Just-in-Time Coding of the Problem List in a Clinical Environment
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Clinically useful problem lists are essential to the CPR. Providing a terminology that is standardized and understood by all clinicians is a major challenge. UNMC has developed a lexicon to support their problem list. Using a just-in-time coding strategy, the lexicon is maintained and extended prospectively in a dynamic clinical environment. The terms in the lexicon are mapped to ICD-9-CM, NANDA, and SNOMED International classification schemes. Currently, the lexicon contains 12,000 terms. This process of development and maintenance of the lexicon is described.

INTRODUCTION

The challenge of having a problem list within the computer-based patient record (CPR) is having it be clinically useful, yet coded so that the problems can be used for other purposes, i.e. billing, clinical decision support, performance improvement, and research. The terminology must be in the language that the clinician understands and finds useful. The major difficulty with most standardized terminologies and classifications is that the terms are so standardized they are viewed as awkward by the clinician and, therefore, not used. The secondary users of the terms must then expend resources to code the natural language of the clinician for their purposes. This coding step occurs after the patient’s clinical experience is over. The development of a lexicon, containing pre-coordinated terms and synonyms, is one way to meet this challenge. This lexicon must be responsive to the changing needs of the clinician. Therefore, a just-in-time coding strategy has been developed to meet this need in a dynamic clinical environment. Just-in-time coding of a term new to the problem list lexicon occurs within one week of a clinician placing the new non-coded term on a patient’s problem list.

The Institute of Medicine’s (IOM) report on the CPR recommends that the CPR contain a problem list that specifies the patient’s clinical problems and the status of each.¹² In September, 1997, University of Nebraska Medical Center (UNMC) implemented a multidisciplinary patient problem list that met the requirements of IOM recommendation. A following vision was developed to guide the ongoing development of the problem list: “The patient problem list is an historical compilation of the physical, psychosocial, spiritual, and cultural problems that the Care Team uses to communicate and coordinate the clinical decision making and patient care processes; the problem list tracks the care process rationale over time.” The problem list was designed to function (1) to capture and communicate all views and needs of the patient, (2) to be the organizer of the patient’s plan of care, and (3) to be used in both inpatient and outpatient settings.

A critical factor to the success of the problem list is the development and maintenance of a standardized and coded vocabulary or clinical lexicon that serves the needs of each discipline and reveals their contributions to patient care. As the problem list is used, clinicians request that new terms be added to this lexicon. Addition of new terms and their coding into appropriate classifications requires a clinically-focused review team and a clinical coder. It is the prompt response, within one week (the UNMC standard), of this team that ensures a comprehensive, non-redundant lexicon and clinician satisfaction. This paper describes the UNMC experience of providing this responsiveness and support for clinical data and care coordination with a just-in-time coding strategy for the problem list.

REVIEW OF THE LITERATURE

Clinicians have been using words, terms, and clinical vocabularies since the modern patient record began. Patient care has been documented using prose progress notes, formatted flowsheets, and standardized forms. Each health care discipline taught the student about the “correct” vocabulary to use in the process of documenting the identification of a patient problem, goals for treatment, interventions or therapies to use, and patient responses to treatment. As long as a paper record was kept, the use of the clinician’s natural language and its rich dialects was not a problem. Most clinicians have learned to translate freely between the clinical languages learned in school and their personal documentation language. The advent of the CPR has fundamentally changed this practice.
standardized vocabularies are needed to support the entry of clinical data, clarify or translate term meanings and enhance communication between clinicians. Coded terminologies are needed by the computer databases in order to store and retrieve data. As standardization of terminologies occurs, the richness of the natural clinical language decreases and the documenting habits of the clinicians is changed. Clinicians do not cope well with loss and forced habit changes. Therefore, they do not use the current health care classifications.

The IOM recommended that a problem list be used to organize the patient record and identified three advantages to this approach. First, the probability of the team caring for and following-up on all the identified problems is greater if the problem list is maintained as a separate component of the record. The problem list is a central place for clinicians to obtain a concise view of all patient problems. Second, the problem list facilitates relating other information in the record to a specific patient problem. With the pressure of managed care, it becomes extremely important to be able to identify the structures and processes that generate patient outcomes for a specific problem or condition. Third, as a part of a problem oriented medical record, the problem list reveals an orderly process of clinical problem solving and/or clinical judgment. Weed has always believed that this format would greatly enhance a clinician's ability to improve clinical judgment and thereby improve patient outcomes. The IOM concludes that, "patient records should guide and reflect clinical problem solving and that the mere translation of current record formats, data, and habits from paper to computer-based systems will not alone produce the range of improvements in care potentially achievable in a truly reformed patient record system." An easily reviewed and updated problem list is seen as a cornerstone of the IOM's vision. The research reported in this paper is an effort to develop, design, and evaluate a problem list strategy that will meet the IOM criteria.

