

Panel Discussion

Electronic Health Records (EHR): Benefits and Challenges for Data Quality

ABSTRACT

The conversion from paper to electronic patient records (EPR) conveys many benefits for both hospital staff and patients, but also presents many challenges for accurately capturing data. As hospitals have implemented EPR to various degrees, they have faced complications in insuring that data accurately and consistently capture care processes and outcomes. Additionally, data must conform to the specifications of various reporting agencies. Although hospitals have similar data collection and reporting requirements (for example, most are faced with Joint Commission/Centers for Medicare and Medicaid Services core measure requirements), there are likely to be different approaches to overcoming these challenges. This panel will bring together representatives from hospitals of various sizes, organizational structures, and EPR applications, all of whom would be able to share benefits and challenges of EPR implementation as it pertains to data quality.

BIOGRAPHY

Elisa Horbatuk

Data Manager, Decision Support Services
Stony Brook University Medical Center



Elisa Horbatuk is a data manager in Stony Brook University Medical Center's Decision Support Services, responsible for data processing, submission, and analysis for a variety of public reporting databases, including the Joint Commission core measures, New York State cardiac registries, American College of Cardiology registries, and American Heart Association's Get With The Guidelines Heart Failure registry. Additionally, she prepares a wide array of internal reports including scorecards (executive summary data), quality dashboards, and detailed analytic reports. Ms. Horbatuk has worked in healthcare research for three years and quality for eight years, including four years at New York State's Quality Improvement Organization and External Quality Review Organization.

Michael Nix

Manager of the Clinical and Operations Measurement Group
Fletcher Allen Health Care



Michael Nix is Manager of the Clinical and Operations Measurement Group of the James M. Jeffords Institute for Quality and Operational

Effectiveness at Fletcher Allen Health Care, Burlington Vermont. With an academic background in Industrial Management (University of Alabama) and Systems Management (University of Southern California) he has worked for thirty one years in healthcare including quantitative analysis, quality management, clinical operations analysis, consulting, material management as well as general hospital data collection and distribution. He has also taught a variety of business, management and finance courses at the college level for over 24 years and is currently a Graduate Faculty member as well as a part-time Adjunct instructor at Champlain College in Burlington Vermont teaching Financial and Economic Modeling in both their undergraduate and MBA programs.

David Harriman

Director of the Center for Quality
University of Chicago Medical Center (UCMC)



David Harriman is the Director of the Center for Quality at the University of Chicago Medical Center (UCMC). Before joining UCMC, he worked for the Chicago-based firm, Grenzebach Glier and Associates, where he developed data collection instruments and analyzed data returns for national benchmark studies of development program structure, finance, and donor preference of non-profit organizations including the Association of American Medical Colleges, the American Hospital Association, the University of California System, and Mayo Clinic. After receiving his Masters degree in Social Service Administration from the University of Chicago, David joined the UCMC Center for Quality. He is an active member of the UCMC's EPIC Clinical Operations Sponsor Committee, focusing on enhancing the quality and usability of clinical data entered into the electronic medical record and developing reporting solutions that will assist clinicians delivering the highest quality medical care. David works closely with the Business Intelligence group within the institution's information systems department, helping to develop institutional standards for data governance and strategies for meeting Meaningful Use standards.

Alein T. Chun

Manager of the Data Quality Measurement Unit
Cedars-Sinai Health System



Alein T. Chun, Ph.D., M.S.P.H. is the Manager of the Data Quality Management Unit (DQMU) at Cedars-Sinai Health System. He is responsible for the day-to-day operation of the enterprise DQM function. He and his staff of four manage an assortment of activities related to both internal reporting and the release of clinical and administrative data to outside organizations. Essential data quality control activities include creating standard operating procedures for managing high priority data elements, solving critical data problems, validating key data and reports, and assuring quality of data released to outside entities. DQMU also acts as facilitator and change agent in business process improvement across the data supply chain business units. Dr. Chun holds a Ph.D. in Health Services and a Master's degree in Public Health both from UCLA.

