



HEALTH

How Do We Define Success in Self Management Programs?

Soeren Mattke

Singapore Disease Management Conference 2008

Capturing Program Success (or Failure)

- Intuitively, measuring something before and after introducing an innovation should give you the impact of the intervention
- Powerful forces other than the innovation can lead to substantial changes:
 - Secular trend
 - Regression to the mean
 - Bias
- It is also possible that they *disguise* the effect of a successful program
- Correctly identifying program impact requires a sound yet practical attribution strategy

Threats to Validity: Overview

- **Attribution issues are also referred to as threats to validity**
- **Internal validity means that estimates do not accurately effect the intervention effect**
 - **Bias, should be avoided**
- **External validity means that estimates derived in an evaluation cannot be generalized to situations outside that evaluation**
 - **Tends to be a particular problem with randomized trials**
 - **Almost always the case with pilot programs but magnitude of the problem varies**
 - **Cannot always be avoided but should be kept in mind**

Threats to Validity: Secular Trend

- **If you assume that a pre-post measurement gives you the intervention effect, you implicitly assume that nothing would have changed in the absence of the intervention**
- **In health care, this is almost always wrong**
 - **Care gets more expensive**
 - **Patients get sicker**
 - **Quality improves**
- **You need at least an estimate for this trend to correctly identify the intervention effect**

Threats to Validity: Regression to the Mean

- Many, especially the high-cost, events in healthcare are non-recurring (fortunately)
- Even without any changes, cost is likely to return to its long-term trajectory
 - Particular problem in SMS evaluation because patients get enrolled after acute and costly events
- These effects are not confined to cost and utilization:
 - Acute events change patients' behavior
 - Patients receive more attention and scrutiny after acute events

Threats to Validity: Selection Bias

- **Participants in an intervention may be systematically different from non-participants**
 - **Observable: age and sex**
 - **Potentially observable: disease severity**
 - **Non-observable: motivation**
- **Those differences may interact with the intervention in a peculiar way**
- **This can overstate or understate the intervention effect**
- **Particular problem with results from pilot programs:**
 - **Pilot sites tends to be top performers**
 - **Pilot patients can more attention**
 - **Pilot participants tend to be more engaged**

Threats to Validity: Measurement, Reporting and Ascertainment Bias

- **Participants in an intervention typically receive an unusual degree of attention, especially in the pilot phase**
 - **More data will be collected**
 - **Greater attention will be given to data quality**
 - **Patients pay more attention to questions and surveys**
- **Incentives may amplify this problem**
 - **Non-financial incentives matter, too!**
- **This may make those patients look different than they would look under routine conditions**

