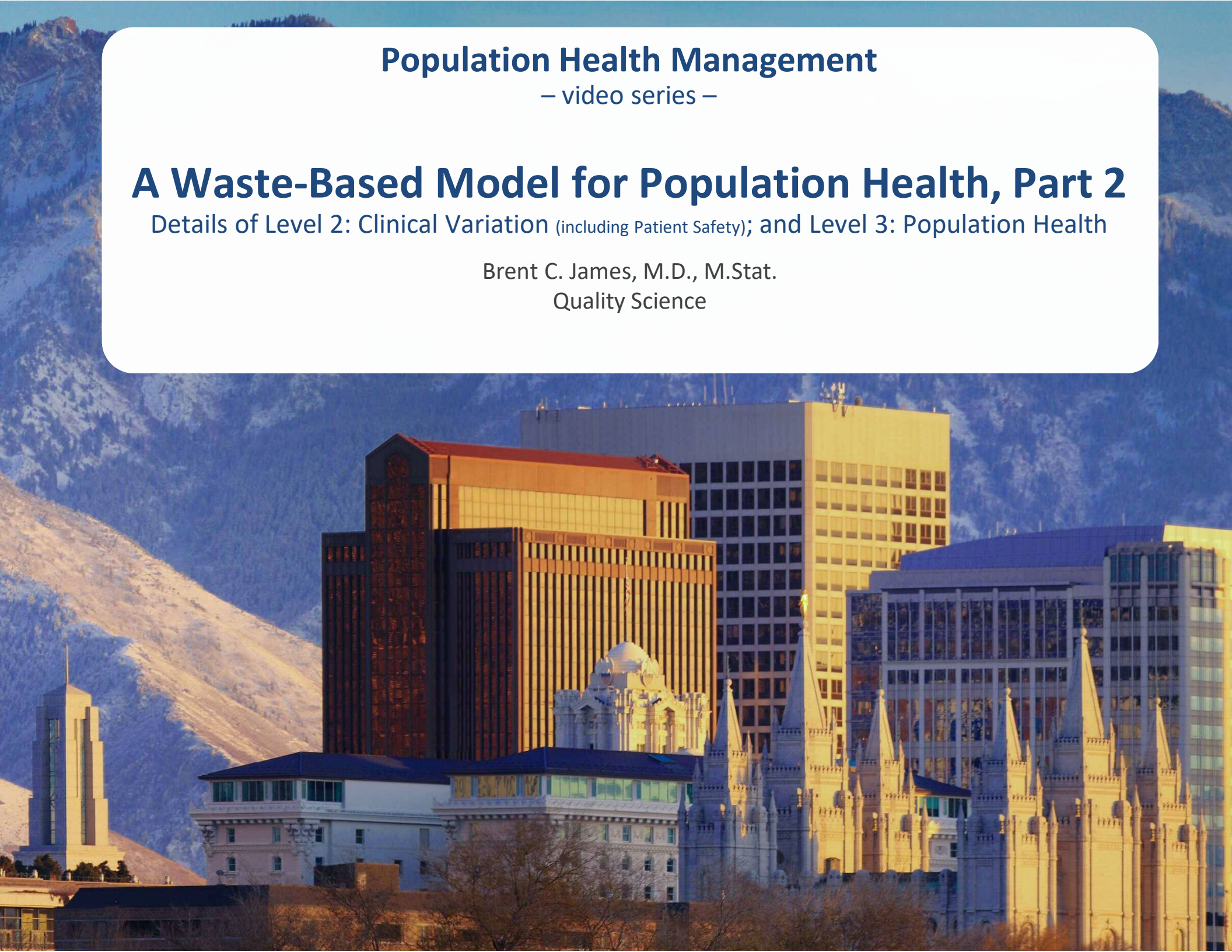
Population Health Management

– video series –

A Waste-Based Model for Population Health, Part 2

Details of Level 2: Clinical Variation (including Patient Safety); and Level 3: Population Health

Brent C. James, M.D., M.Stat.
Quality Science



Video and slides

Nested sources of waste

Waste class	% of all waste	Waste subclasses
2. Within-case utilization *(# and type of units per case)*		a) Clinical variation *(e.g., QUE studies; surgical equipment)* b) Avoidable patient injuries *(e.g., serious safety event systems; CLABSI)*
1. Efficiency *(cost per unit of care)*		a) Supply chain *(external products & services)* b) Operational efficiencies *- TPS Lean observation - clinical engineering* *- current EMR functions - communications + IT* c) Indirect costs *- administration - billing adjudication* *- regulatory burden - utilities - etc.*

Quality, Utilization, and Efficiency (QUE)

- ***Six clinical areas studied over 2 years:***

- transurethral prostatectomy (TURP)
- open cholecystectomy
- total hip arthroplasty
- coronary artery bypass graft surgery (CABG)
- permanent pacemaker implantation
- community-acquired pneumonia

