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Comparison of ICHI and CCAM Basic Coding System

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Abstract

While diagnoses are captured by ICD-Codes across the world, it is different for procedures. There are also a lot of countries without any procedure classification. During the last years the introduction of a common/ international medical procedure classification has been discussed again. The Australian NCCH presented the *International Classification of Health Interventions* (ICHI) as a proposal for an international procedure classification. An alternative way could be to use the CCAM framework for procedure classification - "Système de Codification" of the French *Classification Commune des Actes Médicaux* - for the generation of a procedure shortlist. We compared ICHI and CCAM Basic Coding System focusing on the appropriateness of both systems for supporting comparability of procedure data. Considering the ongoing standardization of terminologies and classifications for health care telematics we strongly recommend to improve the structure of ICHI by the benefits of the CCAM architecture.

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Comparison of ICHI and CCAM Basic Coding System

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Introduction

Information on surgical and other medical interventions constitutes an indicator for the use of health care, of hospitals in particular. While diagnoses are captured by ICD-Codes across the world, it is different for procedures. Europe- and worldwide, various coding systems are in use. There are, however, countries without any procedure classification. Data about the performance of medical procedures is rarely available and poorly comparable. During the last years, the introduction of a common/international medical procedure classification has been discussed again. The Australian NCCH presented the International Classification of Health Interventions (ICHI) as a proposal for an international procedure classification. An alternative way could be to use the CCAM framework for procedure classification - "Système de Codification" of the French Classification Commune des Actes Médicaux - for the generation of a procedure shortlist. We compared ICHI and CCAM Basic Coding System focusing on the appropriateness of both systems for supporting comparability of procedure data.

Material

We used ICHI Alpha Version 2002, a trial version [1], and CCAM Système de Codification (Basic Coding System) Version V0bis from 2001. [2] ICHI is a procedure shortlist of 1421 classes, based on the Australian Classification of Health Interventions (ACHI). CCAM Basic Coding System is a framework for the multiaxial classification of procedures according to anatomical site, action ("surgical deed") and approach/method. Using this framework, France developed a CCAM Tabular List, containing about 8.000 relevant procedures, to be used for in- and outpatients.

As we had done before with classes of the German OPS-301 [3], we mapped ICHI classes to multiaxial CCAM codes and assessed representability and granularity. Mapping ICHI to CCAM was based on ICHI block titles: We represented ICHI contents to anatomical site, procedural type, and approach/method, using the axes of the Basic Coding System of CCAM. This resulted in multiaxial codes for ICHI procedure descriptions. In addition, we compared the architecture of both classifications, regarding coding system, hierarchy, as well as vocabulary.

	ICHI	**CCAM**
Publication	Pilot Version 2002	Preliminary Version 2001 Final version 2002
Organisation	NCCH	ATIH, ANAES, CNAMTS
Content based on	Australian Procedure Classification ACHI (since 1995?)/ Medicare Benefits Schedule (MBS)	CdAM, GALEN Procedure Model
Intention	Adaptation of the more detailed ACHI for international use and for countries without a procedure classification.	Classification of inpatient and outpatient procedures; basis for health care financing and decision making.

ICHI: International Classification of Health Interventions

ICHI (Pilot Version 2002) is a procedure (short)list of 1421 classes. These classes correspond to the lowest aggregation level in the Australian Classification of Health Interventions (ACHI), so called "blocks". In ACHI, a block aggregates a number of more specific codes, in ICHI, a block is used as a code itself.

Hierarchy: ICHI presents procedures hierarchically listed according to

1. body system/ specialty
2. anatomical site
3. procedural type

These axes constitute a **hierarchical layer** above ICHI procedure descriptions (so called "blocks"), which are coded by sequential numbers.

