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Continuous Improvement Pays Off in Health Care

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Disclosures

Neither I, Brent C. James, nor any family members, have any relevant financial relationships to be discussed, directly or indirectly, referred to or illustrated with or without recognition within the presentation.

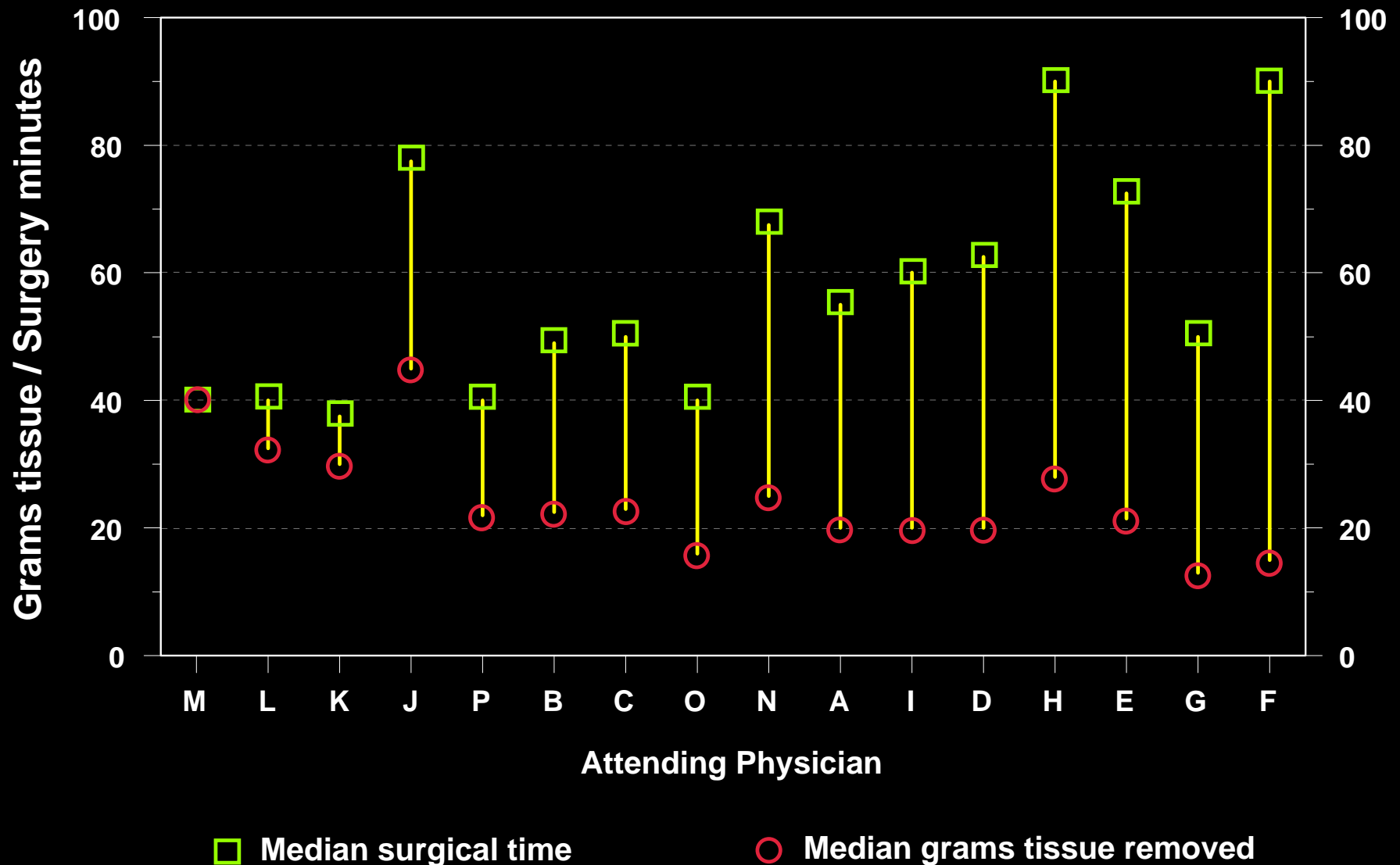
I have no financial relationships beyond my employment at Intermountain Healthcare.

1987 - Quality, Utilization, & Efficiency

- ◆ **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)

