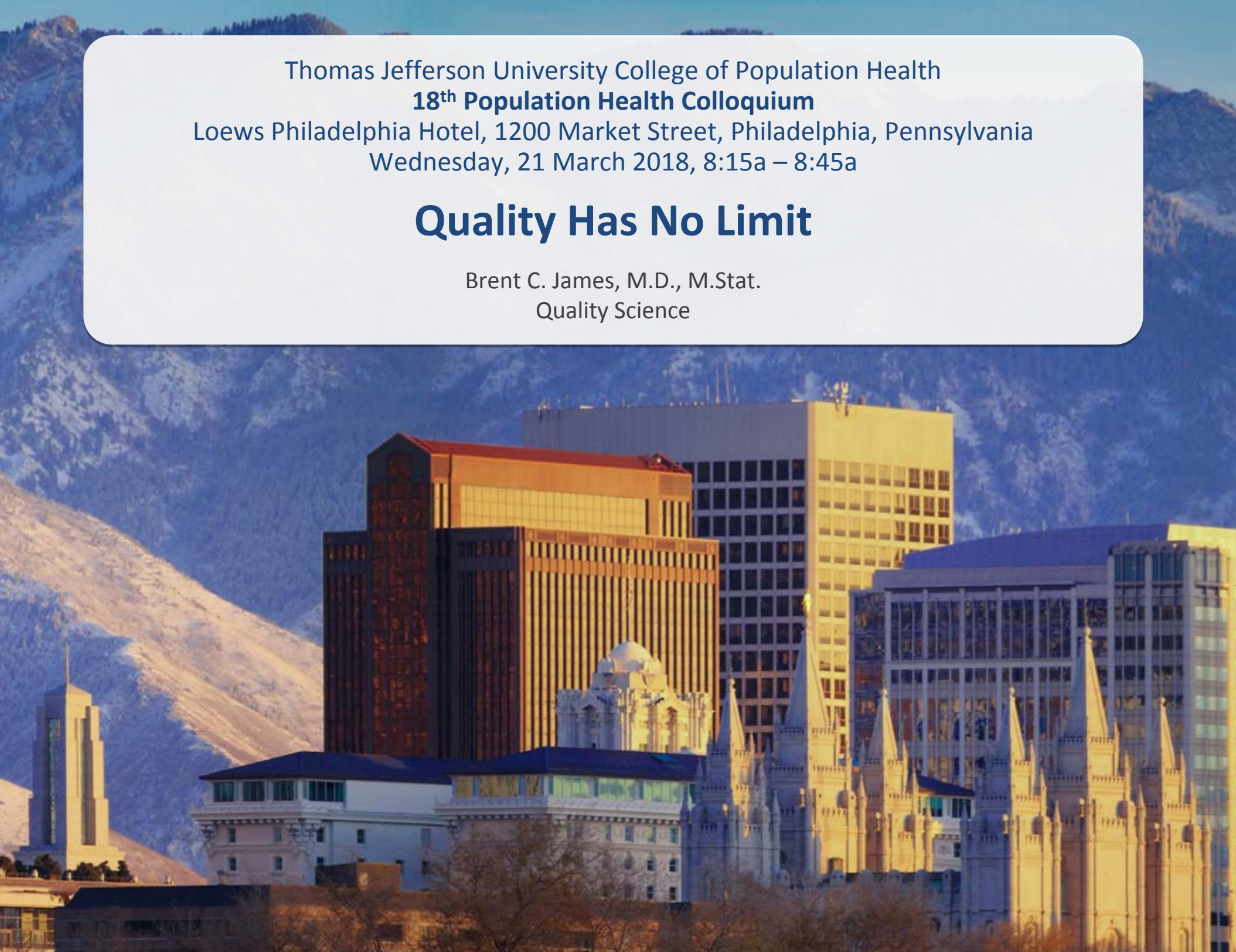


Thomas Jefferson University College of Population Health
18th Population Health Colloquium
Loews Philadelphia Hotel, 1200 Market Street, Philadelphia, Pennsylvania
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Quality Has No Limit

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Quality Science



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.

