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ASIA EDITION

# Medical coding needs better documentation technology

August 29, 2013 | Opinion | By BioSpectrum Bureau



m-model

In most US healthcare information technology (HIT) environments, the speed and accuracy of medical coding relies heavily on the narrative that a physician details during a patient consultation. However, the nation's transition from the ICD-9 to the robust ICD-10 coding system will pose new challenges for capturing this specificity. The complexity of this transition to ICD-10 has to do with the significant increase in the number and specificity of codes; there are 69,000 diagnostic codes in ICD-10 compared to 14,000 in ICD-9.

Take a specific diagnosis for example: the single ICD-9 code for "closed fractured femur," or thigh bone, translates to 36 distinct ICD-10 codes that describe details regarding the precise nature of fracture, which thigh was fractured, whether a delay in healing occurred, etc. Clinical documentation seems like it would naturally increase and in fact, the American Association of Professional Coders predicts this will lead to a 10-20 percent increase in documentation activities.

Natural language understanding (NLU) can help the healthcare industry meet this challenge and ensure that a patient's comprehensive clinical documentation captures the level of specificity needed for proper reimbursement. NLU is an advanced language querying technology that focuses on syntax, semantics and pragmatics (context contributing to meaning) to improve how structured data, free text and system data are understood and coded. So for instance, if we notice a radiology report has captured that the chest x-ray shows pleural effusion, and the physician has documented congestive heart failure (CHF), we may suggest or ask him if the condition the patient has is an acute exacerbation of CHF. As such, it can help identify holes

and missing pieces in a physician narrative, or identify where there appears to be inaccurate information. When something is coded correctly, it is reimbursed correctly and keeps all major healthcare stakeholders happy. However, many doctors are unaware of what information is necessary downstream for proper coding and billing which leads to great inefficiencies.

NLU is getting wide-spread attention these days, and includes a range of techniques that go from rule-based systems to supervised machine learning solutions to unsupervised approaches to deep learning systems. As such, there are a number of vendors who work with similar techniques and approaches.

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Under the current model though, NLU is commonly used as a back-end coder's tool. Physicians are thus not notified about missing information for days after seeing the patient, enough time for them to see over a hundred more patients. By bringing that technology up to the beginning of the clinical documentation process - front-end NLU - the healthcare industry could remedy the delayed notification problem. M*Modal's front-end NLU provides physicians immediate feedback regarding holes and areas of missing information during the original input stage. It is this closed-loop structure that allows electronic health record (EHR) systems to constantly monitor patient information and reduce the risk of potential inaccuracies or deficiencies. Back-end workers such as coders and CDI specialists are also included in the loop concurrently to fine-tune their workflow, save time and deliver more accurate results. Ultimately, accurate documentation leads to better revenue-cycle operations and finally, better care.

What is unique about M*Modal's NLU technology is that it builds on a flexible infrastructure that allows users to mature the solutions in tandem with new technology/research advances. At its core, we support an open UIMA framework that allows us to customize and utilize various use-case specific NLU pipelines. The framework is extensible at its foundational layer. In addition, the system supports a custom annotation framework that is available for use by our partners, to create gold standards, closed-loop feedback rules, training and testing data sets and other annotations to continuously improve the markup. Leaving the infrastructure open for partners to customize the NLU-pipeline with their own custom approaches makes it practical to quickly bring value to our customers, based on their needs and use cases.

Today's healthcare landscape is undergoing massive transformation. Healthcare organizations are rapidly trying to adopt a variety of information technology solution in response to legal and environmental changes, all of which are constantly being reshaped and redefined. Failure to act puts healthcare organizations at greater risk. Technology solutions that address the core challenges of capturing and creating accurate, detailed and high quality clinical documentation must be part of any healthcare organization's strategy.

M*Modal's flexible, customizable infrastructure supports more than closed-loop clinical documentation - it provides the core solution framework to face the informatics challenges of today and tomorrow, without disrupting today's clinical documentation workflows.

In HIT environments, the speed and accuracy of back-end functions like coding and billing are often predicated on the quality of patient narratives captured in the front-end by physicians. Many providers see the best opportunities for CDI in front-end processes, since doctors often do not know what information may be required downstream.

1) NLU technology can be used to uncover critical patient information in electronic health records for more accurate coding. By moving beyond mere recognition, NLU can identify missing pieces in the patient narrative, or can it extrapolate information within the EHR. This can create a fuller, richer patient narrative. It also can help to identify where there are holes in the narrative, or where there appears to be inaccurate information.

2) Also, NLU can be used in real-time physician prompting, as a viable (and cost-effective) way to improve workflow, speed and clinical documentation quality. This can be done by moving NLU to the front-end, real-time prompting can inform physicians of missing details as they are entering the patient's information. Many current workflow systems have NLU in the back-end. With this model, coders will inform physicians about missing information days after seeing the patient.

In this new workflow model (front-end NLU), physicians are not just providing input, but receive direct, immediately feedback from the system. NLU analysis and synthesizes evidence from all of the patient record to determine what additional information or specificity in the patient narrative the physician needs to provide. With this closed-loop structure, EHR systems can constantly monitor the information being provided and prompt physicians to reduce potential inaccuracies or deficiencies. In essence, one facilitates a virtual coding assistant who shepherds the physician through the complex ICD-10 transition. In addition, coders and CDI specialists are included in the loop concurrently to fine-tune their workflow, save time, and deliver

more accurate results. The result is more accurate documentation, leading to better revenue-cycle operations and ultimately, better care.

In most HIT environments, the speed and accuracy of coding rely on the narrative that the physician details. However, with the increased specificity of ICD-10, HIT needs to meet the challenge of capturing this specificity. In order to do so, NLU can be used to determine missing pieces in the patient narrative. Currently, NLU is commonly used at the back-end of the coding process. However, by moving NLU to the front-end, the re-defined workflow will ultimately save facilities valuable time and resources. To ensure that the physicians are not prompted for unnecessary details, the NLU not only processes the current context, but is also aware of what exists in the patient chart. Therefore, it will only prompt physicians, when the detail needed is not already specified by some other member of the care giver team. With this change, physicians can receive relevant real-time prompts for missing details as they are entering the patient data. With NLU in the back-end, days after he has seen the patient, a coder will inform a physician that details are missing. By moving NLU to the front-end, physicians can get this feedback immediately, leading to better clinical documentation, as there are fewer inaccuracies and deficiencies. In addition, coders and CDI specialists are included in the loop concurrently to fine-tune their workflow, save time and deliver more accurate results. Ultimately, accurate documentation leads to better revenue-cycle operations and finally, better care.

**Benefits**

Fundamentally, the complexity of the transition to ICD-10 has to do with the increase of the number and specificity of codes. There are 69,000 diagnostic codes in ICD-10 compared to 14,000 in ICD-9. The American Association of Professional Coders predicts a 10-20 percent increase in documentation activities. Ultimately, reimbursement challenges related to ICD-10 are fundamentally clinical documentation challenges. In HIT environments, the speed and accuracy of back-end functions like coding and billing are often predicated on the quality of patient narratives captured in the front-end by physicians. NLU technology can be used to uncover critical patient information, which can lead to more accurate coding. Furthermore, many doctors are unaware of what information is necessary downstream for proper coding and billing, but by moving NLU to front-end processes, doctors are given real-time feedback as documentation is created. In this new workflow system, physicians are no longer just supplying input, but are actively given direct and immediate feedback, which reduces inaccuracies and deficiencies. This new approach represents the future of CDI, allowing HIM managers to protect productivity and cost effective care from the coming tide of ICD-10.