MEANS_OF
 HAS_EXTENT
 HAS_TEMPORAL_MARKER
 HAS_LATERALITY
 ACTS_ON
 FOLLOWS
 HAS_LOCATION

Code	Grail Parent	<---	Grail Child
7C220	Construction of penis	<---	7C225 Reconstruction of penis with distant flap
XE0Gm	Bilateral orchidectomy	<---	7C020 Bilateral subcapsular orchidectomy
7C220	Construction of penis	<---	7C227 Reconstruction of penis with skin graft
7C091	Fixation of testis	<---	Xa84q First stage of two stage orchidopexy
7C091	Fixation of testis	<---	Xa84s Second stage of two stage orchidopexy
7C230	Implantation of penile prosthesis	<---	X30HL Renewal of penile prosthesis
7C070	Insertion of testicular prosthesis	<---	X30H3 Replacement of testicular prosthesis
Xa071	Male surgical sterilisation procedure	<---	7C112 Ligation of vas deferens - not for contraception
7C123	Non-microsurgical reversal of vasectomy	<---	7C122 Microsurgical reversal of vasectomy
7C123	Non-microsurgical reversal of vasectomy	<---	7C124 Reversal of vasectomy - unilateral

X30Gk Operation on the scrotum <--- 7C0.. Scrotum and testicle operation
 X30Gs Operation on the testis <--- 7C0.. Scrotum and testicle operation
 Xa9eX Repair of vas deferens <--- 7C123 Non-microsurgical reversal of vasectomy
 Xa9eX Repair of vas deferens <--- 7C120 Reversal of vasectomy
 7C242 Standard circumcision <--- X30Fu Excision of hooded prepuce
 7C242 Standard circumcision <--- 7C248 Plastibell circumcision
 7C242 Standard circumcision <--- 7C249 Revision of circumcision
 Xa2m1 Unilateral orchidectomy <--- 7C030 Unilateral subcapsular orchidectomy
 7C090 Drainage of testis <--- X30HZ Testicular sperm aspiration

8.8.4.2.3.2 *The Parent is underspecified (9)*

Where there is a concept in the Read hierarchy that is underspecified, this generates false relationships. The semantic deconstruction of a concept is too 'broad' and therefore falsely becomes the parent of concepts that it wouldn't have if the parent was defined more specifically. There were only two parent concepts in this category:

```
RUBRIC "Chemical male castration"
ENGLISH_RUBRIC "Chemical male castration"
SOURCE "READ"
CODE "Ua1J1"
STATUS "r"
MAIN clinical action
  ACTS_ON male genital structure
```

And:

```
RUBRIC "Procedure for male sexual function disorder"
ENGLISH_RUBRIC "Procedure for male sexual function disorder"
SOURCE "READ"
CODE "X30HV"
STATUS "i"
MAIN clinical action
  ACTS_ON male genital structure
```

Neither of which is made by the author as 'fully atomised'.

Code	Grail Parent	<---	Grail Child
Ua1J1	Chemical male castration	<---	7C261 Collection of sperm
Ua1J1	Chemical male castration	<---	X30HW Electro-ejaculation
Ua1J1	Chemical male castration	<---	7C16. Operation on male perineum
Ua1J1	Chemical male castration	<---	7C15. Operation on seminal vesicle
Ua1J1	Chemical male castration	<---	X30HF Operation on spermatic cord
Ua1J1	Chemical male castration	<---	X30HX Sperm aspiration
X30HV	Procedure for male sexual function disorder	<---	7C16. Operation on male perineum
X30HV	Procedure for male sexual function disorder	<---	7C15. Operation on seminal vesicle
X30HV	Procedure for male sexual function disorder	<---	X30HF Operation on spermatic cord

8.8.4.2.3.3 *Child anatomy is a kind of the Parent Anatomy (33)*

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains an anatomical term that is a kind-of an anatomical term in the adult concept. The following anatomical relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

Corpus cavernosum	
Erectile structure of the penis	
Preputial structure	are kinds of
Penile structure	
Frenulum	
Glans penis structure	
Epidymis	are kinds of
Testicular structure	
Tunica of Testis	
Cyst which hasLocation Structure	is a kind of
Structure	
Penis	
Scrotum	are kinds of
Male perineal structure	
Testis	
Corpus cavernosum	is a kind of
Erectile structure of Penis	

Code	Grial Parent	<---	Grial Child
7C220	Construction of penis <---	X30HQ	Creation of saphenocorporal shunt
7C220	Construction of penis <---	7C258	Distal shunt for priapism
7C220	Construction of penis <---	7C259	Proximal shunt for priapism
7C090	Drainage of testis <---	7C109	Drainage of epididymis
7C090	Drainage of testis <---	7C082	Drainage of hydrocele
7C040	Excision of lesion of testis <---	X30H6	Excision of lesion of epididymis
Xa8PG	Incision of penis <---	7C243	Dorsal slit of prepuce
Xa8PG	Incision of penis <---	7C247	Lateral slit of prepuce
7C10F	Aspiration of epididymal contents <---	7C105	Aspiration of epididymal cyst
Xa9IL	Aspiration of epididymis <---	7C105	Aspiration of epididymal cyst
7C164	Biopsy of male perineum <---	7C250	Biopsy of penis
7C164	Biopsy of male perineum <---	7C093	Biopsy of testis
7C093	Biopsy of testis <---	XE0Gs	Biopsy of epididymis
Xa0FM	Circumcision <---	X30Fu	Excision of hooded prepuce
7C251	Drainage of penis <---	7C257	Aspiration of corpora for priapism
Xa8PD	Epididymectomy <---	7C10G	Excision of cyst of epididymis
7C16.	Operation on male perineum <---	X30HI	Operation on the penis or foreskin
7C16.	Operation on male perineum <---	X30Gk	Operation on the scrotum
7C16.	Operation on male perineum <---	X30Gs	Operation on the testis
X30Gs	Operation on the testis <---	X30HA	Hydrocele operation
X30Gs	Operation on the testis <---	7C10.	Operation on the epididymis
X30Gt	Orchidectomy <---	Xa8PD	Epididymectomy
X30Gt	Orchidectomy <---	7C080	Excision of hydrocele sac
XE2tz	Plastic operation on penis <---	7C240	Prepuceplasty
7C221	Reconstruction of penis <---	7C223	Frenuloplasty of penis
7C221	Reconstruction of penis <---	7C240	Prepuceplasty
7C221	Reconstruction of penis <---	X90RI	Revision of glans
7C096	Repair of testis <---	7C106	Repair of epididymis
X30Gw	Subcapsular orchidectomy <---	X30H5	Partial epididymectomy
X30HE	Suture of male perineum <---	7C253	Suture of penis
X30HE	Suture of male perineum <---	7C012	Suture of scrotum
7C253	Suture of penis <---	X30HJ	Suture of corpus cavernosum

X30HZ Testicular sperm aspiration <--- X30HY Micro-epididymal sperm aspiration

8.8.4.2.3.4 *Child pathology is a kind of the Parent pathology (33)*

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains a pathological term that is a kind-of an pathological term in the adult concept.

The following relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

Torsion of the testis			
Spermatocoele			
Unspecified haematoma		are kinds of	Unspecified
Surgical Lesion			
Unspecified ectopia			
Unspecified foreign body			

Code	Grail Parent	<---	Grail Child
7C040	Excision of lesion of testis	<---	X30Gx Excision of strangulated testis
X30H6	Excision of lesion of epididymis	<---	7C10A Excision of spermatocoele
7C001	Excision of scrotal lesion	<---	X30G1 Excision of organised scrotal haematoma
7C040	Excision of lesion of testis	<---	7C031 Excision of ectopic testis
7C00.	Removal or destruction of superficial scrotal lesion	<---	7C015 Removal of foreign body from scrotum
7C140	Excision of lesion of spermatic cord	<---	X30Gx Excision of strangulated testis

8.8.4.2.3.5 *Child deed is a kind of the Parent deed (33)*

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains a deed that is a kind-of a deed term in the adult concept.

The following relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

Aspiration		is a kind of	Drainage
Inserting		is a kind of	Clinical Act

Code	Grail Parent	<---	Grail Child
7C109	Drainage of epididymis	<---	7C10F Aspiration of epididymal contents
7C109	Drainage of epididymis	<---	Xa91L Aspiration of epididymis
7C082	Drainage of hydrocele	<---	Xa442 Aspiration of hydrocele
X30G0	Drainage of scrotal haematoma	<---	X30Gn Aspiration of scrotal haematoma
X30HM	Revision of penile prosthesis	<---	X30HL Renewal of penile prosthesis
X30HP	Vascular procedure on the penis	<---	X30HJ Suture of corpus cavernosum

8.8.4.2.3.6 *Grail Modelling problems (4)*

The Grail classifier inferred these relationships as the result of false premises based on the incorrect mapping of the descriptor Distant Flap to the Grail concept SkinFlap. Some procedures containing this descriptor incorrectly subsumed procedures containing the descriptor LocalFlap. This error was corrected by mapping DistantFlap to the newly modelled Grail term DistantFlap, which is a sibling of LocalFlap.

Code	Grail Parent	<---	Grail Child
7C225	Reconstruction of penis with distant flap	<---	7C224 Reconstruction of penis with local flap

7C225 Reconstruction of penis with distant flap <---	7C226 Reconstruction of penis with	microvascular
transferred flap		
7C018 Reconstruction of scrotum with distant flap <---	7C019 Reconstruction of scrotum with free flap	
7C018 Reconstruction of scrotum with distant flap <---	7C017 Reconstruction of scrotum with local flap	

8.8.4.2.4 Only in Read

8.8.4.2.4.1 Child deed not a kind of the adult deed in Galen hierarchy (11)

These links would be required in the Galen hierarchy in order to enable the classifier to automatically infer the asserted relationship in the Read hierarchy. However, these relationships do not exist within the Galen hierarchy, because they are not the strict kind-of relationships that the Galen hierarchy creates and requires.

Constructing – action	is NOT a kind of	occlusion
Aspiration	is NOT a kind of	Harvesting
Cauterisation	is NOT a kind of	Destruction
Plication	are NOT kinds of	Reconstruction
Constructing – action		
Biopsying – action	are NOT a kind of	Removing
Destruction		

Code	Read Parent	<---	Read Child
7C00.	Removal or destruction of superficial scrotal lesion <---	7C010	Biopsy of scrotal lesion
7C00.	Removal or destruction of superficial scrotal lesion <---	7C002	Destruction of scrotal lesion
XE0Gu	Bilateral vasectomy for contraception <---	Xa074	Riddle crossover vasectomy
7C261	Collection of sperm <---	X30HX	Sperm aspiration
7C21.	Destruction of lesion of penis <---	7C211	Cauterisation of lesion of penis
7C002	Destruction of scrotal lesion <---	7C004	Cauterisation of lesion of scrotum
Xa071	Male surgical sterilisation procedure <---	Xa072	Injection vasectomy
Xa071	Male surgical sterilisation procedure <---	XaC11	Vasectomy using silicon plug
XE2tz	Plastic operation on penis <---	7C222	Nesbit's operation on penis
XE0Gv	Repair of spermatic cord <---	X30HG	Vasovasostomy
Xa9eX	Repair of vas deferens <---	Xa8PE	Suture of vas deferens

8.8.4.2.4.2 Child anatomical term is not a kind of the adult anatomical term in Galen hierarchy (3)

These relationships were not inferred by the Grail classifier because the anatomical relationships implicit in the Read hierarchy do not exist in the Galen hierarchy, e.g.

Penile Vein	is NOT a kind of	Erectile structure of the penis
-------------	------------------	---------------------------------

A subtler problem concerns part-whole relationships. In Grail there is no way to capture the concept of 'operations on the testis OR operations on the scrotum'; it is only possible to model such a category as 'operation on the testis AND the scrotum' or 'operation on the scrotum and its contents'. Where the former approach is taken, there are missed classifications because:

Operation on the testis is NOT a kind of Operation on the (Testis and Scrotum)

A solution that has been applied in the past is to expand the semantics of such dissections from:

RUBRIC 'Operations on the Testis and Scrotum'

MAIN clinical action

ACTS_ON testis and scrotum structures

To:

MAIN clinical action

ACTS_ON testis

OR_MAIN clinical action

ACTS_ON scrotum

Code	Read Parent	<---	Read Child
7C0..	Scrotum and testicle operation	<---	X30HA Hydrocele operation
7C0..	Scrotum and testicle operation	<---	7C10. Operation on the epididymis
X30HP	Vascular procedure on the penis	<---	Xa8P0 Ligation of penile veins

8.8.4.2.4.3 Different concepts (1)

In this relationship, the Grail classifier was unable to infer a kind-of relationship, because the concepts are different. Although they share a common ancestor, they are not similar enough to be classified as kinds-of each other.

Code	Read Parent	<---	Read Child
X30H9	Operation on epididymis or male genitalia for infertility	<---	7C10F Aspiration of epididymal contents

The classifier inferred the following relationship between theses concepts.

```

'READ 7C10. Operation on the epididymis'
  'READ X30H9 Operation on epididymis or male genitalia for infertility'
  'READ 7C106 Repair of epididymis'
  'READ Xa8PD Epididymectomy'
  'READ X30H6 Excision of lesion of epididymis'
  'READ XE0Gs Biopsy of epididymis'
  'READ Xa2C5 Biopsy of lesion of epididymis'
  'READ X30H7 Operation on cyst of epididymis'
  'READ 7C109 Drainage of epididymis'
    'READ 7C10F Aspiration of epididymal contents'
  'READ 7C108 Incision of epididymis'
  
```

8.8.4.2.4.4 Grail modelling issues (18)

These relationships were not picked up by the automatic classifier because there were relationships implied in the Read hierarchy that did not exist in the Grail model, but should have. The following issues were identified as a result of the analysis.

- TesticularVein and CremasterMuscle are now components of the SpermaticCord.

- The descriptors Reconstruction – action and Reconstructing are now synonymous.
- The descriptor Attention – action now is mapped to the Grail concept SurgicalDeed rather than being (incorrectly) mapped to Harvesting.
- Treatment VS. Treating:

Three atomisations use one of these links, all referring to a deed that is MOTIVATED_BY Treatment / Treating ACTS_ON infertility. These two descriptors have different mappings to Grail, as they have different meanings. It was decided to replace treating (mapped to NormalisingProcess) with Treatment (mapped to TreatmentAct) as this was more consistent and more semantically correct. It is suggested that the descriptors possibly should be replaced in the original templates.

Code	Read Parent	<---	Read Child
7C221	Reconstruction of penis	<---	7C225 Reconstruction of penis with distant flap
7C221	Reconstruction of penis	<---	7C224 Reconstruction of penis with local flap
7C221	Reconstruction of penis	<---	7C226 Reconstruction of penis with microvascular transferred flap
7C221	Reconstruction of penis	<---	7C227 Reconstruction of penis with skin graft
XE0Gy	Attention to penile prosthesis	<---	X30HL Renewal of penile prosthesis
XE0Gy	Attention to penile prosthesis	<---	X30HM Revision of penile prosthesis
X30Gq	Repair or reconstruction of scrotum	<---	7C018 Reconstruction of scrotum with distant flap
X30Gq	Repair or reconstruction of scrotum	<---	7C019 Reconstruction of scrotum with free flap
X30Gq	Repair or reconstruction of scrotum	<---	7C017 Reconstruction of scrotum with local flap
X30Gq	Repair or reconstruction of scrotum	<---	7C016 Reconstruction of scrotum with skin graft
X30Gq	Repair or reconstruction of scrotum	<---	7C012 Suture of scrotum
7C103	Epididymovasostomy	<---	7C10D Microsurgical epididymovasostomy
X30H9	Operation on epididymis or male genitalia for infertility	<---	7C103 Epididymovasostomy
7C13.	Operation on varicocele	<---	7C132 High ligation of testicular vein for varicocele
X30HF	Operation on spermatic cord	<---	Xa0Y8 Cremasteric myotomy

8.8.4.2.4.5 Artefactual misclassification as a result of the expansion into Grail (3)

Code	Read Parent	<---	Read Child
7C00.	Removal or destruction of superficial scrotal lesion	<---	7C001 Excision of scrotal lesion
7C00.	Removal or destruction of superficial scrotal lesion	<---	X30G1 Excision of organised scrotal haematoma
7C00.	Removal or destruction of superficial scrotal lesion	<---	X30Gm Excision of multiple scrotal sebaceous cysts

8.8.4.2.4.6 Deed acting on pathology (10)

In these relationship pairs, the Grail classifier did not infer a relationship because they were in the form:

Read Parent	Read child
MAIN deed	MAIN deed
ACTS_ON Structure	ACTS_ON Pathology
Structure	HAS_LOCATION

The Grail classification does not support the refinement of Structure along pathology in some circumstances, but it is intended to examine these and see whether it would be useful to allow such refinement in these circumstances.

XE0Gs Biopsy of epididymis <--- Xa2C5 Biopsy of lesion of epididymis
 7C011 Drainage of scrotum <--- X30Gn Aspiration of scrotal haematoma
 7C011 Drainage of scrotum <--- X30Gp Drainage of scrotal abscess
 7C011 Drainage of scrotum <--- X30Go Drainage of scrotal haematoma
 Xa8PD Epididymectomy <--- X30H6 Excision of lesion of epididymis
 7C040 Excision of lesion of testis <--- X30Gy Excision of appendix of testis
 Xa8P0 Ligation of penile veins <--- 7A6G5 Ligation of penile veins for impotence
 X30HF Operation on spermatic cord <--- 7C13. Operation on varicocele
 XE2tz Plastic operation on penis <--- 7C220 Construction of penis
 XE2tz Plastic operation on penis <--- 7C254 Release of chordee

8.8.4.2.5 Contradictory (2)

For these relationships, the Grail classifier found that the Read parent was a kind-of the Read child. In this case, it is again a reflection of the inclusive and problem discussed above, i.e. 'operation on the (scrotum AND testis)' is more specialised than, and therefore a child of, 'operation on the testis alone' in the Grail hierarchy.

7C0.. Scrotum and testicle operation <--- X30Gk Operation on the scrotum
 7C0.. Scrotum and testicle operation <--- X30Gs Operation on the testis

8.8.4.2.6 Can't Compare (16)

These relationships could not be compared either because descriptors were unmapped or the meaning of the atomisation was unclear.

- No mapping for male paraurethral tissue (3)
- Meaning of a template is not clear (1)
- No mapping for Peyronie's disease (1)
- No mapping for sweat-gland bearing skin of male perineum (1)
- No mapping for processus vaginalis (3)
- No mapping for reduction action (2)
- No mapping for one/two stage processes (3)
- No mapping for zip fastener injury to penis (1)
- No mapping for Ritual (1)

Xa0FM Circumcision <--- 7C256 Ritual circumcision
 7C031 Excision of ectopic testis <--- Xa8PB Excision of intra-abdominal testis
 X30HA Hydrocele operation <--- 7C086 Ligation/excision of patent processus vaginalis
 X30H1 One stage orchidopexy <--- XE0Gp One stage unilateral orchidopexy
 7C16. Operation on male perineum <--- X30HD Drainage of male periurethral abscess
 7C16. Operation on male perineum <--- 7C162 Excision of male periurethral tissue
 7C16. Operation on male perineum <--- 7C160 Excision of sweat gland bearing skin of male perineum
 7C16. Operation on male perineum <--- 7C163 Incision of male periurethral tissue
 7C24. Operation on prepuce <--- 7C245 Manual reduction of paraphimosis
 X30HI Operation on the penis or foreskin <--- X30HU Release of penis from zip fastener
 X30Gs Operation on the testis <--- 7C092 Reduction of torsion of testis
 X30Gz Orchidopexy <--- X30H1 One stage orchidopexy
 X30Gz Orchidopexy <--- X30H2 Two stage orchidopexy
 XE2tz Plastic operation on penis <--- X30HK Excision of Peyronie's plaque and insertion of graft
 X30H2 Two stage orchidopexy <--- Xa84q First stage of two stage orchidopexy
 X30H2 Two stage orchidopexy <--- Xa84s Second stage of two stage orchidopexy

8.8.4.3 Results of Analysis of Ear Procedures

Translating the Read templates into Grail:

- 188 Atom templates
- 185 Compile into Grail
- 3 Templates do not compile into Grail (the reasons are discussed in the Can't Compare section below)

Comparison of Hierarchies:

The analysis found and examined 1566 kind-of relationships which yielded the following subsumption relationships:

- Only in Grail hierarchy 140
- Only in Read hierarchy 51
- Contradictory 4
- Same Grail concept with different Read codes 22
- Common to both hierarchies 196
- Can't compare the relationships 4

8.8.4.3.1 *Common to both hierarchies (196)*

The common relationships between the two hierarchies are listed in the Appendix.

8.8.4.3.2 *Same Grail concept (22)*

Of the 22 atom templates pairs that compiled into the same Grail, seven contained templates that were classed as 'fully atomised'.

7302. Plastic operation on pinna <--- XE0BX Pinnaplasty
 X00gr Mastoid operations <--- 7311. Other operations on mastoid
 XaB34 Mastoidectomy <--- 73103 Simple mastoidectomy
 XaB9W Cochlear prosthesis procedure <--- XE0Bq Attention to cochlear prosthesis
 XE0Ba Mastoid and middle ear procedure <--- X00gs Middle ear operations
 XE0BW External ear and external auditory canal procedure <--- XaB1v External ear operations
 XE0BY Anterior crurotomy of ear <--- X00gW Fowler anterior crurotomy of ear

The other 15 contained at least one template that was either 'reviewable' or 'impossible'.

73010 Excision of lesion of pinna <--- 73015 Shave excision of lesion of external ear
 X00gf Suction clearance of external auditory canal <--- XaAyH Microsuction clearance of external auditory canal
 X00gx Mastoid pack procedures <--- 73112 Removal or change of mastoid pack
 X00hJ Attention to middle ear ventilation tube <--- 73178 Unblocking of ventilation tube through tympanic membrane
 X00hU Inner ear procedure <--- 7322. Operation on vestibular apparatus
 X00hW Decompression of endolymphatic sac <--- X00hX Decompression of endolymphatic sac and insertion of shunt
 Xa2kr Myringotomy and insertion of grommet <--- 73130 Myringotomy and insertion of short-term grommet
 XaB2L Removal of ventilation tube from ear <--- XE0Bn Removal of ventilation tube from tympanic membrane
 XaB34 Mastoidectomy <--- XE0Bd Cortical mastoidectomy
 XE0Bf Myringoplasty <--- 73120 Plug myringoplasty
 XE0B1 Stapedectomy <--- X00hF Large fenestra stapedectomy
 XE0B1 Stapedectomy <--- X00hG Small fenestra stapedectomy
 XE0Bm Tympanoplasty <--- X00h8 Tympanoplasty with round window protection
 XE0Bm Tympanoplasty <--- X00hC Combined approach tympanoplasty
 XE0BX Pinnaplasty <--- X00ge Mustarde pinnaplasty

8.8.4.3.3 *Only In Grail (139)*

8.8.4.3.3.1 *Child contains additional specialisations (22)*

In these relationships, there is the same anatomy, deed, etc but there are additional specifications added to the child concept in the form of:

Parent concept

ADDITIONAL_LINK(S) additional concepts

Where the additional links are:

WITH
HAS_EXTENT
ACTS_ON
HAS_TEMPORAL_MARKER
HAS_LOCATION
HAS_DESTINATION
BY_MEANS_OF
HAS_APPROACH

Code	Grail Parent	<---	Grail child
73030	Drainage of haematoma of pinna <---	73032	Drainage of haematoma of pinna and insertion of bolster sutures
73103	Simple mastoidectomy <---	73101	Modified radical mastoidectomy
73103	Simple mastoidectomy <---	XE0Bc	Radical mastoidectomy
73141	Ossiculoplasty using biological graft <---	X00hB	Homograft replacement of tympanic membrane and ossicles
7321.	Operation on cochlea <---	XaAv6	Second stage bone anchored hearing aid procedure
7321.	Operation on cochlea <---	XaBiI	Removal of bone anchored hearing aid
X00gn	Insertion of dressing in external auditory canal <---	X00gp	Change of dressing in external auditory canal
X00gt	Mastoid marginectomy <---	73101	Modified radical mastoidectomy
X00gt	Mastoid marginectomy <---	XE0Bc	Radical mastoidectomy
X00gy	Insertion of mastoid pack <---	X00h0	Change of mastoid pack
X00h2	Insertion of bone anchors for subcutaneous bone anchored hearing aid <---	X00gc	Insertion of bone pins for aural prosthesis
X00h2	Insertion of bone anchors for subcutaneous bone anchored hearing aid <---	X00h1	Insertion of osseointegrated bone anchors
X00h3	Insertion of bone anchors for percutaneous bone anchored hearing aid <---	X00gc	Insertion of bone pins for aural prosthesis
X00h3	Insertion of bone anchors for percutaneous bone anchored hearing aid <---	X00h1	Insertion of osseointegrated bone anchors
X00hS	Inflation of Eustachian tube using Politzer technique <---	X00hT	Inflation of Eustachian tube using balloon
XaB34	Mastoidectomy <---	73101	Modified radical mastoidectomy
XE0Bd	Cortical mastoidectomy <---	73101	Modified radical mastoidectomy
XE0Bd	Cortical mastoidectomy <---	XE0Bc	Radical mastoidectomy
XE0Bg	Formal myringoplasty using biological graft <---	X00hB	Homograft replacement of tympanic membrane and ossicles
XE0BX	Pinnaplasty <---	XaB9V	Reconstruction of external ear with flap
73180	Tympanotomy using mastoid approach <---	73182	Tympanotomy using combined approach
73181	Tympanotomy using permeatal approach <---	73182	Tympanotomy using combined approach

8.8.4.3.3.2 The Read parent is underspecified (58)

Code	Grail Parent	<---	Grail child
7311.	Other operations on mastoid <---	73103	Simple mastoidectomy
7311.	Other operations on mastoid <---	73106	Atticoantrostomy
7311.	Other operations on mastoid <---	73107	Excision of lesion of mastoid
7311.	Other operations on mastoid <---	73110	Obliteration of mastoid cavity
7311.	Other operations on mastoid <---	73112	Removal or change of mastoid pack
7311.	Other operations on mastoid <---	73114	Closure of postaural fistula
7311.	Other operations on mastoid <---	73115	Biopsy of mastoid
7311.	Other operations on mastoid <---	73116	Exploration of mastoid

