Envisioning The Future Of Value Based Payment

#valuepayment

May 12, 2016
W Hotel
Washington, DC
Health Affairs thanks our sponsors:
Panel 1:
**Current And Future Challenges Of Hospital Value Based Payment**

HealthAffairs
Modifying Value-Based Purchasing To Drive Improvement

David W. Baker, MD, MPH, FACP
Executive Vice President, Healthcare Quality Evaluation
The Joint Commission
Shift From HACs To Harm Measures

- Currently, major causes of harm are not measured,* many measures invalid, severity not considered, only lowest quartile penalized
- Develop valid measures of all-cause harm
  - Incentivize culture of safety across hospital
- Incorporate weights for harm severity
  - Focus on harms most important to patients
- Increasing penalties if above a benchmark
  - Encourages improvement across spectrum

*Jha and Pronovost, JAMA 2016
Retire RRP, Focus On Admissions

- 30-day readmission rate declined from 21.5% to 17.8% from 2007-15, mostly 2010-12*
  - Virtually no decline during the next 3 years
- Now, small % of readmissions are preventable
  - Much of remaining differences are spurious and do not reflect true differences in quality
- Need to incentivize preventing all admissions
  - Alternative payment models, bundles

*Zuckerman RB, et al. NEJM 2016
Use Measures For Improvement

- Process measures led to unprecedented improvements in quality from 2002-2015*
  - So successful that many measures were retired because they were “topped out”
- Can we reproduce this “quality escalator”? 
  - Introduce national goals and measures, facilitate and reward rapid improvement
  - Shift topped-out measures to maintenance, and then introduce new national goals

*America’s Hospitals: Improving Quality and Safety
The Joint Commission Annual Report 2015
Hospital Performance On National Accountability Measures

- **% > 95%**: Steady increase in performance
- **# measures**: Huge increase in the number of measures

From Health Affairs
Use Measures For Improvement

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*America’s Hospitals: Improving Quality and Safety
The Joint Commission Annual Report 2015
Scrutinize Outcome Measures

• Some outcome measures can differentiate high quality providers and drive improvement
  – For example, complication rates and mortality after procedures (CABG)
• Many outcome measures have serious threats to validity (e.g., inadequate risk adjustment) and are unlikely to help improve care
  – For example, AMI, COPD, and stroke
• Need stricter criteria to use outcomes in VBP
16 Principles for Improved Performance Measurement

Jonathan B. Perlin, MD, PhD, MSHA, MACP, FACMI
President, Clinical Services Group and Chief Medical Officer
HCA / Hospital Corporation of America

Chair, American Hospital Association, 2015
Clinical Professor of Medicine & Biomedical Informatics, Vanderbilt University
Adjunct Professor of Health Administration, Virginia Commonwealth University

Contact: Jonathan.Perlin@HCAHealthcare.com
Overview:

• **Endorse Performance Measurement**
  – Measures Drive Behavior Change

• **Good Measurement, Based on Good Science**
  – Evidence for Recommendation
  – Evidence for Measure

• **Measures Should be “Fit for Purpose”**
  – Learning
  – Organizational Improvement
  – Accountability
Disclaimer:

• Examples cited address universally important issues (e.g., sepsis, pain, HAI, cost), related to safety, quality, timeliness, access, experience and value.
• Examples are not intended to diminish importance of measurement, but serve as cautionary notes to better direct subsequent work.
• Measures should be . . .
About Patient Care & Quality

- At best, imperfect proxies for quality
- Measurement should seek to improve patient outcomes, and be guided by science (not conjecture or convenience)

**N.B.:** Role for Process Measures
- Don’t have to reprove link to clinical outcome (e.g., immunization)
- Are outcomes, if frame-of-reference is provider

Example: “Efficiency” Measures
- Not clear that spending per beneficiary (Part A & B, -3 to +30d, HIQRP & VBP) correlates with care quality
Provider Behavior Affects Outcome

• Accountable entity has to have control (or substantial influence) over variable(s) of interest

Example: THR, TKR Risk-Standardized Complications

• -3 to + 90d driven by many exogenous factors (e.g., PAC)
Timely Reporting Supports PI

- Reporting is as concurrent as possible, to support timely feedback and improvement.
- Lagging data are difficult to respond to rationally.

Examples:
- Readmissions (-48 to -12 mo reporting)
- Mortality (48 to -12 mo reporting)
Rational Financial Incentives

• Incentivize improvement
  – Don’t penalize “doing the right thing” (e.g., necessary readmission)
  – Don’t remove resources from improvement
    • Can be budget neutral, based on savings to payers from improvement

• Accountability measures should not cause “double-jeopardy” regardless of FFS, FFV

Examples: HAC SIR <1.0, but bottom quartile CDC-NHSN measures in both VBP and HAC CJR Pricing, BPCI (Sepsis)
Strong Evidence for Recommendation

- Use framework akin to USPSTF and measure only where strong evidence exists for or against particular action.

Example: MU, 5% Patients Must Enroll for Portal
**Strong Evidence for Recommendation**

Example: Routine PSA for Prostate CA Screening

<table>
<thead>
<tr>
<th>Grade</th>
<th>Definition</th>
<th>Suggestions for Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The USPSTF recommends the service. There is high certainty that the net benefit is substantial.</td>
<td>Offer/provide this service.</td>
</tr>
<tr>
<td>B</td>
<td>The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.</td>
<td>Offer/provide this service.</td>
</tr>
<tr>
<td>C</td>
<td>The USPSTF recommends against routinely providing the service. There may be considerations that support providing the service in an individual patient. There is moderate or high certainty that the net benefit is small.</td>
<td>Offer/provide this service only if other considerations support offering or providing the service in an individual patient.</td>
</tr>
<tr>
<td>D</td>
<td>The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.</td>
<td>Discourage the use of this service.</td>
</tr>
<tr>
<td>I statement</td>
<td>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.</td>
<td>Read the clinical considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.</td>
</tr>
</tbody>
</table>
**Strong Evidence for Measures**

- Measures need to be adequately tested and demonstrated as reliable and valid
- Measures need to be demonstrated as valid & reliable *in mode of administration*
  - Manually abstracted measures may not behave identically, when administered electronically
    - e.g., abstracting measures applies logic that may not be available electronically

**Example:** ER Throughput

Time \(_{\text{Admit to Unit}}\) minus Time \(_{\text{Discharge from ER}}\) never contemplated a negative number. (BH, Trauma)
Benefit Exceeds Cost of Measurement

• Marginal benefit has to be worthwhile relative to other improvement opportunities
  – Parallel approaches to measuring the same activity are wasteful . . . and divert attention and resources from improvement opportunity to measurement and reporting activity. Goal is improvement!

