



## Improving the quality of clinical coding: a comprehensive audit model

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### ABSTRACT

**Introduction:** The review of medical records with the aim of assessing the quality of codes has long been conducted in different countries. Auditing medical coding, as an instructive approach, could help to review the quality of codes objectively using defined attributes, and this in turn would lead to improvement of the quality of codes.

**Method:** The current study aimed to present a model for auditing the quality of clinical codes. The audit model was formed after reviewing other audit models, considering their strengths and weaknesses. A clear definition was presented for each quality attribute and more detailed criteria were then set for assessing the quality of codes.

**Results:** The audit tool (based on the quality attributes included legibility, relevancy, completeness, accuracy, definition and timeliness); led to development of an audit model for assessing the quality of medical coding. Delphi technique was then used to reassure the validity of the model.

**Conclusion:** The inclusive audit model designed could provide a reliable and valid basis for assessing the quality of codes considering more quality attributes and their clear definition. The inter-observer check suggested in the method of auditing is of particular importance to reassure the reliability of coding.

**Keywords:** Quality, Clinical codes, Audit model, Audit tool, Data quality attributes

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### Introduction

In many countries, administrators are moved by poor health information documentation. This problem is related not only to the quality of health record documentation but also to the collection of health care statistics at all levels, from the largest hospitals to the smallest clinics or aid posts (1-4). As to the impact of information quality on quality of care, Rigby believes that "good records are at the heart of professional practice". Moreover, good healthcare delivery, best use of healthcare resources, and delivery of a cohesive health care service that satisfies an increasingly demanding population can be achieved only with good communications and a shared clinical perception of a patient's problems and needs. Accurate, timely, and accessible health care data play a vital role in planning, development and maintenance of health care services (5, 6)."

Historically, health care enterprises have placed little emphasis on developing processes and assigning responsibility for data quality on an enterprise-wide level.

In other words, data quality has fallen through the cracks in most organizations. In today's environment, however, quality data can make a difference in obtaining a strategic or business advantage in the marketplace. It is imperative that health care enterprises recognize the business advantage of quality data and develop process, policies, and procedures to protect their value (7, 8).

Quality improvement and the timely dissemination of quality data are essential and maintained for the present and future care of the patient regardless of the level at which the service is provided. The quality of that data is crucial, not only for use in patient care, but also for monitoring the performance of health service and employees. Data collected and presented must be accurate, complete, reliable, legible and accessible to authorized users if they are to meet the requirements of the patient, doctor and other health professionals, the health care facility, legal authorities, province and national government health authorities.

Accurate and reliable health care data are needed for: The continual future care of patients at all levels of health

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care.

- \* Medico-legal purposes for the patient, doctor and health care services.

- \* Accurate and reliable information about diseases treated and surgical procedures performed in a hospital and within a community, as well as immunization and screening programs, including the number and type of participants.

- \* Clinical and health service research and outcomes of health care intervention, if required.

- \* Accurate, reliable and complete statistical information about the uses of health care services within a community.

- \* Teaching health care professionals; and

- \* Working out staffing requirements and planning health care services (9).

If quality attributes are not inherent in data when they are entered into, and manipulated by, the system, then bigger, faster, and more complex only means more and faster garbage production and distribution among a larger number of audience. Data quality has many more dimensions than “correctness” of data. Data with inherent quality are those that are comprehensive, current, relevant, accurate, complete, timely, and appropriate (7).

A key task of Health Information Management (HIM) departments is coding, i.e classification of health care information using available standard classification and nomenclature systems. Coding facilitates information retrieval to meet educational, clinical and research purposes (10). The main aim of coding is to provide accurate, consistent, and concise representation of information related to patients’ conditions and the services delivered to them (11-13). Therefore, the quality of codes assigned to clinical data is of particular importance wherever care has been provided (14). From this perspective, producing and maintaining high quality data could be regarded as part of routine practices of healthcare settings (15) which could help healthcare settings to improve the quality of services, to reassure equitable healthcare reimbursement, and to allow high quality research to be conducted (16). The audit of clinical coding, hence, has a key role in achieving the aforementioned objectives. In addition, undertaking coding audit on a regular basis could provide valuable information for continuous quality improvement programs and could support Payment by Results (17) through comparing what is clinically documented in the medical record with what is coded (18). An active audit program reinforces the facility’s ability to produce accurate and complete medical coding data sets from medical record (17). Having an on-going audit program in place highlights problem areas and provides necessary information and tools to reassure high quality data are produced (19). Different healthcare settings could have their own coding quality review and reporting program. The majority of the programs aim to improve the quality of codes by improving the accuracy of codes (20). However, a well-planned coding audit program would be expected to include more quality attributes rather than being limited to certain attributes such as accuracy.

