Using Performance Measures to Drive Improvement in Pediatric Emergency Care
Webcast 11/2/2010

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Funded by HRSA/MCHB EMSC
Targeted Issues Grant H34MC08512
Special Thanks

• HRSA/MCHB EMSC program
• Pediatric Emergency Care Applied Research Network (PECARN)
• Investigative Team
  ▪ Elizabeth Alpern, Jim Chamberlain, Rich Ruddy, Kathy Shaw, Marc Gorelick and Kartik Varadarajan
• Expert Panel Members
• EMSC Stakeholders
Agenda

- Importance and relevance of performance measurement in pediatric emergency care
- Use of a consensus development process to define a balanced report card for pediatric emergency care
- Integration of performance measurement into the electronic medical record
- Examples of how measures have been used to improve pediatric emergency care
  - Pain assessment and management
    - Marc Gorelick, Children’s Hospital of Wisconsin
  - Effective treatment of pediatric asthma exacerbations
    - Kathy Shaw, The Children’s Hospital of Philadelphia
  - Timely antibiotic administration for children with fever, neutropenia and central lines
    - Stephanie Kennebeck, Cincinnati Children’s Hospital Medical Center
Why Measure Performance?

• Improve, Innovate
  ▪ Health and Healthcare
    • For patients and populations
    • Within one ED or with one practitioner
    • Within networks of EDs or health systems

• Inform
  ▪ Transparency, consumer decision-making
  ▪ Regionalization of care

• Incentivize
  ▪ Pay for performance
  ▪ National rankings
Motivators: IOM Reports

1999: To Err is Human

2001: Crossing the Quality Chasm

2005: Pathways to Quality Health Care
Emergency Medicine: The Problem (The Opportunity?)

National Health Policy Forum
The Future of Emergency Care: 2006 IOM Report

If there is one word to describe pediatric emergency care in 2006, it is uneven
IOM Report p 41.
Motivators

• IOM: The Future of Emergency Care
  ▪ Achieving the Vision
    • Coordination
    • Regionalization
    • Accountability
      ▪ Convene a panel with emergency care expertise to
devvelop evidence-based indicators of emergency
care system performance

• Healthy People 2010, Objective 1-14b
  ▪ increase the number of States that have adopted and
disseminated pediatric guidelines that categorize acute
care facilities

• EMSC Research Agenda Consensus Committee
Main Project Goal

To develop three EMSC deliverables

- A comprehensive and balanced set of performance measures that form a quality report card for hospitals providing pediatric emergency care
- A prioritized list of data requirements that will inform development and maturation of ED health information systems planning to capture performance measures
- A prioritized list of key performance measures in need of further research to improve their evidence base
Primary Aim

To identify quality performance measures that comprehensively reflect hospital-based pediatric emergency care through consideration of three important dimensions

- Institute Of Medicine quality domains
- Donabedian’s structure, process and outcome framework for quality
- Pediatric emergency care disease frequency and severity (common, rare but high risk)
Rationale

Limitations of prior work

- Single centers or geographic locales
- Focus on condition-specific indicators
- Preponderance of process-oriented measures
- Benchmarks very focused on
  - Timeliness (through put)
  - Satisfaction (ceiling effect)
- Lack of comprehensiveness regarding spectrum of ED care
  - Lindsay et. al., AEM, 2002
  - Guttmann et. al., Pediatrics, 2006

Meaningful use of electronic health records
Institute of Medicine
Quality Domains

Built around the core need for health care to be

- Safe
- Effective
- Efficient
- Timely
- Patient-centered
- Equitable
Institute of Medicine
Quality Domains

Safe
• Health care avoids injuries to patients from the care that is intended to help them

Effective
• Health care provides services based on scientific knowledge to all who could benefit, and refrains from providing services to those not likely to benefit
Institute of Medicine
Quality Domains

Efficient

• Health care avoids waste, including waste of equipment, supplies, ideas and energy

Timely

• Health care reduces waits and sometimes harmful delays for both those who receive and those who give care
Institute of Medicine
Quality Domains

Patient - centered

• Health care provides care that is respectful of and responsive to individual patient preferences, need and values, and ensures that patient values guide all clinical decisions

Equitable

• Health care provides care that does not vary because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status
Donabedian’s Framework