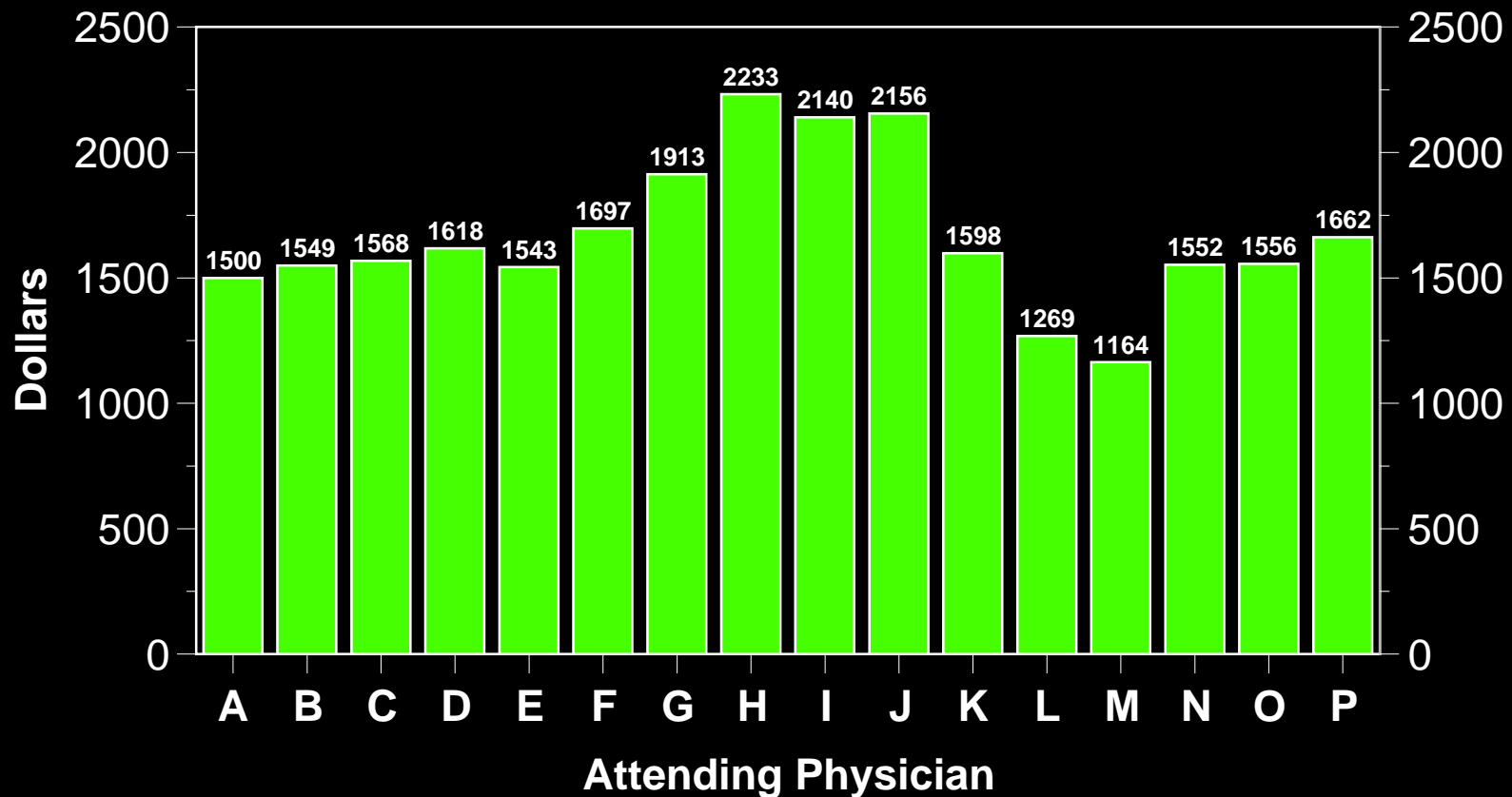
Intermountain TURP QUE Study

Median Surgery Minutes vs Median Grams Tissue



Intermountain TURP QUE Study

Average Hospital Cost



Deming's core process theory

- ♦ **All productive human activity happens through defineable "processes"**
- ♦ **All processes produce 3 parallel categories of outcomes:**
 - physical outcomes (in medicine, medical outcomes), a.k.a. "quality"
 - cost outcomes
 - service outcomes
- ♦ **Quality controls cost** through 3 causal mechanisms; the best way to reduce operating costs is to improve physical outcomes
- ♦ **Management, not front-line workers, control common cause variation through systems design** (fundamental knowledge)
- ♦ **All real processes contain built-in variation** (common cause); **they also are affected by external factors** (special cause variation)
- ♦ **Special cause versus common cause variation require very different management approaches** - it is critical to correctly identify the type of variation then use the appropriate tools for that particular class

The opportunity *(care falls short of its theoretic potential)*

- 1. Well-documented, massive, variation in practices** *(beyond the level where it is even remotely possible that all patients are receiving good care)*
- 2. High rates of inappropriate care** *(2 - 32% of all care delivered, depending on specific condition examined)*
- 3. Unacceptable rates of preventable care-associated patient injury and death**
- 4. A striking inability to "do what we know works"**
- 5. Huge amounts of waste** *(>50%, by best recent measures), spiraling prices, and limited access*

50+% of all resource expenditures in hospitals is quality-associated waste:

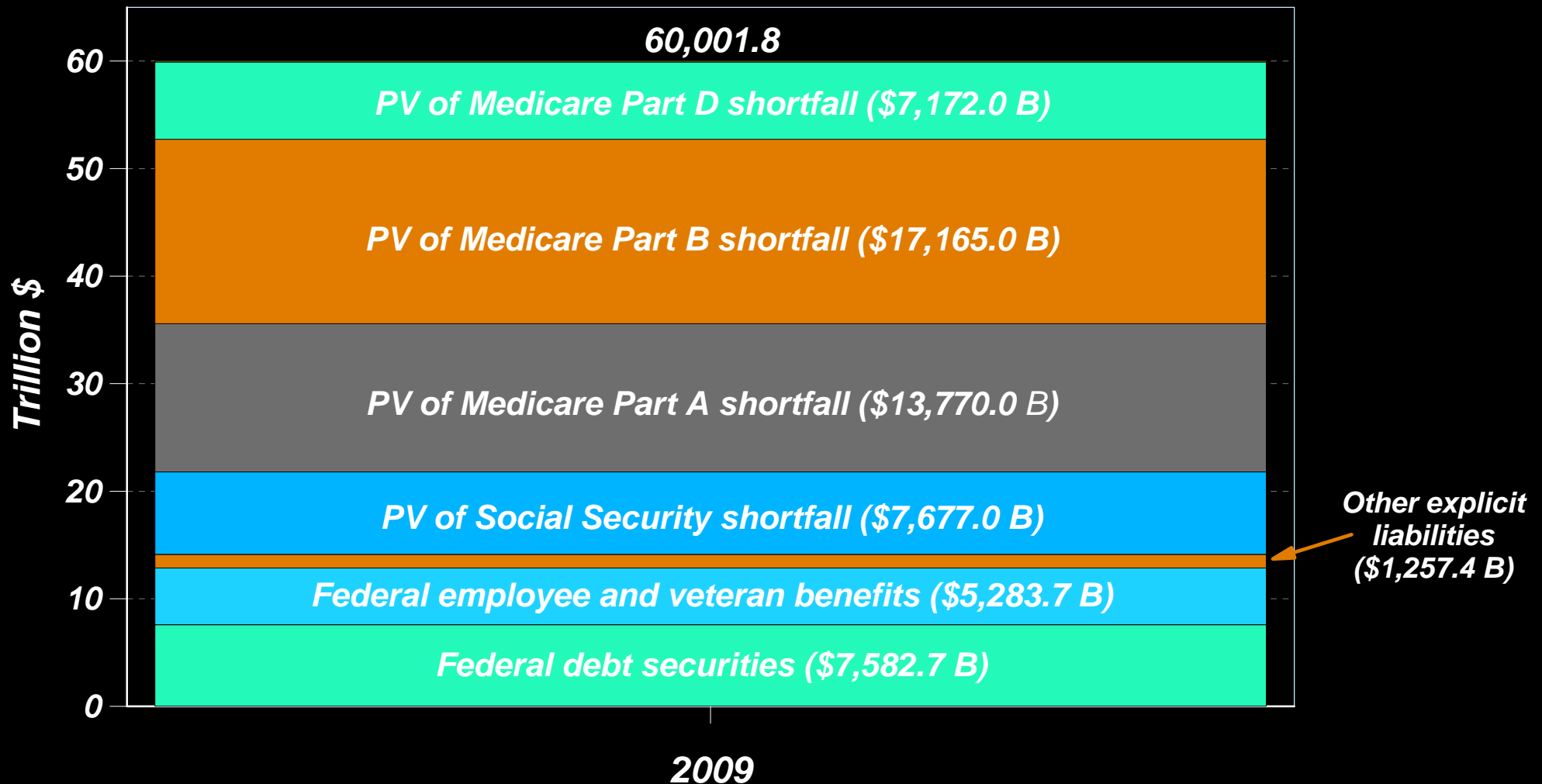
- ◆ *recovering from preventable foul-ups*
- ◆ *building unusable products*
- ◆ *providing unnecessary treatments*
- ◆ *simple inefficiency*