Code	Title	Hierarchical level	
X.	Procedures on digestive system (blocks 850-1011)	1	chapter
-	Rectum, Anus	2	(site)
-	Excision	3	(procedural type)
936	*Total proctocolectomy*	*4*	block

Vocabulary: ICHI titles describe procedures

- in varying granularity and with more or less specifity, e.g.:
  - 555 *Transplantation of lung*
  - 954 *Repair procedures on liver* - for transplantation of liver.
- with terms which are either "clinical" or "formal"
  - 963 Total proctocolectomy ("clinical")
  - 953 Excision procedures on liver ("formal") - for total or partial hepatectomy
- "formal" descriptions **use** the controlled vocabulary defining the axes for anatomical site and procedural type. E.g.:
  - X. Procedures on digestive system
  - Liver (anatomical site)
  - Excision (procedural type)
  - 953 Excision procedures on liver
- "clinical" descriptions **specify** descriptions with vocabulary of the axes mentioned above (anatomical site, procedural type) without controlled vocabulary, e.g.:
  - X. Procedures on digestive system
  - Rectum, Anus (anatomical site)
  - Excision (procedural type)
  - 936 Total proctocolectomy

CCAM: Classification Commune des Actes Médicaux

CCAM is a hierarchically structured procedure catalogue used in France since 2002 for reimbursement and decision making in health care**.** Each procedure listed in this catalogue is described by a code using a multiaxial classification framework and by a standardised text, both developed according to EN 1828 and the GALEN procedure

model**.** This comparison, however, does not refer to the CCAM procedure catalogue and its high granular procedure descriptions, but only to the underlying multiaxial classification framework, here referred to as "CCAM Basic Coding System".

CCAM Basic Coding System classifies procedures according to

1. anatomical site
2. action
3. approach/method

The concatenation of the codes for these axes result in a **multiaxial code**, which gives a "formal" procedure description based on the code/definition tables of the CCAM Basic Coding System. E.g.:

BH	Eye/Eyeball
M	Repair (Establishment of functioning: Controlling, Fabricating, Preparing, Repairing, Revising)
A	Open Approach
BHMA => "Repair of eyeball, open approach"	

Finer procedure descriptions, as listed in the CCAM catalogue, have a composite code: multiaxial code plus sequential number, e.g. BHMA001 Repair of perforating wound of eyeball, with corneoscleral suture. CCAM titles describe procedures in clinical terms, using a standardised vocabulary in standardised order. CCAM tabular list presents procedures hierarchically listed in up to five aggregation levels according to body system/anatomical site and action/procedural type.)

Results

Mapping ICHI Blocks to CCAM Coding System

A high percentage of ICHI classes could be mapped directly to four-digit CCAM Codes (n=1114, 78,4%) due to considerable similarities between both procedure models, especially concerning anatomical site (mapping rate 99,3%). Only 307 ICHI classes (21,6%) have no or a partial CCAM-Code

Partial or no CCAM Code						
Anatomy	Action	Approach	N	% of 307	% of 1421	Total Failure
∅	∅	∅	3	1,0%	0,2%	No anatomy 0,7%
∅	+	+	7	2,3%	0,5%	
+	∅	∅	138	45,0%	9,7%	No action 14,9%
+	∅	+	74	24,1%	5,2%	
+	+	∅	85	27,7%	6,0%	No approach 6,0%
			307	100,0%	21,6%	

Representability of the action/procedural type axis was affected by missing CCAM codes for "incision on …" and "other procedure…" and by imprecise procedure descriptions in ICHI titles/blocks, e.g. "procedure for (a disease)".

The third axis for approach/method could represent more information, if ICHI blocks would provide such information. In traditional procedure classifications, information of this type is merely implicit to a great extent, so we were unable to map procedures, which in practice are performed using different approaches or techniques.

Comparison of ICHI/CCAM Architecture

Coding system: ICHI blocks are coded using sequential numbers, while the hierarchical information to anatomical site and procedural type is not coded. CCAM provides multiaxial four-digit codes, representing body system, anatomical site, action (procedural type).

Hierarchy: ICHI tabulates each block according to 1) anatomical site/ specialty, 2) anatomical site/detail, 3) procedural type. The result is a formal, consistent hierarchical procedure list. CCAM's multiaxial classification system supports different hierarchies; it makes sense to choose a hierarchical tabulation oriented on the axis for body system/anatomical site.

Vocabulary: ICHI titles (blocks) do not use a controlled vocabulary, which in some cases, leads to ambiguities. The procedure descriptions are either "clinical" (*proctocolectomy*) or "formal" (*excision procedures on liver,* i.a. for *hepatectomy*) and of varying granularity. CCAM uses a controlled vocabulary to describe procedures unambiguously and in a consistent granularity, equivalent or slightly coarser than "formal" procedure descriptions of ICHI.

