

Reducing Clinical Variation in Healthcare - Why It matters

Emerging Issues in U.S. Healthcare Policy
Washington, DC
March 2017

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Objectives

- Define the various types of variation
- Gain an understanding of the impact of variation on cost, quality and safety
- Provide examples of variation reduction
- Identify obstacles to reducing variation
- Provide examples of collaboration

I have no financial interests or disclosures related to this topic material

If somebody were to ask, “Can you explain, in three words or less, what’s wrong with our healthcare system?” the answer would be easy: *unexplained clinical variation*

David B. Nash, MD, MBA
Sanjaya Kumar, MD, MSc, MPH
(in *Demand Better: Revive Our Broken Healthcare System*,
Second River Healthcare Press, 2010)

‘I’ve been told that I need a hip replacement . . .’

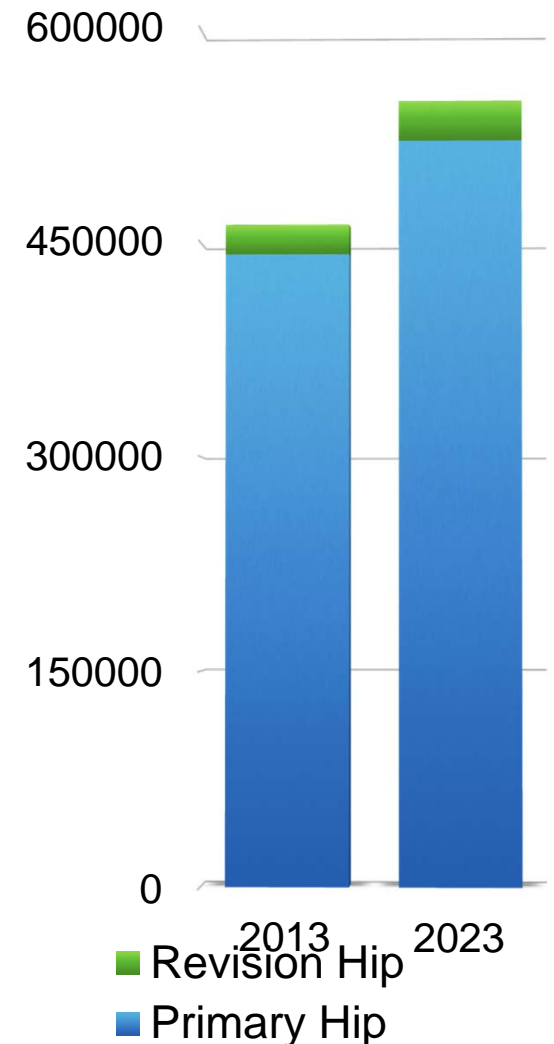
51 year-old healthy female with traumatic arthritis, left hip

‘When should I have it done?’

‘What implant material is best for me?’

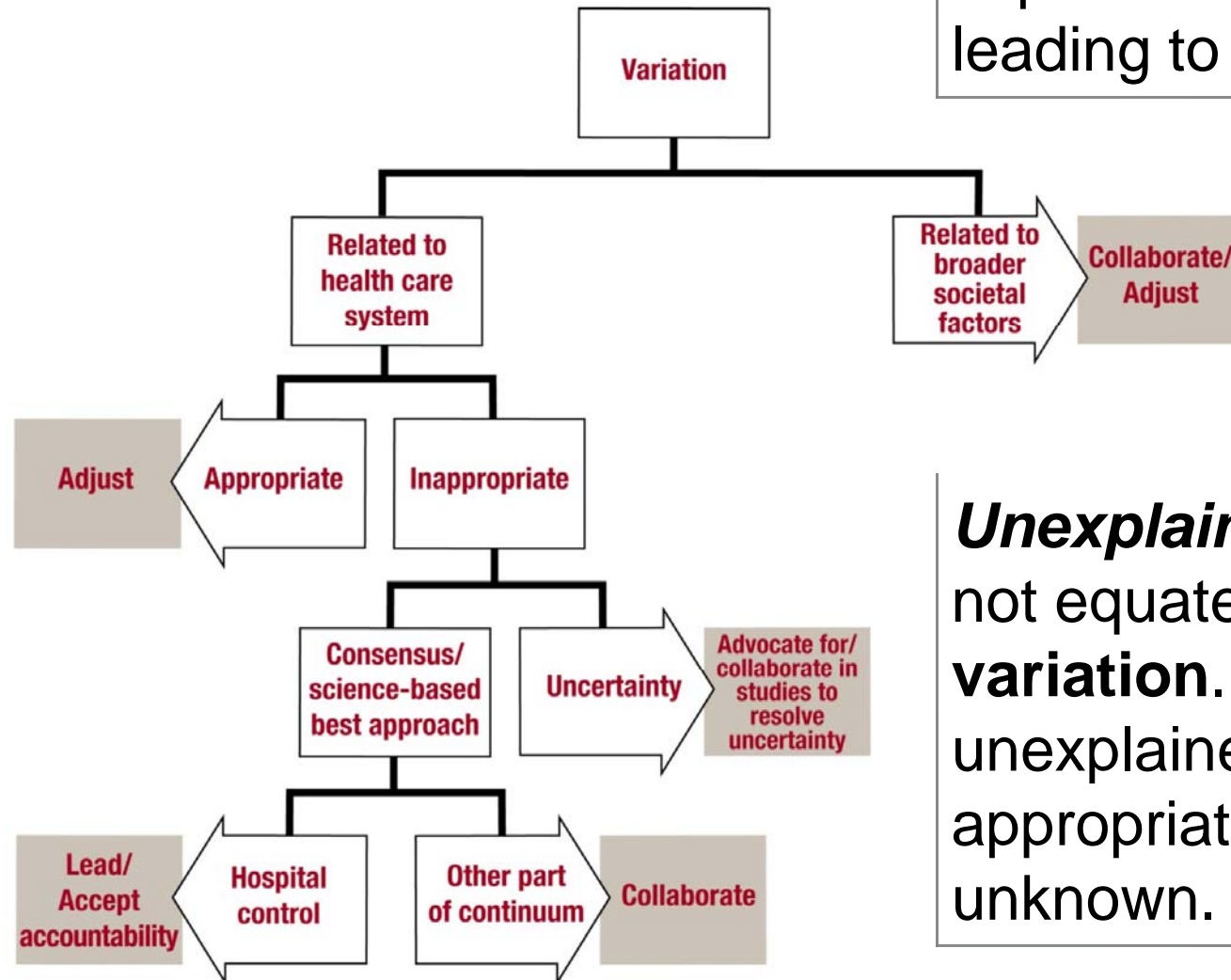
‘What can I do after it is replaced?’

Average cost of a hip replacement in the U.S. is \$30,000



Variation - What is it?

Variation is expected and necessary when there is experimentation, hopefully leading to future consensus



***Unexplained* variation** does not equate to ***inappropriate* variation**. What portion of unexplained variation is appropriate or inappropriate is unknown.

Variation - Where is it?

Variation

- Exists at all levels of the health care system
- Exists across multiple performance dimensions
- Occurs in both private-pay and Medicare populations
- Exists in all settings - hospitals, home health, ASCs, etc
- Affected by many factors
- Exists regardless of payment incentives, organizational structure
- Financial incentives matter
- Providers respond to data even without financial incentives
- The link between quality and spending is disputed

Variation - Is it Normal?

‘Clearly some variation is expected (evolving medical science, variation in patient population, etc) and some is appropriate . . . [but] nearly any health care professional looking across all providers in their own organization would say that there are differences in practice patterns that cannot be justified by differences in patient needs and, therefore represent inappropriate variation’

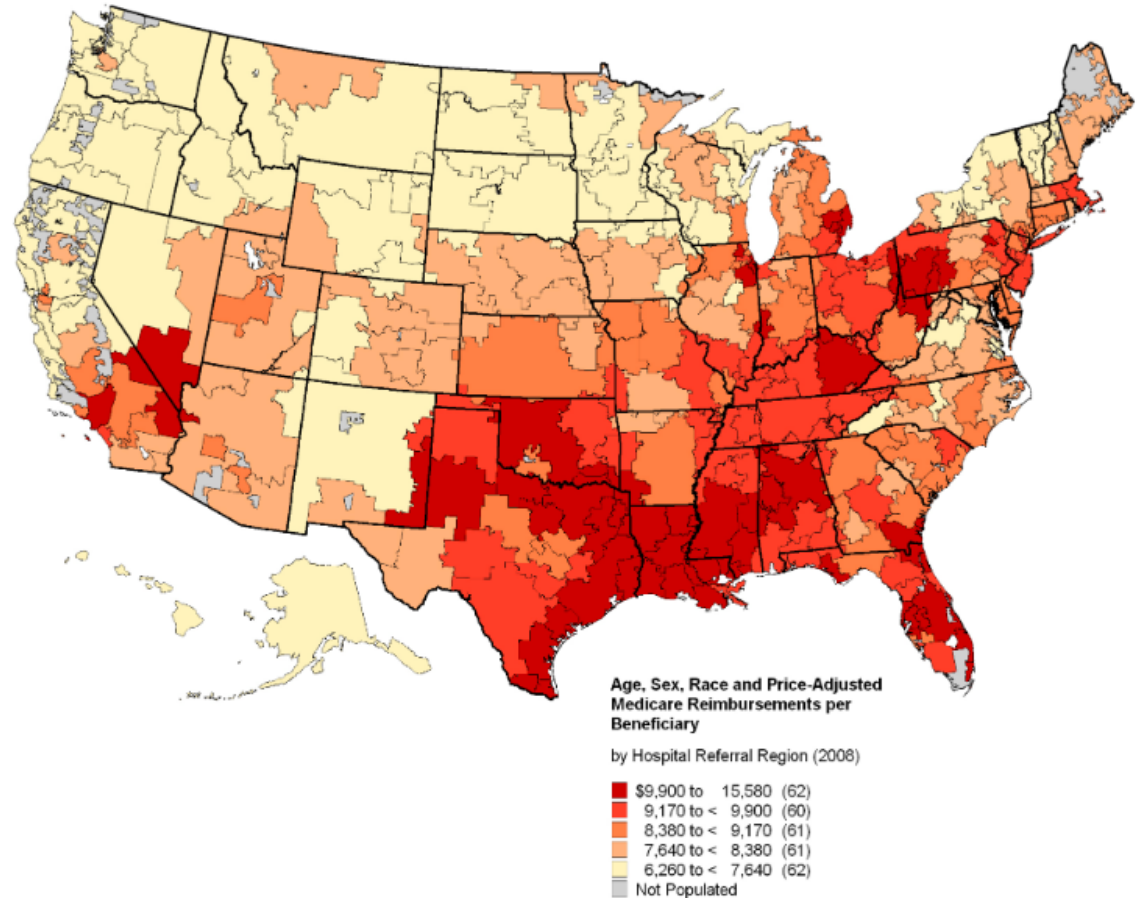
Report of the Task Force on Variation in Health Care Spending,
American Hospital Association, 2011

30%

Excess Medicare Spending
30% of all Medicare clinical care spending is unnecessary or harmful and could be avoided without worsening health outcomes

\$700 billion

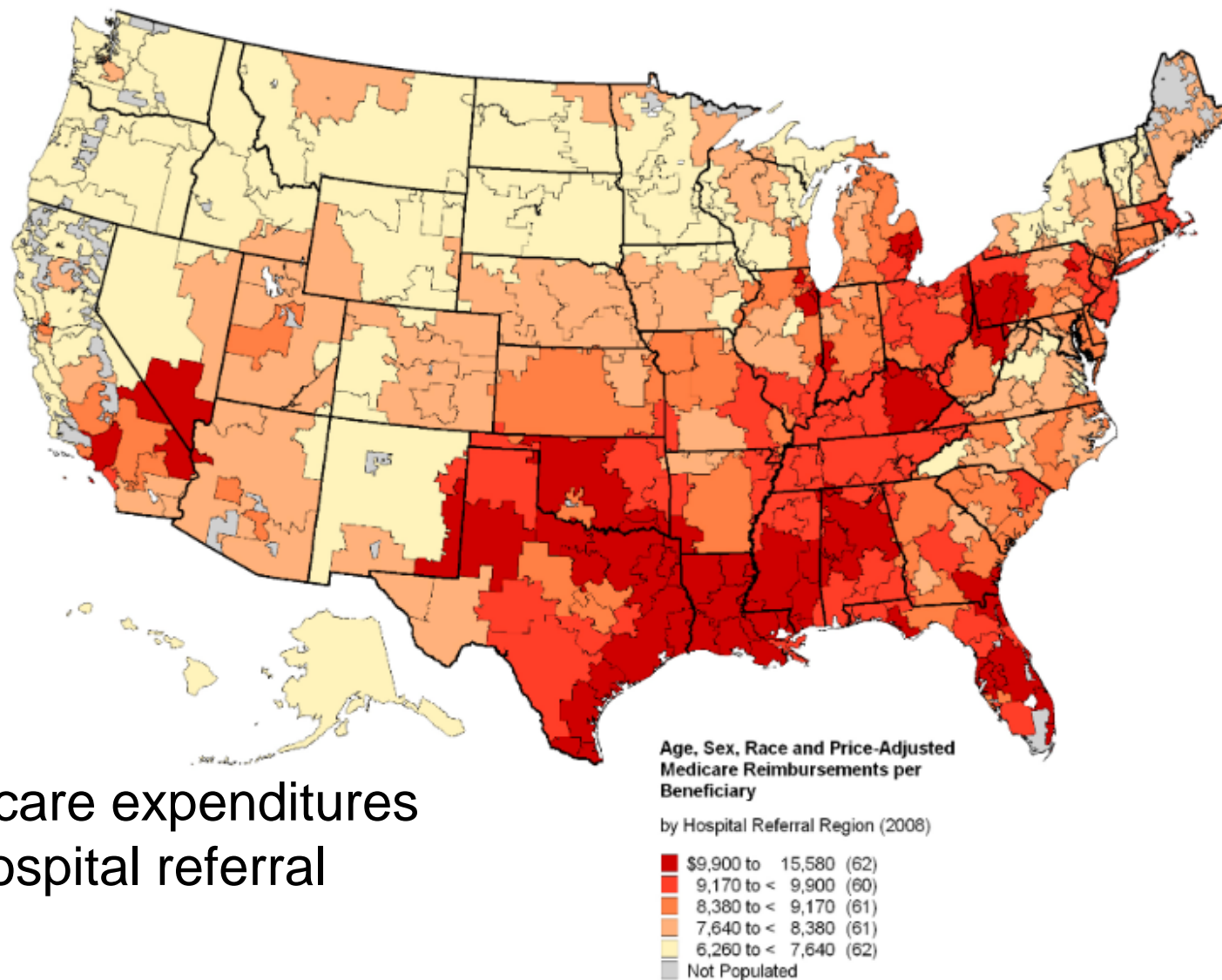
Reducing Waste in Health Care, Health Policy Brief
Health Affairs, December 2012 (www.healthaffairs.org)



Price-adjusted Medicare expenditures
per beneficiary by hospital referral
region (2008)

*A New Series of Medicare Expenditure Measures
by Hospital Referral Region: 2003-2008,
The Dartmouth Atlas*
(http://www.dartmouthatlas.org/downloads/report/s/PA_Spending_Report_0611.pdf)