Andersen, C. 1991
James BC *et al.*, 2006

Rough estimate: more than 80% of all cost saving opportunities lie on the clinical side of the line

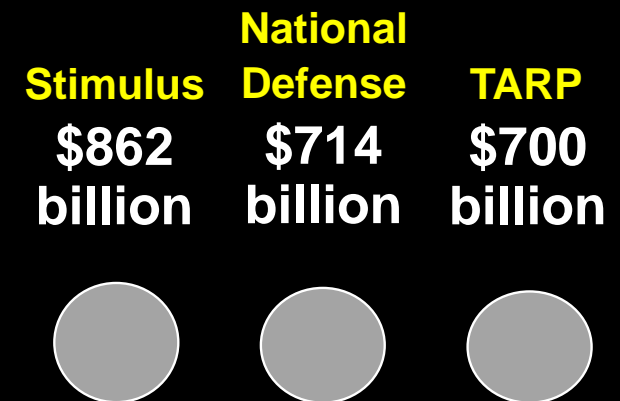
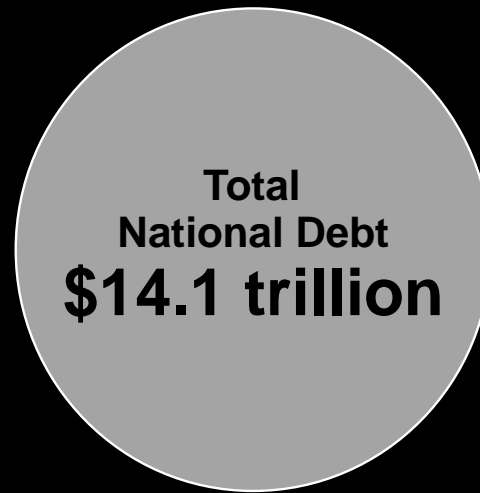
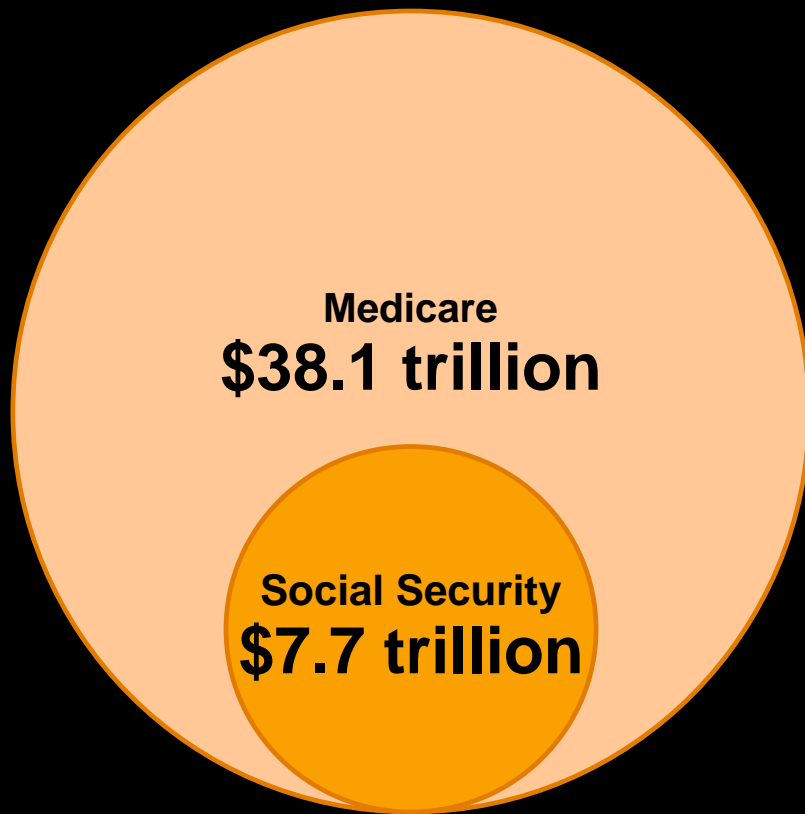
Total U.S. fiscal exposures

By layering on future obligations, the total net prevent value (PV) of debt rises to over \$60 trillion -- about \$195,000 for every man, woman and child in the U.S. More than two-thirds of the shortfall arises from health care delivery.)



