The CR Alpha Diagnostic Coding System for Ambulatory Care

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A three-digit code system for patient encounters in ambulatory care was constructed to meet the criteria of integrity, retrievability, flexibility, and acceptability. The system is distinguished from other comparable codes by the use of an alphabetical letter as a category designator, the provision of "open" areas within each category for the addition of new rubrics in appropriate sequence, and the availability of "open" categories for use in research or expansion.

The system has the capacity to expand from 22 primary categories to 97 subheadings and to a maximum of 3,200 rubrics.

The system uses both diagnostic and symptom-oriented rubrics. The diagnostic terms are adopted from the International Classification of Diseases, Adapted, Eighth Revision (ICDA-8) and the symptoms from the National Ambulatory Medical Care Survey Symptom Classification.

It is only by getting your cases grouped . . . that you can make any real progress in your post-graduate education; only in this way can you gain wisdom with experience. . . . It is common error to think that the more a doctor sees the greater his experience and the more he knows. – William Osler.[1]

The benefits of using a diagnostic coding system in the field of health-care delivery are, by this time, well understood and undisputed. The uniform use of the ICDA-8 system[2] has standardized diagnosis and facilitated communication in and between all levels of the inpatient care delivery system. These advantages are manifest to providers of ambulatory primary health care; it is clear that communication and comparison with other primary care providers result in the emergence of higher standards for patient care and for the profession as a whole. The need for a common language in which to communicate has led to the construction of a number of coding systems designed to suit the unique needs of ambulatory care and specifically family practice. This paper will examine the uses of a coding system in ambulatory care, discuss how a code may be constructed for these uses, and introduce a system designed according to these guidelines.

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Uses of a Coding System

Taxonomy is the organization of a set of objects or ideas into an orderly, related pattern. A code is a system of signals or symbols which represents certain assigned meanings. The meanings themselves, eg, diagnoses or symptoms, may be designated as "rubrics." When a code is uniformly applied to a taxonomy, a system of communication emerges which can signal complex information precisely and economically.

With the proliferation of facilities, specialties, and formats which characterizes the health-care delivery system today, it is clear that such precise and economic communication is to the advantage of both the provider – the physician or other health professional – and the consumer – the patient. In terms of patient care, office procedures, medical education, research, and quality assessment, the use of a coding system will decrease the occurrence of miscommunication and error, increase the accuracy and uniformity of data, and accelerate the actual procedures of care and administration. This, in turn, should raise quality of care, increase consumer satisfaction, and lower cost and frustration for all involved in the system – an estimable objective.

A major goal of the primary care physician is to provide the patient with continuity of care. Indeed, overspecialization, with its orientation to disease and its fragmentation of the care of the patient, was a causative factor in the establishment of family practice as a specialty. A single code, used consistently, would not only allow a physician to review quickly a patient's major problems from visit to visit; it would also ensure that the physician's partners (in a group practice setting) or colleague (in a consultation) would have a concise and accurate statement of the patient's history, ongoing problems, and current diagnosis, and could communicate his findings in an equally simple and relevant form. Likewise, a referral,

whether to a physician of another specialty or to an allied health professional – a nurse practitioner or a medical social worker, for example – would be accompanied by a simple and accurate codification of history and diagnosis.

All of these providers, equipped with the same coding system and symbols, could provide uniformity and continuity of care with a minimum of professional miscommunication. The patient receives consistent, informed care as an *individual,* rather than as a collection of unrelated disease states.

Office procedures and administration are often a source of confusion. Problems of nomenclature and illegibility affect all aspects of practice management, particularly between different functions or phases of the delivery system. Ordering the desired laboratory procedures is much simplified by the use of a code which includes these tests. Uniform charges for identical services becomes virtually automatic. The whole process of billing is standardized and clarified. Patients, office personnel, and health-care providers all benefit.

It is the responsibility of medical educators to clarify the objectives of their curricula and to evaluate the results of their training programs. Directors of family practice residency programs must ensure that each resident encounter enough appropriate patient problems and experiences in the course of his education to prepare him for comprehensive practice. Review and evaluation of code-documented patient encounters will provide the resident and the program director with direct evidence of the need for further education or correction in specific areas. Further, residents will enter practice with a knowledge of the need for and a workable vehicle for the implementation of future self-audit.

As family practice matures, increasing emphasis will be placed on research to validate, expand, and direct the growth of the specialty. Here, the necessity for a body of retrievable data is obvious. Uniformly coded information from divergent sources, correlated and compared, will yield rich opportunities for further investigation.