Variation - Medicare, Cost



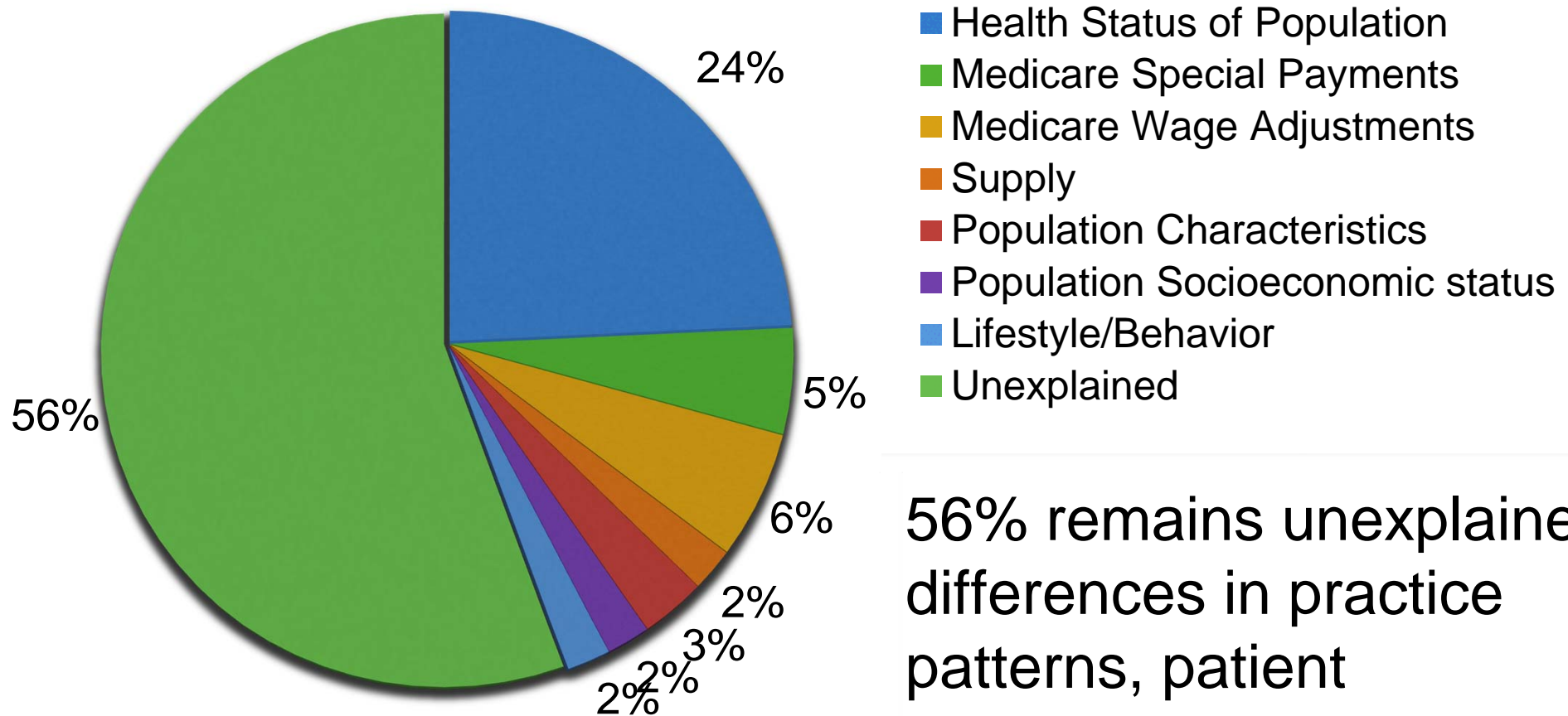
Price-adjusted Medicare expenditures
per beneficiary by hospital referral
region (2008)

*A New Series of Medicare Expenditure Measures by Hospital Referral Region: 2003-2008,
The Dartmouth Atlas*
(http://www.dartmouthatlas.org/downloads/reports/PA_Spending_Report_0611.pdf)

Factors Influencing Variation

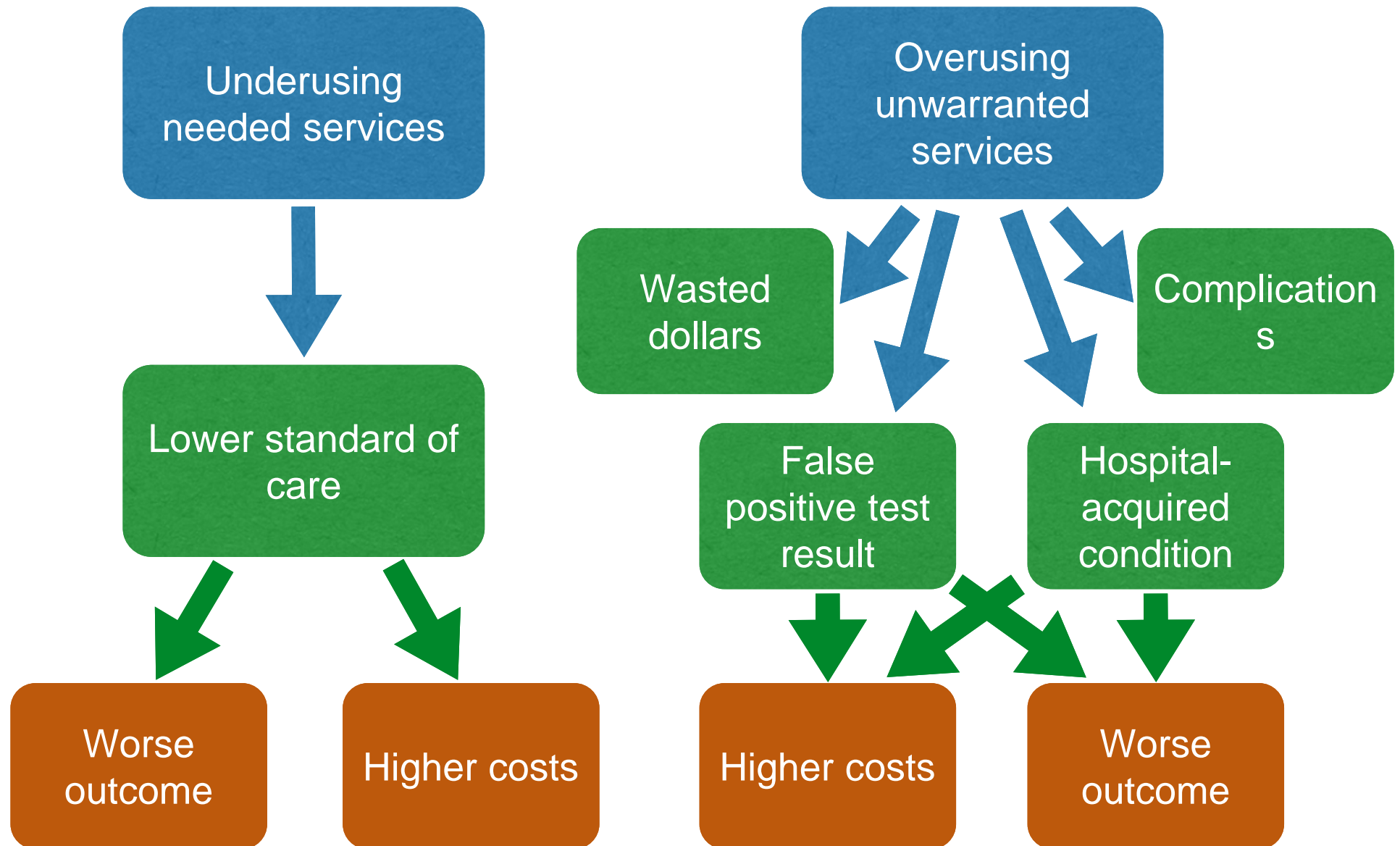
Societal Factors	Market/Provider Factors	Regulatory Environment
<ul style="list-style-type: none">• Health status/disease prevalence• Health behavior• Income/poverty• Urban/rural location• Level of uninsurance• Unemployment• Age/sex• Race/Ethnicity• Local culture• Environmental factors - housing, air quality, etc• Other	<ul style="list-style-type: none">• Quality of care• Efficiency per unit of service• Practice patterns• Access to care• Training of clinicians• Costs of doing business• Penetration of IT• Prevalence of physician ownership of hospitals, ASCs, etc• Mix of physician specialties• Supply• Physician payment model• Payer mix• Other	<ul style="list-style-type: none">• Medicare payment policies• Medical liability environment• Scope of practice regulations• Other state and federal regulations• CON relationships• Medicaid/CHIP policies• Insurance regulatory environment• Other

Explaining Geographic Variation in Spending per Medicare Beneficiary



56% remains unexplained - differences in practice patterns, patient preferences and other local factors

Inappropriate Variation - the Consequences



“In America, there is no guarantee that any individual will receive high-quality care for any particular health problem. The healthcare industry is plagued with over-utilization of services and errors in healthcare practice”

The Quality of Healthcare Delivered to Adults in the United States,
New England Journal Medicine, 2003; 348:2635-2645

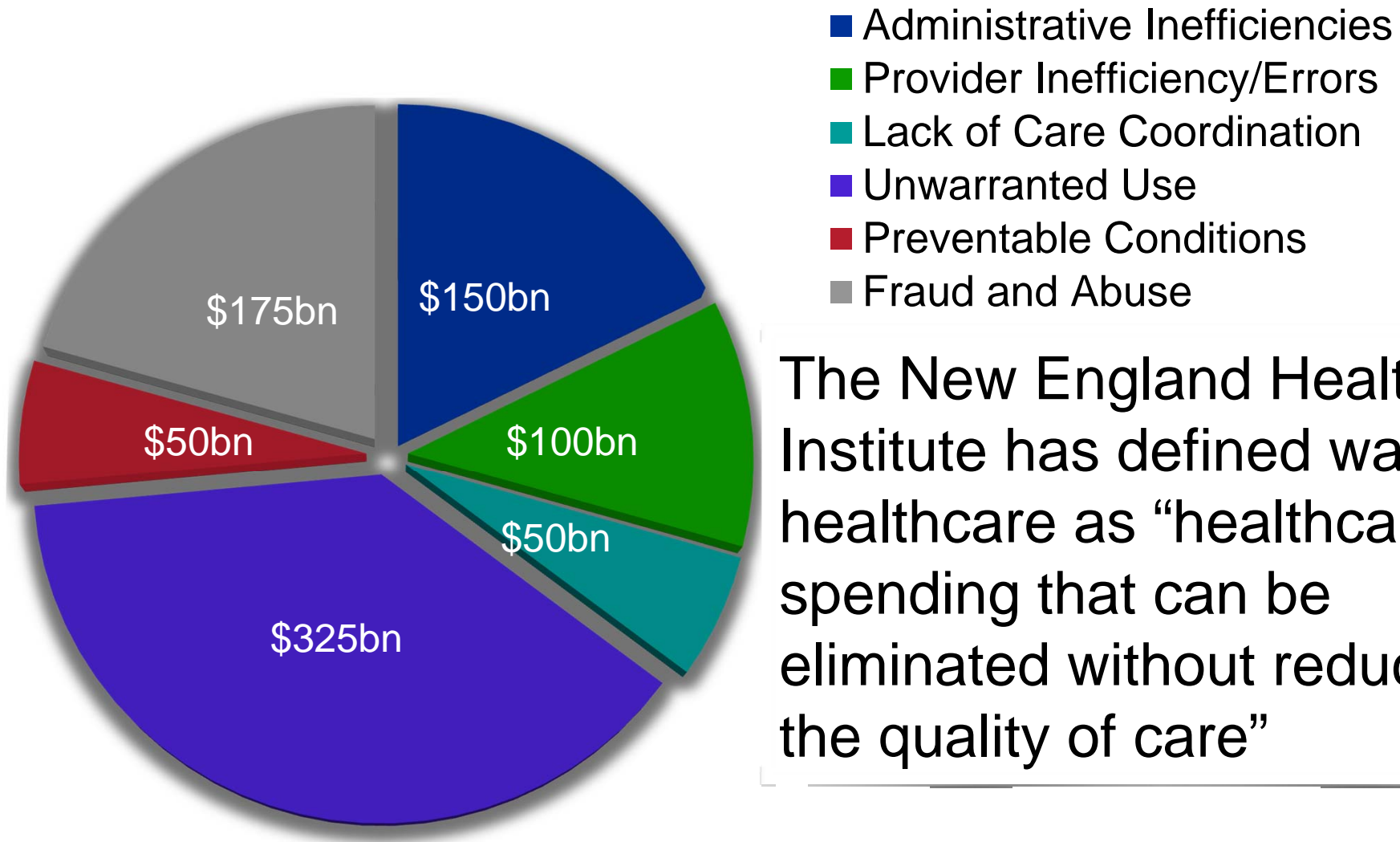
Can this be true?
What about now?

Table 5. Adherence to Quality Indicators, According to Condition.*

Condition	No. of Indicators	No. of Participants Eligible	Total No. of Times Indicator Eligibility Was Met	Percentage of Recommended Care Received (95% CI)
Senile cataract	10	159	602	78.7 (73.3–84.2)
Breast cancer	9	192	202	75.7 (69.9–81.4)
Prenatal care	39	134	2920	73.0 (69.5–76.6)
Low back pain	6	489	3391	68.5 (66.4–70.5)
Coronary artery disease	37	410	2083	68.0 (64.2–71.8)
Hypertension	27	1973	6643	64.7 (62.6–66.7)
Congestive heart failure	36	104	1438	63.9 (55.4–72.4)
Cerebrovascular disease	10	101	210	59.1 (49.7–68.4)
Chronic obstructive pulmonary disease	20	169	1340	58.0 (51.7–64.4)
Depression	14	770	3011	57.7 (55.2–60.2)
Orthopedic conditions	10	302	590	57.2 (50.8–63.7)
Osteoarthritis	3	598	648	57.3 (53.9–60.7)
Colorectal cancer	12	231	329	53.9 (47.5–60.4)
Asthma	25	260	2332	53.5 (50.0–57.0)
Benign prostatic hyperplasia	5	138	147	53.0 (43.6–62.5)
Hyperlipidemia	7	519	643	48.6 (44.1–53.2)
Diabetes mellitus	13	488	2952	45.4 (42.7–48.3)
Headache	21	712	8125	45.2 (43.1–47.2)
Urinary tract infection	13	459	1216	40.7 (37.3–44.1)
Community-acquired pneumonia	5	144	291	39.0 (32.1–45.8)
Sexually transmitted diseases or vaginitis	26	410	2146	36.7 (33.8–39.6)
Dyspepsia and peptic ulcer disease	8	278	287	32.7 (26.4–39.1)
Atrial fibrillation	10	100	407	24.7 (18.4–30.9)
Hip fracture	9	110	167	22.8 (6.2–39.5)
Alcohol dependence	5	280	1036	10.5 (6.8–14.6)

* Condition-specific scores are not reported for management of pain due to cancer and its palliation, management of symptoms of menopause, hysterectomy, prostate cancer, and cesarean section, because fewer than 100 people were eligible for analysis of these categories. CI denotes confidence interval.