Bruce N. Davidson

Director of Resource and Outcomes Management
Cedars-Sinai Health System



Bruce N. Davidson, Ph.D., M.P.H. is Director of Resource and Outcomes Management for Cedars-Sinai Health System, a position he's held since 1996. He leads a department of 23 in the development and implementation of initiatives to promote cost-effective, high quality medical care. He is also an Adjunct Assistant Professor in the Health Services Department at the UCLA School of Public Health, teaching Quality Improvement and Informatics for the Executive Masters Program. Dr. Davidson has 30 years of hands-on experience in leading, supporting, and evaluating patient care process improvement initiatives, as well as the delivery of patient care services in both inpatient and outpatient settings. He has published in the areas of medical treatment effectiveness, decision-making in health care, and measurement for quality improvement, with a recent focus on information management. His PhD in Health Services Research and his Masters in Public Health are from UCLA and his Bachelors is from MIT.

Electronic Health Records (EHR): Benefits and Challenges for Data Quality

MIT Information Quality Industry Symposium
July, 2011

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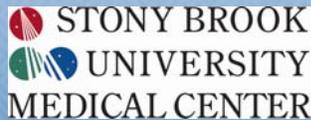
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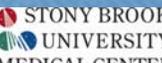


- Cerner



Status of EHR Implementation

- 1 – Already implemented
- 2 – Planned in short term
- 3 – Planned in longer term
- 4 – Different application that interfaces with EHR (discrete fields)
- 5 – Different application that interfaces with EHR (Free text or “blobs”)
- 6 – Different application that does not interface with EHR

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ED Documentation	1	1	1 & 2 (partial)	1
Nursing Documentation	1	1	1 & 2 (partial)	1
Lab Results/Flowsheets	1	1	4	1
Medication Administration	1	1	1	1
Medication Reconciliation	1	1 & 2 (partial)	1	1
Intraoperative Report	4	6	1	2
Operative Report	4	6	5	2 (5 now)
CPOE	1	2 (ED = 1)	1	1
Discharge Summary	1	5	5	2 (5 now)
Radiology Testing Results	4	5	5	1
Cath Lab/EP Lab Reports	4	6	5	4
MD Progress Notes	1	2 (CSMG = 1)	2	2
ICU Flowsheets	1	1	2	1
Anesthesiology Document.	4	3	2	3
Discharge Process	1	1 & 2 (partial)	2	1 & 2 (partial)
ICD-9 Coding	6	1	4	4

Anticipating Data Quality Challenges in EHR Implementations

Michael Nix - Measurement Manager
Jeffords Institute for Quality & Operational Performance

Paul Rosenau, MD – Quality Director
Vermont Children's Hospital at Fletcher Allen

