Quality: An Imperative for Organizational Survival

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Part 1

The roots of reform ...

- 46 million people without health insurance
- cost increases that are bankrupting the country
Total health: How long, how well we live

**Behavior:**
- Tobacco
- Ethanol (and other recreational drugs)
- MDD (movement deficit disorder - obesity)
- Sexually-transmitted disease (AIDS)
- Unwed teenage pregnancy
- Suicide, violence, & accidents (young men)

**Genetics:**
- ~30%

**Environment / public health:**
- ~20%

**Health care delivery** (hospitals and clinics)
- ~10%

McGinnis JM, Williams-Russo P, & Knickman JR. The case for more active policy attention to health promotion. Health Affairs 2002; 21(2):78-93 (Mar).
The Great Equation:

Health = medical care
and medical care = "access to care"

"But the Great Equation is wrong ..."
Healthcare - or a house?

- **Insurance premium - family coverage at national average rate**: $906
- **Mortgage payment on national median-value ($211,000) home**: $1,040
- **Health care delivery burden for a typical family of 4 when insurance-funded and tax-funded care are combined**: $2,376

Source: Kaiser Family Foundation, Wall Street Journal, 22Feb06
The uninsured - who are they?

- **Noncitizens** 9.5 million (~20.7%)
- **Eligible but not enrolled** 12 million (~26.1%)
- **Temporarily uninsured** (job change) 9 million (~19.6%)
- **Free riders** (income > $84,000) 7 million (~15.2%)
- **Long-term uninsured** 8 million (~17.4%)

Health cost per resident, by country
Life expectancy at birth, by country
Infant mortality per 100,000 births

- United States
- Sweden
- United Kingdom
- Germany
- Canada
What do we get for all that money?

W. Edwards Deming: Aim defines the system ...

**Three possible aims of a health care delivery system:**

1. **Total health** -- how long and how well we live

2. **High touch** -- patients value their relationship with a trusted clinical advisor more than any other element in health care delivery *(the clinician-patient relationship)*
A man stricken with disease today is assaulted by the same fears and finds himself searching for the same helping hand as his ancestors did five or ten thousand years ago. He has been told about the clever tools of modern medicine and somewhat vaguely, he expects that by-and-by he will profit by them, but in his hour of trial his desperate want is for someone who is personally committed to him, who has taken up his cause, and who is willing to go to trouble for him.

D. Emerick Szilagyi, MD: *In Defense of the Art of Medicine, 1965*

(with thanks to Dr. Steven Kappes, Milwaukee, WI)
High touch? Maybe not ...

W. Edwards Deming: Aim defines the system ...

Three possible aims of a health care delivery system:

1. Total health -- how long and how well we live

2. High touch -- patients value their relationship with a trusted clinical advisor more than any other element in health care delivery (the clinician-patient relationship)

3. Rescue care -- the Rule of Rescue

Primary care vs. Secondary care
Rapid response: The Rule of Rescue

Jonsen AR, 1986: The imperative people feel to rescue identifiable individuals facing (avoidable?) suffering or death.*

- Subconscious personal identification at an emotional level;
- A person instead of just a number; "a name and a face"

➢ The child down the well
➢ The whales trapped in the ice
➢ The dog on the abandoned boat
➢ "60 Minutes" program on pertussis vaccination

"A single death is a tragedy, a million deaths is a statistic."

Joseph Stalin (who killed more than 17 million of his own Russian people)

System performance, by nation

Mortality Rate (%)

<table>
<thead>
<tr>
<th></th>
<th>United States</th>
<th>Germany</th>
<th>Great Britain</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major trauma</td>
<td>8.2</td>
<td>14.3</td>
<td>16.5</td>
<td>17.1</td>
</tr>
<tr>
<td>Heart attack</td>
<td>6.5</td>
<td>8.1</td>
<td>9.4</td>
<td>9.2</td>
</tr>
</tbody>
</table>

- United States
- Germany
- Great Britain
- France
System performance, by nation

Mortality Rate (%) for Neonates < 1500 grams:
- **U.S.**: 12.2%
- **Canada**: 16.4%
- **Germany**: 21.1%
- **Sweden**: 22.4%
- **U.K.**: 24.5%