Part 1

The best the world has ever seen

The emergence of modern medicine

~1860 - 1910:

◆ ***new high standards for clinical education***

- *Flexner Report: more than half of all U.S. "medical schools" shut down*
- *new model: hospital-based 2 year course of study (integrated clinical exposure)*

◆ ***strict requirements for professional licensing***

◆ ***clinical practice founded on scientific research***

- *shift to germ theory, rather than "an imbalance of the 4 bodily humors," as the basis for understanding disease and its treatment*
- *health care's first entry into "evidence-based medicine"*

◆ ***new internal organization for hospitals***

Porter, R. *The Greatest Benefit to Mankind: A Medical History of Humanity*. New York, NY: W.W. Norton and Co; 1997.

Barry, JM. *The Great Influenza: The Epic Story of the Deadliest Plague in History*. New York, NY: Penguin Group; 2004.

Starr, P. *The Social Transformation of American Medicine*. New York, NY: Basic Books (Perseus Books Group; 1984.

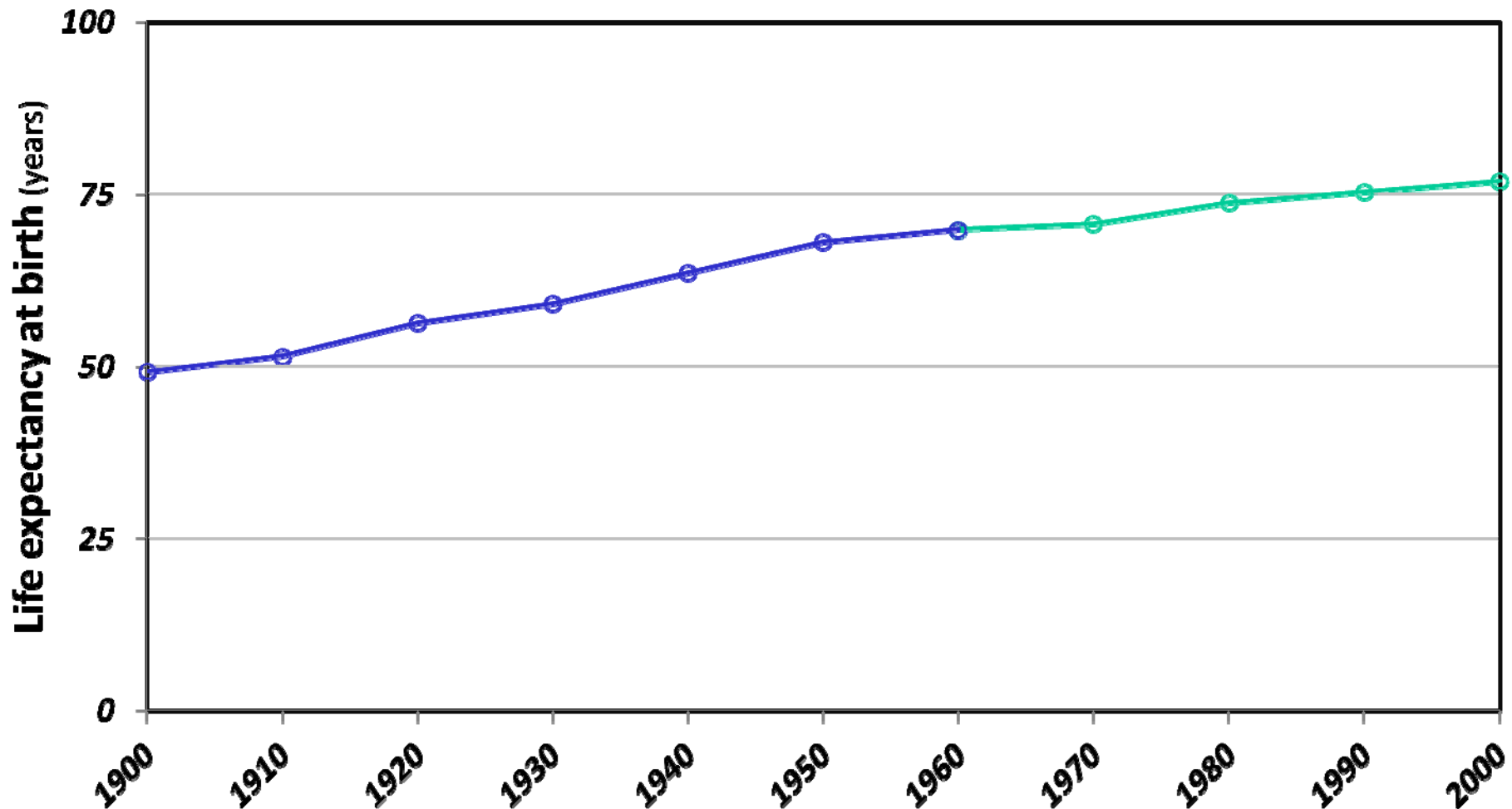
Rosenberg, CE. *The Care of Strangers: The Rise of the American Hospital System*. New York, NY: Basic Books; 1987.