7311. Other operations on mastoid <--- X00gt Mastoid marginectomy
 7311. Other operations on mastoid <--- X00gx Mastoid pack procedures
 7311. Other operations on mastoid <--- X00gy Insertion of mastoid pack
 7311. Other operations on mastoid <--- X00h2 Insertion of bone anchors for subcutaneous bone anchored hearing aid
 7311. Other operations on mastoid <--- X00h3 Insertion of bone anchors for percutaneous bone anchored hearing aid
 7311. Other operations on mastoid <--- XaAv6 Second stage bone anchored hearing aid procedure
 7311. Other operations on mastoid <--- XaB34 Mastoidectomy
 7311. Other operations on mastoid <--- XaBiI Removal of bone anchored hearing aid
 7311. Other operations on mastoid <--- XE0Bb Exenteration of mastoid disease
 7311. Other operations on mastoid <--- XE0Bd Cortical mastoidectomy
 73120 Plug myringoplasty <--- XE0Bg Formal myringoplasty using biological graft
 73160 Tympanoplasty using biological graft <--- 73141 Ossiculoplasty using biological graft
 73160 Tympanoplasty using biological graft <--- XE0Bg Formal myringoplasty using biological graft
 73161 Tympanoplasty using artificial prosthesis <--- 73140 Ossiculoplasty using artificial prosthesis
 73178 Unblocking of ventilation tube through tympanic membrane <--- X00hN Repositioning of ventilation tube through tympanic membrane
 73178 Unblocking of ventilation tube through tympanic membrane <--- XaB2L Removal of ventilation tube from ear
 73178 Unblocking of ventilation tube through tympanic membrane <--- XE0Bn Removal of ventilation tube from tympanic membrane
 73178 Unblocking of ventilation tube through tympanic membrane <--- XE0Bo Maintenance of ventilation tube through tympanic membrane
 Ua1rV Removal of ear plug <--- 73050 Syringing ear to remove wax
 Ua1rV Removal of ear plug <--- 73051 Manual removal of wax from external auditory canal
 Ua1rV Removal of ear plug <--- 73065 Removal of foreign body from external auditory canal
 Ua1rV Removal of ear plug <--- X00gg Removal of ventilation tube from external auditory canal
 Ua1rV Removal of ear plug <--- X00go Removal of dressing from external auditory canal
 X00ge Mustarde pinnaplasty <--- X00gd Revision pinnaplasty
 X00ge Mustarde pinnaplasty <--- XaB9V Reconstruction of external ear with flap
 X00ge Mustarde pinnaplasty <--- XE0BZ Reconstruction of external auditory canal
 X00h8 Tympanoplasty with round window protection <--- 73120 Plug myringoplasty
 X00h8 Tympanoplasty with round window protection <--- 7314. Reconstruction of ossicular chain
 X00h8 Tympanoplasty with round window protection <--- 73160 Tympanoplasty using biological graft
 X00h8 Tympanoplasty with round window protection <--- X00hD Tympanoplasty with mastoidectomy
 X00h8 Tympanoplasty with round window protection <--- XE0Bf Myringoplasty
 X00h8 Tympanoplasty with round window protection <--- XE0BZ Reconstruction of external auditory canal
 X00hC Combined approach tympanoplasty <--- 73120 Plug myringoplasty
 X00hC Combined approach tympanoplasty <--- 7314. Reconstruction of ossicular chain
 X00hC Combined approach tympanoplasty <--- 73160 Tympanoplasty using biological graft
 X00hC Combined approach tympanoplasty <--- X00hD Tympanoplasty with mastoidectomy
 X00hC Combined approach tympanoplasty <--- XE0Bf Myringoplasty
 X00hC Combined approach tympanoplasty <--- XE0BZ Reconstruction of external auditory canal
 X00hF Large fenestra stapedectomy <--- X00hH Platinectomy
 X00hG Small fenestra stapedectomy <--- X00hH Platinectomy
 XE0Bh Myringotomy and ventilation tube operation <--- 73120 Plug myringoplasty
 XE0Bh Myringotomy and ventilation tube operation <--- 73123 Excision of retraction pocket of tympanic membrane
 XE0Bh Myringotomy and ventilation tube operation <--- XE0Bf Myringoplasty
 XE0Bj Myringotomy and insertion of long-term grommet <--- 73130 Myringotomy and insertion of short-term grommet
 XE0Bj Myringotomy and insertion of long-term grommet <--- 73133 Myringotomy and insertion of T tube
 XE0Bj Myringotomy and insertion of long-term grommet <--- Xa2Kr Myringotomy and insertion of grommet
 XE0Bm Tympanoplasty <--- 73120 Plug myringoplasty
 XE0Bm Tympanoplasty <--- 7314. Reconstruction of ossicular chain
 XE0Bm Tympanoplasty <--- XE0Bf Myringoplasty
 XE0Bm Tympanoplasty <--- XE0BZ Reconstruction of external auditory canal

8.8.4.3.3.3 *Child anatomy is a kind of the Parent Anatomy (33)*

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains an anatomical term that is a kind-of an anatomical term in the adult concept. The following anatomical relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

External auditory canal structure are kinds of
 External ear structure
 Pinna

Pathology which hasLocation structure is a kind of structure

Tympanic nerve
 Round window
 Internal Auditory meatus are kinds of
 Middle ear structure
 Oval window
 Ear ossicle

External acoustic meatus is a kind of
 External auditory canal structure

Ossicular prosthesis is a kind of
 Ear ossicle structure

Cochlear structure
 Round window are kinds of
 Inner ear structure
 Oval window

Code	Grail Parent	<---	Grail child
7300.	Excision of external ear <---	X00gj	Excision of polyp from external auditory canal
7300.	Excision of external ear <---	X00gk	Removal of osteoma from external auditory canal
7300.	Excision of external ear <---	Xa0MH	Removal of exostosis from external auditory canal
73002	Excision of preauricular abnormality <---	X00gj	Excision of polyp from external auditory canal
73002	Excision of preauricular abnormality <---	X00gk	Removal of osteoma from external auditory canal
73002	Excision of preauricular abnormality <---	Xa0MH	Removal of exostosis from external auditory canal
73010	Excision of lesion of pinna <---	X00gi	Excision of lesion of external auditory canal
73010	Excision of lesion of pinna <---	X00gj	Excision of polyp from external auditory canal
73010	Excision of lesion of pinna <---	X00gk	Removal of osteoma from external auditory canal
73010	Excision of lesion of pinna <---	Xa0MH	Removal of exostosis from external auditory canal
73015	Shave excision of lesion of external ear <---	X00gi	Excision of lesion of external auditory canal
73015	Shave excision of lesion of external ear <---	X00gj	Excision of polyp from external auditory canal
73015	Shave excision of lesion of external ear <---	X00gk	Removal of osteoma from external auditory canal
73015	Shave excision of lesion of external ear <---	Xa0MH	Removal of exostosis from external auditory canal
7302.	Plastic operation on pinna <---	XE0BZ	Reconstruction of external auditory canal
7303.	Drainage of pinna <---	73062	Drainage of external auditory canal
73040	Biopsy of lesion of pinna <---	X00gl	Biopsy of lesion of external auditory canal
73103	Simple mastoidectomy <---	73123	Excision of retraction pocket of tympanic membrane
73170	Excision of lesion of middle ear <---	X00hd	Excision of lesion of internal auditory canal
7322.	Operation on vestibular apparatus <---	7321.	Operation on cochlea
7322.	Operation on vestibular apparatus <---	73215	Closure of fistula of round window
7322.	Operation on vestibular apparatus <---	73216	Closure of fistula of oval window
X00gs	Middle ear operations <---	73215	Closure of fistula of round window
X00gs	Middle ear operations <---	73216	Closure of fistula of oval window
X00gS	Total excision of pinna and external auditory canal <---	73000	Total excision of pinna
X00gt	Mastoid marginectomy <---	73123	Excision of retraction pocket of tympanic membrane
X00h0	Operation for middle ear lesion <---	73152	Division of adhesions of ossicle of ear
XaB1v	External ear operations <---	X00gR	External auditory canal operations
XaB34	Mastoidectomy <---	73123	Excision of retraction pocket of tympanic membrane

XE0Ba Mastoid and middle ear procedure <--- 73215 Closure of fistula of round window
 XE0Ba Mastoid and middle ear procedure <--- 73216 Closure of fistula of oval window
 XE0Bd Cortical mastoidectomy <--- 73123 Excision of retraction pocket of tympanic membrane
 XE0BX Pinnaplasty <--- XE0BZ Reconstruction of external auditory canal
 XE0BZ Reconstruction of external auditory canal <--- 73023 Meatoplasty of external ear
 XM0nF Ossicular chain operation <--- 73161 Tympanoplasty using artificial prosthesis
 73002 Excision of preauricular abnormality <--- X00gi Excision of lesion of external auditory canal
 X00gs Middle ear operations <--- X00I8 Transection of Jacobson's nerve

8.8.4.3.3.4 *Grail Modelling problems (20)*

The following changes needed to be made to the Grail hierarchy.

- The external auditory canal was wrongly classified as a kind of middle ear structure
- The membranous labyrinth was wrongly classified a kind of bony labyrinth
- Skin graft flaps were modelled incorrectly.

73170 Excision of lesion of middle ear <--- X00gi Excision of lesion of external auditory canal
 73170 Excision of lesion of middle ear <--- X00gj Excision of polyp from external auditory canal
 73170 Excision of lesion of middle ear <--- X00gk Removal of osteoma from external auditory canal
 73170 Excision of lesion of middle ear <--- Xa0MH Removal of exostosis from external auditory canal
 73172 Biopsy of lesion of middle ear <--- X00gl Biopsy of lesion of external auditory canal
 73174 Suction clearance of middle ear <--- X00gf Suction clearance of external auditory canal
 73174 Suction clearance of middle ear <--- XaAyH Microsuction clearance of external auditory canal
 X00gs Middle ear operations <--- X00gR External auditory canal operations
 X00gZ Reconstruction of external ear with distant flap <--- 73024 Reconstruction of external ear with rim advancement flap
 X00gZ Reconstruction of external ear with distant flap <--- 73025 Reconstruction of external ear with postauricular skin flap
 X00gZ Reconstruction of external ear with distant flap <--- X00ga Reconstruction of external ear with free flap
 X00gZ Reconstruction of external ear with distant flap <--- X00gY Reconstruction of external ear with local flap
 X00h0 Operation for middle ear lesion <--- 73065 Removal of foreign body from external auditory canal
 X00h0 Operation for middle ear lesion <--- X00gj Excision of polyp from external auditory canal
 X00h0 Operation for middle ear lesion <--- X00gk Removal of osteoma from external auditory canal
 X00h0 Operation for middle ear lesion <--- Xa0MH Removal of exostosis from external auditory canal
 Xa1nV Drainage of middle ear <--- 73062 Drainage of external auditory canal
 Xa80e Excision of middle ear polyp <--- X00gj Excision of polyp from external auditory canal
 XE0Ba Mastoid and middle ear procedure <--- X00gR External auditory canal operations
 73222 Osseous labyrinthectomy <--- 73221 Membranous labyrinthectomy

8.8.4.3.4 *Only in Read*

8.8.4.3.4.1 *Child deed / object not a kind of the adult deed / object in Galen hierarchy (23)*

These links would be required in the Galen hierarchy in order to enable the classifier to automatically infer the asserted relationship in the Read hierarchy.

Cauterisation	are not kinds of	Destruction
Removal		
Fenestration		
Reimplantation		
Inserting	are not kinds of	
Reconstruction		
Repair		
Transposition		
Evacuation	is not a kind of	Removal
Dilating	is not a kind of	Insufflation
Suturing	is not a kind of	Repair
Excision		
Incising	are not kinds of	Excenteration
Exploration		
Injecting	is not a kind of	Excision
Grommet	is not a kind of	
Foreign Body		

Code	Read Parent	<---	Read Child
73011	Destruction of lesion of pinna <---	73014	Cauterisation of lesion of pinna
73011	Destruction of lesion of pinna <---	Xa3n3	Curettage of lesion of pinna
7302.	Plastic operation on pinna <---	7L0M0	Replantation of ear
7302.	Plastic operation on pinna <---	X00gc	Insertion of bone pins for aural prosthesis
7302.	Plastic operation on pinna <---	X00gX	Repair of pinna
7305.	Clearance of external auditory canal <---	73051	Manual removal of wax from external auditory canal
7305.	Clearance of external auditory canal <---	73065	Removal of foreign body from external auditory canal
7314.	Reconstruction of ossicular chain <---	73140	Ossiculoplasty using artificial prosthesis
73141	Ossiculoplasty using biological graft <---	X00hA	Incus transposition
73160	Tympanoplasty using biological graft <---	X00hA	Incus transposition
73202	Insufflation of eustachian tube <---	X00hS	Inflation of Eustachian tube using Politzer technique
73202	Insufflation of eustachian tube <---	X00hT	Inflation of Eustachian tube using balloon
X00gX	Repair of pinna <---	73043	Suture of external ear
XE0Bb	Exenteration of mastoid disease <---	73101	Modified radical mastoidectomy
XE0Bb	Exenteration of mastoid disease <---	73106	Atticoantrostomy
XE0Bb	Exenteration of mastoid disease <---	73111	Atticotomy
XE0Bb	Exenteration of mastoid disease <---	73116	Exploration of mastoid
XE0Bb	Exenteration of mastoid disease <---	73123	Excision of retraction pocket of tympanic membrane
XE0Bb	Exenteration of mastoid disease <---	X00gt	Mastoid marginectomy
XE0Bm	Tympanoplasty <---	73161	Tympanoplasty using artificial prosthesis
XE0Bm	Tympanoplasty <---	X00h9	Fenestration of middle ear
XM0nJ	Labyrinthectomy <---	XaBFW	Chemical labyrinthectomy
73065	Removal of foreign body from external auditory canal <---	X00gg	Removal of ventilation tube from external auditory canal

8.8.4.3.4.2 *Child anatomical term is not a kind of the adult anatomical term in Galen hierarchy (5)*

These relationships were not inferred by the Grail classifier because the anatomical relationships implicit in the Read hierarchy do not exist in the Galen hierarchy, e.g.

Petrous bone structure	are NOT kinds of	Mastoid
Temporal division of the facial nerve		
Vestibulocochlear Nerve	is NOT a kind of	
Internal Auditory meatus		
PetrousPartOfTemporalBone	is NOT a kind of	
MastoidPartOfTemporalBone		
(petrous part of mastoid)		
(mastoid structure0		

Code	Read Parent	<---	Read Child
X00gr	Mastoid operations	<---	X00h5 Petrosectomy
X00gr	Mastoid operations	<---	X00Ie Decompression of temporal section of facial nerve
X00gr	Mastoid operations	<---	X00IX Grafting of temporal section of facial nerve
X00hd	Excision of lesion of internal auditory canal	<---	Xa709 Removal of acoustic neuroma
X00gr	Mastoid operations	<---	XE0Be Drainage of petrous apex of mastoid

8.8.4.3.4.3 *Different concepts (6)*

In this relationship, the Grail classifier was simply unable to infer a kind-of relationship, because the concepts are different. Although they share a common ancestor, they are not similar enough to be classified as kinds-of each other.

Code	Read Parent	<---	Read Child
X00hJ	Attention to middle ear ventilation tube	<---	X00hM Replacement of ventilation tube through tympanic membrane
Xa80d	Syringing of ear	<---	73050 Syringing ear to remove wax
XaB2L	Removal of ventilation tube from ear	<---	X00hK Removal of ventilation tube from middle ear
73112	Removal or change of mastoid pack	<---	X00h0 Change of mastoid pack
X00gx	Mastoid pack procedures	<---	X00gy Insertion of mastoid pack
X00h1	Insertion of osseointegrated bone anchors	<---	X00gc Insertion of bone pins for aural prosthesis

8.8.4.3.4.4 *Grail modelling issues (14)*

These relationships were not picked up by the automatic classifier because there were relationships implied in the Read hierarchy that did not exist in the Grail model, but should have. The following issues were identified a result of the analysis.

- Polyotica is not classified as a Pathological Structure in the Grail model.
- The descriptor mappings of Unspecified Cyst and Unspecified sinus were changed, because in this set, they are used exclusively to mean Pathological cysts and sinuses.
- The Cochlear Nerve is a kind of Cochlear Structure in the Read hierarchy, but in the Grail hierarchy, the Cochlear Nerve serves the Chochlea. The attribute serves does not refine along isStructuralComponent and so the Cochlear Nerve is not a kind of Cochlear Structure Grail.

- The VestibularBranchOfVestibularCochlearNerve is now a part of the inner ear in the Grail model.
- The relationships concerning skin graft flaps have been changed (see Male Genitourinary Procedures above)
- The mapping of the descriptor Attention – action was corrected.
- The EustachianCanal is now a middle ear structure.
- Mastoid structure is a middle ear structure in Read, but not in Grail.
- The oval and round windows are now components of the Cochlea in Grail.

Code	Read Parent	<---	Read Child
73002	Excision of preauricular abnormality	<---	X00gT Excision of accessory auricle
73002	Excision of preauricular abnormality	<---	X00gU Excision of preauricular sinus
73002	Excision of preauricular abnormality	<---	X00gV Excision of preauricular cyst
73010	Excision of lesion of pinna	<---	73012 Removal of granulation tissue from external ear
7321.	Operation on cochlea	<---	73213 Cochlear neurectomy
7322.	Operation on vestibular apparatus	<---	73223 Vestibular neurectomy
X00gY	Reconstruction of external ear with local flap	<---	73024 Reconstruction of external ear with rim advancement flap
X00gY	Reconstruction of external ear with local flap	<---	73025 Reconstruction of external ear with postauricular skin flap
XE0Ba	Mastoid and middle ear procedure	<---	7320. Procedure on eustachian tube
XE0Ba	Mastoid and middle ear procedure	<---	X00gr Mastoid operations
XE0Bq	Attention to cochlear prosthesis	<---	73210 Implantation of intracochlear prosthesis
XE0Bq	Attention to cochlear prosthesis	<---	73211 Implantation of extracochlear prosthesis
XE0Bq	Attention to cochlear prosthesis	<---	X00hV Removal of cochlear prosthesis
7321.	Operation on cochlea	<---	73215 Closure of fistula of round window
7321.	Operation on cochlea	<---	73216 Closure of fistula of oval window

8.8.4.3.4.5 Deed acting on pathology (4)

Read Parent	Read child
MAIN deed	MAIN deed
ACTS_ON Structure	ACTS_ON Pathology
Structure	HAS_LOCATION

The Grail classification does not support the refinement of Structure along pathology in some circumstances, but it is intended to examine these and see whether it would be useful to allow such refinement in these circumstances.

Code	Read Parent	<---	Read Child
7300.	Excision of external ear	<---	73002 Excision of preauricular abnormality
7300.	Excision of external ear	<---	73010 Excision of lesion of pinna
73066	Biopsy of external auditory canal	<---	X00gl Biopsy of lesion of external auditory canal
X00hU	Inner ear procedure	<---	X00hd Excision of lesion of internal auditory canal

8.8.4.3.5 Contradictory (4)

For these relationships, the Grail classifier found that the Read parent was a kind-of the Read child. This is because the way the templates have been modelled, the parent concept in Read is a more specialised version of the child version.

73065	Removal of foreign body from external auditory canal	<---	Ua1rV Removal of ear plug
X00h1	Insertion of osseointegrated bone anchors	<---	X00h2 Insertion of bone anchors for subcutaneous bone anchored hearing aid
X00h1	Insertion of osseointegrated bone anchors	<---	X00h3 Insertion of bone anchors for percutaneous bone anchored hearing aid
Xa2kr	Myringotomy and insertion of grommet	<---	XE0Bj Myringotomy and insertion of long-term grommet

8.8.4.3.6 *Can't Compare (4)*

These relationships could not be compared either because the meaning of the descriptors or the meaning of the atomisation was unclear.

73001 Partial excision of pinna <--- 73003 Wedge resection of pinna
 7322. Operation on vestibular apparatus <--- X00hc Sacculotomy
 Xa3dX Operative examination of ear <--- 73231 Examination of ear under anaesthetic
 XE0Bm Tympanoplasty <--- 73143 Myringostapediopexy

8.8.4.4 Results of Analysis of Gynaecological Procedures

Translating the Read templates into Grail:

- 485 Atom templates
- 471 Compile into Grail
- 14 Templates do not compile into Grail (the reasons are discussed in the Can't Compare section below)

Comparison of Hierarchies:

The analysis found and examined 945 kind-of relationships which yielded the following subsumption relationships:

- Only in Grail hierarchy 423
- Only in Read hierarchy 105
- Contradictory 3
- Same Grail concept with different Read codes 43
- Common to both hierarchies 504
- Can't compare the relationships 21

8.8.4.4.1 *Common to both hierarchies (504)*

The common relationships between the two hierarchies are listed in the Appendix.

8.8.4.4.2 *Same Grail concept (43)*

Of the 43 atom templates pairs that compiled into the same Grail, five contained templates that were classed as 'fully atomised'.

XE0hz Artificial insemination <--- XE06k Intrauterine artificial insemination
 7E1.. Fallopian tube operation <--- 7E1H. Other fallopian tube operations
 Xa8Pc Oophorectomy <--- Xa8PZ Unilateral oophorectomy
 7D1.. Vagina operation <--- 7D1D. Miscellaneous vaginal operations
 XE0Gz Vulva and female perineum operation <--- Xa1Fs Vulva operation

The other 38 contained at least one template that was either 'reviewable' or 'impossible'.

XE0hz Artificial insemination <--- 7E0A1 Intracervical artificial insemination
 XE0hz Artificial insemination <--- Ua1Ih Intravaginal artificial insemination
 XE0hz Artificial insemination <--- Ua1Ig Subzonal insemination
 XE0hz Artificial insemination <--- Ua1If Zona drilling
 7E02. Biopsy of cervix <--- XaC3o Cone biopsy of cervix
 7E02. Biopsy of cervix <--- 7E024 Ring biopsy of cervix
 Xa7kQ Cauterisation of ovary <--- X404B Multicauterisation of ovary
 X404G Drainage of ovarian abscess <--- 7E234 Oophorotomy and drainage of abscess
 7D110 Excision of hymen <--- 7D115 Excision of hymenal tag
 Xa1Ft Female perineum operation <--- 7D07. Miscellaneous female perineum operations
 7D112 Incision of hymen <--- X4020 Fenton's operation
 7D112 Incision of hymen <--- 7D100 Schuchardt's incision
 Xa3w Insertion of abortifacient pessary <--- 7E0B4 Insertion of prostaglandin abortifacient pessary
 7E09. Intrauterine contraceptive device procedure <--- Ua1Is Feeling stem of intrauterine device
 XM15M Intrauterine device check <--- Ua1Ir Checking position of thread of intrauterine device

7E090 Introduction of intrauterine contraceptive device <--- XaBSw Introduction of Mirena coil
 Xa8PS Loop diathermy excision of cervix <--- 7E004 Large loop excision of transformation zone
 XE06f Metroplasty <--- X403Z Jones modified Strassman metroplasty
 XE06f Metroplasty <--- X403Y Strassman metroplasty
 XE06f Metroplasty <--- X403a Tomkins metroplasty
 XM00C Operation on cervix <--- 7E03. Miscellaneous operations of cervix
 7E1A. Operation on fimbria <--- 7E1A1 Burying of fimbria in uterine wall
 7D19. Repair of vault of vagina <--- 7D190 Zacharin repair of vaginal vault
 7E184 Salpingostomy <--- X403s Distal salpingostomy
 7E19. Salpingotomy <--- X4041 Linear salpingotomy
 Xa36H Termination of pregnancy <--- Xa36I Medical termination of pregnancy
 Xa36H Termination of pregnancy <--- Xa8PU Operative termination of pregnancy
 X403h Tubal patency test <--- 7E1H2 Dye test of fallopian tube
 7E0.. Uterine operation <--- 7E0F. Miscellaneous operations on uterus
 7D1.. Vagina operation <--- X402P Excision and obliteration of vagina
 7D16. Vaginoplasty <--- X402Z Perineal-pull-through vaginoplasty
 7D16. Vaginoplasty <--- X402a Reconstruction of vagina with colon
 7D16. Vaginoplasty <--- X402Y Tissue expansion vaginoplasty
 7D16. Vaginoplasty <--- X90Rn Vaginal Z-plasty
 7D16. Vaginoplasty <--- X402X Williams vulvovaginoplasty
 XE075 Ventrosuspension of uterus <--- X404K Gilliam suspension of uterus
 Xa1Fs Vulva operation <--- 7D05. Miscellaneous vulval operations
 7D02. Vulvectomy <--- X4023 Wide local excision of vulva

8.8.4.4.3 Only In Grail (423)

8.8.4.4.3.1 Child contains additional specialisations (22)

In these relationships, there is the same anatomy, deed, etc but there are additional specifications added to the child concept in the form of:

Parent concept
 ADDITIONAL_LINK(S) additional concepts

Where the additional links are:

WITH
 ACTS_ON
 BY_MEANS_OF
 HAS_LOCATION
 HAS_EXTENT
 MOTIVATED_OVERALL_BY
 HAS_TEMPORAL_MARKER
 HAS_APPROACH
 HAS_EXTENT
 HAS_DESTINATION
 HAS_LATERALITY

Code	Grail Parent	<---	Grail Child
Xa8PL	Anterior colporrhaphy	<---	Xa8PJ Anterior colporrhaphy and amputation of cervix uteri
Xa8PL	Anterior colporrhaphy	<---	X402c Anterior colporrhaphy and posterior colpoperineorrhaphy
XM13i	Colposcopy	<---	X404S Microcolpohysteroscopy
7E002	Excision of lesion of cervix	<---	X402y Laser excision of lesion of cervix
XaD29	Fallopian tube anastomosis	<---	7E181 Uterotubal implantation
XE0H6	Female perineorrhaphy	<---	X402b Colpoperineorrhaphy
Xa1Ft	Female perineum operation	<---	XE0Gz Vulva and female perineum operation

