5th International Congress on Early Onset Scoliosis and Growing Spine
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Developing Evidence for EOS Treatment

Michael J. Goldberg, MD
Seattle Children's Hospital
Seattle WA, USA

Key questions:

Are we helping?

How do we know?

We are certainly making patients different. Are we making them better?

How might we figure this out?

- Construct an evidence based guideline
- Do a randomized clinical trial
- Perform comparative effectiveness research
- Just measure the outcomes.
- Establish a registry

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Clinical Practice Guidelines

- An **Evidence Based Clinical Practice Guideline** is developed from a systematic, transparent, and non-biased examination of the highest quality evidence in the peer reviewed published literature.
- Using a rigorous and standardized methodology, and weighing the quality of the evidence, a set of practice recommendations are developed, as well as their “strength”.

- Expert opinions, review articles, textbooks, animal studies, case reports, abstracts, proceedings, and retrospective case series are not included.
- Prospective randomized clinical trials are NOT required for evidence based CPGs
- The evidence bar is actually set quite low. The only requirements are:

  Prospective data collection.

  A patient relevant outcome.
- A CPG is a summation of the evidence and only the evidence speaks.
- How loudly does the EOS literature speak?

Fusionless procedures for the management of early-onset spine deformities in 2011: What do we know?

Current Concept Review J. Child Orthop (2011) 5: 159-172.

Retrospective case review..... 31

Animal studies..... 10

Case reports..... 2

Epidemiology, descriptive, classifications, natural history, assessment tools..... 19

Reviews, text book chapters..... 14

Retrospective comparison of groups..... 4

Prospective longitudinal study..... 2

5th ICEOS Meeting: Published abstracts
Journal Children's Orthopaedics (2011) 5:387-401

Retrospective case series……19

Animal studies…… 5

Case report…… 1

Epidemiology…… 1

Classification and assessment tools…… 2

Retrospective comparisons of groups… 4

Prospective, x-ray outcome…… 1

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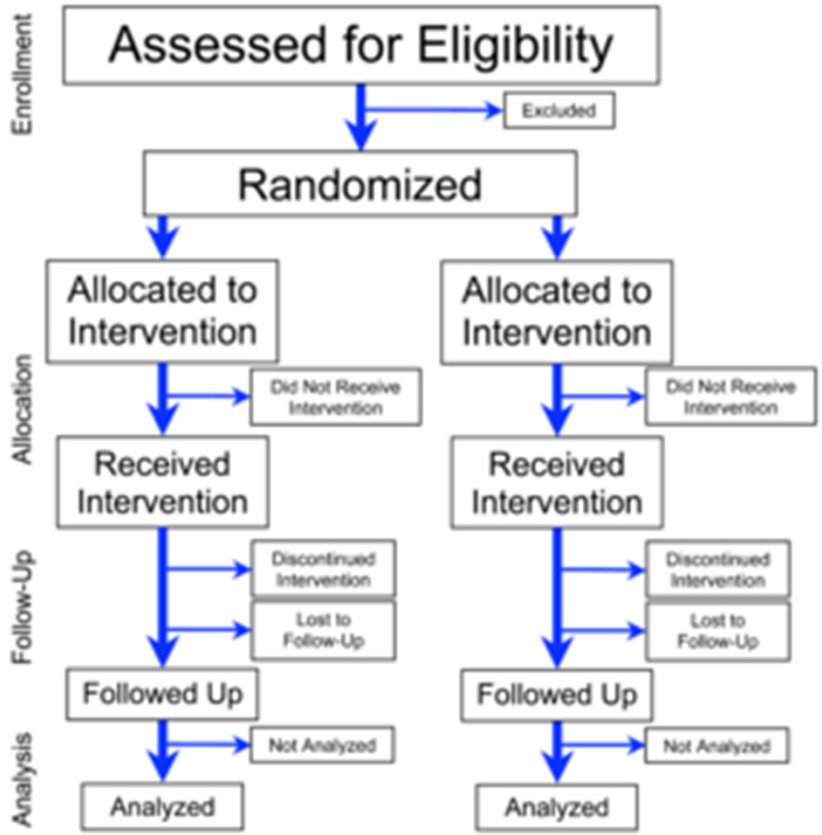
RCTs and Clinical Equipoise

- Provides the ethical basis for patients assigned to different treatment arms of a clinical trial.
- Exists when there is no consensus within the expert clinical community about the comparative merits of the alternatives to be tested.

