High Value Care in Pediatrics

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I have nothing to disclose.

I do not plan to discuss any off-label medication use.
Learning Objectives

1) Define common terms in value-based care including high and low value care, over diagnosis, overuse, and value based purchasing
2) Articulate strategies to engage in high-value care in practice
3) List common examples of low-value care in pediatrics
4) List resources for improving the teaching and practice of high-value care

JAMA Patient Page

High-Value Care

Arla A. Raza, MD, MSc

High-value care means providing the best care possible, efficiently using resources, and achieving optimal results for each patient.
Value-Based Purchasing (VBP)

Linking provider payments to improved performance by health care providers. This form of payment holds health care providers accountable for both the cost and quality of care they provide. It attempts to reduce inappropriate care and to identify and reward the best-performing providers. [Healthcare.gov](https://www.healthcare.gov)

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Low-Value Care

- The term *low-value care* refers to health care services with little potential benefit or for which less expensive alternatives are available
- *Overtreatment* (provision of treatments that are more likely to harm than benefit), *overtesting* (use of tests that are more likely to result in harm than benefit) and *overdiagnosis* (diagnostic labeling of conditions that are not clinically relevant)
- Overuse is underappreciated because: 1) Rarely tracked or prioritized (few measures) 2) Identification is complex 3) Harms can occur after a long cascade of interventions 4) No administrative home

The first duties of the physician is to educate the masses not to take medicine.

William Osler

Avoiding overuse is “the next quality frontier.”

• Don Berwick *Lancet*. 2017

But it really all boils down to...
At least $200 billion/year wasted on overuse, but not well studied in Peds

- RCT's don't exist for well child visits, developmental screening tests
- Vaccinations (our most effective interventions) are UNDERUSED
- Twice as many kids as adults > 65 but also cheaper—$3,552 vs $18,988*
- Weak evidence base/Children are fragile*
- Screening may have large returns over a lifespan*
- Harms (radiation, abx) may have greater effects in children

Ralston S, Schroeder A. JAMA Pediatrics October 2017
Is Excessive Resource Utilization an Adverse Event?

- An estimated one-third of care delivered in the United States is considered wasteful (IOM 2012)
- Much of this waste results from well-intentioned physicians who, in seeking to provide excellent care to their patients, conflate “the best care” with “the most care”
- “Even though there is general agreement that health care costs are excessive and that clinicians should be stewards of resource utilization, it is not always clear...if overuse should be evaluated in the same manner as a typical case review of adverse events.”


Why overuse is so prevalent

- Doing more feels safer, because it alleviates uncertainty, particularly when the stakes are high.
- Parental pressure, peer review, defensive medicine, emphasize errors of omission over commission, vigilance and effort needed to perform fewer tests (closer follow up outpatient, more exams in-patient)
- Publication bias and economic incentives (fee for service)
- Any review of an adverse event related to an intervention should include a discussion of whether the intervention was warranted in the first place.

Comprehensive review of 48 articles and 13,011 clinicians

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Harms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overestimate</td>
<td>32%</td>
</tr>
<tr>
<td>Underestimate</td>
<td>9%</td>
</tr>
</tbody>
</table>

Clinicians’ Expectations of the Benefits and Harms of Treatments, Screening, and Tests A Systematic Review
Overdiagnosis: How Our Compulsion for Diagnosis May Be Harming Children

- Definition
- Overdiagnosis versus misdiagnosis
- The condition detected was the condition sought (true positive)
- Not beneficial, potentially harmful
- Can knowing more not be beneficial?