X404K Gilliam suspension of uterus <--- Xa20Z Open ventrosuspension of uterus
 XaBDK Hysteroscopy and endometrial biopsy <--- 7E0E0 Hysteroscopy and biopsy of lesion of uterus
 7D1B0 Insertion of Hodge pessary into vagina <--- X402l Renewal of Hodge pessary in vagina
 7D1B1 Insertion of ring pessary into vagina <--- X402j Renewal of ring pessary in vagina
 X402m Insertion of shelf pessary into vagina <--- X402k Renewal of shelf pessary in vagina
 7D1B. Insertion of supporting pessary into vagina <--- X402i Renewal of supporting pessary in vagina
 7E090 Introduction of intrauterine contraceptive device <--- 7E091 Replacement of intrauterine contraceptive device
 XaBSw Introduction of Mirena coil <--- 7E091 Replacement of intrauterine contraceptive device
 7E119 Left salpingectomy <--- 7E117 Left salpingo-oophorectomy
 Xa36I Medical termination of pregnancy <--- 7E066 Hysterotomy and termination of pregnancy
 Xa8Pc Oophorectomy <--- 7E24. Oocyte recovery
 Xa8Pc Oophorectomy <--- 7E20. Partial excision of ovary
 Xa8Pc Oophorectomy <--- 7E200 Wedge resection of ovary
 XM00C Operation on cervix <--- Xa8Pl Cervical smear
 XM00C Operation on cervix <--- Ua1Ii Fitting of cervical cap
 XM00C Operation on cervix <--- Ua1Io Insertion of cervical cap
 Xa8PM Posterior colporrhaphy <--- X402b Colpoperineorrhaphy
 7E046 Radical hysterectomy <--- X403I Radical laparoscopic hysterectomy
 7E118 Right salpingectomy <--- 7E116 Right salpingo-oophorectomy
 Xa8Pb Salpingectomy <--- 7E100 Bilateral salpingo-oophorectomy
 Xa8Pb Salpingectomy <--- Xa8Pa Salpingo-oophorectomy
 X402Y Tissue expansion vaginoplasty <--- 7D163 McIndoe vaginoplasty
 X402Y Tissue expansion vaginoplasty <--- 7D165 Reconstruction of vagina with distant flap
 7D120 Total colectomy <--- 7E040 Radical abdominal hysterocolpectomy
 Xa8PZ Unilateral oophorectomy <--- 7E24. Oocyte recovery
 Xa8PZ Unilateral oophorectomy <--- 7E20. Partial excision of ovary
 Xa8PZ Unilateral oophorectomy <--- Xa8Pa Salpingo-oophorectomy
 Xa8PZ Unilateral oophorectomy <--- 7E200 Wedge resection of ovary
 7E0.. Uterine operation <--- X403x Cornual-ampullary anastomosis
 7E0.. Uterine operation <--- X403w Cornual-isthmic anastomosis
 7E0.. Uterine operation <--- X404S Microcolpohysteroscopy
 7E0.. Uterine operation <--- X404R Microhysteroscopy
 7E0.. Uterine operation <--- 7E181 Uterotubal implantation
 7D1.. Vagina operation <--- X403c Creation of uterovaginal fistula
 7D1.. Vagina operation <--- 7E2A3 Vaginal vault smear
 Xa1Fs Vulva operation <--- Xa0Ga Vulval smear
 Xa8PZ Unilateral oophorectomy <--- Xa8PW Bilateral oophorectomy

8.8.4.4.3.2 The Read parent is underspecified (288)

Code	Grail Parent	<---	Grail child
7E1A1	Burying of fimbria in uterine wall	<---	7E1A0 Excision of fimbria
7E1A1	Burying of fimbria in uterine wall	<---	X403r Fimbrioplasty
XaC3o	Cone biopsy of cervix	<---	7E023 Punch biopsy of cervix
XaC3o	Cone biopsy of cervix	<---	X402z Wedge biopsy of cervix
X402P	Excision and obliteration of vagina	<---	XC0fn Advancement of vagina
X402P	Excision and obliteration of vagina	<---	XE0HI Biopsy of lesion of vagina
X402P	Excision and obliteration of vagina	<---	X402r Biopsy of vagina
X402P	Excision and obliteration of vagina	<---	7D152 Cauterisation of lesion of vagina
X402P	Excision and obliteration of vagina	<---	X402Q Colpocleisis
X402P	Excision and obliteration of vagina	<---	Xa8PP Colposcopy of vagina
X402P	Excision and obliteration of vagina	<---	X403c Creation of uterovaginal fistula
X402P	Excision and obliteration of vagina	<---	7D15. Destruction of vaginal lesion
X402P	Excision and obliteration of vagina	<---	X402W Division of vaginal septum
X402P	Excision and obliteration of vagina	<---	7D1D7 Drainage of the canal of Nuck
X402P	Excision and obliteration of vagina	<---	7D1C0 Evacuation of vaginal haematoma
X402P	Excision and obliteration of vagina	<---	7D150 Excision of vaginal lesion
X402P	Excision and obliteration of vagina	<---	7D1C. Exploration of vagina
X402P	Excision and obliteration of vagina	<---	7D1D0 Freeing of adhesions of vagina
X402P	Excision and obliteration of vagina	<---	X402t Haemostasis of vaginal vault
X402P	Excision and obliteration of vagina	<---	7D154 Implantation of radioactive substance into vagina
X402P	Excision and obliteration of vagina	<---	X402h Insertion / removal of supporting pessary into vagina

X402P Excision and obliteration of vagina <--- Xa8PQ Insertion of pack into vagina
X402P Excision and obliteration of vagina <--- 7D1B. Insertion of supporting pessary into vagina
X402P Excision and obliteration of vagina <--- XE0HJ Insertion of vaginal dilator
X402P Excision and obliteration of vagina <--- 7D122 Marsupialisation of lesion of vagina
X402P Excision and obliteration of vagina <--- X402N Operation on vaginal introitus
X402P Excision and obliteration of vagina <--- X402v Painting of vagina
X402P Excision and obliteration of vagina <--- X402Z Perineal-pull-through vaginoplasty
X402P Excision and obliteration of vagina <--- Xa8PR Posterior colpotomy
X402P Excision and obliteration of vagina <--- X402a Reconstruction of vagina with colon
X402P Excision and obliteration of vagina <--- 7D1D3 Removal of foreign body from vagina
X402P Excision and obliteration of vagina <--- X402s Removal of pack from vagina
X402P Excision and obliteration of vagina <--- X402w Removal of vaginal dilator
X402P Excision and obliteration of vagina <--- X402f Sacrospinous fixation of vaginal vault
X402P Excision and obliteration of vagina <--- XE0HH Suture of vagina
X402P Excision and obliteration of vagina <--- X402Y Tissue expansion vaginoplasty
X402P Excision and obliteration of vagina <--- 7D1C1 Toilet to vagina
X402P Excision and obliteration of vagina <--- XM0oL Vaginal repair operation
X402P Excision and obliteration of vagina <--- 7E2A3 Vaginal vault smear
X402P Excision and obliteration of vagina <--- X90Rn Vaginal Z-plasty
X402P Excision and obliteration of vagina <--- 7D12. Vaginectomy
X402P Excision and obliteration of vagina <--- 7D16. Vaginoplasty
X402P Excision and obliteration of vagina <--- X402X Williams vulvovaginoplasty
Ua1Is Feeling stem of intrauterine device <--- Ua11r Checking position of thread of intrauterine device
Ua1Is Feeling stem of intrauterine device <--- XM15M Intrauterine device check
Ua1Is Feeling stem of intrauterine device <--- 7E090 Introduction of intrauterine contraceptive device
Ua1Is Feeling stem of intrauterine device <--- XaBSw Introduction of Mirena coil
Ua1Is Feeling stem of intrauterine device <--- XaC3g Removal of intrauterine contraceptive device
Xa36w Insertion of abortifacient pessary <--- 7E0A0 Embryo transfer
Xa36w Insertion of abortifacient pessary <--- Ua1Ii Fitting of cervical cap
Xa36w Insertion of abortifacient pessary <--- 7E0A. Gamete intrauterine transfer
Xa36w Insertion of abortifacient pessary <--- Ua1Io Insertion of cervical cap
Xa36w Insertion of abortifacient pessary <--- X4033 Insertion of self-retaining catheter through cervix
Xa36w Insertion of abortifacient pessary <--- 7E090 Introduction of intrauterine contraceptive device
Xa36w Insertion of abortifacient pessary <--- XaBSw Introduction of Mirena coil
Xa36w Insertion of abortifacient pessary <--- X403K Introduction of substance - uterine cavity
Xa36w Insertion of abortifacient pessary <--- 7F241 Obstetric uterine tamponade
7E0B4 Insertion of prostaglandin abortifacient pessary <--- 7E0A0 Embryo transfer
7E0B4 Insertion of prostaglandin abortifacient pessary <--- Ua1Ii Fitting of cervical cap
7E0B4 Insertion of prostaglandin abortifacient pessary <--- 7E0A. Gamete intrauterine transfer
7E0B4 Insertion of prostaglandin abortifacient pessary <--- Ua1Io Insertion of cervical cap
7E0B4 Insertion of prostaglandin abortifacient pessary <--- X4033 Insertion of self-retaining catheter through cervix
7E0B4 Insertion of prostaglandin abortifacient pessary <--- 7E090 Introduction of intrauterine contraceptive device
7E0B4 Insertion of prostaglandin abortifacient pessary <--- XaBSw Introduction of Mirena coil
7E0B4 Insertion of prostaglandin abortifacient pessary <--- X403K Introduction of substance - uterine cavity
7E0B4 Insertion of prostaglandin abortifacient pessary <--- 7F241 Obstetric uterine tamponade
7E0A1 Intracervical artificial insemination <--- X403N Artificial insemination by donor
7E0A1 Intracervical artificial insemination <--- Ua1Ie Direct intraperitoneal insemination
XE06k Intrauterine artificial insemination <--- X403N Artificial insemination by donor
XE06k Intrauterine artificial insemination <--- Ua1Ie Direct intraperitoneal insemination
Ua1Ih Intravaginal artificial insemination <--- X403N Artificial insemination by donor
Ua1Ih Intravaginal artificial insemination <--- Ua1Ie Direct intraperitoneal insemination
X403Z Jones modified Strassman metroplasty <--- X4031 Reconstruction of cervix
7D07. Miscellaneous female perineum operations <--- 7D079 Biopsy from female perineum
7D07. Miscellaneous female perineum operations <--- 7D063 Cauterisation of lesion of female perineum
7D07. Miscellaneous female perineum operations <--- 7D073 Closure of fistula of female perineum
7D07. Miscellaneous female perineum operations <--- 7D06. Destruction of lesion of female perineum
7D07. Miscellaneous female perineum operations <--- 7D070 Drainage of female perineum
7D07. Miscellaneous female perineum operations <--- X402M Excision biopsy of female perineal lesion
7D07. Miscellaneous female perineum operations <--- 7D060 Excision of lesion of female perineum
7D07. Miscellaneous female perineum operations <--- 7D076 Excision of sweat gland bearing skin of female perineum
7D07. Miscellaneous female perineum operations <--- 7D077 Exploration of female perineum
7D07. Miscellaneous female perineum operations <--- 7D072 Female perineoplasty

7D07. Miscellaneous female perineum operations <--- XE0H6 Female perineorrhaphy
 7D07. Miscellaneous female perineum operations <--- Xa8PI Female perineotomy
 7D07. Miscellaneous female perineum operations <--- 7D05. Miscellaneous vulval operations
 7D07. Miscellaneous female perineum operations <--- X402J Painting of female perineal warts
 7D07. Miscellaneous female perineum operations <--- 7D078 Removal of foreign body from female perineum
 7D07. Miscellaneous female perineum operations <--- XE0Gz Vulva and female perineum operation
 7D07. Miscellaneous female perineum operations <--- Xa1Fs Vulva operation
 7E03. Miscellaneous operations of cervix <--- 7E000 Amputation of cervix
 7E03. Miscellaneous operations of cervix <--- 7E02. Biopsy of cervix
 7E03. Miscellaneous operations of cervix <--- XE06V Cauterisation of lesion of cervix
 7E03. Miscellaneous operations of cervix <--- Ua1Ip Cervical cap procedure
 7E03. Miscellaneous operations of cervix <--- XaB2E Cervical cryoconisation
 7E03. Miscellaneous operations of cervix <--- Xa8Pl Cervical smear
 7E03. Miscellaneous operations of cervix <--- XaC3o Cone biopsy of cervix
 7E03. Miscellaneous operations of cervix <--- 7E01. Destruction of lesion of cervix
 7E03. Miscellaneous operations of cervix <--- X402x Diathermy of cervix
 7E03. Miscellaneous operations of cervix <--- 7E00. Excision of cervix
 7E03. Miscellaneous operations of cervix <--- 7E002 Excision of lesion of cervix
 7E03. Miscellaneous operations of cervix <--- Ua1Ii Fitting of cervical cap
 7E03. Miscellaneous operations of cervix <--- Ua1Io Insertion of cervical cap
 7E03. Miscellaneous operations of cervix <--- 7E024 Ring biopsy of cervix
 7E03. Miscellaneous operations of cervix <--- XaCHP Suture of cervix
 7E0F. Miscellaneous operations on uterus <--- XaC3i Abdominal hysterocolpectomy
 7E0F. Miscellaneous operations on uterus <--- X403x Cornual-ampullary anastomosis
 7E0F. Miscellaneous operations on uterus <--- X403w Cornual-isthmic anastomosis
 7E0F. Miscellaneous operations on uterus <--- 7E07. Curettage of uterus
 7E0F. Miscellaneous operations on uterus <--- X4035 Curettage of uterus and endometrial sampling
 7E0F. Miscellaneous operations on uterus <--- XaC3e Dilatation of cervix and curettage of uterus
 7E0F. Miscellaneous operations on uterus <--- XE06g Endometrial ablation
 7E0F. Miscellaneous operations on uterus <--- X4036 Endometrial biopsy
 7E0F. Miscellaneous operations on uterus <--- X4037 Endometrial washing
 7E0F. Miscellaneous operations on uterus <--- 7E0D1 Endoscopic cauterisation of lesion of uterus
 7E0F. Miscellaneous operations on uterus <--- 7E0D2 Endoscopic cryotherapy to lesion of uterus
 7E0F. Miscellaneous operations on uterus <--- XE06l Endoscopic excision of lesion of uterus
 7E0F. Miscellaneous operations on uterus <--- Ua1Is Feeling stem of intrauterine device
 7E0F. Miscellaneous operations on uterus <--- X403B Hysterectomy
 7E0F. Miscellaneous operations on uterus <--- Xa36w Insertion of abortifacient pessary
 7E0F. Miscellaneous operations on uterus <--- 7E0B4 Insertion of prostaglandin abortifacient pessary
 7E0F. Miscellaneous operations on uterus <--- 7E09. Intrauterine contraceptive device procedure
 7E0F. Miscellaneous operations on uterus <--- Xa36I Medical termination of pregnancy
 7E0F. Miscellaneous operations on uterus <--- X404S Microcolpohysteroscopy
 7E0F. Miscellaneous operations on uterus <--- X404R Microhysteroscopy
 7E0F. Miscellaneous operations on uterus <--- 7E03. Miscellaneous operations of cervix
 7E0F. Miscellaneous operations on uterus <--- XM0oC Operation on cervix
 7E0F. Miscellaneous operations on uterus <--- Xa8PU Operative termination of pregnancy
 7E0F. Miscellaneous operations on uterus <--- Xa36H Termination of pregnancy
 7E0F. Miscellaneous operations on uterus <--- 7E0D. Therapeutic endoscopic operations on uterus
 7E0F. Miscellaneous operations on uterus <--- XaAtT Uterine ligament operation
 7E0F. Miscellaneous operations on uterus <--- 7E181 Uterotubal implantation
 7E0F. Miscellaneous operations on uterus <--- 7E0G0 Vaginal excision of lesion of uterus
 7E0F. Miscellaneous operations on uterus <--- XaC3j Vaginal hysterocolpectomy
 7D1D. Miscellaneous vaginal operations <--- XC0fn Advancement of vagina
 7D1D. Miscellaneous vaginal operations <--- XE0HI Biopsy of lesion of vagina
 7D1D. Miscellaneous vaginal operations <--- X402r Biopsy of vagina
 7D1D. Miscellaneous vaginal operations <--- 7D152 Cauterisation of lesion of vagina
 7D1D. Miscellaneous vaginal operations <--- X402Q Colpocleisis
 7D1D. Miscellaneous vaginal operations <--- Xa8PP Colposcopy of vagina
 7D1D. Miscellaneous vaginal operations <--- X403c Creation of uterovaginal fistula
 7D1D. Miscellaneous vaginal operations <--- 7D15. Destruction of vaginal lesion
 7D1D. Miscellaneous vaginal operations <--- X402W Division of vaginal septum
 7D1D. Miscellaneous vaginal operations <--- 7D1D7 Drainage of the canal of Nuck
 7D1D. Miscellaneous vaginal operations <--- 7D1C0 Evacuation of vaginal haematoma
 7D1D. Miscellaneous vaginal operations <--- 7D150 Excision of vaginal lesion
 7D1D. Miscellaneous vaginal operations <--- 7D1C. Exploration of vagina

7D1D. Miscellaneous vaginal operations <--- 7D1D0 Freeing of adhesions of vagina
7D1D. Miscellaneous vaginal operations <--- X402t Haemostasis of vaginal vault
7D1D. Miscellaneous vaginal operations <--- 7D154 Implantation of radioactive substance into vagina
7D1D. Miscellaneous vaginal operations <--- X402h Insertion / removal of supporting pessary into vagina
7D1D. Miscellaneous vaginal operations <--- Xa8PQ Insertion of pack into vagina
7D1D. Miscellaneous vaginal operations <--- 7D1B. Insertion of supporting pessary into vagina
7D1D. Miscellaneous vaginal operations <--- XE0HJ Insertion of vaginal dilator
7D1D. Miscellaneous vaginal operations <--- 7D122 Marsupialisation of lesion of vagina
7D1D. Miscellaneous vaginal operations <--- X402N Operation on vaginal introitus
7D1D. Miscellaneous vaginal operations <--- X402v Painting of vagina
7D1D. Miscellaneous vaginal operations <--- X402Z Perineal-pull-through vaginoplasty
7D1D. Miscellaneous vaginal operations <--- Xa8PR Posterior colpotomy
7D1D. Miscellaneous vaginal operations <--- X402a Reconstruction of vagina with colon
7D1D. Miscellaneous vaginal operations <--- 7D1D3 Removal of foreign body from vagina
7D1D. Miscellaneous vaginal operations <--- X402s Removal of pack from vagina
7D1D. Miscellaneous vaginal operations <--- X402w Removal of vaginal dilator
7D1D. Miscellaneous vaginal operations <--- X402f Sacrospinous fixation of vaginal vault
7D1D. Miscellaneous vaginal operations <--- XE0HH Suture of vagina
7D1D. Miscellaneous vaginal operations <--- X402Y Tissue expansion vaginoplasty
7D1D. Miscellaneous vaginal operations <--- 7D1C1 Toilet to vagina
7D1D. Miscellaneous vaginal operations <--- XM0oL Vaginal repair operation
7D1D. Miscellaneous vaginal operations <--- 7E2A3 Vaginal vault smear
7D1D. Miscellaneous vaginal operations <--- X90Rn Vaginal Z-plasty
7D1D. Miscellaneous vaginal operations <--- 7D12. Vaginectomy
7D1D. Miscellaneous vaginal operations <--- 7D16. Vaginoplasty
7D1D. Miscellaneous vaginal operations <--- X402X Williams vulvovaginoplasty
7D05. Miscellaneous vulval operations <--- 7D01. Bartholin's gland operation
7D05. Miscellaneous vulval operations <--- XE0H4 Cauterisation of lesion of vulva
7D05. Miscellaneous vulval operations <--- 7D00. Clitoris operation
7D05. Miscellaneous vulval operations <--- 7D03. Destruction of vulval lesion
7D05. Miscellaneous vulval operations <--- X4026 Excision biopsy of vulval lesion
7D05. Miscellaneous vulval operations <--- X4025 Excision of vulval lesion
7D05. Miscellaneous vulval operations <--- 7D034 Implantation of radioactive substance into vulva
7D05. Miscellaneous vulval operations <--- X402N Operation on vaginal introitus
7D05. Miscellaneous vulval operations <--- 7D035 Painting of vulval warts
7D05. Miscellaneous vulval operations <--- XE0H5 Reconstruction of vulva
7D05. Miscellaneous vulval operations <--- X402C Topical vulval chemotherapy
7D05. Miscellaneous vulval operations <--- Xa0Ga Vulval smear
7D05. Miscellaneous vulval operations <--- 7D02. Vulvectomy
7D05. Miscellaneous vulval operations <--- X4023 Wide local excision of vulva
X404B Multicauterisation of ovary <--- 7E210 Open cauterisation of lesion of ovary
7E1H. Other fallopian tube operations <--- X4040 Balloon tuboplasty
7E1H. Other fallopian tube operations <--- 7E1A1 Burying of fimbria in uterine wall
7E1H. Other fallopian tube operations <--- 7E191 Drainage of fallopian tube
7E1H. Other fallopian tube operations <--- 7E1H2 Dye test of fallopian tube
7E1H. Other fallopian tube operations <--- 7E1C0 Endoscopic bilateral cauterisation of fallopian tubes
7E1H. Other fallopian tube operations <--- 7E1C1 Endoscopic bilateral clipping of fallopian tubes
7E1H. Other fallopian tube operations <--- 7E130 Excision of lesion of fallopian tube
7E1H. Other fallopian tube operations <--- 7E133 Excision of ruptured ectopic tubal pregnancy
7E1H. Other fallopian tube operations <--- XaD29 Fallopian tube anastomosis
7E1H. Other fallopian tube operations <--- XE2u0 Fallopian tube prosthesis operation
7E1H. Other fallopian tube operations <--- XE06y Falloposcopy
7E1H. Other fallopian tube operations <--- X403l Gamete intrafallopian transfer
7E1H. Other fallopian tube operations <--- 7E1H3 Insufflation of fallopian tube
7E1H. Other fallopian tube operations <--- X4041 Linear salpingotomy
7E1H. Other fallopian tube operations <--- XE06q Open bilateral clipping of fallopian tubes
7E1H. Other fallopian tube operations <--- XE06v Open clipping of left fallopian tube
7E1H. Other fallopian tube operations <--- XE06u Open clipping of right fallopian tube
7E1H. Other fallopian tube operations <--- 7E1A. Operation on fimbria
7E1H. Other fallopian tube operations <--- 7E180 Reconstruction of fallopian tube
7E1H. Other fallopian tube operations <--- XM0C3 Reversal of female sterilisation
7E1H. Other fallopian tube operations <--- Xa8Pb Salpingectomy
7E1H. Other fallopian tube operations <--- X403q Salpingolysis
7E1H. Other fallopian tube operations <--- 7E19. Salpingotomy

7E1H. Other fallopian tube operations <--- X403o Tubal embryo transfer
 7E1H. Other fallopian tube operations <--- X403f Tubal occlusion
 7E1H. Other fallopian tube operations <--- X403h Tubal patency test
 7E1H. Other fallopian tube operations <--- X403n Zygote intrafallopian transfer
 X402Z Perineal-pull-through vaginoplasty <--- 7D163 McIndoe vaginoplasty
 X402Z Perineal-pull-through vaginoplasty <--- 7D165 Reconstruction of vagina with distant flap
 X402a Reconstruction of vagina with colon <--- 7D163 McIndoe vaginoplasty
 X402a Reconstruction of vagina with colon <--- 7D165 Reconstruction of vagina with distant flap
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XaC3i Abdominal hysterocolpexy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XE06o Biopsy of lesion of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403x Cornual-ampullary anastomosis
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403w Cornual-isthmic anastomosis
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403c Creation of uterovaginal fistula
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E07. Curettage of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X4035 Curettage of uterus and endometrial sampling
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XaC3e Dilatation of cervix and curettage of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XE06g Endometrial ablation
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X4036 Endometrial biopsy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X4037 Endometrial washing
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E0D1 Endoscopic cauterisation of lesion of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E0D2 Endoscopic cryotherapy to lesion of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XE06l Endoscopic excision of lesion of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XaC3h Exploration of uterine cavity
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- Ua1Is Feeling stem of intrauterine device
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E0F0 Freeing of intrauterine adhesion
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403B Hysterectomy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XaBDK Hysteroscopy and endometrial biopsy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- Xa8PT Hysterotomy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- Xa36w Insertion of abortifacient pessary
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E0B4 Insertion of prostaglandin abortifacient pessary
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E09. Intrauterine contraceptive device procedure
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403Z Jones modified Strassman metroplasty
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- Xa36I Medical termination of pregnancy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XE06f Metroplasty
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X404S Microcolpohysteroscopy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X404R Microhysteroscopy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E03. Miscellaneous operations of cervix
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XM0oC Operation on cervix
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- Xa8PU Operative termination of pregnancy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7D1A3 Repair of uterovaginal fistula
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X30EY Repair of vesicouterine fistula
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403Y Strassman metroplasty
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- Xa36H Termination of pregnancy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E0D. Therapeutic endoscopic operations on uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- X403a Tomkins metroplasty
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XaAtT Uterine ligament operation
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E181 Uterotubal implantation
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E0G0 Vaginal excision of lesion of uterus
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- XaC3j Vaginal hysterocolpexy
 Ua1Iq Retrieval of lost thread of intrauterine contraceptive device <--- 7E089 Vaginal removal of uterine foreign body
 7E024 Ring biopsy of cervix <--- 7E025 Diathermy loop cone biopsy of cervix
 7E024 Ring biopsy of cervix <--- 7E020 Knife cone biopsy of cervix uteri
 7E024 Ring biopsy of cervix <--- 7E021 Laser cone biopsy of cervix uteri
 7E024 Ring biopsy of cervix <--- 7E023 Punch biopsy of cervix
 7E024 Ring biopsy of cervix <--- X402z Wedge biopsy of cervix
 X402f Sacrospinous fixation of vaginal vault <--- Xa8bV Abdominal sacrocolpexy