1912 : The 'Great Divide'

"... for the first time in human history, a random patient with a random disease consulting a doctor chosen at random stands a better than 50/50 chance of benefitting from the encounter."

Harvard Professor L. Henderson

"We routinely achieve miracles"



Since 1960, 6.97 years gained over 4 decades = 1.74 years / decade

(from 1900-1960, 20.7 years gained over 6 decades = 3.45 years / decade)

Cutler DM, Rosen AB, Vijan S. The value of medical spending in the United States, 1960-2000. New Engl J Med 2006; 355(9):920-7 (Aug 31).

Current health care *is the best the world has ever seen*

A few simple examples:

- *From 1900 to 2000, average life expectancy at birth increased from **49** years to almost **77** years (28 year gain).*
- *Since 1960, age-adjusted mortality from heart disease (#1 killer) has decreased by **56%** (from 307.4 to 134.6 deaths / 100,000); and*
- *Since 1950, age-adjusted mortality from stroke (#3 killer) has decreased by **70%** (from 88.8 to 26.5 deaths / 100,000)*

Initial life expectancy gains almost all resulted from public health initiatives -- clean water, safe food, and (especially) widespread control of epidemic infectious disease. But since about 1960, direct disease treatment has made increasingly large contributions.

Centers for Disease Control. Decline in deaths from heart disease and stroke--United States, 1900-1999. *JAMA* 1999; 282(8):724-6.

National Center for Health Statistics. *Health, United States, 2000 with Adolescent Health Chartbook*. Hyattsville, MD: U.S. Dept. of Health and Human Services, Center for Disease Control and Prevention, 2000; pg. 7 (DHHS Publication No. (PHS) 2000-1232-1).

U.S. Department of Health and Human Services, Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*. Washington, DC: U.S. Government Printing Office, 1991 (DHHS Publication No. (PHS) 91-50212).

Part 2

*Current care delivery
could be MUCH better*

Sources of progress

*Traditional biomedical and
clinical research*

Care delivery science

The basis for variation research:

*Apply rigorous
clinical research methods*

to

daily care delivery performance
(quality and cost of care)

Care delivery science

Quality improvement is

the science of process management

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

1. **Massive variation in clinical practices** *(beyond even the remote possibility that all patients receive good care)*
2. **High rates of inappropriate care** *(where the risk of harm inherent in the treatment outweighs any potential benefit)*
3. **Unacceptable rates of preventable care-associated patient injury and death**
4. **Striking inability to "do what we know works"**
5. **Huge amounts of waste, leading to spiraling prices that limit access to care**

Part 3

We have found proven solutions ...

Dr. Alan Morris, LDS Hospital, 1991

- ♦ **NIH-funded randomized controlled trial**
assessing an Italian "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*

Problems with “best care” protocols

♦ **Lack of evidence for best practice**

- Level 1, 2, or 3 evidence available only about 15-25% of the time

♦ **Expert consensus is unreliable**

- experts can't accurately estimate rates relying on 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; therefore, no guideline perfectly fits any patient** (with very rare exception)

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- ◆ ***discovered large variations in ventilator settings***
across and within expert pulmonologists
- ◆ ***created a protocol*** *for ventilator settings in the control arm of the trial*
- ◆ ***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 Lean Learning Loop*

Results:

- **Survival** (for ECMO entry criteria patients) **improved from 9.5% to 44%**
- **Costs fell by ~25%** (from ~\$160,000 to ~\$120,000 per case)
- **Physician time fell by ~50%** (a major increase in physician productivity)

Shared Baseline “Lean” 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** (= *clinical decision support; don't rely on human memory; make "best care" the lowest energy state, default choice that happens automatically unless someone must modify*)
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 those data back** (*variations, outcomes*) **in a Lean Learning Loop** - *constantly update and improve the protocol*