Structure
• Indirect quality-of-care measures related to a physical setting and resources: Staff, space, supplies, equipment and financial resources

Process
• Measures evaluate the method or process by which care is delivered, including both technical and interpersonal components

Outcome
• Outcome elements describe valued results related to lengthening life, relieving pain, reducing disabilities and satisfying the consumer
PEM Disease
Frequency & Severity

• **Condition-specific**
  ▪ Proportion of patients with croup receiving corticosteroids

• **General**
  ▪ Proportion of visits by patients <18 years of age with a weight in kilograms documented during the current ED visit

• **Cross-cutting**
  ▪ Proportion of patients <18 yrs of age with an endotracheal tube whose placement is confirmed by the end tidal CO2 method
Choosing Condition-Specific Measures

www.pecarn.org/tools

Alessandrini et.al., Academic Emerg Med; February 2010
Methods

• Identify existing performance measures
  ▪ Literature reviews
  ▪ Health care quality organization websites
  ▪ Interviews with leaders and experts

• Secondary analysis of existing data sets
  ▪ PECARN Core Data Project
  ▪ National Hospital Ambulatory Medical Care Survey

• Formation of expert panel and stakeholder group

• Consensus techniques
  ▪ Nominal Group
  ▪ Electronic Delphi surveys
Measure Development Process

SOURCES
- Research Literature
- Actual Use
- Concept

Aim 1
- Candidate Measures N = 60

Measure by Measure Evaluation for Selection

Measure Set

Selection Criteria

Evaluation for Application

Adapted from AHRQ PDI development process
Development and Elimination of Performance Measures Over Time

Development of Performance Measures Over Time

<table>
<thead>
<tr>
<th>Measures</th>
<th>Initially Nominated Measures</th>
<th>Measures After 1st Round of Cuts</th>
<th>Measures After 2nd Round of Cuts</th>
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Measure Evaluation Criteria

Importance

- The measure reflects a priority or high impact aspect of healthcare
- The measure addresses outcomes or is strongly linked to improving outcomes
- The measure addresses an area of considerable variation or poor performance across providers or population groups

National Quality Forum Measure Evaluation Criteria
Measure Evaluation Criteria

Scientific Acceptability

• There is strong evidence for the specific measure focus, such as evidence based guidelines

• The measure is reliable, reproducible and accurately represents quality of care
Measure Evaluation Criteria

Usability

• The measure provides information that is actionable and can be used to make decisions that improve the quality of care
• The measure is meaningful and understandable
Measure Evaluation Criteria

Feasibility

• Data for the measure is generated during care delivery and is available in the EHR or other electronic sources
• Data collection for the measure can be implemented
• The information provided outweighs the costs/burdens of collecting the data
Performance Measure Distribution by IOM Quality Domain

Applicability of Measures to IOM Domains
(Measures can apply to more than one IOM domain)

Equitable – measures stratified by gender, age, race, ethnicity and payor
Performance Measure Distribution by Donabedian Framework

Distribution of Measures by Donabedian Classification

- Outcome: 13 measures
- Process: 37 measures
- Structure: 10 measures

Measure Type

# of Measures
Cross-cutting measures include pain/sedation, severe illness, diagnostic testing and medication management
## Measure Content Areas

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<td>2. ED infrastructure and personnel</td>
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<td>10. Childhood infections</td>
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<td>11. Quality and safe care for all patients</td>
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Measure Development Process

SOURCES
- Research Literature
- Actual Use
- Concept

Candidate Measures N = 60

Measure by Measure Evaluation for Selection

Selection Criteria

Aim 2

Measure Set

Evaluation for Application

Adapted from AHRQ PDI development process
Stakeholder Groups

American Academy of Pediatrics
  Executive Committee of the Section on Emergency Medicine
  Committee on Pediatric Emergency Medicine (COPEM)

American College of Emergency Physicians
  Pediatric Emergency Medicine Subcommittee
  Quality and Performance Committee
  Quality Improvement and Patient Safety Section