• Seek administrative simplicity
  – Ideally, electronic, but only if validated in electronic format

Example: Sepsis – 9 page, manual-abstraction algorithm
Avoid Unintended Consequences

- Measures drive behaviors. While intent may be desirable, adequate testing may reveal unintended consequences.

Example: PNE – Antibiotics within 4 hours
Avoid Unintended Consequences

13. During this hospital stay, how often was your pain well controlled?

1. Never  
2. Sometimes 
3. Usually  
4. Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

1. Never  
2. Sometimes  
3. Usually  
4. Always

Example: HCAHPS – Pain
Support Alignment and “Systemness”

- Align purpose (improvement) over time (episode), across sites, and among providers. For example
  - Align physician and hospital
  - Align hospital and post-acute providers

Example: HIQRP, VBP, HACS don’t have direct analogs in PQRS. (Medicare Part A & B disconnected)

• Notionally Promising: Bundles, MACRA
Focuses Improvement Effort, not Reporting

- Measure consistency among public & private payers and accreditation organizations
  - Harmonization ≠ Identicality
    - Improvement efforts diluted by reporting burden

Example: TJC All Behavioral Health in HBIPS, but CMS only PPS units in HBIPS)
Reporting Reveals Meaningful Differences (in performance)

- Providers should not be rewarded or punished for meaningless difference in performance

Examples: HACS not predictive from quarter-to-quarter
HCAHPS Star-Ratings Nurse Communication Domain (76% TB is 2-star, 77% is 3-star)
Methodologies Published and Transparent

• Risk adjustment not proprietary
  – Source data available
  – Accountable entity should be able to replicate results to guide improvement efforts

• *N.B.*: Risk adjustment shouldn't jeopardize patient access to services, by avoiding adverse selection

Examples: Commercial payer methodologies

CMS mortality, readmission cannot be replicated as no available pre- and post-hospital data
Publicly Reported Measures Should Be Publicly Understandable

• Role for composite measures
  – Should be guided by intellectual honesty and good science
    • e.g., If no rational reason to weight components differently, weight similarly

• Disclose limitations of measures

Example: PSI-90
Cancer Care cannot be inferred from AMI, HF, PNE, CVA, COPD, CABG R-A-M
National Framework for Measurement & Reporting

- HHS should adopt health and care framework in support of national policy goals
  - Guide payers, providers, publications
    - Avoid current cacophony . . .
    - More “nutrition-label-like”
  - Measures guided by more than convenience data (e.g., avoid “lamppost phenomenon”) and spurious mathematical recapitulations.

Example: Commercial, Consumer Reports, HealthChex, HealthGrades, Leapfrog, ProPublica, Truven, U.S. News
Population ≠ Σ Personal Health Measures

• Population health is not be the aggregate of individual care process measures
• Need *bona fide* population health metrics

Example: Cardiovascular Health ≠ Σ AMI Metrics
Only Validated Measures Used for Accountability

- Measurement serves different purposes
  - Place for learning and testing new measures
    - Need to learn
  - Place for internal improvement metrics
    - Need to improve
  - Place for public accountability
    - Need to be accountable
    - Require evidence for recommendation and measure

Example: Excess Acute Days for AMI & HF (HIQRP)
Summary:

• **Endorse Performance Measurement**
  – Measures Drive Behavior Change

• **Good Measurement, Based on Good Science**
  – Evidence for Recommendation
  – Evidence for Measure
  – Good Math

• **Measures Should be “Fit for Purpose”**
  – Learning
  – Organizational Improvement
  – Accountability

• **Principles Apply Whether FFS or FFV**
Final Thoughts:

- *Not everything that counts is measured, not everything that’s measured counts . . .*
  
  Einstein

- *Numerator and Denominators are real people!*
16 Principles for Improved Performance Measurement

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Contact: Jonathan.Perlin@HCAHealthcare.com
Charting A Path Forward: Opportunities To Strengthen Hospital Value-Based Purchasing

Cheryl Damberg, PhD
RAND Distinguished Chair in Healthcare Payment Policy and Principal Senior Researcher
Discussion Topics

• Measures
  – How can we avoid mis-measurement of quality?
  – Where is the “V” in hospital value-based purchasing?
  – Is the MSPB measure of efficiency measuring the right output?
  – How can measurement take a more patient-centered view?

• Payment/reward structure
Getting Measurement Right

- Absence of adjustment for socioeconomic (SES) factors creates problems:
  - Mis-measurement (lack of measure validity)
  - Undesired effects: de-resourcing low resource providers and avoidance of low SES patients
    - Hospital Readmissions Reduction Program--disproportionately penalized safety-net facilities*

- In the context of value-based payments:
  - Need to adjust for characteristics of patients that are not under control of the clinician but that affect the outcome
    - Clinical factors do not measure all things that affect patient outcomes
  - Within hospital differences in quality performance is fair game for adjustment to make comparisons more equitable
    - Adjusting for within hospital disparities preserves true differences in quality--doesn’t mask quality differences between hospitals

Not Yet Measuring “Value”

- **Value:** defined as outcomes relative to cost (encompasses efficiency)
  - Not yet measuring or paying for value, but rather a weighted combination of quality and resource use measures
  - Push for greater value in health care is based on a belief that there is inefficiency, or potential to improve health at current levels of spending

- **Efficiency:** relationship between a specific product of the health system (output) and the resources used to create product (inputs)
  - Expectation is that providers should produce the highest value for a given level of spending
  - For any given level of spending, increasing efficiency will increase value
Does The HVBP “Efficiency” Measure Capture What We’re Really Interested In?