Lesson 1

We count our successes in lives

Lesson 2

there is nothing new here

except the idea that

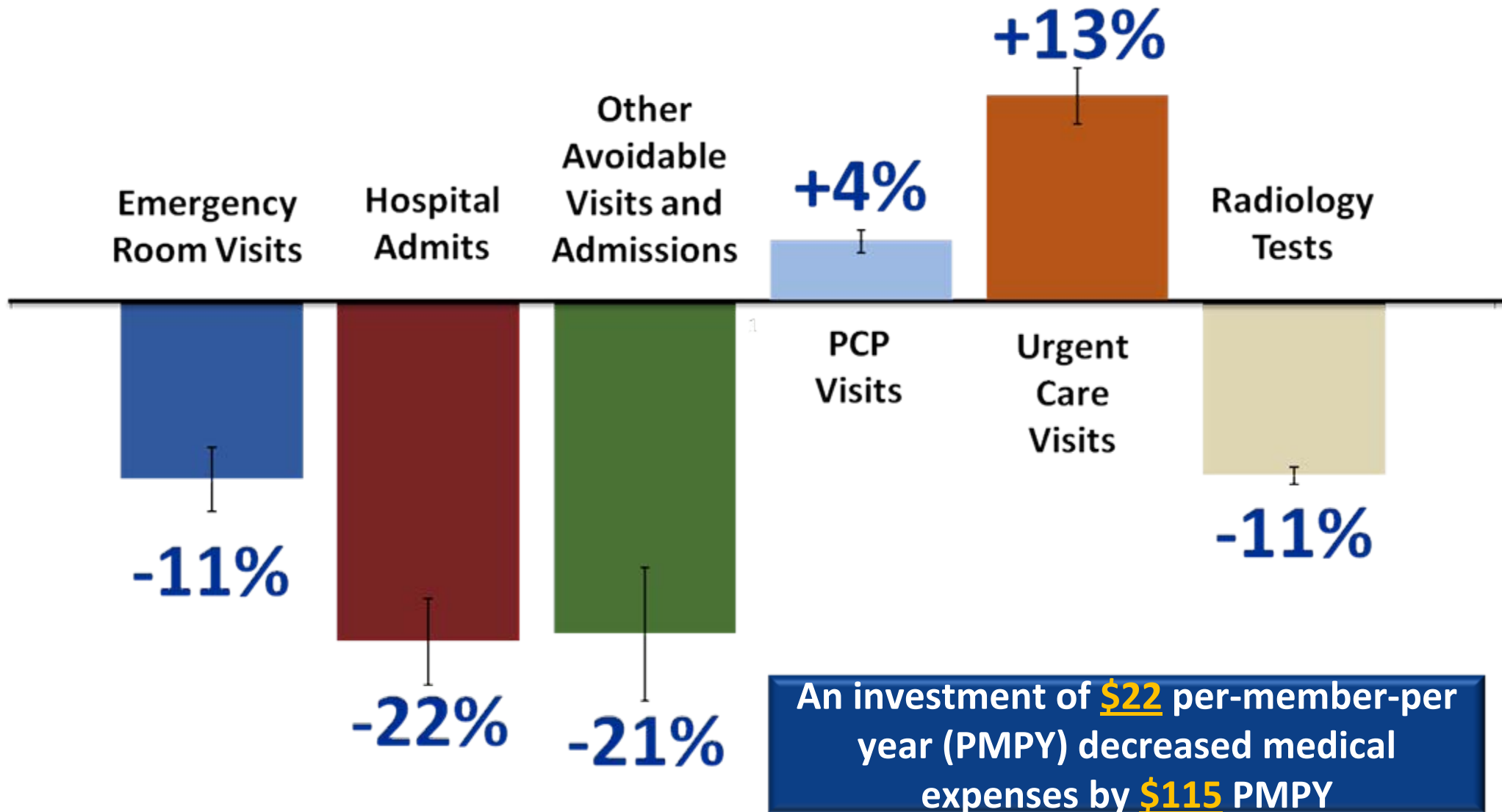
“it takes a team ...”

(and, perhaps, better process-aligned data systems)

It should have started in medicine

Team-Based Care

(3rd generation coordinated medical home)



Lesson 3

Most often
(but not always)

better care is cheaper care

Process management is the key

***better clinical results produce
lower costs***

♦ ***more than half of all cost savings will take the form of unused capacity*** (fixed costs: empty hospital beds, empty clinic patient appointments, reduced procedure, imaging, and testing rates)

♦ ***balanced by increasing demand:*** demographic shifts (Baby Boom); population growth; behavioral epidemics (e.g., obesity); technological advances

Better has no limit ...

an old Yiddish proverb