DEFINING AND IMPROVING VALUE IN PEDIATRIC AND NEONATAL CARE

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Objectives

- Define the term health care value
- Explore problems with measuring value
- Discuss some of the measures of value
- Define 2 ways to improve value in health care

Conflicts/FDA

- I have no conflicts of interested related to the talk.
- I will give examples of how off-label use of medications in the NICU is unsafe.

If this cost was associated with world class outcomes, it might be worth it, but US health care is not the best in the world.
Medscape: What are your goals for healthcare in the United States? Interview with Dr. Berwick

- The health care system we have simply cannot be sustained.
- Create a healthcare system that is just, safe, infinitely humane, and that takes only its fair share of our wealth— that engages only in work that actually improves the lives of patients, families, and communities.
- "...Healthcare is a human right. We are the only Western democracy that hasn't made it a human right."

Is the care we provide safe?

- "Using a weighted average of the 4 studies, a lower limit of 210,000 deaths per year was associated with preventable harm in hospitals.
- ...the true number of premature deaths associated with preventable harm to patients maybe than 400,000 per year.
- Serious harm seems to be 10- to 20-fold more common than lethal harm."


Examples of Harm in the NICU

- Being admitted hypothermic
- E-Ferol
- Heparin and IVH
- Infusion of breast milk in IV
- Lipids being infused at hyperalimentation rate and hyperalimentation being infused at the lipid rate.

Cost of Adverse Events/Medical Errors

EQUAL TO UP TO 45% OF HEALTH CARE SPENDING

Source: National Center for Policy Analysis

TRADITIONAL PAYMENT SYSTEM

- Providers/Hospitals are typically not compensated for producing value. Instead, they are rewarded for the volume of services they provide.
- THINGS HAVE AND ARE CHANGING
  - Pay for performance
  - Value based care
  - Accountable Care Organizations (ACOs)
  - ... 

Resources required for value based programs

- Information Technology
  - Cyber-Security measures
  - EHR customization
  - Patient portal
  - Predictive analytics/modeling
  - Tele- and mobile health
- Human Capital
  - Higher number of non-MD providers
  - Population health management staff
  - IT staff: architecture, database, data warehouse, analysts

Major Payment models in the U.S.- The Risk Escalator Model

What is value?

http://www.merriam-webster.com/dictionary/value

- Noun
  - the amount of money that something is worth: the price or cost of something
  - something that can be bought for a low or fair price
- Verb
  - to make a judgment about the amount of money that something is worth
  - to think that (someone or something) is important or useful

- **Value = Outcomes/Costs** (Encompasses efficiency)
- Or maybe Outcomes/What the health care team gets paid
  - Cost reduction without regard to the outcomes
    - Dangerous and self-defeating
    - False "savings"
    - The patient who dies reduces health care cost but no one would say that is a good outcome of a health care encounter or a health care system
- Outcomes (numerator)
  - Inherently condition-specific and multidimensional
  - No single outcome captures the results of care

Value reduction without regard to the outcomes

- **Cost (denominator)** = total costs of the full cycle of care for the patient’s medical condition, not the cost of individual services.

Cost reduction without regard to the outcomes

- To reduce cost, we may spend more on some services to reduce the need for others.
- This is particularly true of children as the cost of care is amortized over a lifetime.
- Preventing premature birth and promoting normal neurodevelopmental outcomes can improve the quality of life and reduce cost of care.

The perspective of value matters

- Patients
- Employers
- Payers
- Providers

Problems

- Cost is always the sum of everything paid for that service (insurance payments, co-pays, interventions/medications deductibles, etc.)
- Costs are often reduced (or increased) without regard to outcome.
- Providers contracting with payers are constantly increasing or decreasing their costs with no change in their patient outcomes.
- Medications are prescribed that may increase harm (associated with a worse outcome) and cost.
- The patient may perceived that they received valuable care because they got the antibiotics they wanted but the opposite may be true. The over use of antibiotics promotes the emergence of resistant organisms and this effect everybody.