- Hussey et al., state “efficiency is used by different stakeholders to connote various constructs”
  - Current MSPB efficiency doesn’t capture the construct of interest
- MSPB is a utilization metric (given price standardization)
  - Examines the relative use of health services for three days prior, hospitalization +30 days post
  - No specification of quality in the measure of “output”
- What should be the output of interest?
  - Output: Level of “quality produced”
  - Measure: Hospital’s relative efficiency in producing a level of quality (“output”) for a given total cost (“input”)
  - Estimate relative efficiency using a production function

Hypothetical Production Frontier

- Circles represent two providers with different costs but with same quality, q
- Full efficiency--achieved along the production frontier (solid curve), represents the maximum possible quality levels qa and qb at costs a and b, respectively
- Efficiency for a provider is “actual” quality q divided by the maximum possible level of quality
Patient Focused Care Requires Moving To Measuring Patient-reported Outcomes

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Health Improvements reported by patients after hip replacement</th>
<th>Health Improvements reported by patients after knee replacement</th>
<th>Health Improvements reported by patients after varicose vein surgery</th>
<th>Health Improvements reported by patients after groin hernia surgery</th>
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<td>Westminster Bridge Road, London, SE1 7EH</td>
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| Source: National Health Service Choices website (http://www.nhs.uk/Service-Search/Hip-replacement/LocationSearch/1374)
What Do We Know About The Relationship Between Quality And Cost?

<table>
<thead>
<tr>
<th></th>
<th>Clinical Process</th>
<th>HCAHPS</th>
<th>Outcomes</th>
<th>Efficiency</th>
<th>Non-Efficiency</th>
<th>Payment Adjustment</th>
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<td>Clinical Process</td>
<td>1.000</td>
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<td>HCAHPS</td>
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<td>Non-Efficiency</td>
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<tr>
<td>Adjustment</td>
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<td>0.251</td>
<td>0.496</td>
<td>0.452</td>
<td>1.000</td>
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</table>

Efficiency=Medicare Spending Per Beneficiary. Non-efficiency=composite of outcomes, HCAHPS and clinical process domain scores.
Payment/Reward Structure

- Recent Health Affairs article* highlighted problem with current HVBP reward structure
  - If pay for lower cost (MSPB), could reward low quality
- Paying for “low cost” is more likely to create disparities
  - Often the low cost providers are those who serve low SES populations, and resources are more scarce (lower payments)
  - Disadvantaged patients cost more to treat
  - Below some level of spending, may not be able to produce quality. May need to spend more to get to quality

Payment/Reward Structure

• How to provide right incentives for a heterogeneous set of providers?
  – Emphasize different things at different points

• Alternative payment approach:
  – If below some benchmark “Q” then just focus on rewarding quality
    • As “Q” improves, shift to rewarding both “Q” and cost/efficiency
  – Among those who are high quality, use efficiency as a tie breaker to reward providers differentially (i.e., efficiency measure performance becomes bonus points once you do it right—meaning get to “Q”)
Health Affairs thanks our sponsors:
Panel 2:
Current And Future Challenges Of Physician Value Based Payment
What Is The Role For Physician Value-based Purchasing In Medicare?

Meredith Rosenthal, PhD
Professor of Health Economics and Policy
Harvard T.H. Chan School of Public Health
Health Care Purchasing Reform Environment

- Hospital compare, nursing home compare
- Premier and PGP demonstration
- ACOs and Bundled Payment
- Physician Quality Reporting System
- Meaningful use
- VBPM | MIPS
Elements Of A Strategy

• Narrow in the beginning, broader over time
• Demonstrations
• Quality first, then cost
• Low-powered to high-powered
• Incremental to transformative
Physician Value Based Purchasing

- PQRS and VBPM were ignored by most – few physicians got to “practice” before MACRA arrived
- No demonstrations of pay for performance
- Quality and cost together from the beginning, along with some participation measures
- Choice of quality measures makes it hard to know what we will get
What Is CMS’ Goal For Physician Value-based Purchasing?

• A way to limit spending increases (by way of a pay cut)?
• An incentive to join a larger entity?
• An incentive for physicians to join alternative payment models?
What Might Be Accomplished Through Physician Payment Reform?

- Little traction for VBP with individual physicians
- Maybe taking the joy out of the status quo is the most important feature of MACRA
- Perhaps measure development will be accelerated
- Some modest possibilities to consider:
  - align physicians with other providers through measure selection (e.g., reward surgeons for implementing checklists)?
  - build regional efforts to align physicians within specialties around the same measures with investment in collaboration, benchmarking
Dana Gelb Safran, ScD
Senior Vice President for Performance Measurement and Improvement
Blue Cross Blue Shield of Massachusetts
Current & Future Challenges of Physician Value-Based Payment:

What Can We Learn from Alternative Quality Contract (AQC) Results, 2009-2016

Dana Gelb Safran, ScD
Chief Performance Measurement & Improvement Officer
Senior VP, Enterprise Analytics
Blue Cross Blue Shield of Massachusetts

Presented at:
Health Affairs Briefing: Envisioning the Future of Value Based Payment
12 May 2016

In 2007, leaders at BCBSMA challenged the company to develop a new contract model that would improve quality and outcomes while significantly slowing the rate of growth in health care spending.

The Alternative Quality Contract:
Twin goals of improving quality and slowing spending growth
AQC Physician Participation (Current as of May 2016)

**PCPs**

- 2009: 1,373
- 2010: 1,420
- 2011: 2,303
- 2012: 4,592
- 2013: 5,136
- 2014: 5,547
- 2015: 5,606
- 2016: 5,753

**SCPs**

- 2009: 2,577
- 2010: 2,618
- 2011: 5,065
- 2012: 11,731
- 2013: 12,986
- 2014: 14,067
- 2015: 14,898
- 2016: 14,860

From Health Affairs
Provider Group Consolidation

History of our 6 largest groups, by in-state HMO membership

Above 17 groups (although not all in AQC at the time) represent 56% of total HMO Blue In-State Membership (Actual AQC groups in 2009 = 22% of total membership)

Above 6 groups represent 63% of total HMO Blue In-State Membership
All AQC groups = 79% of total membership

Above 6 groups represent 59% of total HMO Blue In-State Membership
All AQC groups = 86% of total membership
While the majority of Massachusetts physicians continue to practice in settings with ≤5 physicians, the AQC has contributed to a large share of these small practices opting to affiliate with a larger entity (e.g., IPA, PHO) for infrastructure support.
These graphs show that the AQC has accelerated progress toward optimal care since it began in 2009. The first two scores are based on the delivery of evidence-based care to adults with chronic illness and to children, including appropriate tests, services, and preventive care. The third score reflects the extent to which providers helped adults with serious chronic illness achieve optimal clinical outcomes. Linking provider payment to outcome measures has been one of the AQC’s pioneering achievements.
AQC Results: Significantly Reduced Spending

As compared with similar populations in other states, Massachusetts AQC enrollees had lower spending growth and generally greater quality improvements in the period 2009 through 2012... The AQC experience may be useful to policy-makers, insurers and providers embarking on payment reform. Although it is still early, these results suggest that a two-sided global budget model may serve as a foundation for slowing spending and improving quality.