The Computer-based Patient Record Institute (CPRl) supported two studies that evaluated the ability of major classification systems to capture the clinical content of the patient record. The major finding in both studies was that the common diagnostic classification system (ICD-9-CM, ICD-10) used for clinical reporting were not rich enough to document the preciseness that clinical problem solving required. Richer nomenclatures, such as SNOMED International and the Read Clinical Codes, were needed (see these articles for an in depth description of the classifications evaluated and review by Cimino of coding systems in health care). Even these rich nomenclatures need more terms to adequately describe the patient conditions that health care specialists require during their practice. Cohn and Chute and Payne and Martin have described two major efforts by three clinical organizations to meet this challenge.

The Health Insurance Portability and Accountability Act of 1996 requires the use of standards in health care. The National Committee on Vital and Health Statistics (NCVHS) was charged with making recommendations for standardizing specific health data to meet this federal requirement. Forty-two core health data elements were recommended, including diagnoses and functional status data. These two elements can best be captured and used by clinicians to guide care if they are included in the problem list. Other efforts to identify core data elements, including components of a problem list, have occurred in multidisciplinary clinical environments. Functional status data has not been placed on problem lists because this was usually a clinical judgment made by the clinician. With the advent of managed care and patient outcomes reporting, the need to standardize functional status reporting has developed. Henry et al have made recommendations for using health care classification systems and standardized health status measurement tools to meet this need. Using their approach, health status or functional status can be placed on the patient's problem list. UNMC has directed that any condition that affects the planning of care for the patient is placed on the problem list.

METHODS

A clinical lexicon supports the problem list by providing the terminology for this data element. The lexicon was developed by a small clinician group within the problem list implementation team. The terms of the lexicon were taken from previous clinical and billing documents and existing patient records. Nursing terms were obtained from the standards of care from each nursing unit. Focus groups with medical specialists, clinical nurse specialists, social workers, psychologists, physical therapists, occupational therapists, respiratory therapists, rehabilitation specialists, dieticians, and pastoral care were conducted to gather other terms that were clinically useful to add to the lexicon. Clinical terms and their appropriate synonyms (local language of the clinicians) were included for all health care disciplines. After duplicates were eliminated, this comprehensive list was reviewed by a multidisciplinary
panel to ensure that the terms were understandable by all clinicians—jargon was eliminated. The terms in the lexicon were then mapped to appropriate clinical code sets and classifications, i.e. ICD-9-CM, SNOMED International, and NANDA. These coding schemes/classifications were chosen for the capacity to support clinical care, decision support, and billing requirements. The coded problem list provides support for clinical and billing decision tools and for integration of the clinical work flow.

Upon completion and functional testing of the initial lexicon, composed of 11,200 problem labels, a vocabulary and coding team, comprised of five clinicians and a clinical coding expert, was established to maintain and extend the clinical lexicon. The clinical coder, employed at 0.5 FTE for this project, reviews unlisted (not in the lexicon) problems and codes these terms in order to meet the needs of the clinicians. Before the coder adds these new terms to the lexicon, the terms and codes are reviewed by the appropriate clinician from the vocabulary and coding team. This review and approval process requires about two hours a month of the clinician’s time. The coder also participates on the problem list implementation team.

The clinical coder works closely with unit clerks, billing clerks, and clinicians to educate them about code use and selection. She assists with problem solving and work flow analysis concerning the finding of the problem on the problem list entry screen (both inpatient and outpatient) and the appropriate diagnostic code on the outpatient billing screen. As a resource to the clinicians and clerks, the coder is available by e-mail, phone, and appointment to assist in any problem with the coding of the patient’s problems. Her availability and willingness to help the user of the problem list has lead to high levels of satisfaction, especially in terms of responsiveness to clinician needs. This service is called just-in-time coding and is responsible for making the problem list a dynamic and prospective process for identifying patient problems.

The process of just-in-time coding is depicted in Figure 1. First, once a week a list of the previous week’s unlisted problems is sent to the clinical coder’s printer from the CPR. The coder receives the following information about each unlisted problem: clinician name, patient name, medical registration number, the unlisted or free-texted problem, date entered, and zip code of the clinician. Next the CPR database table that supports the problem list entry function is searched for the unlisted problem. If it is found, an e-mail is sent to the clinician informing him/her of the findings and the unlisted problem is appropriately coded in the patient’s record. If the problem is not found, the coder uses two software packages to search for the code of the new term: WinCoder and SnoCode. The terms and codes are placed in a database and sent electronically to the appropriate clinician for review and approval. Then the coder enters the new term and code into the problem list database table. Next, the coder returns to the patient records containing the unlisted problems and places the new term and code in each patient record as required. Again, the clinician is informed of the action. The average time to evaluate an unlisted problem, find a code, notify the clinician, and code the patient record is 30 minutes of an expert coder’s time. If a code for the unlisted term cannot be found in any of the three classifications, the term is forwarded to the Vocabulary Team for action. The team reviews the use of the term and tries to map the concept to one of the classifications. If no match is found, an internal code is created for the lexicon table and the term is forwarded to the appropriate classification developers for consideration.

