Conducting an Evidence-Based Project

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Objectives: Participants in today's sessions will learn:

1. What does "evidence-based" mean, anyway -- as compared to other types of clinical information?
2. How to read an article and quickly understand its findings, limitations, biases, and application
3. The "hierarchy" of study design, and what design types are best suited for different types of clinical questions
4. A process for making recommendations from the literature
5. A proven model for applying evidence to practice: the Model for Improvement
6. Key points in measuring for improvement

1. What Does "Evidence-Based" Mean, Anyway? Scholarly Definitions of Evidence-Based Practice

Evidence based practice is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. Evidence based practice means integrating individual clinical expertise with the best available external clinical evidence from **systematic** research. *Sackett DL, BMJ 1996*

Evidence-based practice is the enhancement of a clinician's traditional skills in diagnosis, treatment, prevention, and related areas through the **systematic** framing of relevant and answerable questions and the use of mathematical estimates of probability and risk. *Greenhalgh T, BMJ 2001*

1. What Does "Evidence-Based" Mean, Anyway? Practical Definition of Evidence-Based Practice

- Decisions based on evidence of effectiveness and benefit:
  - > When there is evidence of benefit, do it.
  - > When there is evidence of no benefit or harm, don't do it.
  - > When there is insufficient evidence to determine if there is benefit, be conservative.

Eddy DM, JAMA 1990

- Evidence of effectiveness comes from an explicit, **systematic** review of the literature

1. What Does "Evidence-Based" Mean, Anyway? Unfortunately Common Alternatives to EBP

Basis for Clinical Decisions		Marker
Evidence based practice	→	Randomized controlled trial
Eminence based practice	→	Radiance of white hair
Vehemence based practice	→	Level of stridency
Eloquence based practice	→	Smoothness of tongue
Providence based practice	→	Degree of religious fervor
Diffidence based practice	→	Level of gloom
Nervousness based practice	→	Litigation phobia level
Confidence based practice	→	Bravado

Isaacs D, BMJ 1999

1. What “Evidence-Based” Does NOT Mean

“The three studies I found through Google all confirmed . . .”

“My [attending]
[nurse manager]
[textbook]
[medical director]
[clinical practice committee] . . .”

“Last month, JAMA and BMJ both had articles that said . . .”

2. How to Read a Paper: Three Levels of Reading

1. **Browsing** – looking for things on topics of interest to us
2. **Reading for information** – looking for answers to specific questions
3. **Reading for research** – seeking a comprehensive view in a defined area

- You will waste time and miss valuable sources if you simply search at random when attempting to read for information or research
- Solutions:
  1. start with a known source of evidence-based or systematic information, or
  2. ask a medical librarian to conduct a Medline search for you

2. How to Read a Paper:
Three Preliminary Questions to Get Your Bearings

1. Why was the study done and what hypotheses were the authors testing?
2. What type of study was done?
3. Was this design appropriate to the broad field of research addressed?

Patients' Bath Basins as Potential Sources of Infection: A Multicenter Sampling Study

By Debra Johnson, RN, BSN, OCN, CIC, Lauri Lineweaver, RN, BSN, CCRN, and Lenora M. Maze, RN, MSN, CNRN

AJCC AMERICAN JOURNAL OF CRITICAL CARE, January 2009, Volume 18, No. 1 www.ajcconline.org

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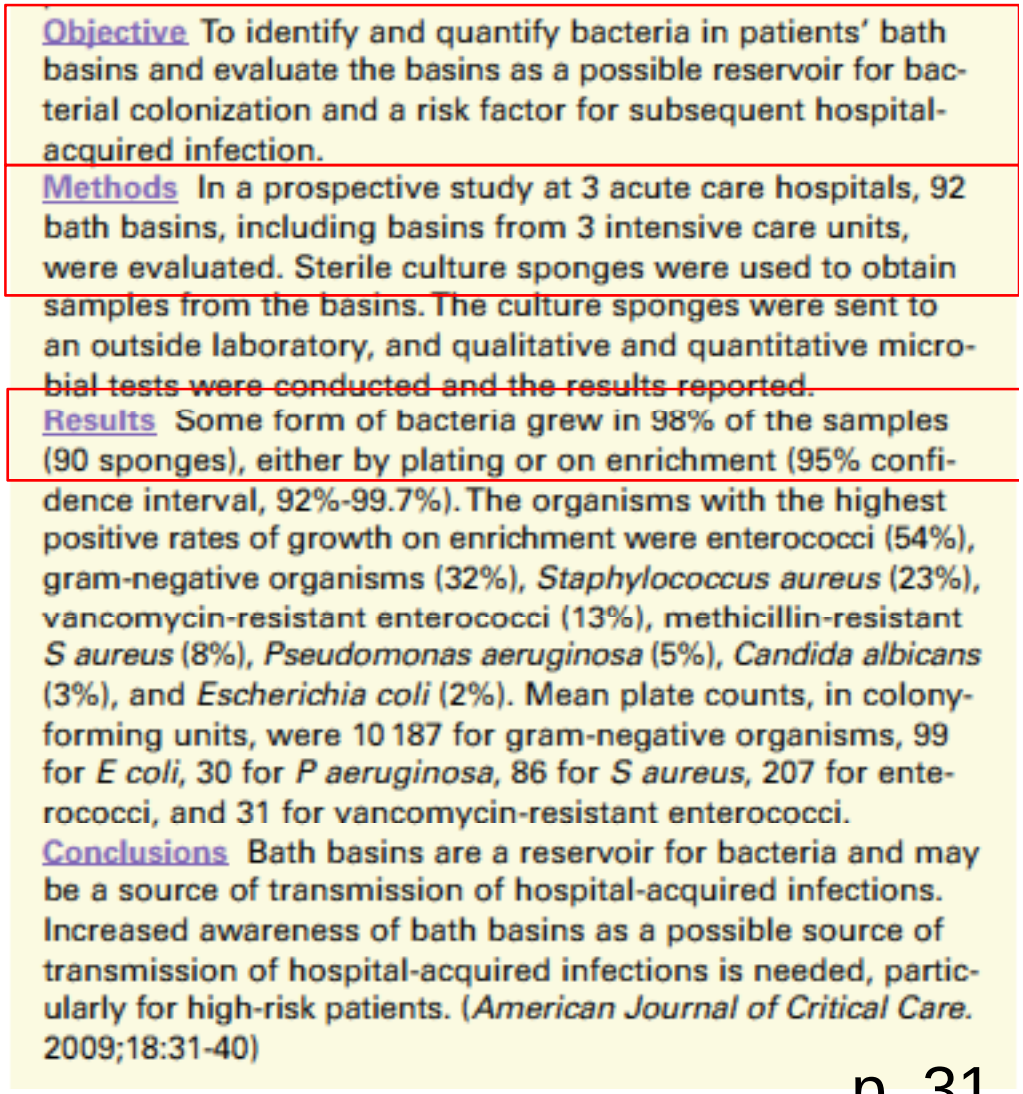

Objective To identify and quantify bacteria in patients' bath basins and evaluate the basins as a possible reservoir for bacterial colonization and a risk factor for subsequent hospital-acquired infection.

Methods In a prospective study at 3 acute care hospitals, 92 bath basins, including basins from 3 intensive care units, were evaluated. Sterile culture sponges were used to obtain samples from the basins. The culture sponges were sent to an outside laboratory, and qualitative and quantitative microbial tests were conducted and the results reported.

Results Some form of bacteria grew in 98% of the samples (90 sponges), either by plating or on enrichment (95% confidence interval, 92%-99.7%). The organisms with the highest positive rates of growth on enrichment were enterococci (54%), gram-negative organisms (32%), *Staphylococcus aureus* (23%), vancomycin-resistant enterococci (13%), methicillin-resistant *S aureus* (8%), *Pseudomonas aeruginosa* (5%), *Candida albicans* (3%), and *Escherichia coli* (2%). Mean plate counts, in colony-forming units, were 10 187 for gram-negative organisms, 99 for *E coli*, 30 for *P aeruginosa*, 86 for *S aureus*, 207 for enterococci, and 31 for vancomycin-resistant enterococci.

Conclusions Bath basins are a reservoir for bacteria and may be a source of transmission of hospital-acquired infections. Increased awareness of bath basins as a possible source of transmission of hospital-acquired infections is needed, particularly for high-risk patients. (*American Journal of Critical Care.* 2009;18:31-40)

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2. How to Read a Paper: Types of Studies

1. Primary Research
   - **Experiments** – interventions performed in a controlled and artificial setting
   - **Clinical Trials** – interventions are offered to a group of patients who are then followed up to evaluate the impact
   - **Surveys** – collect and quantify information from a group of patients, clinicians, etc.
2. Secondary Research
   - **Overviews**
     - (Non-systematic) Reviews of primary studies
     - Systematic reviews, which use a rigorous and predefined methodology
     - Meta-analyses, which integrate numeric data from more than one study
   - **Guidelines** – draw conclusions from primary studies
   - **Decision Analyses** – use results of primary studies to generate probabilities
   - **Economic Analyses** – calculate value of results from primary studies

2. How to Read a Paper
Assessing the Study's Methodological Quality

- Was the study original?
- Who is the study about?
- Was the design of the study sensible?
  - > What specific intervention was being considered, and what was it being compared with?
  - > What outcome was measured, and how?
- Was systematic bias avoided or minimized (e.g. was the study adequately "controlled")?
- Was assessment "blind"?
- Was the study large enough, and continued for long enough, to make the results credible?

