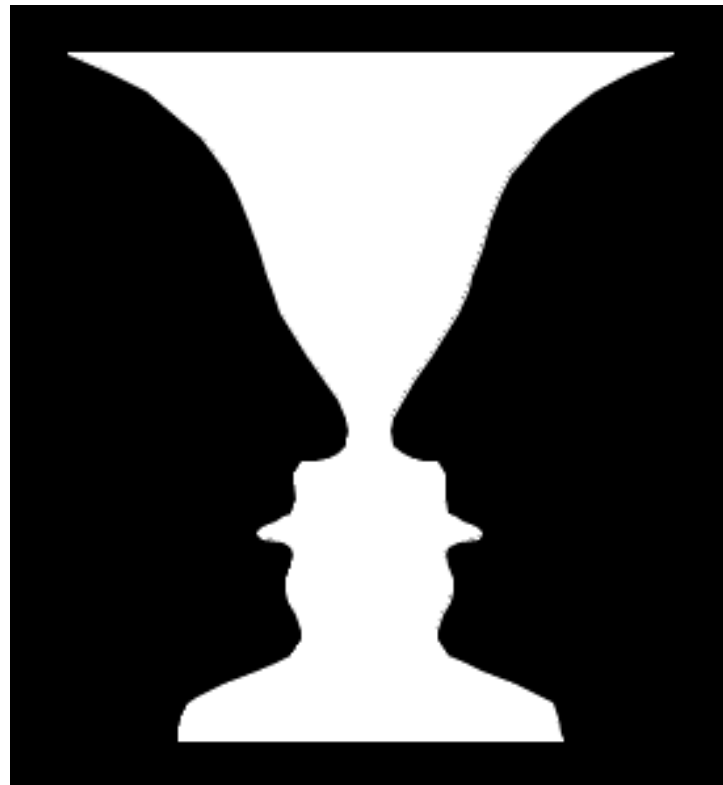


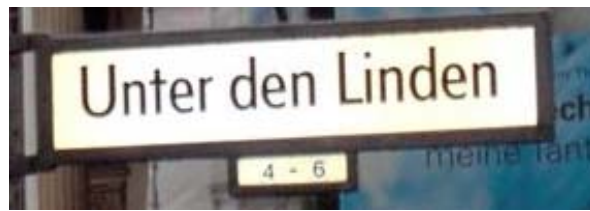
*The Gestalt of Time and Motion in the
Clinical and Financial Impact of Disease
Management Programs.*

Thomas W. Wilson, PhD, DrPH
Trajectory Healthcare, LLC
10633 Loveland-Madeira Rd. #210
Loveland, Ohio 45140
twilson@trajectory-inc.com
513.289.3743

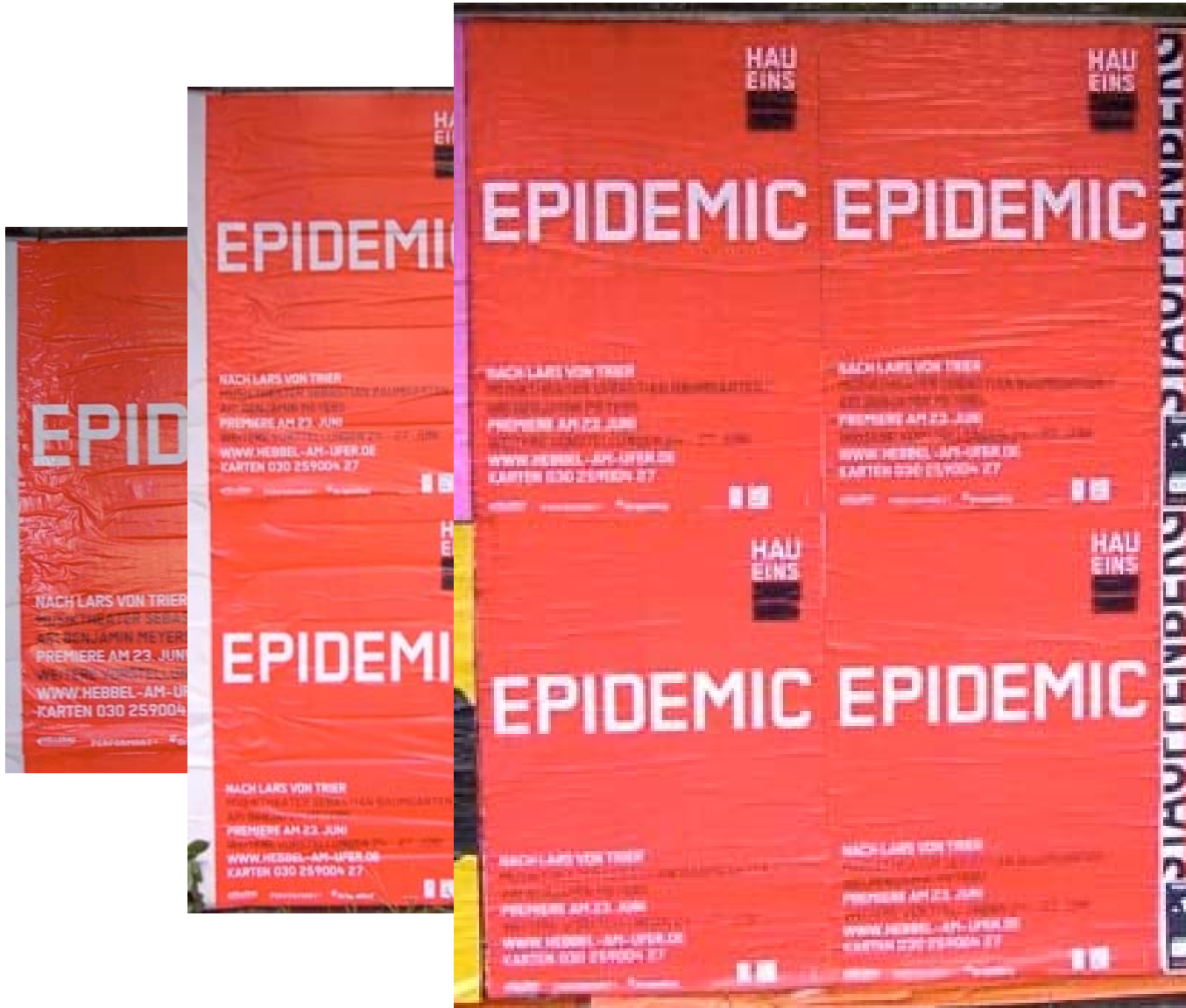
Data



*Data doesn't say anything, you must interpret it: Face or Vase?
(...data can be biased, the interpretation can be biased)*