Curiosities of Clinical Equipoise

- The permissibility to perform an RCT (the most rigorous basis for evidence) rests on expert opinion.
- Is “no consensus” among the experts a 50-50 split?
- The ethical center is the doctor–patient relationship. This ignores wider health policy interests: Regulatory agencies and payers

Is an RCT design possible for the patients with early onset scoliosis?



Eligibility: Inclusion-Exclusion Criteria

- Curved spine: Normal vertebrae and ribs, congenital vertebrae, fused spine.
- Patient diagnosis: Healthy, skeletal dysplasia, syndrome, neuromuscular disease.
- Age of curve onset: congenital, infantile, childhood
- Associated conditions: pulmonary, intra-spinal, brain, cardiac, renal
- Prior treatments: cast, brace, therapies

Heterogeneity of patients will present a major obstacle in performing a high quality Randomized Clinical Trial that is applicable to a large number of patients.

Heterogeneity of surgeons, surgical technique, timing and indications for surgery will complicate matters further.

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Comparative Effectiveness Research

- A new research methodology gaining interest but extraordinarily complex.
- Aim to improve the overall quality, effectiveness, and efficiency of health care.
- **CER has emerged because:**

  Research studies, as a rule, examine the benefit or harm of a single intervention

  Results applicable to only a small number of patients in clinical practice (even if investigating a common diagnosis)

  Treatment not compared to existing or alternatives that may be more helpful.

Comparative Effectiveness Research

- Direct, head to head comparison to determine which treatment works best, for whom, and under what circumstances.
- **Easier said than done:**

  Must use a variety of data sources

  Must review and synthesize all available research

  Must fill in gaps between existing research and actual clinical practice

  Must consider the interests of all stakeholders.

Is CER the right model for EOS?

- Maybe, but probably not at this moment.
- One has to address effectiveness before one moves to comparative effectiveness and efficiency.
- Interest in CER is for common conditions.
- Can consider applying for Patient-Centered Outcomes Research Institute (PCORI) grant, and finding out. www.pcori.org

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Measuring outcomes: Where to start?

- From whose perspective will you measure?
  - Surgeon
  - Patient
  - System
- What type of outcome will you measure?
  - Technical
  - Functional
  - Patient satisfaction
  - Resource utilization
- Can you attribute the outcome to the intervention?

It is important to distinguish between patient oriented outcomes and surrogate outcomes.

- **Patient Oriented Outcomes:**

  Measure how a patient feels, functions, or survives

  Tells clinicians directly, without the need for extrapolation, that a therapeutic procedure helps patients live longer or live better.

- **Surrogate Outcomes:**

  Laboratory measurements or physical signs that are used as substitutes for patient oriented outcomes.

