
Read Codes: A Tool for Automated Medical Records

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Armed with paper, pencil, will, and wits, a family physician can carefully observe and record the phenomena of daily practice in a systematic manner, fulfilling the role of the clinician/researcher.^{1,2} Even so, the allure of the computer at the physician-patient interface has captured our imagination. For many, automating the medical record has become a challenging endeavor, worthy of vigorous pursuit. Improved records have been associated with improved care, and automated practice databases offer new opportunities for practice-based research. Though limited, progress has been made in the struggle to use the computer in a manner that does more good than harm in family practice. In recognition of the potential usefulness of automated medical records for research, a meeting was convened in Washington, DC, in November 1991, to learn more about Read Codes, a comprehensive medical terming system recently developed in the United Kingdom.

A major impediment to computerization of the medical record in family practice and primary care lies in the richness of information gathered during the history taking and the examination that is not adequately captured by the current classification systems. Some "paperless" medical record systems document this information in the form of free text, but the resulting "data" are clumsy to sort and nearly useless in research activities.

This problem has been addressed by an ambitious project in the United Kingdom.³ Read Codes was developed to establish and maintain computerized patient records, which in turn should improve patient care and facilitate practice-based research. Health care professionals input ordinary language, and the computer helps organize these data using Read Codes. For example, shortness of breath as a symptom becomes 173.., and if dyspnea is the most specific diagnosis that can be made during a visit, it is coded as R0608. An abnormal stan-

dard chest radiograph is 5353., lobar pneumonia is H21.., and ampicillin is TJ004.

The accuracy of data depends in part on information being entered at or near the time at which it is obtained by someone who knows what the data mean, ie, the clinician, the pharmacist, the laboratory technician, or the radiologist.

Provision of accurate medical data through the use of a comprehensive coding system with the precision of Read Codes enhances communication throughout the health care system. The experience with Read Codes in Great Britain indicates that a major benefit is improved communication among health care providers, administrative personnel, and policymakers. The use of Read Codes eliminates much of the ambiguity in medical record systems. In contrast, in the system currently used in the United States, a single diagnosis-related group (DRG) or International Classification of Diseases (ICD) code may be used to document a wide range of diseases.

On November 19, 1991, Dr James Read, director of the National Health Service Centre for Coding and Classification in Loughborough, England, met in Washington with a small group of representatives from academia, the private sector, and various governmental units including the Agency for Health Care Policy and Research, the Veterans Administration, the Indian Health Service, the Health Care Financing Administration, the General Accounting Office, and the Institute of Medicine. Dr Read, a general practitioner, explained Read Codes to the audience, noting that it is actually a "terming system" or computerized medical dictionary that can be used with virtually any classification system, such as the International Classification of Primary Care (ICPC) or the International Classification of Diseases, Ninth Revision (ICD-9). A demonstration of the system as it would be used by a family physician displayed its flexibility, precision, and ease of use.

The British Crown attained ownership of Read Codes on April 1, 1990, and declared it the standard for the National Health Service. Developed in general practice by Dr Read, the codes have been applied in the

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Table 1. Hierarchy of Cardiac Terms in Read Codes System

| Cardiac Terms | Read Code | ICD-9-CM |
|-----------------------------------|-----------|----------|
| Circulatory system disease | G | 390-459 |
| Ischemic heart disease | G3 | 410-414 |
| Acute myocardial infarction | G30 | 410 |
| Other acute myocardial infarction | G30y | 410.8 |
| Acute papillary muscle infarction | G30yl | 410.8 |

United Kingdom by general practitioners in the outpatient setting, and more recently in hospitals and in the various medical specialties.

The key features of the Read Codes system that support these functions are that the codes are comprehensive, hierarchical, computerized, coded, cross-referenced, and dynamic.⁴ The codes are comprehensive in that they cover diseases, occupations, history and symptoms, examinations and signs, diagnostic procedures, imaging, preventive procedures, operative procedures, other therapeutic procedures, and administration. Even drugs and medical devices are incorporated into the system.

Each code has five characters and is hierarchical, with the first character defining a broad class, the second a subclass, and so on. As an example, a hierarchy of cardiac terms is shown in Table 1.

There are a total of 656,356,768 possible codes within the Read Codes framework. Currently approximately 100,000 preferred terms and over 150,000 synonymous terms have been specified.

The structure of the Read Codes system allows a user to interface with a computer using natural language, thanks to an extensive thesaurus of synonyms. The codes give a unique identifier to each medical term they represent, facilitating data compaction and analysis and avoiding ambiguity. Thus, each specialty's nomenclature and idiosyncratic terms are captured without harm or inconvenience to the system as a whole.

The codes are cross-referenced to important classification and coding schemes such as the *Diagnostic and Statistical Manual of Mental Disorders—Third Edition—Revised* (DSM III-R), the International Classification of Health Problems in Primary Care-2 (ICHPPC-2), the International Classification for Primary Care (ICPC), and the International Classification of Diseases-9 (ICD-

9). Mapping to other systems is underway, for example, Current Procedural Terminology (CPT-4) and International Classification of Diseases-10 (ICD-10).

The system is dynamic in that users may, and frequently do, suggest additions to and modifications of the codes. As noted previously, specialty societies are in the midst of providing their particular terms to the Centre in Loughborough for incorporation into the system. The Centre maintains the integrity of the codes while incorporating new terms. Updates are developed and released quarterly.

Of course, the Read Codes system alone does not automate a record, facilitate patient care, or perform practice-based research. Machinery and software are required. In the United Kingdom such systems exist and have been deployed to thousands of general practices. The computer has arrived on the desk of the British general practitioner, and a key developmental step that made it possible was the establishment of Read Codes.

Successful automation of the medical record requires an unambiguous, machine-readable language that captures the relevant information of the primary care clinical encounter. The usefulness of the Read Codes system on this side of the Atlantic is unknown. Read Codes may provide a useful tool to document clinical information in an unambiguous way, and facilitate the development of practice-based primary care research. When the Read Codes system, or other alternatives, are developed and prove to be successful, no one stands to benefit more than family physicians and their patients.

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