Overdiagnosis Occurs When screen-detected cancers are either non-growing or so slow-growing that they never would cause medical problems

SCREENING DETECTS CANCER

<table>
<thead>
<tr>
<th>Size of Cancer</th>
<th>Time</th>
<th>Death from Other Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal Cell</td>
<td>Fast</td>
<td>Slow (Size at which cancer causes death)</td>
</tr>
<tr>
<td></td>
<td>Slow</td>
<td>Very Slow (Size at which cancer causes symptoms)</td>
</tr>
<tr>
<td></td>
<td>Very Slow</td>
<td>Non-progressive</td>
</tr>
</tbody>
</table>

This is when overdiagnosis occurs

Source: HCO Division of Cancer Prevention
Adapted from a figure provided courtesy of H. Gilbert Welch, Dartmouth Medical School
Pediatric Overdiagnosis Examples

- ADHD
- Bacteremia
- Aspiration
- Cholelithiasis
- Food Allergy
- VUR
- Hypoxemia in bronchiolitis
- Medium-Chain Acyl-Coenzyme A Dehydrogenase deficiency
- Neuroblastoma

Can we avoid overtesting and overtreatment and still not miss pathology? What about UTI?

Shaikh et al. *JAMA Pediatr*. 2018
Who Warrants a Urine Specimen?

AAP

• Overall rate ~5%

<table>
<thead>
<tr>
<th>Risk Factors: Girls</th>
<th>Probability of UTI (Girls)</th>
<th>No. of Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>White race</td>
<td>&gt;1%</td>
<td>&gt;1</td>
</tr>
<tr>
<td>Age &lt;12 mo</td>
<td>&gt;2%</td>
<td>&gt;2</td>
</tr>
<tr>
<td>Temp ≥39°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever ≥2d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No source</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Factors: Boys</th>
<th>Probability of UTI (Boys)</th>
<th>No. of Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonblack race</td>
<td>&gt;1%</td>
<td>0</td>
</tr>
<tr>
<td>Temp ≥39°C</td>
<td>&gt;2%</td>
<td>1</td>
</tr>
<tr>
<td>Fever &gt;1d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No source</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Factors Uncircumcised</th>
<th>No. of Factors Circumcised</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1%</td>
<td>&gt;2</td>
</tr>
<tr>
<td>&gt;2%</td>
<td>&gt;3</td>
</tr>
</tbody>
</table>

*There’s an app for that:*—Clinical variables plus laboratory results

Available at [https://uticalc.pitt.edu](https://uticalc.pitt.edu)

Test at 2% risk, tx at 5%
<table>
<thead>
<tr>
<th>Model Used to Determine Testing</th>
<th>Urine Samples, No.</th>
<th>UTIs Missed, No.</th>
<th>Urine Samples per UTI Detected, No.</th>
<th>Laboratory Test or Model Used to Determine Treatment</th>
<th>Children With Unnecessary Antibiotic Prescriptions, No.</th>
<th>Children With Delayed Antibiotic Treatment, No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAP algorithm^b</td>
<td>765</td>
<td>3</td>
<td>11.4</td>
<td>Dipstick^c</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dipstick + Gram stain^d</td>
<td>49</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hemocytometer^e</td>
<td>42</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Enhanced UA^f</td>
<td>70</td>
<td>3</td>
</tr>
<tr>
<td>UTICalc^d</td>
<td>684</td>
<td>0</td>
<td>9.8</td>
<td>Dipstick</td>
<td>31</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dipstick + Gram stain</td>
<td>49</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hemocytometer</td>
<td>31</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Enhanced UA</td>
<td>43</td>
<td>3</td>
</tr>
</tbody>
</table>

*Please note: The pretest probability of UTI for your patient is relatively HIGH (i.e., greater than or equal to 2.0%). Many clinicians would obtain a urine sample in a patient with this probability.*
Rush to the Calculator?

Newman, Arch Ped Adol Med 2002

Full Cohort (N = 3066)
Avg Age, 7.0 wk
Avg Temp, 38.6°C
P(UTI), 8.9%

Urine Test at the First Visit
(n = 1666)
Avg Age, 6.2 wk
Avg Temp, 38.9°C
P(UTI), 9.7%

No UTI
(n = 1505)
Avg Age, 6.2 wk
Avg Temp, 38.7°C
P(UTI), 8.7%

Follow-up Obtained
(n = 1324)
Avg Age, 7.9 wk
Avg Temp, 38.5°C
P(UTI), 8.0%

No Follow-up Obtained
(n = 76)
Avg Age, 7.6 wk
Avg Temp, 38.4°C
P(UTI), 6.5%

Antibiotics Given at the First Visit
(n = 486)
Avg Age, 6.3 wk
Avg Temp, 38.6°C
P(UTI), 8.8%