The Fiscal Gap *(unfunded federal obligations - 2009)*

Unfunded obligations



Health care payments will be cut

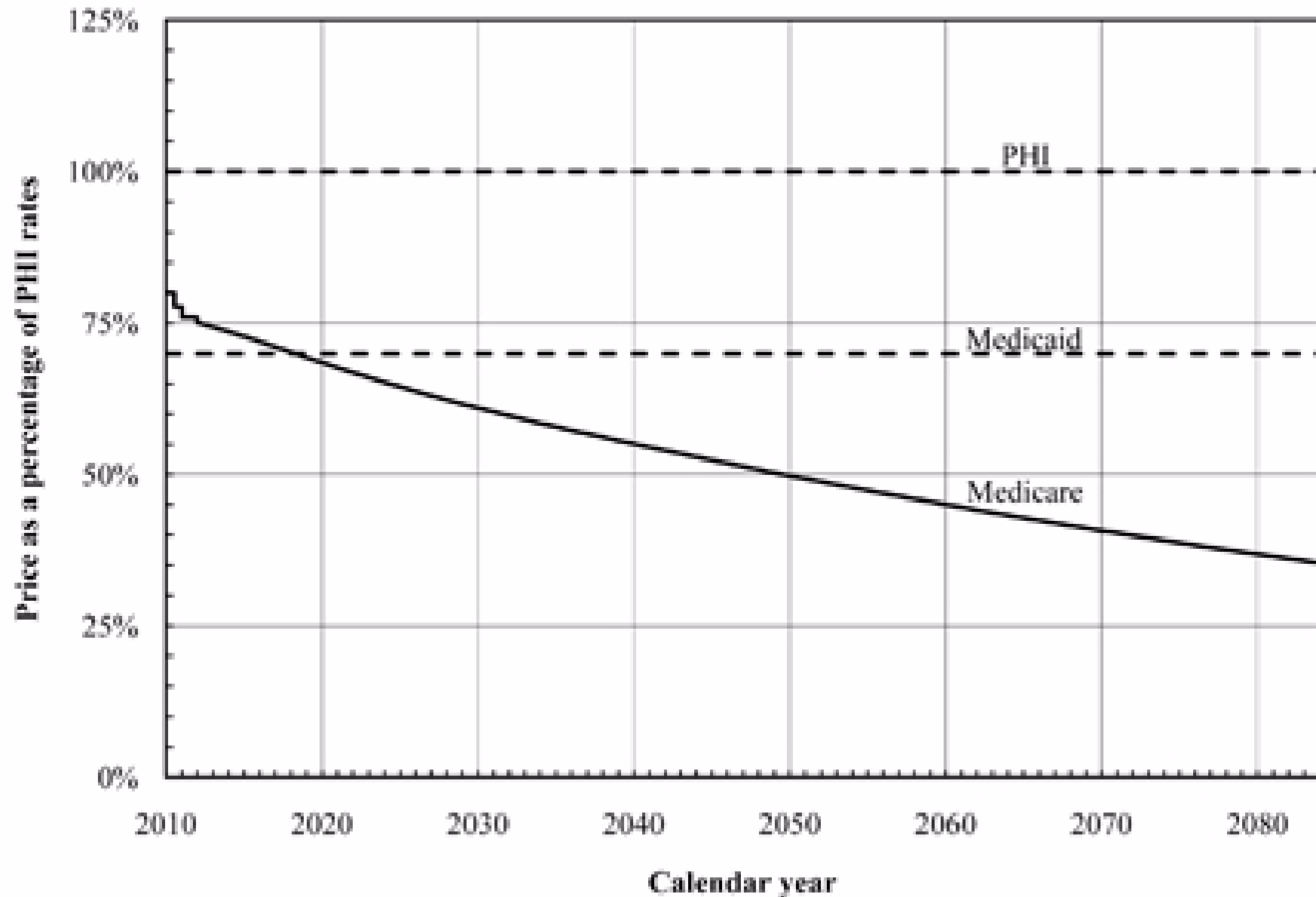
*Next stop: health care **cost control***

Current preliminary forms:

- RAC audits*
- pay for quality (withholds)*
- no payment for "preventable" complications*
- limits on rate increases*
- (SGR finally allowed to play through?)*

Payment rates under PPACA

Simulated Comparison of Relative Medicare, Medicaid, and Private Health Insurance Prices Under Current Law



Three proposed approaches:

Democrats: price controls *(a.k.a. single payer)*

Republicans: market forces *at physician-patient level*

QI: improve productivity
(i.e., eliminate waste)

Process science led to proven solutions

Dr. Alan Morris, LDS Hospital, 1991:

- ◆ **NIH-funded randomized controlled trial** assessing an "artificial lung" vs. standard ventilator management for acute respiratory distress syndrome (ARDS)
- ◆ **discovered large variations in ventilator settings** across and within expert pulmonologists
- ◆ **created a protocol** for ventilator settings in the control arm of the trial

Challenges with guidelines / protocols

- ◆ **Lack of evidence for best practice**
 - Level 1, 2, or 3 evidence available only about 15-20% of the time
- ◆ **Expert consensus is unreliable**
 - experts can't accurately estimate rates using subjective recall
(produce guesses that range from 0 to 100%, with no discernable pattern of response)
 - what you get depends on whom you invite (specialty level, individual level)
- ◆ **Guidelines don't guide practice**
 - systems that rely on human memory execute correctly
~50% of the time (McGlynn: 55% for adults, 46% for children)
- ◆ **No two patients are the same = no guideline perfectly fits any patient** (with very rare exception)

Solution: A Lean "learning system"

