October 18, 2013

Dear Dr. Nolen,

On behalf of our team, I would like to thank you once again for your participation in the 2013 Technical Expert Panel (TEP), "Evaluating Electronic Health Record (EHR) Data Elements for Use in Hospital Quality Measures." Your responses to our survey and contributions to the TEP discussion were invaluable in helping us assess the feasibility and utility of EHR data for use in quality measurement.

After the TEP, we were able to test specific clinical data elements in the QDM subcategories identified by the TEP as feasible and important for risk adjustment in a multi-site EHR dataset. We confirmed feasibility by assessing which data elements within the feasible subcategories were captured for 90% of adult medical inpatients close to the time they first entered the hospital. Among those confirmed to be feasible, we assessed which data elements were predictive of 30-day mortality in preliminary statistical models for a variety of common medical conditions. The data elements that met our feasibility criteria and that were statistically significant risk-adjustment variables for one or more common medical conditions are the Core Clinical Data Elements (CCDE). The CCDE will provide measure developers with a set of feasible clinical data elements that can be used as a foundation for building risk adjusted models for hospital outcome measures.

Please find the updated TEP summary table, which includes the comments and corrections collected during and after the TEP, and the CCDE specifications below. We appreciate your interest in and continued support of this work. It has truly been a pleasure working with you. Please do not hesitate to contact us with any further questions or comments regarding this work.

Sincerely,

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Summary of TEP Discussion and Comments

Category - Subcategory	Summary of TEP Scoring Discussion and Comments	Subcategory Should be Included in Feasibility Testing	
		Yes	No
Encounter – Performed	**Survey Consensus Score** • **0.88** **Final Consensus** • **Encounter Performed (documentation of a hospital admission) is best defined by the appearance of a bill in a hospital's administrative database with the accompanying length of stay. Information required for billing purposes is consistently captured and coded. However, exact start and stop times and dates for an admission lack a standard definition or method of capture. Such data would be structured as time and date stamps in patient registration or EHR systems which might or might not be integrated with billing or administrative databases.** **TEP Discussion Points** • Timing of admission and discharge can be captured differently by patient management systems (time in a bed and out of bed). • There are built-in incentives to capture these times with accuracy as payment is tied to length of stay, discharge timing, etc. This means that data are present. However, there is no standard definition for which data element (what pieces of metadata, what source of data) best captures the concepts of admission start and stop. • Time and date stamps for discharge and admit orders are associated with coding systems. However, other data elements used to establish the start and stop of encounters might not be systematically coded (e.g., patient management data). **Comments from Survey** • EHR or integrated patient management systems will always capture when a patient arrived in a bed and when they were discharged.	√	
Transfer - To	**Survey Consensus Score** • **0.86** **Final Consensus** • **Transfer to meets all 3 data capture criteria although there is no coding structure representing this concept and important metadata (receiving facility) might be missing or not encoded.** **TEP Discussion Points** • Transfer to is reliable and transfer from is not. Payment systems incentivize transfer to as capture of discharge. • There is no standard code for a transfer. • Transfer from data are only likely to be consistently captured if tied to a new incentive, such as quality reporting. **Comments from Survey** • Target or receiving facility might not be coded (e.g., facility type). • Receipt of a transfer (transfer from) is often only captured in notes as string or text data.	√	

Category - Subcategory	Summary of TEP Scoring Discussion and Comments	Subcategory Should be Included in Feasibility Testing	
		Yes	No
Physical Examination Vital Signs - Result	**Survey Consensus Score** • **0.69** **Final Consensus** • **Several instances of vital signs results are consistently captured at specific time points during the admission (triage in the ED, first on admission to the inpatient floor or ICU, etc.). The data are captured as numbers and usually in a structured field or convertible to structured data.** **TEP Discussion Points** • The numerous variations in circumstances surrounding and methods of assessment of vital sign measurement make it difficult to conclude that there is a strict standard definition associated with any individual instance of a vital sign. For example, is a heart rate captured while sitting, standing, during an episode of pain or anxiety, by a machine, by clinical staff, in response to a patient's complaint about palpitations, or is the capture routine, etc.?. • Although there is a standard coding system for vital sign findings, syntax is not specified so that a code might correspond to the broad concept of a specific vital sign (heart rate) but will not specify how it is structured (e.g., as a 2- or 3-digit integer in units of beats per minute). **Comments from Survey** • Machine-measured vital sign findings will not be fully integrated into many EHR systems although some instance of results from machine measurements are often entered manually.	√	
Physical Examination Neurological Assessment - Result	**Survey Consensus Score** • **0.60** **Final Consensus** • **These data elements do not currently meet the data capture criteria.** **TEP Discussion Points** • GCS might be captured routinely for ICU-admitted, trauma, or other patients with abnormal mental status. • Clinicians' descriptions of neurological status are likely captured as text or string data requiring natural language processing to extract for analysis. **Comments from Survey** • ICUs and trauma response teams might use standardized flow sheets to capture data which might result in structured GCS data. • Although EHRs will have local coding systems for these data they might not yet be associated with standardized value sets, such as Logical Observation Identifiers Names and Codes (LOINC). • There is no standard and routine neurological assessment currently captured across most or all inpatient settings or for most or all adult admitted patients.		√