UTIs Predicted: 8.8% of 486 = 43
UTIs Observed = 4

No Antibiotics Given at the First Visit
(n = 807)
Avg Age, 7.7 wk
Avg Temp, 38.5°C
P(UTI), 7.6%

UTIs Predicted: 7.6% of 807 = 61
UTIs Observed = 2

Antibiotic Data Missing
(n = 31)
Avg Age, 6.2 wk
Avg Temp, 38.6°C
P(UTI), 6.3%

UTIs Predicted: 5.9% of 31 = 2
UTIs Observed = 0
It’s a Freak Thing…

Head Trauma

- There’s an app for that too

https://ttrikalin.github.io/ciTBI-prediction-tool/
Table 1. PECARN Rules for Risk Stratification of Children With Minor Head Trauma

<table>
<thead>
<tr>
<th>Risk Groups per Age (Average Risk of ciTBI)</th>
<th>Criteria</th>
<th>Comment</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age &lt;2 y</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher risk (4.4%)</td>
<td>GCS score 14 or other signs of AMS, or palpable skull fracture</td>
<td>Other signs of AMS include agitation, somnolence, repetitive questioning, slow response to verbal communication; 13.9% of population</td>
<td>CT imaging</td>
</tr>
<tr>
<td>Low risk (0.9%)</td>
<td>Occipital, parietal, or temporal scalp hematoma; or history of LOC ≥ 5 s; or severe mechanism of injury; or not acting normally per parent</td>
<td>Severe mechanisms of injury include motor vehicle crash with patient ejection, death of another passenger, rollover; pedestrian or bicyclist without helmet struck by a motorized vehicle; fall from &gt;0.9 m; or head struck by a high-impact object; 32.9% of population</td>
<td>Observation vs CT based on (1) clinician experience, (2) guardians’ preference, and (3) risk stratification (presence of multiple vs isolated findings; worsening course after emergency department observation, age &lt;3 mo)</td>
</tr>
<tr>
<td>Very low risk (&lt;0.02%)</td>
<td>None of the aforementioned criteria</td>
<td>53.2% of population</td>
<td>No CT imaging</td>
</tr>
<tr>
<td><strong>Age ≥2 y</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher risk (mean 4.4%)</td>
<td>GCS score 14 or other signs of AMS, or signs of basilar skull fracture</td>
<td>14.0% of population</td>
<td>CT imaging</td>
</tr>
<tr>
<td>Low risk (0.8%)</td>
<td>History of LOC, history of vomiting, severe mechanism of injury, or severe headache</td>
<td>Definitions as above, with the exception that falls from a height of at least 1.5 m count as severe mechanisms of injury: 28.8% of population</td>
<td>Observation vs CT based on (1) clinician experience, (2) guardians’ preference, and (3) risk stratification (presence of multiple vs isolated findings; worsening course after emergency department observation)</td>
</tr>
<tr>
<td>Very low risk (0.05%)</td>
<td>None of the aforementioned criteria</td>
<td>57.2% of population</td>
<td>No CT imaging</td>
</tr>
</tbody>
</table>

Table 2. Cross-Classification of Predictions of Very Low, Low-, or Higher-Risk and ciTBI Status in the 2 Age Strata

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Cohort or Outcome</th>
<th>Very Low Risk (&lt;0.1%)</th>
<th>Low Risk (0.1% to 3%)</th>
<th>Higher Risk (&gt;3%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OCT</td>
<td>PECARN</td>
<td>OCT</td>
</tr>
<tr>
<td>Younger (&lt;2 y and predominantly nonverbal)</td>
<td>Development</td>
<td>No ciTBI</td>
<td>6085</td>
<td>4541</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ciTBI</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Validation</td>
<td>No ciTBI</td>
<td>1520</td>
<td>1158</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ciTBI</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Older (≥2 y and predominantly verbal)</td>
<td>Development</td>
<td>No ciTBI</td>
<td>16427</td>
<td>14478</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ciTBI</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Validation</td>
<td>No ciTBI</td>
<td>4167</td>
<td>3656</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ciTBI</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Abbreviations: ciTBI, clinically important traumatic brain injury; OCT, optimal classification tree; PECARN, Pediatric Emergency Care Applied Research Network.
De-implementation