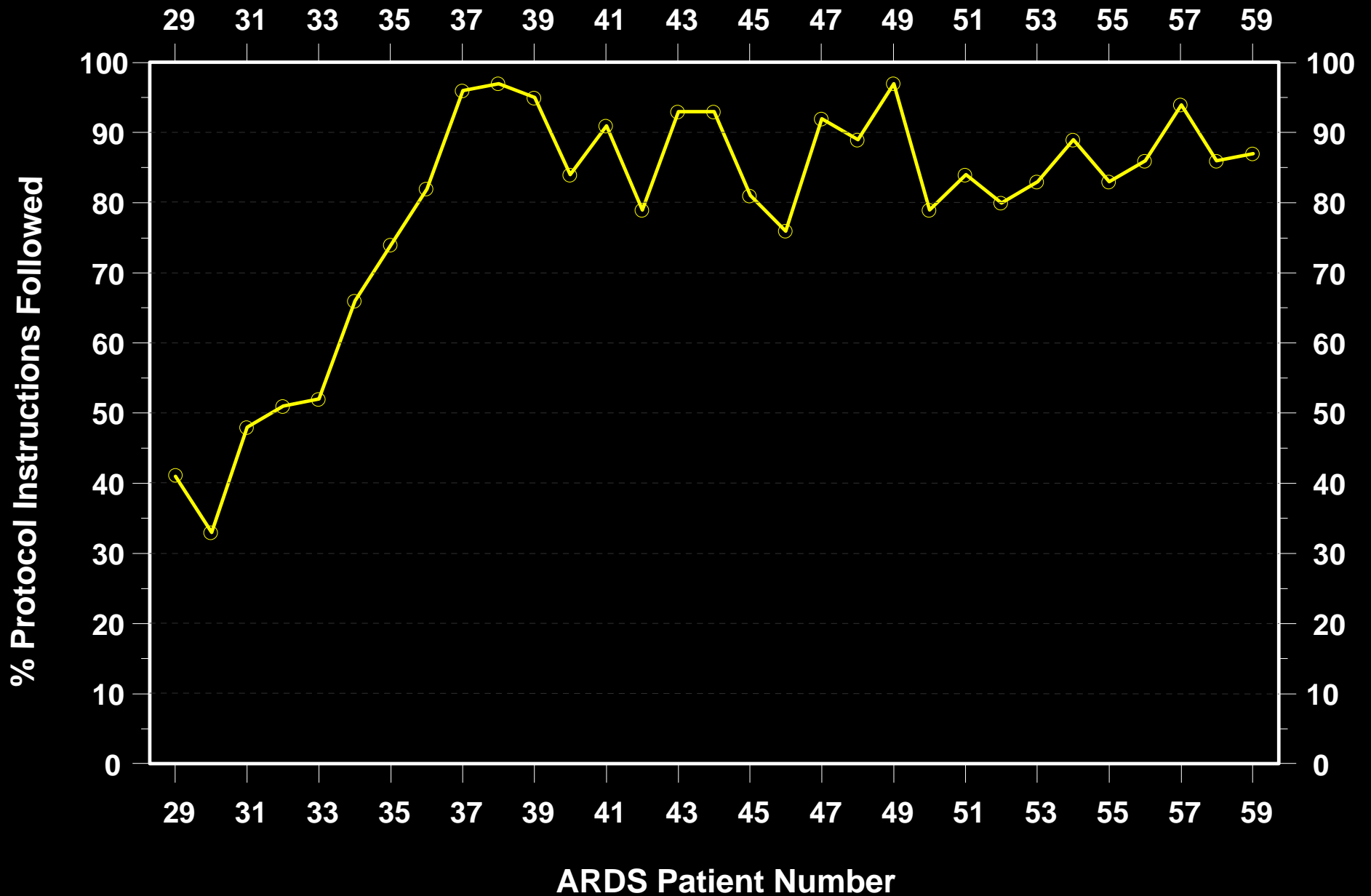
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- ◆ **Implemented the protocol using Lean principles**
(Womack et al., 1990 - The Machine That Changed the World)
 - built into clinical workflows - automatic unless modified
 - clinicians encouraged to vary based on patient need
 - variances and patient outcomes fed back in a learning loop

Shared Baseline protocols = "bundles"

- 1. Identify a high-priority clinical process** (*key process analysis*)
- 2. Build an evidence-based best practice protocol**
(*always imperfect: poor evidence, unreliable consensus*)
- 3. Blend it into clinical workflow** (*don't rely on human memory; make it the lowest energy state, default choice that happens automatically unless someone intervenes*)
- 4. Embed data systems to track** (1) **protocol variations and**
(2) **short and long term patient results** (*intermediate and final clinical, cost, and satisfaction outcomes*)
- 5. Demand that clinicians vary based on patient need**
- 6. Feed data back** (*variations, outcomes*) **in a learning loop** -
continuously update and improve the protocol

ARDS Protocol Compliance



Dr. Alan Morris, LDS Hospital, 1991

◆ **Results:**

survival (for ECMO entry criteria patients) improved from 9.5% to 44%

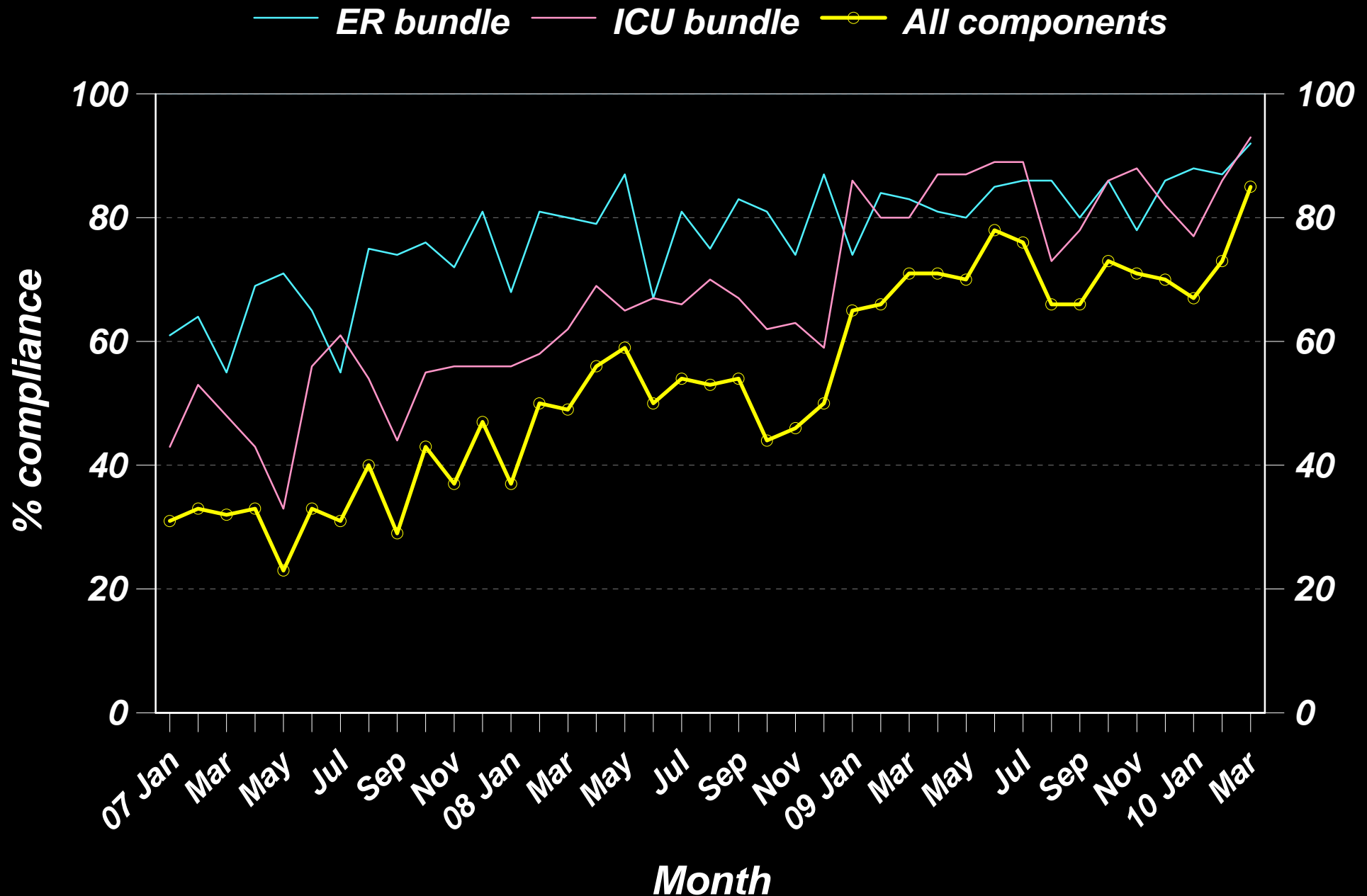
costs fell by ~25% (from \$160k to \$120k)

