Improving Patient Centered Outcomes

Don Goldmann, M.D.
Senior Vice President
Institute for Healthcare Improvement
Professor of Pediatrics
Harvard Medical School
Professor of Immunology and Infectious Disease and Epidemiology
Harvard School of Public Health

Roadmap

• Technology and science-enabled innovation: church design from master builders to computer models
  – Implications for health and healthcare
• A personal journey – from epidemiology to improvement science
• IHI’s R&D, implementation, and dissemination pipeline
• Developing and translating evidence for better care
  – How we gain confidence that new approaches to prevention, treatment, and systems improvement will work at scale
• Achieving better patient centered care and outcomes
  – From intuitive to empiric to precision medicine
  – Disruptive innovations
Carolingian Church – Einshardsbasilka, 824-827

St. Georg Reichenau, 900
Church of Santa Monica, Madrid

The Church of Brasilia
A Personal Journey

Epidemiology can take you only so far….

Cumulative Incidence of Bloodstream Infection: Cox model including only patient-related variables as covariates
Variation in parenteral nutrition utilization

Cox model including patient- and treatment-related variables as covariates
Overcoming Clinicians Distrust
Why Clinicians Are Skeptical About QI

• Many associate QI with old-style, punitive QA
• QI gurus overemphasize the industrial origins of QI and its “religious” aspects and promote specific tools to the exclusion of others (six sigma, lean, model for improvement)
• QI experts tend to focus on non-clinical processes and outcomes
• Teams trying to do QI “by the book” get bogged down in tedious process and settle for small incremental improvements

Why Clinicians are Skeptical About QI

• QI leaders are not up front about the fiscal agenda
  – Increasing emphasis on value
• QI programs do not provide clinicians with the data they need to improve
• QI experts do not emphasize the academic potential of QI research
If they can do it in Bogotá…

Reducing Post-Caesarian Infections

Causes and Effect Diagram

Perioperative antibiotic prophylaxis

Preparation of the skin before surgery

Surgical technique

Endometritis

After Cesarean Section

Host & Antenatal Factors

Peripartum events

Perioperative events

Pre-existing host factors

Timing

Antiseptic agent application

Nutritional status

Bacterial vaginosis

Prenatal care

Underlying diseases

Rupture of membranes

Chorioamnionitis

Prenatal care

Labor

Presence

Duration

Extraction of the placenta

Type of incision

Training

Skill Complications

Presence

Number

Technique

Extraction of the placenta

Type of incision

Technique

Extraction of the placenta

Type of incision

Technique

Extraction of the placenta

Type of incision

Technique
Meta-Analysis the Effect of Antibiotic Prophylaxis on Infection Rates after Cesarean Section


Priority Matrix

<table>
<thead>
<tr>
<th>Factor</th>
<th>Importance</th>
<th>Within the capacity of hospital personnel to improve</th>
<th>Timeframe for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic prophylaxis</td>
<td>4</td>
<td>4</td>
<td>short</td>
</tr>
<tr>
<td>Skin preparation</td>
<td>3</td>
<td>4</td>
<td>short</td>
</tr>
<tr>
<td>Surgical technique</td>
<td>4</td>
<td>4</td>
<td>medium</td>
</tr>
<tr>
<td>Antenatal factors</td>
<td>3</td>
<td>1</td>
<td>long</td>
</tr>
<tr>
<td>Peripartum events</td>
<td>4</td>
<td>2</td>
<td>medium</td>
</tr>
</tbody>
</table>
Utilization and Timing of Antibiotic Prophylaxis for Cesarean Section

<table>
<thead>
<tr>
<th></th>
<th>% receiving prophylaxis</th>
<th>% receiving prophylaxis ≤1 hour after delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital A</td>
<td>70%</td>
<td>31%</td>
</tr>
<tr>
<td>Hospital B</td>
<td>32%</td>
<td>70%</td>
</tr>
</tbody>
</table>

**Hospital A: Existing System**

1. Plan to perform C/S
2. Prescribe prophylaxis?
   - Yes: MD writes prescription
   - No: Transport antibiotic to patient
3. Antibiotic in L&D or pharmacy?
   - Yes: Administer antibiotic
   - No: MD writes prescription
4. Family buys antibiotic at pharmacy outside the hospital

**PCPI - March 2011 meeting presentation**

**Improving patient centered outcomes**

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Hospital A: Revised System

Plan to perform C/S ➔ Start ➔ Delivery ➔ Administer antibiotic ➔ End

MD writes prescription

Nurse puts antibiotic in packet of supplies

Packet transported to operating room with patient

Utilization and Timing of Perioperative Antibiotic Prophylaxis & Surgical Site Infections After Cesarean Section

- □ Receipt of antibiotic
- ○ Receipt of antibiotic <1 hour after delivery
- ◆ Surgical site infection rate