- ***pulled all patients treated over a defined time period***

across all Intermountain inpatient facilities - typically 1 year

- ***identified and staged*** *(relative to changes in expected utilization)*

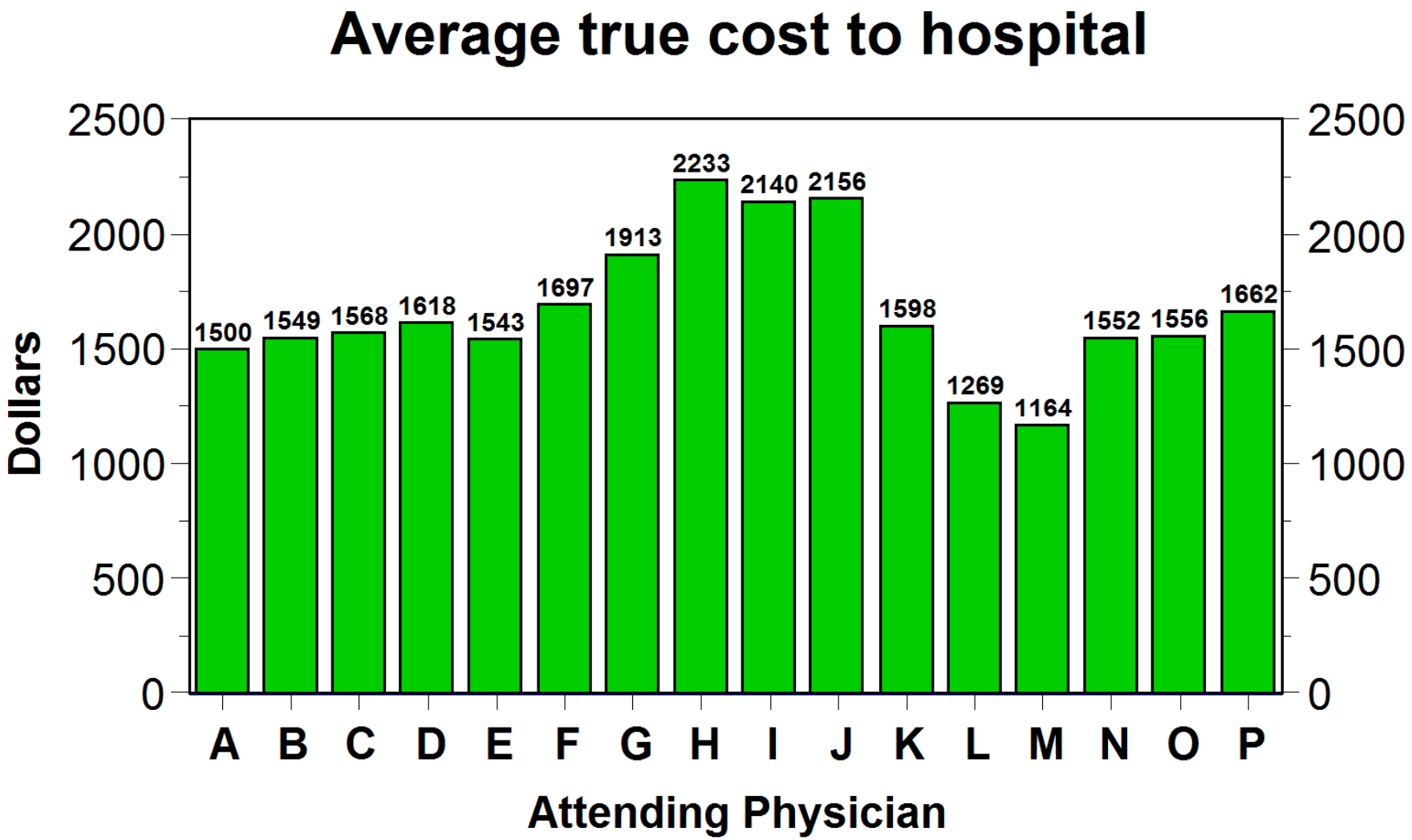
- severity of presenting primary condition
- all comorbidities on admission
- every complication
- measures of long term outcomes

- ***compared physicians with meaningful # of cases***

(low volume physicians included in parallel analysis, as a group)

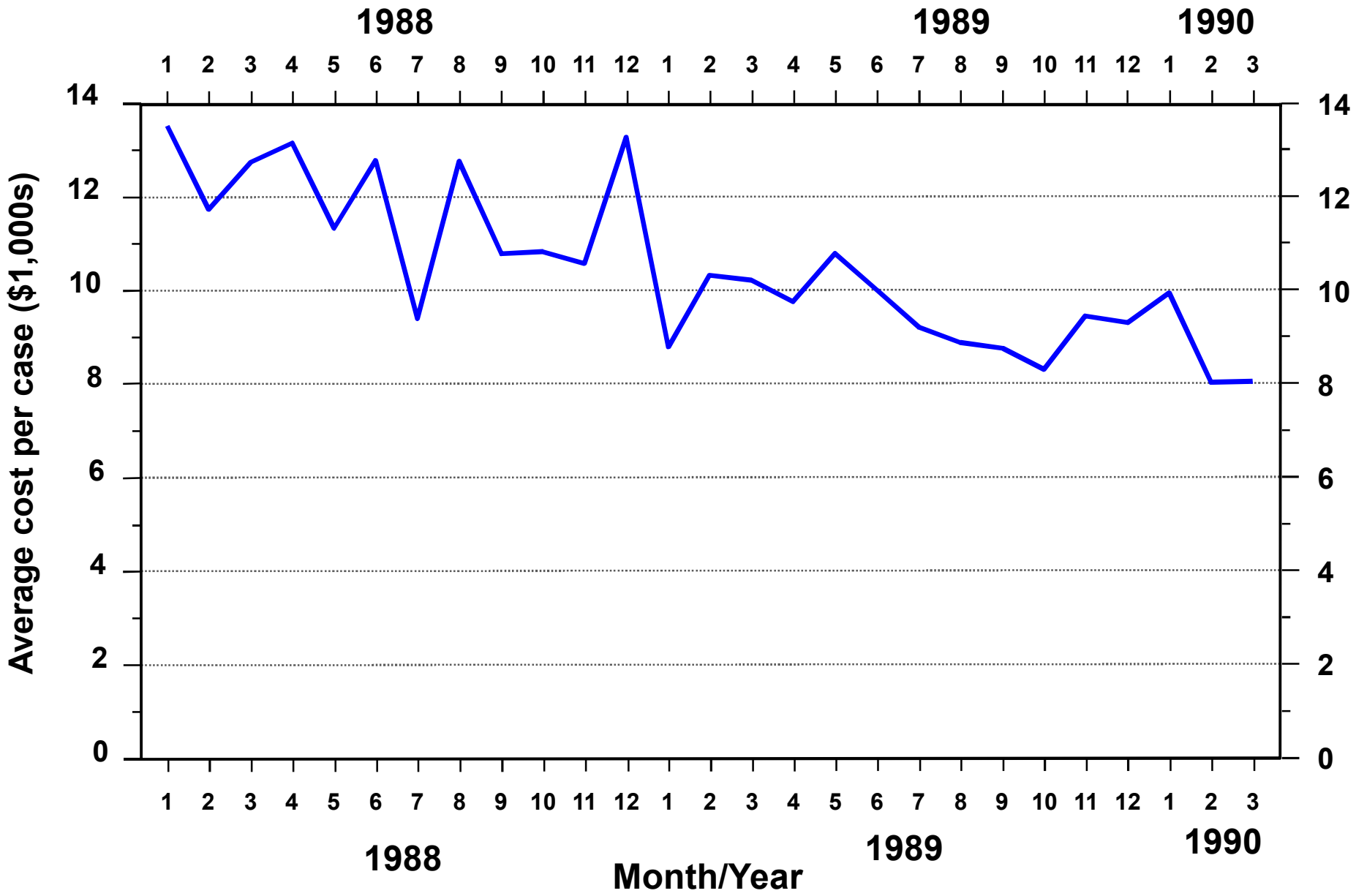
James, B.C. What is a TURP? controlling variation in the performance of clinical processes. *Improving Clinical Practice: Total Quality Management & the Physician* (ed: D.B. Blumenthal and A.C. Scheck). San Francisco, CA: Jossey-Bass Publishers, 1995 (Chapter 7).

Intermountain TURP QUE Study



James, B.C. What is a TURP? controlling variation in the performance of clinical processes. *Improving Clinical Practice: Total Quality Management & the Physician* (ed: D.B. Blumenthal and A.C. Scheck). San Francisco, CA: Jossey-Bass Publishers, 1995 (Chapter 7).