physician time fell by ~50%

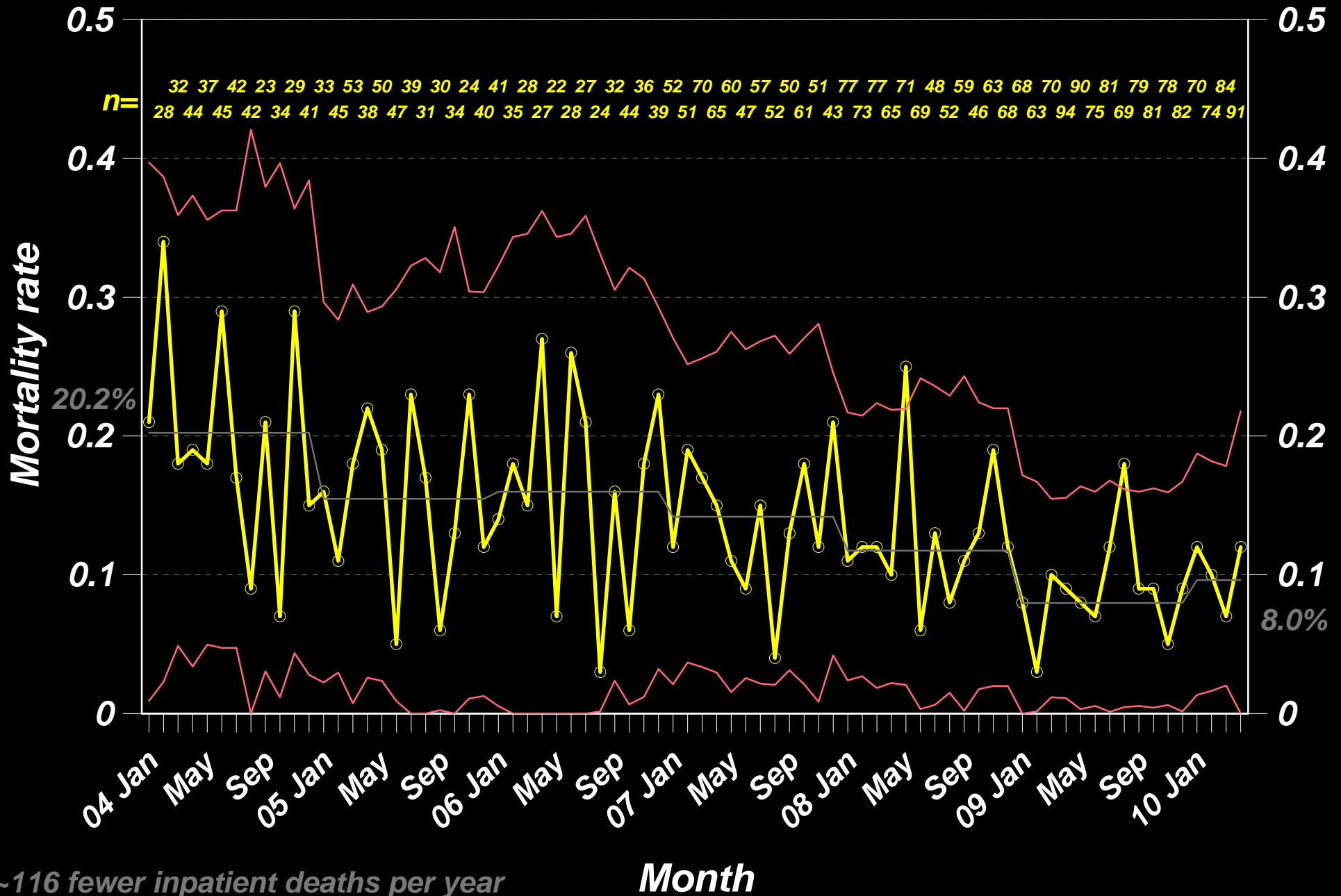
Key take-aways

- 1. No protocol perfectly fits any patient**
 - **solution:** Shared Baseline "bundles" (mass customization)
- 2. Serious limitations to protocol development**
 - **solution:** a Learning System (embedded variance and outcomes tracking; continuous protocol review and tested improvement)
- 3. Reliance on human memory (craft of medicine) produces "55% medicine"**
 - **solution:** tools to embed protocols in workflows
- 4. Only one difference from traditional medicine: It requires coordinated teams with reliable data systems**

Sepsis bundle compliance



Sepsis mortality - ER-ICU transfers



Lesson 1

We count our successes in lives ...

Lesson 2

Almost always,

better care is cheaper care ...