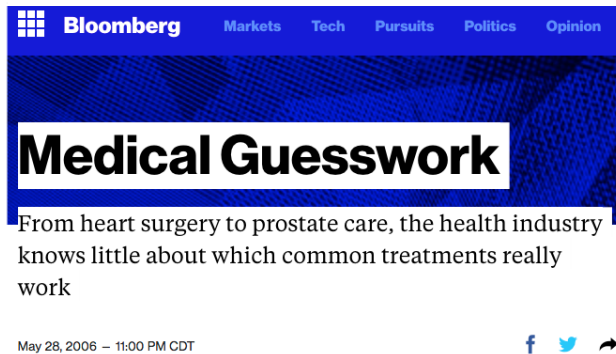
Employers believe that \$600-850 billion is wasted each year



The New England Healthcare Institute has defined waste in healthcare as “healthcare spending that can be eliminated without reducing the quality of care”

Reducing Waste in Healthcare: Impact of IT,
Thomson Reuters, January 2010,

<http://www.healthtechnet.net/docudepot/Thomson-Reuters%20Presentation%201-15-10.pdf>



Chief of Bioengineering, U.S. Army
Professor, Engineering, Stanford
Professor, Health Care Policy, Duke
Cardiovascular Surgeon, Duke
Chief Scientist, BCBS
Director, WHO Center for Research
Chief Medical Officer, Archimedes
Many Others

“I think of healthcare as a \$2.7 trillion tank rumbling down the road. Hundreds of people have their hands on the wheel, pulling in different directions, and shouting in different languages. The windshields are smudged over with Vaseline. The tank is providing decent protection for a lot of people, but it is smashing into trees and houses (and it certainly does not meet California’s emissions standards)”

David Eddy, MD, PhD

Hospital sticker shock

A report on hospital sticker price variation in Washington state

www.wacommunitycheckup.org

DIFFERENCE BETWEEN HIGHEST BILLING HOSPITAL AND LOWEST BILLING HOSPITAL FOR FUSION OF BACK VERTEBRAE:

3x OR **\$131,611**

Average Amount Billed by Hospitals for Fusion of Back Vertebrae:

Average Amount Paid by Medicare for Fusion of Back Vertebrae:

STATEWIDE

\$117,430

\$26,106

\$96,581

\$23,983

NATIONAL

Price Variation - Spine Surgery (Washington State)

Price Variation for Fusion of Back Vertebrae (DRG 460)

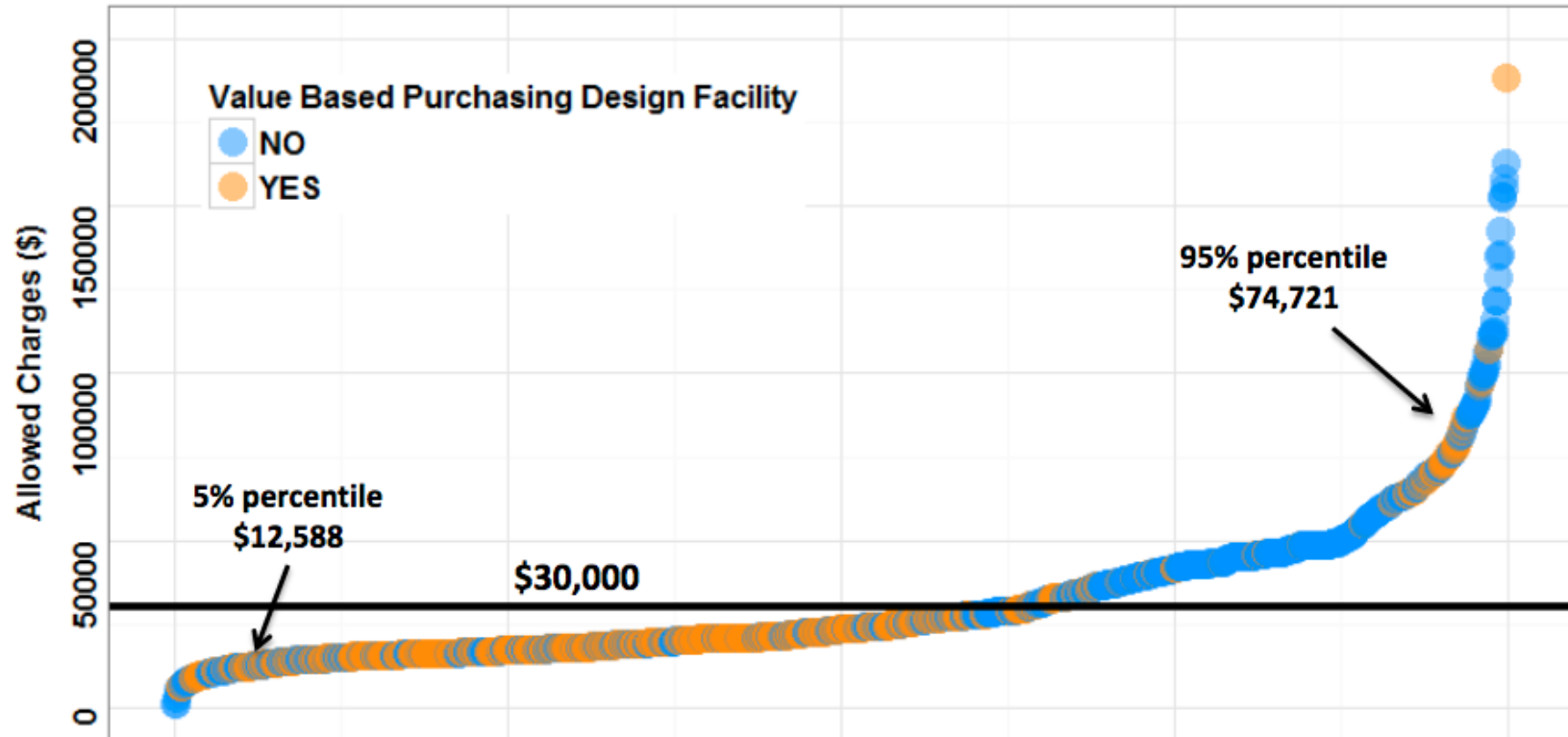
	CITY	HOSPITAL	DISCHARGES	AVG BILLED BY HOSPITAL	AVG PAID BY MEDICARE
1	OLYMPIA	C PROVIDENCE ST PETER HOSPITAL	53	\$193,323	\$26,983
2	PUYALLUP	P MULTICARE GOOD SAMARITAN HOSPITAL	26	\$180,648	\$26,747
3	FEDERAL WAY	C ST FRANCIS COMMUNITY HOSPITAL	28	\$176,157	\$25,188
4	SEATTLE	P SWEDISH MEDICAL CENTER	85	\$162,862	\$28,544
5	SPOKANE	P DEACONESS HOSPITAL	36	\$157,437	\$32,627
6	TACOMA	P TACOMA GENERAL ALLENMORE HOSPITAL	52	\$151,508	\$27,645
7	YAKIMA	P YAKIMA REGIONAL MEDICAL AND CARDIAC CENTER	75	\$150,296	\$25,107
8	BREMERTON	P HARRISON MEDICAL CENTER	30	\$131,617	\$25,086
9	EVERETT	C PROVIDENCE REGIONAL MEDICAL CENTER EVERETT	22	\$129,568	\$24,920
10	SEATTLE	L HARBORVIEW MEDICAL CENTER	50	\$126,358	\$37,878
11	SPOKANE	C PROVIDENCE HOLY FAMILY HOSPITAL	25	\$125,850	\$27,469
12	OLYMPIA	P CAPITAL MEDICAL CENTER	107	\$118,476	\$23,869
13	TACOMA	C ST JOSEPH MEDICAL CENTER	120	\$117,837	\$24,302
14	SEATTLE	C SWEDISH MEDICAL CENTER - CHERRY HILL	78	\$103,681	\$24,983
15	SPOKANE	C PROVIDENCE SACRED HEART MEDICAL CENTER	61	\$103,608	\$23,407
16	RENTON	H VALLEY MEDICAL CENTER	108	\$103,360	\$25,605
17	BELLEVUE	O OVERLAKE HOSPITAL MEDICAL CENTER	46	\$102,266	\$22,170
18	SEATTLE	P VIRGINIA MASON MEDICAL CENTER	27	\$100,376	\$28,014
19	SEATTLE	O NORTHWEST HOSPITAL	28	\$91,325	\$21,243
20	MOUNT VERNON	H SKAGIT VALLEY HOSPITAL	18	\$88,436	\$26,187
21	KIRKLAND	H EVERGREEN HOSPITAL MEDICAL CENTER	16	\$86,422	\$23,921
22	RICHLAND	P KADLEC REGIONAL MEDICAL CENTER	45	\$85,390	\$23,407
23	WALLA WALLA	P PROVIDENCE ST MARY MEDICAL CENTER	43	\$85,083	\$23,041
24	SEATTLE	S UNIVERSITY OF WASHINGTON MEDICAL CTR	45	\$84,376	\$37,452
25	BELLINGHAM	O PEACEHEALTH ST JOSEPH MEDICAL CENTER	53	\$83,218	\$24,700
26	WENATCHEE	O CENTRAL WASHINGTON HOSPITAL	38	\$83,008	\$25,957
27	VANCOUVER	P PEACEHEALTH SOUTHWEST MEDICAL CENTER	23	\$69,654	\$24,603
28	ANACORTES	H ISLAND HOSPITAL	21	\$61,889	\$21,007
29	YAKIMA	P YAKIMA VALLEY MEMORIAL HOSPITAL	21	\$61,712	\$22,650

Source: CMS 2013 price data release for fiscal year ending Sept. 30, 2012

Important: these billing and payment data are not indicators of clinical quality and should not be viewed as such.

Geographic Variation - Knee and Hip Replacement

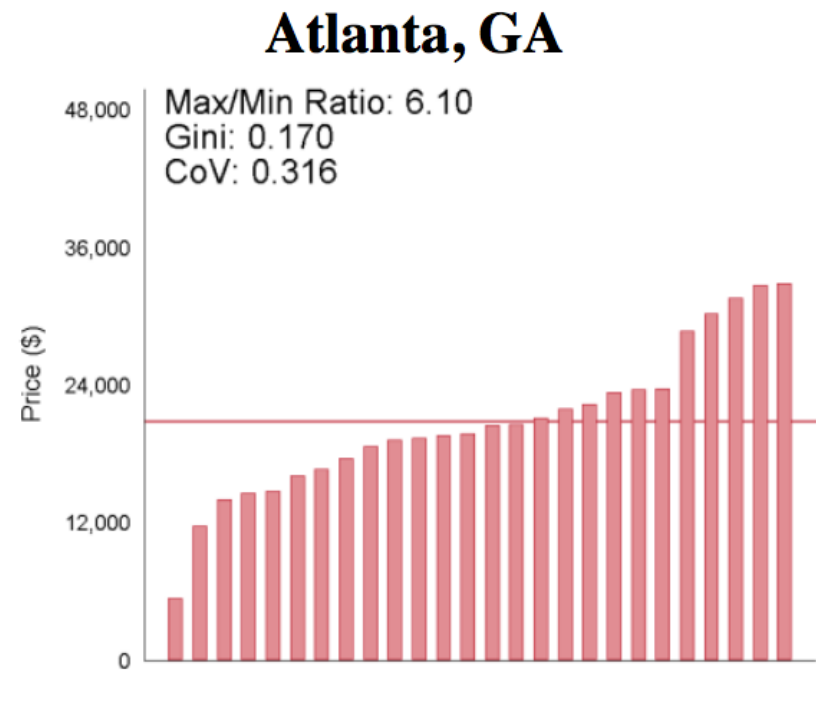
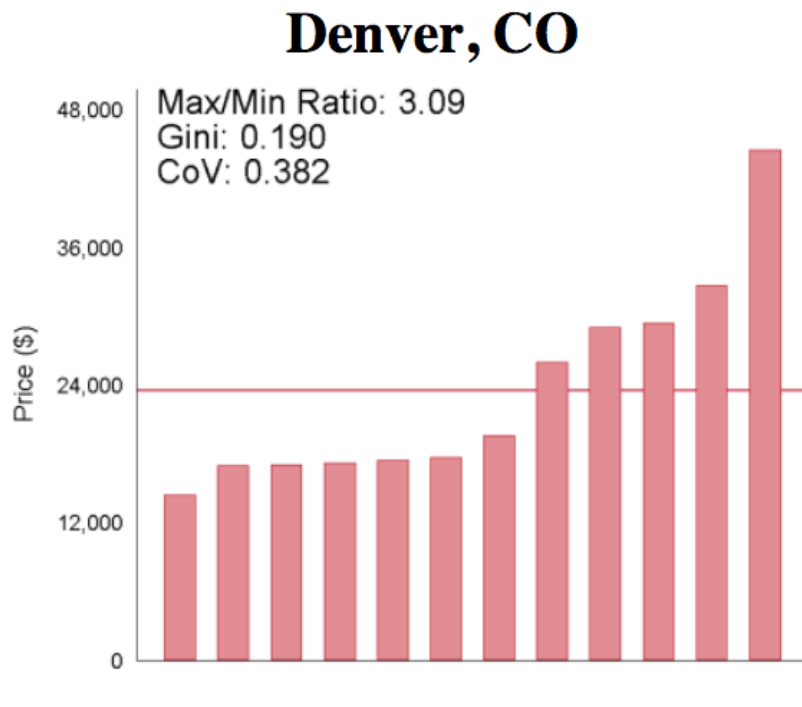
- High volume, high quality facilities with geographic dispersion were charging less than \$30,000



Source: University of California, Berkeley analysis, June 2013. Data for 2008 to 2010.

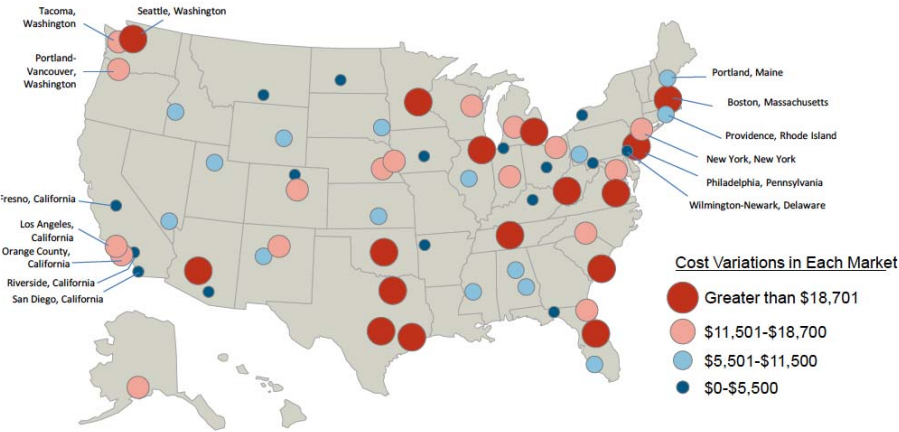
‘Reference Pricing’ used to direct subscribers

Variation in Private Insurance Costs



The Price Ain't Right? Hospital Prices and Health Spending on the Privately Insured. Cooper et al (at http://www.healthcarepricingproject.org/sites/default/files/pricing_variation_manuscript_0.pdf)

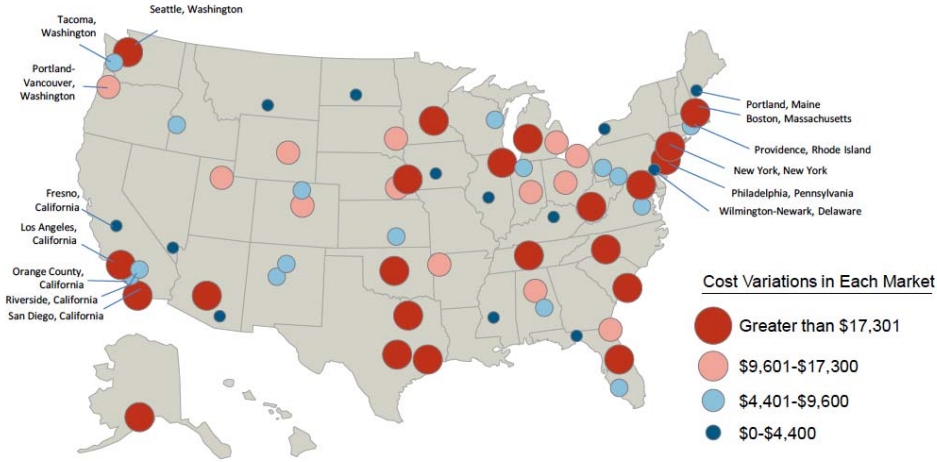
Figure 1: Cost Variation for Knee Replacement Procedures Across the Country
Appendix A contains a list of plotted markets showing the Minimum Cost, Average Cost, Maximum Cost and Percent Differential between the Minimum and Maximum.