Total Hip Arthroplasty - Cost



James, B.C. *Quality Management for Health Care Delivery* (monograph). Chicago, IL: Hospital Research and Educational Trust (American Hospital Association), 1989.

Quality Science

RDS in borderline premature infants

(Drs. Terry Melendez and Steve Minton)

- ***Neonates 33 to 37 weeks gestational age*** *(full term = 40 weeks)*
- ***Immature lungs*** *leading to* ***respiratory distress syndrome*** *(RDS)*
- ***Treated at birth hospital with nasal CPAP*** *(prevents alveolar collapse)* ***+ oxygen + surfactant, rather than intubation + mechanical ventilation in newborn ICU***
- ***Transport / newborn ICU admit / intubation rate:***

78% → ***18%***

- ***Total cost of care:*** ↓ ***44%***

Community acquired pneumonia *(CAP)*

(Dr. Kim Bateman; Sanpete Hospital and Clinic, Ephraim, Utah)

	without protocol	with protocol	
% patients hospitalized	**39%**	**29%**	
Average length of stay *(LOS)*	**6.4** *days*	**4.3** *days*	
Time to initial antibiotics	**2.1** *hours*	**1.5** *hours*	
Significant complications *(determines DRG)*	**15.3%**	**11.6%**	*↓24.7%; p<0.001*
In-hospital mortality	**7.2%**	**5.3%**	*↓26.3%; p=0.015*
Raw cost per case	**$5211**	**$4729**	*↓ 9.3%; p=0.002*
Relative resource units *(RRUs – inflation adjusted cost per case)*	**55.9**	**49.0**	*↓12.3%; p<0.001*

ProComp – Procedure Comparisons

- ***Dr. Mark Ott, Chief of Surgery at major teaching hospital***
- ***Transparency around costs*** *at the point of care, plus peer pressure:*
  - *Assigned medical student to sit in on specific surgical case types (e.g., lap cholecystectomy; appendectomy)*
  - *Had a laptop computer hooked into the activity-based costing system*
  - *When surgeon used a product or device, reported its and alternatives' cost*
  - ***Pro**vider **Comp**arisons: monthly reports listing cost breakouts, by surgeon – surgeons see their unblinded itemized costs, compared to their peers*
  - *included unblinded **P**atient **R**eported **O**utcomes **Comp**arisons, by surgeon*
  - *Extended to lab, imaging, and others "units of care"*
  - *Spread across all hospitals in system (circulating nurse replaced medical student)*
- ***Direct costs of surgical products and devices –***

2013:	↓ **$16.8**	*million*
2014:	↓ **$42.9**	*million*
2015:	↓ **$39.0**	*million*

- ***Led to standardization of Doctor Preference Cards*** *(DPCs)*

POKE – Dr. Erick Ridout, *chief of NICU in St. George, UT*

- ***Framing:***
  - *Invasive procedures lead to white matter injury and lower IQ at school age*
    Vinall J, Miller SP, Bjornson BH, Brant R, Synnes AR, Cepeda IL, Grunan RE. Invasive procedures in preterm children: Brain and cognitive development at school age. Pediatrics *2014; 133(3):412-21 (Feb 17). "Repeated stimulation of physiologically immature neurons led to cytotoxic damage and increased neuronal cell death"; use of morphine to control pain did not help.*
  - *Blood draws from central lines increase infection risk*
- ***Aim: reduce unintentional harm***
- ***4 large NICUs participated; evaluated after 1 year***
- ***Coordinated POKEs*** *– blood draws and medication delivery*
- ***Results:***
  - *# of POKEs:* ↓ *from* **5** *to* **3.1** */ day* *(38% – avoided 96,000+ POKEs / year)*
  - *Fewer lab tests overall – some testing rates fell by a factor of 3, at 1 facility*
  - **99** *months (1,650+ line days) since last CLABSI at 1 major NICU (July, 2013)*
  - *Length of stay:* ↓ **30.1%**
  - *Variable cost:* ↓ **42.5%**
  - *Total cost:* ↓ **$12,021,905** / year

Nested sources of waste

Waste class	% of all waste	Waste subclasses
3. Case-rate utilization *(# cases per population)*		a) Inappropriate cases *(risk outweighs benefit)* *(e.g., many cath lab procedures; CTPA)* b) Preference-sensitive cases *(when given a fair choice, many patients opt out)* *(e.g., elective hips, knees; end-of-life care)* c) Avoidable cases *(hot spotting; move upstream)* *(e.g., team-based care)*
2. Within-case utilization *(# and type of units per case)*		a) Clinical variation *(e.g., QUE studies; surgical equipment)* b) Avoidable patient injuries *(e.g., serious safety event systems; CLABSI)*
1. Efficiency *(cost per unit of care)*		a) Supply chain *(external products & services)* b) Operational efficiencies *- TPS Lean observation - clinical engineering - current EMR functions - communications + IT* c) Indirect costs *- administration - billing adjudication - regulatory burden - utilities - etc.*

Evidence-based use of cardiac interventions

(led by Dr. Donald Lappe)

- *Diagnostic cardiac catheterization*
- *Angioplasty and Stents (PCI)*
- *Implantation of Permanent Pacemakers*
- *Implantation of Defibrillators*
- *Nuclear Stress Testing*

➢ ***Deployed evidence-based indications guidelines***
  – *a 1 sheet form for each procedure; just check off 1 or more indications*
  – *coordinated with insurance pre-authorization approvals*

➢ ***At start, near the bottom of the U.S. in terms of population-adjusted use rates*** *(bottom quintile)*

➢ ***Existing system in place that tracked long-term clinical outcomes***

Angioplasty & Stents

Date_____ Patient Name_____ EMPI_____ Date of Birth_____

Clinical Information on this page should be completed before the procedure.

☐ **Patient has Acute Coronary Syndrome** *(no further documentation beyond medical record is needed)*

Elective PCI

- Anginal / Ischemic Symptoms
  - ☐ CCS 0 *(asymptomatic)*
  - ☐ CCS I-II
  - ☐ CCS III-IV
- Results of Noninvasive Testing *(see Table A2)*
  - ☐ Not Available
  - ☐ Normal / Equivocal
  - ☐ Low Risk
  - ☐ Intermediate Risk
  - ☐ High Risk
- Heart Failure Symptoms
  - ☐ Asymptomatic
  - ☐ NYHA Class I
  - ☐ NYHA Class II
  - ☐ NYHA Class III
  - ☐ NYHA Class IV
- Left Ventricular Systolic Function
  - ☐ Normal (greater than or equal to 55%)
  - ☐ 45 - 55%
  - ☐ 35 - 44%

Table A2: Noninvasive Risk Stratification

High-Risk (greater than 3% annual mortality rate)