Retrievable and uniform data are also necessary in the process of quality assessment and improvement. Use of an appropriate coding system facilitates prospective or retrospective studies of given disease entities or patient cohorts. Retrospective studies are especially valuable, as they retain the element of unscrutinized spontaneity. Coding of specific diagnoses greatly simplifies their isolation within a large patient population; this encourages more frequent and more critical assessment of quality, with the assumption that assessment leads to improvement. The same principle applies to isolating specific patient cohorts for closer monitoring of disease or intensive educational efforts.

Criteria for an Effective Coding System

It is clear that a diagnostic code which is used so often and in so many formats will stand in a very intimate relation to the individual physician and his daily practice. As Westbury has suggested,[3] it is imperative that any code which aspires to wide use be practice-tested in the offices of primary care physicians to determine its validity and relevance. These will, ultimately, be decided by its accordance with four standards: integrity, retrievability, flexibility, and acceptability.

Integrity

A diagnostic code should clearly express the organization of the taxonomy it represents, that is, each code symbol must reflect its place in the categories and sequence of the overall system of classification. The symbol should include a category designator, so that the similarity of code symbols within a given category will identify the category and reflect the similarity of the rubrics within it.

The code should maintain integrity in contraction to a minimum of easily-identifiable categories or expansion to a multitude of individual rubrics. It must be logically constructed and consistent within itself.

Retrievability of Data

Information which is coded and stored in the physician's office must be quickly and accurately retrievable. The system must therefore be adaptable for use in various practice formats and sites, to both manual and computer operation, from simple index cards through the knitting needle system[4,5] or E-books[6] to highly sophisticated computerized facilities.

Flexibility

The code structure must be firm enough to resist major changes in content and sequence, yet flexible enough to incorporate temporary or permanent modifications. It must allow for the addition or deletion of single rubrics with a minimal disruption of sequence. Certain blocks of code symbols should remain unassigned in anticipation of major expansion in the future, or for use in short or long-term research projects.

Acceptability

Ultimately, of course, the proof of a code system's usefulness will be in its acceptability to the health-care provider. In order for a code to gain the wide compliance which will enhance its benefits, it will have to be:

1. *Simple to use.* The accuracy of retrieved data is dependent on the accuracy of the coded input: the simpler the system, the fewer the errors. A short, concise symbol

encourages accuracy, particularly when the system functions in a variety of formats and sites.

2. *Easy to remember.* Ease of retention and recall will stimulate compliance by the busy provider who can learn and implement the system quickly.

3. *Usable by all health professionals.* All providers – physicians, residents, nurses, students, and allied health professionals – should find the system clear, simple, and relevant.

4. *Usable by non-medical personnel.* The code must also be accessible to administrators and office personnel who bridge the gap between the medical and business aspects of the practice.

5. *Economical of effort.* Use of the code should require a minimum of effort and time on the part of all involved.

6. *Adaptable to existing procedures.* Implementation of the code must not significantly disrupt existing patient and chart flow.

The obvious need for a coding system in ambulatory care has encouraged the independent construction of several diagnostic codes. At the suggestion of the World Organization of National Colleges, Academies, and Academic Associations of General Practitioners/Family Physicians (WONCA),[7] all of these adhere to the sequence of ICDA-8. This system, as the most widely used classification system in the world today, is least likely to change in classification categories or sequence in the near future. The most widely used among these are the Royal College of General Practitioners Classification of Disease,[8] the International Classification of Health Problems in Primary Care (ICHPPC),[9] the National Ambulatory Medical Care Survey: Symptom Classification (NAMCS),[10] and their various adaptations and permutations.[7,11] Each of these has its specific advantages of logic or language; but none of them combines all of the desirable features discussed above. Specifically, none of these systems uses a category designator to identify related groups of rubrics. One code system described by F.M. Hull[12] is hierarchically structured; its code symbol is a five-digit arabic numeral in which the first pair of digits identifies the anatomical system, the second, the type of disease, and the fifth digit, the organ involved. Unfortunately, the taxonomy of the system is highly complex and repetitive in form.

The CR Alpha Coding System

The CR Alpha Code was constructed in 1972 in the Cedar Rapids, Iowa Family Practice Residency Training Program to remedy these perceived defects. It was tested repeatedly in the practices of the Cedar Rapids residents and modified to its present form according to their recommendations; since early 1974 it has also been in use in the practices of faculty and residents of the Division of Family Practice at the University of California, Los Angeles. It combines several features which make for a simple, accurate, and usable coding system.

The CR Alpha Code is a three-digit, hierarchical coding system for patient encounters in ambulatory care. Its principal unique characteristic is the use of an alphabetical letter as the first digit, which functions as the category designator. Diagnoses and symptoms are grouped under sub-headings within the major categories by location or type of disease, and specific rubrics are assigned a two-digit arabic numeral. The code conforms to the sequence of ICDA-8, and in large part the rubrics are expressed in the patient-oriented "complaint vernacular" of the NAMCS.