Source: Analysis of Blue Health Intelligence® (BHI®) data

	Highest Average Cost Markets		Lowest Average Cost Markets	
KNEE	New York, New York	\$61,266.08	Alabama, Montgomery	\$16,096.87
	Colorado, Fort Collins-Loveland	\$55,604.10	Alabama, Birmingham	\$19,133.13
	Alaska, Anchorage	\$54,008.45	California, Fresno	\$19,653.06
	Wyoming, Casper	\$52,541.28	Pennsylvania, Pittsburgh	\$23,751.03
	California, San Diego	\$41,042.22	California, Riverside-San Bernardino	\$24,543.40
HIP	New York, New York	\$59,447.86	Alabama, Montgomery	\$16,398.95
	Colorado, Fort Collins-Loveland	\$55,412.64	Alabama, Birmingham	\$17,515.16
	Alaska, Anchorage	\$49,555.69	California, Fresno	\$19,250.98
	Wyoming, Casper	\$44,022.75	California, Riverside-San Bernardino	\$21,381.58
	Texas, Dallas	\$39,263.15	Pennsylvania, Pittsburgh	\$22,134.59

Figure 2: Cost Variation for Hip Replacement Procedures Across the Country
Appendix A contains a list of plotted markets below, showing the Minimum Cost, Average Cost, Maximum Cost, and Percent Differential between the Minimum and Maximum.

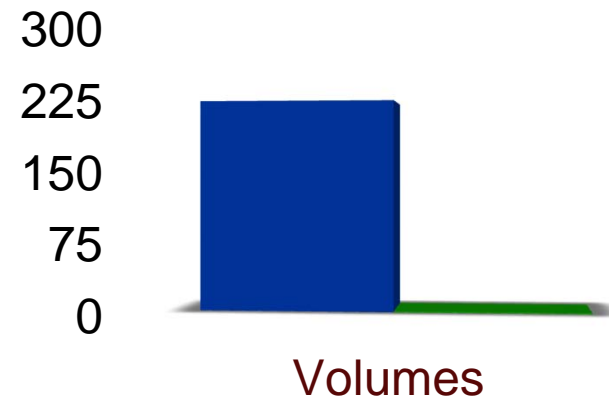
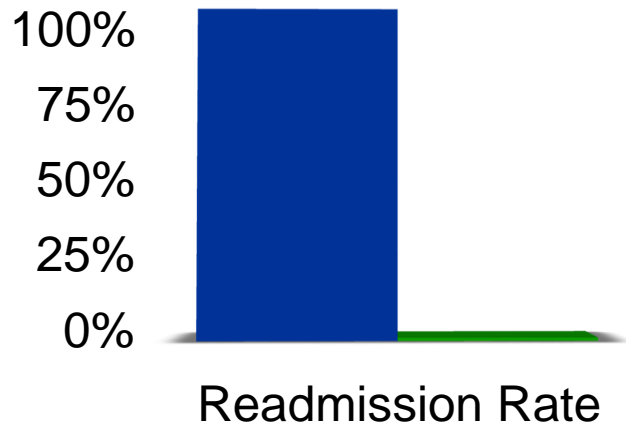
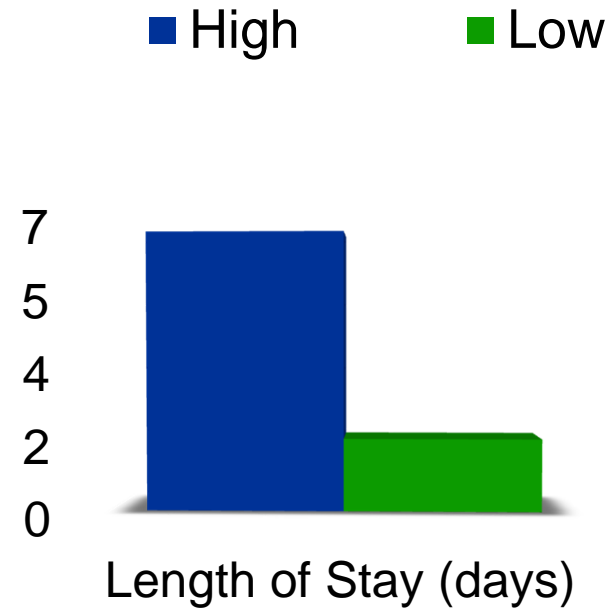
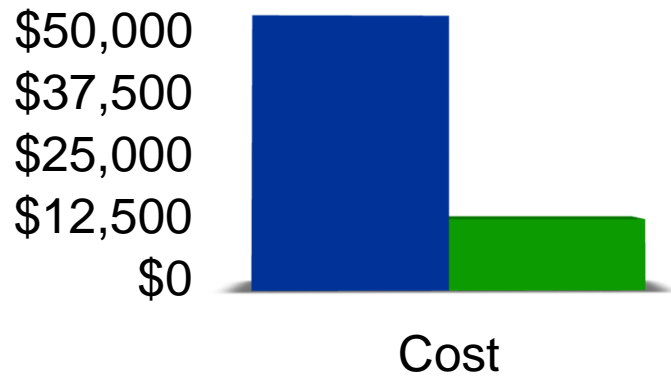


Source: Analysis of Blue Health Intelligence® (BHI®) data

A Study of Cost Variations for Knee and Hip Replacement Surgeries in the U.S.

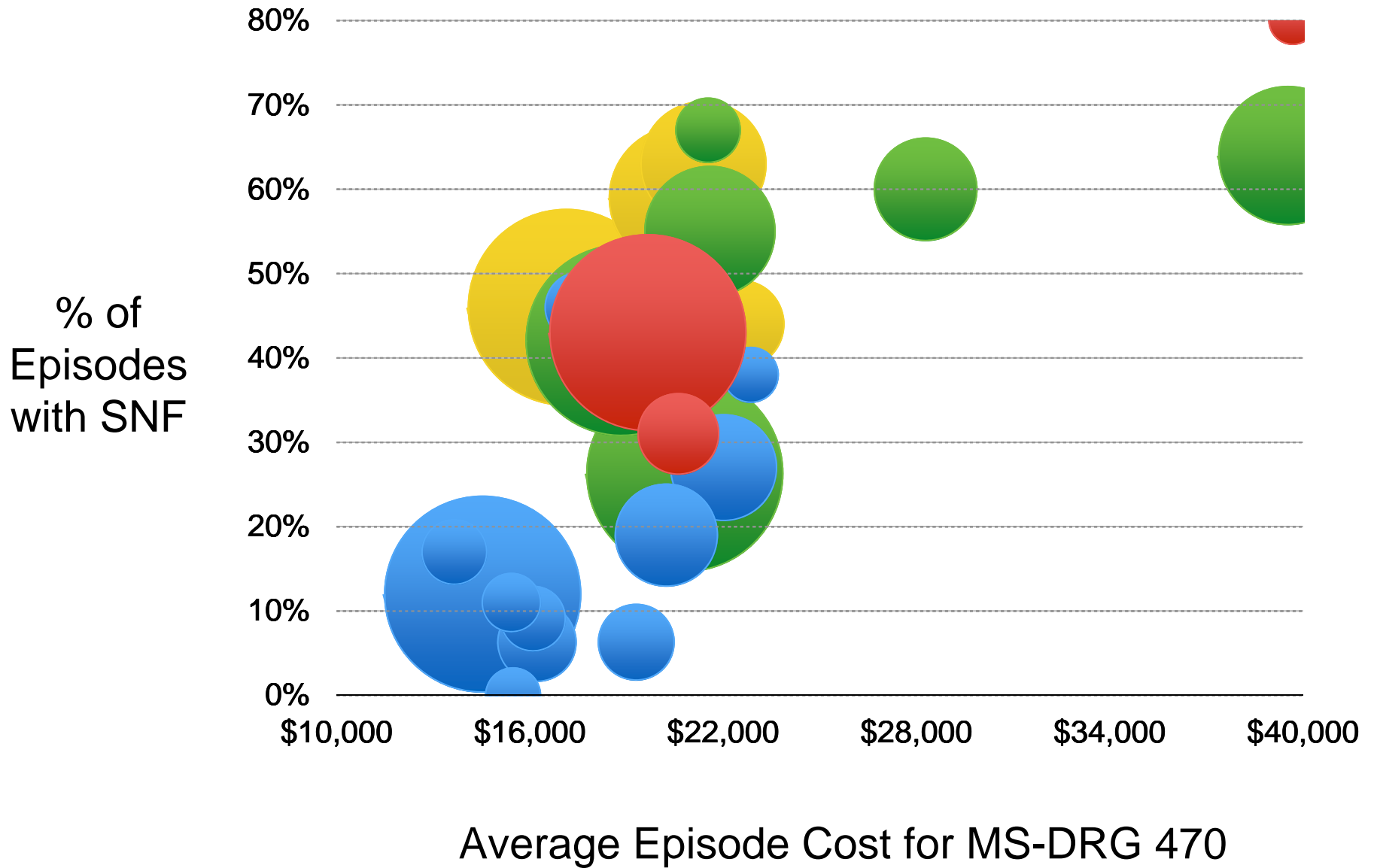
January 21, 2015





Major Joint Replacement
(BCBS, Mississippi)

Combined (all sites)

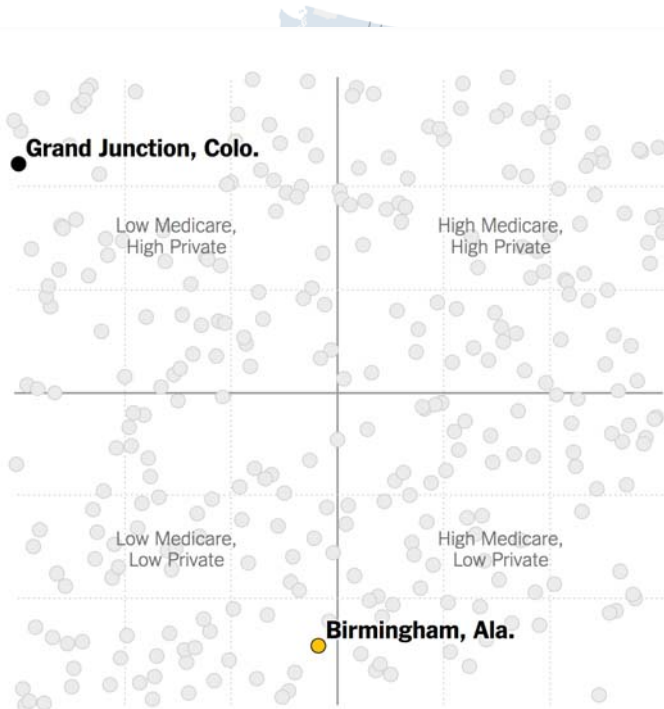


The Experts Were Wrong About the Best Places for Better and Cheaper Health Care

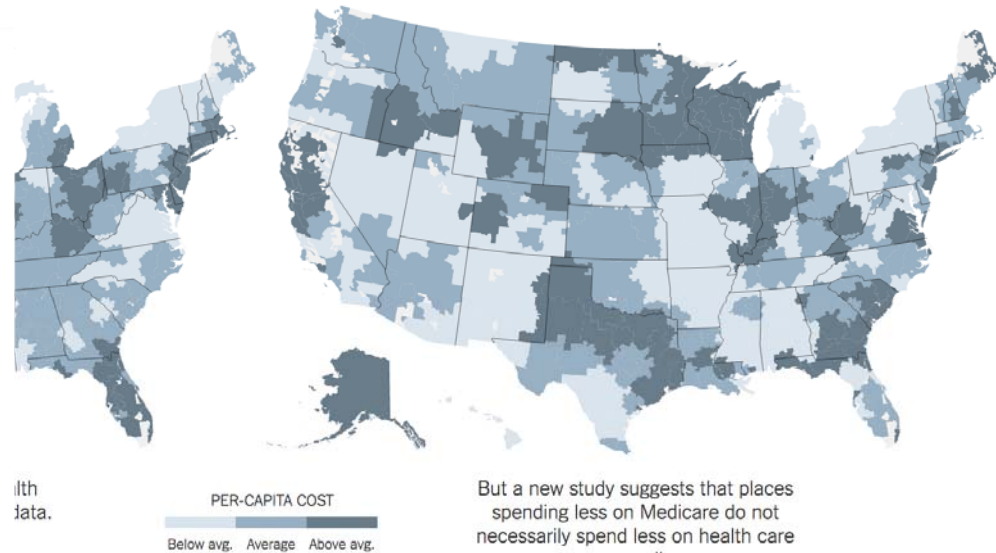
By KEVIN QUEALY and MARGOT SANGER-KATZ DEC. 15, 2015

These maps look nothing alike. Their big differences are forcing health experts to rethink what they know about health costs in Birmingham, Ala. and across the country.

Medicare spending per capita



Private insurance spending per capita

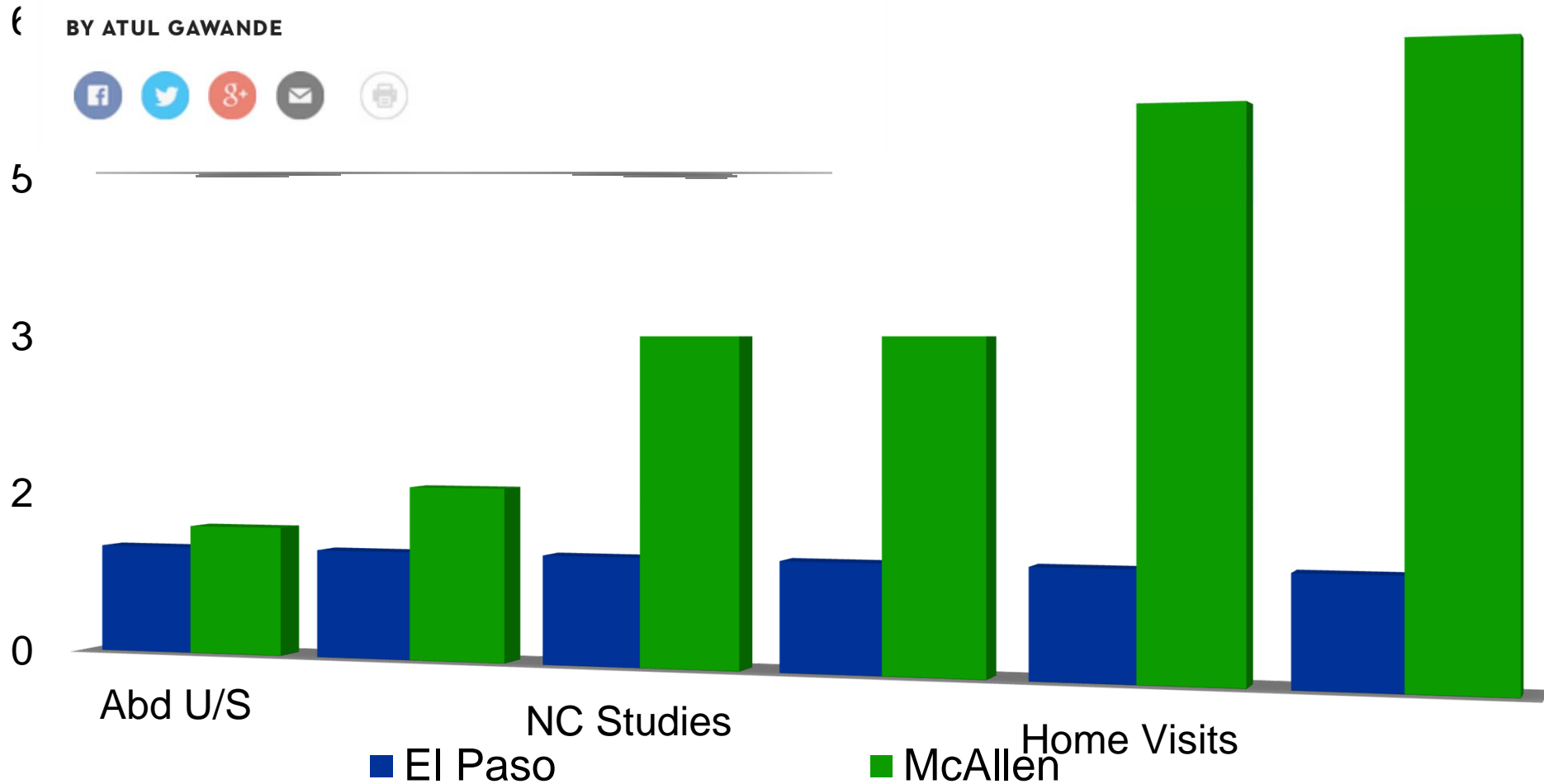


(at http://www.nytimes.com/interactive/2015/12/15/upshot/the-best-places-for-better-cheaper-health-care-arent-what-experts-thought.html?_r=0)