The reviewed literature indicated that the majority of research conducted on auditing the quality of coding has

only focused on two or three attributes of data quality. In addition, in previous research, the definition of attributes studied was not always clear enough and this appeared to influence the objectivity of the research. The researchers, therefore, decided to present a comprehensive and credible audit model for quality of clinical codes through studying standard audit models in the world.

The current study aimed to present a model for auditing the quality of clinical codes. The focus of the review was on similarities and differences as well as the strengths and weaknesses of the audit tools and methods.

## **Methods**

This study was initially shaped based on reviewing the attributes of data quality and methods used for auditing clinical codes in other countries. The focus of the review was on similarities and differences as well as the strengths and weaknesses of the audit tools and methods. Based on the review, a clear definition was provided for each attribute, and detailed criteria were developed based on the definitions to yield the attributes objectivity. A set of criteria led to forming a tool for auditing codes. In addition, a method was suggested for applying the tool based on reviewing the existing audit methods. The tool, together with the method suggested for undertaking the audit, led to proposing a new model for clinical coding audit. At the next step, Delphi technique was used to check the validity of the model by taking the opinions of fifteen participants into consideration. The participants were 15 clinical coders who had more than ten years of experience in coding and were involved in academic teaching of clinical coding. They were regarded as ‘Health Information Management (HIM) experts’ in the current study. As the main diagnosis has priority over other diagnoses in clinical terms, the model was developed considering the main diagnosis, though it would also be used for auditing other diagnoses.

## **Results**

This section presents the proposed ‘audit model’ including the ‘audit tool’ and the ‘audit method’.

### **Audit tool**

The ‘audit tool’ is a checklist composed of a number of attributes for auditing the quality of codes (Table 1). The attributes included in the checklist are “accuracy, completeness, relevancy, timeliness, definition, and legibility” which were taken from previous research conducted on data quality attributes entitled “the systemic-biologic data quality model” (21, 22). Among these, the first five attributes are related to ‘data content’. The sixth one, i.e. ‘legibility’ is of particular importance reflecting the ‘data representation format’. To audit the clinical codes, there should be clear definitions for attributes. Accuracy indicates that data should be correct, right, and consistent (7, 9, 21-24). Completeness refers to the point that data should be present and comprehensive (1, 7, 9, 10, 21-23, 25). Relevancy, as another attribute, is related to usability and usefulness of data as well as the data fitness for the purpose (7, 21, 22, 25, 26). Timeliness indicates that data should be timely and current (1, 7, 9, 21-24). Definition presents that data should be valid, precise, understandable

and have clear and unique meaning (8, 21, 22, 25, 27, 28). Data representation format, by definition, is the format by which data are presented to the end user (7). In other words, this attribute indicates the body or corpus of data (21, 22).

In the current study, to measure a given attribute, a number of questions were developed for that attribute with 'yes' and 'no' choices. The questions, in other words, were considered as the 'audit criteria' for auditing codes. On this basis, the tool was formed with a total of 18 criteria (2 criteria for legibility, 2 for relevancy, 5 for completeness, 6 for accuracy, 2 for definition and 1 for timeliness).

#### Audit Methodology

The proposed audit method consists of a number of activities explained below:

1-1. A sample of records selected randomly is given to a well-experienced and expert coder (coder B). The coder B will code patient records without prior knowledge of codes assigned by the primary coder (coder A). The sample size depends on the hospital activity rate, as the higher activity rate will lead to a bigger sample size. The sample size should include at least 5% of the hospital overall activity.

1-2. An encoding system could be used for checking the validity of codes if such a system is available in a setting.

1) The auditor compares the primary codes with those re-assigned by coder B to determine if there is a discrepancy.

primary and re-assigned codes to determine which one is correct.

4) In case the primary codes were considered as incorrect, the type of the error should be determined according to designed audit tool.

5) After analysis of the findings, the final report is presented in the designed discrepancy analysis tables.

Giving feedback to coders is essential, and further coding training should be planned where appropriate.