1995 - Clinical integration (quality as a core business strategy)

(Education programs: A learning organization)

(A strong shared vision of a preferred future state)

1996: *(strategic) Key process analysis*

1997: *Integrated management information systems*
(an outcomes tracking system)

1998: *Integrated clinical / operations
management structure*

1999: *Integrated (aligned) incentives*

- ◆ *cost structure vs. net income (mediated by payment mechanisms)*
- ◆ *integrated facility / medical expense budgets*

2000: *Full roll-out and administrative integration*

Prioritize: Key process analysis

The **Pareto*** Principle; 80/20 rule; or "the Vital Few":

The IOM Chasm report:

**Design for the usual, but -
recognize and plan for the unusual.**

Within Intermountain, we initially identified > 1400 inpatient and outpatient "work processes" that corresponded to clinical conditions (e.g., "pregnancy, labor, and delivery;" "management of ischemic heart disease;" "management of Type II diabetes mellitus")

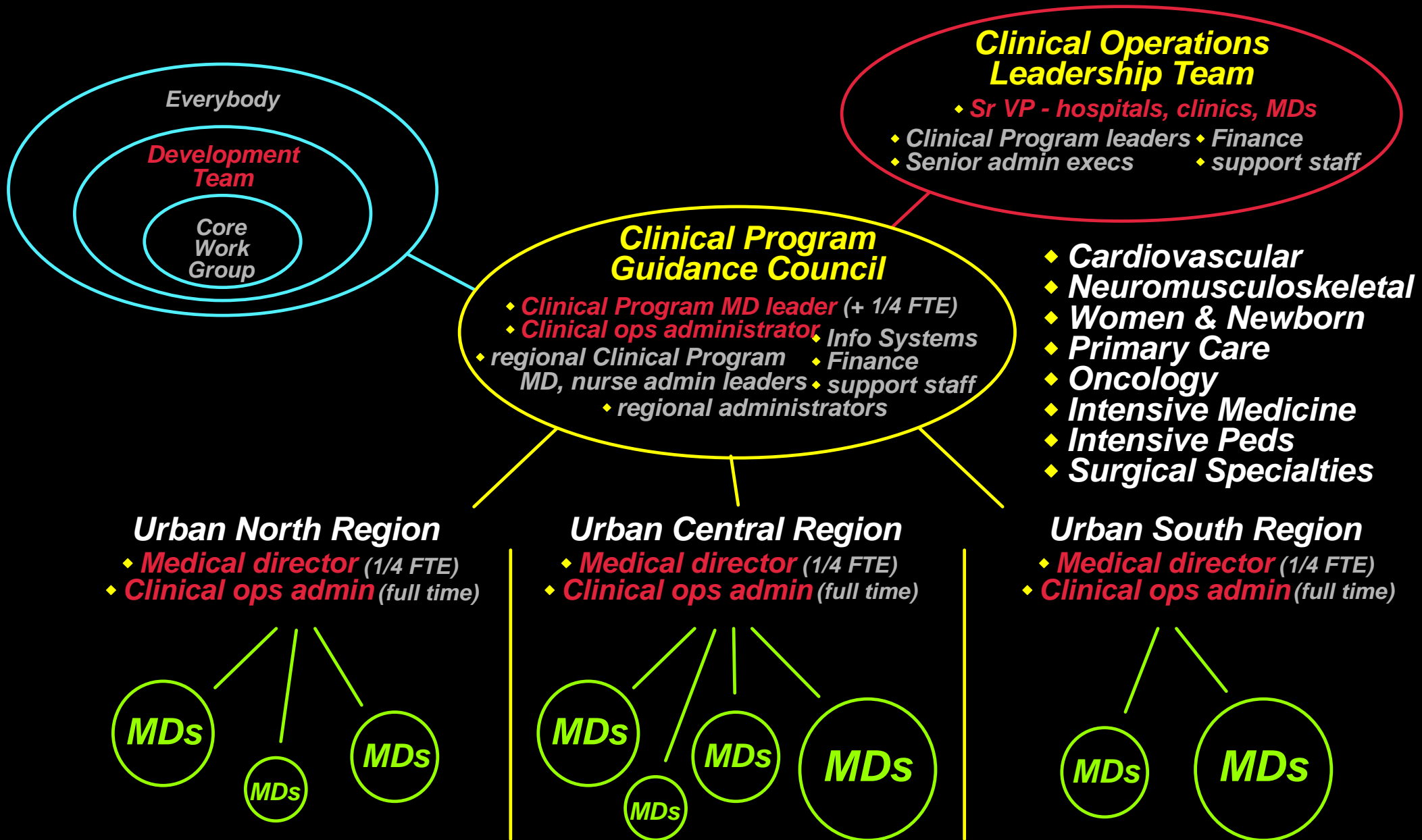
104 of those work processes (~7%) accounted for 95% of all of our inpatient and outpatient care delivery.

* Italian economist Vilfredo Pareto, 1848-1923

Measure for clinical management

- ◆ **We already had "sophisticated" automated data**
 - financial systems
 - time-based Activity Based Costing (since 1983)
 - clinical data for government reporting (JCAHO, CMS Core Measures, etc.)
 - other automated data (lab, pharmacy, blood bank, etc.)
 - **Danger! Availability bias!**
- ◆ **Still missing 30 - 50% of data elements essential for clinical management**
(the reason that the 2 initial Intermountain initiatives for clinical management failed)
- ◆ **We deployed a methodology to identify critical data elements for clinical management**, then built them into clinical workflows *(Danger! Recreational data collection!)*

Organize for clinical management



Clinical Development Teams

Core work group (*knowledge expert*) **responsibility - build and maintain the Care Process Model:**

Initial development phase

- 1. Generate initial evidence-based best practice guideline** (*flowchart*)
- 2. Blend the guideline into clinical workflow**
(*clinical flow sheets, standing order sets, etc.*)
- 3. Design outcomes tracking reports and learning feedback loop**
(*variations; short- and long-term patient clinical, cost, satisfaction outcomes*)
- 4. Design and coordinate decision support** (*electronic medical record*)
- 5. Design patient and professional education materials**

Maintenance phase

- 6. Keep the Care Process Model current** (*research pipeline; protocol variations; outcomes; improvement suggestions*)
- 7. Academic detail front-line teams** (*Clinical Learning Days*)
- 8. Run the referral clinic** (*last step in treatment cascade*)
- 9. Manage specialist care managers**