Society of Academic Emergency Medicine – Clinical Guidelines Committee
Emergency Nurses Association – Quality and Patient Safety Work Team
Society of Trauma Nurses
American College of Surgeons - Committee on Trauma
Emergency Medical Services for Children Stakeholder Group
Family Advisory Network of EMSC State Partnership Grants
EMCare Emergency Physicians Group (community physician group)
Agency for Healthcare Research and Quality (AHRQ)
PECARN Steering Committee
Stakeholder Evaluation Results

Distribution of Importance Scores

Academic Physicians

Parents

Nurses
### Stakeholder Evaluation Results

#### Heat Maps by Responder group and NQF domain

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(1.1) Measuring weight in kilograms for ED patients <18 years of age

IOM Domains = Effective, Safe
Donabedian = Process
Diagnosis Group = General

Importance Data
Mean Importance Score = 5.0
Percent of stakeholders giving highest score = 45.6%

Stakeholder Survey Evaluation
Prioritized 15 Performance Measures

1. Measuring Weight in Kilograms for ED Patients <18 yrs of age
2. All Pediatric Equipment Present in the ED (per ACEP, AAP, ENA policy statement)
3. Reducing Pain in Children with Acute Fractures
4. Systemic Corticosteroids in Asthma Patients with Acute Exacerbations
5. Medication Error Rates
6. Parent/Caregiver Understanding of ED Discharge Instructions
7. ED Door to Provider Time
Prioritized 15 Performance Measures

8. Presence of Method to Identify Age Based Abnormal Pediatric Vital Signs
9. ED Return Visits within 48 hours resulting in admission
10. Total ED Length of Stay
11. Evidence Based Guideline for Bronchiolitis in place
12. Reducing Antibiotic use in Children with Viral Illnesses
13. Children with Minor Head Trauma (GCS 14,15) receiving a Head CT Scan
14. Protocol for Suspected Child Abuse in Place
15. Presence of on-site Pediatric Coordinator
Prioritized 15 Performance Measures

Distribution of Final 15 Measures by IOM Dimension
(measures may apply to more than one dimension)
Prioritized 15 Performance Measures

Distribution of Final 15 Measures by Donabedian Structure/Process/Outcome Domain
Prioritized 15 Performance Measures

Distribution of Final 15 Measures by Diagnosis Category

Disease Specific Categories Represented
- Asthma
- Bronchiolitis
- Viral Illness
- Head Trauma
- Child Abuse
Measure Development Process

SOURCES
- Research Literature
- Actual Use
- Concept

Candidate Measures

Measure by Measure Evaluation for Selection

Selection Criteria

Measure Set

Evaluation for Application

Adapted from AHRQ PDI development process
Data Availability

Aim

• To assess the current and future status of data availability for performance measures through a survey of stakeholder hospitals

Rationale

• Using electronic health records to collect data will allow us capture larger quantities of data with less time and effort
Measure Data Availability

Element Identification Process

- Operational definitions for 60 measures created
- Measures broken down into individual data elements
- Data elements separated into 5 categories
  1. Elements required for all measures
  2. Elements likely to be found in an electronic medical records system
  3. Numeric, non-clinical encounter oriented data collected at regular intervals (e.g., Quarterly or yearly)
  4. Data requiring sampling or possibly not collected in an EMR system
  5. Data collected manually, requiring discrete responses
- PECARN hospitals surveyed
  - Data element availability and quality
<table>
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<tr>
<th>Measure</th>
<th>Elements</th>
<th>Category of Element</th>
</tr>
</thead>
</table>
| Children with minor head trauma (GCS 14 or 15) receiving a head CT scan | • Unique visit identifier  
• ED arrival time  
• ED discharge time  
• Head CT complete time  
• ICD9 code (head trauma)  
• Glasgow Coma Scale (GCS) score | Category 1 elements  
Unique visit Identifier  
ED arrival time  
ED discharge time  
Category 2 elements  
Head CT complete time  
ICD9 code  
GCS score |
<table>
<thead>
<tr>
<th>Measure</th>
<th>Elements</th>
<th>Category of Element</th>
</tr>
</thead>
</table>
| Percent of Asthma patients with acute exacerbation receiving systemic corticosteroids | • Unique visit identifier  
• ED arrival time  
• ED discharge time  
• Date of birth or Age  
• ICD9 code (asthma)  
• Medication name  
• Medication received time | Category 1 elements  
Unique visit Identifier  
ED arrival time  
ED discharge time  
Date of birth/Age  
Category 2 elements  
ICD9 code  
Medication name  
Medication received time |
Data Availability