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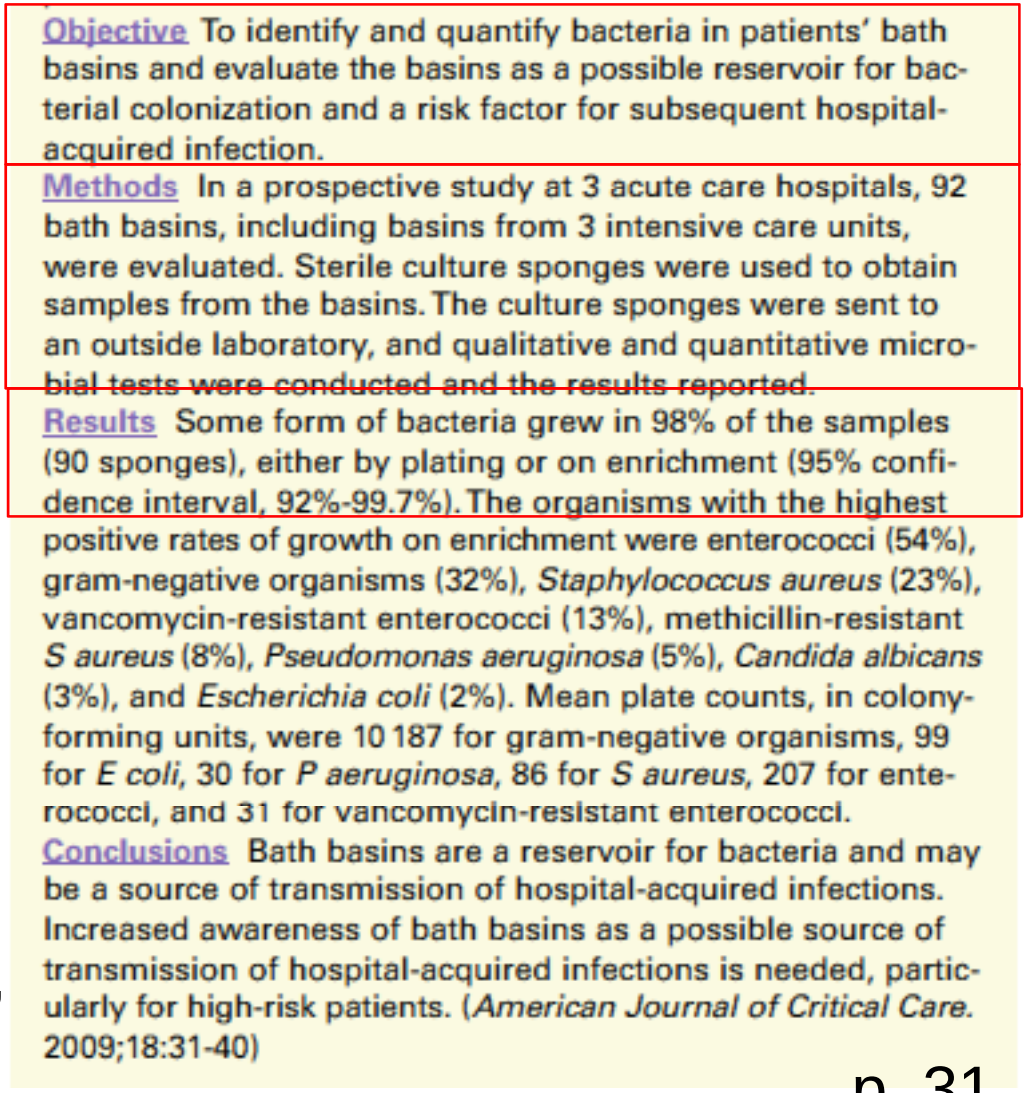

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care community hospital (125 licensed beds). Sampling was limited to basins used at least twice for whole-body bathing of patients hospitalized for 48 hours or longer. Bath basins were not cleaned with any substance after patients were bathed. The study had no inclusion or exclusion criteria for patients because the focus of the research was the bath basin. One registered nurse from each hospital was

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Sampling Procedures

The designated nurse from each hospital sampled the bath basins during the course of a single day. For each basin sampled, 1 culture sponge, which was prewetted with 10 mL of neutralizer, was used to swab the entire interior of the basin, including the walls and base. The neutralizer provided the moisture necessary to remove potential organisms from the basin surface; the neutralizer is not a nutrient and should not encourage growth of organisms. Culturing of the samples included an enrichment step to increase the numbers of organisms to allow qualitative detection of bacterial growth. Testing was based on the qualitative, rather than quantitative, presence of bacteria, and so the results would not be affected if any growth occurred during transport.

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Results

Results Compiled From All Centers

A total of 92 basins were sampled. Samples were collected from basins of 49 men and 43 women 19 to 101 years old (mean, 64). Mean length of stay was 8.1 days; however, 1 outlier (a patient who stayed 122 days) skewed this mean. When data on the outlier was removed, the mean length of stay was 6.9 days. Some form of bacteria grew in 98% of the samples (90 sponges), either by plating or on enrichment (95% confidence interval, 92%-99.7%). Median plate counts were 30 for all but the aerobic plate counts, which had a median of 1150 (Table 1).

Table 1
Plate count results for 92 samples

Plate count, colony-forming units	Mean	SD	Median	Maximum
Aerobic plate count	94657	357861	1150	2200000
Gram-negative organisms	10187	57600	30	500000
Escherichia coli	99	536	30	5000
Pseudomonas aeruginosa	30	0	30	30
Staphylococcus aureus	86	357	30	2700
Enterococci	207	1379	30	13000
Vancomycin-resistant enterococci	31	6	30	90

[a] The minimum count for all samples was 30.

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gated. Our findings are a call to action to health care providers to develop and implement protocols for patients' bathing that address the potential for patients' exposure to pathogens. A system that uses prepackaged bathing supplies could be a useful adjunct to such a protocol.

ACKNOWLEDGMENTS

We thank Michelle Secic, MS, for her expertise in biostatistical analysis of the results reported in this study, and Dr Rhonda Porterfield and Kersten Hammond for their expertise and assistance in the development of the manuscript.

FINANCIAL DISCLOSURES

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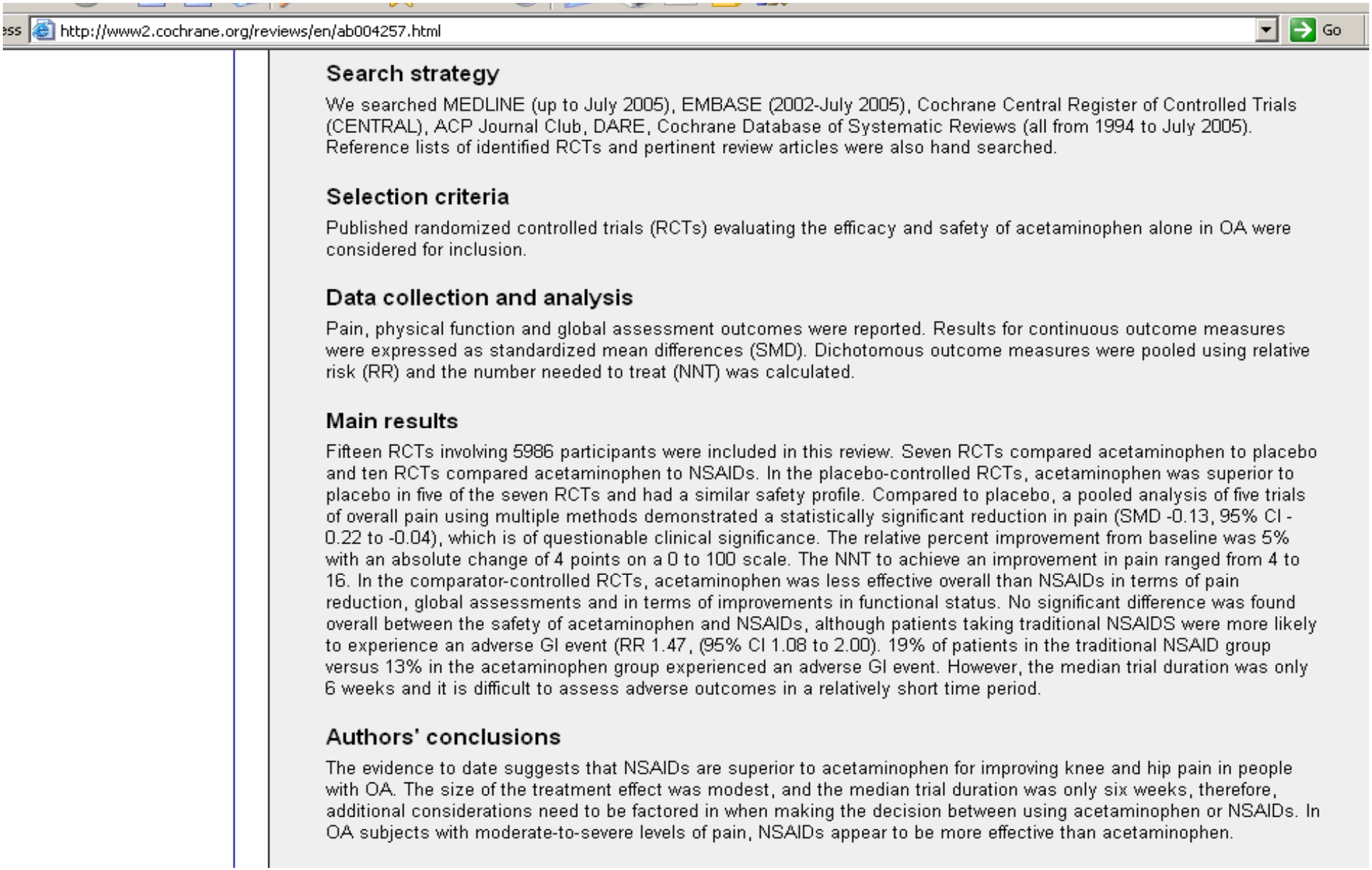
3. The Hierarchy of Study Designs