This may appear to be a sophisticated study, but…

• Amazing results can be achieved with real-time training and support – anywhere
• Time-ordered data is key
  – Time series analysis and multivariable techniques
  – Statistical process control
  – Simple run charts
• Practice with a personal improvement project
  – Getting the kids off to school on time
  – Getting to clinical rounds on time
  – Dinner with the family
Measurement Framework – A Key Requirement for QI

- Structure (facility design, improvement capacity, oversight committees)
- Process (key processes and practices tightly linked to the outcome of interest – adherence to CLABSI bundles)
- Outcome (CLABSI rates)
Aims should be:

- Strategic, important, “stretch”
- Actionable
- Measurable

Measures should be:

- Simple
- Digestible
- Graphic
- Possible to collect as part of routine work
What’s Needed to Improve

- Will
- Ideas
- Execution

- Where do the ideas come from?
- How do we increase our degree of belief that the ideas are valid?
- How do we spread what works?

IHI’s “Production” Model

AIM
Locate Will

Find, vet, and test Ideas

Demonstrate under varied conditions

Demonstrate at Scale

Build Will

RESULTS AT SCALE

Execution
Assessing Will
(to Make Major Changes)

• What are we trying to accomplish?
• What investments are we willing to make?
• What activities should we de-emphasize?
• What conflicts are we willing to resolve?
• What risks are we willing to take?
• How much disruption in the organization are we willing to support to make the transition to a better performing system?

Four Steps on the Pathway from Innovation to Demonstration to Spread of Ideas

• R&D
• Prototyping
• Pilot Testing
• Spread and Dissemination
Four Steps – R&D

- R&D in 90 days
  - Scan the environment constantly for innovative ideas in healthcare and beyond
  - Prioritize topics and align with strategic aims and customer needs (Executive Team and R&D Team)
  - Develop
    • Conceptual/theoretical model for achieving a concrete goal
    • Logic model and key “drivers”
    • Corresponding hypotheses to be tested
    • Package of promising change concepts
  - Develop a “technical brief” and “technical specifications” for further work
  - Make “go” or “no go” decision regarding further development
  - Develop a learning and testing/prototyping plan

The Future of R&D?

- Distributed learning and innovation
  - P&G model (Tide To Go)
    • Metric: % of new products “not invented here”
  - Wiki, blogs, other social networking tools……..
  - Some of the best innovations come from regions with constrained resources
Four Steps: Prototype Testing

• Prototype Testing
  – Specify aggressive goals and high-level measures ("raise-the-bar targets")
  – Intensively evaluate the validity and feasibility of the conceptual model, drivers, change package, and targets
    • Determine if even 1 or 2 highly committed organizations can achieve the targets
    • Determine whether to proceed with pilot testing, abandon the idea, or revisit R&D

Four Steps: Pilot Testing; Spread and Dissemination

• Pilot Testing
  – Expand testing to increase degree of belief that the changes will result in improvement under a broader range of organizations and conditions
    • Collaboratives, increasingly virtual

• Spread and Dissemination
  – Scale up regionally and nationally
    • 100,000 and 5 Million Lives Campaigns
    • Durable network of “nodes” and “mentor hospitals”
    • Trust and verify – spread without adoption does not count
Framework for Execution

Achieve *Breakthrough* Goals

- Aspirational v. Realistic
- Portfolio of Projects To Support Goals
- Spread and Sustain
- Provide Leaders for Large System Projects
- Provide Day-to-Day Leaders for Micro Systems
- Develop Human Resources
- Manage Local Improvement And Projects

Models, Drivers and Associated Change Packages Must be Tested and Refined in the Real World

The essence of quality and systems improvement
What are we trying to accomplish?

How will we know that a change is an improvement?

What change can we make that will result in improvement?

How much evidence do we need before spreading a change strategy?
How much confidence do we need in the change concept?
Where does Improvement Science Fit in “Translational Research?”

Five Paradigms

The NIH “Roadmap” for Translational Research

Figure 1. The 2 Translational Blocks in the Clinical Research Continuum

Central challenges facing the national clinical research enterprise
“3Ts” Roadmap to Transform US Health Care

Figure. The 3Ts Road Map

Note that T3 needs a healthy dose of patient focus and shared decisions

The "3Ts" road map to transform US health care: the "how" of high-quality care

Transition from Descriptive Theory to Normative Theory – ↑ Degree of Belief

Carlile and Christensen Practice and Malpractice In Management Research
Rigorous Learning in Complex Systems

Simple Linear Cause-and-Effect

Case Series "Anecdotes"

Poor Learning

"Rigorous Learning"

"Adaptive" Cluster RCTs
Time Series/SPC Methods
Mixed Methods
Anthropology
Ethnography
Sociology
Journalism

