Building Evidence-based Clinical Standards into Care Delivery

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Conflict of Interest

• Charles G Macias MD, MPH

• Has no real or apparent conflicts of interest to report.
Agenda

• Learning objectives
• Quality in healthcare
• Unwanted variation in practice: Treatment/clinical
• Quality and cost: Population management
• Evidence based practice/clinical standards: Treatment/clinical
• The Texas Children’s model for clinical standards development and implementation: Treatment/clinical
• Clinical Systems Integration and data governance: Electronic data
• Analytics to define opportunities and financial value: Savings
• Triple Aim of healthcare: Population management; Satisfaction; Savings
• Lessons learned
Learning Objectives

Participants will be able to:

1. Describe effective organizational structures for developing and implementing clinical standards products across a health system

2. Evaluate one health system’s methodology for rapid-cycle development and implementation of clinical standards products

3. Outline the technologies and processes required to effectively develop and deploy strategies to minimize unwanted variation in practice

4. Describe the roles of analytics solutions and decisions support tools for implementing clinical standards to drive iterative change
Johnny Jones

- 8 year-old boy with a history of lung transplant
- Emergency department: his triage evaluation demonstrated heart rate and other findings consistent with early signs of shock
  - Delivery of critical resuscitation fluids was slow and undertreated
  - Antibiotics arrived hours after they were ordered
- Lung inpatient unit: a “Rapid Response Team” was called 3 ½ hours after the evaluation of concerning signs and symptoms
- Pediatric Intensive Care Unit
  - Blood pressure was not obtainable
  - Put on a ventilator
  - Aggressive drug therapies
  - Procedural interventions to artificially oxygenate his blood

Johnny died 18 hours after he first arrived
Root Cause Analysis

• Diagnostic and therapeutic errors identified in the ED and the inpatient ward by multiple provider types

• A gap in meaningful communication between providers created confusion in management plans

• Neither management guidelines nor the EMR were providing clinical standards or clinical decision support for practitioners

• Systems were not well integrated
A Similar Story in New York State...

- The Rory Staunton Act
  - Hospitals shall have in place **evidence-based protocols** for the early recognition and treatment of patients with severe sepsis/septic shock...
  - **Analytics**: all severe sepsis/septic shock patients to be entered in the NYS database for annual risk adjusted mortality rates
  - Targeting systems of care

Source:
Public Health Law, State of New York, Sections 405.2 and 405.4 of Title 10
Contextualizing a Definition for Quality

IOM Domain for Quality

Quality

Cost

Value

Safe

Timely

Efficient

Effective

Care Coordination

Efficient

Effective

Timely

Safe

Equitable

Patient Centered

Access to Care
Variability in Pediatrics

- 16 hospitals treating children for bronchiolitis
- Quality metrics
  - Dx: chest radiograph, laboratory blood work
  - Tx: antibiotics, breathing treatments, IV placement
- These variations in practices were NOT explained by severity of illness

Poll Question

How many medical articles are published each year?

1. 800,000
2. 600,000
3. 400,000
4. 200,000

FIGURE S-1 Number of journal articles published on health care topics per year from 1970 to 2010. Publications have increased steadily over 40 years, with the rate of increase becoming more pronounced starting approximately in 2000.

Correlation Between Quality and Cost

- Describing variation in care in three pediatric diseases: gastroenteritis, asthma, simple febrile seizure
- Pediatric Health Information System database (for data from 21 member hospitals)
- Two quality-of-care metrics measured for each disease process
- Wide variations in practice
- Increased costs were NOT associated with lower admission rates or 3-day ED revisit rates

Poll Question

What % of health care expenditures are attributed to waste?