The Value Equation’s Components

- Outcome Measures (Numerator)
  - How do we measure the quality of the care we provide in the NICU?
Domains

- Delivered to defined patient/s, by a defined provider/s and must relate to one domain.
  - Process - a health care service provided to or on behalf of a patient.
  - Outcome - a patient’s health state resulting from health care.
  - Access - the patient’s attainment of timely and appropriate health care.
  - Patient experience - a patient report about observations of and participation in health care.

Guidelines for Measurement
National Quality Measures Clearinghouse

- Quality of Care
  - The degree to which health care services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.

- Measurement
  - Assigning a quantity to quality by comparing it with a criterion.

Reliability vs Validity

- Reliability is the extent to which variation in the outcome measure is due to variation in quality of care rather than random variation due to the sample of cases observed.

- Validity is the accuracy with which the outcome measure reflects the quality of care on average.

- Validity depends on the accuracy of calculations: whether complete records are available and the accuracy of the data in the medical record.

Frame of Reference/Benchmark
Comparison Group Matters

Problems With the General Application of Any Model

- Standardized Rate: Observed outcome rate divided by the predicted rate
- Inadequate sample size (but may be slow in identifying poor performers if we have to wait for adequate sample size)
- Selection biases
- Comparison group/benchmark
- How the model is built
- Neonatal care changes and the model must be recalibrated

What is SMR (Shrunken)?

“A shrunken standardized morbidity or mortality ratio (SMR) and its upper and lower bounds indicate whether your center has more or fewer infants with the outcome than would be expected given the characteristics of infants treated at your center. It is calculated as observed/expected rate of the event being measured.”

https://nightingale.vtoxford.org/help/ISSL/WebHelp/SMR.htm

DOES RISK ADJUSTMENT WORK?

Look at the next 2 slides. The data is from the same site and measured by the same group. What makes the difference? Why do the error bars and point estimates of the standardized outcomes change?

How do you want to be graded?
How do you want your quality measured?
Do we really know the cost of health care?

Costs, charges and payments

- Variable costs (salaries of clinicians, costs of supplies and medications)
- Fixed costs (overhead expenses and cost of equipment, land and buildings)
- Hospital charges are list prices for medical services

List prices (charges) are not reflective of what patients/insurance actually pay.

SIX CATEGORIES OF WASTE

- Overtreatment
- Failures of care coordination
- Failures in execution of care processes
- Administrative complexity
- Pricing failures
- Fraud and abuse

The sum of the lowest available estimates exceeds 20% of total health care expenditures.


Cultural, environmental and cognitive characteristics vary among NICUs perhaps more than traditional CQI methodology and PBPs, possibly explaining the inconstancy of VLBW infant morbidity reduction efforts.
What are some of the ways to decrease healthcare cost in the newborn care?

Prevent Morbidities


- 425 VLBW infants born alive between July 2005 and June 2009 at Rush University Medical Center.
- After controlling for birth weight, gestational age, and sociodemographic characteristics
  - brain injury associated with a $12,048 increase in costs;
  - necrotizing enterocolitis, with a $15,440 increase costs;
  - bronchopulmonary dysplasia, with a $31,565 increase;
  - and late onset sepsis, with a $10,055 (P < .001) increase.

Important to remember that this is rare but the cost of rare events get payers attention.
Reduce site variability in care and outcomes

Site variation is real; it is large and it influences everything (cost and outcomes and patient satisfaction and families and ...)


Hospital Rates of Risk-Adjusted Outcomes and Active Treatment by Gestational Age at Birth.

