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"Code Blue" for Coding Discharge Diagnoses in the Emergency Department

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The need to collect epidemiological data on the causes of morbidity and mortality arose during the plague epidemic in the 16th century and culminated in the London Bills of Mortality [1], the first-ever collection of epidemiological data. Local clerks collected the information concerning births and deaths in the parish and submitted them for weekly publication. As a result of the clerks' lack of medical training, the causes of death recorded were often peculiar or vague, such as "stoppage in the stomach," "twisting of the Guts," "eaten by Lice," "overjoy," and "teeth."

The first attempt to classify diseases systematically, made by François Bossier de Lacroix (1706–1777), was published under the title *Nosologia methodica* [2]. Further methodological attempts to classify diseases were made a century later, and at the end of the 19th century the International Statistical Institute conference in Chicago adopted the Bertillon Classification of Cause of Death (developed by physician and demographer Jacques Bertillon, 1851–1922) as an internationally recognized classification of diseases based on the anatomical site of the disease [3].

In Israel, we use the 9th revision of this original list, ICD-9 (International Classification of Disease), or more accurately the North American version, ICD-9-CM (Clinical Modification). Many western countries have adopted the ICD-10, which the United States will implement in October 2014. The World Health Organization is in the midst of a gargantuan task to publish ICD-11 in 2015.

Further to the need to classify diseases for the sake of collecting epidemiological data, the development of medical computing in the late 20th century raised the need to record data in a usable form, i.e., encoding it by using standard terms taken from a controlled vocabulary. Computerized applications such as order entry, automated decision support, and data aggregation for clinical research require that the data be recorded in a standard manner [4]. The third and most common reason to code medical data is reimbursement. Health organizations such as hospitals and health funds base their transactions on coding of diseases and procedures.

The requirements for a standard vocabulary vary according to the purpose of its use and the domain in which it will be applied. System developers and users frequently claim that they cannot find the standard that meets their needs. As a result, many "standards" have been developed, such as ICD, SNOMED, CPT, WONCA, ICPC, DSM and MeSH [5].

Discharge diagnoses of hospitalized patients in Israel are coded using ICD-9-CM and are reported to the Ministry of Health. During the paper-only era, handwritten discharge letters were sent to the medical records department where medical registrars would read the records and code the discharge diagnoses. Since the introduction of electronic medical records in many hospitals, the physician encodes by selecting the most appropriate diagnosis from a list based on terms taken from the ICD-9-CM. In some hospitals these codes are reviewed by the medical records department and in others they are sent without review to the Ministry of Health.

A few years ago the Israel Ministry of Health mandated that emergency departments register the discharge diagnosis in the patient's file and report it to the Ministry. A "pick list" was created based partially on terms from the ICD-9-CM. Physicians are asked to circle the appropriate diagnosis which is then registered in the hospital information system by secretaries and reported to the Ministry. In some hospitals where clinical information systems are used in the emergency department, the diagnoses are coded by physicians using lists based on the ICD-9-CM, but these are not necessarily compatible with the Ministry's pick lists.

In this issue of *IMAJ*, Limor Aharonson-Daniel et al. [6] examine the quality and accuracy of diagnoses recorded in the emergency department in order to appraise its potential utility in reflecting the population's medical needs. The ultimate goal of their study is that the ED diagnoses database of the Health Ministry be used by the entire medical community to better understand, and hence meet, the public health needs. Towards this end they assessed the quality, accuracy and relevance of data recorded in four EDs in Israel by comparing the diagnoses registered in the Health Ministry database to the physicians' report in the patients' charts. The authors found that only 58% of all visits in 2009 had a recorded ICD diagnosis, of which 14%

ED = emergency department

were coded as "other" (999.9). Therefore, the data retrieved from the Ministry represented only 50% of the population. Furthermore, exploring the coded data raised some concerns about the accuracy of the data. For example, 6% of males and 32% of females with a diagnosis of acute myocardial infarction were discharged from the ED; one would expect 100% hospitalization of patients with acute MI. These findings cast doubt on the usability of the data and their reflection of the public's health. The finding of a relatively high correlation between the registered diagnoses and the chart diagnoses is not comforting since there is a significant variability in coding accuracy between days of the week and between medical specialties [6].

There is no debate about the importance of coding ED discharge diagnoses for public health evaluation. In order to improve health care in Israel the authorities and researchers should study the medical conditions that bring patients to the ED. However, this cannot be achieved by incomplete and inaccurate data, as found by Aharonson-Daniel and co-authors. The coding procedure in Israel desperately needs resuscitation.

What should be done to improve the coding of ED discharge diagnoses? I would suggest two steps. The first is to alert physicians to the importance of writing discharge diagnoses to be reported to the Health Ministry and to educate them to write them appropriately. Physicians should understand the purpose of this information and why it is critical to be accurate and specific when writing a diagnosis. For example, they should understand that using "other" as a diagnosis is worthless, and that writing a symptom as the first diagnosis is inappropriate if they know what caused it. Next, we need to provide physicians with the optimal conditions for writing the most appropriate diagnosis. The authors investigated the use of pick lists and concluded that it is a good system for facilities that use paper charts. As we move to using the electronic medical record in emergency departments, we must enable physicians to enter the most appropriate diagnoses into this system. Physicians are not coding experts and they make many errors in coding, but they do know how to write a diagnosis. It follows that a basic requirement for finding the most appropriate diagnosis from a list of representative diagnoses is a user-friendly language that they recognize. ICD-9 is not the ideal coding system for that purpose. We need to move to a more physician-friendly system such as SNOMED-CT (Systematized Nomenclature of Medicine – Clinical Terms), as already decided by the Health Ministry [7] but not yet implemented. I urge the Health Ministry to execute its decision to implement SNOMED-CT in the health system. The diagnoses entered by physicians should then be automatically translated into ICD-10-CM terms using mapping tables that are available internationally and reported to the Health Ministry.

I posit that only a reform such as this will enable the authors to achieve their goal of improving community health care by analyzing ED data. If not, we are not that far from the vague London Bills of Mortality.

MI = myocardial infarction

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