Ten Tips for Incorporating Scientific Quality Improvement Into Everyday Work
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A Webber Training Teleclass

Institute for Healthcare Improvement

Ten Tips for Incorporating Scientific Quality Improvement into Everyday Work

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The Science of Improvement is *NOT*:

- Just PDSA cycles
  - A method for rapid-cycle testing on the pathway to implementation of new ideas of evidence-based practices
    - Critical for improvement, but not and end in itself
- "Breakthrough Series" Collaboratives
  - A method for shared learning among organizations to accelerate improvement
    - Works best to speed adoption of evidence-based practices, not complex, multifaceted interventions
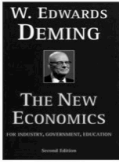

The Science of Improvement
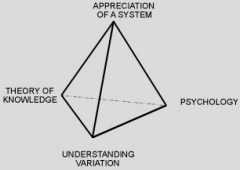
<1950s

History of Science

The Scientific Method
Epistemology

CI Lewis
Plato
Carl Popper
Foucault
Etc...

W. EDWARDS DEMING — THE NEW ECONOMICS FOR INDUSTRY, GOVERNMENT, EDUCATION, Second Edition

Deming 1900-1993

System of Profound Knowledge

APPRECIATION OF A SYSTEM

THEORY OF KNOWLEDGE — PSYCHOLOGY

UNDERSTANDING VARIATION

The Science of Improvement

Deming 1900-1993

System of Profound Knowledge

APPRECIATION OF A SYSTEM

THEORY OF KNOWLEDGE — PSYCHOLOGY

UNDERSTANDING VARIATION

THE IMPROVEMENT GUIDE
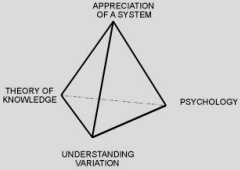
Langley et al 1997

The Model for Improvement

Terminology Chaos and Confusion

- Science of Improvement
- Implementation science
- Health care delivery science
- Health systems strengthening
- Health services research

Key Attributes of Improvement Science

- Clear, measurable aims, framework
- Clear description of the ideas (content) and how these ideas are expected to impact results
  - Conceptual or logic model, driver diagram
- Clear description of the execution strategy
  - What will be done to ensure adoption of the content
- Respect for the complexity of systems
- Learning from variation and heterogeneity
- Application of behavioral science
- Use of time-ordered data

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Rigorous (Even Publishable) QI Is Possible Almost Anywhere

SQUIRE Guidelines

http://squire-statement.org/

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Personal Experience

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If They Can Do It in Bogotá…

Reducing Post-Caesarian Infections

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Cause and Effect Diagram

Perioperative antibiotic prophylaxis | Preparation of the skin before surgery | Surgical technique

Utilization — Skin antisepsis
Agent — Antiseptic agent — Application technique — Technique
Dose — Training Skill
Timing — Hair Removal — Complications
Method Timing — Extraction of the placenta — Type of incision

Endometritis After Cesarean Section

Preexisting host factors — Vaginal exams
Underlying diseases — Nutritional status — Technique — Number
Pregnancy-related conditions — Labor
Presence — Duration
Bacterial vaginosis — Rupture of membranes — Presence — Duration
Prenatal care — Chorioamnionitis
Clinical — Subclinical

Host & Antenatal Factors | Peripartum events

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

Elective & Emergency | Elective Only

Odds Ratio

Any serious infection | Endometritis | Wound infection | Endometritis | Wound infection

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Enkin M, et al. Prophylactic antibiotics in association with cesarean section. In: Chalmers, Enkin, Keirse eds. Effective care in pregnancy and childbirth.

Priority Matrix

Factor	Importance	Within the capacity of hospital personnel to improve	Timeframe for improvement
Antibiotic prophylaxis	4	4	short
Skin preparation	3	4	short
Surgical technique	4	4	medium
Antenatal factors	3	1	long
Peripartum events	4	2	medium