Performance Measurement Needs for Population-Based Payment (PBP) Models

Recommendation: To support the long-term success and sustainability of population-based payment models, future state measures must be based, as much as possible, on results that matter to patients (e.g., functional status) or the best available intermediate outcomes known to produce these results.
For More Information

dana.safran@bcbsma.com
Physician Health Partners

- Since 1996
- IPA/Network Management
- PHPprime
  - 185,000 lives
- Medicaid Regional Care Collaborative Organization (RCCO)
  - 125,000 lives

Total # of Covered Lives = 315,799
Tom Valuck, MD, JD
Partner, Discern Health
Health Affairs thanks our sponsors:
Keynote Address

David Blumenthal, MD
President
The Commonwealth Fund
Envisioning the Future of Value Based Payment

David Blumenthal, MD, MPP
President, The Commonwealth Fund

Health Affairs Briefing
Washington, D.C.
May 12, 2016
Today’s Agenda
Today’s Agenda
## Measure Proliferation

### Measure Categories (hundreds)

- Prev: tobacco cessation
- Pexp: clinician communication
- Pexp: patient rating of doctor
- Pexp: collaborative decision-making
- Safe: wrong site surgery
- Safe: hospital-acquired conditions
- Safe: central line infections
- Safe: hand hygiene
- Safe: MRSA bacterium
- Safe: pressure ulcers
- Safe: medication reconciliation
- Safe: adverse event reporting
- Cost
- PC: insurance coverage
- PC: out of pocket med payments
- RR: Total cost of care index
- RR: prescription of generic drugs
- UN: condition-specific imaging use
- Ind: health literacy
- Ind: children reading at grade level

### Measure in Use (thousands)

- Quality of ca
  - CVD: aspirin
  - CVD: Beta b
  - CVD: heart f
  - CVD: blood
  - Con: surgery
  - Con: Rep/Pr
  - Resp: asthma
  - Resp: COPD
  - DM: HbA1c
  - DM: A1c
  - DM: diabetes
  - MH: depression
- Safe: wrong site surgery
- Safe: hospital-acquired conditions
- Safe: central line infections
- Safe: hand hygiene
- Safe: MRSA bacterium
- Safe: pressure ulcers
- Safe: medication reconciliation
- Safe: adverse event reporting
- ... others ...
- PC: insurance
- PC: out of pocket
- RR: Total cost
- RR: prescription
- UN: condition-specific imaging use
- Ind: health literacy
- Ind: children reading at grade level
- ... others ...
- Population h
  - HS: life exp
  - HS: perceived
  - HS: illness da
  - Beh: fruit/veget
  - Beh: activity
  - Soc: income
  - Soc: neighbor
  - Env: air partic

From Health Affairs
DATAWATCH

US Physician Practices Spend More Than $15.4 Billion Annually To Report Quality Measures

Each year US physician practices in four common specialties spend, on average, 785 hours per physician and more than $15.4 billion dealing with the reporting of quality measures. While much is to be gained from quality measurement, the current system is
\[ V = \frac{Q_1 + Q_2 + Q_3 + Q_4 \ldots + Q_n}{C_1 + C_2 + C_3 + C_4 \ldots + C_n} \]
Value is about what we value.
Choice Requires Two Things

• Criteria (values)

• Legitimate process
Key Measure Domains

Healthy People
- Length of life
- Quality of life
- Healthy behaviors
- Health social circumstances

Care Cost
- Affordability
- Sustainability

Engaged People
- Individual engagement
- Community engagement

Care Quality
- Prevention
- Access to care
- Safe care
- Appropriate treatment
- Person-centered care
Rates of EHR Adoption Among Hospitals and Physicians

From Health Affairs

Notes: Hospital data of those with at least a basic EHR system (ONCHIT, 2015); physician data of practices with any EHR system (National Center for Health Statistics, 2014).
Remaining Challenges

• Health information exchange.
• Cybersecurity.
• Analytics.
What Can Data Do For Us?

- Create value through new knowledge.
- Create new measures.
- Reduce measurement burden.
RESEARCH ARTICLE | PRECISION MEDICINE

Identification of type 2 diabetes subgroups through topological analysis of patient similarity

Li Li¹, Wei-Yi Cheng¹, Benjamin S. Glicksberg¹, Omri Gottesman², Ronald Tamler³, Rong Chen¹, Erwin P. Bottinger² and Joel T. Dudley¹,4,*
Risks and Benefits of Estrogen Plus Progestin in Healthy Postmenopausal Women
Principal Results From the Women’s Health Initiative Randomized Controlled Trial
Banishing Burden

- EHR adoption
- Decision-support
- Interoperability
- Patient portals
- Privacy and security
- Wearables and biosensors

From Health Affairs
Key Points

1) Value in the eye of the beholder.

2) New technologies don’t solve problems, but…
   They create opportunities for humans to solve problems.

3) Big Data is a huge resource…
   If we can figure out what we want.
Health Affairs thanks our sponsors:
Panel 3:
The Future of Value Based Payment
Using Big Data To Improve Patient Care: The Era Of Precision Delivery

David W. Bates, MD, MSc
Chief Innovation Officer
Brigham and Women’s Hospital, Boston, MA
Immediate Past President, ISQua
Big Data And Value-Based Care: What Has Changed

• Lots of electronic clinical data now available
  – Inside hospital
  – Outside hospital

• Natural language processing techniques have come of age

• Many other data sources to link to
  – Genetic, genomic
  – Social
  – Mobile
This Viewpoint discusses the use of electronic health record “big data” to integrate predictive analytics into clinical practice and future directions for using predictive analytics to achieve high-value health care.
Big Data in Clinical Care

Six Use Cases:

- High-cost patients
- Readmissions
- Triage
- Decompensation
- Adverse events
- Treatment optimization