7/14/2011

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1



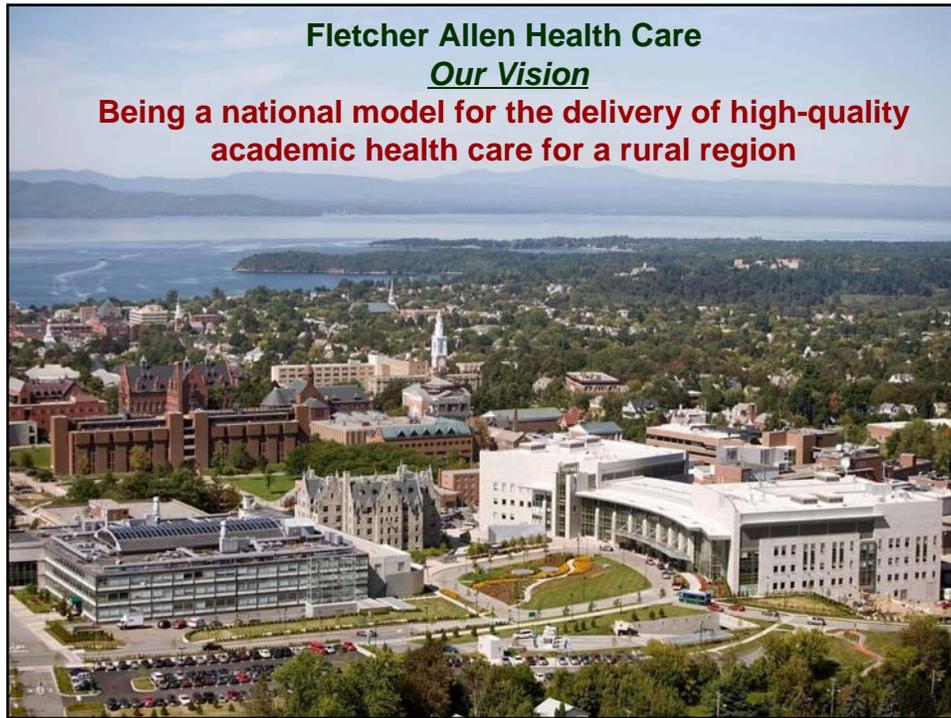
About Fletcher Allen Health Care

- Located in Burlington, Vermont
- Affiliated with the University of Vermont Medical School
- 620 Licensed Bed – Approximately 450 operational beds
- ~ 450 employed physicians
- 6,000+ Employees (largest employer in state)
- Tertiary care coverage for Northern Vermont & New York State
- Operates main hospital, rehab/ambulatory surgery campus plus primary care & specialty physician clinics

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2





EHR Implementation

- EPIC was EHR vendor selected
- Rollout Timeline was June 2009 through December 2010 for entire organization
- EHR implemented across all clinical areas
 - ED & Inpatient in first round of rollout
 - Primary Care Clinics in second round
 - Specialty Clinics in third round
- Usually involved multiple semi-autonomous working groups within implementation project team

EHR Implementation Environment

- EHR's are inherently complex projects
- Timelines are tight
- Resources are limited
- Most stakeholders don't have experience in EHR implementation environments
- Usually involves multiple autonomous working groups within implementation project team environment

Understanding the Origins of Data Quality Errors

- Data Quality Issues Usually Stem from Relatively Simple Situations in Implementation Process
- The presence of an EHR is **Not** an automatic guarantee of improved quality of data
- Understanding the basis of Data Quality Errors is the first step in preventing them
- For this presentation a framework of 6 major data categories is used

The “Data Quality” Measurement Challenge With EHR’s

- Electronic Health Records (EHR’s) are inherently complex – a lot of data elements
- Multiple uses of data with differing levels of granularity needed – how data is captured matters!
- Diverse stakeholder data needs – does the data meet all the needs of the providers of care?
- Does the data quality meet the user expectations?
- The danger of Garbage In- Garbage Out!

EHR’s Are Inherently Complex Data Environments

A Sample Flowsheet

Acetate, Lucy MRN: 71218 DOB: 3/20/1994 Age/Sex: 15 y.o./F Pt Class: IP Visit #: None Allergies: No Known All Infection: (None)

Admission (Current) 04/23/10 Current Unit: Fletcher Allen VT Children's

	4/23/10	2030	0000	0002	0359	0400	0500
Vital Signs							
Temp	38.1 (100.5)		37.7 (99.8)				37.4 (99.4)
Temp src			*Oral				*Oral
Pulse		70		66			72
Pulse / HR source							
Resp		22		22			24
BP		112/72		108/68			110/68
BP Device							
Patient Position		Sitting		Supine			Supine
BP Cuff Location							
Height and Weight							
Height							
Weight							
Type of Scale							
Head Cir							
BSA (Calculated - sq m)							
BMI (Calculated)							
Pain Calculation_Weight							

Data Quality Error Categories

- Data Entry Error
- Omissions of Data
- Contradictions Between Data
- Incomplete Data
- Ambiguity of Data Captured
- Authenticity of Data Elements

“To err is human, but to really foul things up requires a computer.”

~*Farmer's Almanac*,
1978

Entry - Simple Human Error

In EHR terms the human error source is usually an incorrect data entry:

- **Active error** – someone entering the wrong value → *Is there an alternative to having a person make a manual entry?*
- **Passive Error** – a system default value was not reset to a correct value → *Test all default value settings for appropriateness, when in doubt don't have defaults produce an active entry*

Errors of Omission

Not having data due to being overlooked (clutter) or not in a logical location →

- Live test flow sheets, screens and other clinical platforms with real patient values in a secure test environment.
- Actively query clinicians about completeness of key elements.