Reduce early delivery (Late Preterm/Early Term)

Any Report of Use of H2 blockers By Site

- Baseline 09to10 • 11to12

Site Random Code

Outliers

Overall

Your Biggest C-Section Risk May Be Your Hospital. By Tara Haelle. Last updated: May 16, 2017
http://www.consumerreports.org/c-section/your-biggest-c-section-risk-may-be-your-hospital/

Most U.S. Hospital C-Section Rates Too High

Sucksdorff et al. Preterm Birth and Poor Fetal Growth as Risk Factors of Attention-Deficit/Hyperactivity Disorder. www.pediatrics.org/cgi/doi/10.1542/peds.2015-1493

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CONCLUSION:
The available data, all observational, show reduced odds of mortality to discharge in neonates born before 24 weeks of gestation who received antenatal corticosteroids and active intensive treatment. Antenatal corticosteroids should be considered for women at risk of imminent birth before 24 weeks of gestation who choose active postnatal resuscitation.


• Observational cohort study, participants were extremely premature infants (birth weight range, 401-1000 g; gestational age, 22-27 weeks) who were born at participating centers of the NRN between January 2006 and December 2011.
  • 848 infants in the no ANS group
  • 1581 in the partial ANS group
  • 3692 in the complete ANS group

• Among the no, partial, and complete ANS groups, there were significant differences in the rates of:
  • mortality (43.1%, 29.6%, and 25.2%, respectively)
  • severe intracranial hemorrhage among survivors (23.3%, 19.1%, and 11.7%),
  • death or necrotizing enterocolitis (48.1%, 37.1%, and 32.5%),
  • and death or bronchopulmonary dysplasia (74.9%, 68.9%, and 65.5%).

• Death or neurodevelopmental impairment occurred in 68.1%, 54.4%, and 48.1% of patients in the no, partial, and complete ANS groups, respectively. Logistic regression analysis revealed that complete (odds ratio, 0.63; 95% CI, 0.53-0.76) and partial (odds ratio, 0.77; 95% CI, 0.63-0.95) improved outcomes.

Antibiotic Stewardship

Antimicrobial Exposure and NEC

1. Avoid routine use of antireflux medications for treatment of symptomatic gastroesophageal reflux disease or for treatment of apnea and desaturation in preterm infants.
2. Avoid routine continuation of antibiotic therapy beyond 48 hours for initially asymptomatic infants without evidence of bacterial infection.
3. Avoid routine use of pneumograms for predischarge assessment of ongoing and/or prolonged apnea of prematurity.
4. Avoid routine daily chest radiographs without an indication for intubated infants.
5. Avoid routine screening term equivalent or discharge brain MRIs in preterm infants.

In Monte Carlo simulation, current feeding of ELBW infants was associated with $28 excess NEC cases and 121 excess deaths annually, compared with a model in which 90% of infants received ≥ 98% MM.

These models estimated an annual cost of suboptimal feeding of ELBW infants of $27.1 million (CI $24million, $30.4 million) in direct medical costs, $563,655 (CI $476,191, $599,069) in indirect nonmedical costs, and $1.5 billion (CI $1.3 billion, $1.6 billion) in cost attributable to premature death.
Engage in large collaboratives

100,000 Babies Campaign

“Redesigning the Delivery of Neonatal Intensive Care”

A national quality improvement program designed to improve the outcomes of all critically ill newborns


Quality Summit Attendance & CDW Utilization by Clinicians

<table>
<thead>
<tr>
<th>Activity</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Summit Attendance</td>
<td>263</td>
<td>331</td>
<td>447</td>
<td>414</td>
<td>425</td>
<td>456</td>
<td>468</td>
</tr>
<tr>
<td>CDW Unique Visitors</td>
<td>301</td>
<td>512</td>
<td>547</td>
<td>648</td>
<td>693</td>
<td>638</td>
<td>659</td>
</tr>
<tr>
<td>CDW Visits</td>
<td>1,656</td>
<td>1,568</td>
<td>1,276</td>
<td>1,100</td>
<td>1,004</td>
<td>1,048</td>
<td>1,270</td>
</tr>
<tr>
<td>CDW Reports Viewed</td>
<td>6,511</td>
<td>10,132</td>
<td>11,819</td>
<td>15,314</td>
<td>15,443</td>
<td>16,148</td>
<td>17,122</td>
</tr>
</tbody>
</table>