1. Severe resting left ventricular dysfunction (LVEF less than 35%)
2. High-risk treadmill score (score less than or equal to -11)
3. Severe exercise left ventricular dysfunction (exercise LVEF less than 35%)
4. Stress-induced large perfusion defect (particularly if anterior)
5. Stress-induced multiple perfusion defects of moderate size
6. Large, fixed perfusion defect with LV dilation or increased lung uptake (thallium-201)
7. Stress-induced moderate perfusion defect with LV dilation or increased lung uptake (thallium-201)
8. Echocardiographic wall motion abnormality (involving greater than two segments) developing at low dose of dobutamine (less than or equal to 10 mg/kg/min) or at a low heart rate (less than 120 beats/min)
9. Stress echocardiographic evidence of extensive ischemia

Intermediate-Risk (1% to 3% annual mortality rate)

1. Mild / moderate resting left ventricular dysfunction (LVEF 35% to 49%)
2. Intermediate-risk treadmill score (score between -11 and less than 5)
3. Stress-induced moderate perfusion defect without LV dilation or increased lung intake (thallium-201)
4. Limited stress echocardiographic ischemia with a wall motion abnormality only at higher doses of dobutamine involving less than or equal to 2 segments

Low-Risk (less than 1% annual mortality rate)

1. Low-risk treadmill score (score greater than or equal to 5)

Implantable pacemakers

Intermountain Permanent Pacemaker Indications

Patient Name: _____ **Date of Service:** _____ **EMPI Number:** _____

Before performing the pacemaker procedure, the implanting physician must complete the form below and sign this document along with assuring that medical record documentation supports the selected indication. If the physician believes a pacemaker is warranted outside the guidelines below, please check category I and carefully document the specific justifications and be sure they are well documented in the patient's records. These exceptions must be approved by the chief of cardiology or his/her appointee.

ALL APPLICABLE SECTIONS MUST BE COMPLETED BEFORE PROCEEDING WITH PACEMAKER IMPLANTATION

- **Section 1—Permanent Pacemaker Indications**
- **Section 2—Dual Chamber Indication**
- **Section 3—Biventricular Indication**

Section 1—Pacemaker Indication

- ☐ (P-1) Acquired complete (also referred to as third-degree) AV heart block.
- ☐ (P-2) Congenital complete heart block with severe bradycardia (in relation to age), or significant physiological deficits or significant symptoms due to the bradycardia.
- ☐ (P-3) Second-degree AV heart block of Type II (i.e., no progressive prolongation of P-R interval prior to each blocked beat. P-R interval indicates the time taken for an impulse to travel from the atria to the ventricles on an electrocardiogram)

Section 1—Pacemaker Indication

- ☐ (P-1) Acquired complete (also referred to as third-degree) AV heart block.
- ☐ (P-2) Congenital complete heart block with severe bradycardia (in relation to age), or significant physiological deficits or significant symptoms due to the bradycardia.
- ☐ (P-3) Second-degree AV heart block of Type II (i.e., no progressive prolongation of P-R interval prior to each blocked beat. P-R interval indicates the time taken for an impulse to travel from the atria to the ventricles on an electrocardiogram).
- ☐ (P-4) Second-degree AV heart block of Type I (i.e., progressive prolongation of P-R interval prior to each blocked beat) with significant symptoms due to hemodynamic instability associated with the heart block.
- ☐ (P-5) Sinus bradycardia associated with major symptoms (e.g., syncope, seizures, congestive heart failure); or substantial sinus bradycardia (heart rate less than 50) associated with dizziness or confusion. The correlation between symptoms and bradycardia must be documented, or the symptoms must be clearly attributable to the bradycardia rather than to some other cause.
- ☐ (P-6) In selected and few patients, sinus bradycardia of lesser severity (heart rate 50-59) with dizziness or confusion

Nuclear stress testing

Intermountain Healthcare
Healing for life®

Nuclear Cardiac Stress Test Indications Order

Fax: **Phone:**

Patient Name:	**Gender:**	**DOB:**	**Age:**
Patient Phone #:	**Pt. Address:**		
Referring Physician:		**Fax:**	
☐ ***NUCLEAR CARDIAC STRESS TEST***			
(Prep—Nothing by mouth >6 hours and no meds, PLUS no caffeine 12-24 hours, wear comfortable exercise clothing)			
(If patient is diabetic have patient hold medications in fasting status or as otherwise directed by you)			

***Check a box* to identify indication (women under 50 years and men under 40 years old should only have nuclear testing if higher risk or other stress testing modalities are not adequate)**

COMMON INDICATIONS

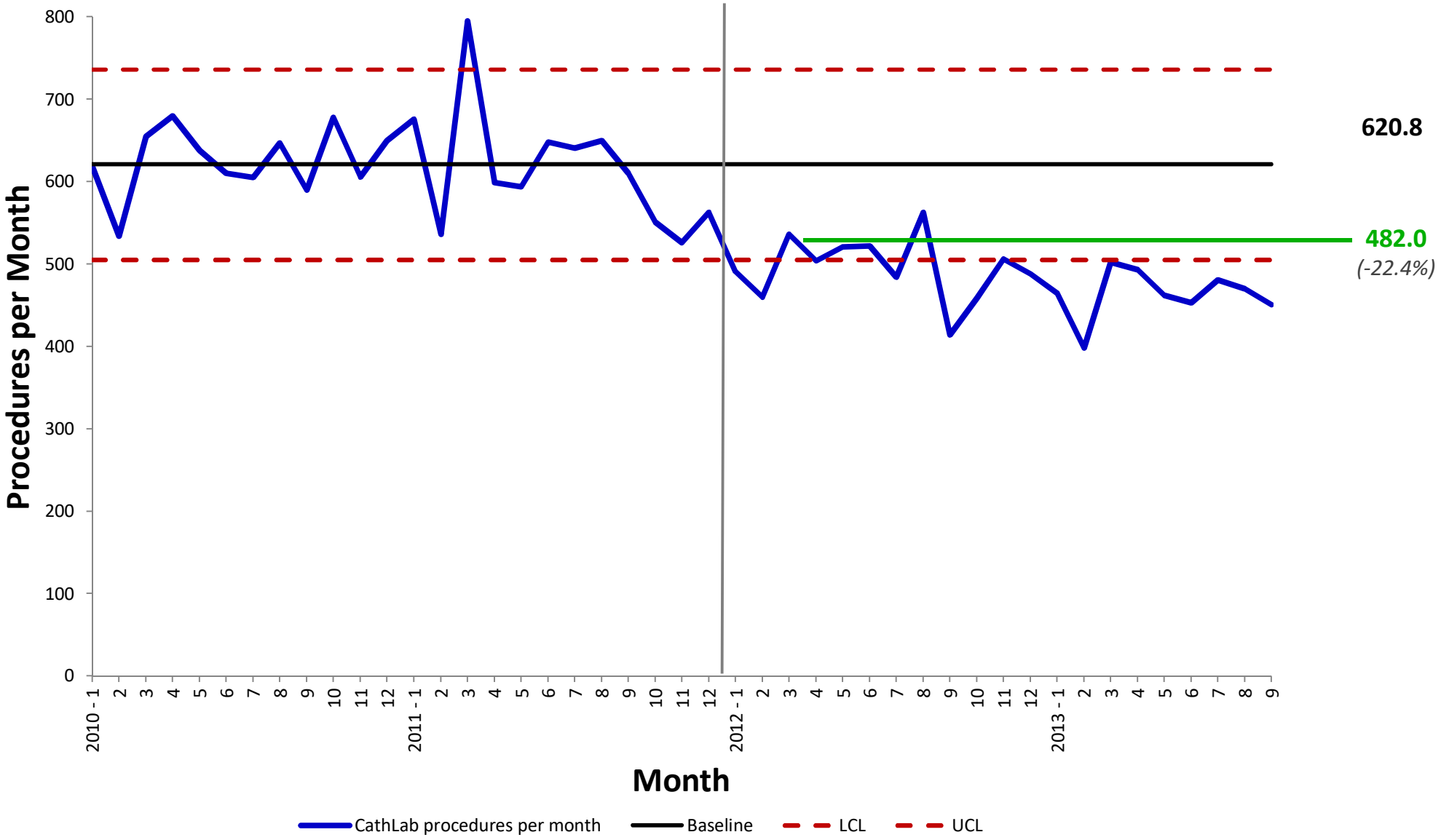
- ☐ Anginal "chest pain" that is likely to be ischemic (N1)
- ☐ Anginal "chest pain" with diabetes, carotid artery disease, abdominal aortic aneurysm, or significant peripheral arterial disease (N2)
- ☐ Anginal "chest pain" with 3 or more of the coronary heart disease risk factors‡ listed below (N3)