our earlier flow sheet example

Vital Signs	
BP	110/70
HR	88
RR	22
SpO2	98%
Temp	37.4

Height and Weight	
Height	5'7"
Weight	130 lbs

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Contradiction Errors

Data in multiple locations don't coincide →

- Test for common source locations on system
 - ✓ In a flow sheet entry?
 - ✓ Contained in a narrative note?
 - ✓ Is it in a scanned document?
- Determine if elements captured in multiple locations makes logical sense – complexity adds to this type error
- Notes or comments are often source of confusion
- Check discrete data elements in multiple locations

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12



Incomplete Errors

Information captured does not contain all required elements – some data is present but not all components →

- There is no simple fix for this type of error unless some type of “forcing function” is possible (e.g. if A element is present then must have B element)
- Drawback is hard stops or alerts have to be “bypassable” to maintain flows
- Be aware of potential to promote “alert fatigue”

Ambiguity Errors

When data elements are not definitive uncertainty regarding interpretation can be common →

- “High BP”, “Elevated Temp”, etc. in non-discrete data locations can lead to ambiguity
- Use of discrete data elements rather than free text or comment/note fields for critical data is most common approach: e.g. B/P= 188/123; Temp= 38.9 C, etc.

Authenticity Errors

Source data on same observation or event resides in more than one location dependent on updates – which location is definitive source?
→ e.g. Nursing flow sheet says patient is long term current smoker, physician notes indicate no longer a smoker and receiving nicotine therapy.

Avoiding need for “notes” or comment field entries by using discrete data fields is most common and effective solution

Summation

- Addressing the source of errors is often a function of how the implementation team operates between working groups.
- Defining norms like a common data dictionary from day one of project is important!!!
- Cross check for consistent approaches between implementation working groups

Summation (Cont)

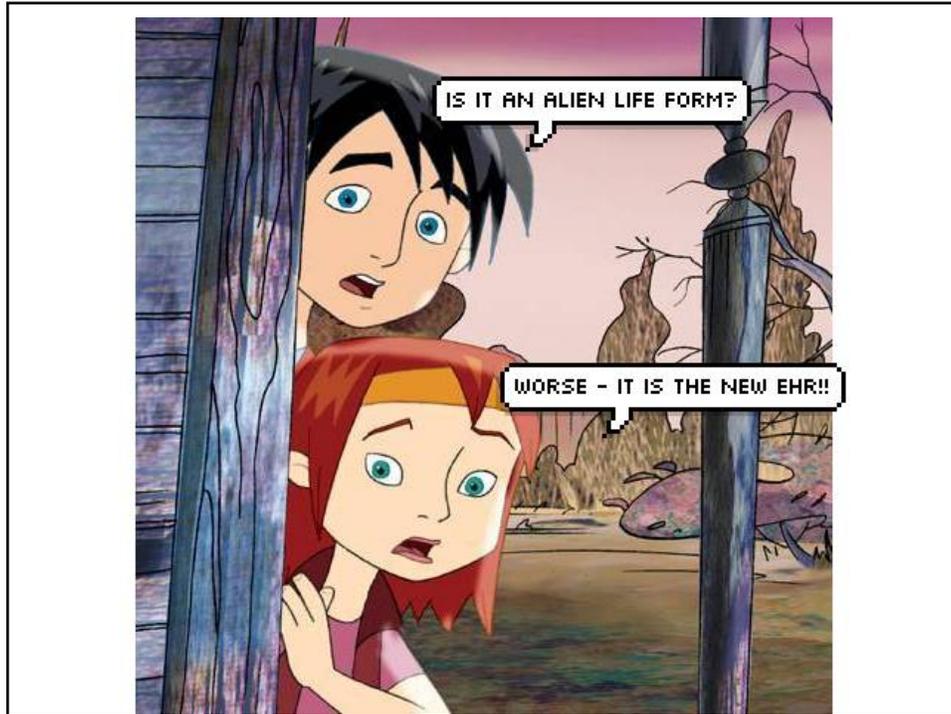
- When in doubt – use discrete data fields with a single data dictionary identity
- Keep track of where common data elements are used in various screens and flowsheets
- Data quality has to be engineered into the build and configuration of the EHR during implementation – not as an afterthought!!