The chart illustrates the mortality rates for neonates under 1500 grams by country.
Renal dialysis per 100,000 population

- United States
- Sweden
- United Kingdom
- Germany
- Canada

# patients on dialysis per 100,000 population

- 1970
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000

- 0
- 20
- 40
- 60
- 80
- 100

United States, Canada, Sweden, United Kingdom, Germany
Kidney transplants per 100,000 population

- United States
- Sweden
- United Kingdom
- Germany
- Canada


# kidney transplants per 100,000 population
Mortality amenable to health care

Deaths per 100,000 population

International health comparisons

- **On a macro basis, many countries out-perform the U.S.:**
  This is primarily attributable to healthier behaviors, better public health, and a heavy emphasis on easily accessible primary care (easy access = "high touch" = better satisfaction; primary care is relatively cost effective)

- **the U.S. system performs significantly better for those with severe illness or injury.** This is due to several factors:
  - Better access to technology
  - Less explicit and implicit rationing
  - Easy access to subspecialists - better / more extensive health professional training; very much less waiting in line for specialty care (queueing)
Current care delivery offers opportunities ...
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**

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 and spiraling prices, that limit access**
   (46.6 million uninsured Americans, and still climbing)
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
U.S. fiscal exposures (Comptroller General David Walker)

- **Explicit liabilities**
  - Publicly held debt (e.g., the national debt) $4.3 trillion
  - Military & civilian pensions & retiree health 3.1 trillion
  - Other 1.7 trillion
  - Total: $9.1 trillion

- **Commitments & contingencies**
  - (e.g., PBGC, undelivered orders) 0.9 trillion

- **Implicit exposures**
  - Future Social Security benefits 5.7 trillion
    - Obligations in excess of trust fund 4.0 trillion
    - Debt held by the trust fund 1.7 trillion
  - Future Medicare Part A benefits 8.8 trillion
    - Obligations in excess of trust fund 8.6 trillion
    - Debt held by the trust fund 0.3 trillion
  - Medicare Part B benefits 12.4 trillion
  - Medicare Part D benefits 8.7 trillion

**Total:** $45.6 trillion

Another way to think about it

- Debt held by the public: $4.3 trillion
- Trust fund debt: 3.1
- Gross debt\(^1\): $7.4 trillion

- Gross debt per person: about $25,000

- The $46 trillion is fiscal exposures is:
  - a burden of more than $150,000 per person or more than $370,000 per full-time worker;
  - nearly 19 times the current annual federal budget, and 4 times the current annual Gross Domestic Product;
  - almost equal to the (estimated) $48.5 trillion total net worth, including home equity, of all U.S. citizens.

\(^1\) Includes all debt held by government accounts.
1. **Massively raise taxes** *(mandatory health insurance; increased Medicare copays and deductibles; fees on pharma, device makers, care providers, insurers, etc., passed along to patients)*

2. **Decrease benefits** *(e.g., means test Medicare; tighten coverage criteria for specific interventions)*

3. **Shift money from other areas in the federal budget**

4. **Shift responsibility to States** *(bait and switch through block grants)*

5. **Decrease payments to care providers**
Composition of federal spending

Source: Office of Management and Budget
Looming financial crisis

- **Unsupportable increases in federal spending**
- **Employers exiting health insurance**
  (and transferring cost increases to employees)
- **Increasing numbers of under- and uninsured**
- **Medical tourism** (off-shore treatment)
Dartmouth CECS group  
(Jack Wennberg, Elliott Fisher, et al.)