THE COST CONUNDRUM

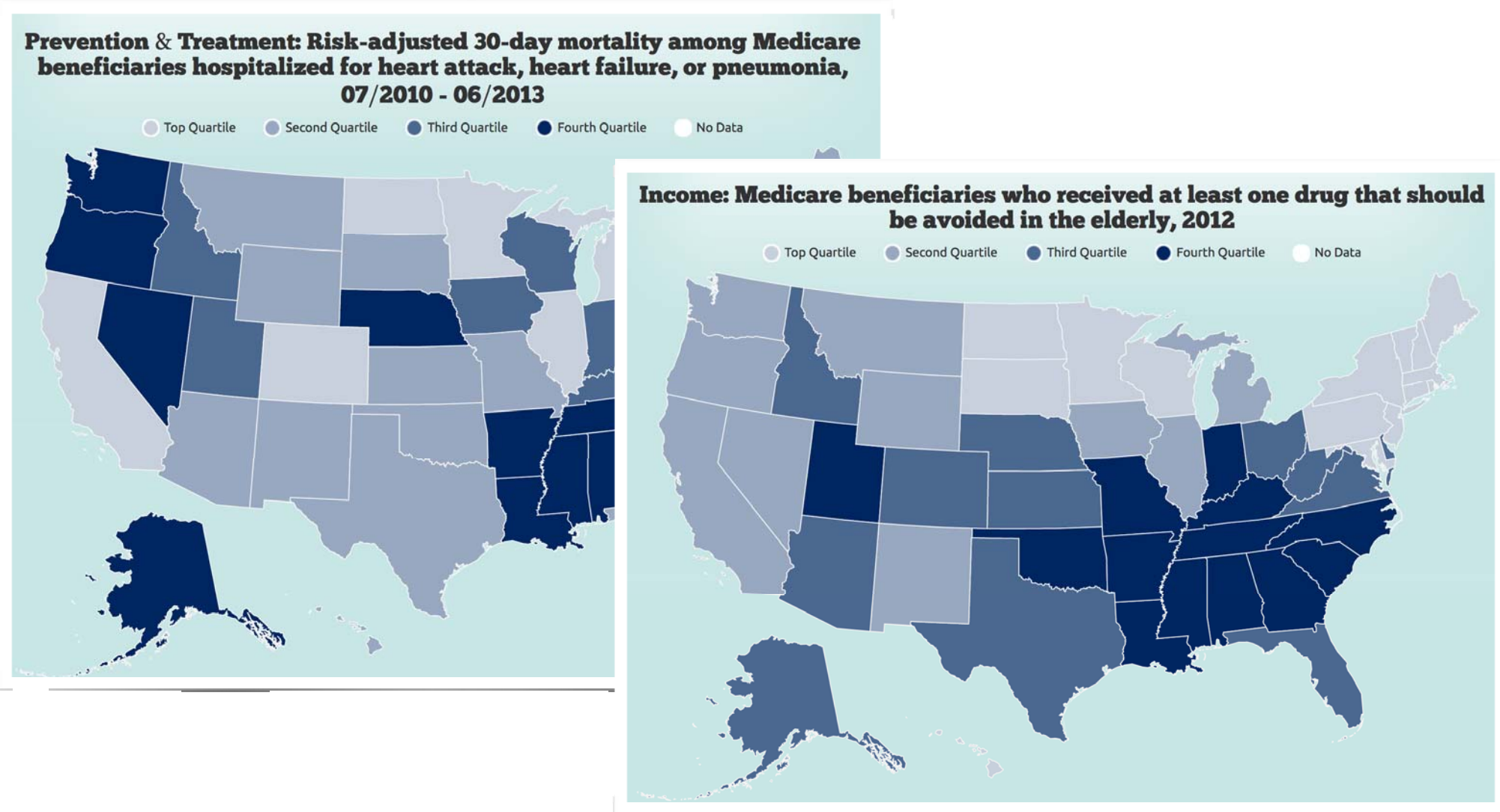
What a Texas town can teach us about health care.

BY ATUL GAWANDE



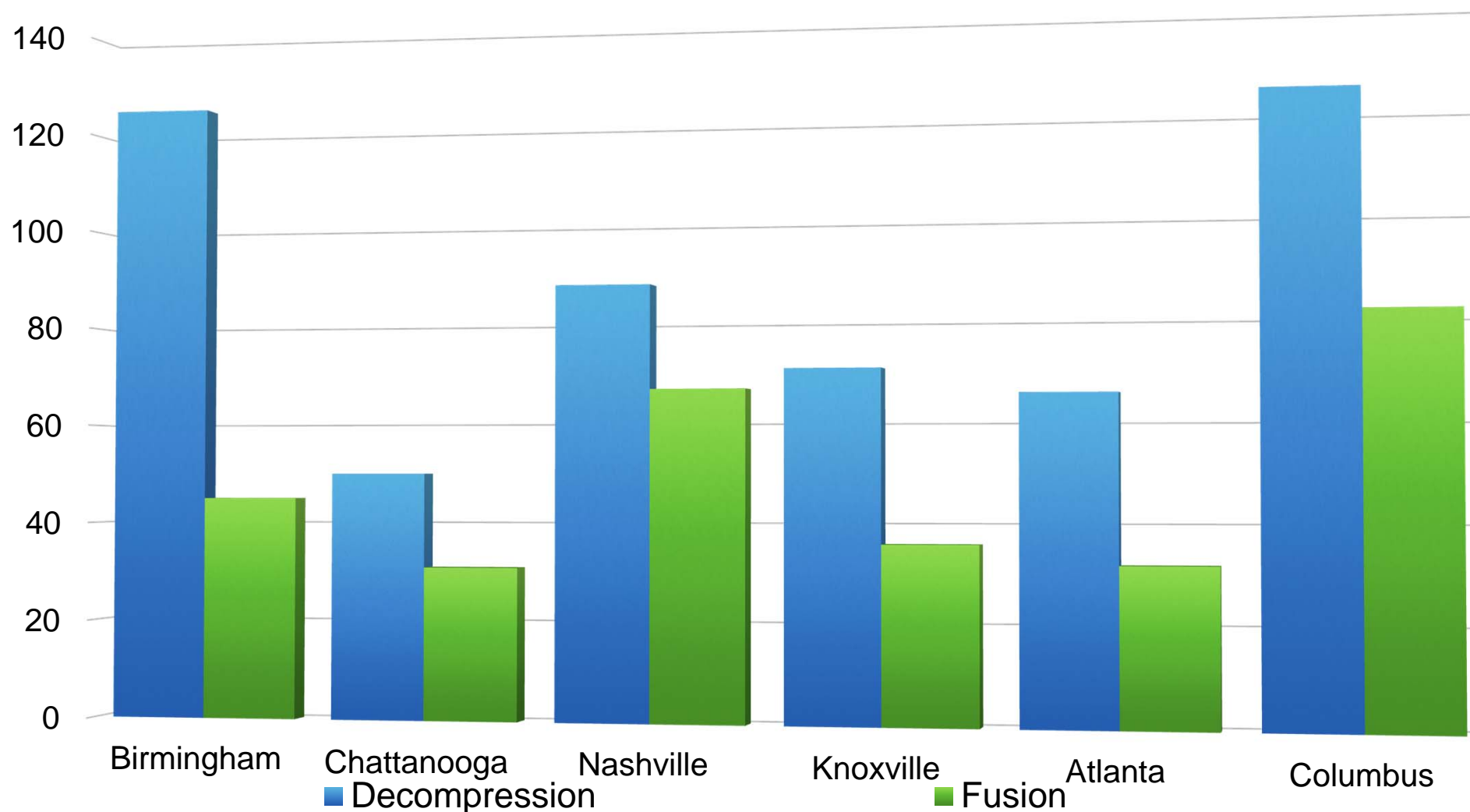
McAllen - \$15,000 per year per beneficiary
Nat'l Average - \$7,500 per year per beneficiary

Where people live matters: it influences their ability to access care as well as the quality of care they receive



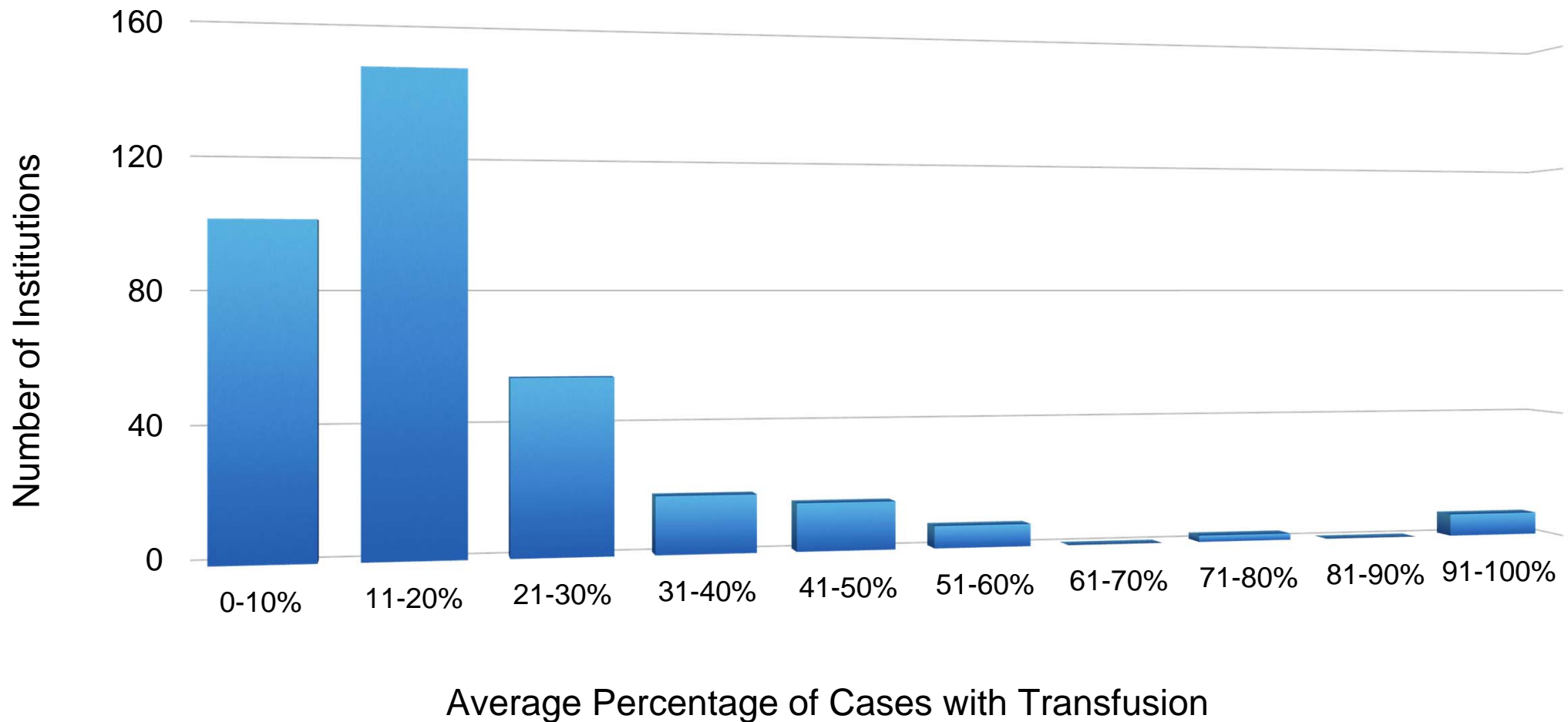
Rising to the Challenge: Results from a Scorecard on Local Health System Performance, 2012, The Commonwealth Fund
(<http://www.commonwealthfund.org/publications/fund-reports/2012/mar/local-scorecard>)

Rates of Inpatient Lumbar Decompression and Fusion for Lumbar Spinal Stenosis by Hospital Referral Regions (per100,000 Medicare Beneficiaries, 2001-2011)



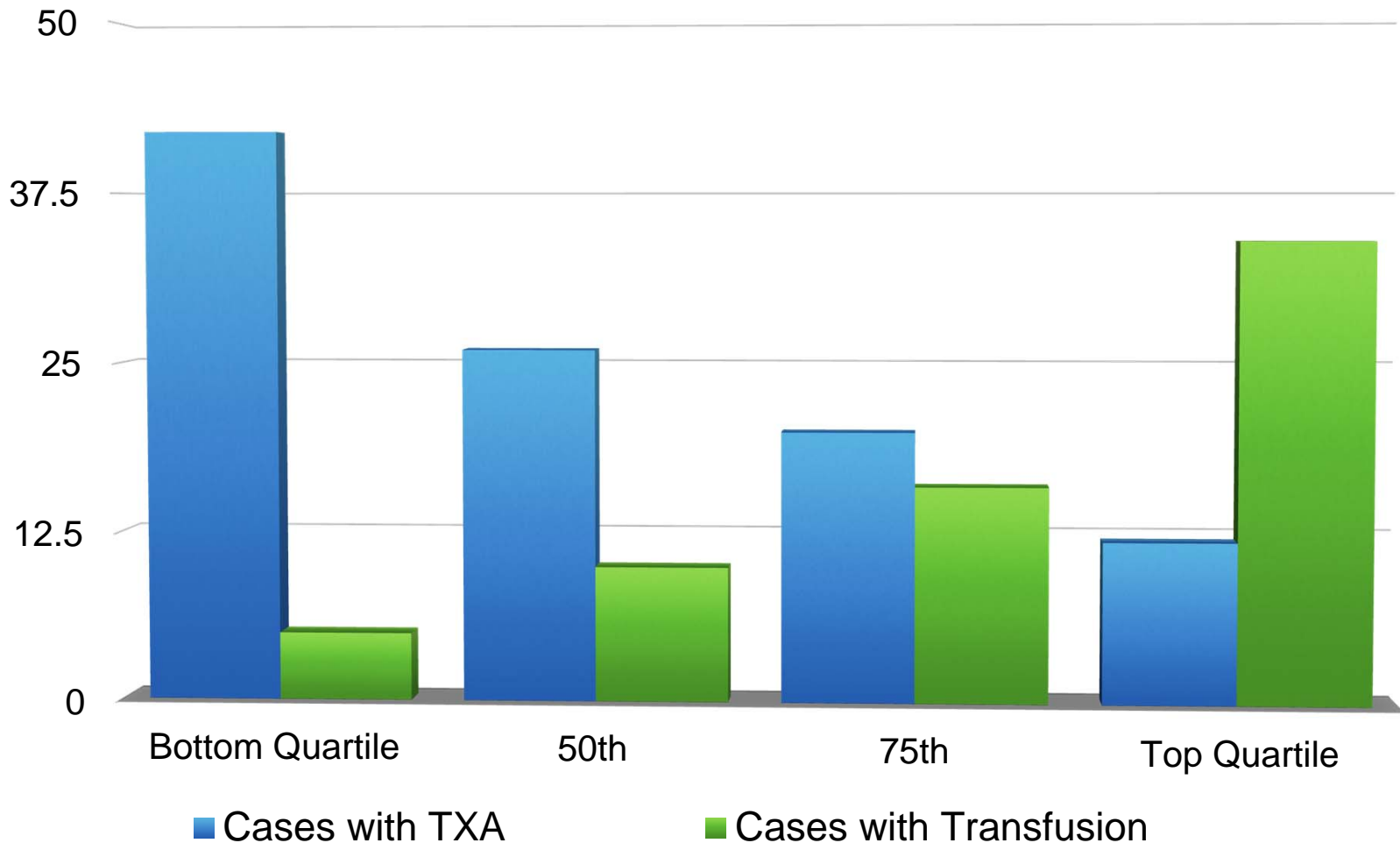
‘The purpose of variation reduction is to determine the appropriate level of care and to ensure that all patients receive care that is needed - no more and no less. Addressing variations in care supports the triple bottom line - improved quality, increased efficiency, and a better patient experience’

