

Comprehensive Coding¹

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Abstract

The Read Clinical Classification is a super-set of ICD-9, ICPM and the OPCS Classification of Occupations. New classifications have been developed to cover history and symptoms, examination and signs, prevention and administration. The Read system covers the whole of medicine at a level of detail suitable for clinical notes on individual patients. The hierarchical classification is suitable for statistical analysis. It is designed for use with computers, incorporating automatic encoding and validations, with short fixed-length rubrics for each code and synonym.

Requirements

The collection and management of medical data using computers requires two key criteria to be met. Firstly, clinicians need to record information in the form, language and detail that is of greatest value in treating individual patients. Secondly, data should be held within the computer in a form that facilitates statistical analysis of aggregated data, information retrieval and communication between computers. These dual aims have led to the development of a new comprehensive computer-based classification, nomenclature and coding system for medicine (the Read Clinical Classification).

Applications

The clinical uses of the new system include:

- (1) Structured medical records and notes
- (2) Call and recall systems for preventive medical care
- (3) Expert systems and clinical protocols for diagnosis, treatment and follow-up of patients
- (4) Self audit, peer audit and policy planning
- (5) Administration, including accountancy and financial control.

Statistical applications include:

- (1) Clinical trials and research
- (2) Health service management and planning
- (3) Health and sickness surveys and epidemiology
- (4) Pharmaceutical and actuarial market research
- (5) International comparisons.

Classification and Nomenclature

A statistical classification of medicine consists of a number of categories in which every condition or procedure has its appropriate place. Some conditions or procedures have more than one name and such synonyms or alternative names are incorporated within the classification, so creating a nomenclature. A nomenclature is a list of approved medical terms which must be extensive if it is to be comprehensive.

Attributes of both a statistical classification and a nomenclature are needed to meet the needs of both practising clinicians and users of statistical information. The Read Clinical Classification is a hierarchical statistical classification with the features of nomenclature. It has four levels of detail.

When thought of as a nomenclature, the system has 24,948 entries, but it is also a hierarchy with 27 first-level categories, 273 at the second level and 2770 at the third level and so on. Each synonym is linked to the code for the specific category that it is an alternative name for.

¹ This is a re-formatted copy of the first published description of the Read Codes, published in the British Journal of Healthcare Computing in May 1986. All footnotes are new additions. It has been prepared in conjunction with the James Read Memorial Lecture, IHTSDO Implementation Showcase Conference, Sydney, 14 October 2011.

Hierarchical Codes

The structure of the hierarchical classification is mapped directly by codes. In the same way as a map grid reference specifies a position on a map, each code specifies its position within the classification.

The Read Clinical Classification has four-digit alpha-numeric codes using the numerals 0-9 and the letters A-Z.² The first character relates to level 1, the second to level 2 and so on. Consider code B136, which is broken down as follows:

First level	B ³	Neoplasm
Second level	B1	Malignant neoplasm
Third level	B13	Carcinoma stomach
Fourth level	B136	Ca. greater curvature-stomach

The four-digit codes increase in detail from left to right. Facilities have been built in to allow for extension within the basic frame-work. The alpha-numeric coding system using four digit codes allows 1,679,616 possible entries (36 to the power 4).

Automatic encoding

The classification incorporates automatic encoding. Entry of the first few letters of any term displays a list beginning with those letters from which the user chooses by line number. Consider the term 'rubella'. Entry of the letters 'rub' triggers the following list:

0	H/O: rubella	1418
1	Rubella	A47.
2	Rubella + pregnancy	K2A3
3	Rubella-congenital	O251
4	Rubella health educ.	6794
5	Rubella antibody titre	439.
6	Rubella contact	65P5
7	Rubella damage-preg.	K364
8	Rubella screen	62J.
9	Rubella vaccination	65P.

Choice by line number selects the required code with its attached description (rubric). All rubrics are limited to thirty characters which is convenient for display on computer screens and print formats.

Compatibility

A number of national and international medical classifications have been developed primarily to facilitate the production of statistics for epidemiology and research. These systems were developed for manual recording and have been adapted latterly for use with computers. None of these classifications covers the whole field of medicine, and none is suitable for clinical use as their coded content is not sufficiently specific.

Read aims to be comprehensive in both breadth of cover and also in the detail of the terms used. The Read Clinical Classification is compatible with, fully cross-referenced to ICD-9, ICPM, OPCS Classification of Occupations.