Xa1hN Staging laparoscopy <--- X404P Second look laparoscopy
 X403Y Strassman metroplasty <--- X4031 Reconstruction of cervix
 Ua1Ig Subzonal insemination <--- X403N Artificial insemination by donor
 Ua1Ig Subzonal insemination <--- Ua1Ie Direct intraperitoneal insemination
 X90Rn Vaginal Z-plasty <--- 7D163 McIndoe vaginoplasty
 X90Rn Vaginal Z-plasty <--- 7D165 Reconstruction of vagina with distant flap
 X4023 Wide local excision of vulva <--- Xa8PH Clitoridectomy
 X4023 Wide local excision of vulva <--- 7D010 Excision of Bartholin's gland
 X4023 Wide local excision of vulva <--- 7D021 Excision of excess labial tissue
 X4023 Wide local excision of vulva <--- 7D110 Excision of hymen
 X4023 Wide local excision of vulva <--- 7D115 Excision of hymenal tag
 X4023 Wide local excision of vulva <--- X4027 Excision of labial cyst
 X4023 Wide local excision of vulva <--- XM0oN Excision of vulval polyp
 X4023 Wide local excision of vulva <--- X4021 Hemivulvectomy
 X4023 Wide local excision of vulva <--- 7D022 Partial vulvectomy
 X4023 Wide local excision of vulva <--- X4024 Skinning vulvectomy
 X4023 Wide local excision of vulva <--- 7D020 Total vulvectomy
 X402X Williams vulvovaginoplasty <--- 7D163 McIndoe vaginoplasty
 X402X Williams vulvovaginoplasty <--- 7D165 Reconstruction of vagina with distant flap
 Ua1If Zona drilling <--- X403N Artificial insemination by donor
 Ua1If Zona drilling <--- Ua1Ie Direct intraperitoneal insemination

8.8.4.4.3.3 *Child anatomy is a kind of the Parent Anatomy (69)*

Vestibular Gland Structure		
Vulval Structure	are kinds of	Female
perineal structure		
Skin of the female external genitalia		
Hymen		
Uterine ligament		
Endometrium		
Cervix uteri structure	are kinds of	Uterine
structure		
Broad ligament		
Uterine cornu		
Fimbria of the fallopian tube		
Ampulla of Fallopian Tube	are kinds of	Fallopian Tube Structure
Uterine cornu		
Skin of the Female external genitalia	is a kind of	Skin of Female Genitalia
Labial Structure		
Hemi-vulva		
Clitoral Structure	are kinds of	Vulval Structures
Vaginal Introitus		
Clitoral Structure		
Posterior fornix		
Anterior wall of the vagina	is a kind of	Vaginal Structure
Hymen		

Code Grail Parent <--- Grail Child

Xa8PK Anterior and posterior colporrhaphy <--- X402c Anterior colporrhaphy and posterior colpoperineorrhaphy
Xa8PL Anterior colporrhaphy <--- 7D170 Anterior and posterior colporrhaphy and amputation of cervix uteri
7D079 Biopsy from female perineum <--- XM1G5 Biopsy of vulva
7D063 Cauterisation of lesion of female perineum <--- XE0H4 Cauterisation of lesion of vulva
Xa8PP Colposcopy of vagina <--- 7D1D5 Colposcopic removal of foreign body from vagina
7D062 Cryosurgery to lesion of female perineum <--- 7D032 Cryotherapy of lesion of vulva
7D06. Destruction of lesion of female perineum <--- 7D03. Destruction of vulval lesion
X402K Diathermy of lesion of female perineum <--- X402B Diathermy of lesion of vulva
X402L Drainage of female perineal abscess <--- X402D Drainage of vulval abscess
7D070 Drainage of female perineum <--- 7D012 Drainage of Bartholin's gland
7D070 Drainage of female perineum <--- X402L Drainage of female perineal abscess
7D070 Drainage of female perineum <--- 7D051 Drainage of lesion of vulva
X402D Drainage of vulval abscess <--- X401z Drainage of Bartholin's abscess
X402M Excision biopsy of female perineal lesion <--- X4026 Excision biopsy of vulval lesion
7D060 Excision of lesion of female perineum <--- X4025 Excision of vulval lesion
7D076 Excision of sweat gland bearing skin of female perineum <--- X4024 Skinning vulvectomy
X403A Excision of uterine polyp <--- XE06W Cervical polypectomy
X4025 Excision of vulval lesion <--- 7D014 Excision of lesion of Bartholin's gland
XE06y Falloposcopy <--- X404Q Ampullosalpingoscopy
7D072 Female perineoplasty <--- XE0H5 Reconstruction of vulva
XE0H6 Female perineorrhaphy <--- 7D111 Repair of hymen
Xa8PI Female perineotomy <--- X4020 Fenton's operation
Xa8PI Female perineotomy <--- 7D112 Incision of hymen
Xa8PI Female perineotomy <--- 7D100 Schuchardt's incision
Xa1Ft Female perineum operation <--- 7D05. Miscellaneous vulval operations
Xa1Ft Female perineum operation <--- Xa1Fs Vulva operation
X403B Hysterectomy <--- X4030 Endometrial resection
X403B Hysterectomy <--- 7E00. Excision of cervix
X403B Hysterectomy <--- X404H Excision of parovarian cyst
X403B Hysterectomy <--- X403b Excision of rudimentary uterine horn
X403B Hysterectomy <--- X403A Excision of uterine polyp
X403B Hysterectomy <--- X403W Resection of uterine septum
X403D Laparoscopic hysterectomy <--- X403X Endoscopic resection of uterine septum
7D061 Laser destruction of lesion of female perineum <--- 7D031 Laser destruction of lesion of vulva
XE0H1 Marsupialisation of lesion of vulva <--- X401y Marsupialisation of Bartholin's abscess
XE0H1 Marsupialisation of lesion of vulva <--- X401x Marsupialisation of Bartholin's cyst
XE06f Metroplasty <--- X4031 Reconstruction of cervix
X404R Microhysteroscopy <--- 7E034 Colposcopy of cervix
Xa8Pc Oophorectomy <--- 7E203 Ovarian cystectomy
XM00C Operation on cervix <--- Ua1Ip Cervical cap procedure
X402J Painting of female perineal warts <--- 7D035 Painting of vulval warts
X4020 Radical total vulvectomy <--- X4022 Radical hemivulvectomy
X4031 Reconstruction of cervix <--- X403e Recanalisation of hypoplastic cervix
XE0H5 Reconstruction of vulva <--- 7D002 Clitoroplasty
7D17. Repair of vaginal prolapse and amputation of cervix uteri <--- 7D170 Anterior and posterior colporrhaphy and amputation of cervix uteri
7D17. Repair of vaginal prolapse and amputation of cervix uteri <--- Xa8PJ Anterior colporrhaphy and amputation of cervix uteri
Xa8Pb Salpingectomy <--- 7E1A0 Excision of fimbria
Xa8Pb Salpingectomy <--- X403b Excision of rudimentary uterine horn
X403a Tomkins metroplasty <--- X4031 Reconstruction of cervix
Xa8PZ Unilateral oophorectomy <--- 7E203 Ovarian cystectomy
7E0.. Uterine operation <--- XaAtT Uterine ligament operation
7D1.. Vagina operation <--- Xa8PR Posterior colpotomy
XM00L Vaginal repair operation <--- 7D111 Repair of hymen
7D12. Vaginectomy <--- 7D14. Excision of band of vagina
7D12. Vaginectomy <--- X402T Excision of Gartner's duct cyst
7D12. Vaginectomy <--- 7D110 Excision of hymen
7D12. Vaginectomy <--- 7D115 Excision of hymenal tag
7D12. Vaginectomy <--- X402V Excision of septum of vagina
7D12. Vaginectomy <--- 7D155 Excision of vaginal adhesions
XE0Gz Vulva and female perineum operation <--- X402N Operation on vaginal introitus
XE0Gz Vulva and female perineum operation <--- Xa0Ga Vulval smear

Xa1Fs Vulva operation <--- X402N Operation on vaginal introitus
7D02. Vulvectomy <--- Xa8PH Clitoridectomy
7D02. Vulvectomy <--- 7D010 Excision of Bartholin's gland
7D02. Vulvectomy <--- 7D021 Excision of excess labial tissue
7D02. Vulvectomy <--- 7D110 Excision of hymen
7D02. Vulvectomy <--- 7D115 Excision of hymenal tag
7D02. Vulvectomy <--- X4027 Excision of labial cyst
7D02. Vulvectomy <--- XM0oN Excision of vulval polyp

8.8.4.4.3.4

8.8.4.4.3.5 *Child pathology is a kind of the Parent pathology (5)*

In the Grail hierarchy:

Septate uterus
Unspecified adhesions are kinds of Unspecified Surgical Lesions
Unspecified cysts
Vaginal Septum

Code	Grail Parent	<---	Grail Child
XE061	Endoscopic excision of lesion of uterus	<---	X403X Endoscopic resection of uterine septum
7D150	Excision of vaginal lesion	<---	7D14. Excision of band of vagina
7D150	Excision of vaginal lesion	<---	X402T Excision of Gartner's duct cyst
7D150	Excision of vaginal lesion	<---	X402V Excision of septum of vagina
7D150	Excision of vaginal lesion	<---	7D155 Excision of vaginal adhesions

8.8.4.4.3.6 *Child deed / other concept is a kind of the Parent deed / other concept(9)*

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains a deed that is a kind-of a deed term in the adult concept.

The following relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

Husband donor is a kind of Donor
Excision biopsy is a kind of Biopsy
Examination – action is a kind of Clinical Act
Reconstruction
Aspiration is a kind of Drainage
Radical (extent) is a kind of Total (extent)

Code	Grail parent	<---	Grail Child
X403N	Artificial insemination by donor	<---	X403M Artificial insemination by husband
XE0HI	Biopsy of lesion of vagina	<---	X402R Excision biopsy of vaginal lesion
Xa8PP	Colposcopy of vagina	<---	XM13i Colposcopy
Xa7kN	Drainage of ovarian cyst	<---	X404F Aspiration of ovarian cyst
Xa7kO	Drainage of ovary	<---	Xa7kP Aspiration of ovary
7E1..	Fallopian tube operation	<---	XE06y Falloposcopy
7E1A.	Operation on fimbria	<---	X403r Fimbrioplasty
XE06Z	Total abdominal hysterectomy	<---	XaBEI Radical abdominal hysterectomy

X403E Total laparoscopic hysterectomy <--- X403I Radical laparoscopic hysterectomy

8.8.4.4.3.7 *Grail Modelling problems (8)*

The following classifications were inferred by the Grail classifier as a result of the mismapping of the Descriptor 'incision ostomy' to the Grail concept 'Osteotomy' and as a result of the incorrect modelling of skin flaps.

Code	Grail Parent	<---	Grail Child
X4041 Linear salpingotomy	<---	X403s Distal salpingostomy	
X4041 Linear salpingotomy	<---	7E184 Salpingostomy	
7D165 Reconstruction of vagina with distant flap	<---	7D164 Reconstruction of vagina with local flap	
7D165 Reconstruction of vagina with distant flap	<---	7D166 Reconstruction of vagina with microvascular transferred flap	
7D043 Reconstruction of vulva with distant flap	<---	7D044 Reconstruction of vulva with free flap	
7D043 Reconstruction of vulva with distant flap	<---	7D042 Reconstruction of vulva with local flap	
7E19. Salpingotomy	<---	X403s Distal salpingostomy	
7E19. Salpingotomy	<---	7E184 Salpingostomy	

8.8.4.4.4 *Only in Read*

8.8.4.4.4.1 *Child deed not a kind of the adult deed in Galen hierarchy (53)*

These links would be required in the Galen hierarchy in order to enable the classifier to automatically infer the asserted relationship in the Read hierarchy. However, these relationships do not exist within the Galen hierarchy, because they are not the strict kind-of relationships that the Galen hierarchy creates and requires.

Amputaion	is not a kind of	Repair
Removal	is not a kind of	Biopsy
Destruction	is not a kind of	Cauterisation
Irrigation		
Removal	are not kinds of	Sampling
Excision		
Division		
Cauterisation		
Excision	are not kinds of	Destroying
Applying		
Introduction		
Matsupialisation		
Cauterisation	are not kinds of	Occluding
Inserting		
Amputation	are not kinds of	Excising
Excision biopsyng		
Introduction	are not kinds of	termination
Evacuation		

	Draining	is not a kind of	Incising
	Repair		
	Dilatation		
	Construction	are not kinds of	Reconstruction
	Freeing		
	Incision ostomy		
	Aspiration	is not a kind of	Removing
	Implantation		
	Suturing	are not kinds of	Repairing
	Fixation		
	Insufflation	is not a kind of	Investigation
	Plication	is not a kind of	Fixation
Code	Read parent	<---	Read Child
X402c	Anterior colporrhaphy and posterior colpoperineorrhaphy <---	7D170	Anterior and posterior colporrhaphy and amputation of cervix uteri
7E02.	Biopsy of cervix <---	X4030	Endocervical curettage
Xa7kQ	Cauterisation of ovary <---	Xa84a	Diathermy of ovary
X4035	Curettage of uterus and endometrial sampling <---	7E07.	Curettage of uterus
X4035	Curettage of uterus and endometrial sampling <---	XaC3e	Dilatation of cervix and curettage of uterus
X4035	Curettage of uterus and endometrial sampling <---	X4036	Endometrial biopsy
X4035	Curettage of uterus and endometrial sampling <---	X4037	Endometrial washing
X4035	Curettage of uterus and endometrial sampling <---	X403A	Excision of uterine polyp
X4035	Curettage of uterus and endometrial sampling <---	7E083	Extraction of menses
7E01.	Destruction of lesion of cervix <---	XE06V	Cauterisation of lesion of cervix
7E01.	Destruction of lesion of cervix <---	X402y	Laser excision of lesion of cervix
7D06.	Destruction of lesion of female perineum <---	7D063	Cauterisation of lesion of female perineum
7D06.	Destruction of lesion of female perineum <---	X402J	Painting of female perineal warts
7D15.	Destruction of vaginal lesion <---	7D152	Cauterisation of lesion of vagina
7D15.	Destruction of vaginal lesion <---	X402W	Division of vaginal septum
7D15.	Destruction of vaginal lesion <---	7D14.	Excision of band of vagina
7D15.	Destruction of vaginal lesion <---	X402T	Excision of Gartner's duct cyst
7D15.	Destruction of vaginal lesion <---	X402V	Excision of septum of vagina
7D15.	Destruction of vaginal lesion <---	7D154	Implantation of radioactive substance into vagina
7D15.	Destruction of vaginal lesion <---	7D122	Marsupialisation of lesion of vagina
7D03.	Destruction of vulval lesion <---	XE0H4	Cauterisation of lesion of vulva
7D03.	Destruction of vulval lesion <---	7D034	Implantation of radioactive substance into vulva
7D03.	Destruction of vulval lesion <---	7D035	Painting of vulval warts
7D03.	Destruction of vulval lesion <---	X402C	Topical vulval chemotherapy
7E1C.	Endoscopic bilateral occlusion of fallopian tubes <---	7E1C0	Endoscopic bilateral cauterisation of fallopian tubes
7E1C.	Endoscopic bilateral occlusion of fallopian tubes <---	7E1C1	Endoscopic bilateral clipping of fallopian tubes
7E00.	Excision of cervix <---	7E000	Amputation of cervix
7D150	Excision of vaginal lesion <---	X402R	Excision biopsy of vaginal lesion
X4025	Excision of vulval lesion <---	X4026	Excision biopsy of vulval lesion
7E017	Loop diathermy of cervix <---	Xa8PS	Loop diathermy excision of cervix
Xa36I	Medical termination of pregnancy <---	Xa36w	Insertion of abortifacient pessary
7E236	Oophorotomy <---	7E233	Open drainage of ovarian cyst
7E236	Oophorotomy <---	7E234	Oophorotomy and drainage of abscess
7E15.	Open bilateral occlusion of fallopian tubes <---	XE06q	Open bilateral clipping of fallopian tubes
XE06r	Open unilateral occlusion of fallopian tube <---	XE06v	Open clipping of left fallopian tube

XE06r Open unilateral occlusion of fallopian tube <--- XE06u Open clipping of right fallopian tube
 Xa8PU Operative termination of pregnancy <--- 7E085 Dilatation and evacuation termination of pregnancy
 Xa8PU Operative termination of pregnancy <--- 7E084 Suction termination of pregnancy
 X4031 Reconstruction of cervix <--- X4032 Lash repair of internal os of cervix
 X4031 Reconstruction of cervix <--- 7E032 Repair of cervical laceration
 7E180 Reconstruction of fallopian tube <--- X4040 Balloon tuboplasty
 7E180 Reconstruction of fallopian tube <--- XaD29 Fallopian tube anastomosis
 7E180 Reconstruction of fallopian tube <--- X403q Salpingolysis
 7E180 Reconstruction of fallopian tube <--- 7E184 Salpingostomy
 7E180 Reconstruction of fallopian tube <--- 7E181 Uterotubal implantation
 XE2u1 Removal of products of conception from fallopian tube <--- Xa8Pg Aspiration of gestational sac from fallopian tube
 7E22. Repair of ovary <--- 7E220 Replantation of ovary
 7E22. Repair of ovary <--- 7E221 Suturing of ovary
 7D19. Repair of vault of vagina <--- Xa8bV Abdominal sacrocolpopexy
 7D19. Repair of vault of vagina <--- X402f Sacrospinous fixation of vaginal vault
 X403h Tubal patency test <--- 7E1H3 Insufflation of fallopian tube
 XM00L Vaginal repair operation <--- XE0HH Suture of vagina
 XE075 Ventrosuspension of uterus <--- 7E281 Plication of round ligament of uterus

8.8.4.4.4.2 Child anatomical term is not a kind of the adult anatomical term in Galen hierarchy (3)

These relationships were not inferred by the Grail classifier because the anatomical relationships implicit in the Read hierarchy do not exist in the Galen hierarchy, e.g.

Uterus	is not a kind of	Pathological lesion that is located in the uterus
Anterior wall of the vagina	is not a kind of	Female perineal structure

Code	Read parent	<- --	Read child
XE06o	Biopsy of lesion of uterus <--- XaBDK	Hysteroscopy and endometrial biopsy	
XE06o	Biopsy of lesion of uterus <--- 7E0E0	Hysteroscopy and biopsy of lesion of uterus	

8.8.4.4.4.3 Different concepts (22)

In these relationships, the Grail classifier was unable to infer a kind-of relationship, because the concepts are too different.

Code	Read Parent	<---	Read Child
7E000	Amputation of cervix <--- 7D170	Anterior and posterior colporrhaphy and amputation of cervix uteri	
7E000	Amputation of cervix <--- Xa8PJ	Anterior colporrhaphy and amputation of cervix uteri	
7E000	Amputation of cervix <--- 7D17.	Repair of vaginal prolapse and amputation of cervix uteri	
XE06x	Endoscopic unilateral occlusion of fallopian tube <--- 7E1D2	Endoscopic occlusion of left fallopian tube	
XE06x	Endoscopic unilateral occlusion of fallopian tube <--- 7E1D1	Endoscopic occlusion of right fallopian tube	
X404L	Gynaecological endoscopic examination <--- 7H29.	Laparoscopy	
X403K	Introduction of substance - uterine cavity <--- 7E0A0	Embryo transfer	
X403K	Introduction of substance - uterine cavity <--- 7E0A.	Gamete intrauterine transfer	
X403D	Laparoscopic hysterectomy <--- X403C	Laparoscopy assisted vaginal hysterectomy	
7H29.	Laparoscopy <--- X404P	Second look laparoscopy	
7H29.	Laparoscopy <--- Xa1hN	Staging laparoscopy	
7E03.	Miscellaneous operations of cervix <--- XaC3e	Dilatation of cervix and curettage of uterus	
7E0F.	Miscellaneous operations on uterus <--- Xa8Pt	Uterine packing	
XE06r	Open unilateral occlusion of fallopian tube <--- 7E166	Open ligation of right fallopian tube	
XE06r	Open unilateral occlusion of fallopian tube <--- 7E167	Open ligation of left fallopian tube	
Xa8PY	Total unilateral salpingectomy <--- 7E119	Left salpingectomy	
Xa8PY	Total unilateral salpingectomy <--- 7E118	Right salpingectomy	
Xa8PX	Unilateral salpingo-oophorectomy <--- 7E117	Left salpingo-oophorectomy	
Xa8PX	Unilateral salpingo-oophorectomy <--- 7E116	Right salpingo-oophorectomy	

Xa8Pt Uterine packing <--- 7F241 Obstetric uterine tamponade
XE074 Operation on round and uterosacral ligament <--- 7E284 Diathermy lesion uterosacral ligament
XE074 Operation on round and uterosacral ligament <--- XE076 Division of uterosacral ligament

8.8.4.4.4 Grail modelling issues (8)

These relationships were not picked up by the automatic classifier because there were relationships implied in the Read hierarchy that did not exist in the Grail model, but should have. The following issues were identified as a result of the analysis.

- Modelling of combined procedures: should procedures such as Hysterocolpectomy be represented as

MAIN excising		MAIN excising
ACTS_ON uterus	or as	ACTS_ON
uterus		
ACTS_ON vagina		WITH_MAIN excising
		ACTS_ON
vagina		

- Body spaces (such as the endocervical canal and the uterine space) are not currently classified as kinds-of the body structure in which they are contained.
- Enterocoele was not classified a prolapse lesion
- The vulval vein was not a component of the vulva.

Code	Read parent	<- --	Read child
XE06Y	Abdominal hysterectomy <---	XaC3i	Abdominal hysterocolpectomy
7E00.	Excision of cervix <---	XaC3d	Endocervical excision
X404L	Gynaecological endoscopic examination <---	7E0E.	Hysteroscopy
XaBEI	Radical abdominal hysterectomy <---	7E040	Radical abdominal hysterocolpectomy
Xa8P0	Repair of vaginal wall prolapse <---	Xa8PN	Repair of enterocoele
Xa8Pa	Salpingo-oophorectomy <---	7E100	Bilateral salpingo-oophorectomy
XE06b	Vaginal hysterectomy <---	XaC3j	Vaginal hysterocolpectomy
Xa1sw	Injection into vulva <---	7D053	Sclerosing injection into vulval vein

8.8.4.4.5 Deed acting on pathology (15)

In these relationship pairs, the Grail classifier did not infer a relationship because they were in the form:

Read Parent	Read child
MAIN deed	MAIN deed
ACTS_ON Structure	ACTS_ON Pathology
Structure	HAS_LOCATION

Code	Read Parent	<---	Read Child
7D079	Biopsy from female perineum <---	X402M	Excision biopsy of female perineal lesion
X402r	Biopsy of vagina <---	XE0HI	Biopsy of lesion of vagina
7E013	Cryotherapy to lesion of cervix <---	XaB2E	Cervical cryoconisation
7E01.	Destruction of lesion of cervix <---	X402x	Diathermy of cervix
7D010	Excision of Bartholin's gland <---	7D014	Excision of lesion of Bartholin's gland
7E00.	Excision of cervix <---	7E002	Excision of lesion of cervix
7E0F.	Miscellaneous operations on uterus <---	X403S	Myomectomy
X404D	Ovarian biopsy <---	7E260	Endoscopic biopsy of lesion of ovary

X404D Ovarian biopsy <--- 7E232 Open biopsy of lesion of ovary
 7E20. Partial excision of ovary <--- 7E201 Excision of lesion of ovary
 7E13. Partial salpingectomy <--- 7E130 Excision of lesion of fallopian tube
 7E13. Partial salpingectomy <--- 7E133 Excision of ruptured ectopic tubal pregnancy
 7E0D. Therapeutic endoscopic operations on uterus <--- 7E0D1 Endoscopic cauterisation of lesion of uterus
 7E0D. Therapeutic endoscopic operations on uterus <--- 7E0D2 Endoscopic cryotherapy to lesion of uterus
 7E0D. Therapeutic endoscopic operations on uterus <--- XE061 Endoscopic excision of lesion of uterus

8.8.4.4.4.6 Link – attribute problems (10)

In the Gynaecological procedures there is inconsistent use of the HAS_LOCATION and HAS_DESTINATION links. These seem to be used interchangeably, for no clear reason.

Code	Read parent	<---	Read child
Ua1Ip	Cervical cap procedure <---	Ua1Ii	Fitting of cervical cap
Ua1Ip	Cervical cap procedure <---	Ua1Io	Insertion of cervical cap
X402h	Insertion / removal of supporting pessary into vagina <---	7D1B.	Insertion of supporting pessary into vagina
X402h	Insertion / removal of supporting pessary into vagina <---	X402i	Renewal of supporting pessary in vagina

8.8.4.4.5 Contradictory (3)

X402c Anterior colporrhaphy and posterior colpoperineorrhaphy <--- Xa8PK Anterior and posterior colporrhaphy
 7E09. Intrauterine contraceptive device procedure <--- Ua1Iq Retrieval of lost thread of intrauterine contraceptive device
 XE0Gz Vulva and female perineum operation <--- Xa1Ft Female perineum operation

8.8.4.4.6 Can't Compare (21)

These relationships could not be compared either because descriptors were unmapped or the meaning of the atomisation was unclear.

Xa8PH Clitoridectomy <--- 7D001 Ritual clitoridectomy
 7E0A0 Embryo transfer <--- X403L Frozen embryo transfer
 7E1C. Endoscopic bilateral occlusion of fallopian tubes <--- 7E1C2 Endoscopic bilateral ringing of fallopian tubes
 7E1.. Fallopian tube operation <--- X403k Excision of tubo-ovarian mass
 X401w Gynaecological procedure <--- 7D... Lower female genital tract operation
 X401w Gynaecological procedure <--- 7E... Upper female genital tract operation
 7D... Lower female genital tract operation <--- 7D1.. Vagina operation
 7D... Lower female genital tract operation <--- XE0Gz Vulva and female perineum operation
 7E0F. Miscellaneous operations on uterus <--- Xa360 Uterine sounding
 7D05. Miscellaneous vulval operations <--- X402F Excision of female periurethral tissue
 7D05. Miscellaneous vulval operations <--- X402I Ritual female circumcision
 7E1A. Operation on fimbria <--- 7E1A2 Excision of hydatid of Morgagni
 7E1H. Other fallopian tube operations <--- X4043 Expression of fallopian tube
 7E1H. Other fallopian tube operations <--- X4048 Methotrexate injection into tubal pregnancy
 7E1H. Other fallopian tube operations <--- X4045 Removal of ring from fallopian tube
 X4049 Ovary operation <--- X403k Excision of tubo-ovarian mass
 X4049 Ovary operation <--- 7E222 Suture ruptured corpus luteum
 7E... Upper female genital tract operation <--- 7E1.. Fallopian tube operation
 7E... Upper female genital tract operation <--- X4049 Ovary operation
 7E... Upper female genital tract operation <--- XaAtT Uterine ligament operation
 7E... Upper female genital tract operation <--- 7E0.. Uterine operation

8.8.4.5 Results of Analysis of Lymphatic Procedures

Translating the Read templates into Grail:

- 164 Atom templates
- 153 Compile into Grail
- 11 Templates do not compile into Grail (the reasons are discussed in the Can't Compare section below)

Comparison of Hierarchies:

The analysis found and examined 1183 kind-of relationships which yielded the following subsumption relationships:

- Only in Grail hierarchy 43
- Only in Read hierarchy 24
- Contradictory 0
- Same Grail concept with different Read codes 10
- Common to both hierarchies 150
- Can't compare the relationships 11

8.8.4.5.1 Common to both hierarchies (150)

The common relationships between the two hierarchies are listed in the Appendix.