- 90% or more of sites indicate the ability to electronically capture category 1 elements
- Ability to electronically capture other expected elements was between 7% and 95%
- Median ability to capture category 2 data elements was 63%
Electronic Availability of Data Elements

Data Element
- Date of Visit
- Date of Birth
- Age
- Unique patient identifier (such as MRN)
- Patient Disposition
- ED arrival time
- Unique Visit identifier
- Lab test type
- Lab result available time
- CPT Evaluation and Management code
- ED discharge time
- Triage status
- Patient seen by provider time
- Weight
- ICD-9 code (all)
- CPT code (procedure code)
- Prescription(s)
- Medication name

Percent
0 10 20 30 40 50 60 70 80 90 100
Electronic Availability of Measures

- ED Return Visits within 48 hours resulting in admission
- ED Left Without Being Seen
- Total ED Length of Stay
- ED patients triaged using a validated pediatric triage tool
- Diagnostic Imaging Test Turn Around Time
- Laboratory Test Turn Around Time
- Measuring weight in kilograms for ED patients
- Timeliness of relievers for acute asthma exacerbations
- Systemic corticosteroids for acute asthma exacerbations
- ED Door to Provider
Measure Development Process

Sources:
- Research Literature
- Actual Use
- Concept

Candidate Measures

Selection Criteria

Measure by Measure Evaluation for Selection

Evaluation for Application

Measure Set

Adapted from AHRQ PDI development process
Improving Analgesic Administration for Children with Painful Conditions

Marc Gorelick, MD
Children’s Hospital of Wisconsin

Rationale:
• Pain is one of the most common presenting complaints for child ED visits
• Timely delivery of analgesics can reduce morbidity and improve satisfaction
• CHW has established pain reduction as a hospital-wide goal
Specific Improvement Aim

Overall Outcome/Global Aim
• Provide timely relief for children presenting with pain

Specific Aim
• By April 2008 (12 months) we will improve the rate of analgesic administration for children pain in triage by 15% (relative increase)
(5.5) Reducing pain in children with acute fractures

IOM Domains = Effective, Patient-Centered, Timely
Donabedian = Process
Diagnosis Group = Cross Cutting (Pain), Fractures

Importance Data
Mean Importance Score = 4.9
Percent of stakeholders giving highest score = 27.7%

Stakeholder Survey Evaluation
Reducing pain in children with acute fractures

• Numerator- Number of patients < 18 years of age with pain assessed and reassessed using the same age-appropriate pain scale who show documented improvement in pain score within 90 minutes of arrival

• Denominator- Number of patients < 18 years of age with acute long-bone fractures

• Notes- Examples of age appropriate pain scores include; NPASS, FLACC, Bieri faces pain scale and verbal analogue scale (VAS).
Operational Definition:

Analgesics for children with pain

- Numerator - Number of eligible children receiving an analgesic
- Denominator - Number of children <18 years of age with painful condition* and pain score > 3/10 in triage

* extremity injury, ear ache, headache, sore throat, dental caries/injury
Data Capture

• Eligible patients:
  - Manual review of ED logs to identify eligible diagnoses/electronic query of discharge diagnoses from billing data
  - Manual review of triage sheets for pain scores and chief complaints
  - Manual review of nursing notes/electronic query of MAR for analgesic administration
Interventions to Improve

Patient with eligible painful condition

Assess pain score

> 3

Assess contraindications (NPO, allergy, NSAID within 6 hours)

Administer ibuprofen 10 mg/kg po

Request alternative analgesic from physician
Proportion Receiving Analgesic
Arm Fracture Patients

months since intervention
Proportion Receiving Analgesic Arm Fracture Patients

![Graph showing proportion of patients receiving analgesics over time.](image-url)
## Proportion Receiving Analgesic

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
<th>Change (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All fracture patients</strong></td>
<td>58.2%</td>
<td>67.8%</td>
<td>9.6% (3.1, 16.0)</td>
</tr>
<tr>
<td><strong>Fracture patients with pain score&gt;3</strong></td>
<td>63.6%</td>
<td>75.2%</td>
<td>11.6% (4.5, 18.7)</td>
</tr>
</tbody>
</table>
Time to Analgesic

[Graph showing time to analgesic consumption over months since intervention]
Time to Analgesic

[Box plot diagram showing distribution of time to analgesic with two groups labeled 0 and 1.]