testing if higher risk or other stress testing modalities are not adequate)

COMMON INDICATIONS

- ☐ Anginal "chest pain" that is likely to be ischemic (N1)
- ☐ Anginal "chest pain" with diabetes, carotid artery disease, abdominal aortic aneurysm, or significant peripheral arterial disease (N2)
- ☐ Anginal "chest pain" with 3 or more of the coronary heart disease risk factors‡ listed below (N3)
- ☐ Anginal "chest pain" **AND** left bundle branch block, pacemaker, or ICD (N4)
- ☐ Anginal equivalent such as exertional dyspnea, jaw pain or arm pain etc. that is likely to be ischemic (N5)
- ☐ New onset atrial fibrillation (N6)
- ☐ New onset heart failure with LV systolic dysfunction (N7)
- ☐ Patient with known coronary heart disease with new or worsening cardiac symptoms (N8)
- ☐ Asymptomatic with CABG ≥ 5 years ago or stent ≥2 years ago and 3 or more of the coronary heart disease risk

All Cath Lab procedures *(system-wide; 2012-14)*



Evidence-based use of cardiac interventions

Clinical Outcomes: ***Remained excellent*** *(slight, nonsignificant, uptick)*

Cost impact:

# Cases:	↓	**137 / month**
Variable costs:	↓	**$18,918,519**
Total costs:	↓	**~$40,000,000**

Shared decision making *("preference sensitive" conditions)*

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

A Randomized Trial of a Telephone Care-Management Strategy

David E. Wennberg, M.D., M.P.H., Amy Marr, Ph.D., Lance Lang, M.D., Stephen O'Malley, M.Sc., and George Bennett, Ph.D.

ABSTRACT

BACKGROUND

Studies have shown that telephone interventions designed to promote patients' self-management skills and improve patient–physician communication can increase patients' satisfaction and their use of preventive services. The effect of such a strategy on health care costs remains controversial.

METHODS

We conducted a stratified, randomized study of 174,120 subjects to assess the effect of a telephone-based care-management strategy on medical costs and resource utilization. Health coaches contacted subjects with selected medical conditions and predicted high health care costs to instruct them about shared decision making, self-care, and behavioral change. The subjects were randomly assigned to either a usual-support group or an enhanced-support group. Although the same telephone intervention was delivered to the two groups, a greater number of subjects in the enhanced-support group were made eligible for coaching through the lowering of cutoff points for predicted future costs and expansion of the number of qualifying health conditions. Primary outcome measures at 1 year were total medical costs and number of hospital admissions.

RESULTS

At baseline, medical costs and resource utilization were similar in the two groups. After 12 months, 10.4% of the enhanced-support group and 3.7% of the usual-support group received the telephone intervention. The average monthly medical and pharmacy costs per person in the enhanced-support group were 3.6% ($7.96) lower than those in the usual-support group ($213.82 vs. $221.78, P=0.05); a 10.1% reduction in annual hospital admissions (P<0.001) accounted for the majority of savings. The cost of this intervention program was less than $2.00 per person per month.

ment program was successful in reducing medical
based study. (Funded by Health Dialog

From Health Dialog Services, Boston. Address reprint requests to Dr. Wennberg at Health Dialog Services, 2 Monument Sq., Portland, ME 04101, or at dwennberg@healthdialog.com.

N Engl J Med 2010;363:1245-55.

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PATIENT DECISION AIDS

Modifying Unwarranted Variations In Health Care: Shared Decision Making Using Patient Decision Aids

A review of the evidence base for shared decision making.

by Annette M. O'Connor, Hilary A. Llewellyn-Thomas, and Ann Barry Flood

ABSTRACT: Shared decision making is the process of interacting with patients in arriving
at informed values-based choices when options have features that patients value differ-
ently. Patient decision aids (PtDAs) are evidence-based tools designed to facilitate that pro-
cess. Numerous randomized trials indicate that PtDAs improve decision quality and prevent
overuse of options that informed patients do not value. Therefore, they have a potential role
in reducing unwarranted variations in the use of preference-sensitive health care options.
However, barriers to their widespread use need to be addressed with coherent plans for en-
suring good standards, improving access to PtDAs, training practitioners, testing practice
variation, and launching demonstration projects.

MANY DECISIONS IN HEALTH CARE do not have clear answers because the benefit/harm ratios are either scientifically uncertain or sensitive to the value patients place on benefits versus harms. Common examples include decisions for treating abnormal uterine bleeding, benign prostate enlargement, chronic back pain, and early-stage breast or prostate cancers. John Wennberg and colleagues define these decisions as "preference-sensitive" because the choice depends on patients' values or preferences for the benefits, harms, and uncertainties of each option.[1]

Small-area regional practice variations in the use of preference-sensitive surgery are ample, the likelihood of having a prostatectomy or hysterectomy can vary severalfold from one region to another.[2] These variations may be "un-

O'Connor AM, Llewellyn-Thomas HA, Flood AB. Modifying unwarranted variations in health care: Shared decision making using patient decision aids. *Health Aff* 2004; 23(No. Suppl2):63-72 (Oct 7). https://doi.org/10.1377/hlthaff.var.63

Wennberg DE, Marr A, Lang L, O'Malley S, Bennett G. A randomized trial of a telephone care management strategy. *New Engl J Med* 2010; 363(13):1245-55 (Sep 23).