Complex Non-Linear Chaotic

Static RCTs

Traditional RCTs

Adapted from Berwick

Generalizable Knowledge | Site Implementation | Test and Refine | Outcomes Improved?
---|---|---|---
Theoretical Logic/Change Model | A. Contextual Adaptation | Amendment 1 | Yes
Local Experience | B. Contextual Adaptation | Amendment 2 | Yes
Explanatory Theory | C. Contextual Adaptation | Amendment 3 | No
Prior Research and Experience | Etc. | Amendment 4 |

Generalizable

Specific to Context

From Gareth Parry

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Weighing the Evidence

- How much evidence is required before deciding to implement widely and spread change?
- What kind of evidence is appropriate?
- How can comparative effectiveness research (CER) be most helpful for the kinds of problems we face in quality improvement and implementation research?

Diverse Study Designs

- Examples include:
  - Cluster randomized trials and meta-analytic trials
  - Bayesian and Adaptive trials
  - Pragmatic trials
  - Action and community-based participatory research
  - Quasi-experimental designs (e.g., factorial, time series designs)
  - Context-sensitive mixed methods research
  - Observational studies with attention to exposure and follow-up (including propensity scoring, instrumental variables)
    - Data Mining
Engaging Providers and Patients

- What is true patient and family centered care?
  - Respectfully incorporating patient and family preferences and the culture and context in which they live into care decisions – even in a busy practice setting
  - Empowering the patient to be a vocal partner
    - Don Goldmann’s 4 questions about his shoulder:
      - Why are you recommending a MRI?
      - What are the alternatives?
      - What will it cost (including costs to me)?
      - What if I refuse?

Helping Providers and Patients Understand and Act on Evidence

- How can providers keep abreast of the latest evidence
  - Decision support tools and technologies can help
    - Managing ICU patients in 1970 v. 2011
- How can the evidence be understood by providers and patients
  - Evidence often is complex, ambiguous or incomplete (HRT)
  - Many patients have multiple co-morbidities and medications
Making Evidence-Based Medicine Personal

- Translating population-based, aggregated, “average” results of clinical trials into something that a patient can relate to…
  - Can patients personalize average probabilities and “number needed to treat” to their situation?
  - Geisinger and Mayo approaches showing how personal choices relate to outcomes are helpful, but still focused mainly on population-based results
- A simple example: colon cancer screening
- Helping each patient track his response to treatment over time (BP, insulin requirements)

Judging Performance: Those Wicked Provider-Based Measurement Problems

- Most providers do not have sufficient volume to have stable estimates of condition-specific performance metrics for most diagnoses
- Increasing numbers of patients have complex conditions, co-morbidities, and regimens that do not conform to condition-specific guidelines and metrics
- Very little evidence supports P4P and other incentive schemes
  - Can ACOs and regional solutions address this?
The Physician-Patient Trust Problem

- Shared decision making is founded on trust
- Physicians may no longer be seen as omniscient with special “magic”
  - Patients may come armed with more information (even if not correct) than physicians thanks to the Internet
    - There is too much information for physicians to remember, though decision support tools will help
    - Being defensive and dismissive (seen as not trusting the patient) reduces trust
    - Not providing time to listen and answer questions undermines trust

The Physician-Patient Trust Problem

- Professionalism is key: guild attitudes and actions will erode patient trust
  - With so much emphasis on evidence-based care, professional member organizations are on a razor thin edge, pitting “bread and butter” against “the right thing to do”
Using Health IT to Overcome Challenge of Clinician Time

Virtual Patient Advocates
- Emulate face-to-face communication
- Develop therapeutic alliance - empathy, gaze, posture, gesture
- Teach RED
- Tailored
- Determine Competency
- Can drill down
- Print Reports
- High Risk Meds
  - Lovenox
  - Insulin

Characters: Louise (L) and Elizabeth (R)

Overall Attitudes

Relationship with Agent
1 = stranger, 4 = neutral, 7 = close friend

Trust in Agent

Mean of 38
Mean of 49
Mean of 42
Overall Attitudes

How much do you feel that Elizabeth cares about you?
1=not at all, 7=very much

How much do you feel that you and Elizabeth understand each other?

Who Would You Rather Receive Discharge Instructions From?

36% prefer agent
48% neutral
16% prefer doc or nurse

“I prefer Louise, she’s better than a doctor, she explains more, and doctors are always in a hurry.”

“It was just like a nurse, actually better, because sometimes a nurse just gives you the paper and says ‘Here you go.’ Elizabeth explains everything.”

1=definitely prefer doc, 4=neutral, 7=definitely prefer agent
Will large, interoperable clinical datasets, data mining, and decision support, plus ubiquitous cheap digital communication, permit customized shared decision making?

Can we build a new type of cathedral without losing the learning that comes from close observation of unpredictable idiosyncratic artistry?

What disruptive innovations will be next? (hand held ultrasounds, remote monitoring