- Time scale: 0 to 300 minutes
- Data points distributed across 0 and 1 categories.
Conclusions

• Modest improvement in rate of analgesic administration for children with fractures
• No real change in timeliness (but both pre- and post- median was close to 30 minutes)
• Huge amount of effort to obtain data!
  ▪ QI considerations, especially around pain/analgesics, informing adoption of EHR
Improving the Timeliness of ED Care for Asthma Patients

Kathy Shaw, MD, MSCE
The Children’s Hospital of Philadelphia

Rationale:
• Asthma is the most common childhood illness resulting in hospitalization from the ED
• Timely care with bronchodilators and corticosteroids has been shown to reduce hospitalization rates
• CHOP has automated tracking of time to treatment to evaluate interventions such as co-location of asthma patients in a Respiratory Cohort
Specific Improvement Aim

Aim

- Increase the proportion of patients receiving bronchodilators and corticosteroids within one hour of ED arrival

Overall Outcome/Global Aim

- Decrease total ED length-of-stay and asthma hospitalization rates by providing timely, reliable and effective care to patients
(8.3) Timeliness of reliever treatment for patients with acute asthma exacerbation

IOM Domains = Effective, Timely
Donabedian = Process
Diagnosis Group = Asthma

Importance Data
Mean Importance Score = 4.9
Percent of stakeholders giving highest score = 28.4%

Stakeholder Survey Evaluation
(8.1) Systemic corticosteroids in asthma patients with acute exacerbation

IOM Domains = Effective
Donabedian = Process
Diagnosis Group = Asthma

Importance Data
Mean Importance Score = 5.1
Percent of stakeholders giving highest score = 33%

Stakeholder Survey Evaluation
Operational Definition:
Bronchodilator and Corticosteroid Treatment

• Denominator- Number of patients with:
  ▪ Primary diagnosis of asthma (493.XX)
  ▪ 2 years or older
  ▪ Triaged as Acute (level 2 in 5-level triage system)
  ▪ Received more than 1 bronchodilator in the ED

• Numerator- Number of eligible patients receiving medication within 1 hour from arrival
Data Capture

Data captured using a combination of information systems:

- **Arrival**: Registration system notes time of first contact of patient with greeter at ED front desk
- **Medication administration**: Time of administration documented by Respiratory Therapist or RN in computerized order system
Patients who received systemic steroids

Asthma as primary diagnosis

and triaged as ED acute

and given serial nebs in ED

Sources

- EPIC
- Wellsoft
- SCM

Definition

Narrowing Population

Outcome

Patients who received systemic steroids
Data Capture

- Hospital data warehouse identifies eligible patients from diagnosis, age and triage codes and displays trends interactively.
**Intervention to Evaluate**

**Overall goal**
- Reduce time to corticosteroid administration for Acute patients

**Intervention**
- Co-location of asthma patients in Respiratory Cohort
- Team approach with MD/NP, RN and RT
- Focus on one disease process
- Existing web-based pathway and computerized order sets
Mean Time to Steroid: Geographic Co-location

![Graph showing geographic co-location patients over time with corresponding time from arrival to corticosteroid administration. The graph indicates fluctuations in time taken for steroid administration.]
Mean Time to Steroid: All Patients
# Time to Inhaled Beta Agonist (IBA) and Corticosteroid (CS)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Non-cohort, N</th>
<th>Cohort, N</th>
<th>Non-cohort, minutes (IQR)</th>
<th>Cohort, minutes (IQR)</th>
<th>P value*</th>
<th>Median diff., minutes (95% CI)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to IBA from ED arrival</td>
<td>364</td>
<td>905</td>
<td>66 (41-101)</td>
<td>47 (31-71)</td>
<td>&lt;.0001</td>
<td>-17 (-22,-31)</td>
<td>-29%</td>
</tr>
<tr>
<td>Time to CS from ED arrival</td>
<td>364</td>
<td>905</td>
<td>69 (42-108)</td>
<td>47 (31-70)</td>
<td>&lt;.0001</td>
<td>-19 (-24,-15)</td>
<td>-31%</td>
</tr>
<tr>
<td>Time to IBA from room placement</td>
<td>341</td>
<td>801</td>
<td>36 (23-59)</td>
<td>28 (19-45)</td>
<td>&lt;.0001</td>
<td>-7 (-9,-4)</td>
<td>-21%</td>
</tr>
<tr>
<td>Time to CS from room placement</td>
<td>341</td>
<td>801</td>
<td>39 (24-66)</td>
<td>29 (19-45)</td>
<td>&lt;.0001</td>
<td>-9 (-12,-6)</td>
<td>-26%</td>
</tr>
</tbody>
</table>