Align financial incentives *to professional values*

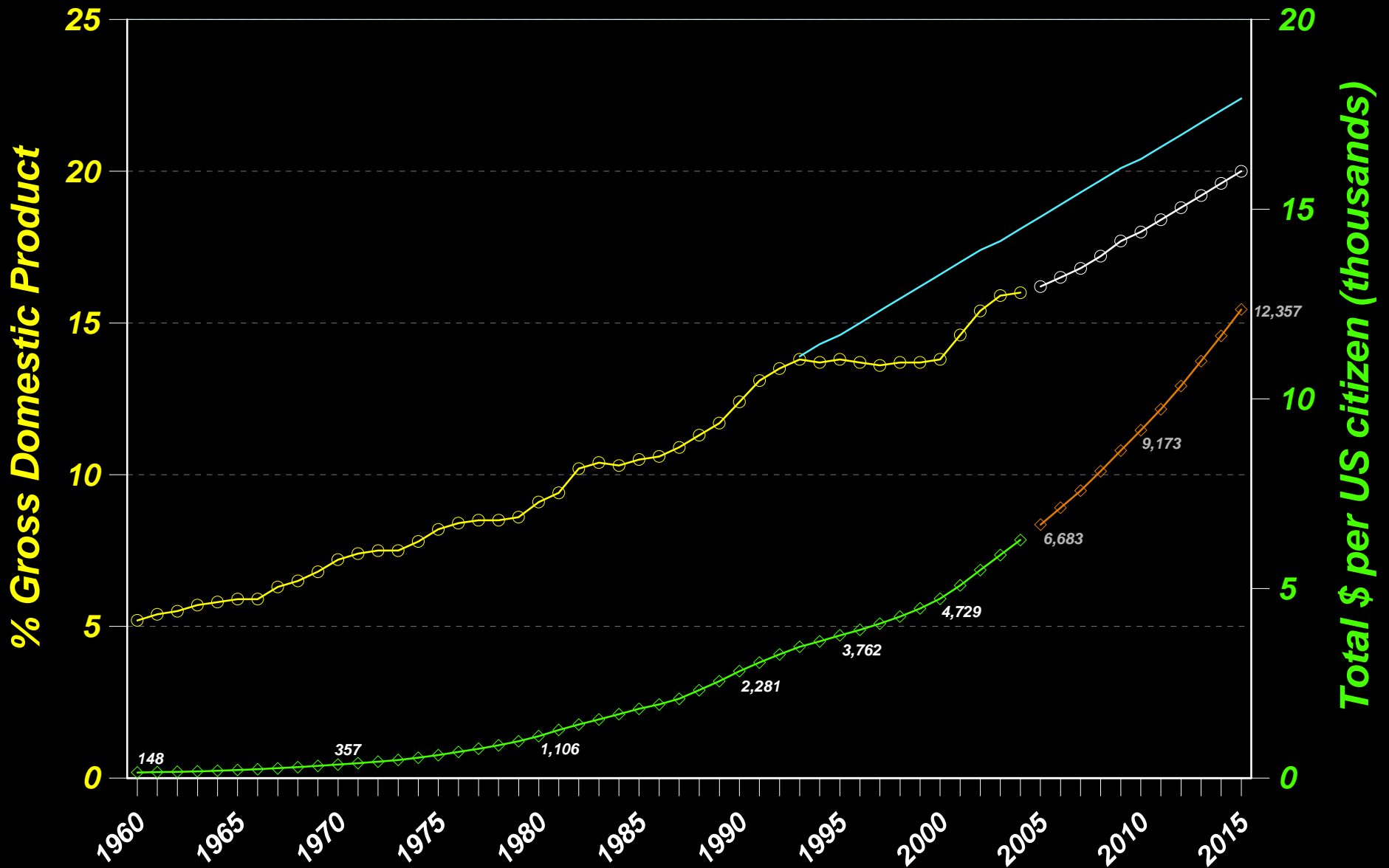
- ◆ **Neonates > 33 weeks gestational age who develop respiratory distress syndrome**
- ◆ **Treat at birth hospital with nasal CPAP** (prevents alveolar collapse), **oxygen, +/- surfactant**
- ◆ **Transport to NICU declines from 78% to 18%.**
- ◆ **Financial impact** (NOI; ~110 patients per year; raw \$):

| | <u>Before</u> | <u>After</u> | <u>Net</u> |
|---------------------------------|----------------|----------------|-----------------|
| Birth hospital | 84,244 | 553,479 | 469,235 |
| Transport (staff only) | 22,199 | - 27,222 | - 49,421 |
| Tertiary (NICU) hospital | <u>958,467</u> | <u>209,829</u> | <u>-748,638</u> |
| Delivery system total | 1,064,910 | 736,086 | -328,824 |
| Integrated health plan | 900,599 | 512,120 | 388,479 |
| Medicaid | 652,103 | 373,735 | 278,368 |
| Other commercial payers | <u>429,101</u> | <u>223,215</u> | <u>205,886</u> |
| Payer total | 1,981,803 | 1,109,070 | 872,733 |

Current payment mechanisms

- ◆ **Actively incent overutilization:** *do more, get paid more - even when there is no health benefit*
- ◆ **I am paid to harm my patients** *(paid more for complications)*
- ◆ **Actively disincent innovation that reduces costs through better quality** *(a key success factor for the rest of the U.S. economy)*
- ◆ **Very strong, deep, wide evidence showing exactly this effect throughout U.S. healthcare**

Bending the cost curve



Capitation makes a comeback

- 1. ACOs, AMHs, bundled payment, shared savings, pay for value: sophisticated forms of capitation**
 - provider at (financial) risk ... but with far better data systems for (1) quality measurement and (2) risk adjustment
- 2. Represent "managed care at the bedside"**
 - ask clinical teams at the bedside to manage the care, not distant and disengaged insurance companies
- 3. More than 80% of cost saving opportunities live on the clinical side; 70+% of clinical improvement activities reduce costs by freeing up care delivery capacity** (technically, "fixed cost leverage").

Two complementary forces

1. Massive downward pressure on payments

2. Pending huge increases in demand for our services

- *shifting demographics (the Baby Boom enters its chronic disease years)*
- *"behavioral" epidemics (e.g., obesity)*
- *continued advances in technology which drive demand higher*
- *system capacity (workforce, hospital beds) can't keep up*

Create additional capacity within existing workforce/facility structure by eliminating waste and improving productivity.

Process management is the key

- ◆ **higher quality drives lower costs**
- ◆ **under capitation, all of the savings come back to clinical process managers**
- ◆ **more than half of all cost savings will take the form of unused capacity** (fixed costs: empty hospital beds, empty clinic patient appointments, and reduced procedure, imaging, and testing rates)
- ◆ **balanced by increasing demand** (Baby Boom; obesity; community growth; technological advances; may still require some capacity management / reduction)
- ◆ **major financial model shift**, from revenue enhancement to cost control
- ◆ **key difference: it takes a team**

Better has no limit ...

an old Yiddish proverb