The code's 22 primary categories are listed in Table 1.

The letters O and V are not used in the Code, to avoid confusion with zero and U. You will note that M subsumes two related categories, "Congenital Malformations" and "Perinatal Morbidity and Mortality"; and that the category "Surgical and Nonsurgical Procedures" requires two letters – T and U – for its multitudinous rubrics. It should also be noted that X and Y are missing from the list; these letters have not been assigned to a particular category, but have been left "open" to

Table 1. Primary Categories in the CR Alpha Code

A00–A99	Infectious Disease
B00–B99	Neoplasms
C00–C99	Endocrine-Nutritional-Metabolic-Hematopoietic
D00–D99	Mental Illness
E00–E99	CNS and Sensory
F00–F99	Circulatory System
G00–G99	Respiratory System
H00–H99	Digestive System
I00–I99	Genitourinary Systems
J00–J99	Complications of Pregnancy, Delivery, and Puerperium
K00–K99	Skin and Cellular Tissue
L00–L99	Musculoskeletal System
M00–M49	Congenital Malformations
M50–M99	Perinatal Morbidity and Mortality
N00–N99	Abnormal Diagnostic Tests without Specific Diagnosis
P00–P99	Accidents and Violence
Q00–Q99	Preventive
R00–R99	Social Problems
S00–S99	Nonsymptomatic Visits According to Patient's Purpose
T00–T99	Surgical and Nonsurgical Procedures
U00–U99	Surgical and Nonsurgical Procedures, continued
W00–W99	Family History of Selected Diseases
Z00–Z99	General Signs and Symptoms

Table 2. Infectious Disease Subheadings in the CR Alpha Code

A00–A99 Infectious Disease

Bacterial

A04	Bacterial gastroenteritis (specific etiology)
A05	Food poisoning (bacterial)
A10	Tuberculosis (excluding atypical)
A24	Streptopharyngitis, scarlet fever, beta strep
A28	Septicemia
A32	Bacterial meningitis (non-tuberculin)
A34	Other recognized systemic bacterial disease

Viral

A35	Polio and sequelae
A42	Chicken pox
A43	Herpes zoster
A44	Herpes simplex
A45	Measles and rubeola
A46	Rubella
A47	Other viral exanthem
A50	Hepatitis (infectious)
A51	Hepatitis (serum)
A52	Mumps
A55	Infectious mononucleosis
A56	Viral warts (excluding condyloma A67)
A59	Other recognized viral infection

Venereal

A60	Syphilis
A65	Gonococcal
A67	Other venereal (condyloma acuminata, etc, excluding candida and trichomoniasis)

Fungal

A70	Dermatophytosis and dermatomycosis (tineas)
A72	Candidiasis (moniliasis)
A79	Other fungal infection

Parasitic

A81	Enterobiasis (pinworm)
A88	Other helminth
A90	Protozoal infections
A91	Trichomoniasis
A92	Pediculosis (head, body, and pubic)
A93	Ascariasis (scabies and chigger)
A96	Other and unspecified infection and parasitic disease

Other

A98	Sarcoid

accommodate individual research projects. It is not inconceivable that such research may call for a permanent expansion of the taxonomy in the future; these open letters may be assigned to newly developed categories as they appear.

Ninety-seven sub-headings appear throughout the code as demanded by symptom classification. For example, "A – Infectious Disease" includes the following subheadings: Bacterial, Viral, Venereal, Fungal, Parasitic, and Other. Under these sub-headings fall the various specific diagnoses and symptoms, each with its unique two-digit arabic numeral. The entire listing of Infectious Disease is given in Table 2. The final rubric under each subheading is "Other"; these "Other" rubrics and their code numerals, when extrapolated from the surrounding diagnoses, form a primary expansion of 97, from the original 22 categories.

The secondary expansion is from the 97 sub-headings to the total potential number of diagnoses in all categories – 2,400 including the open categories of X and Y. A tertiary expansion to 3,200 is possible by substituting arabic numerals in the first digit (omitting zero and one to avoid confusion with Q, I, or L) for the alphabetical category designators.

The two-digit numeral allows for 100 diagnoses in each category. Not all of these are assigned, however; unassigned, open numerals are distributed throughout the code to accommodate the anticipated insertion of single rubrics without significantly disturbing the code sequence.

Comment

The acceptance and wide implementation of a uniform hierarchical diagnostic coding system for ambulatory care will be of extreme advantage to family physicians, researchers, educators, students, and related medical and non-medical personnel. The use of such a code will make accurate data widely available for comparison in formats varying from private community practice to international research. Toward this end the CR Alpha Diagnostic Coding System was developed and is proposed.*

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*The entire CR Alpha Diagnostic Coding System for ambulatory care is available from the author on request.