Large areas of medicine have not been covered before and Read has extended the areas covered by the above systems to include history, symptoms, examination findings, prevention and administration (and medication).

² A significant extension, made in 1986, shortly after this paper was published, was to extend the range of characters to include lower case characters (not just upper case). A drug dictionary was also added with chapters beginning with lower case characters, based on the structure of the original British National Formulary.

³ The actual four-character code for neoplasm is "B..." (with spaces filled with dots). Similarly, malignant neoplasm has code "B1.." and carcinoma stomach is "B13..".

Diseases, injuries and death

The International Classification of Diseases Ninth Revision (ICD-9) is the standard statistical classification of diseases, used by health services throughout the world. Sections of the Read Clinical Classification which deal with diagnoses, injuries and death are directly based on ICD-9. The Read first-digit codes A to Q correspond directly to ICD chapters, with the exception of chapter XVI (symptoms, signs and ill-defined conditions) which is covered in greater detail elsewhere. Each Read category is precisely cross-referenced to ICD-9.

This section of the Read Classification has 17 first level codes, 115 two-digit codes, 728 three-digit codes, 2598 four-digit codes and 2575 synonyms. The level of detail at each level is illustrated by the following example:

level 1	G	Circulatory system diseases
level 2	G7	Cerebrovascular disease
level 3	G71	Cerebral haemorrhage
level 4	G711	Subarachnoid haemorrhage
	G712	Intracerebral haemorrhage
	G713	Extradural haemorrhage
	G714	Subdural haemorrhage

Procedures

The International Classification of Procedures in Medicine (ICPM) complements ICD-9 as the standard classification of surgical, diagnostic and therapeutic procedures. The Read Clinical Classification covers the whole of ICPM with the exception of the section on drugs, medicaments and biological agents. In many cases the content and detail has been expanded to provide clinically specific rubrics. For example the results of laboratory procedures are classified as in:

level 1	4	Laboratory procedures
level 2	46	Urine examination
level 3	466	Urine test for glucose
level 4	4661 ⁴	Urine glucose test not done
	4662	Urine glucose test negative
	4663	Urine glucose test=trace
	4664	Urine glucose test=+
	4665	Urine glucose test=++
	4666	Urine glucose test=+++
	4667	Urine glucose test=++++

Similarly in operative procedures mastectomy for example, is classified as:

level 1	7	Operative procedures
level 2	7F	Breast operations
level 3	7F1	Mastectomy
level 4	7F11	Breast lump local excision
	7F12	Partial mastectomy
	7F13	Simple mastectomy
	7F14	Extended simple mastectomy
	7F15	Radical mastectomy
	7F16	Extended radical mastectomy
	7F17	Subcut mastect. + prosth implant
	7F18	Subcutaneous mastectomy

Sections of the Read Clinical Classification covering diagnostic procedures (including laboratory and X-ray) and therapeutic procedures (including surgery) comprise 6023 code categories and 2483 synonyms.

Occupations

⁴ Another change, made shortly after the original publication of this paper, was to start sub-lists at 0 rather than 1. The lists shown here are those in the original paper, not those widely implemented.

The OPCS Classification of Occupations is the basis of this section of the Read Clinical Classification with 1749 coded occupational categories and 936 synonyms. Occupation is an important part of any patient database used for prevention or epidemiology.

History/symptoms

The history and symptoms section of the Read Classification contains family, social and medical history as well as presenting symptoms. The relevant sections in ICD-9 are incomplete and reclassification has been needed to provide adequate clinical detail. Where any history/symptom factor has gradable variables each option is offered as a separate fourth level category. For example:

level 1	1	History/symptom
level 2	13	Social/personal history
level 3	137	Tobacco consumption
level 4	1371	Complete non-smoker
	1372	Trivial smoker
	1373	Light smoker
	1374	Moderate smoker
	1375	Heavy smoker
	1376	Very heavy smoker
	1377	Ex-smoker
	1378	Tobacco consumption unknown

Each term is precisely defined. 'Heavy smoker' is 12-24 cigarettes a day or 80-160 per week, and 20 cigarettes is equivalent to 2 large cigars, 5 medium cigars, 10 small cigars or an ounce of tobacco.

The history/symptoms section has 1299 codes and 901 synonyms. History data is of cardinal importance in diagnosis and the prevention of disease and disability. "Listen to the patient, he is trying to tell you the diagnosis."