Distribution of Transfusion Rates for Hip and Knee Replacement Cases



There will not be blood : Big opportunity to cut blood use in hip and knee cases, Advisory Board, June 2015, <https://www.advisory.com/research/physician-executive-council/prescription-for-change/2015/06/there-will-not-be-blood>

Average TXA Rate and Transfusion Rate by Institution for Joint Replacement Cases (quartiles)

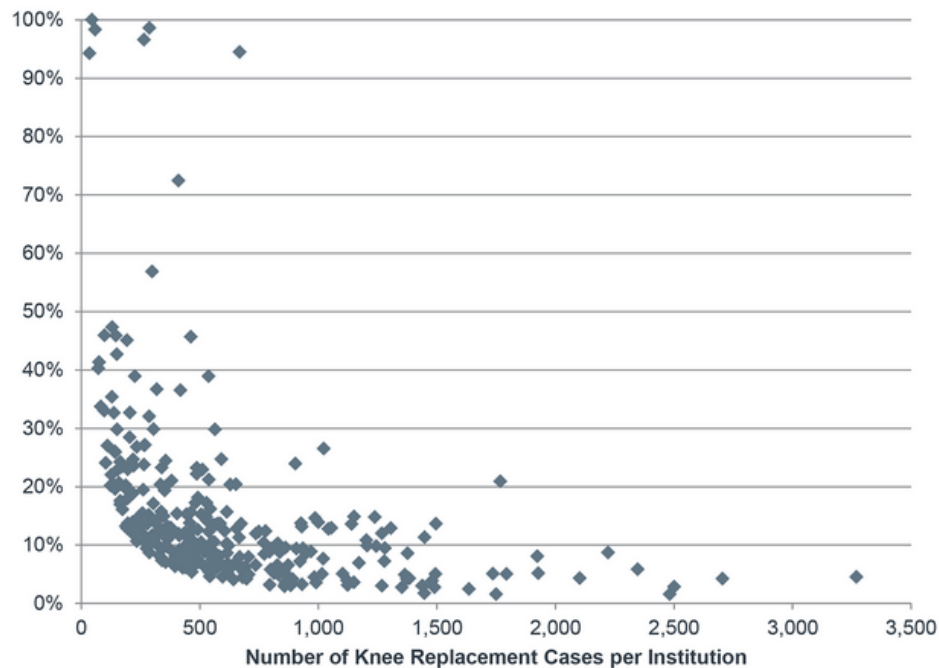


There will not be blood : Big opportunity to cut blood use in hip and knee cases, Advisory Board, June 2015, <https://www.advisory.com/research/physician-executive-council/prescription-for-change/2015/06/there-will-not-be-blood>

Benefits

- Lower risk of postoperative infections
- Shorter length of stay
- Average institutional savings of \$1M

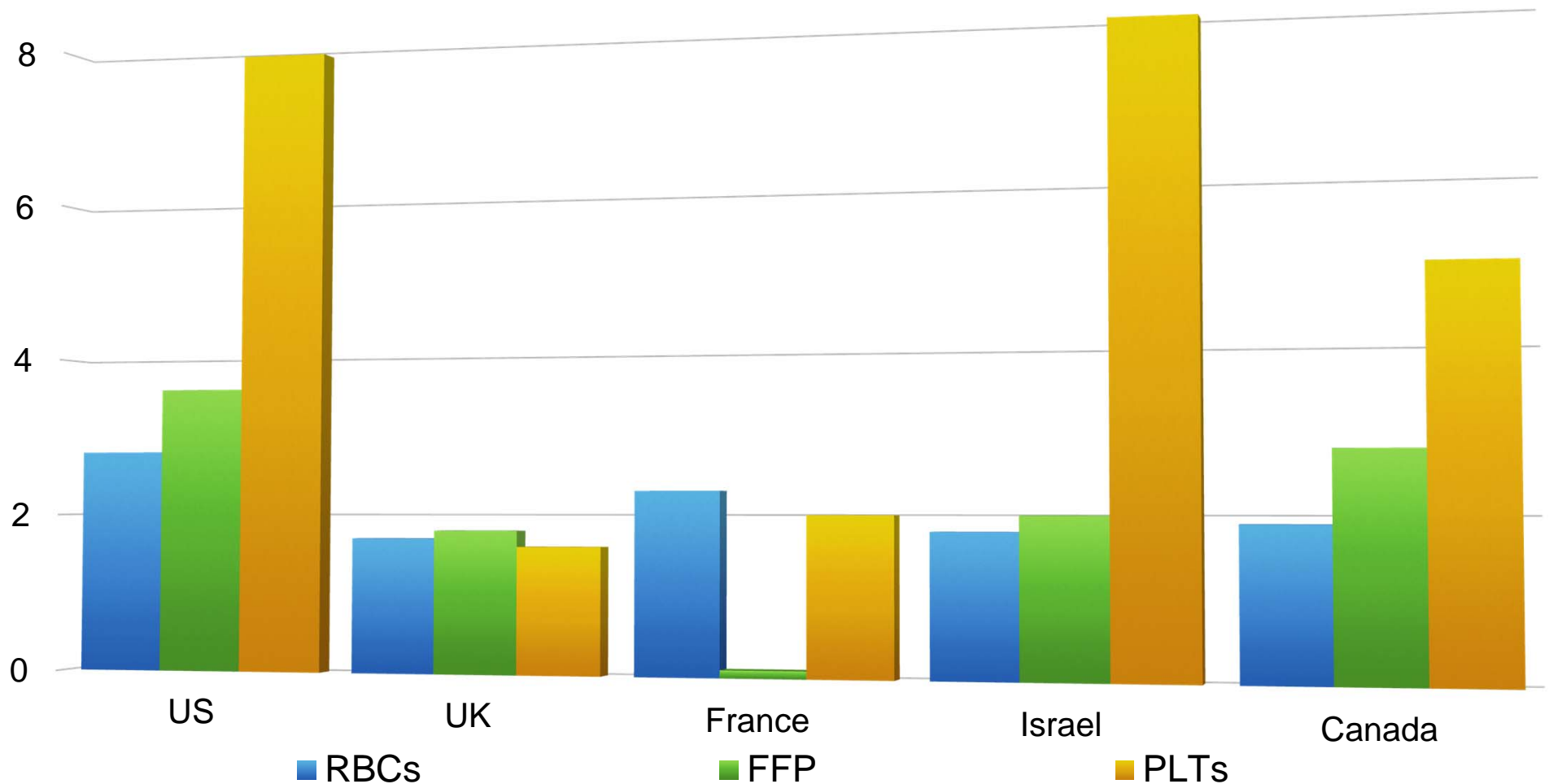
Percentage of knee replacement cases with blood transfusion as a function of procedure volume per institution



The larger the program,
the lower the transfusion
rate

Needed - a focus on the objective of reducing this
undesirable care variation

Transfusion Practices, Cardiac Surgery - Patients Transfused (%)



The ongoing variability in blood transfusion practices in cardiac surgery, TRANSFUSION, Vol 48, July 2008,
perfusion.com/services/wp-content/uploads/2012/01/The-ongoing-variability-in-blood-transfusion-practices-in.pdf



Blood Utilization and Management

Blood transfusions for anemia in the hospital

How much blood do you need?

Getting a blood transfusion in the hospital can save your life. You may need a lot of blood if you are bleeding heavily because of an injury or illness.

But anemia is usually not urgent. And usually you don't need a lot of blood. You may only need one unit of blood while you are in the hospital. Or you may not need any blood at all. Here's why:

What is anemia?

If you have anemia, your blood doesn't have enough red blood cells, or they don't work properly. Red blood cells carry hemoglobin. This is an iron-rich protein that helps bring oxygen to the body. Anemia is measured in hemoglobin levels.

There are a number of reasons you may become anemic while you are in the hospital, including:

- Bleeding
- Frequent blood draws
- Liver and kidney damage
- A chronic condition or disease
- Medications
- Kidney disease
- Chronic infections
- Cancer

American Association of Blood Banks

[View all recommendations from this society](#)

Released April 24, 2014

Don't transfuse more units of blood than absolutely necessary.

Each unit of blood increases the vast majority of oxygenation (even in cardiovascular disease). Hemoglobin concentration is a poor indicator of non-bleeding, hemodynamic re-assessment of

American College of Obstetricians and Gynecologists

[View all recommendations from this society](#)

March 14, 2016

Don't routinely transfuse hemoglobin level greater than 7 g/dL.

Multiple factors need to be considered: clinical status and oxygenation thresholds should not be the sole basis for blood cells.

Society of Hospital Medicine – Adult Hospital Medicine

[View all recommendations from this society](#)

Released February 21, 2014

Avoid transfusions of red blood cells at thresholds of 7 g/dL or higher in the absence of clinical failure or stroke.

The AABB recommends that transfusion of red blood cells to hospitalized, stable patients should be influenced by symptoms. The Institutes of Health Commission's indication for red cell transfusion is the patient's clinical status.

Critical Care Societies Collaborative – Critical Care

[View all recommendations from this society](#)

Released January 28, 2014

Don't transfuse red blood cells in hemodynamically stable, non-bleeding ICU patients with a hemoglobin concentration greater than 7 g/dL.

American Society of Anesthesiologists

[View all recommendations from this society](#)

Released October 12, 2013

Don't administer packed red blood cells (PRBCs) in a young healthy patient without ongoing blood loss and hemoglobin of ≥ 6 g/dL unless symptomatic or hemodynamically unstable.

The hemoglobin transfusion threshold used in multiple studies has varied from 6.0 to 10.0 g/dL. The optimal hemoglobin/hematocrit criterion for transfusion remains controversial in several clinical settings. Nevertheless, compared with higher hemoglobin thresholds, a lower hemoglobin threshold is associated with fewer red blood cell units transfused without adverse associations with mortality, cardiac morbidity, functional recovery or length of hospital stay. Hospital mortality remains lower in patients randomized to a lower hemoglobin threshold for transfusion versus those randomized to a higher hemoglobin threshold.

17 years?

You've got to be kidding!

Managing clinical knowledge for health care improvement

Balas EA, Boren SA. Managing clinical knowledge for health care improvement. Yearbook of Medical Informatics 2000: Patient-Centered Systems. Stuttgart, Germany: Schattauer Verlagsgesellschaft mbH; 2000:65-70

Sources of Variation in Clinical Care

Increasingly complex healthcare environment

10,000 biologicals
300,000 OTC
Sophisticated devices
Transplant
Catheter-based
Much more

Exponentially increasing medical knowledge

22,000 RCTs per year
16,000 new articles
(To maintain current
knowledge, general
would need to read
per day, each day)

Lack of valid clinical knowledge

Only about 20% of medical
practice based on
scientific evidence
Much of clinical practice
based on tradition

Over-reliance on subjective judgement

Beliefs of experts as to a
clinical condition can vary over
a very wide range that is often
poor across groups over time

Clinical Variation in Your Medical Organization

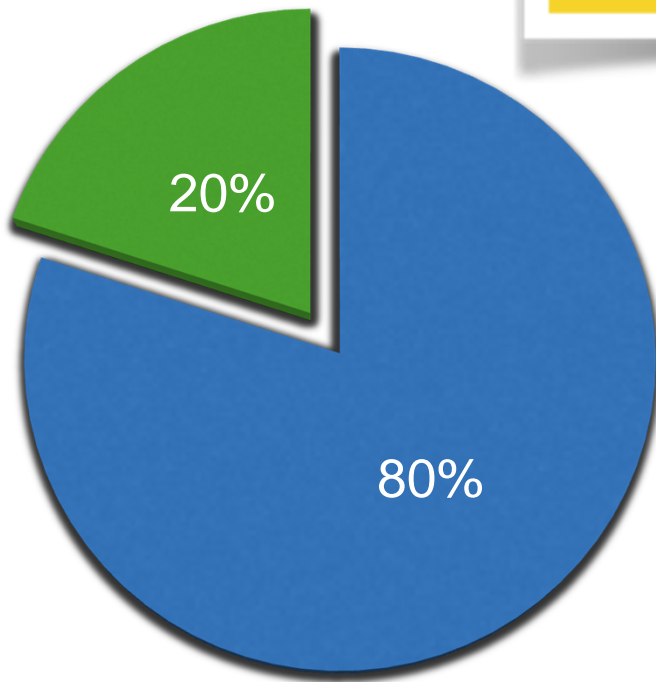
(at <https://www.healthcatalyst.com/role-clinical-variation-medical-practice>)

“Art” of Medicine

How you were trained

Culture of own practice environment

Own experiences with your patients



Huge gaps in the scientific evidence guiding physician decision-making

- Based on Less Reliable Studies, Guesswork, etc
- Solid Evidence Exists

White Coat Leadership

Exhibits an “all knowing” attitude

Adopts an “in charge” posture

Demonstrates autocratic tendencies

Adopts a “buck stops here” approach

Shows impatience

Blames others

Controls others

How have most
doctors and
administrators
been trained?

It seems that
something more is
needed - individual
transformation

Improvement Leadership

Demonstrates humility

Exhibits curiosity

Facilitates improvement efforts

Teaches others

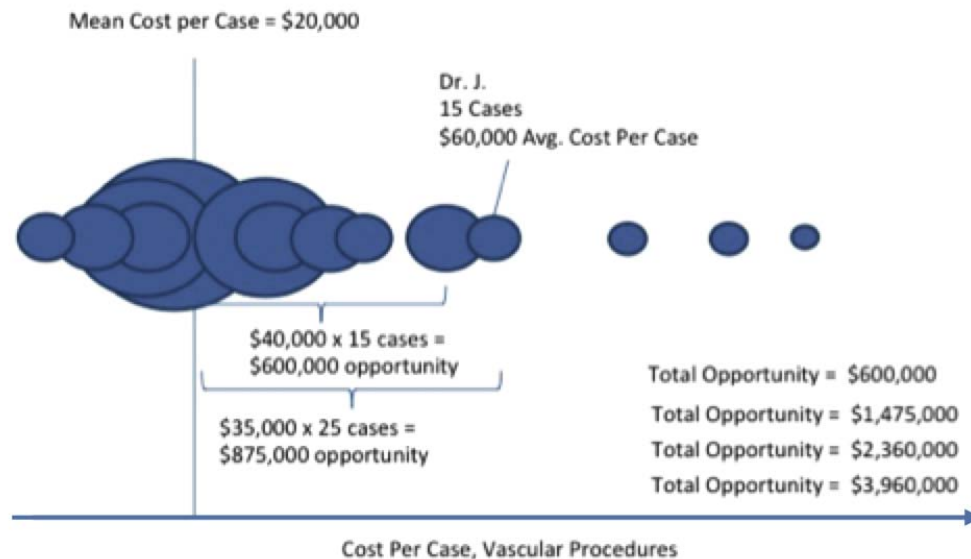
Learns from others

Communicates effectively

Perseveres

Practical Example of Variation (in cost)

Fictional analysis of cost/case for vascular procedures.