- **Systematic reviews and meta-analyses:** at the top of the pinnacle because they find and critically appraise all primary studies on a particular subject according to rigorous criteria
- **Randomized controlled trials:** participants (usually patients) are randomly assigned to one intervention or another, both groups are followed for a specified period of time for specific outcomes
- **Cohort studies:** two or more groups of people (usually "subjects") are selected on the basis of differences in history or behaviors and followed up for long periods of time
- **Case-control studies:** patients with a particular disease or condition (cases) are identified and "matched" with controls (e.g. some other disease, the general population, relatives)
- **Cross sectional surveys:** data are collected at a single point in time but may refer retrospectively to experiences in the past
- **Case reports:** describe the medical history of a single patient in the form of a story; often are run together to form a "case series"

3. The Hierarchy of Study Designs
When is a Review Systematic?

- **A systematic review** is an summary of the evidence regarding a clearly formulated question from primary studies that
  - > Uses a pre-defined protocol of systematic and explicit methods to identify, select, and appraise relevant studies, and
  - > Extracts, collates, and reports their findings
- **A meta-analysis** is a statistical technique for combining (pooling) results of numerous studies that address the same question and report on the same outcomes to produce a summary result. The aim is to derive more precise and clear information from a large data pool.

3. The Hierarchy of Study Designs: Example Systematic Review (from Cochrane)



Search strategy

We searched MEDLINE (up to July 2005), EMBASE (2002-July 2005), Cochrane Central Register of Controlled Trials (CENTRAL), ACP Journal Club, DARE, Cochrane Database of Systematic Reviews (all from 1994 to July 2005). Reference lists of identified RCTs and pertinent review articles were also hand searched.

Selection criteria

Published randomized controlled trials (RCTs) evaluating the efficacy and safety of acetaminophen alone in OA were considered for inclusion.

Data collection and analysis

Pain, physical function and global assessment outcomes were reported. Results for continuous outcome measures were expressed as standardized mean differences (SMD). Dichotomous outcome measures were pooled using relative risk (RR) and the number needed to treat (NNT) was calculated.

Main results

Fifteen RCTs involving 5986 participants were included in this review. Seven RCTs compared acetaminophen to placebo and ten RCTs compared acetaminophen to NSAIDs. In the placebo-controlled RCTs, acetaminophen was superior to placebo in five of the seven RCTs and had a similar safety profile. Compared to placebo, a pooled analysis of five trials of overall pain using multiple methods demonstrated a statistically significant reduction in pain (SMD -0.13, 95% CI -0.22 to -0.04), which is of questionable clinical significance. The relative percent improvement from baseline was 5% with an absolute change of 4 points on a 0 to 100 scale. The NNT to achieve an improvement in pain ranged from 4 to 16. In the comparator-controlled RCTs, acetaminophen was less effective overall than NSAIDs in terms of pain reduction, global assessments and in terms of improvements in functional status. No significant difference was found overall between the safety of acetaminophen and NSAIDs, although patients taking traditional NSAIDS were more likely to experience an adverse GI event (RR 1.47, (95% CI 1.08 to 2.00). 19% of patients in the traditional NSAID group versus 13% in the acetaminophen group experienced an adverse GI event. However, the median trial duration was only 6 weeks and it is difficult to assess adverse outcomes in a relatively short time period.

Authors' conclusions

The evidence to date suggests that NSAIDs are superior to acetaminophen for improving knee and hip pain in people with OA. The size of the treatment effect was modest, and the median trial duration was only six weeks, therefore, additional considerations need to be factored in when making the decision between using acetaminophen or NSAIDs. In OA subjects with moderate-to-severe levels of pain, NSAIDs appear to be more effective than acetaminophen.

3. The Hierarchy of Study Designs: Example Meta-Analysis (from NICE)

Major bleeding results

A network meta-analysis for major bleeding was conducted using studies acr fracture surgery, hip replacement surgery, knee replacement surgery, genera patients and general surgical patients.

One hundred and twenty eight (128) studies were included in the analysis of

- 10 studies were in **medical patients**[45,121,191,256,257,350,387,390,394,579],
- 48 studies were in **general surgery patients**[10,14,29,40,50,52,72,75,76,92,113,199,210,227,230,238,262,266,267,269,280,283,3 366,385,439,496,499,503,504,516,517,530,552,553,570,575,588,589,633,639,641,645,657,667,

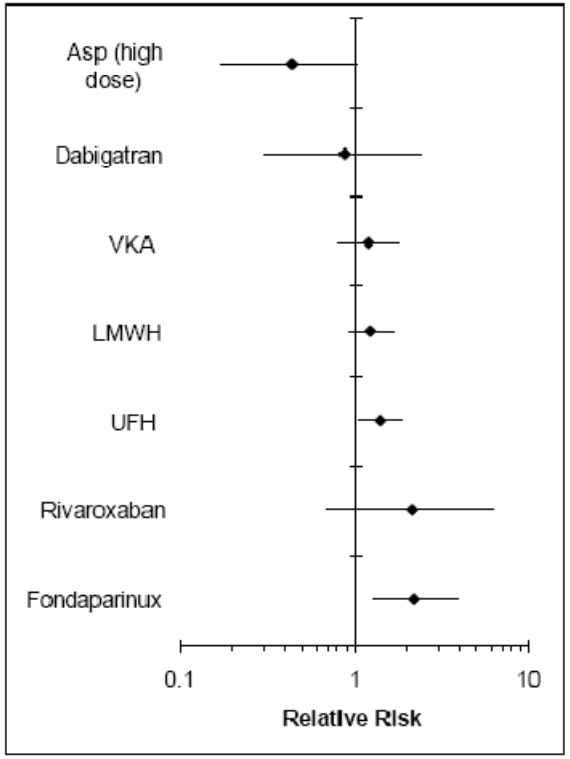


Figure 11-29: Major Bleeding – network meta-analysis results of interventions compared to no prophylaxis

Table 11-62: Major bleeding – summary of results from RCTs

Comparison	No. of studies	Interven -tion	Control	Relative risk	Absolute effect	
Proph vs no proph						
LMWH vs nil [388]	1	0/66	1/65	0.33 (0.01, 7.92)	-0.02 (-0.06, 0.03)	
High dose aspirin vs. nil [436]	1	1/21	0/12	1.77 (0.08, 40.40)	0.05 (-0.10, 0.20)	
Single proph vs single						
IPCD/FID vs LMWH [66]	1	0/63	1/67	0.35 (0.01, 8.54)	-0.01 (-0.06, 0.03l)	ET: 37 FP: 89
IPCD/FID vs High dose aspirin [436]	1	0/10	1/21	0.67 (0.03, 15.06)	-0.05 (-0.21, 0.11)	ET: 37 FP: 100
VKA vs. LMWH [186,274,389]	3	22/789	38/786	0.58 (0.34, 0.97)	-0.02 (-0.04, 0.01)	ET: 34 FP: 59

3. The Hierarchy of Study Designs: Appropriate Design for Specific Clinical Questions

Therapy:	▪ randomized controlled trial
Diagnosis:	▪ cross sectional survey
Screening:	▪ cross sectional survey
Prognosis:	▪ longitudinal cohort study
Causation:	▪ cohort or case-control study, possibly case reports

4. Making Recommendations from the Literature: Asking Answerable Clinical Questions

- First, define precisely ***what and whom*** the question is about (e.g. elective general surgical patients with diagnosis of diabetes)
- Next, define ***what intervention*** you are considering for this patient or population (e.g. a drug treatment) and, if necessary, comparison or alternative interventions (e.g. placebo or standard treatment)
- Finally, define the ***desired (or undesired) outcome(s)*** (for example, reduced mortality, better quality of life, reduction in charges)

4. Asking Answerable Clinical Questions: What is the Situation?

- Patient Population(s)
  >
  >
- Health Problem(s)
  >
  >
- Clinician(s)
  >
  >
- Setting(s)
  >
  >