ABSTRACT The US health care system is rapidly adopting electronic health records, which will dramatically increase the quantity of clinical data that are available electronically. Simultaneously, rapid progress has been made in clinical analytics—techniques for analyzing large quantities of data and gleaning new insights from that analysis—which is part of what is known as big data. As a result, there are unprecedented opportunities to use big data to reduce the costs of health care in the United States. We present six use cases—that is, key examples—where some of the clearest opportunities exist to reduce costs through the use of big data: high-cost patients, readmissions, triage, decompensation (when a patient’s condition worsens), adverse events, and treatment optimization for diseases affecting multiple organ systems. We discuss the types of insights that are likely to emerge from clinical analytics, the types of data needed to obtain such insights, and the infrastructure—analytics, algorithms, registries, assessment scores, monitoring devices, and so forth—that organizations will need to perform the necessary analyses and to implement changes that will improve care while reducing costs. Our findings have policy implications for regulatory oversight, ways to address privacy concerns, and the support of research on analytics.
High-Cost Patients

• About 5% of patients account for 50% of spending
  – First step in managing population is identifying this group
• Need to include data about mental health, socioeconomic status, marital and living status
• Identification of specific actionable needs and gaps
  – Can make managing these patients much more cost-effective
BWH Claims-Based Approach

• Uses LACE to risk stratify
• Claims data from past 12 months
• Clinical conditions from a list of ~30 are categorized as high, moderate or low acuity
• Combinations of conditions from each category determine level of clinical complexity
• Hospitalizations, ER visits and other types of utilization trigger inclusion
Population

• About 3000 patients currently
• Majority female (61%)
• Elderly (mean age 71, range 21-102 years)
• 32% with a mental health diagnosis
• An average of 17 medications per patient
• PMPM ~$2000
• 2-4 times higher than average
• Hospital admissions account for > 50% of costs
• 2,064 inpatient discharges from BWH 2/1/13 – 12/31/14
• Average admit per 1000 rate Feb 2013 – Dec 2013 was 49 and in 2014 was 40
• 18% reduction
Readmissions

• CMS has strongly incentivized reducing their frequency
• Should use an algorithm to predict frequency
• Key differentiators:
  – Tailoring intervention to individual patient
  – Ensuring that patients get intended intervention
  – Monitoring specific patients after discharge
  – Ensuring low rate flagged for intervention to patients experiencing a readmission
Triage

• Estimating risk of complications—at admission, evaluation, transfer
  – Need detailed guideline that clarifies how the algorithm will inform care
• Examples
  – Evaluating newborns for early onset sepsis
  – Emergency department composite scores to predict decompensation
Decompensation

• Monitoring patients especially outside ICUs
• Can track many parameters with “wearables” or even devices that sit between mattress and bed
• In one trial a device that measured pulse, respiratory rate and movement reduced number of subsequent ICU days by 47% (Brown, Am J Med 2014)
• Use of multiple parameters simultaneously, especially in ICUs
Conclusions

• Clinical data are now nearly ubiquitous in the U.S.
  – Levels of adoption of about 80% in hospitals and clinical setting in U.S.

• Yet most organizations haven’t yet figured out how best to leverage these data
  – Every organization will need to invest

• “Big data” approaches will result in many insights both in clinical care and research

• Some of the examples likely to bear fruit early on

• Novel sources are most likely to provide marginal improvement—social, mobile
ACS Perspective
Measurement Under MACRA/QPP

Frank G. Opelka, MD FACS
Medical Director
American College of Surgeons
• Regardless of the path a clinician takes – MIPS or APMs - performance measurement should reflect the patient care provided, not the payment system.

• Clinicians need consistent measurement infrastructure using advanced analytics, multiple data sources, & registries – all of these represent a much larger clinical data ecosystem than EHRs can ever offer alone. The dashboards of care!
Dashboards And Data Flows

Value = Quality/Cost

**DASHBOARDS:**

**LEADING INDICATORS:**
- Physician work flow CDS
- Patient level dashboards
- Clinical Service Line dashboards
- Pop Health Dashboards
- ACO Performance Dashboards

**LAGGING INDICATORS:**
- Support CQI
- Support MOC
- Support OPPE
- Support MIPS, APM
- Support Public Reporting

**Research**
- Observational Clinical Trials
- RCT
- Comparative Effectiveness
The Merit-based Incentive Payment System (MIPS)

COST
(10 percent of total score in year 1; replaces the cost component of the Value Modifier Program, also known as Resource Use): the score would be based on Medicare claims, meaning no reporting requirements for clinicians. This category would use more than 40 episode-specific measures to account for differences among specialties.

QUALITY
(50 percent of total score in year 1; replaces the Physician Quality Reporting System and the quality component of the Value Modifier Program): clinicians would choose to report six measures versus the nine measures currently required under the Physician Quality Reporting System. This category gives clinicians reporting options to choose from to accommodate differences in specialty and practices.

CLINICAL PRACTICE IMPROVEMENT ACTIVITIES
(15 percent of total score in year 1): Clinicians would be rewarded for clinical practice improvement activities such as activities focused on care coordination, beneficiary engagement, and patient safety. Clinicians may select activities that match their practices’ goals from a list of more than 90 options. In addition, clinicians would receive credit in this category for participating in Alternative Payment Models and in Patient-Centered Medical Homes.

ADVANCING CARE INFORMATION
(25 percent of total score in year 1; replaces the Medicare EHR Incentive Program for physicians, also known as “Meaningful Use”): Clinicians would choose to report customizable measures that reflect how they use electronic health record (EHR) technology in their day-to-day practice, with a particular emphasis on interoperability and information exchange. Unlike the existing Meaningful Use program, this category would not require all-or-nothing EHR measurement or quarterly reporting.
• ACS Registries – the first 100 years.
Four Guiding Principles of Continuous Quality Improvement

1. Standards
   - Individualized by patient
   - Backed by research

2. Right Infrastructure
   - Staffing levels
   - Specialists
   - Equipment
   - Checklists

3. Rigorous Data
   - From medical charts
   - Backed by research
   - Post-discharge tracking
   - Continuously updated

4. Verification
   - External peer-review
   - Creates public assurance
Every surgical patient in every specialty walks through the phases of surgical care. To optimally design a value based surgical care system which promotes better care requires a framework that values the phases.