A Parting Perspective

“The potentials of EHR systems and data quality challenges are just beginning to be understood. Just like mastering any complex tool; it requires time, patience and diligence to insure it is operating at its potential as well as meeting the needs of the healthcare providers. Accurate and complete data is an absolute minimum requirement to justify the efforts to integrate EHR’s into healthcare“



~Me



Thank you |

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Cedars-Sinai

CS-Link Data Quality Dashboard Pilot

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Manager, Data Quality Management Unit

Bruce Davidson, PhD, MPH
Director, Resource & Outcomes Management

July 13, 2011

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The Context

Cedars-Sinai Medical Center

- Academic Medical Center/Health System
- Largest Non-Profit Hospital in the Western US
- 958 Beds, 10,000 Employees, 2100 MDs
- Basic Annual Statistics
 - 57,000 inpatients
 - 565,000 outpatients
 - 82,000 ER visits
 - 7,000 deliveries

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CS-Link Data Quality Dashboard Timeline

- CS-Link Quality and Regulatory Data Committee
 - Chartered June 2009
 - Broad membership
- CS-Link Data Quality Dashboard Working Group
 - Initiated December 2010
 - Membership includes representatives from CS-Link Clinical Documentation Build Team and CS Data Quality Management Team
- Development Currently Underway
 - Pilot Dashboard
 - Scalable Approach



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CS-Link Quality & Regulatory Data Committee

Committee Objectives

- Identify data elements necessary for Medical Center functions that should be available in CS-Link
- Provide a multi-disciplinary forum for review of CS-Link clinical content for purposes of Quality/Safety, resource management and Regulatory guidelines
- Help ensure that CS-Link designed clinician documentation will support abstracting and coding
- Ensure Quality and Core Measure reporting needs can be supported with CS-Link documentation tools
- Ensure all licensing requirements are maintained with CS-Link



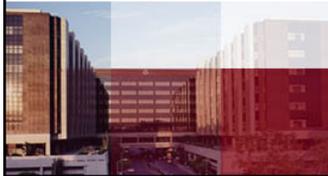
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CS-Link Quality & Regulatory Data Committee

Key Activities

- Inventory of currently reported and anticipated data related to clinical care needed for public reporting or internal quality management
- Review CS-Link clinical content to ensure the support needs identified above
- Note where changes/modifications are needed, provide feedback to application team, ensure changes are made.



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CS-Link Quality & Regulatory Data Committee

Key Activities (cont'd)

- Provide a consistent data quality perspective for content review and oversight
- Own the migration of current data abstracting related to quality, safety, regulatory and core measure reporting to CS-Link
- Develop and update dashboard of measures to reflect progress

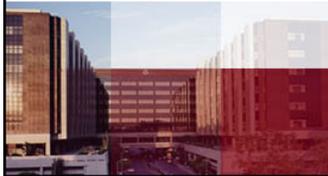


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Charge for CS-Link Data Quality Dashboard Working Team

- For each key Quality Council Dashboard Measure, develop method for evaluating data quality at three points of data lifecycle
 - ensuring input data quality
 - ensuring internal logic data quality
 - ensuring extract data quality
- If all three are “green,” then leadership can be confident that the measure is an accurate representation of performance



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CS-Link Data Quality Dashboard: Progress

- Focus of Pilot Determined
 - VTE Prophylaxis for ICU patients that are part of the VAP Bundle
 - Will be used to develop a standardized process for evaluating data quality of other key Quality Council measures derived from CS-Link.
- The build team had completed, but not released, a new build for VAP Bundle, including VTE Prophylaxis, due to perceived data quality problems with initial build released with IP2.



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Process for Evaluating Input Data Quality

- Identify data elements needed to operationalize VAP ICU VTE Prophylaxis measure
- Develop Data Acquisition Workflow to document how required data elements are input into CS-Link
- Ensure new build will cover “gaps” by comparing:
 - Original CareVue data flow (believed to be correct)
 - Current CS-Link build (believed to be problematic)
 - Redesigned CS-Link build (believed to be correct)
- Develop and test reports to allow ongoing assurance of continuing data input integrity



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Process for Evaluating Internal Logic Data Quality