Evidence-based de-implementation for contradicted, unproven, and aspiring healthcare practices
VIP NETWORK

• VIP Network began as a grass-roots organization founded in 2008 by a group of pediatric hospitalists committed to improving the value of care for hospitalized children.

• The vision was to build an inclusive pediatric inpatient collaboration for clinicians in order to provide hospitalized children the most efficient, safe, and evidence based healthcare.

• In 2011, the VIP Network joined the American Academy of Pediatrics (AAP) and became an instrumental part of the overall quality improvement program at the AAP.
VALUE IN INPATIENT PEDIATRICS (VIP) NETWORK

354 pediatric hospitalists from over 200 hospitals

VIP MISSION:
To improve the value of care delivered to any pediatric patient in a hospital bed by helping providers implement clinical practice guidelines and other best practices focused on eliminating harm and waste caused by over utilization.

PROJECTS

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Year(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardization of Fluids in Inpatient settings (SOFI)</td>
<td>2018-2020</td>
</tr>
<tr>
<td>Pathways for Improving Pediatric Asthma Care (PIPA)</td>
<td>2017 - 2019</td>
</tr>
<tr>
<td>Reducing Excessive Variability in Infant Sepsis Evaluation (Project REVISE)</td>
<td>2016 - 2018</td>
</tr>
<tr>
<td>Quality Improvement for Children Hospitalized with Urinary Tract Infection (Q-UTI)</td>
<td>2015 - 2016</td>
</tr>
<tr>
<td>Stewardship and Improvement in Bronchiolitis (SIB)</td>
<td>2015 - 2016</td>
</tr>
<tr>
<td>Quality Collaborative for Improving Hospitalist Compliance with the AAP Bronchiolitis Guideline (B-QIP)</td>
<td>2013 – 2014</td>
</tr>
<tr>
<td>Benchmarking Bronchiolitis</td>
<td>2008-2010</td>
</tr>
</tbody>
</table>
DE-INNOVATION (OR DE-ADOPTION, OR DE-IMPLEMENTATION) IS NOT INNOVATION IN REVERSE

- The Psychological Impact Of Shifting Standards
  - Endowment effect
  - Cognitive dissonance
- Confirmation bias
- Biases Arising From Clinical Experience
- Availability heuristic
- Specialty bias
- Seeing Causality When It Isn’t There

Ubel P, Asch D. Creating Value In Health By Understanding And Overcoming Resistance To De-Innovation. HEALTH AFFAIRS 34, NO. 2 (2015): 239–244
“Men generally fix their affections more on what they are possessed of, than on what they never enjoyed. For this reason, it would be greater cruelty to dispossess a man of any thing, than not to give it him.”

David Hume 18th Century Scottish Philosopher

Cognitive Dissonance
DE-IMPLEMENTATION FRAMEWORK

• The **individual** health professionals - awareness, knowledge, attitude, outcome expectancy, beliefs, routines
• The **innovation itself** - empirical evidence, attractiveness, credibility, feasibility
• The **patients** - knowledge, skills, attitude, adherence
• The **social context** - opinion of colleagues, culture of the network, leadership
• The **organizational context** - organization of care processes, staff, capacities, structures
• The **economic and political context** - financial arrangements, regulations and policies

WHY DOES COLLABORATING MATTER?