4. Asking Answerable Clinical Questions: What Interventions are You Considering?

- Intervention
  - >
  - >
- Alternatives
  - >
  - >

4. Asking Answerable Clinical Questions: What are the Desired Outcomes?

- Health Outcomes
  - >
  - >
  - >
- Intermediate Outcomes
  - >
  - >
  - >

Example Problem Formulation

Clinical Question	What is the appropriate standard approach for bathing intensive care unit patients to avoid transmission of hospital-acquired infections?
Intended Use of the Guideline	To assist nursing staff and other clinicians in caring for patients who are at risk of hospital-acquired infections
Population	Cardiac care, surgical intensive care, and medical intensive care patients
Health Problem	Risk of hospital-acquired infections
Health Intervention	Bathing using reusable bath basins
Alternative Interventions	Bathing using one-time-use products, e.g. -"Bath in a bag" -Disposable bath basins
Practitioners	Licensed and nonlicensed staff involved in bathing patients
Setting	Cardiac care, surgical intensive care, and medical intensive care units
Health Outcomes	-Hospital-acquired infections -Mortality
Intermediate Outcomes	-Skin breakdown (e.g. rash) -Hospital length of stay -Bathing product cost per patient day

Example Problem Formulation

Clinical Question	Does routine peri-care with chlorhexidine wipes for patients with indwelling urinary catheters reduce the incidence of CA-UTIs?
Intended Use of the Guideline	To assist nursing staff and other clinicians in caring for patients who are at risk of CA-UTIs
Population	Adult inpatients with indwelling urinary catheters
Health Problem	Catheter-associated urinary tract infections
Health Intervention	Routine (e.g. daily) peri-care with chlorhexidine wipes
Alternative Interventions	-Routine peri-care using soap and water -Routine peri-care using non-chlorhexidine peri-care wipes
Practitioners	Licensed and nonlicensed staff who provide peri-care to patients
Setting	All inpatient care areas
Health Outcomes	-CA-UTIs -Allergic reactions (including anaphylactic shock)
Intermediate Outcomes	-Skin breakdown (e.g. rash) -Hospital length of stay -Peri-care product cost per patient day

4. Asking Answerable Questions:
Most Challenging Aspects of Problem Formulations

- Questions that are answerable, but don't direct decisions
- Questions that are unstructured and don't facilitate the use of the healthcare literature
- Use of intermediate outcomes

4. Making Recommendations from the Literature: Summarizing the Evidence in Evidence Tables

- Study Design
- Patient Population
- Sample Size
- Intervention
- Treatment Period (or follow up)
- Outcomes (including adverse events)
- Statistics (RR, OR, NNT, AR, RR or p-value)
- Bias
- YOUR conclusion based on the evidence

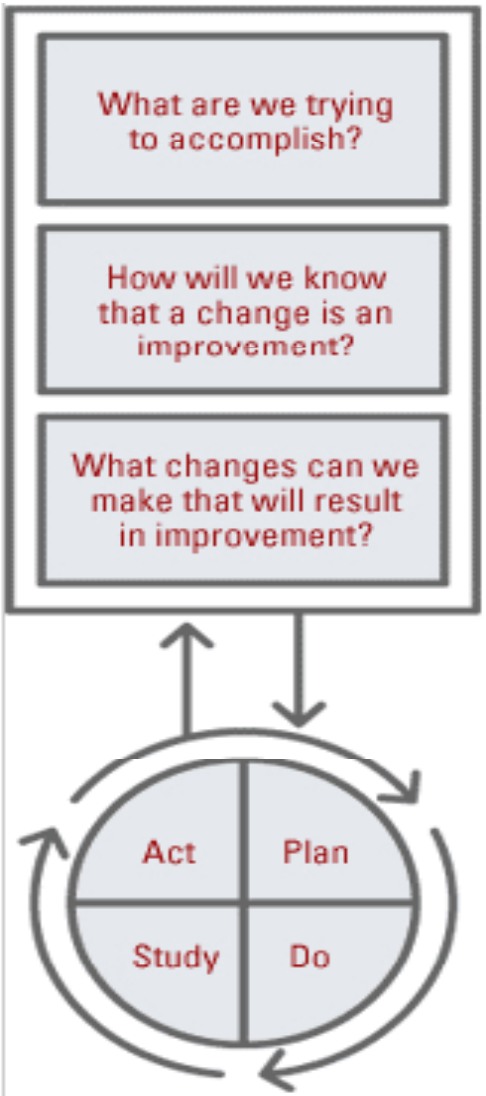
4. Making Recommendations from the Literature Based on Evidence

- Evidence-Based Recommendation
  - > Multiple high quality studies in favor of the intervention? "Recommend"
  - > Conflicting evidence? "Option"
  - > No good/unclear evidence? "Option"
  - > Multiple high quality studies not in favor of the intervention? "Do not recommend"
- Expert Opinion
  - > No good evidence, but a recommendation needs to be made
  - > Evidence is available, but a recommendation is made that differs from the preponderance of the evidence

Concluding Remarks About Evidence-Gathering and Review

- Leverage other resources before starting the process from scratch
- Be specific when asking clinical questions
- Ensure your review of the literature is sufficiently systematic
- Utilize the appropriate studies to develop your recommendations
- This is a learning process; feel free to ask for a second opinion if you're not sure of your questions or your answers!

5. A Proven Model for Applying Evidence to Practice: The Model for Improvement's 3 Questions



1. Set Aims

2. Establish Measures

Outcome measures
Process measures
"Balancing" measures

3. Select Changes

4. Test Changes

5. *Question 1. What Are We Trying to Accomplish? – Setting Aims*

- **Your aim should be time-specific and measurable**
  - > *How good?*
  - > *By when?*
- **When possible, your aim should be informed by the available evidence**
- **Make sure the aim/problem is manageable in size/scope and that you can do something about it**
  - > *Determine the project scope (e.g. the patient population or operational units it addresses)*
  - > *Be aware of "scope creep" and "aim drift"*
  - > *Stay focused*

Example Aim Statements

- **Improve medication reconciliation at transition points by 75% within one year**
- **Reduce the average length of stay for medical ICU patients by 50% within 9 months**
- **Within 6 months, ensure every patient from the ED is transferred to an inpatient bed within 1 hour of the decision to admit**

5. *Question 2. How Will We Know That a Change is an Improvement? – Establishing Measures*

Three Types of Measures in Improvement Efforts

- Outcome Measures
  - How is the system performing? What is the **result**?
- Process Measures
  - Are the parts of the system performing **reliably** and **as planned**?
- Balancing Measures
  - Did the changes we made to improve one part of the system have an **unintended consequence** on another part of the system?

Example Measures:
Reducing Ventilator-Acquired Pneumonia (VAP)

- Outcome Measures
  - VAPs per 1000 ventilator days
  - VAP mortality rate
- Process Measures
  - Percent documented adherence to the VAP bundle
  - Average duration of intubation
- Balancing Measure
  - Re-intubation rate

Again, your measures should be informed, where possible, by the metrics being used in the evidence you've reviewed

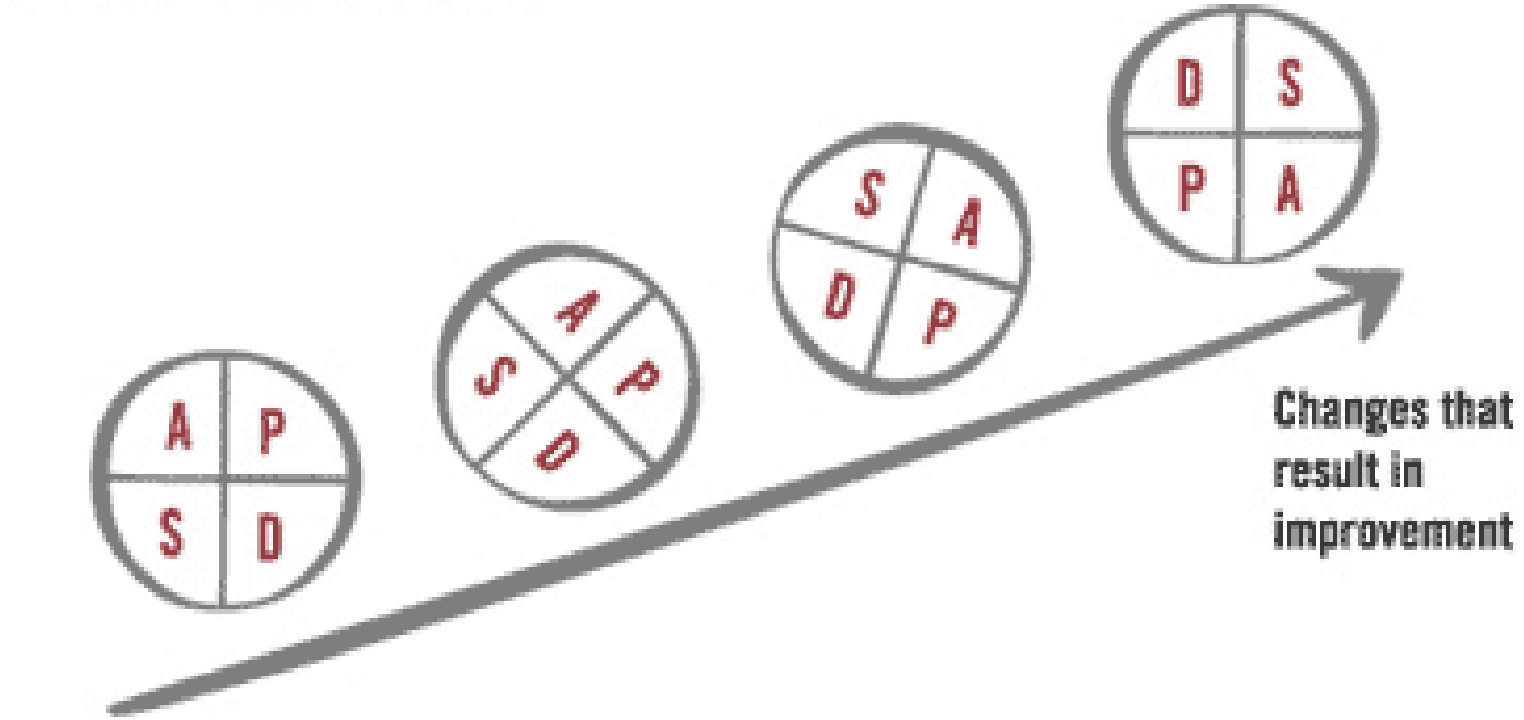
5. Question 3. What Changes Can We Make that Will Result in Improvement? -- Selecting Changes