Patient Oriented and Surrogate Outcomes

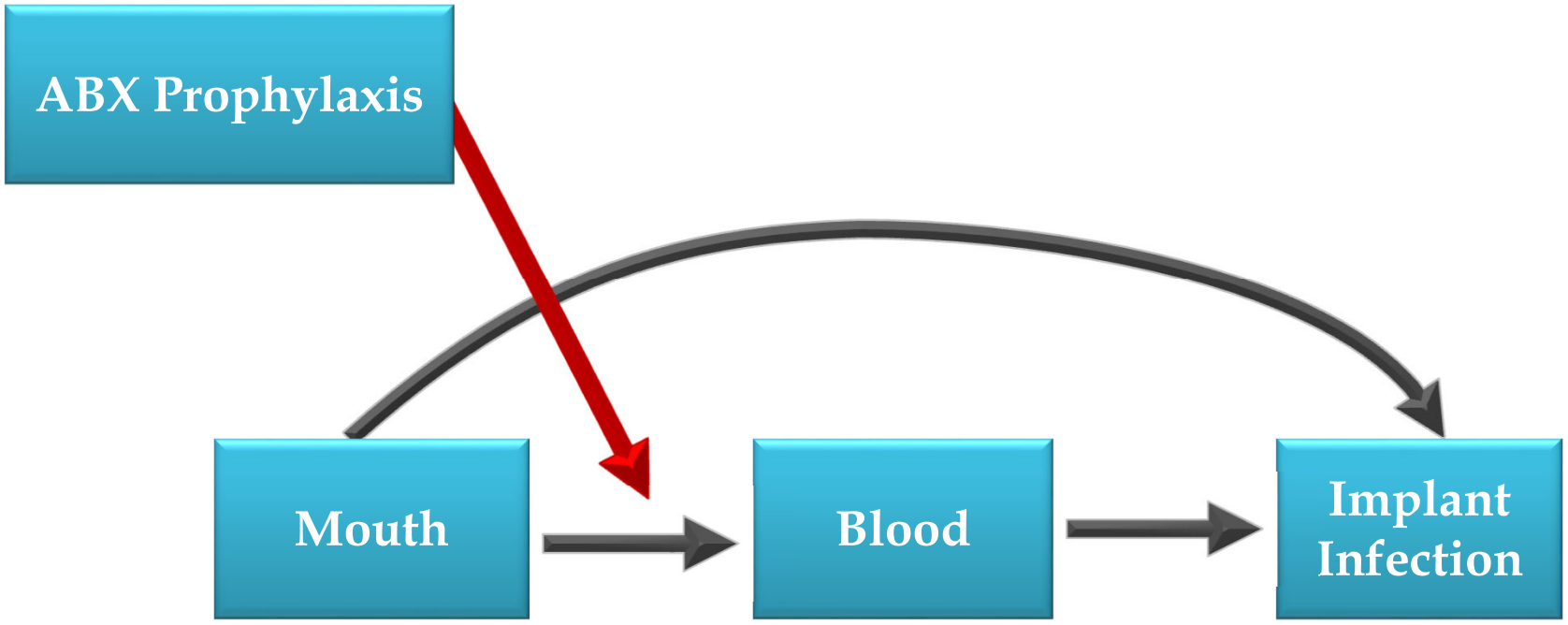
Patient Oriented Outcomes

- Pain relief
- Physical or mental function
- Fractures
- Death

Surrogate Outcomes

- Imaging results
- Laboratory results
- Blood cholesterol
- Bone mineral density

