Efficient Translation of EHR Free-Text Data to Coded Data PRN

Chad M. Hodge, MS[1, 2], Trilok Prithvi, MS[1, 2], Naveen Maram, MD[1], Kathryn G. Kuttler, PhD[1], Scott P. Narus, PhD[1, 2]
[1]Intermountain Healthcare, Salt Lake City, UT; [2] University of Utah, Salt Lake City, UT

Abstract
When developing a new clinical system, Intermountain Healthcare (IH) recognized an opportunity to try new means of improving and maintaining the underlying terminology. Implementing the new process and tool has increased clinician engagement, reduced uncoded patient data, and helped meet Meaningful Use goals.

Introduction
Intermountain Healthcare (IH) works with clinicians prior to implementation of vocabularies to define, pre-coordinate, and load only the concepts and representations that are clinically useful. Post-implementation, clinicians require new content, and request synonyms for existing content, allowing for efficient searching. When terminology is incomplete, clinicians revert to adding patient data as free-text rather than as coded concepts. Current processes for handling free-text data requests are ad-hoc, and entail many months of effort. This can leave clinicians disengaged from content governance, and patient data remains uncoded and thus unavailable to decision support. To address these issues, IH developed a new terminology feedback process to engage clinicians. Novel and efficient mechanisms were developed to identify gaps and allow clinicians to interactively review and approve recommended content in the context of patient care.

Methods
During a six-month period, hospitalists, providers at seven NICUs and one STICU, and TeleHealth services had access to the new feedback tool, made available initially through our EMR's problem management module. When clinicians added a free-text problem, a structured request was automatically routed to the terminology work queue. Clinical modeling engineers (CME) then inspected the free-text term, and searched for and evaluated matches for the term in the existing dictionary to determine if the term was misspelled, an acronym, a synonym, or missing. CMEs then added the new content or created mappings between the synonym/acronym and root concept, ensuring future searches return proper results. CMEs then created a list of candidate substitutions for the clinician's free-text problem, and sent that list back to the application for review by the clinician. The next time a clinician opened the same patient's problem list, the application presented the clinician with the substitution candidates for the free-text problem (Figure 1). The original free-text was viewed alongside the list of candidates. The clinician could select a single choice to serve as the replacement for the free-text problem, or could alternatively choose to reject all provided choices with an accompanying reason. If rejected, the process was performed one more time, resulting in a new set of candidates. If the clinician chose to accept one of the newly provided coded candidates, the free-text problem was automatically replaced by the coded concept. If rejected, the problem would remain free-text.

Results
The first three days the tool was available, over 1,200 free-text requests were created during normal clinician use of the problem list. The new process handled these requests daily. The old process added new concepts to the dictionary, *if* the missing content was discovered by the CMEs. This allowed future use of the term, but left previously entered patient problems as free-text. This new approach has permitted coded content to replace the original free-text problems, with clinician interaction. In fact, free-text problems remaining on problem lists dropped from 12% using the legacy system, down to 1% using the new process.

Conclusion
Allowing clinicians to choose coded substitutes of free-text problems in the workflow has reduced free-text problems remaining on lists, engaged clinicians, and reduced turnaround time to add coded content.

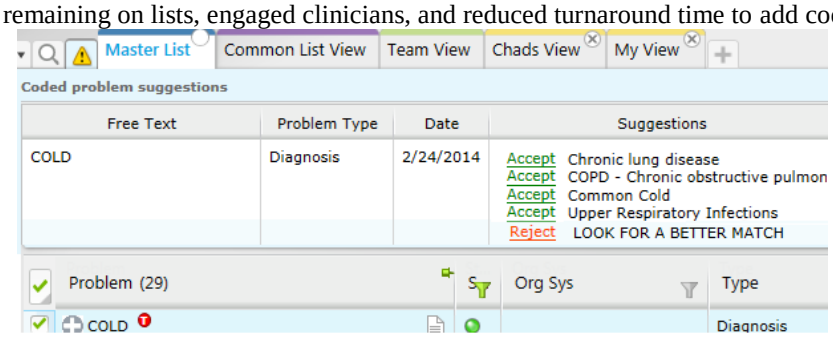

Figure 1 - Functionality in the Problem Management Module that allows a clinician to substitute a free-text problem with a coded problem, based on CME & clinical governance suggestions, or to reject candidates and request a new set of choices.