1. 8%
2. 14%
3. 22%
4. 36%
The US Healthcare System is Inefficient

$765B of healthcare expenditures is waste (2009)
- Unnecessary services
- Inefficiently delivered services
- Excess administrative costs
- Prices that are too high
- Missed prevention opportunities
- Fraud

Source: IOM, The Healthcare Imperative 2010; Berwick JAMA 2012

Overuse for tests and therapies beyond established evidence
Procedural/surgical intervention vs appropriate watchful wait
Discretionary use of services or devices
Unnecessary choice of higher cost services

$210 Billion
Reforming Healthcare

Source: Institute of Medicine Best Care at Lower Cost 2013
Poll Question:

My organization currently has in place:
1. >10 guidelines we developed
2. <10 guidelines we developed
3. We use other’s guidelines
4. We don’t use guidelines
Clinical Standards/ Practice Guidelines

- Systematically developed statements or recommendations to assist the practitioner about appropriate health care for specific clinical circumstances.


- Evidence based guidelines help control complexity
  - Summarize available evidence and translate to guidance for care
  - Address treatment uncertainties and reduces variation in care delivery where evidence lacks
  - Help maximize use of health care resources: system efficiency
  - Improved patient outcomes: diagnostic accuracy and therapeutic effectiveness
  - Enhance shared decision-making between patients and physicians
  - Provide a framework for analytics

- Pareto principle
  - 80/20 rule
  - 20% of the problems cause 80% of the trouble

  Source: Adapted from Penney and Foy. Best Practice and Research, 2007
Evidence Based Outcomes Center (TCH): Systematic Development of Clinical Standards

- Overcoming barriers of siloed work: resourcing a center
- Identifying quality gaps through big data
  - High prevalence
  - Resource intensive care
  - High morbidity or mortality
  - Marked variations in care
- EDW, analytics and the key process analysis
EBOC Process

1. Identify the quality problem/gaps: mortality, resource consumption, variability, prevalence
2. Search for existing guidelines and assess their applicability
3. Assemble a group of stakeholders (bottom up, never top down)
4. Identify the Patient Intervention Comparison Outcomes (PICO) questions
5. Search the evidence
6. Evaluate the evidence using an evidence rating AND recommendation rating tool
7. Vet with stakeholders
8. Once approved, build into Epic with consider for clinical decision support
Clinical standards products

- Evidence based guidelines: across the care continuum
- Evidence based summaries: limited PICO questions, rapid cycle time
- Evidence informed pathways: peri- and intraoperative expansion

**EBOC Clinical Standards products**

- EB Guidelines: 30%
- EB Summaries: 33%
- EB Pathways: 2%
- Approved summaries: 35%
Poll Question:

For guidelines, my organization has structure to:

1. Develop and implement
2. Develop, not implement
3. Implement, not develop
4. Don’t develop nor implement
Clinical Systems Integration Domains

“The means to facilitate the coordination of patient care across conditions, providers, settings, and time in order to achieve care that is safe, timely, effective, efficient, equitable, and patient focused.”

Source: The American Medical Association

Cross cutting elements: clinical care, operations, and finance
Clinical Systems Integration

Governance Structure

Clinical System Integration Executive Leadership Council

- Clinical Technology Council
  - Prioritizes and assesses technology initiatives that integrate with the EMR or proposed as independent solutions
  - EMR and all clinical technologies

- Content and Analytics Team
  - Develops clinical standards (guidelines) and oversees clinical data/predictive analytics
  - EBP and the Enterprise Data Warehouse are part of this structure

- Clinical Implementation Team
  - Oversees development and implementation of clinical programs/analytics and knowledge assets
  - Quality Improvement and permanent care process teams

Clinical Systems Integration Executive Leadership Council
Population Health Approaches: Permanent Teams Drive PDSA Cycles

Population health approaches: the permanent care process teams

- Diabetes
- Pregnancy
- Asthma
- Bronchiolitis
- Pneumonia
- Appendicitis
- Newborn

Hospital Acquired Conditions
- Sepsis and septic shock
- Obesity
- Transitions of care
- Survey explorer

Expansion for 2016: complex care, potentially preventable events, antimicrobial stewardship
What Should Be an Organizational Direction for Data?