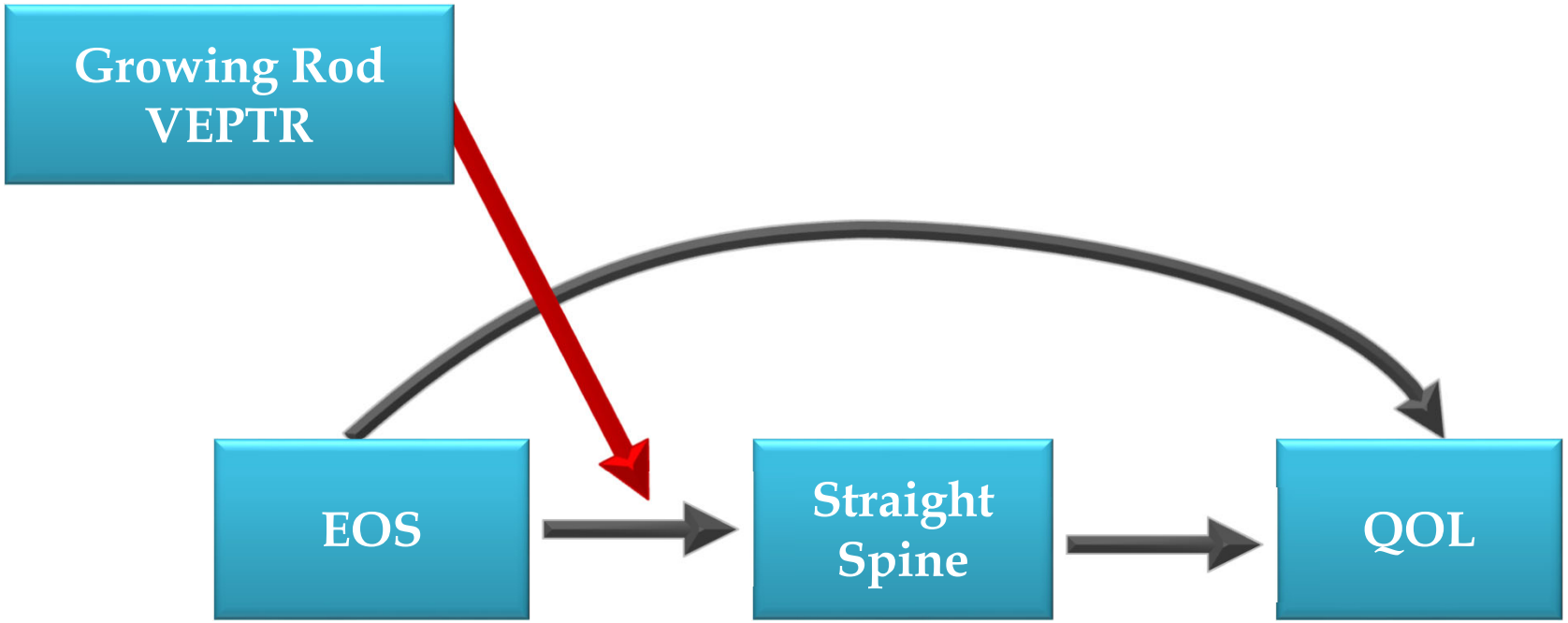
Surrogate and Patient Oriented Outcomes



Surrogate Outcomes are Problematic

- An intervention that improves a surrogate outcomes does not necessarily improve a patient oriented outcome.
- The opposite can be true!
- Using surrogate outcomes as a study endpoint can make a harmful treatment look beneficial.
- Example: Sodium fluoride increase bone mineral density. It also increases the rate of non-vertebral fractures.

Surrogate and Patient Oriented Outcomes



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Clinical Registry

- An organized system that uses observational study methods to collect uniform clinical data to evaluate specified outcomes for a population defined by a particular disease.
- It provides a real world view

- Science tells us what we can do.
- Guidelines tells us what we should do.
- Performance measures tells us what we must do.
- Registries tells us what is actually being done.
- Properly constructed registries will tell us what we will be doing in the future, more so than RCTs.

Comparison of

RCT

- Common disease
- Experimental method
- Specified intervention
- Randomized
- Homogeneous group
- Data at specified times
- Easier data analysis
- No practitioner decision making

Clinical Registry

- Rare disease
- Observational
- All or no interventions
- All comers with dx.
- Generalizable group
- When care is given
- Data more subject bias
- Full practitioner judgment.

Advantages of a registry

- Data collection can be done in the "community" with all patients and physicians participating.
- Able to measure the benefit of additional treatment effects.
- Able to measure the combination of functional outcomes that are important to patients.
- Able to determine how to risk adjust

Treatment Effect

- What is the benefit of an additional treatment

  Treatment: A, B, C,

  compared to:

  Treatment: A, B, C, plus D

- Success is not comparing D to placebo.
- Treatment effect is not one parameter, but determining the benefit of an additional intervention to all else the patient is receiving.

Patient Success Bundle

15% improvement in function

30% improvement in pain

50% improvement in sleeping

10% improvement in school performance

- Success is a composite score, not a single construct.
- Success for the patient is measured only in patient relevant outcomes