- **Generate ideas for tests of change**
  - > Evidence/literature review
  - > Brainstorming
  - > Benchmarking
- **Ensure you actively involve staff who regularly encounter this issue or patient population**
- **Prioritize**
  - > Start with the ideas that address the most common challenges or that may have the best chance of working
  - > The team will be using the Plan-Do-Study-Act (PDSA) cycle to conduct multiple **"small"** and **"rapid"** tests of change in the "real world", so lots of ideas are needed

5. The 4th Step: Test Changes Using the PDSA Cycle

- **Testing changes is an iterative process: the completion of each cycle leads to the start of the next**
- **The goal of tests is to learn – e.g. what worked, what didn't; what should be kept, changed, or abandoned – and to use that knowledge to plan the next test**
- **People are far more willing to test a change when they know that changes can and will be modified as needed. Linking small tests of change helps overcome an organization's natural resistance to change and helps with clinician buy-in.**

Plan – Do – Study – Act (PDSA)



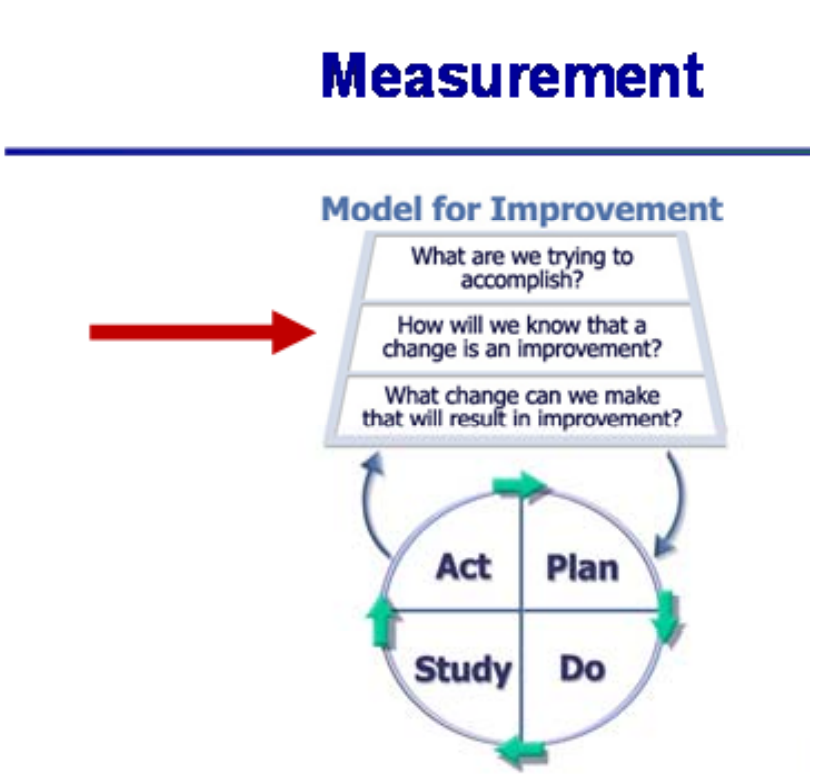
6. Measuring for Improvement is different from measurement for accountability or academic research

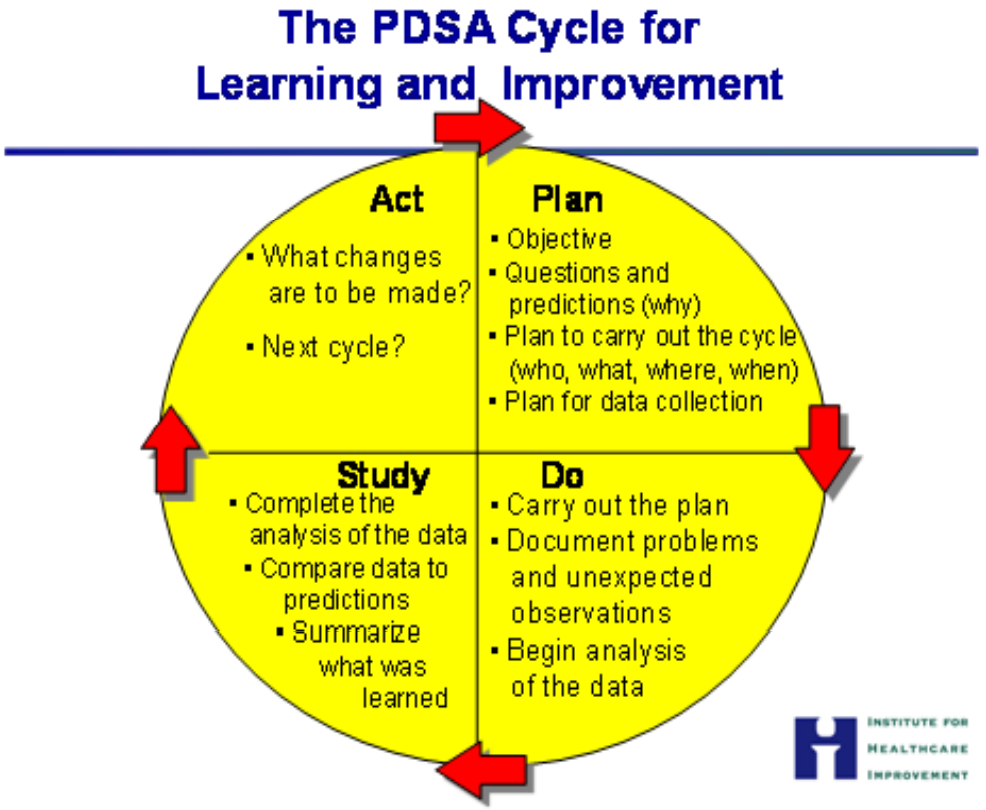
The Three Faces of Performance Measurement

Aspect	Improvement	Accountability	Research
Aim	Improvement of care	Comparison, choice, reassurance, spur for change	Newknowledge
Methods: • Test Observability	Test observable	No test, evaluate current performance	Test blinded or controlled
• Bias	Accept consistent bias	Measure and adjust to reduce bias	Design to eliminate bias
• Sample Size	"Just enough" data, small sequential samples	Obtain 100% of available, relevant data	"Just in case" data
• Flexibility of Hypothesis	Hypothesis flexible, changes as learning takes place	No hypothesis	Fixed hypothesis
• Testing Strategy	Sequential tests	No tests	One large test
• Determining if a change is an improvement	Run charts or Shewhart control charts	No change focus	Hypothesis, statistical tests (t-test, F-test, chi square), p-values
• Confidentiality of the data	Data used only by those involved with improvement	Data available for public consumption and review	Research subjects' identities protected

Joint Commission Journal on Quality Improvement. 1997;23(3):135-147.