8.8.4.5.2 Same Grail concept (10)

Of the eight atom templates pairs that compiled into the same Grail, only one contained templates that were classed as 'fully atomised'.

7H600 Block dissection of cervical lymph nodes <--- X209x Selective neck dissection of cervical lymph nodes
XM1G3 Drainage of lesion of spleen <--- X20BP External drainage of splenic lesion

The other eight contained at least one template that was either 'reviewable' or 'impossible'.

7K1Q0 Autologous bone marrow transplant <--- X20Bc Marrow-treated bone marrow transplant
X20Bi Haemopoietic stem cell transplant <--- Xa0fJ Cord cell transfusion
X20Bi Haemopoietic stem cell transplant <--- Xa0fK Peripheral blood stem cell graft
Xa8Ry Allogeneic bone marrow transplant <--- X20Be T-cell depleted allogeneic bone marrow graft
Xa8Ry Allogeneic bone marrow transplant <--- X20Bf Imperfect T-cell depleted allogeneic bone marrow graft
Xa8Ry Allogeneic bone marrow transplant <--- X20Bg Allogeneic related bone marrow transplant
Xa8Ry Allogeneic bone marrow transplant <--- X20Bh Allogeneic unrelated bone marrow transplant
XE050 Lymphatic tissue operation <--- X20B0 Enteromesenteric bridge operation

8.8.4.5.3 Only In Grail (43)

8.8.4.5.3.1 Child contains additional specialisations (14)

In these relationships, there is the same anatomy, deed, etc but there are additional specifications added to the child concept in the form of:

Parent concept
ADDITIONAL_LINK(S) additional concepts

Where the additional links are:

BY_MEANS_OF
HAS_EXTENT
HAS_APPROACH
ACTS_ON

Code	Grail Parent	<---	Grail Child
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X209x	Selective neck dissection of cervical lymph nodes	<---	7H605 Modified radical neck dissection of cervical lymph nodes
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X209x Selective neck dissection of cervical lymph nodes <--- X209v Extended radical neck dissection of cervical lymph nodes
 X209x Selective neck dissection of cervical lymph nodes <--- X209w Radical neck dissection of cervical lymph nodes
 X20A4 Excision of group of lymph nodes <--- 7H60. Block dissection of lymph nodes
 X20A5 Excision of cervical lymph nodes group <--- 7H600 Block dissection of cervical lymph nodes
 X20A5 Excision of cervical lymph nodes group <--- X209x Selective neck dissection of cervical lymph nodes
 X20A6 Excision of axillary lymph nodes group <--- 7H601 Block dissection of axillary lymph nodes
 X20A7 Excision of mediastinal lymph nodes group <--- 7H602 Block dissection of mediastinal lymph nodes
 X20A9 Excision of pelvic lymph nodes group <--- X20A1 Block dissection of pelvic lymph nodes
 X20AA Excision of inguinal lymph nodes group <--- 7H604 Block dissection of inguinal lymph nodes
 X20Az Drainage of lymphatics <--- X20BC Incision and drainage of cystic hygroma
 X20BP External drainage of splenic lesion <--- X20BQ Fine needle aspiration of lesion of spleen
 Xa9IV Lymph node operation <--- X20At Lymphonodovenous anastomosis
 XM1G3 Drainage of lesion of spleen <--- X20BQ Fine needle aspiration of lesion of spleen

8.8.4.5.3.2 The Parent is underspecified (15)

Code	Grail Parent	<---	Grail Child
X20Aq	Lymphatic drainage through buried fascia/tensor fascia lata	<---	X20Ar Lymphatic drainage through omental transfer
X20Aq	Lymphatic drainage through buried fascia/tensor fascia lata	<---	X20As Lymphatic drainage through pedicled skin flap
X20Aq	Lymphatic drainage through buried fascia/tensor fascia lata	<---	X20B9 Aspiration of cystic hygroma
X20Aq	Lymphatic drainage through buried fascia/tensor fascia lata	<---	X20BC Incision and drainage of cystic hygroma
X20B0	Enteromesenteric bridge operation	<---	X20Ay Excision of lymphangioma
X20B0	Enteromesenteric bridge operation	<---	X20Az Drainage of lymphatics
X20B0	Enteromesenteric bridge operation	<---	X20B5 Operation on lymphocyst
X20B0	Enteromesenteric bridge operation	<---	X20B8 Operation on cystic hygroma
X20B0	Enteromesenteric bridge operation	<---	Xa8RY Excision of lymphoedematous tissue
X20B0	Enteromesenteric bridge operation	<---	Xa9IV Lymph node operation
X20Be	T-cell depleted allogeneic bone marrow graft	<---	X20Bd Syngeneic bone marrow transplant
X20Bf	Imperfect T-cell depleted allogeneic bone marrow graft	<---	X20Bd Syngeneic bone marrow transplant
X30FB	Operation on pelvic lymph node draining prostate	<---	X20Af Fine needle aspiration of pelvic lymph node
X30FB	Operation on pelvic lymph node draining prostate	<---	X20Am Drainage of lesion of pelvic lymph node
X30FB	Operation on pelvic lymph node draining prostate	<---	X20AU Biopsy of pelvic lymph node

8.8.4.5.3.3 Child anatomy is a kind of the Parent Anatomy (2)

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains an anatomical term that is a kind-of an anatomical term in the adult concept. The following anatomical relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

Cyst which hasLocation Structure is a kind of Structure

Para-aortic lymph node group is a kind of Abdominal Lymph node group

Code	Grail Parent	<---	Grail Child
7H64.	Operation on lymphatic duct	<---	X20B8 Operation on cystic hygroma
X20A8	Excision of abdominal lymph nodes group	<---	7H603 Block dissection of para-aortic lymph nodes
X20Az	Drainage of lymphatics	<---	7H63. Drainage of lesion of lymph node
X20Az	Drainage of lymphatics	<---	X20B6 Drainage of lymphocyst
X20Az	Drainage of lymphatics	<---	X20B9 Aspiration of cystic hygroma

8.8.4.5.3.4 Child pathology is a kind of the Parent pathology (2)

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains a pathological term that is a kind-of a pathological term in the adult concept.

The following relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

	Lymphocoele	is a kind of	Unspecified Cyst
	Unspecified abscess lesion	is a kind of	Unspecified surgical
Code	Grail Parent	<---	Grial Child
X20B7	Excision of lymphocyst	<---	7H660 Excision of lymphocoele
X20BP	External drainage of splenic lesion	<---	Xa3lh Drainage of splenic abscess

8.8.4.5.3.5 *Child deed /other descriptor is a kind of the Parent deed / other descriptor (6)*

In these pairs, the Grail classifier infers that the child concept is a kind-of the parent concept because in the Grail model the child concept contains a deed that is a kind-of a deed term in the adult concept.

The following relationships exist within the Grail model, but appear not to exist within the Read hierarchy underlying the classification of these procedures.

	Aspiration	is a kind of	Drainage
	Synergic graft	is a kind of	Homograft
	Autograft Graft	is a kind of	Synergic
Code	Grail Parent	<---	Grial Child
X20Bd	Syngeneic bone marrow transplant	<---	7K1Q0 Autologous bone marrow transplant
X20Bd	Syngeneic bone marrow transplant	<---	X20Bc Marrow-treated bone marrow transplant
X20Bg	Allogeneic related bone marrow transplant	<---	X20Bd Syngeneic bone marrow transplant
X20Bh	Allogeneic unrelated bone marrow transplant	<---	X20Bd Syngeneic bone marrow transplant
Xa8Ry	Allogeneic bone marrow transplant	<---	X20Bd Syngeneic bone marrow transplant
X20Az	Drainage of lymphatics	<---	X20AZ Fine needle aspiration of lymph node

8.8.4.5.3.6 *Grail Modelling problems (1)*

At present, cystic lymphangioma is possibly incorrectly modelled as a kind-of simple lymphangioma.

Code	Grail Parent	<---	Grial Child
X20Ay	Excision of lymphangioma	<---	XE05W Excision of cystic hygroma

8.8.4.5.4 *Only in Read*

8.8.4.5.4.1 *Child deed not a kind of the adult deed in Galen hierarchy (12)*

These links would be required in the Galen hierarchy in order to enable the classifier to automatically infer the asserted relationship in the Read hierarchy. However, these relationships do not exist within the Galen hierarchy, because they are not the strict kind-of relationships that the Galen hierarchy creates and requires.

Aspiration	is NOT a kind of	Blopsyng
------------	------------------	----------

	Inserting		are NOT kinds of	Repairing
	Suturing			
	Draining		are NOT kinds of	Constructing
	Transposition			
	Aspiration		are NOT kinds of	Sampling
	Trephining			
	Marsupialisation		are NOT kinds of	Drainage
	Constructing			
Code	Read Parent	<---	Read Child	
78422	Biopsy of lesion of spleen <---	X20BQ	Fine needle aspiration of lesion of spleen	
78423	Repair of spleen <---	78424	Banding of spleen	
78423	Repair of spleen <---	X20BR	Suturing of spleen	
7H641	Bypass of obstruction of lymphatic duct <---	X20Aq	Lymphatic drainage through buried fascia/tensor fascia lata	
7H641	Bypass of obstruction of lymphatic duct <---	X20Ar	Lymphatic drainage through omental transfer	
7H641	Bypass of obstruction of lymphatic duct <---	X20As	Lymphatic drainage through pedicled skin flap	
7H641	Bypass of obstruction of lymphatic duct <---	X20Av	Transplantation of lymph collectors	
X20BV	Bone marrow sampling <---	X20BW	Bone marrow aspiration	
X20BV	Bone marrow sampling <---	X20BZ	Bone marrow trephine	
XM1G3	Drainage of lesion of spleen <---	78411	Marsupialisation of splenic lesion	
XM1G3	Drainage of lesion of spleen <---	X20BN	Splenic cystogastrostomy	
XM1G3	Drainage of lesion of spleen <---	X20B0	Splenic cystojejunostomy	

8.8.4.5.4.2 Child anatomical term is not a kind of the adult anatomical tem in Galen hierarchy (6)

These relationships were not inferred by the Grail classifier because the anatomical relationships implicit in the Read hierarchy do not exist in the Galen hierarchy.

	Supramyohyoid LN group		are not kinds of	
	Cervical LN group			
	Supraclavicular LN group			
	Lymphatic vessel		are not kinds of	
	Lymphatic tissue			
	Lymphatic structure			
Code	Read Parent	<---	Read Child	
X209x	Selective neck dissection of cervical lymph nodes <---	7H606	Supraomohyoid lymph nodes neck dissection	
X20Ab	Fine needle aspiration of cervical lymph node <---	X20Aa	Fine needle aspiration of supraclavicular lymph node	
XE05P	Cervical lymph nodes sampling <---	XE05Q	Sampling of supraclavicular lymph nodes	
Xa8RY	Excision of lymphoedematous tissue <---	Xa8RX	Excision of lymphoedematous tissue of leg	
Xa8RY	Excision of lymphoedematous tissue <---	XE05S	Excision of lymphoedematous tissue of arm	
XE050	Lymphatic tissue operation <---	7H64.	Operation on lymphatic duct	

8.8.4.5.4.3 Different concepts (2)

In these relationships the Grail classifier was simply unable to infer a kind-of relationship, because the concepts are different. Although they share common ancestors, they are not similar enough to be classified as kinds-of each other.

Code	Read Parent	<---	Read Child
------	-------------	------	------------

7H64. Operation on lymphatic duct <--- 7H641 Bypass of obstruction of lymphatic duct
 7H641 Bypass of obstruction of lymphatic duct <--- X20At Lymphonodovenous anastomosis

8.8.4.5.4 Grail modelling issues (3)

These relationships were not picked up by the automatic classifier because there were relationships implied in the Read hierarchy that did not exist in the Grail model, but should have. The following issues were identified as a result of the analysis.

- The descriptor Partial was remapped to OrganPartial
- Thoracic Lymphatic duct was reclassified as a lymph vessel
- Bone marrow and lymphatic tissue are now kinds-of lymphoreticular system components

Code	Read Parent	<---	Read Child
78410	Partial splenectomy	<---	Ua1JD Subtotal splenectomy
7H642	Ligation of lymphatic duct	<---	X20Aw Ligation of thoracic lymph duct
X209u	Lymphatic, spleen and bone marrow procedures	<---	X20BU Bone marrow procedure

8.8.4.5.5 Contradictory (0)

8.8.4.5.6 Can't Compare (11)

7H604 Block dissection of inguinal lymph nodes <--- X20A2 Ilioinguinofemoral lymphadenectomy
 7H604 Block dissection of inguinal lymph nodes <--- X20A3 Inguinofemoral lymphadenectomy
 7H63. Drainage of lesion of lymph node <--- X20An Drainage of lesion of femoral lymph node
 7H641 Bypass of obstruction of lymphatic duct <--- X20Au Lymphovenous anastomosis
 X209x Selective neck dissection of cervical lymph nodes <--- X209y Posterolateral lymph nodes neck dissection
 X209x Selective neck dissection of cervical lymph nodes <--- X209z Lateral lymph nodes neck dissection
 X20A4 Excision of group of lymph nodes <--- X20AB Excision of femoral lymph nodes group
 X20AF Excision of lymph node <--- X20AM Excision of femoral lymph node
 X20AP Lymph node biopsy <--- X20AW Biopsy of femoral lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ah Fine needle aspiration of femoral lymph node
 XE050 Lymphatic tissue operation <--- X20Ax Excision of lymphatic vesicles

8.8.4.6 Cardiovascular Procedures

A full analysis of the cardiovascular procedures was presented in the Draft rept that preceded this document. For completeness, the results of an analysis of theses procedures is presented here. These results differ from those of the original analysis because there has been further Grail modelling to correct some inaccuracies identified by the initial experiments.

Translating the Read templates into Grail:

- 1376 Atom templates
- 1277 Compile into Grail

Comparison of Hierarchies:

The analysis found and examined 945 kind-of relationships which yielded the following subsumption relationships:

- Only in Grail hierarchy 1102
- Only in Read hierarchy 310
- Contradictory 2
- Same Grail concept with different Read codes 88

- Common to both hierarchies 1302
- Can't compare the relationships 124

These results are an overview of the analysis of the cardiovascular procedures. These results were analysed in detail in the first report sent to CCC and the details are therefore not duplicated here. The original in-depth analysis of the cardiovascular procedures was completed before the specific aims of CCC were given. As a result, they were prepared and presented in a different form to that adopted in the current report. However, CCC was able to glean useful information from these results, and were able to use the results to make about 100-150 changes to the Read ontology. It was felt that no further useful information would be gained by reanalysing these Read templates, as CCC have already gained the needed information from the initial, less focused analysis.

8.8.4.7 Appendix 1

8.8.4.7.1 Common Relationships (Male Genitourinary Procedures)

7C20. Amputation of penis <--- 7C201 Partial amputation of penis
 7C20. Amputation of penis <--- 7C200 Total amputation of penis
 7C10F Aspiration of epididymal contents <--- X30HY Micro-epididymal sperm aspiration
 7C105 Aspiration of epididymal cyst <--- 7C107 Aspiration of spermatocele
 Xa91L Aspiration of epididymis <--- X30HY Micro-epididymal sperm aspiration
 Xa442 Aspiration of hydrocele <--- 7C085 Diagnostic aspiration of hydrocele
 Xa442 Aspiration of hydrocele <--- XE0Gr Therapeutic aspiration of hydrocele
 XE0Gm Bilateral orchidectomy <--- 7C021 Bilateral total orchidectomy
 7C021 Bilateral total orchidectomy <--- 7C022 Bilateral total inguinal orchidectomy
 7C021 Bilateral total orchidectomy <--- 7C023 Bilateral total scrotal orchidectomy
 Xa0FM Circumcision <--- 7C248 Plastibell circumcision
 Xa0FM Circumcision <--- 7C249 Revision of circumcision
 7C21. Destruction of lesion of penis <--- 7C213 Cryotherapy to lesion of penis
 7C002 Destruction of scrotal lesion <--- 7C003 Cryosurgical destruction of lesion of scrotum
 7C131 Embolisation of varicocele <--- Xa0Rj Percutaneous embolisation of varicocele
 Xa8PD Epididymectomy <--- X30H5 Partial epididymectomy
 7C10G Excision of cyst of epididymis <--- 7C10A Excision of spermatocele
 7C210 Excision of lesion of penis <--- Xa70L Excision of penile warts
 Xa84q First stage of two stage orchidopexy <--- 7C052 First stage bilateral orchidopexy
 Xa84q First stage of two stage orchidopexy <--- 7C062 First stage unilateral orchidopexy
 X30HA Hydrocele operation <--- Xa442 Aspiration of hydrocele
 X30HA Hydrocele operation <--- 7C082 Drainage of hydrocele
 X30HA Hydrocele operation <--- 7C080 Excision of hydrocele sac
 X30HA Hydrocele operation <--- 7C081 Injection sclerotherapy of hydrocele
 X30HA Hydrocele operation <--- 7C083 Jaboulay's operation for hydrocele
 X30HA Hydrocele operation <--- 7C084 Lord's operation for hydrocele
 7C230 Implantation of penile prosthesis <--- 7C233 Implantation of inflatable penile prosthesis
 7C230 Implantation of penile prosthesis <--- 7C232 Implantation of semi-rigid penile prosthesis
 7C10B Injection sclerotherapy of epididymal cyst <--- X30H8 Injection sclerotherapy of spermatocele
 Xa0F0 Intracavernous injection <--- X30Ha Intracavernous injection of vasoactive agent
 Xa0F0 Intracavernous injection <--- 7C25C Penile injection to deflate priapism
 Xa0F0 Intracavernous injection <--- 7C25B Penile injection to produce erection
 7C130 Ligation of varicocele <--- 7C133 Inguinal ligation of varicocele
 7C130 Ligation of varicocele <--- X017w Laparoscopic ligation of varicocele
 7C130 Ligation of varicocele <--- 7C134 Scrotal ligation of varicocele
 7C... Male genital organ procedure <--- 7C261 Collection of sperm
 7C... Male genital organ procedure <--- X30HW Electro-ejaculation
 7C... Male genital organ procedure <--- 7C16. Operation on male perineum
 7C... Male genital organ procedure <--- 7C15. Operation on seminal vesicle
 7C... Male genital organ procedure <--- X30HF Operation on spermatic cord
 7C... Male genital organ procedure <--- X30HI Operation on the penis or foreskin
 7C... Male genital organ procedure <--- 7C0.. Scrotum and testicle operation
 7C... Male genital organ procedure <--- X30HX Sperm aspiration
 Xa071 Male surgical sterilisation procedure <--- XE0Gu Bilateral vasectomy for contraception
 Xa071 Male surgical sterilisation procedure <--- Xa073 Ligation vasectomy
 Xa071 Male surgical sterilisation procedure <--- 7C111 Unilateral vasectomy for contraception

X30H7 Operation on cyst of epididymis <--- 7C105 Aspiration of epididymal cyst
X30H7 Operation on cyst of epididymis <--- 7C106 Excision of cyst of epididymis
X30H7 Operation on cyst of epididymis <--- 7C10B Injection sclerotherapy of epididymal cyst
X30H9 Operation on epididymis or male genitalia for infertility <--- 7C10D Microsurgical epididymovasostomy
7C16. Operation on male perineum <--- 7C164 Biopsy of male perineum
7C16. Operation on male perineum <--- X30HE Suture of male perineum
7C24. Operation on prepuce <--- Xa0FM Circumcision
7C24. Operation on prepuce <--- 7C243 Dorsal slit of prepuce
7C24. Operation on prepuce <--- X30Fu Excision of hooded prepuce
7C24. Operation on prepuce <--- 7C241 Freeing of preputial adhesions
7C24. Operation on prepuce <--- 7C247 Lateral slit of prepuce
7C24. Operation on prepuce <--- 7C240 Prepuceplasty
7C24. Operation on prepuce <--- 7C242 Standard circumcision
7C24. Operation on prepuce <--- 7C244 Stretching of prepuce
7C24. Operation on prepuce <--- Xa0WP Trimming of dog ears of prepuce
7C15. Operation on seminal vesicle <--- 7C150 Excision of seminal vesicle
7C15. Operation on seminal vesicle <--- 7C151 Incision of seminal vesicle
7C15. Operation on seminal vesicle <--- 7C152 Seminal vesiculogram
X30HF Operation on spermatic cord <--- 7C141 Biopsy of spermatic cord
X30HF Operation on spermatic cord <--- 7C142 Drainage of spermatic cord
X30HF Operation on spermatic cord <--- 7C140 Excision of lesion of spermatic cord
X30HF Operation on spermatic cord <--- 7C11. Excision of vas deferens
X30HF Operation on spermatic cord <--- 7C112 Ligation of vas deferens - not for contraception
X30HF Operation on spermatic cord <--- Xa071 Male surgical sterilisation procedure
X30HF Operation on spermatic cord <--- XE0Gv Repair of spermatic cord
X30HF Operation on spermatic cord <--- 7C144 Vasogram
X30HF Operation on spermatic cord <--- 7C143 Vasotomy
7C10. Operation on the epididymis <--- Xa9IL Aspiration of epididymis
7C10. Operation on the epididymis <--- XE0Gs Biopsy of epididymis
7C10. Operation on the epididymis <--- Xa2C5 Biopsy of lesion of epididymis
7C10. Operation on the epididymis <--- 7C109 Drainage of epididymis
7C10. Operation on the epididymis <--- Xa8PD Epididymectomy
7C10. Operation on the epididymis <--- 7C103 Epididymovasostomy
7C10. Operation on the epididymis <--- X30H6 Excision of lesion of epididymis
7C10. Operation on the epididymis <--- 7C108 Incision of epididymis
7C10. Operation on the epididymis <--- X30H7 Operation on cyst of epididymis
7C10. Operation on the epididymis <--- X30H9 Operation on epididymis or male genitalia for infertility
7C10. Operation on the epididymis <--- 7C106 Repair of epididymis
X30HI Operation on the penis or foreskin <--- 7C20. Amputation of penis
X30HI Operation on the penis or foreskin <--- 7C250 Biopsy of penis
X30HI Operation on the penis or foreskin <--- 7C211 Cauterisation of lesion of penis
X30HI Operation on the penis or foreskin <--- 7C220 Construction of penis
X30HI Operation on the penis or foreskin <--- 7C21. Destruction of lesion of penis
X30HI Operation on the penis or foreskin <--- 7C251 Drainage of penis
X30HI Operation on the penis or foreskin <--- Xa0W0 Examination of penis under anaesthetic
X30HI Operation on the penis or foreskin <--- 7C210 Excision of lesion of penis
X30HI Operation on the penis or foreskin <--- Xa8PG Incision of penis
X30HI Operation on the penis or foreskin <--- 7A6G5 Ligation of penile veins for impotence
X30HI Operation on the penis or foreskin <--- 7C222 Nesbit's operation on penis
X30HI Operation on the penis or foreskin <--- 7C24. Operation on prepuce
X30HI Operation on the penis or foreskin <--- XE2tz Plastic operation on penis
X30HI Operation on the penis or foreskin <--- XE0Gx Prosthesis operation on penis
X30HI Operation on the penis or foreskin <--- 7C221 Reconstruction of penis
X30HI Operation on the penis or foreskin <--- 7C254 Release of chordee
X30HI Operation on the penis or foreskin <--- X30HT Removal of constricting object around penis
X30HI Operation on the penis or foreskin <--- X30HJ Suture of corpus cavernosum
X30HI Operation on the penis or foreskin <--- 7C253 Suture of penis
X30HI Operation on the penis or foreskin <--- X30HP Vascular procedure on the penis
X30Gk Operation on the scrotum <--- 7C010 Biopsy of scrotal lesion
X30Gk Operation on the scrotum <--- 7C004 Cauterisation of lesion of scrotum
X30Gk Operation on the scrotum <--- 7C002 Destruction of scrotal lesion
X30Gk Operation on the scrotum <--- X30Gp Drainage of scrotal abscess
X30Gk Operation on the scrotum <--- X30Go Drainage of scrotal haematoma
X30Gk Operation on the scrotum <--- 7C011 Drainage of scrotum