- **Phase 1 – Pre-operative care**
  - *Initial assessment & optimization of co-morbid conditions, medications, & informed consent*

- **Phase 2 – Peri-operative care**
  - *Pre-check 72 hrs prior to & upon admission: surgical checklist, position, & prep*

- **Phase 3 – Intra-operative care**
  - *Intra-operative conduct with entire team, technical procedure, & anesthesia*

- **Phase 4 – Post-operative care**
  - *Initial recovery, in-hospital clinical pathways*

- **Phase 5 – Post discharge care**
  - *Recovery plan & care coordination*
Risk adjusted major complications including death

Odds Ratios (95%) by TQIP Hospital; Major Complications Including Death

OR Ranges:
- Low 0.32-0.79
- Average 0.67-1.37
- High 1.25-3.36

Cohort = All Patients
Positive Outliers – Driving Change

82% of hospitals decreased complications
66% of hospitals decreased mortality
250-500 complications prevented annually per hospital

Overall (Non-Multispecialty) 30-Day Mortality O/E Ratios
07/01/2008 - 06/30/2009

90% Confidence interval

Low Outlier
High Outlier

(n=20)
(n=19)

Identification Number N=222

From Health Affairs
Treatment Episode

Trigger Code(s) define episode type
- Relevant Services (Px codes)
- Relevant Diagnoses (Dx codes)
- Sequelae (complications)

Ex: IP admissions/SNF
    Physician visits
    Therapies
    Testing
    ED
## EGM Treatment Episodes and Their Indications

<table>
<thead>
<tr>
<th>Treatment Episodes</th>
<th>Indications – Lung resection</th>
<th>Indication – AICD Implantation</th>
<th>Indication – Endoscopic sinus surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung resection</td>
<td><em>Airway lung neoplasm malignant</em></td>
<td><em>Cardiomyopathy</em></td>
<td><em>Sinusitis chronic</em></td>
</tr>
<tr>
<td>AICD implantation</td>
<td><em>Metastatic neoplasm chest</em></td>
<td><em>Heart failure (chronic or acute)</em></td>
<td><em>Nasal disorder polyps</em></td>
</tr>
<tr>
<td>Insertion or replacement of permanent pacemaker</td>
<td><em>Airway lung neoplasm benign</em></td>
<td><em>Ventricular tachycardia</em></td>
<td><em>Deviated nasal septum</em></td>
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<td>TAVR</td>
<td></td>
<td><em>Ischemic heart disease</em></td>
<td><em>Nasopharyngitis allergic/chronic</em></td>
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<tr>
<td>Aortic aneurysm repair</td>
<td></td>
<td><em>Pacer/AICD complication/malfunction</em></td>
<td><em>Nasal/sinus neoplasm malignant</em></td>
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<tr>
<td>Leg vein sclerosing</td>
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<tr>
<td>Iliac artery revascularization</td>
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<td></td>
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<tr>
<td>Parathyroidectomy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Endoscopic sinus surgery</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Thyroidectomy</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Breast lumpectomy</td>
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<tr>
<td>Colpopexy</td>
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<tr>
<td>Colpohraphy</td>
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<td>Hysterectomy</td>
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<td>Appendectomy</td>
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<tr>
<td>ERCP</td>
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<td>Shoulder total arthroplasty</td>
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<td>Repair inguinal hernia</td>
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<tr>
<td>Pancreatectomy</td>
<td></td>
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<td>Prostate biopsy</td>
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</tr>
<tr>
<td>Prostatectomy</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Building APMs

Condition Episode

Trigger Code(s) define episode type
- Relevant Services (Px codes)
- Relevant Diagnoses (Dx codes)
- Sequelae (complications)

Look-back period
90 days

Episode start date
Date of onset/identification

- Ex: IP admissions/SNF
- Physician visits
- Therapies
- Testing
- ED

Episode end date (acute);
Episode period end (chronic)
Comprehensive EDD covers majority of Medicare spending

16 Clinical Chapters
- Behavioral
- Cardiovascular
- Chest (respiratory)
- Dermatologic
- Ear, Nose, Throat, Dental
- Endocrine Metabolic
- Eye
- Female Genital (includes breast)
- Gastrointestinal
- General, systemic, unspecified
- Hematologic, Lymphatic
- Male Genital (includes prostate)
- Musculoskeletal
- Neurological
- Pregnancy
- Urinary (includes gender neutral genital items)

10 Diagnostic Type within Chapters
- Congenital and hereditary
- Infection
- Neoplasm
- Injury Poisoning Toxins
- Signs, Symptoms, clinical states
- Degenerative
- Immune, Inflammatory
- Nutrition, metabolic
- Other, general
- Status, Screening, service

12 Service type within chapters
- Anesthesia
- Supplies, equipment, devices
- Drugs, contrast, etc.
- Evaluate, manage (specific to chapter)
- Facility (IP, OP, ER, etc.)
- Infusion, dialysis, pheresis, radiation tx
- Other, general
- Definitive (major) procedure
- Supporting (minor) procedure
- Tests, labs, imaging
- Professional treatment, therapy
- Transport

Condition Episode < Chapter X Dx Type
Treatment Episode < Chapter X SVC Type
1. Alignment of surgical treatment plan and **patient goals of care**: percent of patients who have been given the purpose for the recommended procedure AND goals of care have discussed and documented in the medical record.

**Purpose of the procedure:**
1. Establish a diagnosis
2. Relieve symptoms
3. Treat underlying condition
4. Improve function and/or QoL

2. Identification of **major co-morbid medical conditions**: Percentage of patients undergoing a surgical procedure who received general or spinal anesthesia and who has documentation of significant co-morbid condition(s) in their medical record.

(Do not list the co-morbid conditions as part of the measure specifications)

3. **Modifiable risk factor, smoking cessation**: percentage of smoking patients who receive tobacco screening and are offered counseling of delaying procedure until smoking cessation is achieved.

Two steps to the measure:
1) Identify that the patient is a smoker
2) Refer the patient to a cessation program
4. Pre-op key medications review for anticoagulation medication: percentage of patients undergoing anesthesia who are on anticoagulation medication(s) and who are given a perioperative management plan for anticoagulation medications.

5. Patient Centered Risk Calculator: 
http://riskcalculator.facs.org/ 
As part of shared decision making, provide patient with preop risk calculator for expected outcomes.

6. Patient frailty or functional index: percentage of patients 65 years and older who underwent a non-emergency surgery and were evaluated using a frailty index score or a functional status score. (this can include multiple tools)
7. **Perioperative composite:** percentage of patients who underwent surgery and the current status of updated Hx and Phys, re-evaluation of critical studies, documentation of site and side are documented in the medical record.

8. **Post-op care coordination and follow-up:** percentage of patients who underwent a major surgery with appropriate anesthesia who had their results communicated to the patient’s PCP or referring physician within 30 days of the procedure via telephone, EHR, or written letter, with appropriate documentation in the medical record.