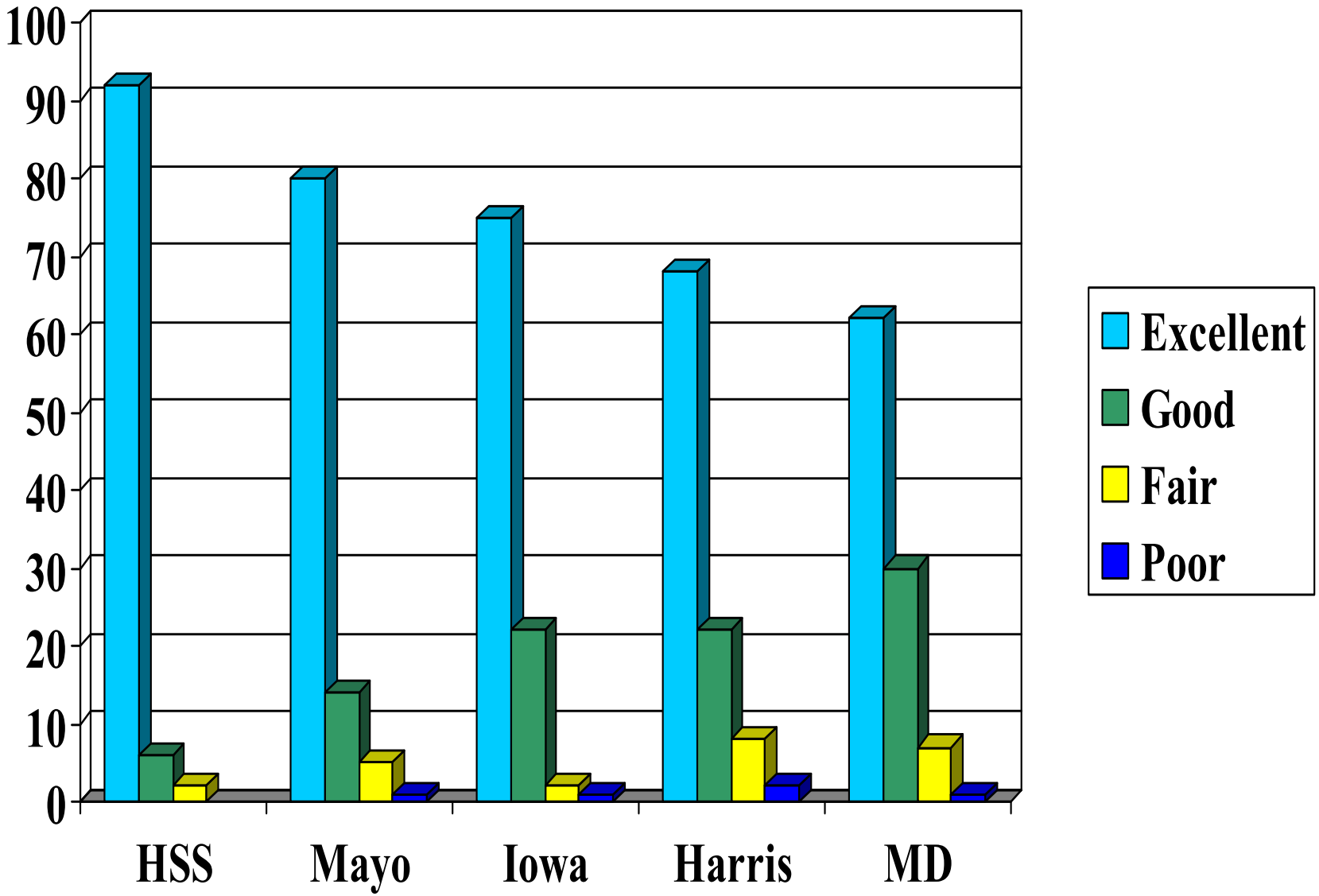
Think about what you want the registry to do before starting any data collection!

- Collect data that will answer answer specific questions.
- Answers are not found by grazing through abundant fields of data.
- Use focused data collection.
- Don’t measure something for curiosity’s sake.
- Establish aims for the registry.
- Connect measurement tools to those aims.

Data is not necessarily information.

When selecting tools to measure patient centered outcomes

- Use validated instruments.
- Avoid tools developed by those who have a conflict of interest either in the outcome of the procedure or a conflict of interest with the equipment (implant) being evaluated.
- The measurement tool can drive the result.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Fair
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AHRQ: Agency for Healthcare Research and Quality

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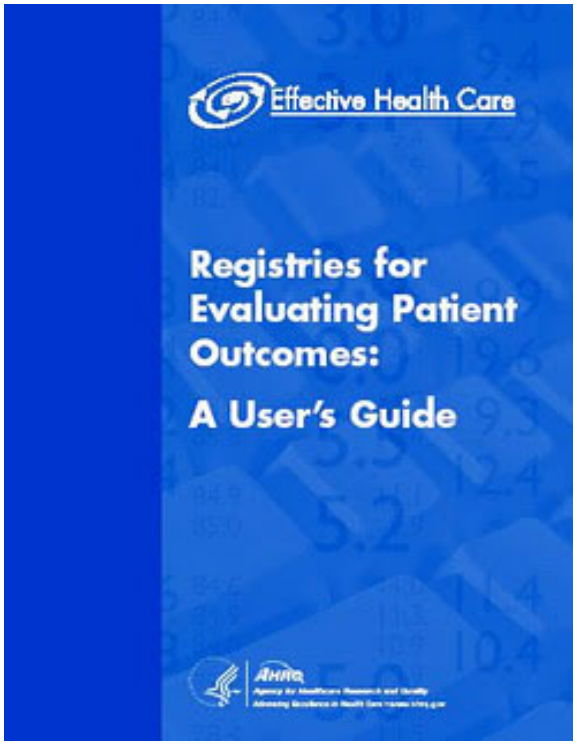

Summary of options for developing evidence for EOS treatment.

- Construct an evidence based guideline
- Do a randomized clinical trial
- Perform comparative effectiveness research
- Just measure the outcomes.
- Establish a registry for evaluating patient centered outcomes.

Not everything that can be counted counts, and not everything that counts can be counted.

Albert Einstein