X30Gk Operation on the scrotum <--- X30Gm Excision of multiple scrotal sebaceous cysts
X30Gk Operation on the scrotum <--- 7C001 Excision of scrotal lesion
X30Gk Operation on the scrotum <--- 7C000 Excision of scrotal wall
X30Gk Operation on the scrotum <--- 7C013 Exploration of scrotum
X30Gk Operation on the scrotum <--- 7C018 Reconstruction of scrotum with distant flap
X30Gk Operation on the scrotum <--- 7C016 Reconstruction of scrotum with skin graft
X30Gk Operation on the scrotum <--- 7C015 Removal of foreign body from scrotum
X30Gk Operation on the scrotum <--- 7C00. Removal or destruction of superficial scrotal lesion
X30Gk Operation on the scrotum <--- X30Gr Repair of scrotum without skin graft
X30Gk Operation on the scrotum <--- X30Gq Repair or reconstruction of scrotum
X30Gk Operation on the scrotum <--- 7C012 Suture of scrotum
X30Gs Operation on the testis <--- 7C093 Biopsy of testis
X30Gs Operation on the testis <--- 7C041 Destruction of lesion of testis
X30Gs Operation on the testis <--- 7C090 Drainage of testis
X30Gs Operation on the testis <--- X30Gy Excision of appendix of testis
X30Gs Operation on the testis <--- 7C040 Excision of lesion of testis
X30Gs Operation on the testis <--- 7C094 Exploration of testis
X30Gs Operation on the testis <--- 7C091 Fixation of testis
X30Gs Operation on the testis <--- X30Gt Orchidectomy
X30Gs Operation on the testis <--- X30Gz Orchidopexy
X30Gs Operation on the testis <--- XaBYK Prosthesis procedure for testis
X30Gs Operation on the testis <--- 7C095 Removal of foreign body from testis
X30Gs Operation on the testis <--- 7C096 Repair of testis
7C13. Operation on varicocele <--- 7C131 Embolisation of varicocele
7C13. Operation on varicocele <--- 7C130 Ligation of varicocele
X30Gt Orchidectomy <--- XE0Gm Bilateral orchidectomy
X30Gt Orchidectomy <--- 7C031 Excision of ectopic testis
X30Gt Orchidectomy <--- X30Gx Excision of strangulated testis
X30Gt Orchidectomy <--- X30Gw Subcapsular orchidectomy
X30Gt Orchidectomy <--- X30Gv Total orchidectomy
X30Gt Orchidectomy <--- Xa2m1 Unilateral orchidectomy
X30Gz Orchidopexy <--- Xa84q First stage of two stage orchidopexy
X30Gz Orchidopexy <--- Xa84s Second stage of two stage orchidopexy
XE2tz Plastic operation on penis <--- 7C223 Frenuloplasty of penis
XE2tz Plastic operation on penis <--- X90RI Revision of glans
X30HV Procedure for male sexual function disorder <--- 7C261 Collection of sperm
X30HV Procedure for male sexual function disorder <--- X30HW Electro-ejaculation
X30HV Procedure for male sexual function disorder <--- X30HX Sperm aspiration
XE0Gx Prosthesis operation on penis <--- XE0Gy Attention to penile prosthesis
XE0Gx Prosthesis operation on penis <--- 7C230 Implantation of penile prosthesis
XE0Gx Prosthesis operation on penis <--- X30HN Removal of penile prosthesis
XE0Gx Prosthesis operation on penis <--- X30HM Revision of penile prosthesis
XaBYK Prosthesis procedure for testis <--- 7C070 Insertion of testicular prosthesis
XaBYK Prosthesis procedure for testis <--- 7C071 Removal of testicular prosthesis
XaBYK Prosthesis procedure for testis <--- X30H3 Replacement of testicular prosthesis
XE0Gv Repair of spermatic cord <--- Xa9eX Repair of vas deferens
XE0Gv Repair of spermatic cord <--- 7C120 Reversal of vasectomy
7C096 Repair of testis <--- Xa8PC Repair of ruptured testis
7C120 Reversal of vasectomy <--- 7C122 Microsurgical reversal of vasectomy
7C120 Reversal of vasectomy <--- 7C124 Reversal of vasectomy - unilateral
Xa84s Second stage of two stage orchidopexy <--- 7C053 Second stage bilateral orchidopexy
Xa84s Second stage of two stage orchidopexy <--- 7C063 Second stage unilateral orchidopexy
X30HX Sperm aspiration <--- X30HY Micro-epididymal sperm aspiration
X30HX Sperm aspiration <--- Xa0FN Percutaneous sperm aspiration
X30HX Sperm aspiration <--- X30HZ Testicular sperm aspiration
X30Gw Subcapsular orchidectomy <--- 7C020 Bilateral subcapsular orchidectomy
X30Gw Subcapsular orchidectomy <--- 7C030 Unilateral subcapsular orchidectomy
X30Gv Total orchidectomy <--- 7C021 Bilateral total orchidectomy
X30Gv Total orchidectomy <--- XE0Gn Unilateral total orchidectomy
Xa2m1 Unilateral orchidectomy <--- XE0Gn Unilateral total orchidectomy
XE0Gn Unilateral total orchidectomy <--- 7C033 Unilateral total inguinal orchidectomy
XE0Gn Unilateral total orchidectomy <--- 7C034 Unilateral total scrotal orchidectomy
X30HP Vascular procedure on the penis <--- 7C257 Aspiration of corpora for priapism
X30HP Vascular procedure on the penis <--- X30HQ Creation of saphenocorporal shunt

X30HP Vascular procedure on the penis <--- 7C258 Distal shunt for priapism
 X30HP Vascular procedure on the penis <--- Xa0F0 Intracavernous injection
 X30HP Vascular procedure on the penis <--- 7C25A Ligation of saphenocorporal shunt
 X30HP Vascular procedure on the penis <--- X30HR Penile revascularisation for impotence
 X30HP Vascular procedure on the penis <--- 7C259 Proximal shunt for priapism

8.8.4.7.2 Common Relationships (Ear Procedures)

73... Ear procedure <--- 7322. Operation on vestibular apparatus
 73... Ear procedure <--- X00gs Middle ear operations
 73... Ear procedure <--- X00hU Inner ear procedure
 73... Ear procedure <--- Xa3dX Operative examination of ear
 73... Ear procedure <--- XaB1v External ear operations
 73... Ear procedure <--- XE0Ba Mastoid and middle ear procedure
 73... Ear procedure <--- XE0BW External ear and external auditory canal procedure
 7300. Excision of external ear <--- 73000 Total excision of pinna
 7300. Excision of external ear <--- 73001 Partial excision of pinna
 7300. Excision of external ear <--- X00gS Total excision of pinna and external auditory canal
 7300. Excision of external ear <--- X00gT Excision of accessory auricle
 7300. Excision of external ear <--- X00gU Excision of preauricular sinus
 7300. Excision of external ear <--- X00gV Excision of preauricular cyst
 73011 Destruction of lesion of pinna <--- 73013 Cryosurgical destruction of lesion of pinna
 7302. Plastic operation on pinna <--- 73023 Meatoplasty of external ear
 7302. Plastic operation on pinna <--- X00gd Revision pinnaplasty
 7302. Plastic operation on pinna <--- XaB9V Reconstruction of external ear with flap
 7303. Drainage of pinna <--- 73030 Drainage of haematoma of pinna
 7303. Drainage of pinna <--- 73031 Drainage of abscess of pinna
 7303. Drainage of pinna <--- 73032 Drainage of haematoma of pinna and insertion of bolster sutures
 7305. Clearance of external auditory canal <--- X00gf Suction clearance of external auditory canal
 7305. Clearance of external auditory canal <--- Xa80d Syringing of ear
 7305. Clearance of external auditory canal <--- XaAyH Microsuction clearance of external auditory canal
 73110 Obliteration of mastoid cavity <--- X00gu Primary obliteration of mastoid cavity
 73110 Obliteration of mastoid cavity <--- X00gv Secondary obliteration of mastoid cavity
 73112 Removal or change of mastoid pack <--- X00gz Removal of mastoid pack
 7314. Reconstruction of ossicular chain <--- 73141 Ossiculoplasty using biological graft
 73160 Tympanoplasty using biological graft <--- X00hB Homograft replacement of tympanic membrane and ossicles
 73170 Excision of lesion of middle ear <--- Xa80e Excision of middle ear polyp
 7318. Tympanotomy and exploration of middle ear <--- 73180 Tympanotomy using mastoid approach
 7318. Tympanotomy and exploration of middle ear <--- 73181 Tympanotomy using permeal approach
 7318. Tympanotomy and exploration of middle ear <--- 73182 Tympanotomy using combined approach
 7320. Procedure on eustachian tube <--- 73200 Graft to eustachian tube
 7320. Procedure on eustachian tube <--- 73201 Intubation of eustachian tube
 7320. Procedure on eustachian tube <--- 73202 Insufflation of eustachian tube
 7320. Procedure on eustachian tube <--- X00hQ Eustachian tube diathermy
 7320. Procedure on eustachian tube <--- X00hS Inflation of Eustachian tube using Politzer technique
 7321. Operation on cochlea <--- 73214 Transtympanic electrocochleography
 7321. Operation on cochlea <--- 73217 Cochleostomy
 7321. Operation on cochlea <--- XaB9W Cochlear prosthesis procedure
 7321. Operation on cochlea <--- XE0Bq Attention to cochlear prosthesis
 7322. Operation on vestibular apparatus <--- X00ha Obliteration of superior semicircular canal
 7322. Operation on vestibular apparatus <--- X00hb Obliteration of posterior semicircular canal
 7322. Operation on vestibular apparatus <--- X00hW Decompression of endolymphatic sac
 7322. Operation on vestibular apparatus <--- X00hX Decompression of endolymphatic sac and insertion of shunt
 7322. Operation on vestibular apparatus <--- X00hZ Closure of fistula of semicircular canal
 7322. Operation on vestibular apparatus <--- XaBFW Chemical labyrinthectomy
 7322. Operation on vestibular apparatus <--- XM0nJ Labyrinthectomy
 X00gi Excision of lesion of external auditory canal <--- X00gj Excision of polyp from external auditory canal
 X00gi Excision of lesion of external auditory canal <--- X00gk Removal of osteoma from external auditory canal
 X00gi Excision of lesion of external auditory canal <--- Xa0MH Removal of exostosis from external auditory canal
 X00gR External auditory canal operations <--- 7305. Clearance of external auditory canal
 X00gR External auditory canal operations <--- 73062 Drainage of external auditory canal
 X00gR External auditory canal operations <--- 73063 Incision of external auditory canal
 X00gR External auditory canal operations <--- 73065 Removal of foreign body from external auditory canal
 X00gR External auditory canal operations <--- 73066 Biopsy of external auditory canal

X00gR External auditory canal operations <--- Ua1rV Removal of ear plug
X00gR External auditory canal operations <--- X00gi Excision of lesion of external auditory canal
X00gR External auditory canal operations <--- X00gl Biopsy of lesion of external auditory canal
X00gR External auditory canal operations <--- X00gn Insertion of dressing in external auditory canal
X00gR External auditory canal operations <--- X00go Removal of dressing from external auditory canal
X00gR External auditory canal operations <--- X00gp Change of dressing in external auditory canal
X00gR External auditory canal operations <--- X00gq Instillation of ear drops or spray
X00gR External auditory canal operations <--- XE0BZ Reconstruction of external auditory canal
X00gr Mastoid operations <--- 73103 Simple mastoidectomy
X00gr Mastoid operations <--- 73106 Atticoantrostomy
X00gr Mastoid operations <--- 73107 Excision of lesion of mastoid
X00gr Mastoid operations <--- 73110 Obliteration of mastoid cavity
X00gr Mastoid operations <--- 73112 Removal or change of mastoid pack
X00gr Mastoid operations <--- 73114 Closure of postaural fistula
X00gr Mastoid operations <--- 73115 Biopsy of mastoid
X00gr Mastoid operations <--- 73116 Exploration of mastoid
X00gr Mastoid operations <--- X00gt Mastoid marginectomy
X00gr Mastoid operations <--- X00gx Mastoid pack procedures
X00gr Mastoid operations <--- X00gy Insertion of mastoid pack
X00gr Mastoid operations <--- X00h1 Insertion of osseointegrated bone anchors
X00gr Mastoid operations <--- X00h2 Insertion of bone anchors for subcutaneous bone anchored hearing aid
X00gr Mastoid operations <--- X00h3 Insertion of bone anchors for percutaneous bone anchored hearing aid
X00gr Mastoid operations <--- XaAv6 Second stage bone anchored hearing aid procedure
X00gr Mastoid operations <--- XaB34 Mastoidectomy
X00gr Mastoid operations <--- XaBiI Removal of bone anchored hearing aid
X00gr Mastoid operations <--- XE0Bb Exenteration of mastoid disease
X00gr Mastoid operations <--- XE0Bd Cortical mastoidectomy
X00gs Middle ear operations <--- 73174 Suction clearance of middle ear
X00gs Middle ear operations <--- 7318. Tympanotomy and exploration of middle ear
X00gs Middle ear operations <--- X00h8 Tympanoplasty with round window protection
X00gs Middle ear operations <--- X00h9 Fenestration of middle ear
X00gs Middle ear operations <--- X00hC Combined approach tympanoplasty
X00gs Middle ear operations <--- X00hK Removal of ventilation tube from middle ear
X00gs Middle ear operations <--- X00h0 Operation for middle ear lesion
X00gs Middle ear operations <--- Xa1nV Drainage of middle ear
X00gs Middle ear operations <--- XE0Bf Myringoplasty
X00gs Middle ear operations <--- XE0Bh Myringotomy and ventilation tube operation
X00gs Middle ear operations <--- XE0Bm Tympanoplasty
X00gs Middle ear operations <--- XM0nF Ossicular chain operation
X00gx Mastoid pack procedures <--- X00gz Removal of mastoid pack
X00gX Repair of pinna <--- 73041 Repair of ear lobe
X00h5 Petrosectomy <--- 73118 Total petrosectomy
X00h5 Petrosectomy <--- 73119 Partial petrosectomy
X00hJ Attention to middle ear ventilation tube <--- X00hN Repositioning of ventilation tube through tympanic membrane
X00hJ Attention to middle ear ventilation tube <--- XaB2L Removal of ventilation tube from ear
X00hJ Attention to middle ear ventilation tube <--- XE0Bn Removal of ventilation tube from tympanic membrane
X00hJ Attention to middle ear ventilation tube <--- XE0Bo Maintenance of ventilation tube through tympanic membrane
X00h0 Operation for middle ear lesion <--- 73170 Excision of lesion of middle ear
X00h0 Operation for middle ear lesion <--- 73171 Destruction of lesion of middle ear
X00h0 Operation for middle ear lesion <--- 73172 Biopsy of lesion of middle ear
X00h0 Operation for middle ear lesion <--- Xa80e Excision of middle ear polyp
X00hU Inner ear procedure <--- 7321. Operation on cochlea
X00hU Inner ear procedure <--- 73215 Closure of fistula of round window
X00hU Inner ear procedure <--- 73216 Closure of fistula of oval window
X00hU Inner ear procedure <--- X00ha Obliteration of superior semicircular canal
X00hU Inner ear procedure <--- X00hb Obliteration of posterior semicircular canal
X00hU Inner ear procedure <--- X00hW Decompression of endolymphatic sac
X00hU Inner ear procedure <--- X00hX Decompression of endolymphatic sac and insertion of shunt
X00hU Inner ear procedure <--- X00hZ Closure of fistula of semicircular canal
X00hU Inner ear procedure <--- XaBFW Chemical labyrinthectomy
X00hU Inner ear procedure <--- XM0nJ Labyrinthectomy
Xa3dX Operative examination of ear <--- X00he Examination of ear under microscope
XaB1v External ear operations <--- 7300. Excision of external ear
XaB1v External ear operations <--- 73002 Excision of preauricular abnormality

XaB1v External ear operations <--- 73010 Excision of lesion of pinna
XaB1v External ear operations <--- 73011 Destruction of lesion of pinna
XaB1v External ear operations <--- 73012 Removal of granulation tissue from external ear
XaB1v External ear operations <--- 73014 Cauterisation of lesion of pinna
XaB1v External ear operations <--- 73015 Shave excision of lesion of external ear
XaB1v External ear operations <--- 7302. Plastic operation on pinna
XaB1v External ear operations <--- 7303. Drainage of pinna
XaB1v External ear operations <--- 73040 Biopsy of lesion of pinna
XaB1v External ear operations <--- 73043 Suture of external ear
XaB1v External ear operations <--- 7L0M0 Replantation of ear
XaB1v External ear operations <--- X00gc Insertion of bone pins for aural prosthesis
XaB1v External ear operations <--- X00ge Mustarde pinnaplasty
XaB1v External ear operations <--- X00gX Repair of pinna
XaB1v External ear operations <--- Xa3n3 Curettage of lesion of pinna
XaB1v External ear operations <--- XE0BX Pinnaplasty
XaB34 Mastoidectomy <--- XE0Bc Radical mastoidectomy
XaB9V Reconstruction of external ear with flap <--- X00ga Reconstruction of external ear with free flap
XaB9V Reconstruction of external ear with flap <--- X00gY Reconstruction of external ear with local flap
XaB9V Reconstruction of external ear with flap <--- X00gZ Reconstruction of external ear with distant flap
XaB9W Cochlear prosthesis procedure <--- 73210 Implantation of intracochlear prosthesis
XaB9W Cochlear prosthesis procedure <--- 73211 Implantation of extracochlear prosthesis
XaB9W Cochlear prosthesis procedure <--- X00hV Removal of cochlear prosthesis
XE0Ba Mastoid and middle ear procedure <--- 73174 Suction clearance of middle ear
XE0Ba Mastoid and middle ear procedure <--- 7318. Tympanotomy and exploration of middle ear
XE0Ba Mastoid and middle ear procedure <--- X00h8 Tympanoplasty with round window protection
XE0Ba Mastoid and middle ear procedure <--- X00h9 Fenestration of middle ear
XE0Ba Mastoid and middle ear procedure <--- X00hC Combined approach tympanoplasty
XE0Ba Mastoid and middle ear procedure <--- X00hK Removal of ventilation tube from middle ear
XE0Ba Mastoid and middle ear procedure <--- X00hO Operation for middle ear lesion
XE0Ba Mastoid and middle ear procedure <--- Xa1nV Drainage of middle ear
XE0Ba Mastoid and middle ear procedure <--- XE0Bh Myringotomy and ventilation tube operation
XE0Ba Mastoid and middle ear procedure <--- XE0Bm Tympanoplasty
XE0Ba Mastoid and middle ear procedure <--- XM0nF Ossicular chain operation
XE0Bf Myringoplasty <--- XE0Bg Formal myringoplasty using biological graft
XE0Bh Myringotomy and ventilation tube operation <--- 73131 Myringotomy
XE0Bh Myringotomy and ventilation tube operation <--- 73133 Myringotomy and insertion of T tube
XE0Bh Myringotomy and ventilation tube operation <--- 73178 Unblocking of ventilation tube through tympanic membrane
XE0Bh Myringotomy and ventilation tube operation <--- X00hJ Attention to middle ear ventilation tube
XE0Bh Myringotomy and ventilation tube operation <--- X00hM Replacement of ventilation tube through tympanic membrane
XE0Bh Myringotomy and ventilation tube operation <--- Xa2kr Myringotomy and insertion of grommet
XE0Bh Myringotomy and ventilation tube operation <--- XE0Bj Myringotomy and insertion of long-term grommet
XE0Bl Stapedectomy <--- X00hH Platinectomy
XE0Bm Tympanoplasty <--- 73160 Tympanoplasty using biological graft
XE0Bm Tympanoplasty <--- X00hD Tympanoplasty with mastoidectomy
XE0BW External ear and external auditory canal procedure <--- 7300. Excision of external ear
XE0BW External ear and external auditory canal procedure <--- 73002 Excision of preauricular abnormality
XE0BW External ear and external auditory canal procedure <--- 73010 Excision of lesion of pinna
XE0BW External ear and external auditory canal procedure <--- 73011 Destruction of lesion of pinna
XE0BW External ear and external auditory canal procedure <--- 73012 Removal of granulation tissue from external ear
XE0BW External ear and external auditory canal procedure <--- 73014 Cauterisation of lesion of pinna
XE0BW External ear and external auditory canal procedure <--- 73015 Shave excision of lesion of external ear
XE0BW External ear and external auditory canal procedure <--- 7302. Plastic operation on pinna
XE0BW External ear and external auditory canal procedure <--- 7303. Drainage of pinna
XE0BW External ear and external auditory canal procedure <--- 73040 Biopsy of lesion of pinna
XE0BW External ear and external auditory canal procedure <--- 73043 Suture of external ear
XE0BW External ear and external auditory canal procedure <--- 7L0M0 Replantation of ear
XE0BW External ear and external auditory canal procedure <--- X00gc Insertion of bone pins for aural prosthesis
XE0BW External ear and external auditory canal procedure <--- X00ge Mustarde pinnaplasty
XE0BW External ear and external auditory canal procedure <--- X00gR External auditory canal operations
XE0BW External ear and external auditory canal procedure <--- X00gX Repair of pinna
XE0BW External ear and external auditory canal procedure <--- Xa3n3 Curettage of lesion of pinna
XE0BW External ear and external auditory canal procedure <--- XE0BX Pinnaplasty
XE0BX Pinnaplasty <--- X00gd Revision pinnaplasty

XE0BZ Reconstruction of external auditory canal <--- X00gm Reconstruction of posterior meatal wall of external auditory canal
 XM0nF Ossicular chain operation <--- 7314. Reconstruction of ossicular chain
 XM0nF Ossicular chain operation <--- 73152 Division of adhesions of ossicle of ear
 XM0nF Ossicular chain operation <--- X00gW Fowler anterior crurotomy of ear
 XM0nF Ossicular chain operation <--- X00hA Incus transposition
 XM0nF Ossicular chain operation <--- X00hF Large fenestra stapedectomy
 XM0nF Ossicular chain operation <--- X00hG Small fenestra stapedectomy
 XM0nF Ossicular chain operation <--- X00hI Stapes mobilisation
 XM0nF Ossicular chain operation <--- XE0Bl Stapedectomy
 XM0nF Ossicular chain operation <--- XE0BY Anterior crurotomy of ear
 XM0nJ Labyrinthectomy <--- 73221 Membranous labyrinthectomy
 XM0nJ Labyrinthectomy <--- 73222 Osseous labyrinthectomy
 XM0nJ Labyrinthectomy <--- X00hY Ultrasonic labyrinthectomy

8.8.4.7.3 Common Relationships (Gynaecological Procedures)

XE06Y Abdominal hysterectomy <--- XaBEI Radical abdominal hysterectomy
 XE06Y Abdominal hysterectomy <--- 7E044 Subtotal abdominal hysterectomy
 XE06Y Abdominal hysterectomy <--- XE06Z Total abdominal hysterectomy
 XaC3i Abdominal hysterocolpectomy <--- 7E040 Radical abdominal hysterocolpectomy
 XE0hz Artificial insemination <--- X403N Artificial insemination by donor
 XE0hz Artificial insemination <--- X403M Artificial insemination by husband
 XE0hz Artificial insemination <--- Ua1Ie Direct intraperitoneal insemination
 Xa7kP Aspiration of ovary <--- X404F Aspiration of ovarian cyst
 Xa7kP Aspiration of ovary <--- 7E237 Open diagnostic aspiration of ovary
 7D01. Bartholin's gland operation <--- 7D012 Drainage of Bartholin's gland
 7D01. Bartholin's gland operation <--- 7D010 Excision of Bartholin's gland
 7D01. Bartholin's gland operation <--- 7D014 Excision of lesion of Bartholin's gland
 7D01. Bartholin's gland operation <--- 7D011 Marsupialisation of Bartholin's gland
 7E02. Biopsy of cervix <--- 7E025 Diathermy loop cone biopsy of cervix
 7E02. Biopsy of cervix <--- 7E020 Knife cone biopsy of cervix uteri
 7E02. Biopsy of cervix <--- 7E021 Laser cone biopsy of cervix uteri
 7E02. Biopsy of cervix <--- 7E023 Punch biopsy of cervix
 7E02. Biopsy of cervix <--- X402z Wedge biopsy of cervix
 X4042 Biopsy of fallopian tube <--- 7E1G0 Endoscopic biopsy of fallopian tube
 X4042 Biopsy of fallopian tube <--- 7E1B1 Open biopsy of fallopian tube
 XE060 Biopsy of lesion of uterus <--- 7E063 Open biopsy of lesion of uterus
 XE0H4 Cauterisation of lesion of vulva <--- X402A Cauterisation of vulval wart
 Xa7kQ Cauterisation of ovary <--- 7E210 Open cauterisation of lesion of ovary
 Ua1Ip Cervical cap procedure <--- Ua1Ik Checking cervix covered by cap
 Ua1Ip Cervical cap procedure <--- Ua1Il Inspecting cervical cap
 Ua1Ip Cervical cap procedure <--- Ua1In Removal of cervical cap
 7D00. Clitoris operation <--- Xa8PH Clitoridectomy
 7D00. Clitoris operation <--- 7D002 Clitoroplasty
 X402Q Colpocleisis <--- XE0H7 Complete colpocleisis
 X402Q Colpocleisis <--- XE0H8 Partial colpocleisis
 XaC30 Cone biopsy of cervix <--- 7E025 Diathermy loop cone biopsy of cervix
 XaC30 Cone biopsy of cervix <--- 7E020 Knife cone biopsy of cervix uteri
 XaC30 Cone biopsy of cervix <--- 7E021 Laser cone biopsy of cervix uteri
 7D032 Cryotherapy of lesion of vulva <--- X4029 Cryotherapy of vulval wart
 7E01. Destruction of lesion of cervix <--- 7E016 Cold coagulation of lesion of cervix
 7E01. Destruction of lesion of cervix <--- 7E013 Cryotherapy to lesion of cervix
 7E01. Destruction of lesion of cervix <--- Xa7f0 Laser destruction of lesion of cervix
 7D06. Destruction of lesion of female perineum <--- 7D062 Cryosurgery to lesion of female perineum
 7D06. Destruction of lesion of female perineum <--- X402K Diathermy of lesion of female perineum
 7D06. Destruction of lesion of female perineum <--- 7D061 Laser destruction of lesion of female perineum
 7D15. Destruction of vaginal lesion <--- 7D153 Cryotherapy of lesion of vagina
 7D15. Destruction of vaginal lesion <--- X402S Diathermy cauterisation of lesion of vagina
 7D15. Destruction of vaginal lesion <--- 7D151 Laser destruction of lesion of vagina
 7D03. Destruction of vulval lesion <--- 7D032 Cryotherapy of lesion of vulva
 7D03. Destruction of vulval lesion <--- X402B Diathermy of lesion of vulva
 7D03. Destruction of vulval lesion <--- 7D031 Laser destruction of lesion of vulva
 X402x Diathermy of cervix <--- 7E017 Loop diathermy of cervix