Photos From Berlin

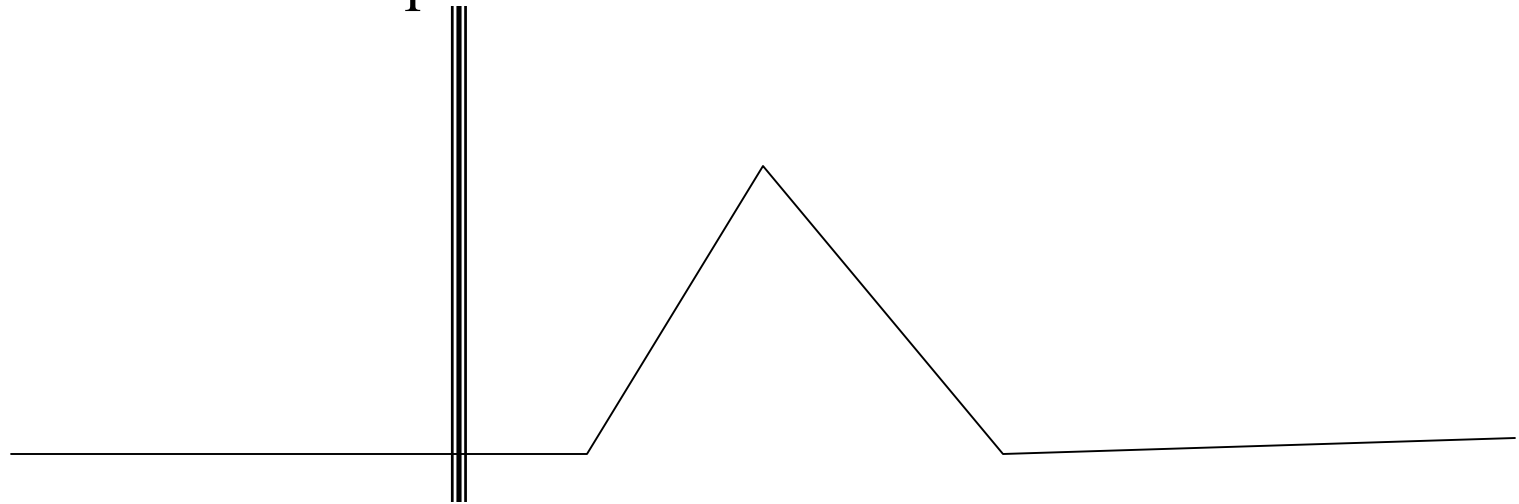


Epidemic:

Calendar/Patient Time Trajectory

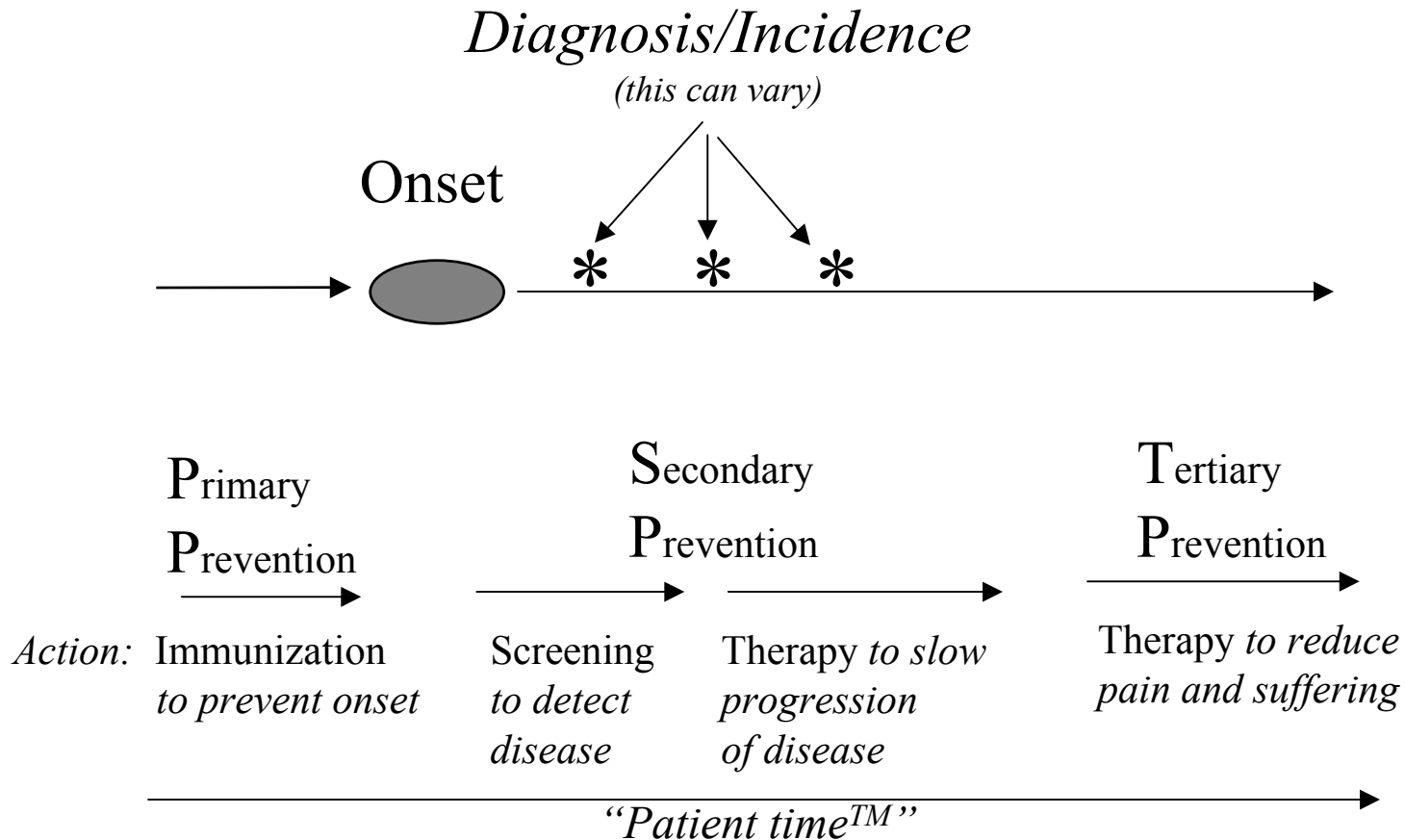
100%

Exposure

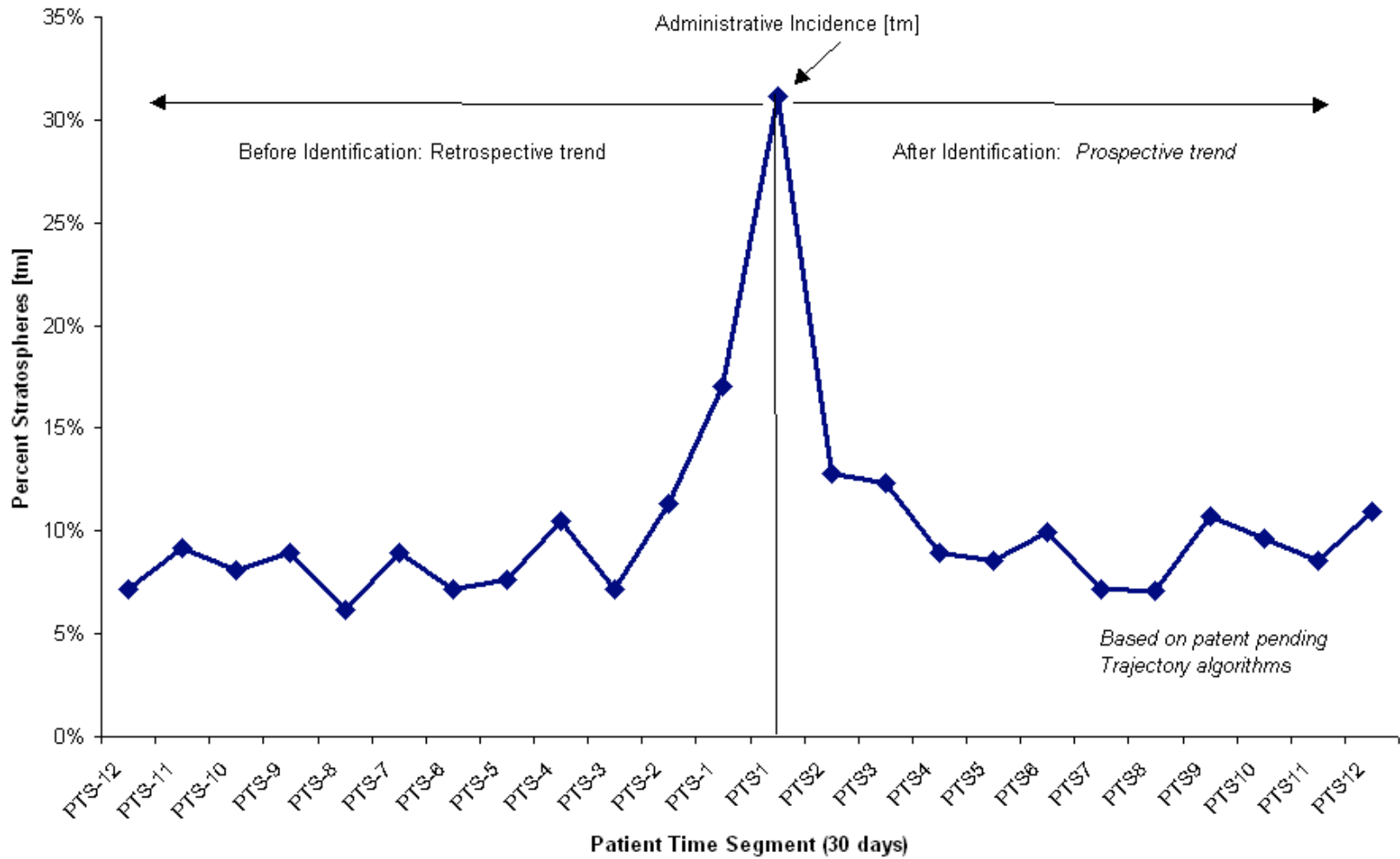


Calendar/Patient Time

Natural History of Health/Disease & Health Care Provider Response



Patient Time Trend of CHF Population for Year 1, Year 2, Year 3.



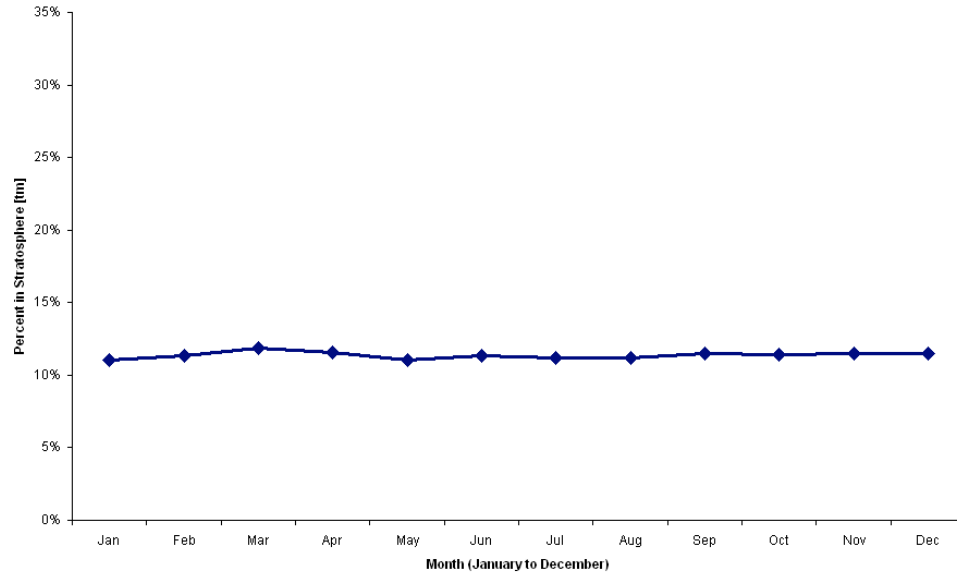
Prior Slide Legend

- The prior slide shows the percent of the defined population that are high cost (“The Tipping Point” or the “Stratospheres”™) in 30 day patient time segments.
- The highest point is the “administrative incidence”™ -- this is the point at which each individual is initially identified with the condition (in this case, it is the first time the diagnosis for CHF appears in a calendar year).
 - Administrative incidence refers to two kinds of people:
 - 1) True incident cases (from the perspective of health)
 - 2) Unknown if case is incident or prevalent
 - This can be parsed out if we allow for a clinically relevant duration of time when the patient is “disease free” (ie. enrolled, but no claims-based evidence of disease).
- Before that identification point is the *retrospective* “Patient Time™” trend, after that point is the *prospective* “Patient Time” trend.
 - The prospective patient time trend represents a true prevalent cases.

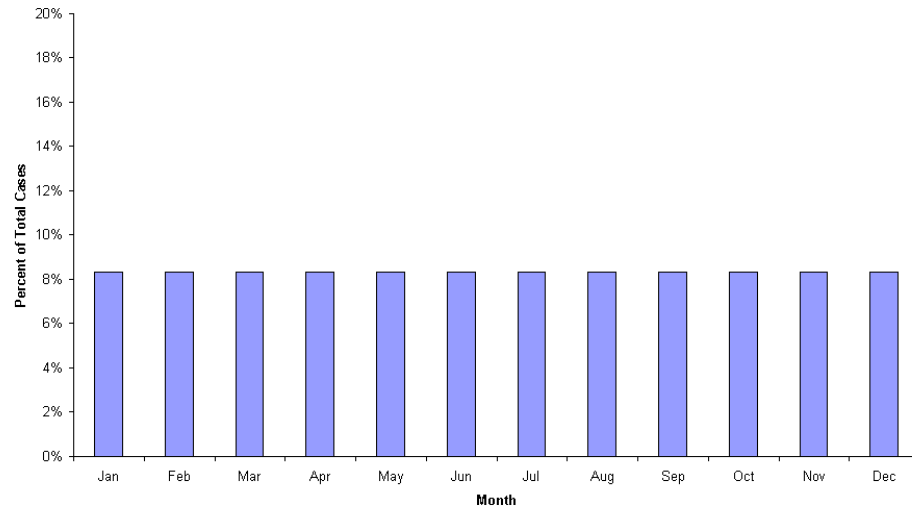
Legend: Next Three Slides.

- The next three slides shows the percent of people above the “Tipping Point” (or in the Stratosphere) in calendar time.
 - The patient time trend is constant for all three charts.
 - The calendar time trend varies because of the pattern of “administrative incidence” in the calendar year.

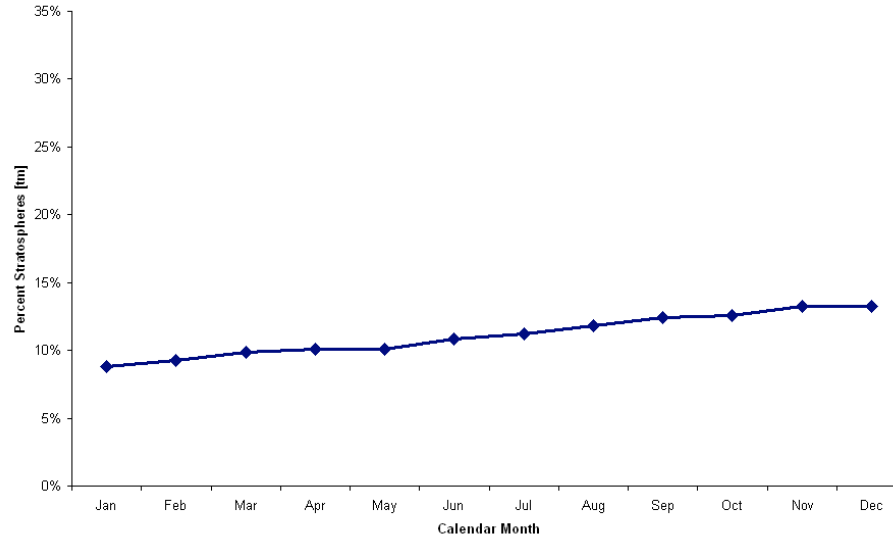
Calendar Time Trend of CHF population: Year 1