*Wilcoxon Rank Sum for p values

Hodges-Lehman Estimate for median difference and 95%CI
ED Length of Stay (LOS) and Discharge Rate

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Non-cohort, N</th>
<th>Cohort, N</th>
<th>Non-cohort, minutes (IQR)</th>
<th>Cohort, minutes (IQR)</th>
<th>P value</th>
<th>Median diff., minutes (95% CI)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED LOS (all patients)</td>
<td>364</td>
<td>905</td>
<td>273 (223-353)</td>
<td>251 (207-317)</td>
<td>&lt;.0001</td>
<td>-19 (-23,-14)</td>
<td>-8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Non-cohort, N (%)</th>
<th>Cohort, N (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharged</td>
<td>174 (47.8%)</td>
<td>432 (47.7%)</td>
<td>1</td>
</tr>
</tbody>
</table>

Wilcoxon Rank Sum or Chi for p values
Hodges-Lehman Estimate for median difference and 95%CI
Conclusions

• Data about timeliness can be automated and used to track interventions to improve quality of care

Further work
• Other interventions to reduce admissions
• Methods to provide data back to staff in real time
Rationale:

• Cancer patients with fever and central lines have a high likelihood of becoming seriously ill due to infection
• Timely delivery of evidence-based care, including antibiotics, reduces morbidity and mortality
• The CCHMC strategic plan includes reducing ED length-of-stay by 20%
Specific Improvement Aim

**Aim**

- By March 2011, we will increase the proportion of oncology patients with cancer and a line with neutropenia who receive their first antibiotic within 90 minutes of ED arrival from 20% to 90%.

**Overall Outcome/Global Aim**

- Decrease total ED length-of-stay by providing timely, reliable and effective care to patients.
Measure 1- Operational Definition:

Did patients with fever, line and neutropenia receive antibiotics in the ED? (Yes, No)

- Numerator-Number of eligible children receiving antibiotics during Emergency Department visit
- Denominator-Number of children <18 years of age with fever, central line and neutropenia

Notes
- Fever: History or documentation of fever greater than or equal to 38.5°C (101.3°F) anytime within 24 hours prior to presentation or during ED visit
- Neutropenia: ANC less than or equal to 500
(10.1) Antibiotic treatment for children with sickle cell disease or documented neutropenia

IOM Domains = Effective, Safe
Donabedian = Process
Diagnosis Group = Fever, Immunosuppression

Importance Data
Mean Importance Score = 4.8
Percent of stakeholders giving highest score = 32.6

Stakeholder Survey Evaluation
Historical Data
November 2009 – June 2010

- 81 fever, line and neutropenia patients identified
- 100% received antibiotics in ED
- Average age: 8.1 years
- Average time to MD: 21.5 min
- Average time to Antibiotic - 179 min (3 hrs)
- Average Length of Stay 336 min (>5 hrs)
Measure 2-Operational Definition:

Time to antibiotic treatment for children with fever, line and neutropenia

- Time from arrival in ED to administration of first antibiotic
- Sample: Number of patients < 18 years of age with neutropenia and fever who received antibiotics
- What is the best way to report the outcome?
  - Median time with interquartile range
  - Proportion of patients meeting a defined goal (< 90 minutes)
(10.2) Time to antibiotic treatment for children with sickle cell disease or documented neutropenia

IOM Domains = Effective, Timely
Donabedian = Process
Diagnosis Group = Fever, Immunosuppression

Importance Data
Mean Importance Score = 4.7
Percent of stakeholders giving highest score = 27.7%