Xa02K Diathermy of lesion of female perineum <--- Xa700 Diathermy of perineal warts
 7D012 Drainage of Bartholin's gland <--- X401z Drainage of Bartholin's abscess
 7D051 Drainage of lesion of vulva <--- X402D Drainage of vulval abscess
 Xa7kN Drainage of ovarian cyst <--- 7E252 Laparoscopic drainage of ovarian cyst
 Xa7kN Drainage of ovarian cyst <--- 7E233 Open drainage of ovarian cyst
 Xa7k0 Drainage of ovary <--- X404G Drainage of ovarian abscess
 Xa7k0 Drainage of ovary <--- Xa7kN Drainage of ovarian cyst
 Xa7k0 Drainage of ovary <--- 7E234 Oophorotomy and drainage of abscess
 X402D Drainage of vulval abscess <--- Xa70N Drainage of labial abscess
 7E1H2 Dye test of fallopian tube <--- Xa1hW Laparoscopic dye test of Fallopian tube
 XE06g Endometrial ablation <--- X403Q Cryotherapy endometrial ablation
 XE06g Endometrial ablation <--- X403P Endometrial laser ablation
 XE06g Endometrial ablation <--- X403R Radiofrequency endometrial ablation
 X4030 Endometrial resection <--- 7E0D5 Transcervical resection endometrium
 XE06l Endoscopic excision of lesion of uterus <--- X403T Endoscopic myomectomy
 7D1C0 Evacuation of vaginal haematoma <--- X402u Evacuation of vaginal vault haematoma
 7E00. Excision of cervix <--- XE06W Cervical polypectomy
 7E00. Excision of cervix <--- 7E004 Large loop excision of transformation zone
 7E00. Excision of cervix <--- Xa8PS Loop diathermy excision of cervix
 7E270 Excision of lesion of broad ligament of uterus <--- X404H Excision of parovarian cyst
 7E002 Excision of lesion of cervix <--- XE06W Cervical polypectomy
 7E201 Excision of lesion of ovary <--- 7E203 Ovarian cystectomy
 X402V Excision of septum of vagina <--- 7D140 Laser excision of septum of vagina
 X4025 Excision of vulval lesion <--- 7D021 Excision of excess labial tissue
 X4025 Excision of vulval lesion <--- X4027 Excision of labial cyst
 X4025 Excision of vulval lesion <--- XM00N Excision of vulval polyp
 XaD29 Fallopian tube anastomosis <--- X403v Ampullary-ampullary anastomosis
 XaD29 Fallopian tube anastomosis <--- X403x Cornual-ampullary anastomosis
 XaD29 Fallopian tube anastomosis <--- X403w Cornual-isthmic anastomosis
 XaD29 Fallopian tube anastomosis <--- X403u Isthmo-ampullary anastomosis
 XaD29 Fallopian tube anastomosis <--- X403t Isthmo-isthmic anastomosis
 7E1.. Fallopian tube operation <--- Xa8Pg Aspiration of gestational sac from fallopian tube
 7E1.. Fallopian tube operation <--- X4040 Balloon tuboplasty
 7E1.. Fallopian tube operation <--- X4042 Biopsy of fallopian tube
 7E1.. Fallopian tube operation <--- 7E1A1 Burying of fimbria in uterine wall
 7E1.. Fallopian tube operation <--- X4047 Catheterisation of fallopian tube
 7E1.. Fallopian tube operation <--- 7E191 Drainage of fallopian tube
 7E1.. Fallopian tube operation <--- 7E1H2 Dye test of fallopian tube
 7E1.. Fallopian tube operation <--- 7E1C0 Endoscopic bilateral cauterisation of fallopian tubes
 7E1.. Fallopian tube operation <--- 7E1C1 Endoscopic bilateral clipping of fallopian tubes
 7E1.. Fallopian tube operation <--- 7E130 Excision of lesion of fallopian tube
 7E1.. Fallopian tube operation <--- 7E133 Excision of ruptured ectopic tubal pregnancy
 7E1.. Fallopian tube operation <--- 7E1B3 Exploration of fallopian tube
 7E1.. Fallopian tube operation <--- XaD29 Fallopian tube anastomosis
 7E1.. Fallopian tube operation <--- XE2u0 Fallopian tube prosthesis operation
 7E1.. Fallopian tube operation <--- X403l Gamete intrafallopian transfer
 7E1.. Fallopian tube operation <--- 7E1H3 Insufflation of fallopian tube
 7E1.. Fallopian tube operation <--- X4041 Linear salpingotomy
 7E1.. Fallopian tube operation <--- XE06q Open bilateral clipping of fallopian tubes
 7E1.. Fallopian tube operation <--- XE06v Open clipping of left fallopian tube
 7E1.. Fallopian tube operation <--- XE06u Open clipping of right fallopian tube
 7E1.. Fallopian tube operation <--- 7E1A. Operation on fimbria
 7E1.. Fallopian tube operation <--- 7E180 Reconstruction of fallopian tube
 7E1.. Fallopian tube operation <--- X4044 Removal of clip from fallopian tube
 7E1.. Fallopian tube operation <--- XE2u1 Removal of products of conception from fallopian tube
 7E1.. Fallopian tube operation <--- XM0C3 Reversal of female sterilisation
 7E1.. Fallopian tube operation <--- Xa8Pb Salpingectomy
 7E1.. Fallopian tube operation <--- Xa8Pa Salpingo-oophorectomy
 7E1.. Fallopian tube operation <--- X403q Salpingolysis
 7E1.. Fallopian tube operation <--- 7E19. Salpingotomy
 7E1.. Fallopian tube operation <--- Xa8Pf Suture of fallopian tube
 7E1.. Fallopian tube operation <--- X403o Tubal embryo transfer
 7E1.. Fallopian tube operation <--- X403f Tubal occlusion
 7E1.. Fallopian tube operation <--- X403h Tubal patency test

7E1.. Fallopian tube operation <--- X403n Zygote intrafallopian transfer
 XE2u0 Fallopian tube prosthesis operation <--- 7E140 Insertion of prosthesis into fallopian tube
 XE2u0 Fallopian tube prosthesis operation <--- 7E142 Removal of prosthesis from fallopian tube
 XE2u0 Fallopian tube prosthesis operation <--- 7E141 Revision of prosthesis in fallopian tube
 Xa1Ft Female perineum operation <--- 7D079 Biopsy from female perineum
 Xa1Ft Female perineum operation <--- 7D063 Cauterisation of lesion of female perineum
 Xa1Ft Female perineum operation <--- 7D073 Closure of fistula of female perineum
 Xa1Ft Female perineum operation <--- X402b Colpoperineorrhaphy
 Xa1Ft Female perineum operation <--- 7D06. Destruction of lesion of female perineum
 Xa1Ft Female perineum operation <--- X402L Drainage of female perineal abscess
 Xa1Ft Female perineum operation <--- 7D070 Drainage of female perineum
 Xa1Ft Female perineum operation <--- X402M Excision biopsy of female perineal lesion
 Xa1Ft Female perineum operation <--- 7D060 Excision of lesion of female perineum
 Xa1Ft Female perineum operation <--- 7D076 Excision of sweat gland bearing skin of female perineum
 Xa1Ft Female perineum operation <--- 7D077 Exploration of female perineum
 Xa1Ft Female perineum operation <--- 7D072 Female perineoplasty
 Xa1Ft Female perineum operation <--- XE0H6 Female perineorrhaphy
 Xa1Ft Female perineum operation <--- Xa8PI Female perineotomy
 Xa1Ft Female perineum operation <--- X402J Painting of female perineal warts
 Xa1Ft Female perineum operation <--- 7D078 Removal of foreign body from female perineum
 X404E Freeing of adhesions of ovary <--- 7E251 Endoscopic freeing of adhesions of ovary
 X404E Freeing of adhesions of ovary <--- 7E231 Open freeing of adhesions of ovary
 X403L Gamete intrafallopian transfer <--- X403m Fallopian replacement of egg with delayed insemination
 X404L Gynaecological endoscopic examination <--- X404Q Ampullosalpingoscopy
 X404L Gynaecological endoscopic examination <--- XM13i Colposcopy
 X404L Gynaecological endoscopic examination <--- XE06y Falloposcopy
 X404L Gynaecological endoscopic examination <--- X404S Microcolpohysteroscopy
 X404L Gynaecological endoscopic examination <--- X404R Microhysteroscopy
 X401w Gynaecological procedure <--- X402P Excision and obliteration of vagina
 X401w Gynaecological procedure <--- 7E1.. Fallopian tube operation
 X401w Gynaecological procedure <--- Xa1Ft Female perineum operation
 X401w Gynaecological procedure <--- X404L Gynaecological endoscopic examination
 X401w Gynaecological procedure <--- X404T Gynaecological smear procedure
 X401w Gynaecological procedure <--- 7D07. Miscellaneous female perineum operations
 X401w Gynaecological procedure <--- 7E0F. Miscellaneous operations on uterus
 X401w Gynaecological procedure <--- 7D1D. Miscellaneous vaginal operations
 X401w Gynaecological procedure <--- 7E1H. Other fallopian tube operations
 X401w Gynaecological procedure <--- X4049 Ovary operation
 X401w Gynaecological procedure <--- Ua1Iq Retrieval of lost thread of intrauterine contraceptive device
 X401w Gynaecological procedure <--- 7E0.. Uterine operation
 X401w Gynaecological procedure <--- 7D1.. Vagina operation
 X404T Gynaecological smear procedure <--- Xa8Pl Cervical smear
 X404T Gynaecological smear procedure <--- 7E2A3 Vaginal vault smear
 X404T Gynaecological smear procedure <--- Xa0Ga Vulval smear
 X4021 Hemivulvectomy <--- X4022 Radical hemivulvectomy
 X403B Hysterectomy <--- XE06Y Abdominal hysterectomy
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 X403B Hysterectomy <--- 7E046 Radical hysterectomy
 X403B Hysterectomy <--- XE06b Vaginal hysterectomy
 Xa1sw Injection into vulva <--- X402G Intradermal steroid injection of the vulva
 Xa1sw Injection into vulva <--- X402H Subcutaneous alcohol injection of the vulva
 X402h Insertion / removal of supporting pessary into vagina <--- 7D1B2 Removal of supporting pessary from vagina
 7D1B. Insertion of supporting pessary into vagina <--- 7D1B0 Insertion of Hodge pessary into vagina
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 7E09. Intrauterine contraceptive device procedure <--- Ua1Ir Checking position of thread of intrauterine device
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 7E09. Intrauterine contraceptive device procedure <--- 7E090 Introduction of intrauterine contraceptive device
 7E09. Intrauterine contraceptive device procedure <--- XaBSw Introduction of Mirena coil
 7E09. Intrauterine contraceptive device procedure <--- XaC3g Removal of intrauterine contraceptive device
 7E09. Intrauterine contraceptive device procedure <--- 7E091 Replacement of intrauterine contraceptive device
 X403K Introduction of substance - uterine cavity <--- XE0hz Artificial insemination
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X403K Introduction of substance - uterine cavity <--- 7E0A1 Intracervical artificial insemination
X403K Introduction of substance - uterine cavity <--- XE06k Intrauterine artificial insemination
X403K Introduction of substance - uterine cavity <--- Ua1Ih Intravaginal artificial insemination
X403K Introduction of substance - uterine cavity <--- 7E0C0 Introduction of radioactive substance into uterine cavity
X403K Introduction of substance - uterine cavity <--- Ua1Ig Subzonal insemination
X403K Introduction of substance - uterine cavity <--- Ua1If Zona drilling
X403D Laparoscopic hysterectomy <--- X403G Classic SEMM laparoscopic hysterectomy
X403D Laparoscopic hysterectomy <--- X403F Laparoscopic supracervical hysterectomy
X403D Laparoscopic hysterectomy <--- X403I Radical laparoscopic hysterectomy
X403D Laparoscopic hysterectomy <--- X403E Total laparoscopic hysterectomy
X403g Laparoscopic tubal occlusion <--- 7E1C. Endoscopic bilateral occlusion of fallopian tubes
X403g Laparoscopic tubal occlusion <--- 7E1D2 Endoscopic occlusion of left fallopian tube
X403g Laparoscopic tubal occlusion <--- 7E1D1 Endoscopic occlusion of right fallopian tube
X403g Laparoscopic tubal occlusion <--- XE06x Endoscopic unilateral occlusion of fallopian tube
Xa7f0 Laser destruction of lesion of cervix <--- 7E015 Colposcopic laser destruction of lesion of cervix
7D031 Laser destruction of lesion of vulva <--- X4028 Laser destruction of vulval wart
7D011 Marsupialisation of Bartholin's gland <--- X401y Marsupialisation of Bartholin's abscess
7D011 Marsupialisation of Bartholin's gland <--- X401x Marsupialisation of Bartholin's cyst
7E202 Marsupialisation of lesion of ovary <--- Xa8Pi Marsupialisation of ovarian cyst
7D122 Marsupialisation of lesion of vagina <--- X402U Marsupialisation of Gartner's duct cyst
7E03. Miscellaneous operations of cervix <--- 7E010 Avulsion of lesion of cervix uteri
7E03. Miscellaneous operations of cervix <--- 7E034 Colposcopy of cervix
7E03. Miscellaneous operations of cervix <--- 7E031 Dilatation of cervix
7E03. Miscellaneous operations of cervix <--- X4033 Insertion of self-retaining catheter through cervix
7E03. Miscellaneous operations of cervix <--- X4032 Lash repair of internal os of cervix
7E03. Miscellaneous operations of cervix <--- X4034 Morcellation of cervix
7E03. Miscellaneous operations of cervix <--- X4031 Reconstruction of cervix
7E03. Miscellaneous operations of cervix <--- 7E032 Repair of cervical laceration
7E0F. Miscellaneous operations on uterus <--- XE06o Biopsy of lesion of uterus
7E0F. Miscellaneous operations on uterus <--- X403c Creation of uterovaginal fistula
7E0F. Miscellaneous operations on uterus <--- X403b Excision of rudimentary uterine horn
7E0F. Miscellaneous operations on uterus <--- XaC3h Exploration of uterine cavity
7E0F. Miscellaneous operations on uterus <--- 7E0F0 Freeing of intrauterine adhesion
7E0F. Miscellaneous operations on uterus <--- XaBDK Hysteroscopy and endometrial biopsy
7E0F. Miscellaneous operations on uterus <--- Xa8PT Hysterotomy
7E0F. Miscellaneous operations on uterus <--- X403Z Jones modified Strassman metroplasty
7E0F. Miscellaneous operations on uterus <--- XE06f Metroplasty
7E0F. Miscellaneous operations on uterus <--- X403e Recanalisation of hypoplastic cervix
7E0F. Miscellaneous operations on uterus <--- 7D1A3 Repair of uterovaginal fistula
7E0F. Miscellaneous operations on uterus <--- X30EY Repair of vesicouterine fistula
7E0F. Miscellaneous operations on uterus <--- X403W Resection of uterine septum
7E0F. Miscellaneous operations on uterus <--- X403Y Strassman metroplasty
7E0F. Miscellaneous operations on uterus <--- X403a Tomkins metroplasty
7E0F. Miscellaneous operations on uterus <--- 7E089 Vaginal removal of uterine foreign body
7D05. Miscellaneous vulval operations <--- XM1G5 Biopsy of vulva
7D05. Miscellaneous vulval operations <--- X402E Colposcopy of vulva
7D05. Miscellaneous vulval operations <--- 7D051 Drainage of lesion of vulva
7D05. Miscellaneous vulval operations <--- 7D052 Evacuation of vulval haematoma
7D05. Miscellaneous vulval operations <--- Xa1sw Injection into vulva
7D05. Miscellaneous vulval operations <--- XE0H1 Marsupialisation of lesion of vulva
7D05. Miscellaneous vulval operations <--- 7D054 Separation of labial adhesions
X403S Myomectomy <--- X403T Endoscopic myomectomy
X403S Myomectomy <--- XE06e Open myomectomy
X403S Myomectomy <--- X403U Vaginal myomectomy
7E24. Oocyte recovery <--- XE072 Laparoscopic oocyte recovery
7E24. Oocyte recovery <--- 7E243 Transvaginal oocyte recovery
Xa8Pc Oophorectomy <--- Xa8PW Bilateral oophorectomy
Xa8Pc Oophorectomy <--- Xa8Pe Left oophorectomy
Xa8Pc Oophorectomy <--- Xa8Pd Right oophorectomy
Xa8Pc Oophorectomy <--- Xa8Pa Salpingo-oophorectomy
7E15. Open bilateral occlusion of fallopian tubes <--- 7E150 Open bilateral ligation of fallopian tubes
Xa7kC Open tubal occlusion <--- 7E15. Open bilateral occlusion of fallopian tubes
Xa7kC Open tubal occlusion <--- 7E167 Open ligation of left fallopian tube
Xa7kC Open tubal occlusion <--- 7E166 Open ligation of right fallopian tube

Xa7kC Open tubal occlusion <--- XE06r Open unilateral occlusion of fallopian tube
 7E27. Operation on broad ligament of uterus <--- 7E271 Destruction of lesion of broad ligament of uterus
 7E27. Operation on broad ligament of uterus <--- X404I Evacuation of broad ligament haematoma
 7E27. Operation on broad ligament of uterus <--- 7E270 Excision of lesion of broad ligament of uterus
 7E27. Operation on broad ligament of uterus <--- X404J Repair of broad ligament tear
 7E27. Operation on broad ligament of uterus <--- XE073 Shortening of broad ligament of uterus
 XM0oC Operation on cervix <--- 7E000 Amputation of cervix
 XM0oC Operation on cervix <--- 7E010 Avulsion of lesion of cervix uteri
 XM0oC Operation on cervix <--- 7E02. Biopsy of cervix
 XM0oC Operation on cervix <--- XE06V Cauterisation of lesion of cervix
 XM0oC Operation on cervix <--- XaB2E Cervical cryoconisation
 XM0oC Operation on cervix <--- 7E034 Colposcopy of cervix
 XM0oC Operation on cervix <--- XaC3o Cone biopsy of cervix
 XM0oC Operation on cervix <--- 7E01. Destruction of lesion of cervix
 XM0oC Operation on cervix <--- X402x Diathermy of cervix
 XM0oC Operation on cervix <--- 7E031 Dilatation of cervix
 XM0oC Operation on cervix <--- 7E00. Excision of cervix
 XM0oC Operation on cervix <--- 7E002 Excision of lesion of cervix
 XM0oC Operation on cervix <--- X4033 Insertion of self-retaining catheter through cervix
 XM0oC Operation on cervix <--- X4032 Lash repair of internal os of cervix
 XM0oC Operation on cervix <--- X4034 Morcellation of cervix
 XM0oC Operation on cervix <--- X4031 Reconstruction of cervix
 XM0oC Operation on cervix <--- 7E032 Repair of cervical laceration
 XM0oC Operation on cervix <--- 7E024 Ring biopsy of cervix
 XM0oC Operation on cervix <--- XaCHP Suture of cervix
 7E1A. Operation on fimbria <--- 7E1A0 Excision of fimbria
 XE074 Operation on round and uterosacral ligament <--- X404K Gilliam suspension of uterus
 XE074 Operation on round and uterosacral ligament <--- XE075 Ventrosuspension of uterus
 X402N Operation on vaginal introitus <--- 7D114 Dilatation of introitus
 X402N Operation on vaginal introitus <--- 7D110 Excision of hymen
 X402N Operation on vaginal introitus <--- 7D115 Excision of hymenal tag
 X402N Operation on vaginal introitus <--- X4020 Fenton's operation
 X402N Operation on vaginal introitus <--- 7D112 Incision of hymen
 X402N Operation on vaginal introitus <--- 7D111 Repair of hymen
 X402N Operation on vaginal introitus <--- 7D100 Schuchardt's incision
 X402N Operation on vaginal introitus <--- 7D113 Stretching of hymen
 Xa8PU Operative termination of pregnancy <--- 7E066 Hysterotomy and termination of pregnancy
 7E1H. Other fallopian tube operations <--- Xa8Pg Aspiration of gestational sac from fallopian tube
 7E1H. Other fallopian tube operations <--- X4042 Biopsy of fallopian tube
 7E1H. Other fallopian tube operations <--- X4047 Catheterisation of fallopian tube
 7E1H. Other fallopian tube operations <--- 7E1B3 Exploration of fallopian tube
 7E1H. Other fallopian tube operations <--- X4044 Removal of clip from fallopian tube
 7E1H. Other fallopian tube operations <--- XE2u1 Removal of products of conception from fallopian tube
 7E1H. Other fallopian tube operations <--- Xa8Pf Suture of fallopian tube
 X404D Ovarian biopsy <--- Xa8Ph Excision biopsy of ovary
 X4049 Ovary operation <--- Xa7kP Aspiration of ovary
 X4049 Ovary operation <--- 7E100 Bilateral salpingo-oophorectomy
 X4049 Ovary operation <--- X404A Bisection of ovary
 X4049 Ovary operation <--- Xa7kQ Cauterisation of ovary
 X4049 Ovary operation <--- Xa84a Diathermy of ovary
 X4049 Ovary operation <--- Xa7kO Drainage of ovary
 X4049 Ovary operation <--- 7E260 Endoscopic biopsy of lesion of ovary
 X4049 Ovary operation <--- 7E131 Excision of ectopic ovarian pregnancy
 X4049 Ovary operation <--- 7E201 Excision of lesion of ovary
 X4049 Ovary operation <--- Xa8Pj Fixation of ovary
 X4049 Ovary operation <--- X404E Freeing of adhesions of ovary
 X4049 Ovary operation <--- 7E117 Left salpingo-oophorectomy
 X4049 Ovary operation <--- 7E202 Marsupialisation of lesion of ovary
 X4049 Ovary operation <--- X404B Multicauterisation of ovary
 X4049 Ovary operation <--- 7E24. Oocyte recovery
 X4049 Ovary operation <--- Xa8Pc Oophorectomy
 X4049 Ovary operation <--- 7E236 Oophorotomy
 X4049 Ovary operation <--- 7E232 Open biopsy of lesion of ovary
 X4049 Ovary operation <--- X404D Ovarian biopsy

X4049 Ovary operation <--- 7E20. Partial excision of ovary
 X4049 Ovary operation <--- 7E22. Repair of ovary
 X4049 Ovary operation <--- 7E220 Replantation of ovary
 X4049 Ovary operation <--- 7E116 Right salpingo-oophorectomy
 X4049 Ovary operation <--- 7E221 Suturing of ovary
 X4049 Ovary operation <--- 7E230 Transposition of ovary
 X4049 Ovary operation <--- Xa8PZ Unilateral oophorectomy
 X4049 Ovary operation <--- 7E200 Wedge resection of ovary
 7E046 Radical hysterectomy <--- XaBEI Radical abdominal hysterectomy
 7E046 Radical hysterectomy <--- 7E050 Radical vaginal hysterectomy
 7E180 Reconstruction of fallopian tube <--- X403r Fimbrioplasty
 XE0H5 Reconstruction of vulva <--- 7D043 Reconstruction of vulva with distant flap
 XE0H5 Reconstruction of vulva <--- 7D044 Reconstruction of vulva with free flap
 XE0H5 Reconstruction of vulva <--- 7D042 Reconstruction of vulva with local flap
 XE0H5 Reconstruction of vulva <--- 7D041 Reconstruction of vulva with skin graft
 X4044 Removal of clip from fallopian tube <--- 7E1E0 Endoscopic removal of clip from fallopian tube
 7D1D3 Removal of foreign body from vagina <--- 7D1D5 Colposcopic removal of foreign body from vagina
 XaC3g Removal of intrauterine contraceptive device <--- XM0oH Transvaginal removal of coil
 7D1B2 Removal of supporting pessary from vagina <--- X402p Removal of Hodge pessary from vagina
 7D1B2 Removal of supporting pessary from vagina <--- X402n Removal of ring pessary from vagina
 7D1B2 Removal of supporting pessary from vagina <--- X402o Removal of shelf pessary from vagina
 X402i Renewal of supporting pessary in vagina <--- X402l Renewal of Hodge pessary in vagina
 X402i Renewal of supporting pessary in vagina <--- X402j Renewal of ring pessary in vagina
 X402i Renewal of supporting pessary in vagina <--- X402k Renewal of shelf pessary in vagina
 Xa8PN Repair of enterocoele <--- X402e Abdominal repair of enterocoele
 Xa8PN Repair of enterocoele <--- X402d Vaginal repair of enterocoele
 X402g Repair of vaginal fistula <--- 7D1A2 Repair of rectovaginal fistula
 X402g Repair of vaginal fistula <--- 7D1A1 Repair of urethrovaginal fistula
 X402g Repair of vaginal fistula <--- 7D1A3 Repair of uterovaginal fistula
 X402g Repair of vaginal fistula <--- 7D1A0 Repair of vesicovaginal fistula
 Xa8P0 Repair of vaginal wall prolapse <--- Xa8PL Anterior colporrhaphy
 Xa8P0 Repair of vaginal wall prolapse <--- Xa8PJ Anterior colporrhaphy and amputation of cervix uteri
 Xa8P0 Repair of vaginal wall prolapse <--- X402c Anterior colporrhaphy and posterior colpoperineorrhaphy
 Xa8P0 Repair of vaginal wall prolapse <--- X402b Colpoperineorrhaphy
 Xa8P0 Repair of vaginal wall prolapse <--- Xa8PM Posterior colporrhaphy
 Xa8P0 Repair of vaginal wall prolapse <--- 7D17. Repair of vaginal prolapse and amputation of cervix uteri
 7D1A0 Repair of vesicovaginal fistula <--- 7D1A6 Abdominal repair vesicovaginal fistula
 7D1A0 Repair of vesicovaginal fistula <--- 7D1A5 Vaginal repair of vesicovaginal fistula
 X403W Resection of uterine septum <--- X403X Endoscopic resection of uterine septum
 XM0C3 Reversal of female sterilisation <--- 7E1E. Endoscopic reversal of female sterilisation
 XM0C3 Reversal of female sterilisation <--- 7E17. Open reversal of female sterilisation
 Xa8Pb Salpingectomy <--- 7E119 Left salpingectomy
 Xa8Pb Salpingectomy <--- 7E13. Partial salpingectomy
 Xa8Pb Salpingectomy <--- 7E118 Right salpingectomy
 Xa8Pb Salpingectomy <--- Xa7kD Total salpingectomy
 Xa8Pa Salpingo-oophorectomy <--- Xa8PX Unilateral salpingo-oophorectomy
 X403q Salpingolysis <--- 7E1F0 Endoscopic freeing of adhesions of fallopian tube
 X403q Salpingolysis <--- 7E1B0 Open freeing of adhesions of fallopian tube
 Xa36H Termination of pregnancy <--- 7E066 Hysterotomy and termination of pregnancy
 XE06Z Total abdominal hysterectomy <--- XE06a Total abdominal hysterectomy and bilateral salpingo-oophorectomy
 Xa7kD Total salpingectomy <--- Xa8PV Total bilateral salpingectomy
 Xa7kD Total salpingectomy <--- Xa8PY Total unilateral salpingectomy
 7D020 Total vulvectomy <--- X4020 Radical total vulvectomy
 X403f Tubal occlusion <--- X403g Laparoscopic tubal occlusion
 X403f Tubal occlusion <--- Xa7kC Open tubal occlusion
 X403f Tubal occlusion <--- Xa70M Tubal diathermy
 X403h Tubal patency test <--- Xa1hW Laparoscopic dye test of Fallopian tube
 Xa8PZ Unilateral oophorectomy <--- Xa8Pe Left oophorectomy
 Xa8PZ Unilateral oophorectomy <--- Xa8Pd Right oophorectomy
 XaAtT Uterine ligament operation <--- 7E27. Operation on broad ligament of uterus
 XaAtT Uterine ligament operation <--- XE074 Operation on round and uterosacral ligament
 XaAtT Uterine ligament operation <--- 7E281 Plication of round ligament of uterus
 7E0.. Uterine operation <--- XaC3i Abdominal hysterocolpectomy
 7E0.. Uterine operation <--- XE06o Biopsy of lesion of uterus