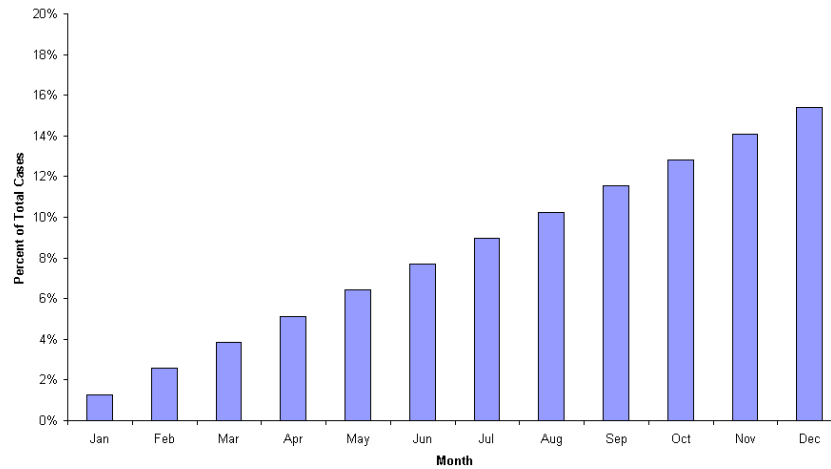
Administrative Incidence *Weighted evenly throughout the year*



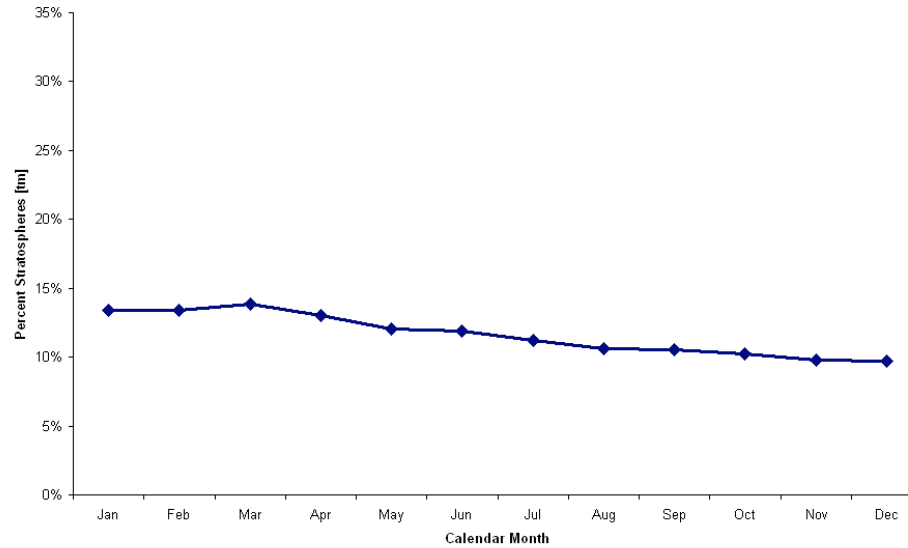
Calendar Trend of CHF Population: Year 2



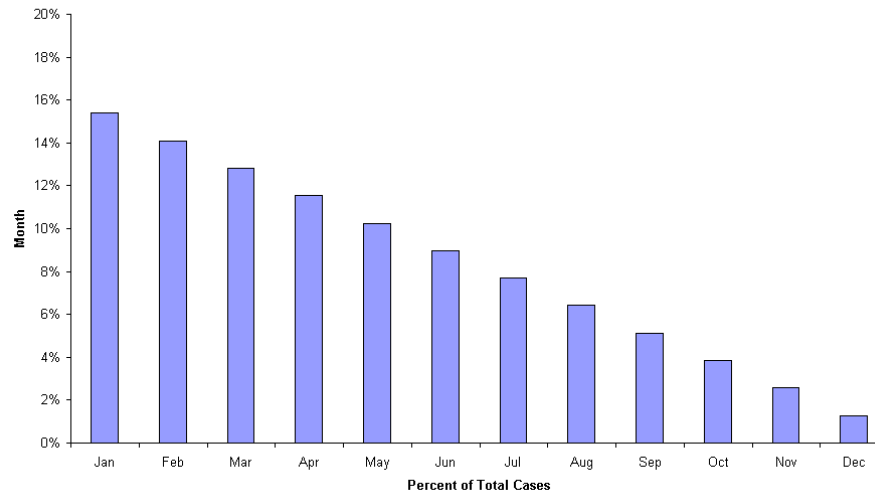
Administrative Incidence: *Weighted toward latter part of the year*



Calendar Trend in CHF Population: Year 3



Administrative Incidence: *Weighted toward early part of the year*



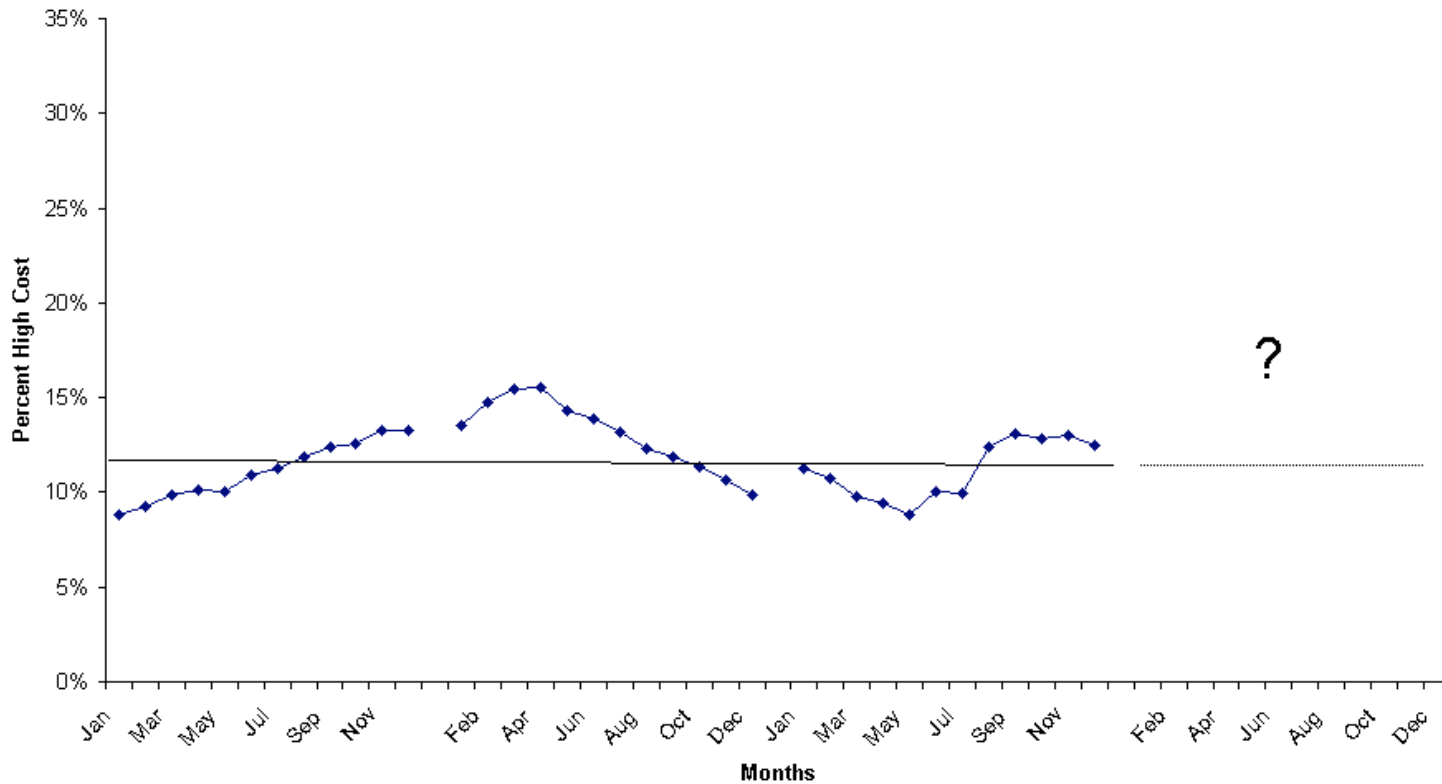
Legend: Next Slide.