6. Two Basic Levels of Measurement in Improvement Work:

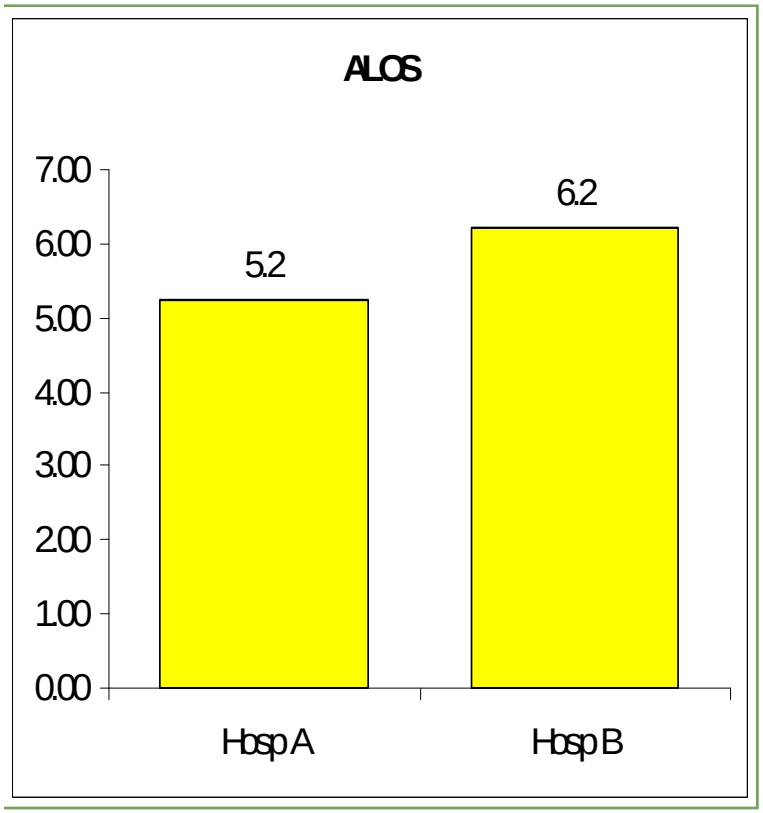


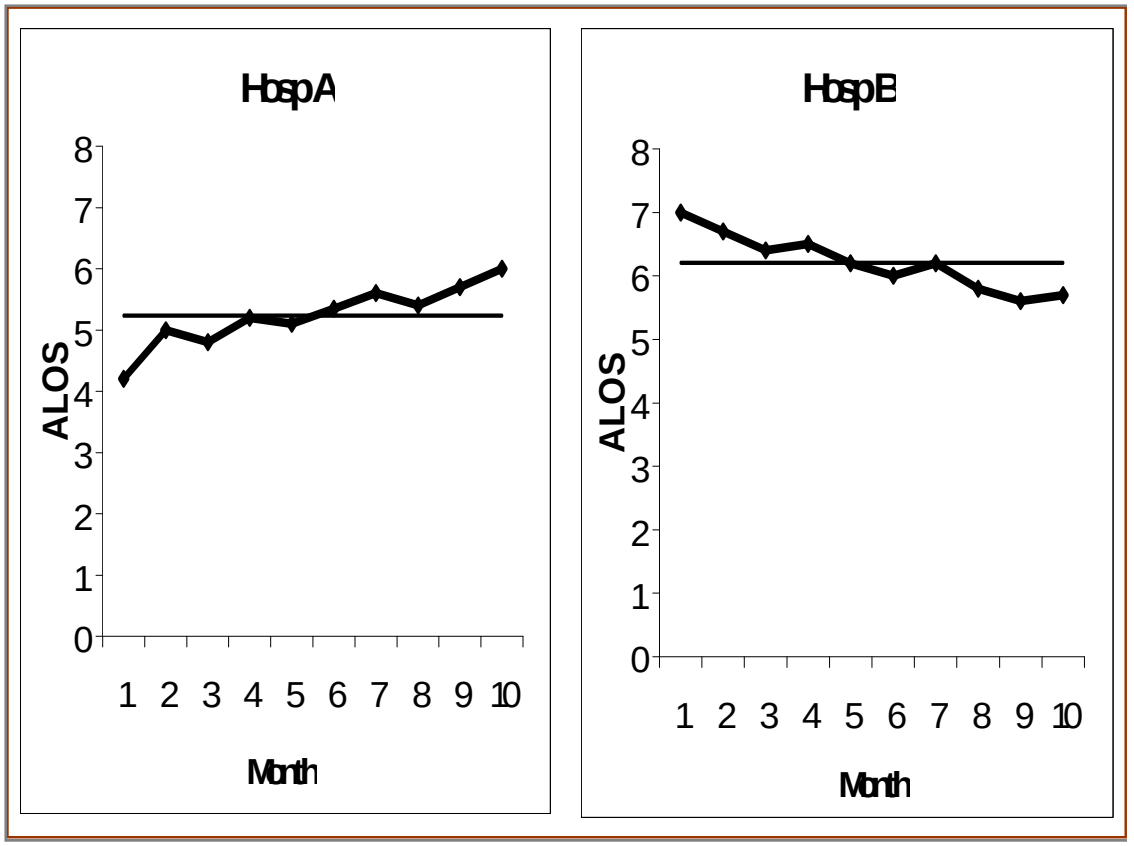


1. Project-level measures that answer the question “How will we know that a change is an improvement?”

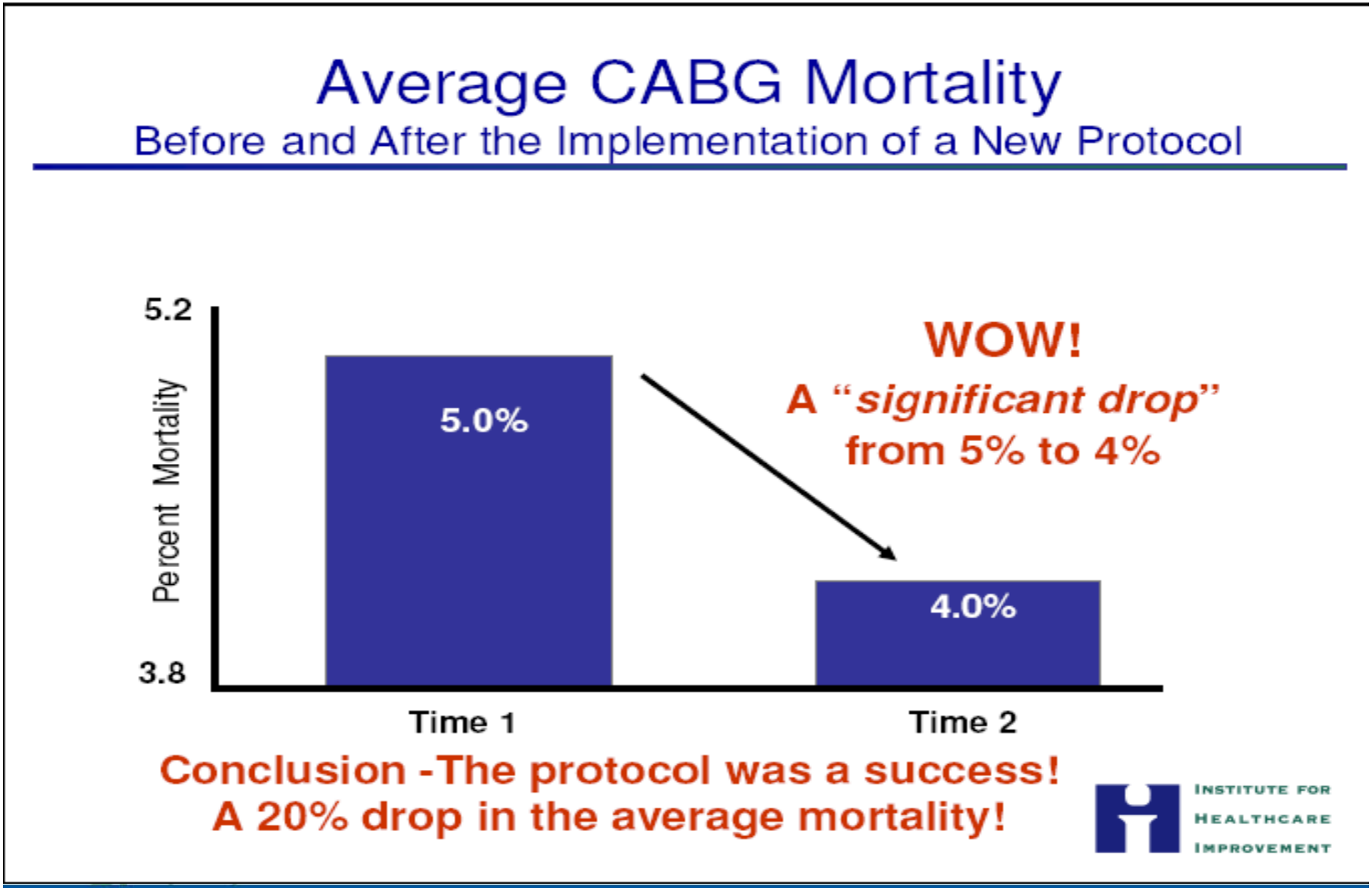
2. PDSA-level measures that help answer the questions in each PDSA cycle (in the “Do” and “Study” phases above)