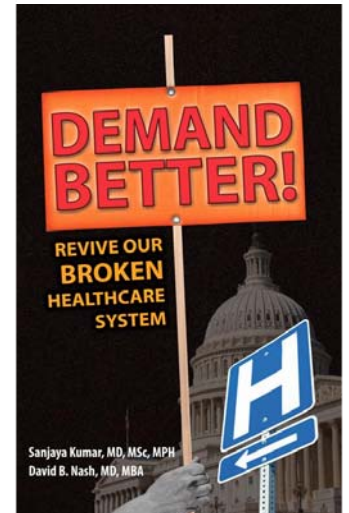
Dr J's average cost is three times the \$20,000 average. At 15 surgeries per year, a potential savings of \$600,000

Wide variations in cost are usually associated with wide variation in quality

Accurate and trusted information is essential!

“Ask fifty cardiovascular surgeons to estimate the probabilities of various risks associated with xenografts (animal-tissue transplant) versus mechanical heart valves and you’ll get answers to the same question ranging from zero percent to about 50 percent. (Ask about the 10-year probability of valve failure with xenografts and you’ll get a range of three percent to 95 percent).”

Excerpt from Demand Better! Our Broken Health Care System,
Second River Healthcare Press, 2011



Challenges in Addressing Variation

- Data related to physician office activity and other care settings is not readily available
- ‘Gray areas’ of medicine still exist
- Dissemination of best practices lags behind their development
- Widespread adoption of effective EHRs and decision-support tools is lacking
- Legal and regulatory barriers exist to clinical integration
- Clinical training programs introduce variation
- The medical liability environment continues to encourage defensive medicine

“The fool doth think he is wise, but the wise man knows himself to be a fool”

William Shakespeare

Diagnostic Failure Rate

- As high as 10-15%
- Highest in ER, IM, FP settings
- Principal cause - Cognitive Errors

Anchoring

Confirmation Bias

Overconfidence
Bias

Fundamental
Attribution Error

Search Satisfying

Diagnosis
Momentum

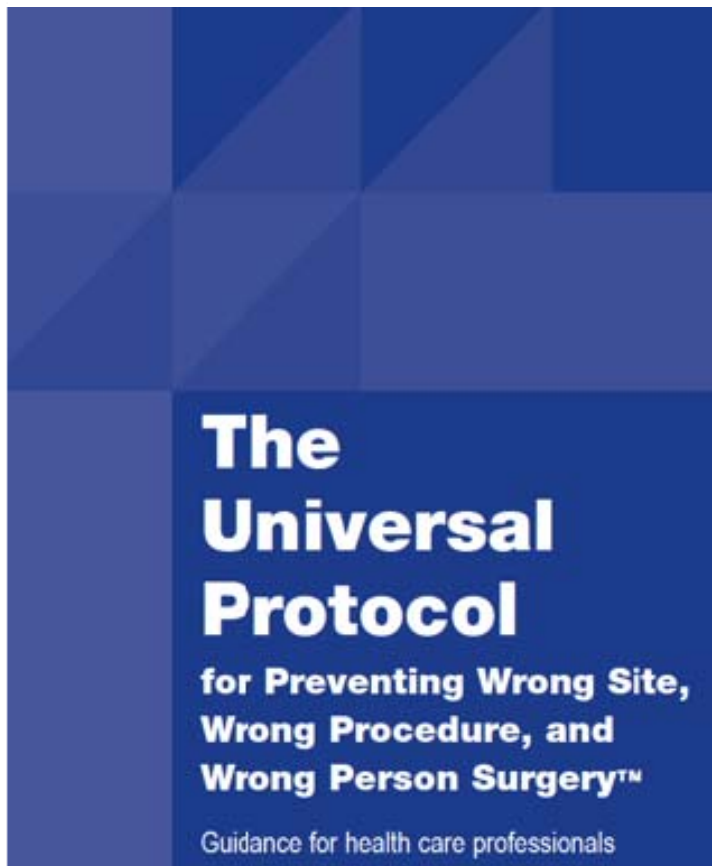
Hindsight Bias

Many Others

From Mindless to Mindful Practice - Cognitive Bias and Clinical Decision Making
P Croskerry. NEJM 2013; 368:2445-2448

Ignoring a known safety rule - What should be the consequence?

Run a STOP sign . . . get a ticket



2004

Surgical Safety Checklist		
World Health Organization Patient Safety		
Before induction of anaesthesia (with at least nurse and anaesthetist)	Before skin incision (with nurse, anaesthetist and surgeon)	Before patient leaves operating room (with nurse, anaesthetist and surgeon)
Has the patient confirmed his/her identity, site, procedure, and consent? <input type="checkbox"/> Yes	<input type="checkbox"/> Confirm all team members have introduced themselves by name and role.	Nurse Verbally Confirms: <input type="checkbox"/> The name of the procedure
Is the site marked? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	<input type="checkbox"/> Confirm the patient's name, procedure, and where the incision will be made.	<input type="checkbox"/> Completion of instrument, sponge and needle counts
Is the anaesthesia machine and medication check complete? <input type="checkbox"/> Yes	Has antibiotic prophylaxis been given within the last 60 minutes? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	<input type="checkbox"/> Specimen labelling (read specimen labels aloud, including patient name)
Is the pulse oximeter on the patient and functioning? <input type="checkbox"/> Yes	Anticipated Critical Events	<input type="checkbox"/> Whether there are any equipment problems to be addressed
Does the patient have a:	To Surgeon: <input type="checkbox"/> What are the critical or non-routine steps? <input type="checkbox"/> How long will the case take? <input type="checkbox"/> What is the anticipated blood loss?	To Surgeon, Anaesthetist and Nurse: <input type="checkbox"/> What are the key concerns for recovery and management of his patient?
Known allergy? <input type="checkbox"/> No <input type="checkbox"/> Yes	To Anaesthetist: <input type="checkbox"/> Are there any patient-specific concerns?	
Difficult airway or aspiration risk? <input type="checkbox"/> No <input type="checkbox"/> Yes, and equipment/assistance available	To Nursing Team: <input type="checkbox"/> Has sterility (including indicator results) been confirmed? <input type="checkbox"/> Are there equipment issues or any concerns?	
Risk of >500ml blood loss (7ml/kg in children)? <input type="checkbox"/> No <input type="checkbox"/> Yes, and two IV/central access and fluids planned	Is essential imaging displayed? <input type="checkbox"/> Yes <input type="checkbox"/> Not applicable	

This checklist is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged.

Revised 11/2009 © WHO, 2009

2009

Checklists - Why So Difficult?

ANNALS OF MEDICINE

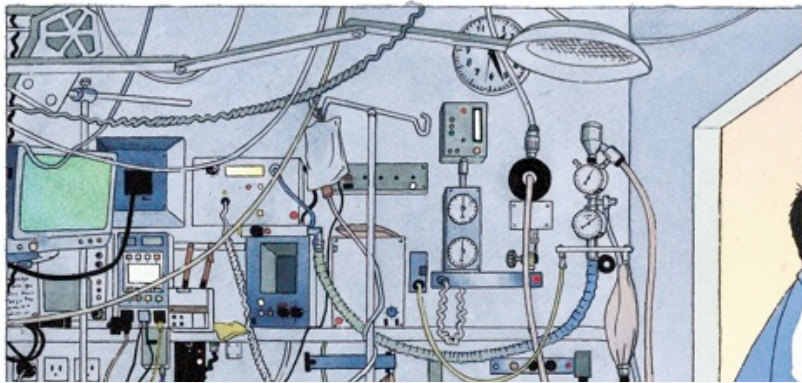
THE CHECKLIST

If something so simple can transform intensive care, what else can it do?

by Atul Gawande

DECEMBER 10, 2007

TEXT SIZE: A | A | A
PRINT | E-MAIL | FEEDS | SINGLE PAGE



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ORIGINAL ARTICLE

[A Correction Has Been Published ▸](#)

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.
N Engl J Med 2006; 355:2725-2732 | December 28, 2006 | DOI: 10.1056/NEJMoa061115

...if a new drug or device is being marketed as a "checklist," there would be a nationwide marketing campaign urging doctors to use it.

- Johns Hopkins, Dr. Pronovost
- CLABSI Reduction
 - Hand washing
 - Chlorhexidine
 - Sterile drapes
 - Mask, hat, gown, gloves
 - Sterile dressing
- 11% to ZERO infections

Help with the mundane (memory), reinforce the critical steps

APPROVED B-17F and G CHECKLIST

REVISED 3-1-44

PILOT'S DUTIES IN RED

COPILOT'S DUTIES IN BLACK

BEFORE STARTING

1. Pilot's Preflight—**COMPLETE**
2. Form 1A—**CHECKED**
3. Controls and Seats—**CHECKED**
4. Fuel Transfer Valves & Switch—**OFF**
5. Intercoolers—Cold
6. Gyros—**UNCAGED**
7. Fuel Shut-off Switches—**OPEN**
8. Gear Switch—**NEUTRAL**
9. Cowl Flaps—Open Right—**OPEN LEFT**—Locked
10. Turbos—**OFF**
11. Idle cut-off—**CHECKED**
12. Throttles—**CLOSED**
13. High RPM—**CHECKED**
14. Autopilot—**OFF**
15. De-icers and Anti-icers, Wing and Prop—**OFF**
16. Cabin Heat—**OFF**
17. Generators—**OFF**

STARTING ENGINES

1. Fire Guard and Call Clear—**LEFT** Right
2. Master Switch—**ON**
3. Battery switches and inverters—**ON & CHECKED**
4. Parking Brakes—Hydraulic Check—**On-CHECKED**
5. Booster Pumps—Pressure—**ON & CHECKED**
6. Carburetor Filters—Open
7. Fuel Quantity—Gallons per tank
8. Start Engines: both magnetos on after one revolution
9. Flight Indicator & Vacuum Pressures—**CHECKED**
10. Radio—**On**
11. Check Instruments—**CHECKED**
12. Crew Report
13. Radio Call & Altimeter—**SET**

ENGINE RUN-UP

1. Brakes—Locked
2. Trim Tabs—**SET**
3. Exercise Turbos and Props
4. Check Generators—**CHECKED & OFF**
5. Run up Engines

BEFORE TAKEOFF

1. Tailwheel—Locked
2. Gyro—**Set**
3. Generators—**ON**

AFTER TAKEOFF

1. Wheel—**PILOT'S SIGNAL**
2. Power Reduction
3. Cowl Flaps
4. Wheel Check—OK right—**OK LEFT**

BEFORE LANDING

1. Radio Call, Altimeter—**SET**
2. Crew Positions—OK
3. Autopilot—**OFF**
4. Booster Pumps—**On**
5. Mixture Controls—**AUTO-RICH**
6. Intercooler—**Set**
7. Carburetor Filters—Open
8. Wing De-icers—**Off**
9. Landing Gear
 - a. Visual—Down Right—**DOWN LEFT**
Tailwheel Down, Antenna in, Ball Turret Checked
 - b. Light—**OK**
 - c. Switch Off—**Neutral**
10. Hydraulic Pressure—**OK** Valve closed
11. RPM 2100—**Set**
12. Turbos—**Set**
13. Flaps $\frac{1}{2}$ — $\frac{1}{2}$ Down

FINAL APPROACH

14. Flaps—**PILOT'S SIGNAL**
15. RPM 2200—**PILOT'S SIGNAL**





Updated Bundles in Response to New Evidence

The leadership of the Surviving Sepsis Campaign (SSC) has believed since its inception that both the SSC Guidelines and the SSC performance improvement indicators (1) will evolve as new evidence that improves our understanding of how best to care for patients with severe sepsis and septic shock becomes available.

With publication of 3 trials (2,3,4) that do not demonstrate superiority of required use of a central venous catheter (CVC) to monitor central venous pressure (CVP) and central venous oxygen saturation (ScvO₂) in all patients with septic shock who have received timely antibiotics and fluid resuscitation compared with controls or in all patients with lactate >4 mmol/L, the SSC Executive Committee has revised the improvement bundles as follows:

TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION*:

1. Measure lactate level
 2. Obtain blood cultures prior to administration of antibiotics
 3. Administer broad spectrum antibiotics
 4. Administer 30ml/kg crystalloid for hypotension or lactate ≥ 4 mmol/L
- * "Time of presentation" is defined as the time of triage in the emergency department or, if presenting from another care venue, from the earliest chart annotation consistent with all elements of severe sepsis or septic shock ascertained through chart review.

TO BE COMPLETED WITHIN 6 HOURS OF TIME OF PRESENTATION:

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥ 65 mmHg
6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥ 4 mmol/L, re-assess volume status and tissue perfusion and document findings according to Table 1.
7. Re-measure lactate if initial lactate elevated.

This Infection Could Kill Your Loved One

Sepsis is responsible for 250,000 deaths a year in the U.S., mostly because treatment isn't given in time.

By [Kimberly Leonard](#) | Staff Writer | Sept. 17, 2015, at 7:00 a.m.



Early Recognition is Imperative

- 100% screening in ER
- 100% screening in hospital
- Nurses encouraged to obtain initial lactate level



On accountability and deserving the trust of the public . . .



Illinois governor signs 'Gabby's Law,' new rules for treating sepsis

By Associated Press | August 18, 2016

Illinois Gov. Bruce Rauner has signed legislation named for a 5-year-old Illinois girl that will require hospitals to be better prepared to treat patients with sepsis or septic shock.

Rauner signed Gabby's Law on Thursday morning at Presence Covenant Medical Center in Urbana, Ill. The legislation is named for Gabby Galbo of Monticello, who died in 2012 due to untreated sepsis. The measure received widespread support in the Illinois Legislature. Sepsis is a response to an infection that can lead to death. Gabby had an undetected tick bite that developed into sepsis.

The new law requires hospitals to adopt protocols for the early recognition and treatment of patients who have sepsis. It also requires that the protocols have certain components including those specific to treating children and adults.



RELATED CONTENT

Indiana hospitals seek to lower sepsis mortality rate

Commentary: Dangers of sepsis means hospitals have to redouble their efforts

Will physicians lead . . . or leave it to others?

What about surgical decision-making?