Organizational evolution over time

Improved outcomes for our patients and our enterprise

Data reporting
- EMR clinical reports
- Financial reports

Data analytics
- Shortening event to reporting time
- Transforming data and translating to action

Predictive analytics
- Linking likelihood of outcomes to care decisions for populations
- Predicting financial outcomes
- Linking strategies across former silos in infrastructures

Prescriptive analytics
- Integrating best evidence into delivery system infrastructures
- EMR based recommendations and alerts
- Integrated plans of care across continuums
- Utilizing big data bi-directionally

Improved outcomes for our patients and our enterprise
Driving Quality Through Analytics

Measurement and analytics using Subject Area Marts in the Enterprise Data Warehouse:
- Patient outcomes
- Financial metrics
- Utilization metrics
Financial Measurement: Activity-based Costing in a Shared Savings Model
Financial Impact - Inpatient

Length of Stay

Charges

Bronchiolitis LOS  Sickle Cell Disease LOS  Pneumonia LOS

Bronchiolitis Charges  Sickle Cell Disease Charges  Pneumonia Charges

Year 1  Year 2  Year 3  Year 4  Year 5
Hardwiring Financial Metrics

38 registries aligned with clinical standards

Clinical operational and financial data
ROI For Diabetes CPT: An Analysis of One Improvement Aim

- Aim: Decrease length of stay for children with diabetic ketoacidosis by development of a Diabetic Care Unit
- Unit opened in Summer 2014
- Preliminary analysis suggests break-even point achieved

CPT Cost = continuing human resource costs = time in meetings + % of employees designated to CPT

Did not include CPT start-up costs or hardware/software costs

$\Delta$ Net revenue = change in revenue for DKA admits + increased revenue from increased capacity compared to 2013
Integrating Clinical Standards to Drive the Triple Aim
“Truth is found more often from mistakes than from confusion …”

- Francis Bacon

- We started big: start small
- We developed standards early in our history in isolation of outcomes: link standards work to outcomes transparency
- We did not pause to disseminate success stories until recent years: celebrate success
- We began with politically appropriate teams: skill’s based team composition is critical (bottom up)
- We were a self contained unit: establish governance early for developing and implementing clinical standards and link to the EMR
- We had gaps in the ability to respond rapidly to clinical care units’ needs: develop a strategy for updating and refining clinical standards products for new evidence and new local data
Other Lessons Learned Today

- Wide variations in practice can be minimized with systematically developed clinical standards: Satisfaction; Treatment/clinical

- Quantitative assessments of care delivery can help identify gaps in quality: Treatment/clinical

- Systematic use of tools will help standardize approaches and maintain the integrity of clinical standards: Treatment/clinical

- Demonstrating analytics for the value of clinical standards work will help shape culture: Electronic data; Population management

- Financial metrics may be linked to demonstrate and hardwire cultural attention to value-based care from clinical standards work: Savings
Sepsis at TCH: The Power of Clinical Standards

**PEDIATRIC SEPTIC SHOCK COLLABORATIVE**

**SEPTIC SHOCK IDENTIFICATION TOOL**

1. Patient presents to the ED with concern for infection and/or temperature abnormality in the ED or within 4 hrs of presentation? (NO)
   - Excluded from shock triage tool. Continue routine triage process.
   - Transfer patient to a resuscitation room and immediately alert physician/resuscitation team.

2. General assessment is patient critically ill? (YES)
   - Continue assessment at triage.

3. Is patient hypoventilated? (NO)
   - Continue assessment at triage.

4. Does patient meet 3 or more of clinical criteria, OR does high-risk patient meet 2 or the 9 clinical criteria? (YES)
   - Identify the patient as meeting septic shock triage criteria, transfer to a high-priority and alert physician.

5. Does physician assessment confirm triage assessment? (NO)
   - Continue routine care.

**Table 1. High Risk Conditions**

- Malignancy
- Aspergillosis (including SCD)
- Bone marrow transplant
- Central or indwelling line/catheter

**PICU Mortality**

**PICU Sepsis Mortality**
Sepsis at TCH: The Power of Clinical Standards
Questions

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