- Evaluate how each data element needed to operationalize VAP ICU VTE Prophylaxis measure:
 - flows from point of entry into CS-Link through the various internal CS-Link environments
 - until it reaches the CS-Link Clarity data base (from which it will be extracted for the Quality Council Dashboard)
- Ensuring integrity by highlighting any decision-points, programmed transformations, or calculations implemented during this process
- Develop and test reports to allow ongoing assurance of continuing internal logic data integrity

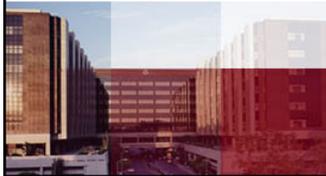


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Process for Evaluating Extract Data Quality

- Evaluate how each data element needed to operationalize VAP ICU VTE Prophylaxis measure:
 - is extracted from CS-Link Clarity data base for use by the Business Objects team to construct the measure in the Quality Council Dashboard
- Ensuring integrity by highlighting any decision-points, programmed transformations, or calculations implemented during this process
- Develop and test reports to allow ongoing assurance of continuing data extract integrity

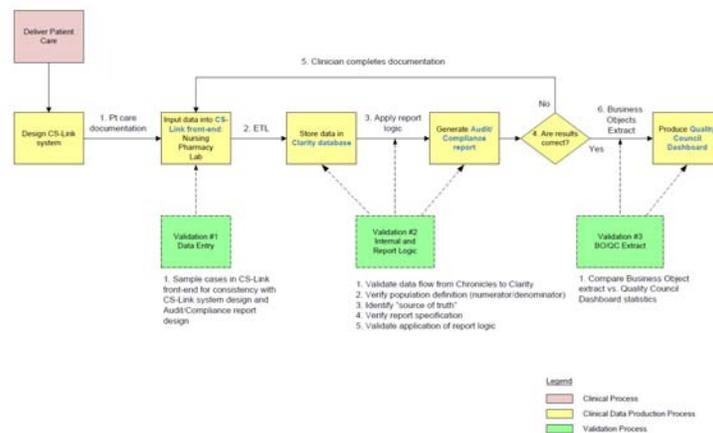


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CS-Link Data Quality Dashboard: Process Flowchart

CS-Link Data Quality Dashboard Pilot
VTE-VAP Bundle Validation Process



Prepared by: Data Quality Management Unit
Resource & Outcomes Management, 3/1/11

1



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Data Validation & Risk Management

Level / Approach	Method	Risk Management Effectiveness*	Data Access Requirement	Currently Applied
1. Sample-based	Spot check few cases	Low	Application, front-end	Yes
2. Population-based	Aggregated, ad hoc query	Medium	Database, back-end	No
3. Proactive monitoring	Rule-based, ongoing	High	Continuous; Database, back-end	No
* Special Case: Report validation	Report specs verification & content validation	High	Report specs; Database, back-end	No (specs & spot check only)



* Effectiveness is based on low to zero risk tolerance for error.

Prepared by: Data Quality Management Unit
Resource & Outcomes Management, 4/20/11

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Concluding Thoughts & Observations

- We believe we have a good working model
- We have established communication between the build team and the data quality management team
- There are limitations to the degree that this process can mitigate risks
- We will be challenged to implement this process for multiple measures simultaneously



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Elisa L. Horbatuk, MA

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Stony Brook University Medical Center

- Long Island, New York
- Region's only tertiary care center
 - 571 Acute Inpatient Beds
 - 34,600 discharges in 2010
 - Adult / Pediatric Emergency Dept.
 - 85,022 visits (FY 09-10)
 - 33 Hospital Based Clinics/Tests
 - Level 1 Trauma Center
 - Level 3 NICU, Regional Perinatal Center
 - Burn Center
 - Renal Transplant Program
 - Autologous/Allogenic Bone Marrow Transplant Program/Unit



Stony Brook University Medical Center

- Hospital is part of the State University of New York at Stony Brook
- Affiliated with a major academic medical center, including medical, nursing, and health technology management schools
 - 48 accredited training programs with 572 residents
- 559 Full time, 443 Voluntary Physicians
- >4,800 Full-time Employees

Decision Support Services

- Part of Quality division
- Holds much of the responsibility for public reporting
- Staff includes analysts and nursing staff working closely together
- Collaborates with Continuous Quality Improvement (CQI) department, participating in Clinical Service Group (CSG) meetings and CQI teams (e.g., door-to-balloon, heart failure)