- The next slides shows three years of calendar time trend with “smoothing” (using least squares regression)
 - Is this baseline “smoothed” trend, when projected to a fourth year, an accurate depiction of “what would have happened in the absence of disease management?”
 - That is the important, as we will compare the actual trend following DM to this to determine impact and ROI.

Are these Pre Trends/Baselines Valid Predictors of Post Trend?

Or “What would have happened in the absence of DM?”

**Three Years of Data:
What is Year 4? (like year 1, 2, 3, other?)**



Real Data

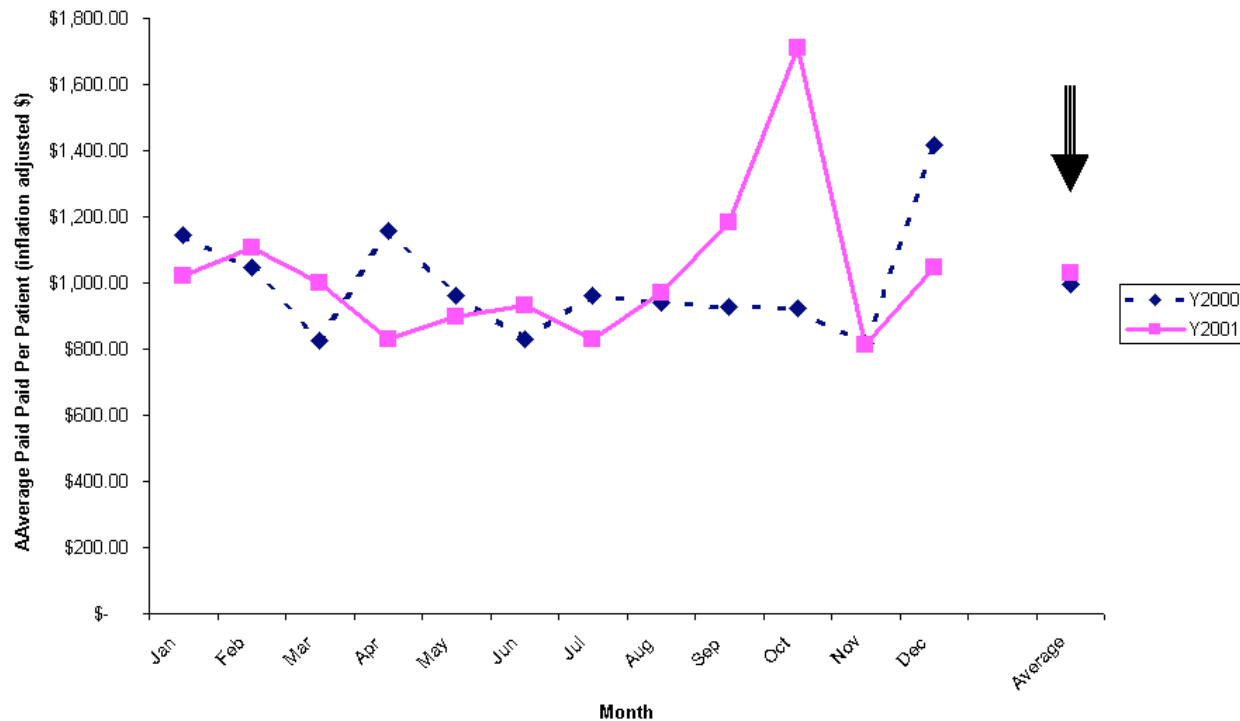
*How well do baseline trends
predict the future?*

- This is from a health plan that did not have any DM services or major benefit changes in 2000 and 2001.
- We use this to test the proposition that the baseline is an accurate prediction of “what would happen.”
- The three defined populations -- CHF, Diabetes, Asthma -- were selected the same way in both periods.

Accurate Prediction:

“Baseline/Pre-Period” Predicts “Post-Period” Costs

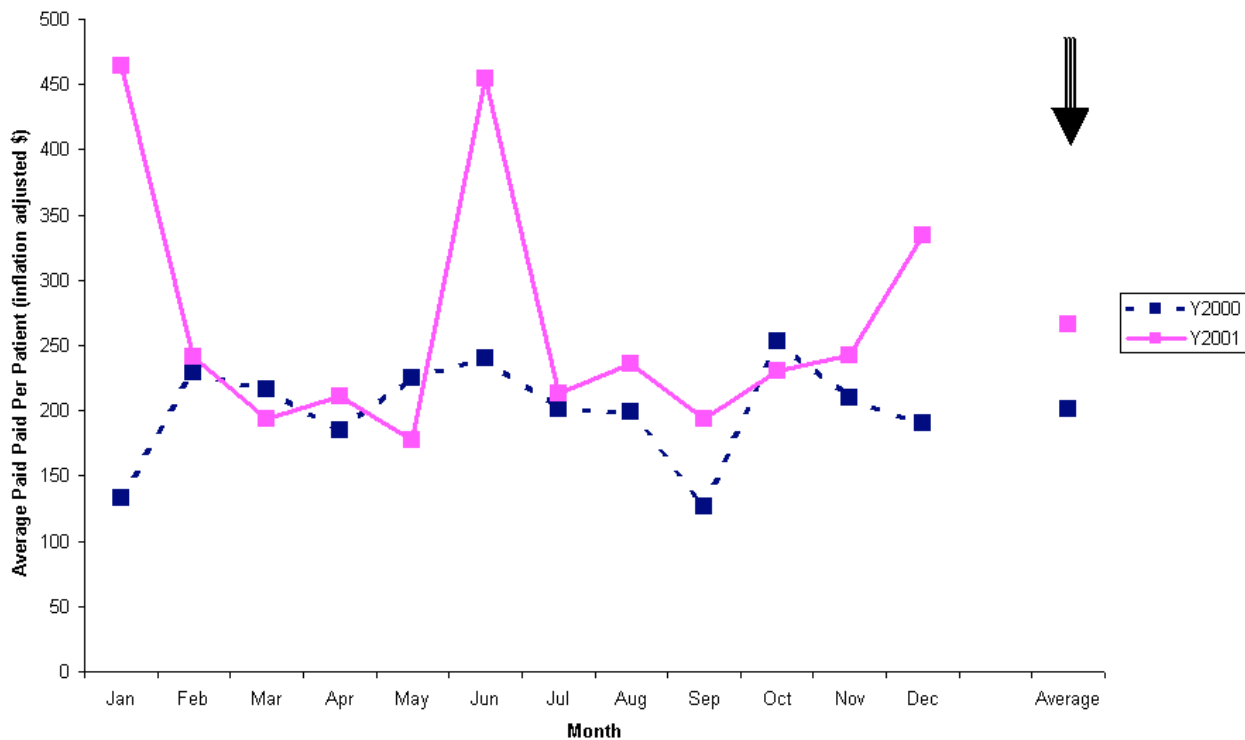
CHF Population: 2000 & 2001



Under Prediction:

“Baseline/Pre-Period” Under Predicts “Post-Period” Costs

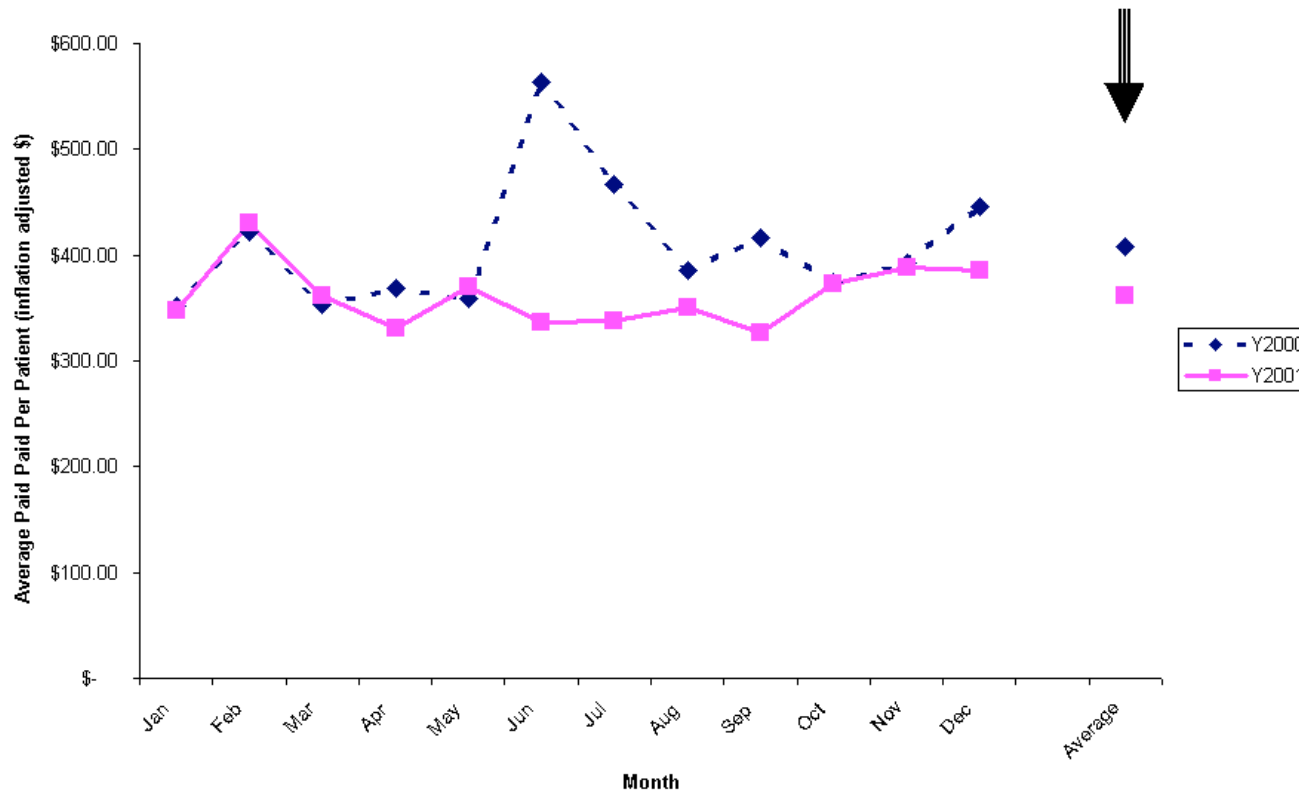
Asthma Population: 2000 & 2001.



Over Prediction:

“Baseline/Pre-Period” Over Predicts “Post-Period” Costs

Diabetes Population: 2000 & 2001



Legend on prior 3 slides.

- 1/3 right
- 1/3 too high
- 1/3 too low.
 - Like a clock that doesn't work: It is right twice a day.
But when is it right?
 - This method appears to be unreliable.

"Medicine is a science of uncertainty
and an art of probability."

– William Osler, MD

So is ROI

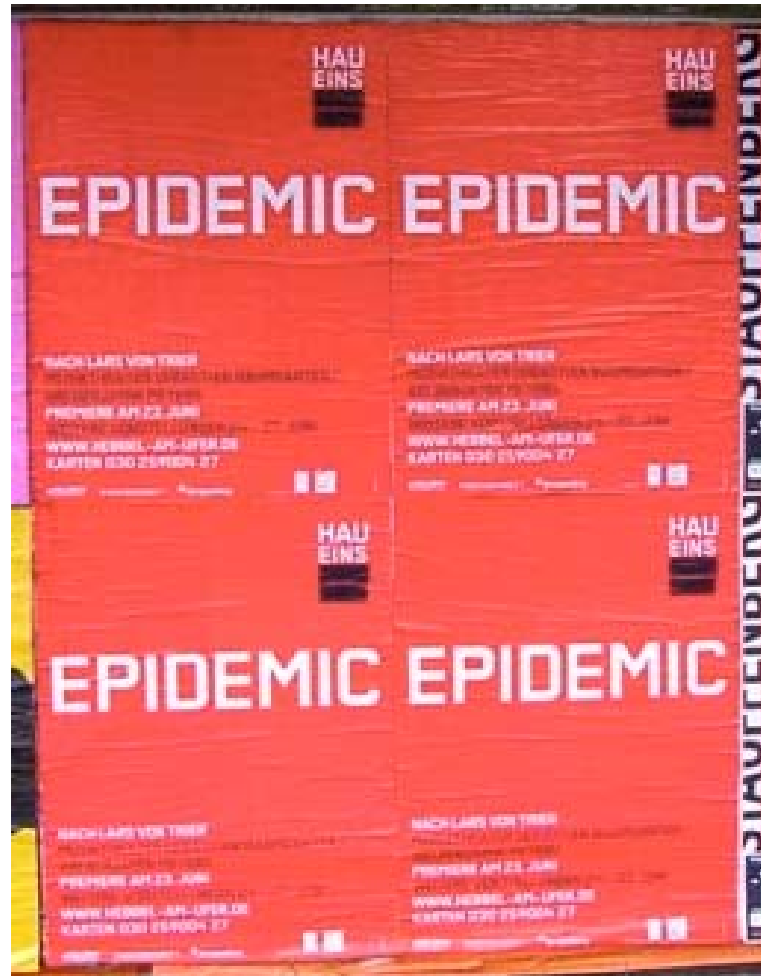
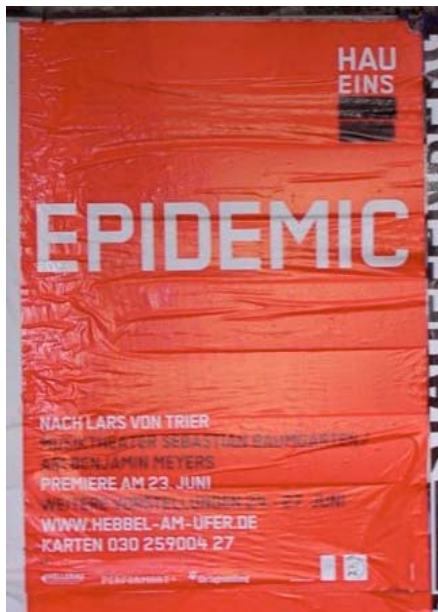
Is There A Better Way?