Specialty: *measuring practice variation*

Observation: ~30% of all health expenditures happen in the terminal episode of life

Question 1: *Is there variation in end-of-life spending?*

(Studies directly adjust for age, gender, ethnicity, burden of comorbid illness)

Answer 1: ~5X *variation* - $12,000 (Intermountain) to $58,000 (UCLA)

Question 2: *Is end-of-life spending variation associated with spending levels before the terminal episode?*

Answer 2: *Yes* - >90% correlation 2 years prior, 5 years prior

Question 3: *Is end-of-life spending associated with quality of care?*

(2 major studies - 1st examined mortality rates, 2nd looked at blended CMS quality measures)

Answer 3: *Yes* (consistent, strong, results from both studies)

Unfortunately, the relationship is negative:

*More spending = lower quality of care* (by either measure)
We know why ...
Why? The collision of 2 forces:

1. **Continued reliance on the "craft of medicine"**
   (clinicians as stand-alone experts)

   runs up against

2. **Clinical uncertainty**

   in the context of

3. **Payment that encourages utilization**
An individual physician

- placing her patient's health care needs before any other end or goal,
- drawing on extensive clinical knowledge gained through formal education and experience

Can craft

- a unique diagnostic and treatment regimen customized for that particular patient.

**Medicine's promise:**

This approach will produce the best result possible for each patient.
Clinical uncertainty (a hundred years of science)

1. Lack of valid clinical knowledge regarding best treatment (poor evidence)
2. Exponentially increasing new medical knowledge (doubling time has decreased to ~8 years; at current rates, a clinician will need to learn, unlearn, then relearn half of their medical knowledge base 5 times during a typical career)
3. Continued reliance on subjective judgment (subjective recall is dominated by anecdotes, and notoriously poor when estimating results across groups or over time)
4. Limitations of the expert mind when making complex decisions
   Miller, 1956: The magic number 7, plus or minus 2: some limits on our capacity for processing information
   Eddy: "The complexity of modern medicine exceeds the capacity of the unaided human mind"

Which, combined with the craft of medicine, leads to:
   • Enthusiam for unproven methods ... Mark Chassin, MD
   • The maxim, "If it might work, try it" ... David Eddy, MD, PhD
   • Quality means "spare no expense" ... Brent James, MD, MStat
We have found proven solutions ...
We have found proven solutions

**Shared baselines** (a form of Lean Production) - A multidisciplinary team of health professionals:

1. **Select a high priority care process**
2. **Generate an evidence-based "best practice" guideline**
3. **Blend the guideline into the flow of clinical work**
   - staffing
   - training
   - supplies
   - physical layout
   - educational materials
   - measurement / information flow
4. **Use the guideline as a shared baseline, with clinicians free to vary based on individual patient needs**
5. **Measure, learn from, and (over time) eliminate variation arising from professionals; retain variation arising from patients** ("mass customization")
Practical limitations on protocol use

When abstract guidelines hit real patient care, experience clearly shows that (with very rare exceptions)

No protocol fits every patient;

more important,

No protocol (perfectly) fits any patient.
Methods to manage complexity

**Subspecialize** *(analytic method; reductionism; 'divide and conquer')*

*(old joke: *Know more and more about less and less until you know everything about nothing)*

**Mass customize** *(a shared baseline: focus on that relatively small subset of factors that are unique by and for each individual patient [typically 5-15%], concentrating your most important resource -- the trained human mind -- where it can have the greatest impact)*
NICU admits by weeks gestation

Deliveries w/o Complications, 2002 - 2003

<table>
<thead>
<tr>
<th>Weeks gestation</th>
<th>NICU admits by weeks gestation</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
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<td>38</td>
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<td>39</td>
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<td>40</td>
<td>2.65</td>
</tr>
<tr>
<td>41</td>
<td>3.44</td>
</tr>
<tr>
<td>42</td>
<td>4.26</td>
</tr>
</tbody>
</table>