EHR Implementation at SBUMC

- Vendor - Cerner
- During the past few years we have implemented
 - Nursing documentation
 - Laboratory results and flowsheets
 - Medication administration documentation
 - Medication reconciliation
 - Intraoperative reporting
 - Emergency Department documentation
 - Computerized Physician Order Entry

EHR Implementation at SBUMC

- Discharge summaries, operative reports, and certain test results are also available in the EPR as free text imported from other systems

EHR Implementation at SBUMC

- **Scheduled for implementation:**
 - Physician documentation
 - ICU flowsheets
 - Anesthesia module
 - Discharge process

Inaccurate or Incomplete Data Capture

- Data element not captured at all
- Data element captured but does not meet required definition(s)
- Data element captured in manner that meets requirement for one registry but not others

Inconsistent Data Capture

- Data element captured differently in different locations in the EHR
- Contradictory data documented on paper tools for hybrid records

Technical Barriers to Data Capture

- Ambiguities in legal medical record printout
- Interfaced systems bring data as “blobs”

Process Barriers to Data Capture

- **Balancing alert fatigue with the need to prompt appropriate care and documentation**
- **Disinclination to require fields**
- **Customization may require more resources than available**
- **Competing needs**

Barriers to Information Quality

- **Real-time decision support is often dependent on processes not completed**
- **Real-time reporting on quality measures is dependent on identification of conditions and entry of data elements not currently captured electronically**

Strategies for Improving Data Capture/Integrity for EHR-Based Public Reporting

- Collaboration among technical, clinical, and quality staff
- Data element by data element review with abstractors
- Comparisons of screen view to printouts
- Preliminary research into alerts to avoid fatigue
- Extensive education of staff
- Continued implementation, minimization of non-electronic, non-discrete sources

Measuring Quality of EHR Public Reporting Data

- Data extracts from EHR compared with data manually abstracted
- Mismatch rates for measure sets overall as well as individual data elements
- For data elements with a mismatch rate greater than zero, identification of Cedars-Sinai data lifecycle point(s) resulting in mismatch:
 - Inputs: What data elements are simply not currently captured in the EHR?
 - Internal Logic: What data elements are captured differently electronically and on paper?
 - Extracts: What is the quality of our extraction?

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Electronic Medical Record Implementation

MIT IQ Symposium 2011

Presented by

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University of Chicago Medical Center

Sameer Badlani, MD, Associate Chief Medical Information
Officer, University of Chicago Medical Center



The University of Chicago Medical Center



Average Beds in Service	532
Admissions	22,692
Patient Days	68,336
Deliveries	1,647
Visits to the DCAM	384,759
Emergency Visits	68,336

The University of Chicago Medical Center, an academic medical center based in Hyde Park on the campus of the University of Chicago, is a not-for-profit corporation which includes:

- Bernard A. Mitchell Hospital, the primary adult patient care facility
- Comer Children's Hospital, devoted to the medical needs of children
- Chicago Lying-in Hospital, a maternity and women's hospital
- Duchossois Center for Advanced Medicine (DCAM), a state-of-the-art ambulatory-care facility with the full spectrum of preventive, diagnostic, and treatment functions
- University of Chicago Pritzker School of Medicine, one of the nation's premier medical schools
- Our patient care system also includes physician offices in several Chicago locations, the suburbs, and northwestern Indiana and affiliations with several hospitals including LaRabida Children's Hospital (staffed by University of Chicago pediatricians), Mercy Hospital, Weiss Memorial Hospital and others.



EMR Implementation Challenges

- “... information presentation profoundly affects user behavior and decision-making, it is critical that information displays be thoughtfully designed and rigorously tested to ensure they yield the best possible performance outcomes – these must consider the full complexity of the context in which the system is to be used.”