Shared decision making *("preference sensitive" conditions)*

- ***Stratified, randomized trial with 174,120 subjects***
- ***Commercial insurance patients*** *(lower expected yield than Medicare patients)*
- ***Telephone coaching for all patients***
- ***Patients with specific medical conditions*** *(e.g., osteoarthritis)* ***and high predicted costs offered shared decision making***

Cost impact:

Implementation investment: **< $2.00** *per member per month*

Hospitalization rate: ↓ **10.1%** *across all causes – not just preference sensitive conditions*

Total medical cost: ↓ **$7.96** *per member per month*

↓ **3.6%** *of total medical spend*

Evidence-based use of cardiac interventions

Clinical Outcomes: ***Remained excellent*** *(slight, nonsignificant, uptick)*

Cost impact:

# Cases:	↓	**137 / month**
Variable costs:	↓	**$18,918,519**
Total costs:	↓	**~$40,000,000**

Research

JAMA | Original Investigation | INNOVATIONS IN HEALTH CARE DELIVERY

Association of Integrated Team-Based Care With Health Care Quality, Utilization, and Cost

Brenda Reiss-Brennan, PhD, APRN; Kimberly D. Brunisholz, PhD; Carter Dredge, MHA; Pascal Briot, MBA; Kyle Grazier, PhD; Adam Wilcox, PhD; Lucy Savitz, PhD; Brent James, MD, MStat

IMPORTANCE The value of integrated team delivery models is not firmly established.

OBJECTIVE To evaluate the association of receiving primary care in integrated team-based care (TBC) practices vs traditional practice management (TPM) practices (usual care) with patient outcomes, health care utilization, and costs.

DESIGN A retrospective, longitudinal, cohort study to assess the association of integrating physical and mental health over time in TBC practices with patient outcomes and costs.

SETTING AND PARTICIPANTS Adult patients (aged ≥18 years) who received primary care at 113 unique Intermountain Healthcare Medical Group primary care practices from 2003 through 2005 and had yearly encounters with Intermountain Healthcare through 2013, including some patients who received care in both TBC and TPM practices.

EXPOSURES Receipt of primary care in TBC practices compared with TPM practices for patients treated in internal medicine, family practice, and geriatrics practices.

MAIN OUTCOMES AND MEASURES Outcomes included 7 quality measures, 6 health care utilization measures, payments to the delivery system, and program investment costs.

RESULTS During the study period (January 2010-December 2013), 113 452 unique patients (mean age, 56.1 years; women, 58.9%) accounted for 163 226 person-years of exposure in 27 TBC practices and 171 915 person-years in 75 TPM practices. Patients treated in TBC practices compared with those treated in TPM practices had higher rates of active depression screening (46.1% for TBC vs 24.1% for TPM; odds ratio [OR], 1.91 [95% CI, 1.75 to 2.08), adherence to a diabetes care bundle (24.6% for TBC vs 19.5% for TPM; OR, 1.26 [95% CI, 1.11 to 1.42]), and documentation of self-care plans (48.4% for TBC vs 8.7% for TPM; OR, 5.59 [95% CI, 4.27 to 7.33]), lower proportion of patients with controlled hypertension (<140/90 mm Hg) (85.0% for TBC vs 97.7% for TPM; OR, 0.87 [95% CI, 0.80 to 0.95]), and no significant differences in documentation of advanced directives (9.6% for TBC vs 9.9% for TPM; OR, 0.97 [95% CI, 0.91 to 1.03]). Per 100 person-years, rates of health care utilization were lower for TBC patients compared with TPM patients for emergency department visits (18.1 for TBC vs 23.5 for TPM; incidence rate ratio [IRR], 0.77 [95% CI, 0.74 to 0.80]), hospital admissions (9.5 for TBC vs 10.6 for TPM; IRR, 0.89 [95% CI, 0.85 to 0.94]), ambulatory care sensitive visits and admissions (3.3 for TBC vs 4.3 for TPM; IRR, 0.77 [95% CI, 0.70 to 0.85]), and primary care physician encounters (232.8 for TBC vs 250.4 for TPM; IRR, 0.93 [95% CI, 0.92 to 0.94]), with no significant difference in visits to urgent care facilities (55.7 for TBC vs 56.2 for TPM; IRR, 0.99 [95% CI, 0.97 to 1.02]) and visits to specialty care physicians (213.5 for TBC vs 217.9 for TPM; IRR, 0.98 [95% CI, 0.97 to 0.99], $P > .008$). Payments to the delivery system were lower in the TBC group vs the TPM group ($3400.62 for TBC vs $3515.71 for TPM; β, −$115.09 [95% CI, −$199.64 to −$30.54]) and were less than investment costs of the TBC program.

CONCLUSIONS AND RELEVANCE Among adults enrolled in an integrated health care system, receipt of primary care at TBC practices compared with TPM practices was associated with higher rates of some measures of quality of care, lower rates for some measures of acute care utilization, and lower actual payments received by the delivery system.