- Yes.
- The Final Way? No.
 - There are many things things going on that could influence outcomes
 - Let's do the best we can, knowing uncertainty is evident in studies that do not use double-blind randomization technique.

1) Acute Events: Why they are important and useful...

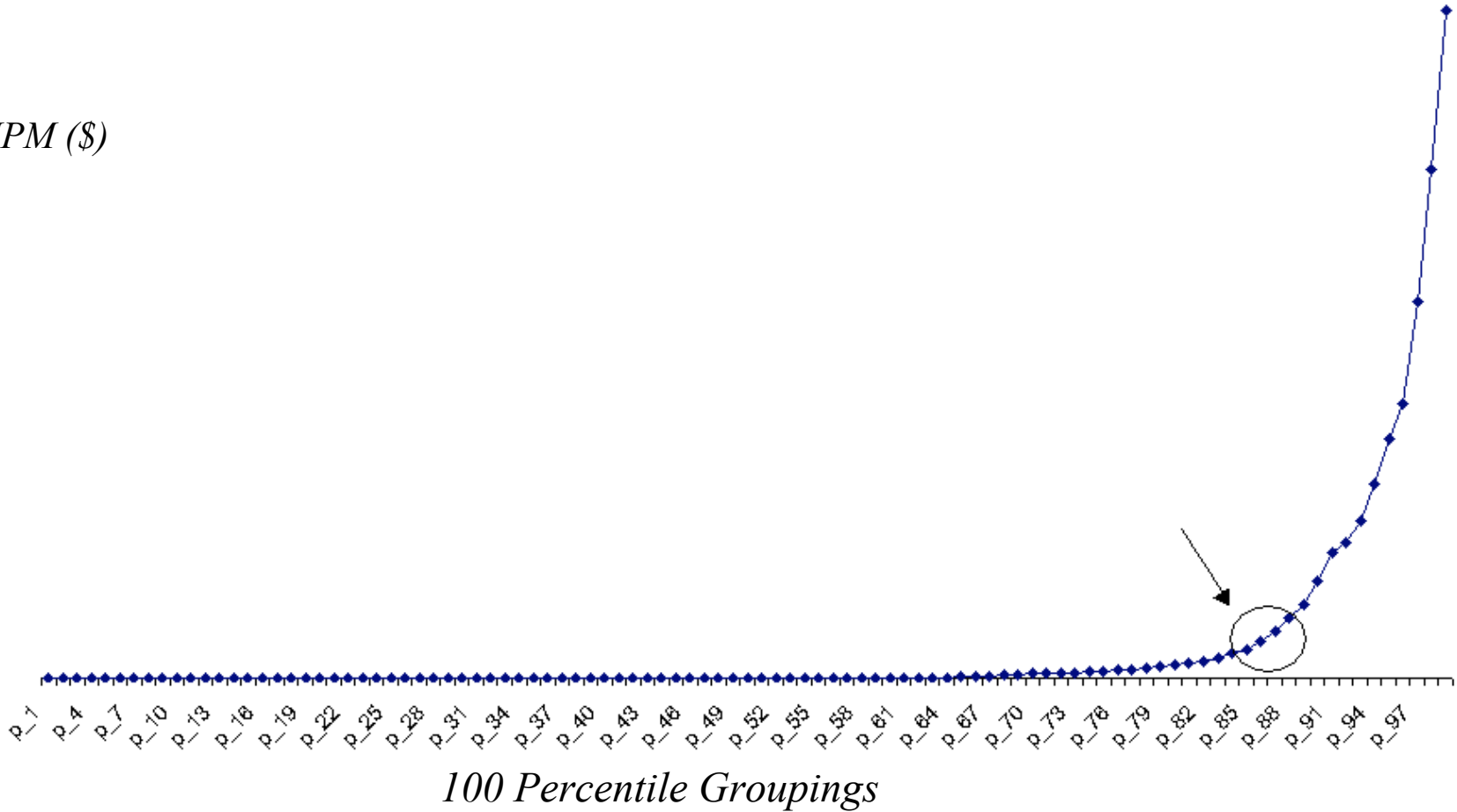
Phase Transition (like water to ice)

The Tipping Point



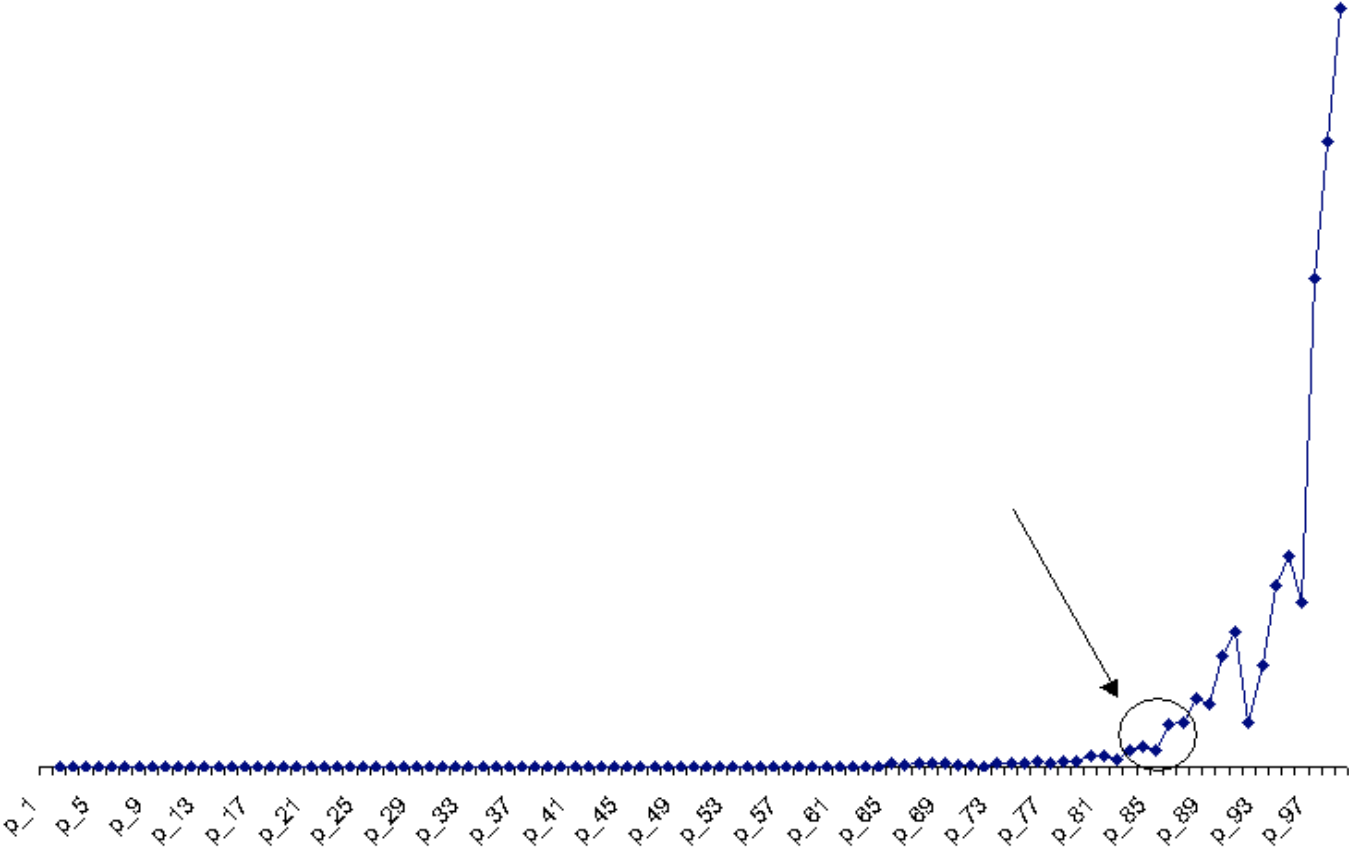
Where's Waldo? Finding The Tipping Point: View 1