RESULTS

The problem list was implemented the third week of September, 1997. During this first week, 2600 problems were entered. An average of 4300 problems per week have been entered by clinicians and clerks since implementation six months ago. A total of 107,400 problems have been entered during the entire six months. The number of problems entered each month has remained fairly constant at an average of 18,000 (see Table 1). Prior to the implementation of the problem list, several clinics had problem lists within a COSTAR database. From this database, 53,300 patients had problem list data. This data was converted to the new CPR, for a total of 205,900 patient problems when the problem list function began. There have been 84,110 patient records with problem list activity since the implementation of the problem list.

Since implementation, 1280 unlisted problems have been entered by clinicians and coded using the just-in-time coding process. During the first week of the problem list, 39 unlisted problems were entered by clinicians and clerks. The second month, as clinicians gained more confidence and competence in using the problem list, 470 unlisted problems were entered. This number steadily decreased over the next three months.
to become 130 unlisted problems during in the sixth month (see Table 2). The problem list lexicon contained 11,200 terms at implementation time. Six months after implementation, the problem list lexicon contains 12,000 terms. At the end of each year the lexicon will be examined for term usage. If a term is not used, the vocabulary and coding team will decide whether or not the term should remain within the lexicon. The process and procedures for this review will be developed at the end of our first year. Feedback concerning the ongoing development and revision of the lexicon will be given to the clinicians and the secondary users of that data. Over time, the just-in-time coding strategy is creating a more robust and comprehensive problem list lexicon that meets the unique needs of our patients, clinicians, and organization.

Table 2: Monthly Incidence of "Unlisted Problems"

<table>
<thead>
<tr>
<th>Month</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep 22-23</td>
<td>0</td>
</tr>
<tr>
<td>Oct</td>
<td>50</td>
</tr>
<tr>
<td>Nov</td>
<td>200</td>
</tr>
<tr>
<td>Dec</td>
<td>400</td>
</tr>
<tr>
<td>Jan</td>
<td>300</td>
</tr>
<tr>
<td>Feb</td>
<td>200</td>
</tr>
<tr>
<td>Mar 1-14</td>
<td>100</td>
</tr>
</tbody>
</table>

DISCUSSION

The just-in-time coding strategy for the problem list has been successful for UNMC. The clinicians have been satisfied with the selection of terms and their involvement in creating the lexicon. The responsiveness of the clinical coder to answer questions, solve problems, add coded terms, and code the unlisted problems has helped to create this satisfaction. The review of an experienced clinician of the proposed new term and code has ensured clinical and data accuracy and integrity. While the growth of the lexicon was initially high, this has decreased to a manageable level for this type of strategy. The problem list use statistics have remained relatively stable over the six months. It is anticipated that this activity may increase as the value of the problem list becomes known. Future evaluation studies of the nature, accuracy and completeness of the problem list are being planned. The process of just-in-time coding has become a smooth process for the coder and the clinician reviewers.

Meeting the needs of the secondary users of the problem list is currently being evaluated. Secondary uses of the list are financial reporting and billing, clinical decision support, outcomes management and research, clinical trial recruitment, and performance improvement activities. The problem list can facilitate the determination of volume and type of patient problems encountered in the organization so that resources can be allocated appropriately. In the future, it is anticipated that third party payers will want all treatment orders tied to specific diagnoses and problems before reimbursement is given. The problem list will be the major tool to accomplish this electronically. Just-in-time clinical coding is an essential strategy to ensure the success of a problem list within a dynamic clinical environment.

References

4. Warren JJ, Delaney C, Ryan P. Health care reform

Figure 1: Coding Unlisted Problems

Clinicians using the problem list find they are unable to find a problem term

Unlisted problems are recorded and a printout of the unlisted problems is presented to the coder.

Yes

Use the program WinCoder to lookup the code in ICD-9-CM

No

Email the clinician with coded problem

Add the correct code to the applicable patient records

Yes

Listed in ICD-9-CM

No

Create a Problem List Code and forward to clinician reviewer for review

Add to Problem List Table

Return to each applicable patient record and add the new code

Notify Clinician of addition of the new term and code

End Process

Enter SnOCode to find if coded in SNOMED

Coded in SNOMED

No

Look for Code in NANDA

Coded in NANDA

No

Submit to Vocabulary Team for Action

New Code

New Code Generated

New Code