9. **PQRS # 356 Unplanned Hospital Readmission within 30 Days of Principal Procedure**

## Data driven Clinical Decision Support

### Surgical Risk Calculator

**Procedure:** Colectomy, partial, with anastomosis

**Risk Factors:**
- Age 75-84, Female, Partially dependent functional status, Emergent, ASA III, Clean/Contaminated wound, Diabetes (new), Dyspnea with exertion, Obese (Framingham)

### Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Estimated Risk (%)</th>
<th>Chance of Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>7%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Any Complication</td>
<td>45%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>7%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Cardiac Complication</td>
<td>3%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Surgical Site Infection</td>
<td>20%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>10%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Venous Thromboembolism</td>
<td>5%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>4%</td>
<td>Above Average</td>
</tr>
<tr>
<td>Serious Complication</td>
<td>25%</td>
<td>Above Average</td>
</tr>
</tbody>
</table>

**Average Length of Hospital Stay:** 8.0 days

### How to Interpret the Graph Above:

- **Your Risk:**
  - **Average Patient Risk:**
    - **Your % Risk:** 5%

### Surgeon Adjustment of Risks

This will need to be used infrequently, but surgeons may adjust the estimated risks if they feel the calculated risks are underestimated. This should only be done if the reasons for the increased risks were NOT already entered into the risk calculator.

1. **No adjustment necessary**

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For Surgeons
• Registry – personalized
• MOC
• OPPE
• Public reporting
• PQRS or payment incentives

For Patients – patient centered care
• Risk assessment
• Guideline check
• Check list reminder
• Appropriateness check
• Patient satisfaction survey

Link to surgeon and patient education modules, ACS mobile web content
Collaboration Breeds Innovation

The Tennessee Surgical Quality Collaborative (TSQC) is a pilot project of 10 Tennessee hospitals seeking to measure and improve the care of surgical patients throughout the state.

The TSQC is collaboration between the Tennessee Chapter of the American College of Surgeons, the Tennessee Hospital Association’s Center for Patient Safety and participating hospitals. The TSQC was funded through a generous three-year grant from Blue Cross Blue Shield’s Tennessee Health Foundation. This funding significantly reduces barriers for Tennessee surgeons entering surgical care into a statewide effort to prevent surgical complications, reduce costs, and improve the quality of care for its patients.

Our goal is to make Florida a national leader in health care quality.

By working together, Florida’s hospitals and surgeons will have a tremendous impact on improving care for Floridians. We will ensure health faster, safer and at a lower cost.

The Michigan Surgical Quality Collaborative (MSQC) is a connected community of 14 Michigan hospitals seeking to measure and improve the care of surgical patients throughout the state.
Dashboards in Medical Homes

LSU Medical Home

- Diabetes
- CHF
- HIV
- Kidney Disease
- Cancer
- Asthma

- Thrombogenic State Control
- Glycemic Control
- Lipid Control
- Exercise
- Diet
- Weight Control
- Smoking Cessation
- Screening
- Wellness
- Blood Pressure Control

From Health Affairs
Patient Summary

Last Inpatient Admission: 12/1/2009

Asthma Needs PFT, ACT Score, Severity Class, Action Plan

CHF Needs NYHA

Diabetes Needs Cr, HbA1C, LDL, Foot Exam, Eye Exam

Weight Management Last BMI 35.4

Preventive Health Needs PSA, FOBT, Colon Imaging

Screening

<table>
<thead>
<tr>
<th>Last</th>
<th>Date</th>
<th>Value</th>
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<tbody>
<tr>
<td>PSA</td>
<td>04/18/2008</td>
<td>0.3</td>
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<tr>
<td>Fecal OBT</td>
<td>Unknown</td>
<td></td>
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<tr>
<td>Colon Imaging</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>HIV Screen</td>
<td>06/21/2007</td>
<td></td>
</tr>
</tbody>
</table>

Tobacco Use Treatment

Smoking Status | 06/23/2010 | Yes |

Vital Signs

<table>
<thead>
<tr>
<th>Last</th>
<th>Date</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure</td>
<td>06/19/2010</td>
<td>130/87 mmHg</td>
</tr>
<tr>
<td>Height</td>
<td>02/03/2008</td>
<td>60.0 in</td>
</tr>
<tr>
<td>Weight</td>
<td>08/19/2008</td>
<td>232.6 lb</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>06/19/2010</td>
<td>83.8 cm</td>
</tr>
<tr>
<td>BMI</td>
<td>08/19/2008</td>
<td>35.4</td>
</tr>
</tbody>
</table>
mhstandards: Last BP > 140/90, Total
denom: MedHm sustained 6/12

VALUES BY quarter: SITE(solid line), TOTAL(dashed line)

Graph uses data from quarters 2009Q1 through 2013Q1
AWARD criterion = 0.27, 25th and 75th percentiles: see lines on graph
mhstandards: Last BP > 140/90, Total
denom: MedHm sustained 6/12

Graph uses data from quarters 200901 through 201301
AWARD criterion = 0.27, 25th and 75th percentiles: see lines on graph
diabetes: last BP ≤ 140/90
denom: MedHm sustained 6/12

Graph uses data from quarters 200901 through 201302
AWARD criterion = 0.60, 25th and 75th percentiles: see lines on graph
Clouds are more than servers and registries!

ACS Surgical Continuum of CareApps

Data Entry or Data Visualization Apps (e.g. Diabetes Care Pathway App)

API Standards Services (HSPC FHIR Profile Specifications)

Identity and Security Management Services (Authentication, Authorization and MPI)

Knowledge Standards Services

Terminology Standards Services (HSPC Terminology Specifications)

Orchestration Layer (Business Process and Modeling Services)

Enterprise Service Bus (Integration Virtualization Layer) (Could exist internal to an organization, external to organizations at a regional level, or across regions at a state/national level)

Data Virtualization Layer (Data Virtualization Services)

EHR A Data Adapters

Registry X Data Adapters

Registry Y Data Adapters

EHR B Data Adapters

Specialty X Registry Data Warehouse

Specialty Y Registry Data Warehouse

EHR B Clinical Data Repository

EHR A Clinical Data Repository

Registry X Graphical User Interface

Registry Y Graphical User Interface

EHR A Graphical User Interface

EHR B Graphical User Interface

Apps And Content

HSPC Reference Architecture Standard

Clinical and Revenue Data Stores

User
**Value = Quality/Cost**

**DASHBOARDS:**

**LEADING INDICATORS:**
- Physician work flow CDS
- Patient level dashboards
- Clinical Service Line dashboards
- Pop Health Dashboards
- ACO Performance Dashboards

**LAGGING INDICATORS:**
- Support CQI
- Support MOC
- Support OPPE
- Support MIPS, APM
- Support Public Reporting

**Research**
- Observational Clinical Trials
- RCT
- Comparative Effectiveness
Thank you!

Frank G Opelka, MD FACS
fopelka@facs.org
Does better data promise to improve value-based payment?