Increased...
- # of clinicians attending Quality Summits
- # of clinicians utilizing the CDW
- # of CDW Visitors
- # of CDW Reports generated

Cumulative Reduction in Morbidity and Cost

<table>
<thead>
<tr>
<th>Observed vs Expected Morbidity</th>
<th>Cumulative Cost</th>
<th>Savings*</th>
</tr>
</thead>
<tbody>
<tr>
<td>324 fewer babies with severe IVH</td>
<td>$3,904,000</td>
<td></td>
</tr>
<tr>
<td>800 fewer babies with NEC</td>
<td>$12,352,000</td>
<td></td>
</tr>
<tr>
<td>745 fewer babies with BPD</td>
<td>$23,516,000</td>
<td></td>
</tr>
<tr>
<td>3,272 fewer babies with late sepsis</td>
<td>$32,900,000</td>
<td></td>
</tr>
</tbody>
</table>

($total: $72,672,000)

Cumulative Reductions in Mortality, Medications

<table>
<thead>
<tr>
<th>Observed vs Expected Morbidity</th>
<th>Cumulative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2008-2013, compared to 2007 baseline)</td>
<td>Savings* (2008-2013, compared to 2007 baseline)</td>
</tr>
<tr>
<td>65,118 fewer days of H-2 blockers</td>
<td>???</td>
</tr>
<tr>
<td>1,885 fewer deaths (all BW)</td>
<td>???</td>
</tr>
<tr>
<td>842 fewer deaths (501-1500g)</td>
<td>???</td>
</tr>
<tr>
<td>1,815 MORE babies 501-1500g who survived without morbidity</td>
<td>???</td>
</tr>
</tbody>
</table>

Total $$: ???????????


Prevent the need for health care
Fix things right the first time (decrease readmissions)
Improve safety/Do not hurt your patient

“Therapeutic illusion”
When physicians believe that their actions or tools are more effective than they actually are, the results can be unnecessary, dangerous and costly care.

Do You Remember E-Ferol? The Penalty for Selling Untested Drugs in Neonatology

- O’Neal/Jones & Feldman Pharmaceuticals began marketing E-Ferol in the fall of 1983 as a vitamin supplement.
- The product was never submitted for FDA approval. Physicians incorrectly assumed E-Ferol had been tested and approved for use by the FDA.
- In 1984, E-Ferol killed at least 38 newborns.
- Iatrogenic disasters are often caused primarily by well-intentioned physicians using logical therapies which turned out to have unexpected, lethal side effects.
- On January 19, 1989, three defendants pleaded guilty and were sentenced to fines of $130,000 each and 6-month jail sentences. Legal settlements in 100,000,000 range.

Vitamin E
Has anyone ever heard of E-ferol? www.eferol.com


Jerold F. Lucey Pediatrics 1992;89:159

10/28/2018

- Medication error that occurred in an Indiana hospital received nationwide publicity when three premature infants died as a result.
- The infants mistakenly received overdoses of heparin because the wrong strength was used to prepare flush solutions for umbilical lines.
- The error occurred when heparin 10,000 units/mL, 1 mL vials inadvertently were placed into a unit-based automated dispensing cabinet (ADC) pocket where heparin 10 units/mL, 1 mL vials were normally kept.
- While nothing can erase the grief experienced by the families and hospital workers in the wake of this tragic incident, it does serve as a reminder of the need to take a closer look at heparin utilization in our facilities.

Barriers

- Inconsistency in team membership.
- Lack of time.
- Lack of information sharing.
- Hierarchy.
- Varying communication styles.
- Presence of conflict.
- Lack of coordination and follow-up.
- Misinterpretation of cues.
- Lack of role clarity.