Surgical registries and quality improvement organizations				
Quality Improvement Initiative	Organization	Surgical Specialty	Focus	Funding
American College of Surgeons National Surgical Quality Improvement Initiative (ACS-NSQIP)	American College of Surgeons	Many	Measuring and reporting patient characteristics and outcomes	Hospitals
Veterans Affairs National Surgical Quality Improvement Program	Veterans Affairs	Many	Measuring and reporting patient characteristics and outcomes	Federal
Society of Thoracic Surgeons National Database (STS)	Society of Thoracic Surgeons	Thoracic surgery	Limiting risk with cardiac and thoracic procedures	Surgeons
Vascular Quality Initiative	Society for Vascular Surgery	Vascular surgery	Improving care of patients with vascular disease	Surgeons and Hospitals

Improvements in Surgical Decision-Making



Surgical Risk Calculator



AMERICAN COLLEGE OF SURGEONS
Inspiring Quality: Highest Standards, Better Outcomes

Procedure: 27130 - Arthroplasty, acetabular and proximal femoral prosthetic replacement (total hip arthroplasty), with or without autograft or allograft

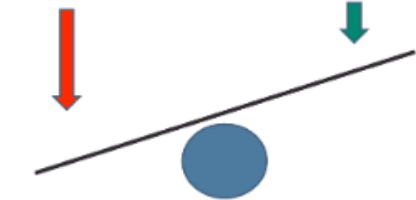
Risk Factors: 65-74 years, Partially dependent functional status, ASA Severe systemic disease, HTN, Dyspnea with moderate exertion, Over Weight

Outcomes	Surgeon estimates higher risk	Your Risk	Average Risk	Chance of Outcome
Serious Complication		7.6%	3.7%	Above Average
Any Complication		8.3%	4.2%	Above Average
Pneumonia		0.8%	0.2%	Above Average
Cardiac Complication		0.7%	0.2%	Above Average
Surgical Site Infection		1.3%	1.0%	Above Average
Urinary Tract Infection		2.1%	0.8%	Above Average
Venous Thromboembolism		0.9%	0.5%	Above Average
Renal Failure		0.2%	0.1%	Above Average
Readmission		5.7%	3.0%	Above Average
Return to OR		2.3%	1.5%	Above Average
Death		0.6%	0.1%	Above Average
Discharge to Nursing or Rehab Facility		57.6%	18.0%	Above Average

Predicted Length of Hospital Stay: 4.5 days

Uncertainty
regarding benefits
and risks of surgery

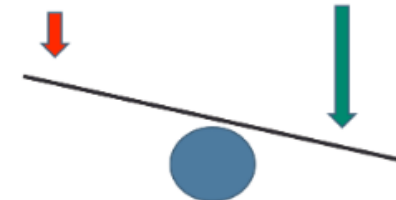
Information for
patients and surgeons
to guide decisions



Variation in surgical decisions: **BEFORE**
the evolution of registries, etc.

Uncertainty
regarding benefits
and risks of surgery

Information for
patients and surgeons
to guide decisions



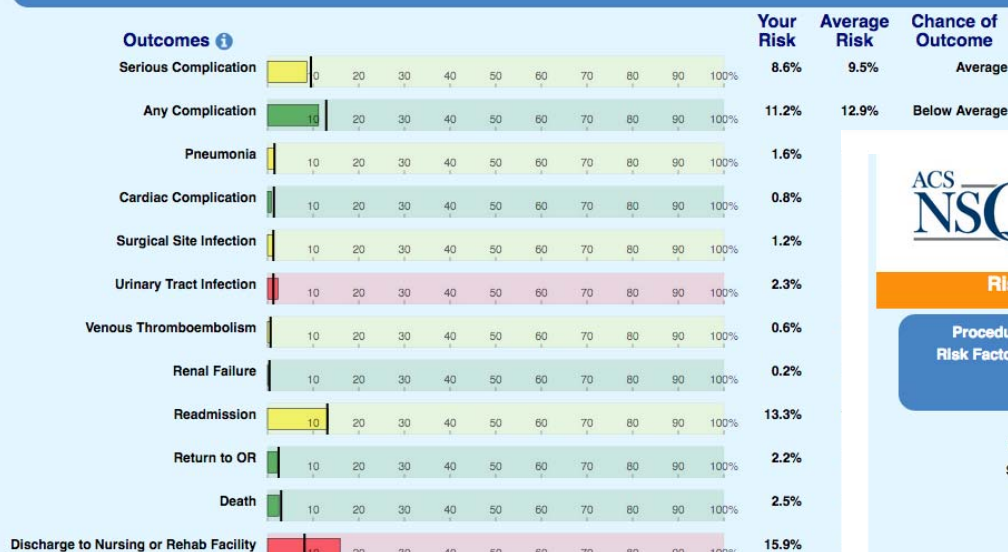
Variation in surgical decisions: **AFTER**
the evolution of registries, etc.

Procedure: 33361 - Transcatheter aortic valve replacement (TAVR/TAVI) with prosthetic valve; percutaneous femoral artery approach

Risk Factors: 85 years or older, Partially dependent functional status, ASA Severe systemic disease, Dyspnea with moderate exertion

Change Patient Risk Factors

Outcomes



Predicted Length of Hospital Stay: 6 days

Appropriate Potential Surgical and Non-operative Treatment Options Are Also Available and Should Be Discussed

How to Interpret the Graph Above:



Surgeon Adjustment of Risks

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

1 - No adjustment necessary

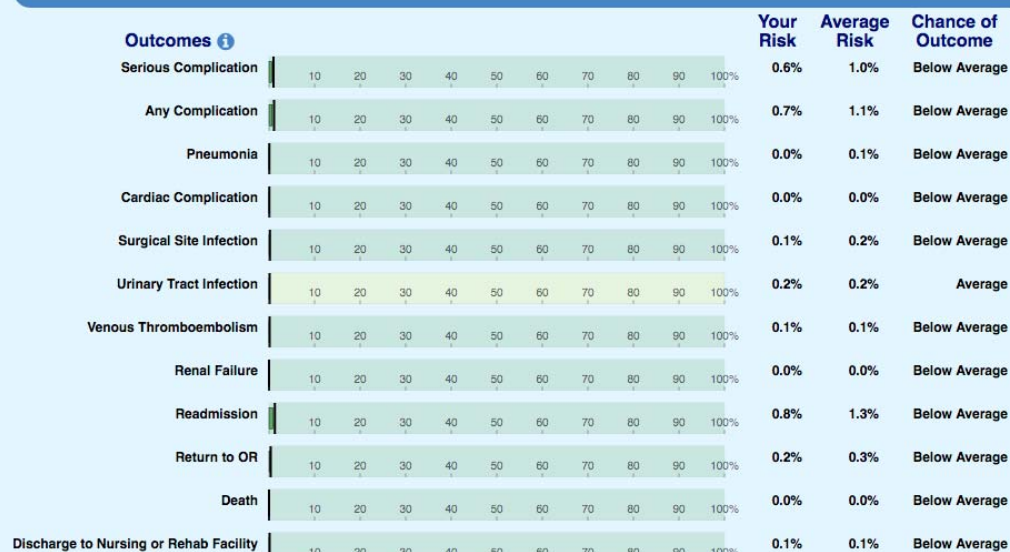
The ACS NSQIP Risk Calculator is designed to be used by surgeons, together with their patients, to help inform patients about their individual risks for surgery

Procedure: 49650 - Laparoscopy, surgical; repair initial inguinal hernia

Risk Factors:

Change Patient Risk Factors

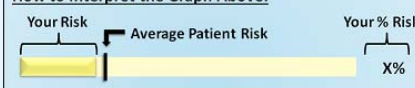
Outcomes



Predicted Length of Hospital Stay: 0 days

Appropriate Potential Surgical and Non-operative Treatment Options Are Also Available and Should Be Discussed

How to Interpret the Graph Above:



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 reason for the increased risks was NOT already entered into the risk calculator.

1 - No adjustment necessary

Hall, BL et al. "Does Surgical Quality Improve in the American College of Surgeons National Surgical Quality Improvement Program?" *Annals of Surgery*. 250 (3): 363-376; Sept. 2009.

IOM's Recommendations

- Improve providers' capacity to collect and use data to advance science and improve care
- Involve patients and their families in care decisions
- Use clinical practice guidelines and provider decision support tools
- Promote partnerships and coordination between providers and the community
- Realign financial incentives to promote continuous learning and the delivery of high value, low cost care
- Improve transparency in provider performance, including quality, price, cost and outcomes

More recent initiatives . . . based on variability in outcome

Proposed Changes to the 2017 LEAPFROG Hospital Survey



Section 3: Inpatient Surgery

- Structural Measure 1: Minimum volume standards for safety

Procedure	Hospital Minimum per 12 mos	Surgeon Minimum per 12 mos
Bariatric surgery	40	20
Esophageal resection	20	TBD
Lung resection	40	20
Pancreas resection	20	TBD
Rectal cancer surgery	15	TBD
Carotid artery stenting	10	TBD
Complex AAA repair	20	TBD
Mitral valve repair	20	10
Hip replacement	50	25
Knee replacement	50	25

More recent initiatives . . . based on variability in outcome

Proposed Changes to the 2017 LEAPFROG Hospital Survey



Section 3: Inpatient Surgery

- Structural Measure 2: Hospital-wide surgical necessity monitoring policy

Key Elements

- Patient engagement in shared decision making around harms, benefits and alternatives to surgery
- Surgeons aware of specialty society's clinical practice guidelines, including Choosing Wisely, others . . and employ them in decision making
- Necessity of surgery monitored at the hospital with periodic reporting alongside other quality and safety reports (4 key components of review)
- Pre-defined, formal plan of action for accountability when inappropriate surgery is identified



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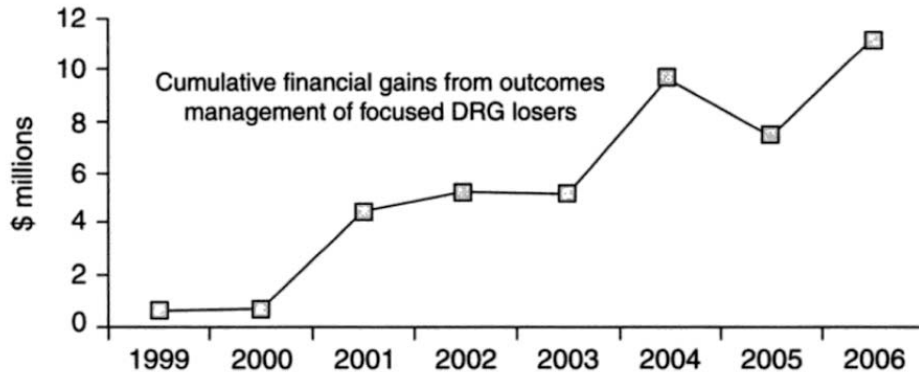


Figure 9.12 Care-based cost management making the business case for quality.²⁷

- One of 13 Highest Value Hospitals in 2008
- Only system in Alabama or Mississippi with AA rating (14 years)
- 35,000 inpatient admissions
- 24,200 surgeries
- 129,000 ER visits
- 610,000 clinical encounters
- \$730 million net revenue

Care-based cost management looks at lowering costs by improving the processes followed in providing patient care and preventing complications

Improving Outcomes - One Example



Statewide Collaborative Quality Initiatives (CQIs)

Health care providers across Michigan are coming together to improve quality and lower costs of health care. The University of Michigan Health System provides leadership and support of "Collaborative Quality Initiatives" (CQIs) which seek to address some of the most common, complex, and costly areas of surgical and medical care. CQI Coordinating Centers, led by UMHS faculty, work collaboratively with health care providers throughout Michigan to collect data to a centralized registry; analyze and share data to identify processes that lead to improved delivery of care and outcomes, and guide quality improvement interventions.

- Initial focus on cardiology, oncology, anesthesiology and spine surgery
- Analysis conducted for 250,000 patients/year
- Five most established initiatives have lowered costs by \$793 million over 10 years
- Close engagement between physicians and the organizations

No Recovery

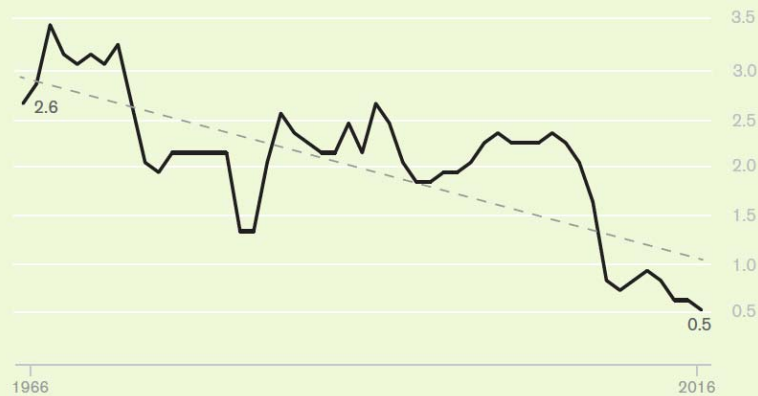
An Analysis of Long-Term U.S. Productivity Decline

Jonathan Rothwell, Gallup Senior Economist



The Growth Slowdown

% Annual growth rate in real GDP per capita over 10-year periods



GALLUP

THE GALLUP BLOG DECEMBER 15, 2016

PRINT SHARE

Report: Healthcare in America Is Grossly Inefficient

HEALTHCARE AS SHARE OF U.S. GDP

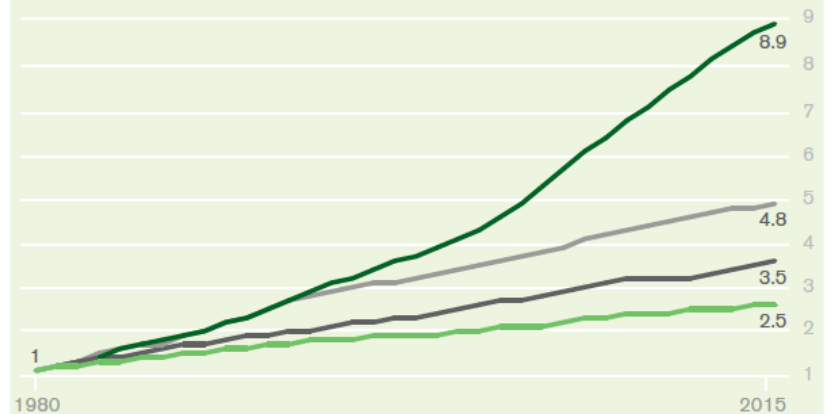
Year	Share of U.S. GDP
1980	9%
2015	18%

GALLUP

EDUCATION, HEALTHCARE AND HOUSING INFLATION COMPARED WITH ALL PRODUCTS FROM 1980 TO 2015

% INFLATION

■ All items ■ Education ■ Healthcare ■ Housing

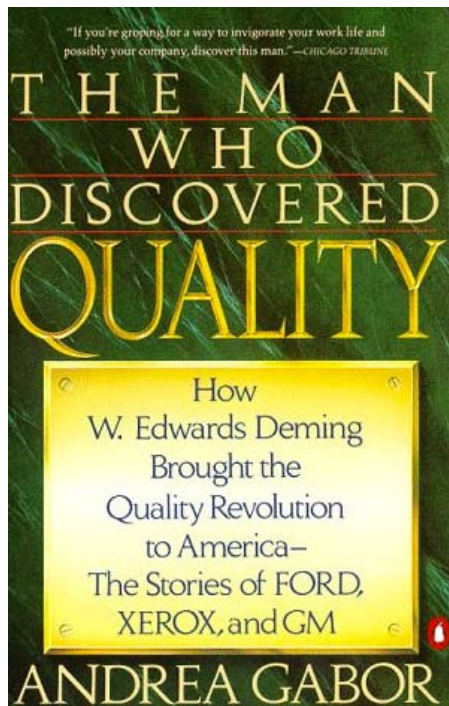


Source: Analysis of data from U.S. Bureau of Economic Analysis, National Income and Product Accounts, Table 2.5.4

“The long-term impact of higher costs for healthcare, housing and education has been to dampen Americans' productivity, consumption, quality of life, ambitions and career choices.”

See http://www.gallup.com/topic/category_healthcare.aspx

“As I use the term here, the job of a leader is to accomplish transformation of his organization. He possesses knowledge, personality, and persuasive power”



W. Edwards Deming,
The New Economics, 1994

Opportunities Abound!

Your Leadership Essential (and expected)

Thank you

Dr. 'Mark'