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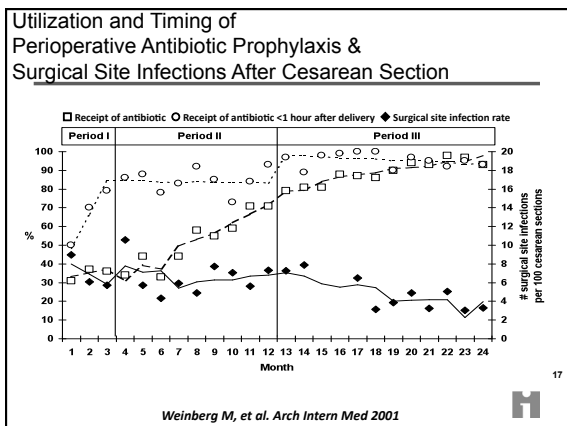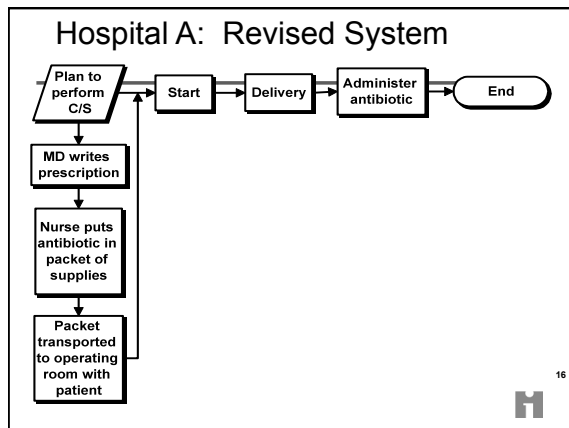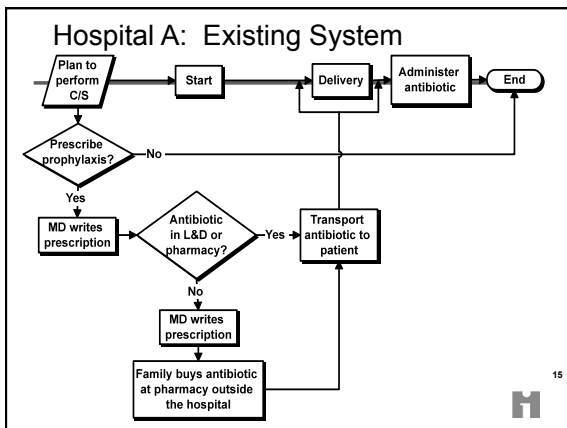**www.webbertraining.com**

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What Would You Choose to Work on First?

1. Antibiotic Prophylaxis
2. Host/Antenatal Factors
3. Peripartum Events?
4. Skin Prep
5. Surgical Technique

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Utilization and Timing of Antibiotic Prophylaxis for Cesarean Section

	% receiving prophylaxis	% receiving prophylaxis ≤1 hour after delivery
Hospital A	70%	31%
Hospital B	32%	70%

Hospital A: Existing System

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Hospital A: Revised System

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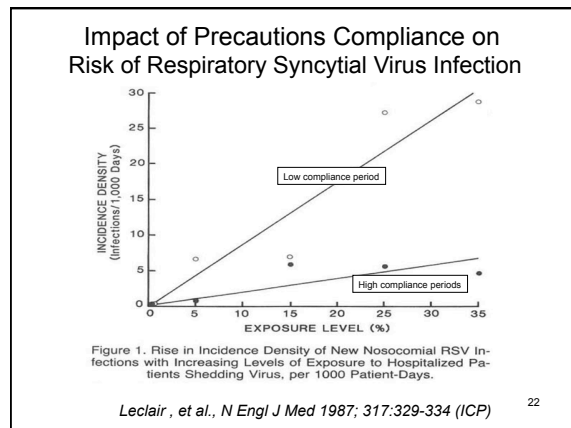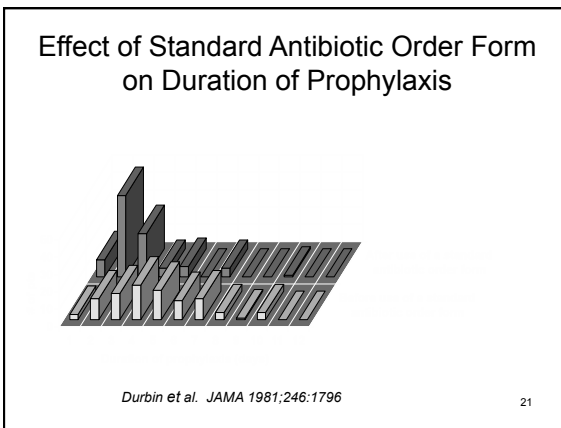