7E0.. Uterine operation <--- Ua1Ip Cervical cap procedure
 7E0.. Uterine operation <--- X403c Creation of uterovaginal fistula
 7E0.. Uterine operation <--- 7E07. Curettage of uterus
 7E0.. Uterine operation <--- X4035 Curettage of uterus and endometrial sampling
 7E0.. Uterine operation <--- XaC3e Dilatation of cervix and curettage of uterus
 7E0.. Uterine operation <--- XE06g Endometrial ablation
 7E0.. Uterine operation <--- X4036 Endometrial biopsy
 7E0.. Uterine operation <--- X4030 Endometrial resection
 7E0.. Uterine operation <--- X4037 Endometrial washing
 7E0.. Uterine operation <--- 7E0D1 Endoscopic cauterisation of lesion of uterus
 7E0.. Uterine operation <--- 7E0D2 Endoscopic cryotherapy to lesion of uterus
 7E0.. Uterine operation <--- XE06l Endoscopic excision of lesion of uterus
 7E0.. Uterine operation <--- XaC3h Exploration of uterine cavity
 7E0.. Uterine operation <--- Ua1Is Feeling stem of intrauterine device
 7E0.. Uterine operation <--- 7E0F0 Freeing of intrauterine adhesion
 7E0.. Uterine operation <--- X403B Hysterectomy
 7E0.. Uterine operation <--- XaBDK Hysteroscopy and endometrial biopsy
 7E0.. Uterine operation <--- Xa8PT Hysterotomy
 7E0.. Uterine operation <--- Xa36w Insertion of abortifacient pessary
 7E0.. Uterine operation <--- 7E0B4 Insertion of prostaglandin abortifacient pessary
 7E0.. Uterine operation <--- 7E09. Intrauterine contraceptive device procedure
 7E0.. Uterine operation <--- X403K Introduction of substance - uterine cavity
 7E0.. Uterine operation <--- X403Z Jones modified Strassman metroplasty
 7E0.. Uterine operation <--- Xa36I Medical termination of pregnancy
 7E0.. Uterine operation <--- XE06f Metroplasty
 7E0.. Uterine operation <--- 7E03. Miscellaneous operations of cervix
 7E0.. Uterine operation <--- XM0oC Operation on cervix
 7E0.. Uterine operation <--- Xa8PU Operative termination of pregnancy
 7E0.. Uterine operation <--- 7D1A3 Repair of uterovaginal fistula
 7E0.. Uterine operation <--- X30EY Repair of vesicouterine fistula
 7E0.. Uterine operation <--- X403Y Strassman metroplasty
 7E0.. Uterine operation <--- Xa36H Termination of pregnancy
 7E0.. Uterine operation <--- 7E0D. Therapeutic endoscopic operations on uterus
 7E0.. Uterine operation <--- X403a Tomkins metroplasty
 7E0.. Uterine operation <--- 7E0G0 Vaginal excision of lesion of uterus
 7E0.. Uterine operation <--- XaC3j Vaginal hysterocolpectomy
 7E0.. Uterine operation <--- 7E089 Vaginal removal of uterine foreign body
 Xa8Pt Uterine packing <--- XE0HU Packing to control postnatal vaginal bleeding
 7E181 Uterotubal implantation <--- X403z Ampullary uterotubal implantation
 7E181 Uterotubal implantation <--- X403y Isthmic uterotubal implantation
 7D1.. Vagina operation <--- XC0fn Advancement of vagina
 7D1.. Vagina operation <--- XE0HI Biopsy of lesion of vagina
 7D1.. Vagina operation <--- X402r Biopsy of vagina
 7D1.. Vagina operation <--- 7D152 Cauterisation of lesion of vagina
 7D1.. Vagina operation <--- X402Q Colpocleisis
 7D1.. Vagina operation <--- Xa8PP Colposcopy of vagina
 7D1.. Vagina operation <--- 7D15. Destruction of vaginal lesion
 7D1.. Vagina operation <--- X402W Division of vaginal septum
 7D1.. Vagina operation <--- 7D1D7 Drainage of the canal of Nuck
 7D1.. Vagina operation <--- 7D1C0 Evacuation of vaginal haematoma
 7D1.. Vagina operation <--- 7D155 Excision of vaginal adhesions
 7D1.. Vagina operation <--- 7D150 Excision of vaginal lesion
 7D1.. Vagina operation <--- 7D1C. Exploration of vagina
 7D1.. Vagina operation <--- 7D1D0 Freeing of adhesions of vagina
 7D1.. Vagina operation <--- X402t Haemostasis of vaginal vault
 7D1.. Vagina operation <--- 7D154 Implantation of radioactive substance into vagina
 7D1.. Vagina operation <--- X402h Insertion / removal of supporting pessary into vagina
 7D1.. Vagina operation <--- Xa8PQ Insertion of pack into vagina
 7D1.. Vagina operation <--- 7D1B. Insertion of supporting pessary into vagina
 7D1.. Vagina operation <--- XE0HJ Insertion of vaginal dilator
 7D1.. Vagina operation <--- 7D122 Marsupialisation of lesion of vagina
 7D1.. Vagina operation <--- X402N Operation on vaginal introitus
 7D1.. Vagina operation <--- X402v Painting of vagina
 7D1.. Vagina operation <--- X402Z Perineal-pull-through vaginoplasty

7D1.. Vagina operation <--- X402a Reconstruction of vagina with colon
 7D1.. Vagina operation <--- 7D1D3 Removal of foreign body from vagina
 7D1.. Vagina operation <--- X402s Removal of pack from vagina
 7D1.. Vagina operation <--- X402w Removal of vaginal dilator
 7D1.. Vagina operation <--- X402f Sacrospinous fixation of vaginal vault
 7D1.. Vagina operation <--- XE0HH Suture of vagina
 7D1.. Vagina operation <--- X402Y Tissue expansion vaginoplasty
 7D1.. Vagina operation <--- 7D1C1 Toilet to vagina
 7D1.. Vagina operation <--- XM0oL Vaginal repair operation
 7D1.. Vagina operation <--- X90Rn Vaginal Z-plasty
 7D1.. Vagina operation <--- 7D12. Vaginectomy
 7D1.. Vagina operation <--- 7D16. Vaginoplasty
 7D1.. Vagina operation <--- X402X Williams vulvovaginoplasty
 7E0G0 Vaginal excision of lesion of uterus <--- X403U Vaginal myomectomy
 XE06b Vaginal hysterectomy <--- X403C Laparoscopy assisted vaginal hysterectomy
 XE06b Vaginal hysterectomy <--- 7E050 Radical vaginal hysterectomy
 XM0oL Vaginal repair operation <--- Xa8PK Anterior and posterior colporrhaphy
 XM0oL Vaginal repair operation <--- Xa8PN Repair of enterocele
 XM0oL Vaginal repair operation <--- X402g Repair of vaginal fistula
 XM0oL Vaginal repair operation <--- Xa8P0 Repair of vaginal wall prolapse
 XM0oL Vaginal repair operation <--- 7D19. Repair of vault of vagina
 XM0oL Vaginal repair operation <--- 7D190 Zacharin repair of vaginal vault
 7D12. Vaginectomy <--- XaC3i Abdominal hysterocolpectomy
 7D12. Vaginectomy <--- 7D121 Partial colpectomy
 7D12. Vaginectomy <--- 7D120 Total colpectomy
 7D12. Vaginectomy <--- XaC3j Vaginal hysterocolpectomy
 7D16. Vaginoplasty <--- 7D163 McIndoe vaginoplasty
 7D16. Vaginoplasty <--- 7D165 Reconstruction of vagina with distant flap
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 XE075 Ventrosuspension of uterus <--- Xa20Z Open ventrosuspension of uterus
 XE0Gz Vulva and female perineum operation <--- 7D01. Bartholin's gland operation
 XE0Gz Vulva and female perineum operation <--- XM1G5 Biopsy of vulva
 XE0Gz Vulva and female perineum operation <--- XE0H4 Cauterisation of lesion of vulva
 XE0Gz Vulva and female perineum operation <--- 7D00. Clitoris operation
 XE0Gz Vulva and female perineum operation <--- X402E Colposcopy of vulva
 XE0Gz Vulva and female perineum operation <--- 7D03. Destruction of vulval lesion
 XE0Gz Vulva and female perineum operation <--- 7D051 Drainage of lesion of vulva
 XE0Gz Vulva and female perineum operation <--- 7D052 Evacuation of vulval haematoma
 XE0Gz Vulva and female perineum operation <--- X4026 Excision biopsy of vulval lesion
 XE0Gz Vulva and female perineum operation <--- X4025 Excision of vulval lesion
 XE0Gz Vulva and female perineum operation <--- 7D034 Implantation of radioactive substance into vulva
 XE0Gz Vulva and female perineum operation <--- Xa1sw Injection into vulva
 XE0Gz Vulva and female perineum operation <--- XE0H1 Marsupialisation of lesion of vulva
 XE0Gz Vulva and female perineum operation <--- 7D035 Painting of vulval warts
 XE0Gz Vulva and female perineum operation <--- XE0H5 Reconstruction of vulva
 XE0Gz Vulva and female perineum operation <--- 7D054 Separation of labial adhesions
 XE0Gz Vulva and female perineum operation <--- X402C Topical vulval chemotherapy
 XE0Gz Vulva and female perineum operation <--- 7D02. Vulvectomy
 XE0Gz Vulva and female perineum operation <--- X4023 Wide local excision of vulva
 Xa1Fs Vulva operation <--- 7D01. Bartholin's gland operation
 Xa1Fs Vulva operation <--- XM1G5 Biopsy of vulva
 Xa1Fs Vulva operation <--- XE0H4 Cauterisation of lesion of vulva
 Xa1Fs Vulva operation <--- 7D00. Clitoris operation
 Xa1Fs Vulva operation <--- X402E Colposcopy of vulva
 Xa1Fs Vulva operation <--- 7D03. Destruction of vulval lesion
 Xa1Fs Vulva operation <--- 7D051 Drainage of lesion of vulva
 Xa1Fs Vulva operation <--- 7D052 Evacuation of vulval haematoma
 Xa1Fs Vulva operation <--- X4026 Excision biopsy of vulval lesion
 Xa1Fs Vulva operation <--- X4025 Excision of vulval lesion
 Xa1Fs Vulva operation <--- 7D034 Implantation of radioactive substance into vulva
 Xa1Fs Vulva operation <--- Xa1sw Injection into vulva
 Xa1Fs Vulva operation <--- XE0H1 Marsupialisation of lesion of vulva
 Xa1Fs Vulva operation <--- 7D035 Painting of vulval warts

Xa1Fs Vulva operation <--- XE0H5 Reconstruction of vulva
 Xa1Fs Vulva operation <--- 7D054 Separation of labial adhesions
 Xa1Fs Vulva operation <--- X402C Topical vulval chemotherapy
 Xa1Fs Vulva operation <--- 7D02. Vulvectomy
 Xa1Fs Vulva operation <--- X4023 Wide local excision of vulva
 7D02. Vulvectomy <--- X4021 Hemivulvectomy
 7D02. Vulvectomy <--- 7D022 Partial vulvectomy
 7D02. Vulvectomy <--- X4024 Skinning vulvectomy
 7D02. Vulvectomy <--- 7D020 Total vulvectomy

8.8.4.7.4 Common relationships – Lymphatic procedures

784.. Spleen operation <--- 78420 Spleen transplant
 784.. Spleen operation <--- 78423 Repair of spleen
 784.. Spleen operation <--- 78424 Banding of spleen
 784.. Spleen operation <--- 78425 Exploration of spleen
 784.. Spleen operation <--- X20BK Splenectomy
 784.. Spleen operation <--- X20BL Procedures for splenic lesions
 784.. Spleen operation <--- X20BN Splenic cystogastrostomy
 784.. Spleen operation <--- X20B0 Splenic cystojejunostomy
 784.. Spleen operation <--- X20BR Suturing of spleen
 784.. Spleen operation <--- X20BS Incision of spleen
 784.. Spleen operation <--- X20BT Injection of spleen
 784.. Spleen operation <--- Xa3Xe Reimplantation of splenic fragments
 7840. Total splenectomy <--- 78400 Total splenectomy and reimplantation of fragments
 7H60. Block dissection of lymph nodes <--- 7H600 Block dissection of cervical lymph nodes
 7H60. Block dissection of lymph nodes <--- 7H601 Block dissection of axillary lymph nodes
 7H60. Block dissection of lymph nodes <--- 7H602 Block dissection of mediastinal lymph nodes
 7H60. Block dissection of lymph nodes <--- 7H603 Block dissection of para-aortic lymph nodes
 7H60. Block dissection of lymph nodes <--- 7H604 Block dissection of inguinal lymph nodes
 7H60. Block dissection of lymph nodes <--- 7H606 Supraomohyoid lymph nodes neck dissection
 7H60. Block dissection of lymph nodes <--- X209x Selective neck dissection of cervical lymph nodes
 7H60. Block dissection of lymph nodes <--- X20A1 Block dissection of pelvic lymph nodes
 7H600 Block dissection of cervical lymph nodes <--- 7H605 Modified radical neck dissection of cervical lymph nodes
 7H600 Block dissection of cervical lymph nodes <--- X209v Extended radical neck dissection of cervical lymph nodes
 7H600 Block dissection of cervical lymph nodes <--- X209w Radical neck dissection of cervical lymph nodes
 7H600 Block dissection of cervical lymph nodes <--- X20A0 Anterior compartment lymph nodes neck dissection
 7H61. Sampling of lymph node <--- 7H611 Axillary lymph nodes sampling
 7H61. Sampling of lymph node <--- 7H613 Sampling of internal mammary lymph nodes
 7H61. Sampling of lymph node <--- 7H614 Mediastinal lymph nodes sampling
 7H61. Sampling of lymph node <--- 7H616 Inguinal lymph nodes sampling
 7H61. Sampling of lymph node <--- X20AC Abdominal lymph nodes sampling
 7H61. Sampling of lymph node <--- X20AE Pelvic lymph nodes sampling
 7H61. Sampling of lymph node <--- XE05P Cervical lymph nodes sampling
 7H61. Sampling of lymph node <--- XE05Q Sampling of supraclavicular lymph nodes
 7H614 Mediastinal lymph nodes sampling <--- 7H613 Sampling of internal mammary lymph nodes
 7H63. Drainage of lesion of lymph node <--- 7H630 Drainage of lesion of cervical lymph node
 7H63. Drainage of lesion of lymph node <--- 7H631 Drainage of lesion of axillary lymph node
 7H63. Drainage of lesion of lymph node <--- 7H632 Drainage of lesion of inguinal lymph node
 7H63. Drainage of lesion of lymph node <--- X20Ak Drainage of lesion of mediastinal lymph node
 7H63. Drainage of lesion of lymph node <--- X20Al Drainage of lesion of abdominal lymph node
 7H63. Drainage of lesion of lymph node <--- X20Am Drainage of lesion of pelvic lymph node
 7H63. Drainage of lesion of lymph node <--- X20Ao Drainage of lesion of popliteal lymph node
 7H63. Drainage of lesion of lymph node <--- X20Ap Drainage of lesion of epitrochlear lymph node
 7H64. Operation on lymphatic duct <--- 7H640 Reconstruction of lymphatic duct
 7H64. Operation on lymphatic duct <--- 7H642 Ligation of lymphatic duct
 7H64. Operation on lymphatic duct <--- 7H643 Cannulation of lymphatic duct
 7H64. Operation on lymphatic duct <--- 7H644 Exploration of chylous fistula
 7H64. Operation on lymphatic duct <--- X20Aq Lymphatic drainage through buried fascia/tensor fascia lata
 7H64. Operation on lymphatic duct <--- X20Av Transplantation of lymph collectors
 7K1Q. Bone marrow transplant <--- 7K1Q0 Autologous bone marrow transplant
 7K1Q. Bone marrow transplant <--- X20Bd Syngeneic bone marrow transplant
 7K1Q. Bone marrow transplant <--- X20Be T-cell depleted allogeneic bone marrow graft
 7K1Q. Bone marrow transplant <--- X20Bf Imperfect T-cell depleted allogeneic bone marrow graft

7K1Q. Bone marrow transplant <--- X20Bg Allogeneic related bone marrow transplant
 7K1Q. Bone marrow transplant <--- X20Bh Allogeneic unrelated bone marrow transplant
 7K1Q. Bone marrow transplant <--- X20Bi Haemopoietic stem cell transplant
 7K1Q. Bone marrow transplant <--- Xa0fJ Cord cell transfusion
 7K1Q. Bone marrow transplant <--- Xa0fK Peripheral blood stem cell graft
 7K1Q. Bone marrow transplant <--- Xa8Ry Allogeneic bone marrow transplant
 X209u Lymphatic, spleen and bone marrow procedures <--- 784.. Spleen operation
 X209u Lymphatic, spleen and bone marrow procedures <--- 7H64. Operation on lymphatic duct
 X209u Lymphatic, spleen and bone marrow procedures <--- X20Aw Ligation of thoracic lymph duct
 X209u Lymphatic, spleen and bone marrow procedures <--- Xa8RX Excision of lymphoedematous tissue of leg
 X209u Lymphatic, spleen and bone marrow procedures <--- Xa9IV Lymph node operation
 X209u Lymphatic, spleen and bone marrow procedures <--- XE05S Excision of lymphoedematous tissue of arm
 X209x Selective neck dissection of cervical lymph nodes <--- X20A0 Anterior compartment lymph nodes neck dissection
 X20A4 Excision of group of lymph nodes <--- X20A5 Excision of cervical lymph nodes group
 X20A4 Excision of group of lymph nodes <--- X20A6 Excision of axillary lymph nodes group
 X20A4 Excision of group of lymph nodes <--- X20A7 Excision of mediastinal lymph nodes group
 X20A4 Excision of group of lymph nodes <--- X20A8 Excision of abdominal lymph nodes group
 X20A4 Excision of group of lymph nodes <--- X20A9 Excision of pelvic lymph nodes group
 X20A4 Excision of group of lymph nodes <--- X20AA Excision of inguinal lymph nodes group
 X20AC Abdominal lymph nodes sampling <--- 7H615 Sampling of para-aortic lymph nodes
 X20AC Abdominal lymph nodes sampling <--- X20AD Sampling of mesenteric lymph nodes
 X20AF Excision of lymph node <--- X20AG Excision of cervical lymph node
 X20AF Excision of lymph node <--- X20AH Excision of axillary lymph node
 X20AF Excision of lymph node <--- X20AI Excision of mediastinal lymph node
 X20AF Excision of lymph node <--- X20AJ Excision of abdominal lymph node
 X20AF Excision of lymph node <--- X20AK Excision of pelvic lymph node
 X20AF Excision of lymph node <--- X20AL Excision of inguinal lymph node
 X20AF Excision of lymph node <--- X20AN Excision of popliteal lymph node
 X20AF Excision of lymph node <--- X20AO Excision of epitrochlear lymph node
 X20AP Lymph node biopsy <--- X20AQ Biopsy of cervical lymph node
 X20AP Lymph node biopsy <--- X20AR Biopsy of axillary lymph node
 X20AP Lymph node biopsy <--- X20AS Biopsy of mediastinal lymph node
 X20AP Lymph node biopsy <--- X20AT Biopsy of abdominal lymph node
 X20AP Lymph node biopsy <--- X20AU Biopsy of pelvic lymph node
 X20AP Lymph node biopsy <--- X20AV Biopsy of inguinal lymph node
 X20AP Lymph node biopsy <--- X20AX Biopsy of popliteal lymph node
 X20AP Lymph node biopsy <--- X20AY Biopsy of epitrochlear lymph node
 X20AT Biopsy of abdominal lymph node <--- XaB13 Biopsy of para-aortic lymph nodes
 X20AZ Fine needle aspiration of lymph node <--- X20Aa Fine needle aspiration of supraclavicular lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ab Fine needle aspiration of cervical lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ac Fine needle aspiration of axillary lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ad Fine needle aspiration of mediastinal lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ae Fine needle aspiration of abdominal lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Af Fine needle aspiration of pelvic lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ag Fine needle aspiration of inguinal lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Ai Fine needle aspiration of popliteal lymph node
 X20AZ Fine needle aspiration of lymph node <--- X20Aj Fine needle aspiration of epitrochlear lymph node
 X20B5 Operation on lymphocyst <--- X20B6 Drainage of lymphocyst
 X20B5 Operation on lymphocyst <--- X20B7 Excision of lymphocyst
 X20B8 Operation on cystic hygroma <--- X20B9 Aspiration of cystic hygroma
 X20B8 Operation on cystic hygroma <--- X20BB Injection of cystic hygroma
 X20B8 Operation on cystic hygroma <--- X20BC Incision and drainage of cystic hygroma
 X20B8 Operation on cystic hygroma <--- XE05W Excision of cystic hygroma
 X20BK Splenectomy <--- 7840. Total splenectomy
 X20BK Splenectomy <--- 78402 Excision of accessory spleen
 X20BK Splenectomy <--- 78410 Partial splenectomy
 X20BK Splenectomy <--- Ua1JD Subtotal splenectomy
 X20BL Procedures for splenic lesions <--- 78411 Marsupialisation of splenic lesion
 X20BL Procedures for splenic lesions <--- 78412 Excision of lesion of spleen
 X20BL Procedures for splenic lesions <--- 78422 Biopsy of lesion of spleen
 X20BL Procedures for splenic lesions <--- X20BM Destruction of lesion of spleen
 X20BL Procedures for splenic lesions <--- X20BP External drainage of splenic lesion
 X20BL Procedures for splenic lesions <--- XM1G3 Drainage of lesion of spleen
 X20BU Bone marrow procedure <--- 7K1Q. Bone marrow transplant

X20BU Bone marrow procedure <--- 7M2C6 Harvest of bone marrow
 X20BU Bone marrow procedure <--- X20BV Bone marrow sampling
 X20BU Bone marrow procedure <--- X20BW Bone marrow aspiration
 X20BU Bone marrow procedure <--- X20BZ Bone marrow trephine
 X20BW Bone marrow aspiration <--- Ua1JC Multiple bone marrow aspiration
 X20BW Bone marrow aspiration <--- X20BX Iliac crest aspiration
 X20BW Bone marrow aspiration <--- X20BY Tibial tubercle aspiration
 X20BW Bone marrow aspiration <--- Xa0Gc Sternal aspiration
 X20BZ Bone marrow trephine <--- X20Ba Sternal trephine
 X20BZ Bone marrow trephine <--- X20Bb Iliac crest trephine
 X30FB Operation on pelvic lymph node draining prostate <--- X20A1 Block dissection of pelvic lymph nodes
 X30FB Operation on pelvic lymph node draining prostate <--- X20A9 Excision of pelvic lymph nodes group
 X30FB Operation on pelvic lymph node draining prostate <--- X20AE Pelvic lymph nodes sampling
 X30FB Operation on pelvic lymph node draining prostate <--- X20AK Excision of pelvic lymph node
 Xa8RY Excision of lymphoedematous tissue <--- 7H664 Excision of lymphoedematous tissue of scrotum
 Xa8RY Excision of lymphoedematous tissue <--- X20B2 Excision of lymphoedematous tissue plus split skin graft
 Xa8RY Excision of lymphoedematous tissue <--- X20B3 Excision of lymphoedematous tissue plus full thickness skin graft
 Xa8RY Excision of lymphoedematous tissue <--- X20B4 Excision of lymphoedematous tissue plus local skin graft
 Xa9IV Lymph node operation <--- 7H60. Block dissection of lymph nodes
 Xa9IV Lymph node operation <--- 7H61. Sampling of lymph node
 Xa9IV Lymph node operation <--- 7H63. Drainage of lesion of lymph node
 Xa9IV Lymph node operation <--- X20A4 Excision of group of lymph nodes
 Xa9IV Lymph node operation <--- X20AF Excision of lymph node
 Xa9IV Lymph node operation <--- X20AP Lymph node biopsy
 Xa9IV Lymph node operation <--- X20AZ Fine needle aspiration of lymph node
 Xa9IV Lymph node operation <--- X30FB Operation on pelvic lymph node draining prostate
 XE050 Lymphatic tissue operation <--- 7H660 Excision of lymphocele
 XE050 Lymphatic tissue operation <--- X20Ay Excision of lymphangioma
 XE050 Lymphatic tissue operation <--- X20Az Drainage of lymphatics
 XE050 Lymphatic tissue operation <--- X20B5 Operation on lymphocyst
 XE050 Lymphatic tissue operation <--- X20B8 Operation on cystic hygroma
 XE050 Lymphatic tissue operation <--- Xa8RY Excision of lymphoedematous tissue
 XE050 Lymphatic tissue operation <--- Xa9IV Lymph node operation
 XM1G3 Drainage of lesion of spleen <--- Xa3lh Drainage of splenic abscess