Examination/signs

The classification of examination findings and signs is organized by systems. This part of the Read Clinical Classification has been classified from scratch in the absence of any other recognized classification covering patient examination. This section comprises 19 second level, 282 third level and 1480 fourth level categories with 890 synonyms. For example, retinal microaneurisms are classified as:

level 1	2	Examination/Signs
level 2	2B	Central nervous system exam.
level 3	2BB	O/E - retinal inspection
level 4	2BB1	O/E - retina normal
	2BB2	O/E - retinal vessel narrowing
	2BB3	O/E - retinal A-V nipping
	2BB4	O/E - retinal microaneurisms
	2BB5	O/E - retinal haemorrhages
	2BB6	O/E - retinal exudates
	2BB7	O/E - retinal vascular prolif.
	2BB8	O/E - vitreous haemorrhages

Prevention

Preventive procedures have been classified from scratch. This is a key section of the classification particularly as computer-based prevention records and protocols could lead to major changes in the quality of patient care. This section includes:

- contraception
- pregnancy care and birth details
- child healthcare
- vaccination and immunization
- chronic disease monitoring
- health education and counselling
- screening, etc

Two examples show the level of detail provided for cervical smear screening and respiratory disease monitoring.

Cervical neoplasia screening	Respiratory disease monitoring
Cx Screen - not offered	Initial respiratory assessment
Cx Screen - offered	Follow-up resp. assessment
Cx Screen - not wanted	Oral steroids last used
Cx Screen - wanted	Intermittent drugs used more
Cx Screen - not needed	Increasing exercise wheeze
Cx Screen - up to date	Inhaler technique shown
Cx Screen - not attended	Inhaler technique observed
Cx Screen - not reached	Home nebulizer
Cx Screen - done	Home oxygen concentrator
Cx Screen - no result yet	Resp. drugs side effects
Cx Screen - normal	Resp. treatment changed
Cx Screen - abnormal	
Cx Screen + fee claimed	

The preventive procedures section of the Read Clinical Classification has 1279 categories and 460 synonyms.

Administration

This section covers all aspects of practice administration. Examples include the stages of patient registration and de-registration, administrative details of patient encounters, processing of claim forms, staff administration, practice finance and audit reporting.

There are 696 coded categories and 416 synonyms in the administration section of the Read Classification. For example contraception FPI001 claim status is classified as:

level 1	9	Administration
level 2	93	Contraception administration
level 3	931	FP1001 claim status
level 4	9311	FP1001 claim signed
	9312	FP1001 claim sent to FPC
	9313	FP1001 claim up to date
	9314	FP1001 claim due
	9315	FP1001 claim due next visit
	9316	FP1001 claim cancelled

Summary

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References

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2. Classification of Occupations and Coding Index. Office of Population Censuses and Surveys. London, 1980.
3. International Classification of Diseases, Injuries and Causes of Death. Ninth Revision. World Health Organisation. Geneva, 1977.
4. International Classification of Health Problems in Primary Care. 3rd Ed. World Organisation of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians (WONCA), 1983.
5. International Classification of Primary Care. World Health Organisation Geneva, 1985.

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7. International Classification of Primary Care Process. WONCA and NAPCRG (North American Primary Care Research Group), 1985.

ANNEXE

Summary of first level categories of disease sections, and first and second level categories of procedure sections of the Read Clinical Classification:

Diseases	5 Radiology/diagnostic imaging
A Infectious disease	51 Radiology/physics - general
B Neoplasms	52 Plain radiography
C Endocrine/Nutrit. diseases	53 Soft tissue imaging
D Blood diseases	54 Contrast radiography excl CVS
E Mental disorders	55 Cardiovascular angiography
F Nervous system diseases	56 Other x-ray diagn. procedures
G Circulatory system diseases	57 Diagnostic nuclear medicine
H Respiratory system diseases	58 Physics: other diagn. methods
I Digestive system diseases	59 External radiotherapy
J Genitourinary diseases	5A Other nuclear therapy
K Obstetric disorders	5B Physics - other therapy
L Dermatological diseases	
M Musculoskeletal disorders	6 Preventive procedures
N Congenital anomalies	61 Contraception
O Perinatal conditions	62 Pregnancy care
P Injury and poisoning	63 Birth details
Q Causes of injury and poisoning	64 Child health care
	65 Infectious disease control
0 Occupations	66 Chronic disease monitoring
01 Top managers	67 Counselling/health education
02 Management support professions	68 Screening
03 Education/welfare/health profes.	69 Special examinations
04 Literary/artistic/sports occupat	
05 Prof. scientists/engin./technol.	7 Operative procedures
06 Managerial occupations	71 Nervous system operations
07 Clerical occupations	72 Endocrine system operations
08 Selling occupations	73 Eye operations
09 Security/protective services	74 Ear operations
0A Catering/personal services	75 Nose/mouth/pharynx operations
0B Farming/fishing occupations	76 Respiratory system operations
0C Materials processors excl metal	77 Cardiovascular operations
0D Making/repairing excl	78 Blood/lymphatic operations
metal/elect	
0E Metal/electrical workers	79 Digestive system operations
0F Painters/product assemblers	7A Urinary tract operations
0G Product inspectors/packagers	7B Male genital organ operations
0H Construction/mining workers	7C Female genital organ operations
0I Transporters/movers/storers	7D Obstetric operations
	7E Musculoskeletal operations
1 History/symptom	7F Skin/subcutaneous operations
11 Depth of history	7G Tissue disruption operations
12 Family history	7I Optional surgery
13 Social/personal history	7J Ill-defined operations
14 Past medical history	
15 Gynaecological history	8 Other therapeutic procedures
16 General symptoms	81 Removal of unwanted material
17 Respiratory symptoms	82 Correction of misplacement
18 Cardiovascular symptoms	83 Immobilisation and support
19 Gastrointestinal symptoms	84 Skeletal and other traction

1A Genitourinary symptoms	85 Other mechanical procedures
1B Nervous system symptoms	86 Other physical agent therapy
1C Ear/nose/throat symptoms	87 Respiratory procedures
1D General symptom description	88 Cardiovascular procedures
	89 Pre/post-operative procedures
2 Examination/signs	8A Monitoring of patient
21 Depth of examination	8B Other therapy
22 General examination of pat	8C Other care
23 Exam. of respiratory system	8D Anatomico-physiolog. assistance
24 Exam. of cardiovascular system	8E Physiotherapy/remedial therapy
25 Exam. of digestive system	8F Other rehabilitation
26 Exam. of genitourinary system	8G Psychotherapy/sociotherapy
27 Obstetric examination	8H Referral for further care
28 Nervous system general examn.	8I Procedure not carried out
29 Motor/sensory systems exam.	
2A Examination of reflexes	9 Administrative procedures
2B Central nervous system exam.	91 Patient registration
2C Haemopoietic system exam.	92 Patient de-registration
2D Ear, nose + throat exam.	93 Patient record types
2E Examination of fever	94 Death administration
2F Examination of skin	95 Maternity services admin.
2G Examination of the extremities	96 Contraceptive services admin.
2H Orthopaedic examination	97 Immunisation services admin.
2I General sign qualifications	98 Other items of service admin.
	99 Ancillary staff administration
3 Diagnostic procedures	9A Rent and rates payments
31 Special diagnostic procedures	9B Supply of drugs payments
32 Electrocardiography	9C Training/seniority/leave adm
33 Physiological function tests	9D Certificates - administration
34 Non-surgical biopsy	9E Medical examinations/reports
35 Surgical biopsy	9F Child examn./reports/meetings
36 Endoscopy	9G Notifications
37 Exploratory diagn. procedures	9H Mental health administration
38 Misc. diagnostic procedures	9I Practice supplies admin.
	9J Drug stock control admin.
4 Laboratory procedures	9K Forms - misc.
41 Laboratory procedures - general	9L Accounting admin
42 Haematology	9M Audit administration
43 Immunology	9N Patient encounter admin data
44 Blood chemistry	9O Prevention/screening admin.
45 Chemical function tests	9P Clinical trial administration
46 Urine examination	9Q Research administration
47 Examination of faeces	9R Patient misc. admin. data
48 Cerebro-spinal fluid exam.	
49 Semen examination	
4A Vomit examination	
4B Synovial fluid examination	
4C Bone marrow examination	
4D Pleural fluid examination	
4E Sputum examination	
4F Ascitic fluid examination	
4G Calculus examination	
4H Amniotic fluid examination	
4I Miscellaneous samples	
4J Microbiology	
4K General pathology	