Weinberg M, et al. Arch Intern Med 2001

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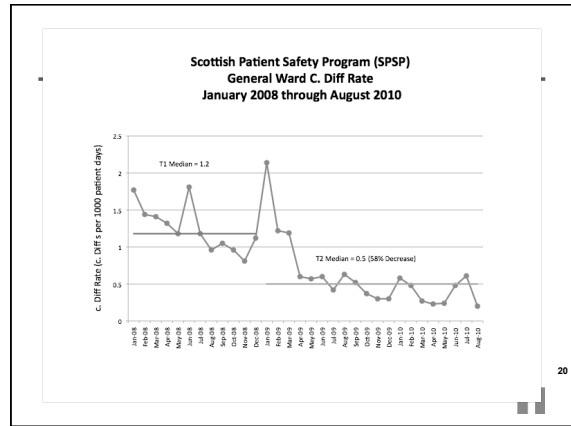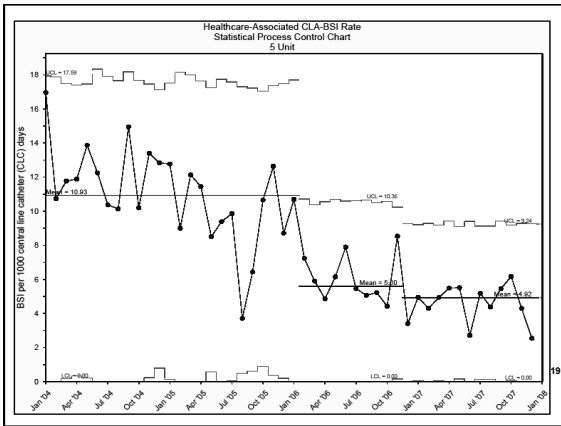Fancy statistical analysis is not necessary for most QI evaluation – as long as it the data are analyzed in a time-ordered fashion

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Effect of Standard Antibiotic Order Form on Duration of Prophylaxis

Durbin et al. JAMA 1981;246:1796

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Impact of Precautions Compliance on Risk of Respiratory Syncytial Virus Infection

Figure 1. Rise in Incidence Density of New Nosocomial RSV Infections with Increasing Levels of Exposure to Hospitalized Patients Shedding Virus, per 1000 Patient-Days.

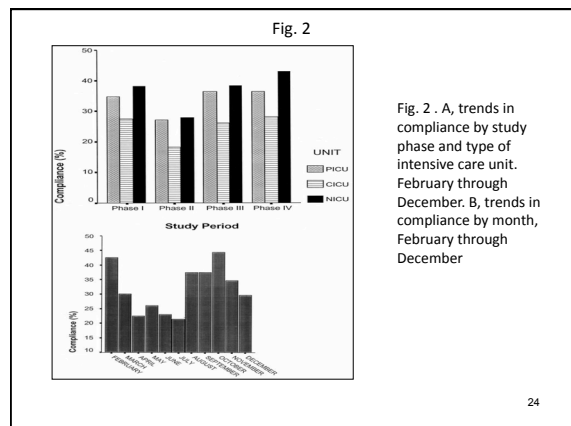*Leclair , et al., N Engl J Med 1987; 317:329-334 (ICP)*

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Interventional Study to Evaluate the Impact of an Alcohol-based Hand Gel on Hand Hygiene Compliance

- Phase I: Baseline period
- Phase II: Introduction of alcohol gel
- Phase III: Alcohol rub + QI
- Phase IV: Maintenance

Harbarth S, et al.; Pediatr Infect Dis J 2002;21:489-495

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Fig. 2

Fig. 2 . A, trends in compliance by study phase and type of intensive care unit. February through December. B, trends in compliance by month, February through December

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Effective QI?

• Satisfied with gel	45%
• Gel helped with compliance	42%
• Sticky, uncomfortable feeling	53%
• Conveniently located	57%
• Posters effective	32%
• Knew there was opinion leader	24%
• Received performance feedback	68%

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Monitoring Patient Safety

- Voluntary event reporting
- Morbidity and mortality conferences/reports
- Chart auditing
  – IHI Global Trigger Tool
- Automated data mining
  – Patient Safety Indicators (AHRQ PSIs)
  – Automated trigger tools
- Random Safety Audit

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Random Safety Audit

- Translated from industry (banking and random process audits *via* Paul Plesk)
- Real time by the front line
- Data and feedback virtually immediate
  - Reliability of key safety processes evident immediately
  - Motivating, enabling, reinforcing; builds self-efficacy and social norms (key elements of behavioral change theory)
- Combines audit and feedback with iterative PDSAs
  – Even better than "what can I try by next Tuesday"