- Most identified access to educational materials sanctioned by a national organization as helpful, including the strategy of offering a “menu” of options rather than proscribing all elements of the intervention
- Many reported that the “camaraderie” of belonging to a larger group helped them cope with difficulties
- We hypothesize that group norming is a major factor in VIP successes

INTERPERSONAL RELATIONSHIPS

- Team engagement was the only factor quantitatively associated with better performance in the overall cohort
- Qualitative themes around team engagement, including the presence of buy-in for successful sites and the inability to engage colleagues at unsuccessful sites, were important differentiating factors between top and bottom performance quartiles
- Some sites voluntarily put together much larger teams than others, and this positively correlated with performance.
- Successful sites’ interviews reflected high engagement of multiple participants, citing frequent meetings and using the term “team” often.
- Bottom quartile site interviewees frequently mentioned that other colleagues did not share in the work required to accomplish the project. They also cited time constraints as a reason for the lack of buy-in from colleagues.

* Shawn L. Ralston, MD, MS; Emily Carson Atwood, MD; Matthew D. Garber, MD; Alison Volpe Holmes, MD, MPH. What Works to Reduce Unnecessary Care for Bronchiolitis? A Qualitative Analysis of a National Collaborative. ACADEMIC PEDIATRICS 2017;17:198–204
INSTITUTIONAL FACTORS

• Peds units in community hospitals 53%, CH within adult-focused hospitals 47%
• Most sites reported that intra-institutional competition for limited resources to do QI differentially hindered pediatrics as a discipline
• They also noted the difference between declarations of administrative support and meaningful resource contributions
• The ability to successfully change the content of disease-specific resources within the electronic medical record (EMR) during the course of the project was almost universally cited as crucial.
• Participants emphasized the difficulty in ensuring continuity of disease management across the continuum of care within an institution (got everything in the ED)

THE CONTINUUM OF CARE

• We learned that we needed to include all stakeholders from the get-go, specifically including ER as an equal partner in the planning and execution of the project (they ‘owned’ the initial interventions)
• Audit and feedback (real time run charts generated by QIDA) helpful with comparison to the ‘norm’ (the network) along with a goal and an action plan
• Group norming “this is what everybody’s doing now”
• Validation – yes you did see infants respond to albuterol (but important outcomes like admission rates and length of stay are not ultimately affected)
DIPLOMACY IS KEY

Hello. My name is Inigo Montoya. You killed my father. Prepare to die.

Remember Inigo Montoya:
1. Polite greeting
2. Name
3. Relevant personal link
4. Manage expectations

IN SUMMARY: TEN YEARS AGO WE WANTED TO....

• Address the things that bother people (common conditions where strong evidence exists and care is documented to be variable)
• Target the places children are treated (general hospitals, children’s hospitals within hospitals)
• Address issues where the provider has control over the intervention measured (appeal to personal responsibility)
AND, WE LEARNED?

- De-implementation is complicated and non-linear
- Many individual and group psychological factors interplay
- Group norming is important
- What gets measured gets managed….up to a point

RESOURCES

- Safely Doing Less
- Less is More
- Bending the Value Curve
- The Lown Institute Right Care Alliance
- Avoiding Avoidable Care
- Preventing Overdiagnosis
- High Value Care Academic Alliance
- Choosing Wisely
High-Value Care Pediatric Curriculum
Suzanne Woods, MD, Carolyn Avery, MD, MHS, Kathleen Bartlett, MD, William Bordley, MD, MPH, Aimee Chung, MD, Brian Eichner, MD, Mikelle Key-Solle, MD, Heather McLean, MD, David Ming, MD Published: July 16, 2015

Definitions

**Cost:** the expenditure of money, time, labor related to providing a given healthcare service

**Charge:** the dollar amount requested by a healthcare provider for a given service

**Price:** the dollar amount the patient has to pay for a given service

**Reimbursement:** the dollar amount a third party negotiates as a payment to the healthcare provider
LESS IS MORE

LESS IS MORE

It’s All Fun and Games Until Somebody Shoots His Eye Out

Hospital Pediatrics 2014

Choosing Wisely

An initiative of the ABIM Foundation

AVOIDING AVOIDABLE CARE

April 25-26, 2012 | Cambridge, MA

NEW AMERICA FOUNDATION

PREVENTING OVERDIAGNOSIS

Selling Sickness

People Before Profits
The Last Word