6. In Improvement work, Data is for Learning - not for Judgment

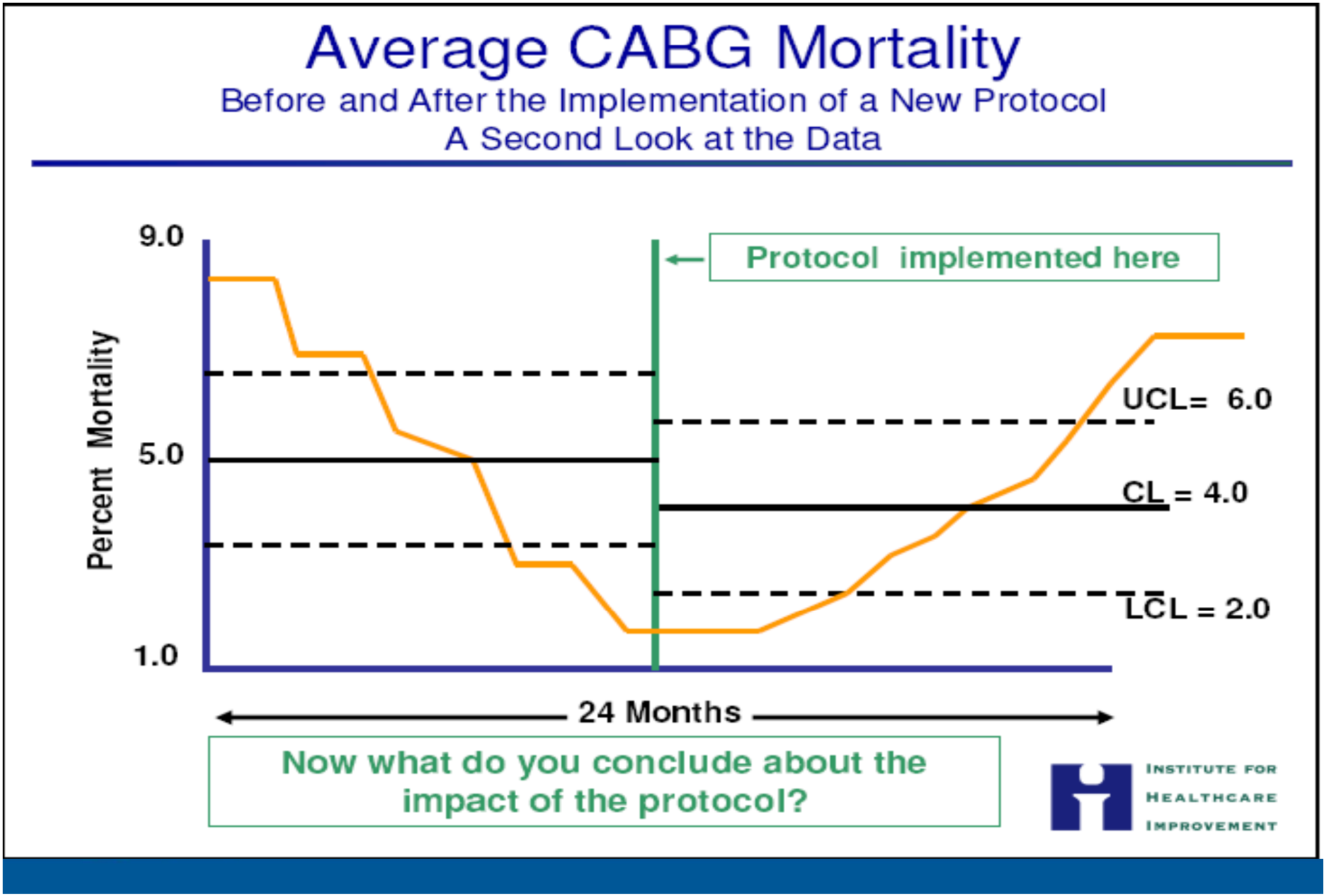




6. Another example: Data is for Learning, not Judgment



6. A Different Look at the Same Data



6. Tips to ensure Measurement is being used to speed things up, not slow things down

- Plot data over time
- Seek usefulness, not perfection
- Use sampling instead of 100 percent data capture
- Integrate measurement into the daily routine
- Use a mix of qualitative and quantitative data
- First improve your own performance, then see how you're doing relative to others

Remember, the goal is not measurement but rather improvement.
And, if you can't measure it, measure it anyway!

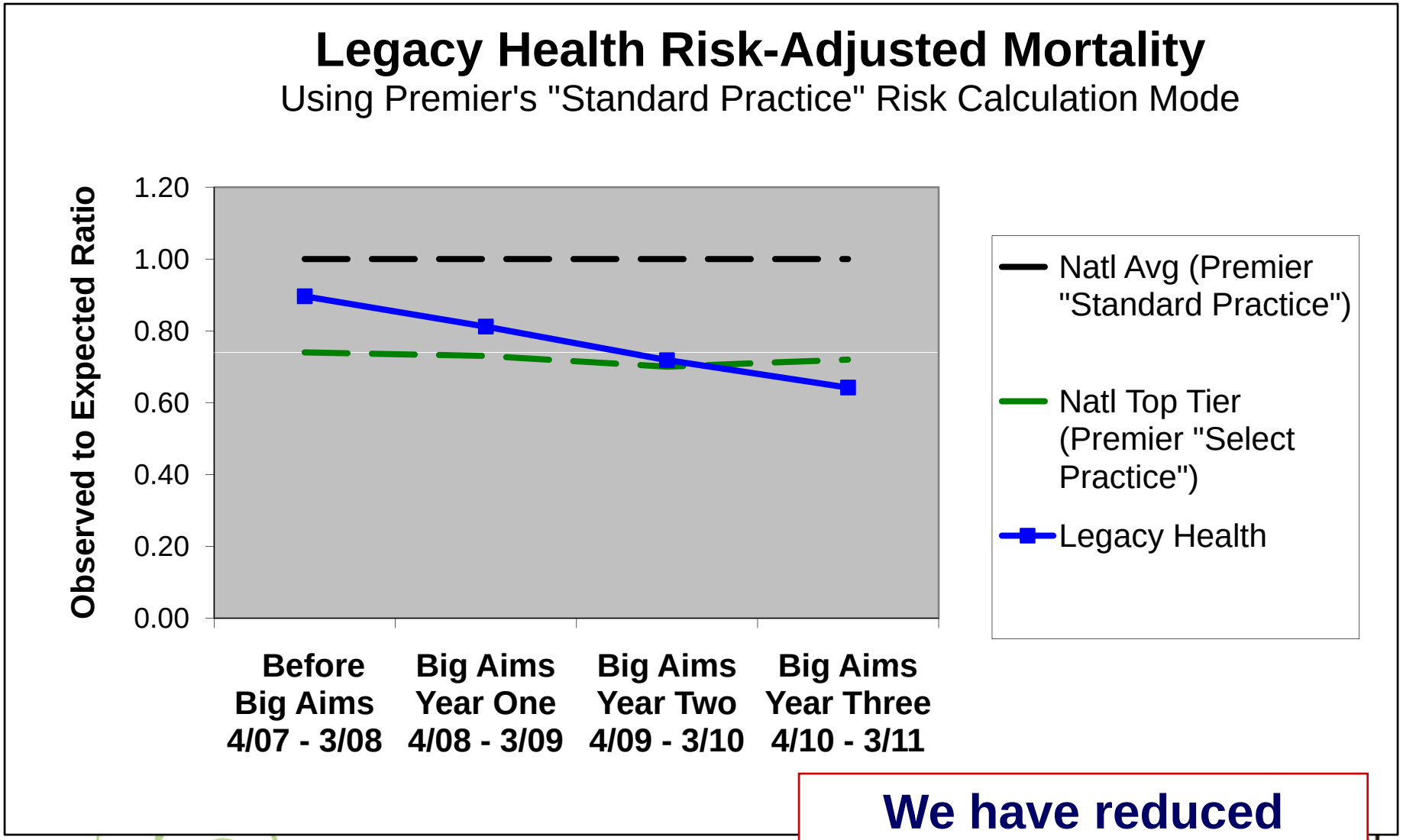
Sounds Good in Theory (maybe), but Does It Work?