Stakeholder Survey Evaluation
Modified Operational Definition

- Identified all ED patients admitted to the bone marrow transplant / oncology service from the ED who received antibiotics
- Use of this proxy makes data capture easier—but still clinically relevant
- Time stamps
  - Arrival at front desk of ED
  - Administration of antibiotics (Zosyn, ceftriaxone, vancomycin)
Project: ED Care of Neutropenic Patients with Fever and Line

Initial Date: 07-01-2010
Revised: 09-13-2010

By March 2011, increase % of patients with F/L/N who receive their first antibiotic within 90 minutes of ED arrival from 20% to 90%

Global Aim
Providing timely, effective care to patients with fever/line/neutropenia will decrease total ED length-of-stay

Key Drivers
- Rapid identification and segmentation of eligible patients
- Treatment team knows the correct therapy
- Treatment team reliably implements the correct therapy
- Correct supplies, equipment and personnel readily available
- *ED and Oncology staff are aware of, accept and participate in the treatment plan
- Patients informed
  - Reminder by oncology at time of referral
  - Family advisory council brochure
- Supply cart to collect all specimens, access lines and antibiotics
- Awareness of performance (Level 1)
  - Feedback reports and ED dashboards
  - ED QI board with posted results

Interventions (Reliability level)
- Greeter desk questions
  - Oncology patient “blue card”
- Standardizing Care (Level 2)
  - Oncology referral checklist
  - ED referral Smartphrase
  - Epic Order Sets
- Team communication of accountability for roles, responsibilities and plan (Level 1)
  - Team huddle in patient room upon arrival
- Patients informed
- Supply cart to collect all specimens, access lines and antibiotics
- Awareness of performance (Level 1)
  - Feedback reports and ED dashboards
  - ED QI board with posted results

Key
Green shaded = what we’re working on right now

Project Leader: Evie Alessandrini
Interventions to Improve

Overall goal
• 90% of patients receive their FIRST antibiotic within 90 minutes of ED arrival

Standardizing Care and Early Order Entry
• Oncology fellow check list
• ED Order set
• Referral Smartphrase

Awareness of Performance
• Posting run charts
• Quality debrief at division meetings
Interventions to Improve

Type .EDONCREFERRALNOTE in the note
Interventions to Improve SmartPhrase for Oncology Referrals
Data Over Time
Median Time to Antibiotics

Median Time to Medication Taken vs. Average LOS (arrival to departure)
N=145, 11/11/09-10/11/10
(patients placed in groups of 10 thru 8/17/10 then groups of 5, ordered by arrival date)
Data Over Time

% Receiving Antibiotics within 90 Minutes

Proportion of Patients Receiving Antibiotic within 90 minutes of arrival vs. LOS
(arrival to departure)
N=145, 11/11/09-10/11/10
(patients placed in groups of 10 thru 8/17/10 then groups of 5, ordered by arrival date)
Are we fixing anything?

<table>
<thead>
<tr>
<th></th>
<th>Prior to intervention</th>
<th>Start of process</th>
<th>First Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of patients getting ABX &lt;90m</td>
<td>18%</td>
<td>33%</td>
<td>41%</td>
</tr>
<tr>
<td>Number of patients</td>
<td>70</td>
<td>30</td>
<td>36</td>
</tr>
</tbody>
</table>
Conclusions

• Use of the proxy can make data capture easier and decrease need to review all charts
• Expecting individuals to “remember” a protocol on low frequency events doesn’t work
• Annotating run chart can provide useful feedback on specific interventions
• Question data points that do not make sense-data isn’t always perfect
Overall Summary

- Work toward improving pediatric emergency care
  - Decrease the “unevenness”
- It’s a three step process
  - The first step toward achieving quality is convening expert members across the healthcare industry, including patients to define quality with uniform standards and measures that apply to the many facets of care patients receive.
  - Second, information gleaned from measuring performance is reported and analyzed to pinpoint where patient care falls short.
  - Third, caregivers examine information about the care they are providing and use it to improve.

References

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  ▪ Volume 56 (4), August 2009, pp 816-829
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  ▪ December 2005
• Joint Policy Statement—Guidelines for Care of Children in the Emergency Department
  ▪ Pediatrics 2009;124:1233–1243
Questions and Answers

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