n = 8,001 18,988 33,185 19,601 4,505 258
Elective inductions < 39 weeks

% elective inductions < 39 weeks

n = 423
Unplanned c-section rates

Electively induced patients by Bishop score, Jan 2002 - Aug 2003

<table>
<thead>
<tr>
<th>Bishop score</th>
<th>Percent c-sections</th>
<th>Multips</th>
<th>Primips</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>2</td>
<td>31.4</td>
<td>49</td>
<td>35</td>
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<tr>
<td>3</td>
<td>36.1</td>
<td>130</td>
<td>61</td>
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<tr>
<td>4</td>
<td>28.3</td>
<td>274</td>
<td>99</td>
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<tr>
<td>5</td>
<td>17.7</td>
<td>567</td>
<td>164</td>
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<tr>
<td>6</td>
<td>15.1</td>
<td>856</td>
<td>278</td>
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<tr>
<td>7</td>
<td>17.6</td>
<td>1114</td>
<td>375</td>
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<td>8</td>
<td>14.4</td>
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<td>487</td>
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<td>9</td>
<td>14.3</td>
<td>1062</td>
<td>453</td>
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<tr>
<td>10</td>
<td>5.8</td>
<td>737</td>
<td>346</td>
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<td>11</td>
<td>4.5</td>
<td>415</td>
<td>179</td>
</tr>
<tr>
<td>12</td>
<td>2.1</td>
<td>86</td>
<td>47</td>
</tr>
<tr>
<td>13</td>
<td>0</td>
<td>19</td>
<td>7</td>
</tr>
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</table>
Average hours in labor & delivery

Electively induced patients by Bishop score, Jan 2002 - Aug 2003

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</tr>
</tbody>
</table>
Elective induction: length of labor

Average hours from admission to delivery

(note: includes all elective inductions)
Overall c-section rate

- National
- Intermountain
Quality-based cost improvement

Combined maternal and neonatal variable cost
Deliveries without complications resulting in normal newborns
Actual - expected cost, based on year-end 2000 with PPI inflation

Cost structure improvement ($)
Cumulative annual total ($)
The healing professions are changing

From **craft-based practice**
- *individual physicians, working alone* *(housestaff ::= apprentices)*
- *handcraft a customized solution for each patient*
- *based on a core ethical commitment to the patient and*
- *vast personal knowledge gained from training and experience*

To **profession-based practice**
- *groups of peers, treating similar patients in a shared setting*
- *plan coordinated care delivery processes* *(e.g., standing order sets)*
- *which individual clinicians adapt to specific patient needs*
- *early experience shows*
  - *less expensive* *(facility can staff, train, supply an organize to a single core process)*
  - *less complex* *(which means fewer mistakes and dropped handoffs, less conflict)*
  - *better patient outcomes*
Why "profession-based" practice?

1. *It produces better outcomes for our patients*

2. *It eliminates waste, reduces costs, and increases available resources for patient care*

3. *It puts the caring professions back in control of care delivery*

4. *It is the foundation for useful shared electronic data -- an important next step in care delivery improvement*
What does it take to survive -- and perhaps even thrive -- in this emerging new world?
Care management at the bedside

Core infrastructure:

1. **Tools to change culture** (clinical and administrative)
2. **Tools for quality control** (a.k.a. quality management)
3. **Knowledge management** (the key organizational advantage)
4. **Administrative follow-through on clinical savings**
Culture change that pays its way

**Formal QI training programs:**

- **Facilitator Workshop Series (FWS)** - 8 days in 4 sessions
- **Advanced Training Program (ATP)** - 20 days in 4 sessions
- **miniATP** - 9 days in 4 sessions
- **others** *(MD intro course, lab series, etc.)*

**that**

- **teach methods** *(key: hands-on projects - creates quality zealots)*
- **change culture** *(key: early adopters)*
- **improve front-line work** *(key: organizational learning that rolls ahead; concrete examples where others can "see the wheels turning")*
- **pays its own way** *(savings from projects provide a net ROI)*
Health care as a system of production

**Design**
- Lean design
- TPS: Value stream analysis
- $6\Sigma$: Define, measure, analyze, design, verify (DMADV)

**Improve**
- 100% participation vs. breakthrough models
- Identify/prioritize opportunities:
  - voice of the customer,
  - voice of the process
- Rapid Cycle Improvement
- TPS: A3 analysis, w/ coaching
- $6\Sigma$: Define, measure, analyze, improve, control (DMAIC)

**Manage**
- Technically, Quality Control (Juran)
- Build essential infrastructure
  - key process identification
  - performance tracking (outcomes)
  - organizational structure
- Accountability - e.g., monthly review
Building infrastructure

To make it easy to do it right ...