Legacy Health's Two "Big Aims" – adopted in April 2008

- ***Eliminate needless death***
- ***Eliminate preventable harm***

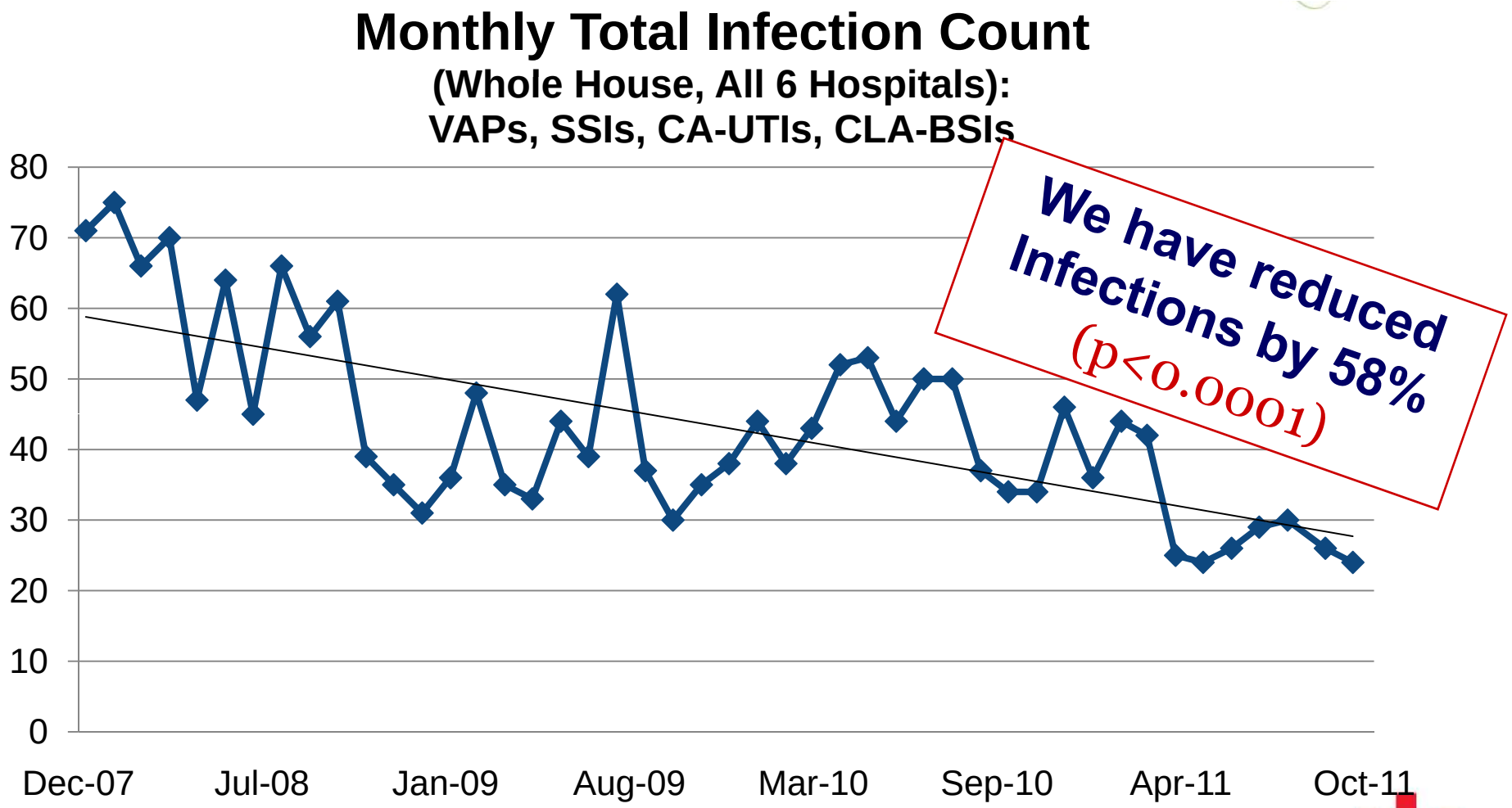
LEGACY HEALTH

Since April 2008 . . .



We have reduced Mortality by 28.4%
($p<0.001$)

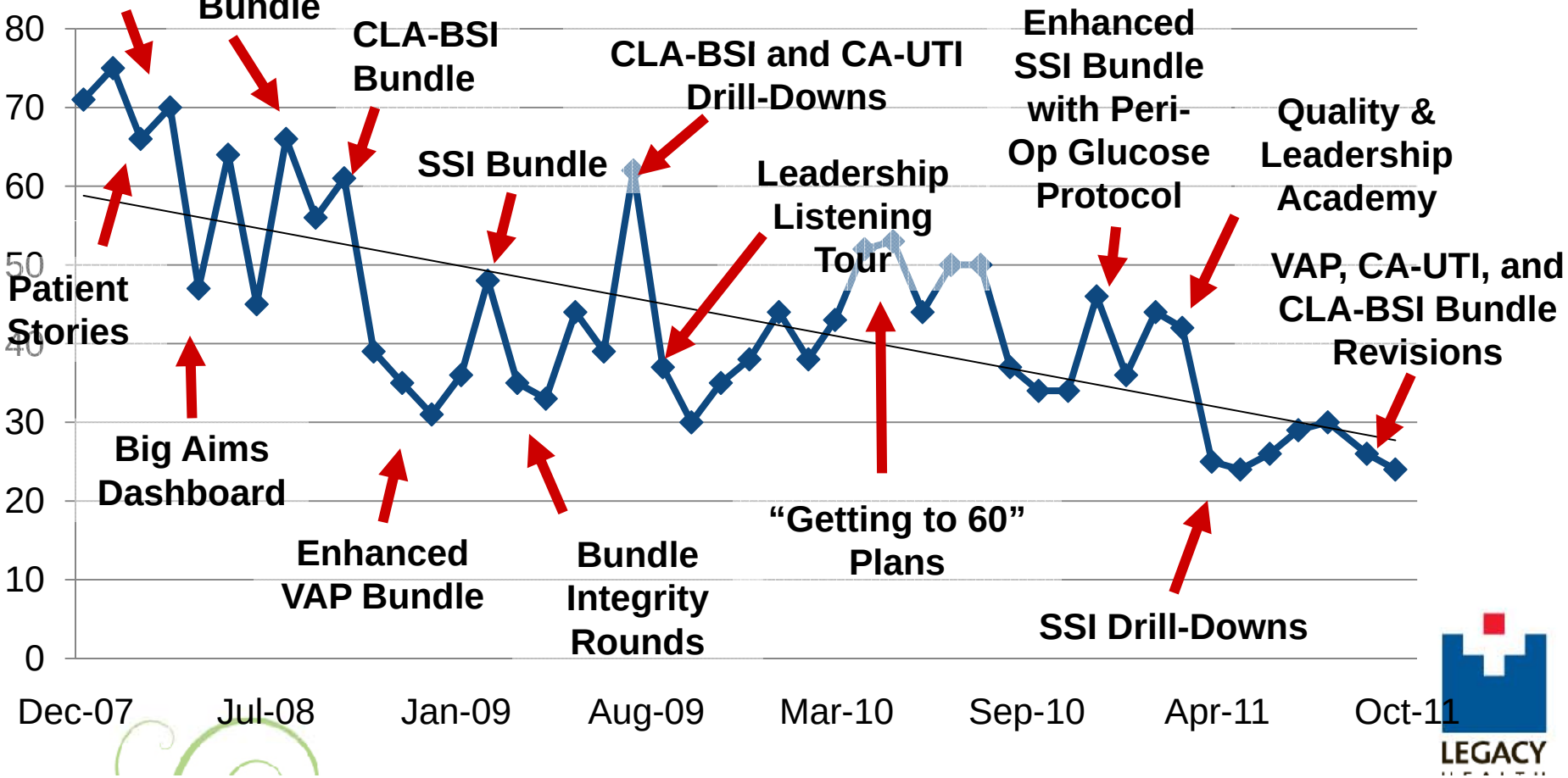
Since April 2008 . . .



Over this time period, Discharges have increased by 3.4% and Case Mix Index has increased by 13.4%

Monthly Total Infection Count

(Whole House, All 6 Hospitals): VAPs, SSIs, CA-UTIs, CLA-BSIs



Our PDSA cycles remain alive and well as our performance is continuing to achieve new levels of improvement

What's the bottom line (so far)?

- 330 prevented deaths
- 1200 prevented infections
- More than $12 million annually in avoided costs from the prevented infections

LEGACY HEALTH

Reading List: Evidence-Based Practice

- Guyatt, G. (2002). Users' Guides to the Medical Literature. Chicago, IL: AMA Press.
- Greenhalgh, T. (2001). How to Read a Paper. (2nd ed.). London: BMJ Publishing Group.
- Sackett, D. (2000). Evidence-Based Medicine: How to Practice and Teach EBM (2nd ed.). London: Churchill Livingstone.

Resources and References: Improving Practice

- *The Improvement Guide*, Langley et al, Jossey-Bass Publishers, Inc., 1996
- *The Data Guide: Learning from Data to Improve Healthcare*, L. Provost and S. Murray, Associates in Process Improvement, 2010
- *Understanding Variation: The Key to Managing Chaos*, Donald J. Wheeler, SPC Press, 2000
- Institute for Healthcare Improvement www.IHI.org (free registration)
- Associates in Process Improvement (www.apiweb.org)
- The Joint Commission (www.jointcommission.org)
- National Quality Forum (www.qualityforum.org)
- Agency for Healthcare Research and Quality (www.ahrq.gov)

Sources for Evidence-based Guidelines

- National Institute for Health and Clinical Excellence (NICE)
  http://www.nice.org.uk
- Institute for Clinical Systems Improvement (ICSI)
  http://www.icsi.org
- Zynx Health
  http://www.zynxhealth.com
- American College of Physicians (ACP)
  http://www.acponline.org
- Group Health Cooperative of Puget Sound **http://www.ghc.org**
  (enter "Group Health Clinical Guidelines" in the search box)
- Australia National Institute of Clinical Studies
  http://www.clinicalguidelines.gov.au
- New Zealand Guideline Group
  http://www.nzgg.org.nz/guidelines
- Scottish Intercollegiate Guideline Network (SIGN)
  http://www.sign.ac.uk

Sources for Evidence-based Systematic Reviews & Synopses

- Cochrane Database of Systematic Reviews
  http://www.cochrane.org/cochrane-reviews
- ACP Journal Club (formerly Best Evidence) **http://www.acpjc.org**
- Agency for Healthcare Research and Quality (AHRQ)
  http://www.ahrq.gov/clinic/epcix.htm
- Essential Evidence Plus (formerly POEMS)
  http://www.essentialevidenceplus.com
- Australia Centre for Clinical Effectiveness
  http://www.southernhealth.org.au/page/health_professionals/cce
- Bandolier **http://www.medicine.ox.ac.uk/Bandolier**
- Clinical Evidence **http://www.clinicalevidence.bmj.com (subscription required to access guidance)**
- NHS Center for Reviews and Dissemination
  http://www.york.ac.uk/inst/crd
- NHS Clinical Knowledge Summaries (formerly Prodigy)
  http://www.cks.nhs.uk (requires free registration)

Q&A

Thank you!

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