Karsh BT, Weinger MB, Abbott PA, Wears RL. Health information technology: fallacies and sober realities. J Am Med Inform Assoc. 2010 Nov 1;17(6):617-23

3



EMR Implementation Challenges

- **Iterative approach to validating and improving the interaction between the users and the application**
 - PI focused on optimizing workflows and ultimately adoption
- **Clinical user interface should allow for some level of modification of information presentation, appropriate to the information needs and workflows of clinicians at the disciplinary, departmental, service levels**
 - Determining the optimal balance between redesigning workflows to accommodate new technology vs customizing technology to fit existing workflows?
 - Determining appropriate use for Problem Lists, BPAs , imposed decision consideration (soft stops)
 - Pilot projects become much more complicated
 - How do you test a new medication reconciliation process without having to go live throughout the entire medical center?
 - Customization creates difficulty in supporting future upgrades and risks in terms of ensuring semantic consistency of elements in reports
- **Optimize semantic agreement between data entry context and the reports that are generated**
 - Does the data element within the printed Medical Record accurately represent the intended meaning as entered by the data originator?

4

 **Workflow, Semantics, and Usability**
Print Group Headers vs. Data Entry Interface

ED Diagnosis

- **Printed Record shows diagnoses listed under a print group header "ED Diagnosis"**
 - **Who entered that data?**
 - **When was that data entered?**
 - **How can the abstractor tell?**
- **Who knew what, and when did they know it?**
 - **Analysis focused on appropriate reference to who, what, when.**
 - **Pre-Analysis results indicated very poor delivery of evidenced based care**
 - **Post-Analysis with logic correction indicated superior delivery of evidence based care**
 - **Pneumonia bundle score would have been at 32% instead of the 98% that we actually earned!**

5

 **Workflow, Semantics, and Usability**
Print Group Headers vs. Data Entry Interface

Heart Failure Education

- Row detail description for heart failure education reads:
 - Heart failure education and packet received which address activity, diet, worsening of symptoms, and weight monitoring.
 - Indeed, HF education materials have been carefully designed to ensure that each element of education, including teach back, is addressed and assessed with the patient.
 - Process of care measures require EXPLICIT confirmation that each of these elements are completed and that documentation in the printed medical record explicitly covers each.
- Printed flowsheet shows "Heart Failure Education" = "Yes"
 - Abstraction logic would fail each element of heart failure education
 - Pre-Analysis score would have been 0%!
 - Post-Analysis score was 96%!

6



Workflow, Semantics, and Usability

The Problem of the Problem List

- Do clinicians understand the EMR's working definitions of data points?
 - Do Residents understand the billing/decision support/quality measurement implications and meaning differences between a diagnosis list and a problem list?
 - Lack of differentiation causes loss of credibility
 - Loss of credibility results in reduced use
 - Reduced use results in poor completion and poor quality for billing and decision support

7



Relative Time References

Home Medications – Time Last Taken

- Home Medications: the medications that the patient was taking prior to hospital admission
 - When was the last dose taken?
 - Can the system differentiate between error in patient-reported medications and later corrections
 - Does the system allow the user to differentiate between the historical record of “who,what,when “ and the “truth” as currently understood?

8



Relative Time References Home Medications – Time Last Taken

- Dynamic Prior to Admission medication module uses relative time references
 - **“Today,” “Yesterday,” “Last Week”**
 - Medications changes are stored (auditable) with each click of “Medications Reviewed”
 - While time/date stamp on each Medication Reviewed audit section reflect changes to meds, the relative time references to not change.

9



Relative Time References Home Medications – Time Last Taken

- April 1 – RN Judy reviews meds and says patient last took aspirin “today”
- April 5 – RN Michelle reviews meds again – makes no adjustments (patient has been in-house continuously since last review)
 - The April 5 review history would now show Aspirin - last dose taken “today.”
 - The problem is that when “today” was entered, the day happened to be April 1. Since the April 5 nurse kept the med as a prior to admission med, but didn’t update the last taken field.
- **THIS IS TRUE EVEN ACROSS DIFFERENT ENCOUNTERS!**
It would take a formal data audit to reveal this.

10



Conclusions

- EMR Implementation is an organization-wide endeavor requiring enterprise-wide proactive validation of input workflows and output presentations.
- Performance Improvement methodologies like PDSA are well-suited correcting data quality issues after they have been identified
- Proactive methods of identifying potential workflow/output/billing/compliance issues must be deployed in a systematic, enterprise-wide manner to *prevent* potentially dangerous errors from occurring and going undetected.

11



Thank you!

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12