(Education programs: A learning organization)
(A shared vision for a 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**
Deploying EBM

Clinical Operations Leadership Team
- Sr VP - hospitals, clinics, MDs
- Clinical Program leaders
- Finance
- Senior admin execs
- Support staff

Clinical Program Guidance Council
- Clinical Program MD leader (+ 1/4 FTE)
- Clinical ops administrator
- Info Systems MD
- Finance
- Support staff
- Regional Clinical Program nurse admin leaders
- Regional administrators

Urban North Region
- Medical director (1/4 FTE)
- Clinical ops admin (full time)

Urban Central Region
- Medical director (1/4 FTE)
- Clinical ops admin (full time)

Urban South Region
- Medical director (1/4 FTE)
- Clinical ops admin (full time)

Everybody

Development Team

Core Work Group

Cardiovascular
Neuromusculoskeletal
Women & Newborn
Primary Care
Oncology
Intensive Medicine
Intensive Peds
Surgical Specialties
Development Team structure

- **Team leader**
  - respected physician leader, in active practice
  - functionally a knowledge expert

- **Core work group**
  - knowledge experts
  - build initial Care Process Model
  - provide academic detailing, run referral clinic
  - geographically base

- **Front line clinicians**
  - physicians, nurses, clerks, techs, etc.
  - first level review; keep knowledge experts grounded
  - 2-way street: fundamental knowledge up, ownership down
  - geographic representation

- **Staff support**
  - flow charter, statistician, data manager, clinical ops administrator
Managing clinical knowledge

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 (using electronic data warehouse)
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
No good deed goes unpunished

- **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 $)*:

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

Deaths per 100,000 population

December 2006

**COST OF LIVING INDEX**

<table>
<thead>
<tr>
<th></th>
<th>Wasatch Front</th>
<th>National</th>
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<tbody>
<tr>
<td><strong>All Categories</strong></td>
<td>154.6</td>
<td>173.4</td>
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<tr>
<td>Housing</td>
<td>182.8</td>
<td>175.6</td>
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<td>Transportation</td>
<td>120.2</td>
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<tr>
<td>Health Care</td>
<td>157.4</td>
<td>249.5</td>
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<tr>
<td>Food at Home</td>
<td>201.2</td>
<td>170.6</td>
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<tr>
<td>Clothing</td>
<td>113.2</td>
<td>102.9</td>
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<tr>
<td>Food Away</td>
<td>162.2</td>
<td>168.7</td>
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<tr>
<td>Utilities</td>
<td>128.7</td>
<td>175.4</td>
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<tr>
<td>Recreation</td>
<td>139.1**</td>
<td>109.8†</td>
</tr>
<tr>
<td>Education &amp; Comm.</td>
<td>124.6**</td>
<td>116.2†</td>
</tr>
<tr>
<td>Other Goods &amp; Svcs.</td>
<td>104.3**</td>
<td>243.3</td>
</tr>
</tbody>
</table>

*Last six-month percentage change compared with same period one year ago.
***(Feb. 1998=100 base)
†(Dec. 1997=100 base)

Research at Dartmouth Medical School suggests that if everyone in America went to the Mayo Clinic, our annual health-care bill would be 25% lower (more than $500 billion!), and the average quality of care would improve. If everyone got care at Intermountain Healthcare in Salt Lake City, our healthcare costs would be lowered by one-third.

Of course, not everyone can get treatment at Mayo or Intermountain. But why are these examples of efficient, high-quality care not being replicated all across the country? The answer is that high-quality, low-cost care is not financially rewarding. Indeed, the opposite is true. Hospitals and doctors can make more money providing inefficient, mediocre care.
"I am sorry for you, young men (and women) of this generation. You will do great things. You will have great victories, and standing on our shoulders, you will see far, but you can never have our sensations. To have lived through a revolution, to have seen a new birth of science, a new dispensation of health, reorganized medical schools, remodeled hospitals, a new outlook for humanity, is not given to every generation."

-- Sir William Osler