Editorial page 822

Supplemental content

CME Quiz at jamanetworkcme.com and CME Questions page 876

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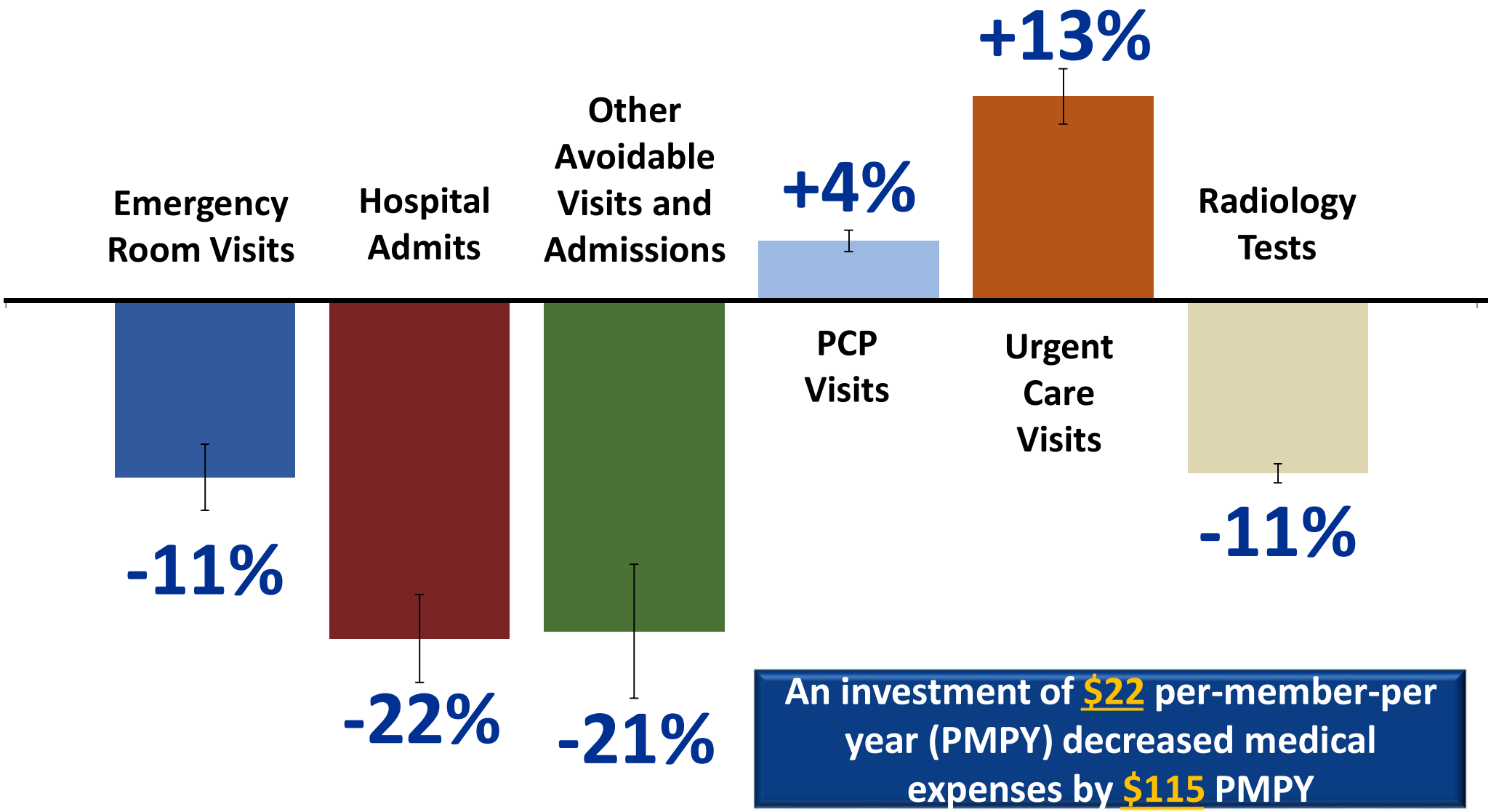
Corresponding Author: Brenda Reiss-Brennan, PhD, Intermountain Healthcare, 36 S State, Salt Lake City,

Reiss-Brennan, B, Brunisholz, KD, Dredge C, Briot P, Grazier K, Wilcox A, Savitz L, James BC. Association of integrated team-based care with health care quality, utilization, and cost. *JAMA* 2016; 316(8):826-34 (Aug 23/30).

Quality Science

Team-Based Care

(3rd generation coordinated medical home)



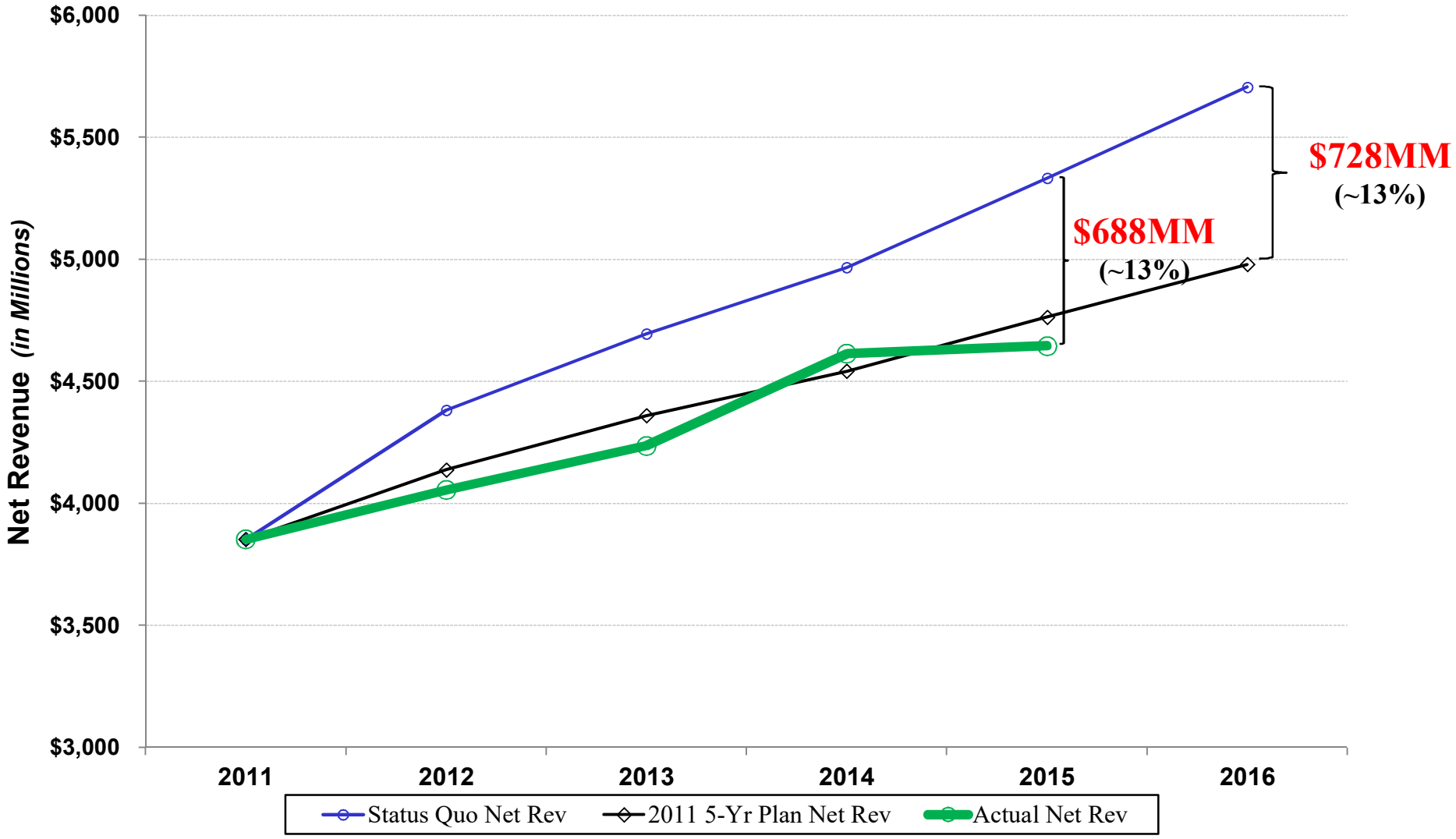
An investment of $22 per-member-per year (PMPY) decreased medical expenses by $115 PMPY

Reiss-Brennan B, Brunisholz KD, Dredge C, Briot P, Grazier K, Wilcox A, Savitz L, and James B. Association of integrated team-based care with health care quality, utilization, and cost. *JAMA* 2016; 316(8):826-34 (Aug 23/30).