Category - Subcategory	Summary of TEP Scoring Discussion and Comments	Subcategory Should be Included in Feasibility Testing	
		Yes	No
Laboratory Test - Result	**Survey Consensus Score** • **0.94** **Final Consensus** • **Data elements within this subcategory met all 3 data capture criteria.** **TEP Discussion Points** • Units of measurement associated with some test results data are not standardized. • Thresholds for and ranges of normal values are nearly always exported from clinical lab databases as text or string data. This text is sometimes bundled with the actual result and exported as one text field. Most common lab test units have universally standard ranges for normal values. **Comments from Survey** • Different panels of laboratory tests in different hospitals and clinical labs (e.g., chemistry panel) might have different individual components and be associated with different codes.	√	
Laboratory Test - Order	**Survey Consensus Score** • **0.81** **Comments from Survey** • Results are more consistently encoded with standard value sets, such as LOINC compared with orders which might not yet be linked to standard value sets.	√	
Laboratory Test - Performed	**Survey Consensus Score** • **0.73** **Comments from Survey** • Several TEP members expressed concern that this subcategory is not consistently captured or encoded across hospitals. • They also expressed the opinion that these data are not needed if the test result is what is desired (e.g., in risk adjustment).		√
Diagnostic Study – Order	**Survey Consensus Score** • **0.88** **Comments from Survey** • Orders are not yet consistently linked with standard value sets, such as LOINC.	√	
Diagnostic Study Result	**Survey Consensus Score** • **0.47** **Comments from Survey** • Results are not captured as structured data.		√

Category - Subcategory	Summary of TEP Scoring Discussion and Comments	Subcategory Should be Included in Feasibility Testing	
		Yes	No
Condition – Active (included discussion of principal discharge diagnosis and secondary diagnoses for hospital admissions)	**Survey Consensus Score** • **0.69** **Final Consensus** • **Clinician documented data elements in this subcategory do not meet data capture criteria as they are not consistently captured and many instances of condition data elements, such as secondary diagnoses are not captured in structured fields (SNOMED or ICD-9 codes).** **TEP Discussion Points** • There are 2 problem lists. One is a clinical problem list assembled by the care team. The second is a billing or administrative problem list generated for payment via review of the medical record. • The choice of conditions captured in administrative databases is strongly influenced by payment incentives. • Clinicians have a poor understanding of the definition of a principal discharge diagnosis (what brought a patient in for care). Clinicians document their patients' most important problems, which could change over the course of their admission or from one clinician to the next. • Clinical problem lists or secondary conditions are not standardized and tend to reflect each individual clinician's decisions about the problems that most affect patients in the moment. New regulatory standards might influence capture so that these lists become more standard and comprehensive. However, this will require significant change in clinician behavior/workflow. • UB-04 claims forms cannot be filled out without diagnosis information so this is consistently available in administrative databases. • For surgical coding, condition coding associated with specific procedures is likely to be more consistent and well defined • The introduction of ICD-10 in 2014 and the Meaningful Use SNOMED mandate will likely make it more difficult to accurately and reliably pull this information in the coming years. **Comments from Survey** • Unclear how emphasis on Meaningful Use will affect capture of clinical problem lists and admission diagnosis (which might be closest to primary discharge diagnosis)		√
Condition – Inactive	**Survey Consensus Score** • **0.31** **Comments from Survey** • Inactive conditions will not be consistently captured.		√
Condition - Resolved	**Survey Consensus Score** • **0.25** **Comments from Survey** • Resolved conditions will not be consistently captured.		√