The findings, as presented in Table 1, showed that all of the experts agreed with most of the quality attributes of codes. However, a limited number of experts (N=2, %13.33) disagreed with the attribute of 'definition' assuming that 'accuracy' covers the concept of 'definition'. It is important to note an aspect of definition is uniqueness. If diagnoses and procedures are defined precisely, the definitions will be unique as well as the codes. Therefore, the attribute of definition should be considered as one different from accuracy.

Table 2 presents the findings related to the experts' views about the proposed model. It was found that the majority of experts (N=13, %86.66) agreed with the criteria set for measuring the attributes, and all of them were in support of the audit method suggested in the model.

**Table 1.** Experts' opinions on quality attributes of codes

Quality attributes of codes	Agree		Disagree	
	Number	Percent	Number	Percent
Legibility	15	100	-	-
Relevancy	15	100	-	-
Completeness	15	100	-	-
Accuracy	15	100	-	-
Definition	13	86.66	2	13.33
Timeliness	15	100	-	-

**Table 2.** Experts' opinions on the proposed audit model

Audit model of quality of clinical codes			Agree		Disagree	
			Number	Percent	Number	Percent
Audit tool	Audit Criteria	Legibility	15	100	-	-
		Relevancy	15	100	-	-
		Completeness	15	100	-	-
		Accuracy	15	100	-	-
		Definition	13	86.66	2	13.33
		Timeliness	15	100	-	-
Audit method			15	100	-	-

2) The lack of discrepancy between codes in a record will result in the record not being considered for further audit.

3) In case of a discrepancy in codes, an independent reviewer (coder C) will be invited to review both the

#### Discussion

The audit of clinical codes designed to medical (health) records has been the focus of different studies reporting some attributes of code quality and the overlap among the attributes (21, 22).

The recent study demonstrated that the studies conducted on auditing quality of clinical codes have not been clear and descriptive enough about the attributes under the study.

In the research by Misset et al (2008), for example, only one attribute of code quality, i.e. reliability, was taken into consideration, but without presenting a clear definition of this attribute (29). This issue, in turn, seemed to influence the objectivity of the research. In another study, the audit of clinical codes was undertaken only by assessing the accuracy of the codes (30). The use of one attribute, and not including other attributes, cannot reflect a broad and in-depth approach for auditing clinical codes. Similarly, other researchers focused only on accuracy of clinical codes (31); however, the criteria set for measuring the accuracy of codes included those used for assessing the completeness. The literature considers 'accuracy' and 'completeness' as two different types of attributes (21, 22). In the research conducted by Jordan et al (2004), the attributes under the study included accuracy and completeness of morbidity codes, and clear definitions and criteria were used for these attributes (32). However, other studies have assessed the quality of clinical codes without introducing the attributes used for measuring quality (33-35). In the current study, a broad range of attributes were suggested for assessing the quality of codes. These included 'legibility, relevancy, completeness, accuracy, definition and timeliness'. A clear definition was provided for each of the six mentioned attributes and clear criteria were then set for either of them. This approach could help us provide a more accurate and robust approach for auditing the quality of clinical codes.

The clarity and objectivity of the method used for auditing clinical codes is of particular importance. In the studies reported above (29-31, 33), the audit of codes was conducted by the researchers themselves, as auditors, and based on their knowledge and experience. In one of the studies reported above (33), although the attributes under the study were not reported, the audit of codes was undertaken by coders different from the researchers. Therefore, there appears to be objectivity problem with the method(s) used in some studies (29-31) as the audit of codes, as the current study suggests, in its best form should be conducted by different well-experienced coders, in particular in case of code discrepancies, to improve auditing the clinical codes.

#### Key messages

- The quality of clinical codes should be placed at the center of attention because of the pivotal role of the codes in reflecting the health care services provided
- The audit of clinical codes is necessary to reassure the quality of clinical codes
- Health care settings should put adequate mechanisms in place to reassure that the quality of clinical codes is assessed accurately
- The audit of clinical codes requires appropriate tool and method to assess different aspects of code quality

#### Conclusion

The insufficiencies and the lack of objectivity with the previous models used for auditing clinical codes necessitated the development of a model consisting of a

tool and a method for assessing the quality of codes. The existing models are not comprehensive and clear enough with respect to criteria used; hence, these appear to be more subjective. The current study led to creating a tool composed of a variety of criteria reflecting the quality attributes of codes. This feature together with the multi-step method proposed could help us to depict a broader and clearer picture of quality of codes. The suggested model could lead to developing a further insight into auditing clinical codes for auditors.

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