Nested sources of waste

	Waste class	% of all waste	Waste subclasses
3.	Case-rate utilization *(# cases per population)*	45%	a) Inappropriate cases *(risk outweighs benefit)* *(e.g., many cath lab procedures; CTPA)* b) Preference-sensitive cases *(when given a fair choice, many patients opt out)* *(e.g., elective hips, knees; end-of-life care)* c) Avoidable cases *(hot spotting; move upstream)* *(e.g., team-based care)*
2.	Within-case utilization *(# and type of units per case)*	40%	a) Clinical variation *(e.g., QUE studies; surgical equipment)* b) Avoidable patient injuries *(e.g., serious safety event systems; CLABSI)*
1.	Efficiency *(cost per unit of care)*	15%	a) Supply chain *(external products & services)* b) Operational efficiencies *- TPS Lean observation - clinical engineering* *- current EMR functions - communications + IT* c) Indirect costs *- administration - billing adjudication* *- regulatory burden - utilities - etc.*

Financial impact of clinical quality improvement at 1 system



James Brent C and Poulsen Gregory P. The case for capitation: It's the only way to cut waste while improving quality. *Harv Bus Rev* 2016; 94(7-8):102-11, 134 (Jul-Aug).

Quality Science

Combining

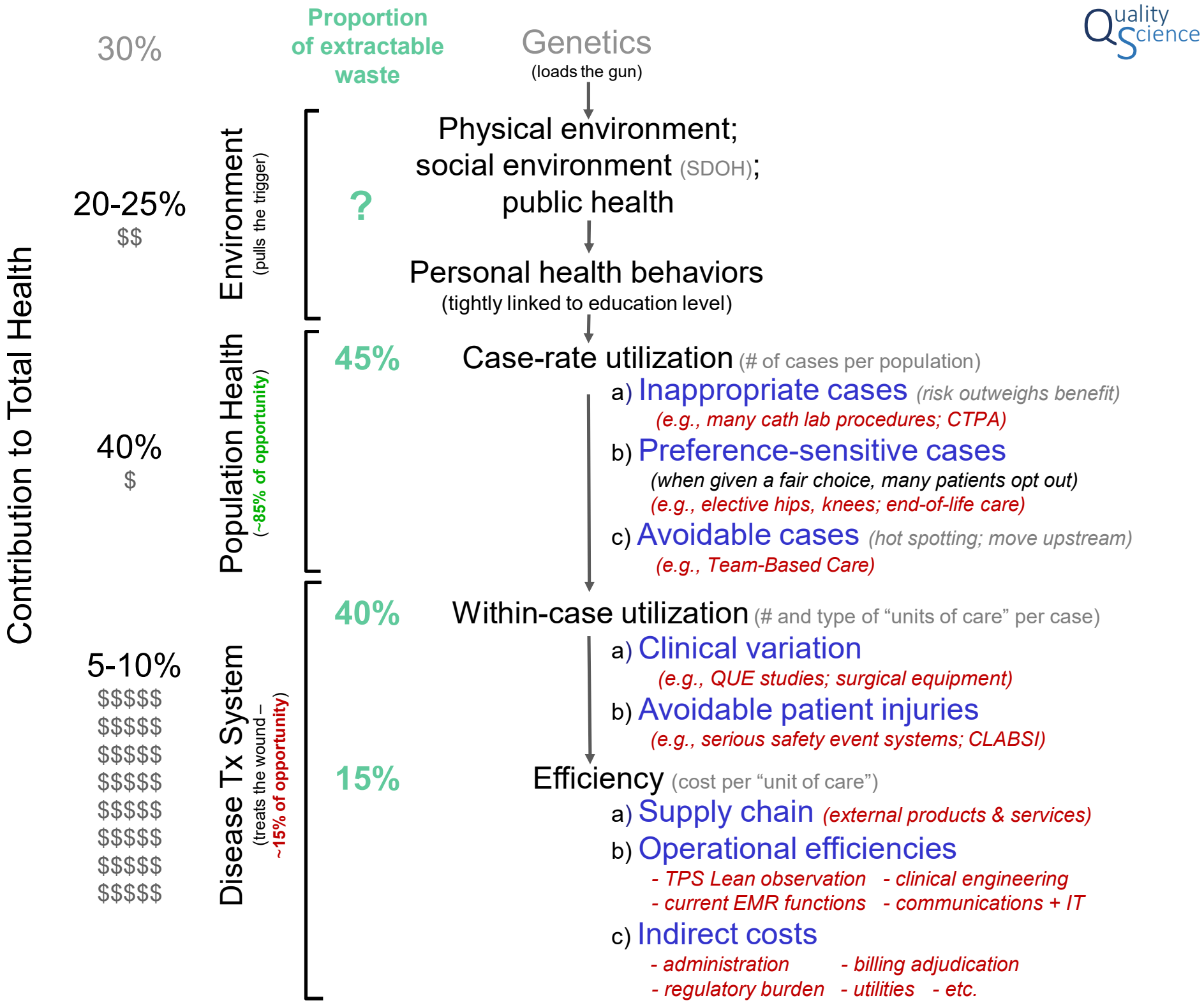
the "health model"

and

the "waste model"

into a comprehensive

Model for Population Health


Quality Science
Contribution to Total Health
30%
Proportion of extractable waste
Genetics
(loads the gun)
20-25%
$$
Environment
(pulls the trigger)
?
Physical environment;
social environment (SDOH);
public health
Personal health behaviors
(tightly linked to education level)
40%
$
Population Health
(~85% of opportunity)
45%
Case-rate utilization (# of cases per population)
a) Inappropriate cases (risk outweighs benefit)
(e.g., many cath lab procedures; CTPA)
b) Preference-sensitive cases
(when given a fair choice, many patients opt out)
(e.g., elective hips, knees; end-of-life care)
c) Avoidable cases (hot spotting; move upstream)
(e.g., Team-Based Care)
5-10%
$$$$$
$$$$$
$$$$$
$$$$$
$$$$$
$$$$$
$$$$$
$$$$$
Disease Tx System
(treats the wound –
~15% of opportunity)
40%
Within-case utilization (# and type of "units of care" per case)
a) Clinical variation
(e.g., QUE studies; surgical equipment)
b) Avoidable patient injuries
(e.g., serious safety event systems; CLABSI)
15%
Efficiency (cost per "unit of care")
a) Supply chain (external products & services)
b) Operational efficiencies
- TPS Lean observation - clinical engineering
- current EMR functions - communications + IT
c) Indirect costs
- administration - billing adjudication
- regulatory burden - utilities - etc.