Melinda Buntin, PhD
Vanderbilt Health Policy
Andy Slavitt @ #hdpalooza: “[...]the “physician data paradox.” They are overloaded on data entry and yet rampantly under-informed.”
Farzad Mostashari @DanDiamond:
“I hate compliance, it is such a low bar, it is such a pity to waste one’s time checking boxes.”
Mutually Reinforcing Policies

Figure 3. Predicted Probabilities That Physicians Routinely Perform Care Processes by Health IT and Payment/Delivery System Characteristics

- Quality measurement: 22%, 49%, 71%
- Population management: 55%, 69%, 83%
- Patient communication: 50%, 77%, 89%
- Care coordination: 85%, 90%, 96%

Figure 2. Percent of Physicians Who Routinely Perform Care Processes*

Quality measurement
- Create reports on clinical care measures by patient demographic: 19% (2%)
- Submit clinical care measures to public and private insurers: 24% (5%)
- Create reports on clinical care measures for patients with specific chronic conditions: 27% (4%)
- Any above quality measurement process: 37% (6%)

*Process is computerized: 19%, 24%, 27%, 37%
*Process is not computerized: 2%, 5%, 4%, 6%

*Estimates are unadjusted.
Doctor Who episode never created...

Colony of humans toils in mines for substance that benefits insect overlords, not themselves.
The Triple Aim for Driving Value

Better Health for Populations

Better Health for Patients

Cost Containment
What are we measuring today?
How do we define value?
It’s all about value for patients

“The central goal in health care must be value for patients, not access, volume, convenience or cost containment”.

“Health care systems need to be redesigned so that they dramatically improve patient value”.

Michael E. Porter
Harvard Business School
Outcomes
- Defined by patient
- Measured for patient’s condition over entire episode of care

Cost
- Measured for patient’s condition over entire episode of care

Value for Patients over their condition = Health Outcomes
- Cost of delivering outcomes
What would be outcomes that matter to patients?

- Hip replacement – functional status
- Cardiac surgery – functional status, survival
- Cancer – survival, quality of life
- Diabetes – quality of life
What are patient reported outcomes?

Information about the status of a patient’s health condition that comes directly from the patient, without interpretation of the patient’s response.

These include:

- Symptoms
- Functional status – physical and mental
- Health-related quality of life
Why PROs

• Intendent consequences
• Value as seen by the patient
• Across the continuity of care (ACOs)
• Support accountability
• Additional benefits

patient activation, comparative effectiveness, transparency will drive value
Experience in the U.S.

- The Dartmouth Spine Center
- Memorial Sloan-Kettering Urology Clinic
- Partners Healthcare
- Cleveland Clinic – Neurology
- Recently – registries such as:
  - Society of Thoracic Surgeons – TAVR
  - The National Neurosurgery Quality and Outcomes Database
NHS National PROMS Program (UK)

- First country in the world to implement a National PROMs program.
- Focusing on four surgical conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Generic component</th>
<th>Condition-specific component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total hip replacement</td>
<td>EQ-5D</td>
<td>Oxford Hip Score</td>
</tr>
<tr>
<td>Total knee replacement</td>
<td>EQ-5D</td>
<td>Oxford knee score</td>
</tr>
<tr>
<td>Varicose vein</td>
<td>EQ-5D</td>
<td>Aberdeen varicose vein questionnaires</td>
</tr>
<tr>
<td>Hernia repair</td>
<td>EQ-5D</td>
<td>None</td>
</tr>
</tbody>
</table>
NHS Results 2014

Chart 1 - Improvement rate (unadjusted scores) by procedure and measure

For the coverage period 1 April 2014 to 31 December 2014.

- Groin Hernia
  - EQ-5D Index: 50.6%
  - EQ-VAS: 37.8%

- Hip Replacement
  - EQ-5D Index: 89.2%
  - EQ-VAS: 65.5%
  - Oxford Hip Score: 96.8%

- Knee Replacement
  - EQ-5D Index: 81.1%
  - EQ-VAS: 66.0%
  - Oxford Knee Score: 93.7%

- Varicose Vein
  - EQ-5D Index: 53.7%
  - EQ-VAS: 40.2%
  - Aberdeen Varicose Vein Questionnaire: 83.6%
Israel – PROMs national demonstration project

Coronary artery disease
- Functional status, symptoms

Prostate cancer
- Functional status, pts reported complications, quality of life

Cataract surgery
- Visual acuity, functional status
Coronary artery disease PROs

Cardiac Surgery

Pts undergoing CABG

ICCU

Step-down unit

Internal Medicine

ACS Pts

Pre-discharge Self/facilitated computerized (ipad) pts evaluation

30 days, 3 & 6 months F\U
שאולון - מתופף מחולק לבסילות חדה

הדות על מילוי השאולון, על פיを持っている שה/apple יוכלו להיתלך.getPath ו/וי/וי במשרה יומית בירואת.
בהישגיה לכמה חוק לכל אחד מהשות וב תורהップ מודרני בירואת על לאור חום.

**בריאות נפשית**

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**_tfkffee פית**

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**כאמות 받아 היח**

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What needs to happen for PROMs based VBP to be a reality?

• **Wide spread adoption**
  – Technology driven vs. paper based vs. telephone based
  – Who pays for the infrastructure

• **Patients play along**
  – Needs to be used by clinicians

• **Case-mix adjustment needs to be worked out**
Next steps

• CMS takes the lead
• Establishing A framework and a roadmap
• Payments for infrastructure investments
• Pay for reporting (based on response rate)
• Tied to specific episode-based/ bundled payments
What the future holds

• Improved data collection and reporting
• Passive data collection
• Real time genotype and phenotype big data to drive personalized medicine
Person Centered Value Based Payments

Let’s agree this is where we eventually want to go… and start on the journey.

Thank you!
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