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Random Safety Audit

- Systematically monitors a subset of error-prone points in the system that have the potential to harm patients
- Items selected randomly to be addressed either on
  – On multi-disciplinary rounds (provider input required)
  – Any time during day (provider input not needed)
- Deck can be "packed"
- 20 items developed by expert consensus for testing in NICU (21st item added later)
- 4X6 "cards" include yes/no data form; trivia question on back

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Staff Perceptions
Random Safety Audit

- 84% of staff participated in rounds on which audit performed
- 100% agreed or strongly agreed that this improved quality and safety
- 95% agreed/strongly agreed that it increased knowledge of clinical guidelines and safety goals
- 9% agree with statement "asking a safety question of rounds took up too much time"

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Ten Tips

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Tip 1

- Select projects that really will make a difference to providers and patients
  - Focus on clinically relevant projects that substantially improve those processes of care that are tightly linked to the outcomes of interest to providers and patients
  - Think of a headline the CEO or CMO would want to feature on the organization's website

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Tip 2

- Set bold, clear, measureable aims and a specific timeline for achieving them
  - Think of fundamental advances that will measurably impact care and outcomes and engage clinical staff

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Tip 3

- Assemble a multi-disciplinary team including providers, stakeholders, and methodologists, tailored to the specific aim of the project
  - Be agnostic with respect to disciplines and titles when assigning roles and rewards
  - If publication is anticipated, define roles and authorships very early on
    - Giving appropriate first authorships to non-MDs does not jeopardize publication in leading journals

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Tip 4

- Be creative in recruiting experts
  - Behavioral scientists, sociologists, economists, epidemiologists, statisticians, qualitative researchers, and other experts often are looking for opportunities to partner with clinical researchers, especially if there is a prospect of co-authorship

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Tip 5

- Adopt the most rigorous study design possible without disrupting routine work unduly
  - Incorporate data collection into usual activities of professional staff (eg: infection control, clinical pharmacists)

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Tip 6

- Do everything possible not to sacrifice data quality and completeness
  - Develop simple data collection tools that also simplify and increase reliability of daily work
  - Checklists and standardized order sets are especially useful

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Tip 7

- Take advantage of emerging certification requirements for clinical staff and make improvement academically viable
  - MOC requirements can be satisfied by improvement activities (eg: Vermont Oxford's NICQ collaborative)
  - Morph "good citizen" work, such as CPG development and evaluation, into publications and other CV-worthy work products

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Tip 8

- Do not assume that substantial external grant funding is required to perform credible quality improvement work
  - Leverage institutional resources
  - Encourage development of institutional small grant awards for quality improvement
  - Consider support from payers, industry, and professional societies
  - Look for "free" hands, such as graduate students

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Tip 9

- Pay careful attention to the ethics of quality improvement work, but try to craft projects that are unlikely to require formal IRB approval
  - Remember
    - Poorly designed projects are unlikely to yield useful knowledge and arguably are not ethical
    - Patients have a right to expect that unexpected consequences will be considered and monitored

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Tip 10

- Anticipate publication
  - Apply the SQUIRE guidelines
  - Right a "dummy" abstract and construct "dummy" tables and figures
  - Be clear about authorships
  - Make the most of "negative" studies

Davidoff et al., Qual Saf Health Care 2008;17 (Suppl 1):13-19

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Coming Soon

06 November *(FREE - WHO Teleclass - Europe)*
ANTIMICROBIAL RESISTANCE ISSUES WORLDWIDE AND THE WHO APPROACH TO COMBAT IT
Dr. Carmen Lucia Pessoa da Silva, World Health Organisation, Geneva

07 November **OCCUPATIONAL INFECTION CONTROL IN CORRECTIONAL SETTINGS**
Robert Marton, Miami-Dade County, Florida

14 November **DENTAL UNIT WATER CONTAMINATION - HEALTH RISKS AND METHODS OF CONTROL**
Prof. Raghu Puttaiah, Managed Care Concepts, L.L.C.

04 December *(FREE - WHO Teleclass - Europe)*
CONTROL OF MULTI-DRUG RESISTANT ORGANISMS IN THE NURSING HOME SETTING
Prof. Andreas Voss, Nijmegen University, Netherlands

www.webbertraining.com/schedulep1.php

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