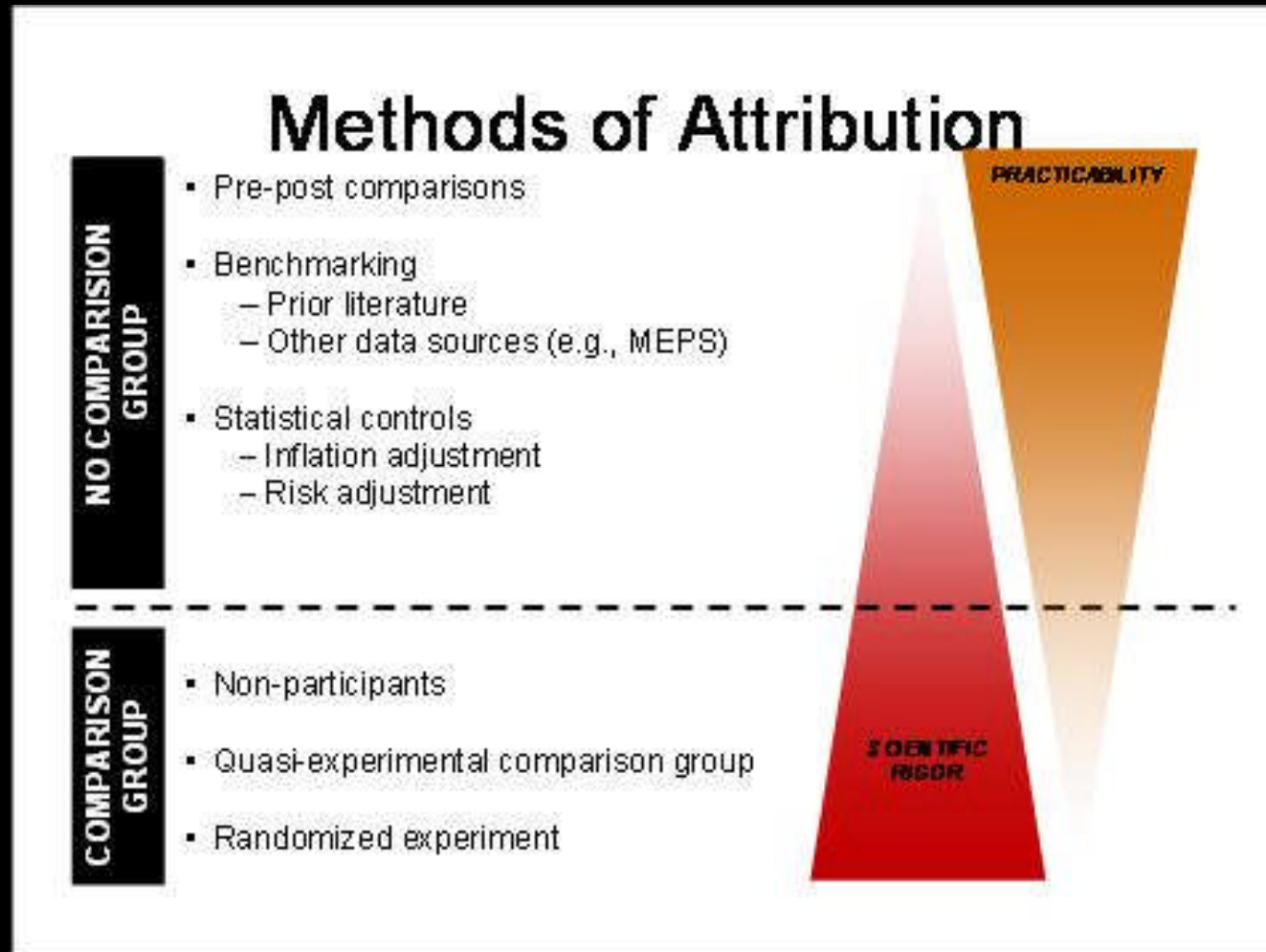
Threats to Validity: Hawthorne Effect

- **Attention involved with the introduction of an innovation may distort behavior**
 - **Providers will be more focused and diligent**
 - **Patients will be more likely to follow guidance and take initiative**
- **Implies that intervention effect may be unspecific and non-sustainable**

What We Have Learned

- **Failure to pay attention to the attribution issue can lead us to mis-estimate the intervention effect**
 - **Promote ineffective approach**
 - **Ignore promising innovation**
- **A perfect solution may not be possible, but the issue should not be ignored**

The Universe of Comparison Strategies



Considerations on Selecting an Attribution Strategy

- **There is an inherent trade-off between scientific rigor and feasibility**
- **Form follows function, not always is maximum rigor warranted**
 - **Novel program intended for national roll-out requires different level of scrutiny than tracking ongoing program**



Strategies to Reduce Threats to Validity

- **As the first step of the evaluation, develop a logic model or conceptual framework**
 - **This is your view of the world**
- **Think about which domains will be affected by the intervention, in which sequence and which timeframe**
 - **Equivalent to your research hypothesis**
- **Select measures to capture performance along those domains**
- **Develop plausible (preferably evidence-based) expectations of the effect size**
- **This is particularly important if the attribution strategy is weak**

Some Helpful Hints in SMS Evaluation

- **It's primary mode of action is to improve health related behaviors and to increase use of secondary prevention services to reduce high-cost exacerbations**
- **The short-term effect is predominately on patient behavior and utilization patterns, real health improvement takes much longer**
- **If the evaluation does not show those patterns, the results cannot be trusted**

Selecting the Analytic Approach

- **Comparison strategy deals with the issue of identifying the intervention effect, analytic design with the estimating its magnitude**
- **Too complex to be discussed here**
- **Numerous techniques are available**
 - **Difference-in-differences**
 - **Regression discontinuity**
 - **Propensity scores**
- **Functional form needs to be specified correctly**
- **But even the best statistical model cannot fix fundamental design flaws**

Summary

- **Attribution is a critical issue that must not be ignored**
- **Numerous threats to validity can lead you into the wrong direction**
- **But the worst mistakes can usually be avoided**

Recommendations

- **Think about it in advance**
 - **Finding a comparison group ahead of time is so much easier**
- **Pay close attention to utilization patterns**
- **Be honest to yourself and test your hypotheses**
- **Don't expect miracles**
 - **Results that are too good to be true probably aren't**
 - **It's hard to truly reduce cost or improve health status with SMS (but it's better to die trying)**



HEALTH