Category - Subcategory	Summary of TEP Scoring Discussion and Comments	Subcategory Should be Included in Feasibility Testing	
		Yes	No
Medication – Order	**Survey Consensus Score** • **0.94** **TEP Consensus** • **Data elements meet all 3 data capture criteria. Medication orders are not consistently encoded with a standard value set (RxNorm). However, the local codes assigned by the EHR software or code systems from pharmacy software vendors are easily mapped to RxNorm.** **TEP Discussion Points** • Orders are more consistently captured and clearly defined compared with other medication subcategories such as administered. • Orders are most likely to be associated with RxNorm codes compared with data generated from pharmacy (e.g., medication administered).	√	
Medication - Administered	**Survey Consensus Score** • **0.75** **TEP Consensus** • **Data elements currently meet all 3 data capture criteria. However, they are difficult to interpret or apply in analyses as there is no consistent capture of the many nuances of medication administration (dose received, route, rate, starts and stops for drips, etc.).** **TEP Discussion Points** • Many pharmacies use proprietary coding that could be readily mapped to RxNorm but is not mappable at this time. • Administration is problematic due to the complexity of drug dosing schedules, routes of delivery, dose timing delays/cancelations, etc. This a lot of data to wade through and define in a standardized way. **Comments from Survey** • Increased capability to perform bar code scanning might help better integrate these data into EHRs.		√
Medication - Discharge	**Survey Consensus Score** • **0.73** **Final Consensus** • **Discharge medications are not consistently captured. When captured, the data are often linked to local codes or pharmacy system proprietary coding structures. These can be readily mapped to RxNorm.** **TEP Discussion Points** • Meaningful Use will likely improve capture of complete lists of discharge medications although this aspect of transition of care is still evolving and falls short of being consistently performed. • Currently these data are best extracted from records of prescriptions written in the EHR. These are not consistently encoded and must be mapped to RxNorm. In addition, what is prescribed might not represent all discharge medications.		√
Laboratory Tests with Threshold Values	**TEP Discussion Points** • Range limits and threshold values for laboratory tests are often text or string data and can only be used after some data parsing separate the numbers extracted in the text fields.		√

Category - Subcategory	Summary of TEP Scoring Discussion and Comments	Subcategory Should be Included in Feasibility Testing	
		Yes	No
Discharge Disposition Data Elements	**TEP Discussion Points** • Death in hospital is consistently captured with a standard definition in a structured field in most EHRs. • There is routine capture of discharge disposition (including AMA and in-hospital death) although the location may vary in different EHR environments. • These elements are not associated with specific codes.	√	
Care Directives and Palliation Data Elements	**TEP Discussion Points** • Code status is captured in orders but is not associated with a standard code. • Palliation is currently a poorly defined clinical concept. • Other care directives (comfort measures only, plans underway to enter hospice) are not routinely captured in the EHR. • SNOMED-CT codes for these concepts are now being integrated into EHR order sets and will likely be more available in near future.		√

Core Clinical Data Elements for Risk-Adjusted Mortality Measures

Clinical Data Elements	Units of Measurement	Timing of First Capture
Patient Characteristics		
Age	Years	---
Gender	Male or female	---
Vital Signs		
Heart Rate	Beats per minute	0-2 hours
Systolic Blood Pressure	mmHg	0-2 hours
Diastolic Blood Pressure	mmHg	0-2 hours
Respiratory Rate	Breath per minute	0-2 hours
Temperature	Degrees Fahrenheit	0-2 hours
Oxygen Saturation	Percent	0-2 hours
Weight	Pounds	0-24 hours
Laboratory Results		
Hemoglobin	g/dL	0-24 hours
Hematocrit	% red blood cells	0-24 hours
Platelet	Count	0-24 hours
WBC Count	Cells/mL	0-24 hours
Potassium	mEq/L	0-24 hours
Sodium	mEq/L	0-24 hours
Chloride	mEq/L	0-24 hours
Bicarbonate	mmol/L	0-24 hours
Anion Gap	mEq/L	0-24 hours
BUN	mg/dL	0-24 hours
Creatinine	mg/dL	0-24 hours
Glucose	mg/dL	0-24 hours