	ICHI	CCAM
Code	Sequential number	Multiaxial code (plus sequential number)
Procedure Description (Title)	ICHI block: clinical or formal	CCAM Basic Coding System: formal CCAM Tabular list: clinical, using a standardised vocabulary in standardised order
Multi-axiality	Procedures are classified according to 1) anatomical site (122 sites) 2) procedural type (11 general types, e.g. "excision"; 64 additional types for special-ties, e.g. "crown and bridge") These axes constitute a hier-archical layer above ICHI procedure descriptions (so called "blocks"), which are coded by sequential numbers (1 to 1916). No specific codes for the axes.	CCAM Basic Coding System classifies procedures according to 1) body system (16)/anatomical site (178 sites) 2) action (18 groups/codes for 40 types) 3) approach/method (14 Types) Each specific procedure description is represented by a multiaxial code which is an aggregation of the codes for the three axes.

Hierarchy	1) anatomical site (specialty) 2) anatomical site, detail 3) procedural type	1) anatomical site 2) diagnostic/therapeutic 3) anatomical site, detail 4) procedural type or anatomical site, detail In addition to the multiaxial basic coding system
European Standard EN 1828	ICHI does not claim to be compatible to EN 1828. "Anatomical site", on the other hand, is one of three concepts required for a procedure description, "procedural type" as a quasisynonym for "surgical deed" another. The third obligate concept, method/approach is not required in ICHI blocks.	CCAM procedure model is based on the GALEN model for surgical procedures, which specifies the model of EN 1828 Structure for Coding and Classification of Surgical Procedures: A medical procedure is described by a certain (surgical) deed on a certain anatomical site using a certain method; if necessary, a pathology concept can be used additionally. CCAM procedure descriptions cover all mandatory concepts.

Table 1: General characteristics of ICHI and CCAM in comparison

Discussion

We found that a complete mapping is possible in a high percentage due to a high degree of similarities, especially concerning anatomical site. Incompatibilities result from undefined classes in CCAM (e.g. "other"), from unspecific descriptions ("procedures for…"), and from missing information to approach/ method in ICHI.

Comparing the architectures of ICHI and CCAM Basic Coding System, we found CCAM being a well defined coding system, appropriate to generate classes which are consistent regarding granularity of procedure description and class boundaries, appropriate for statistical purposes - presumed the integration of additional codes for residual classes ("other"). With a universal modelling and an elaborated application guide [2] in combination with the simplicity of the coding system, CCAM facilitates a correct and consistent assignment of codes, which is a precondition for improved data quality. The hierarchical structure of ICHI shows rather well structured elements, too, with the potential to facilitate statistical analysis, but these elements are not represented in a well applicable coding system. Block titles describe procedures in varying granularity and partially problematic ambiguity. There is also a tendency to group various combinations of anatomical sites ("… of pelvis or hip" next to "… of pelvis or femur"). Thus, statistical analysis using block texts is poorly supported.

Considering the ongoing standardization of terminologies and classifications for health care telematics we strongly recommend to improve the structure of ICHI by the benefits of the CCAM architecture (accordance to European Standard EN 1828, multiaxial coding system, detailed definitions/coding guidelines, controlled vocabulary, and last but not least simplicity). That means in detail: first do the definition-framework, then add a multiaxial code for "anatomy-action-approach" and eliminate textual ambiguities and inconsistencies using a controlled vocabulary.

Literature

[1] International Classification of Health Interventions (ICHI), Alpha Version (Trial Version) http://www3.fhs.usyd.edu.au/ncch/4.1.4.htm. Last visited 20.04.05

[2] *Classification des Actes Médicaux*, *Version V0bis, 2001: Guide de Lecture - Système de Codification*, page 53 ff. CCAM Version V2, 2005, http://www.ameli.fr/77/RUB/77/omb.html. Last visited 20.04.05

[3] Hanser S, Zaiß A, Jakob R: Bewährter Inhalt in neuer Struktur: Abbildbarkeit von Inhalten des OPS-301 mit den Methodiken zweier medizinischer Prozedurenklassifikationen (PCS, CCAM). Informatik, Biometrie und Epidemiologie in Medizin und Biologie, 2003; 34 (3) : 244-246 (48. Jahrestagung der Deutschen Gesellschaft für Medizinische Informatik, Biometrie und Epidemiologie (GMDS), Münster, 14.-19. September 2003)