PMPM (\$)



Where's Waldo? Finding The Tipping Point: View II

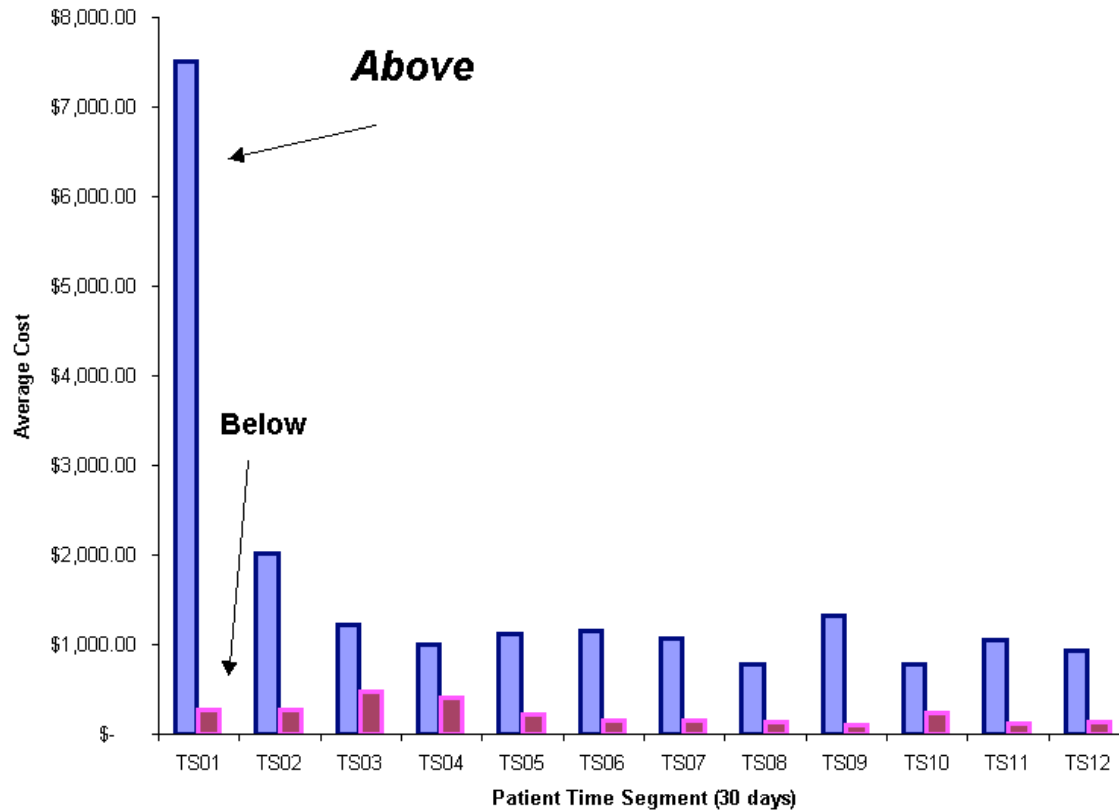
PMPM (\$)



100 Percentile Groupings

PMPM and the Tipping Point

The Rationale of the TIPPING POINT



*Based on patent pending
Trajectory® Algorithms*

Principles

- Intervention Population
- Reference Population
- Comparable Metrics
- Equivalent Populations.

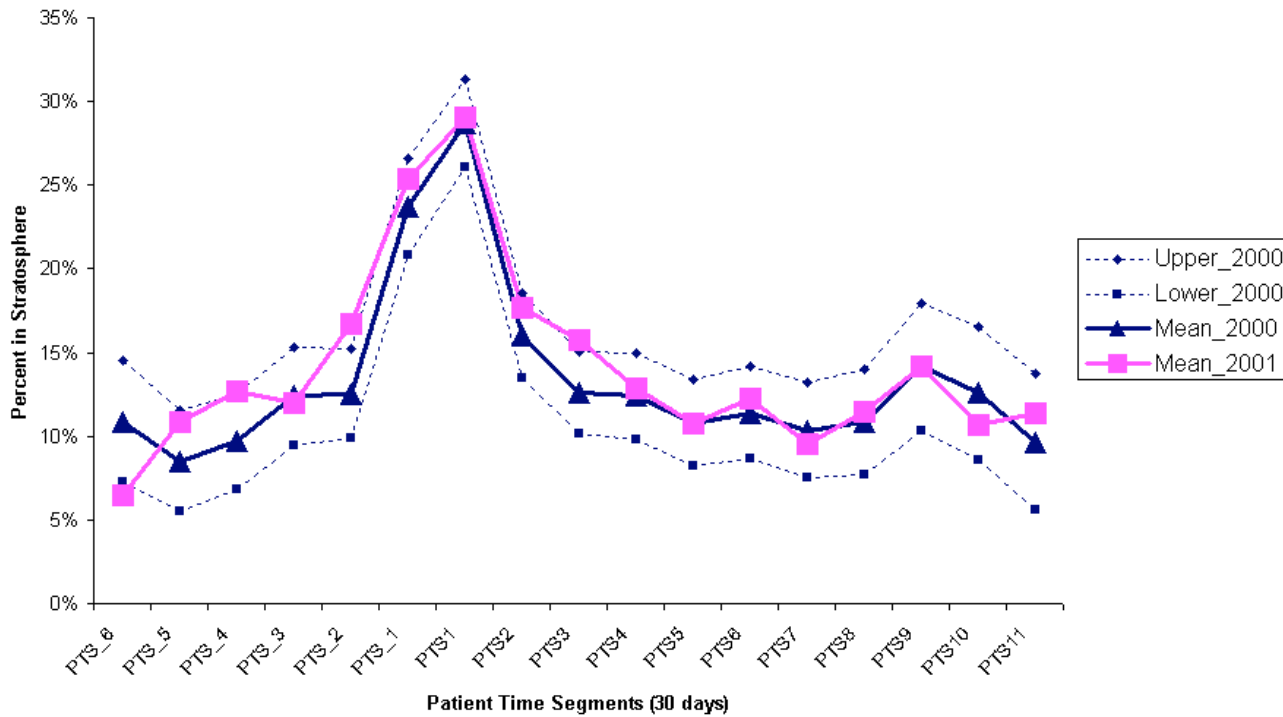
The Biggest Problem in Measuring ROI is Equivalence ...

We've got to get our arms around this basic issue.

- To measure impact we to estimate **ACCURATELY** the pattern that would have existed without the intervention.
 - *Double-Blind Randomized Control Trial*
 - *Other*

Predictability

CHF Patient Time Trends: Six Times Segment Prior to Administrative Incidence and Eleven Patient Segment After AI (# based upon >=100 individuals per each Patient Time Segment):
Dotted lines represent 95% confidence intervals around 2000 patient time trend



ROI

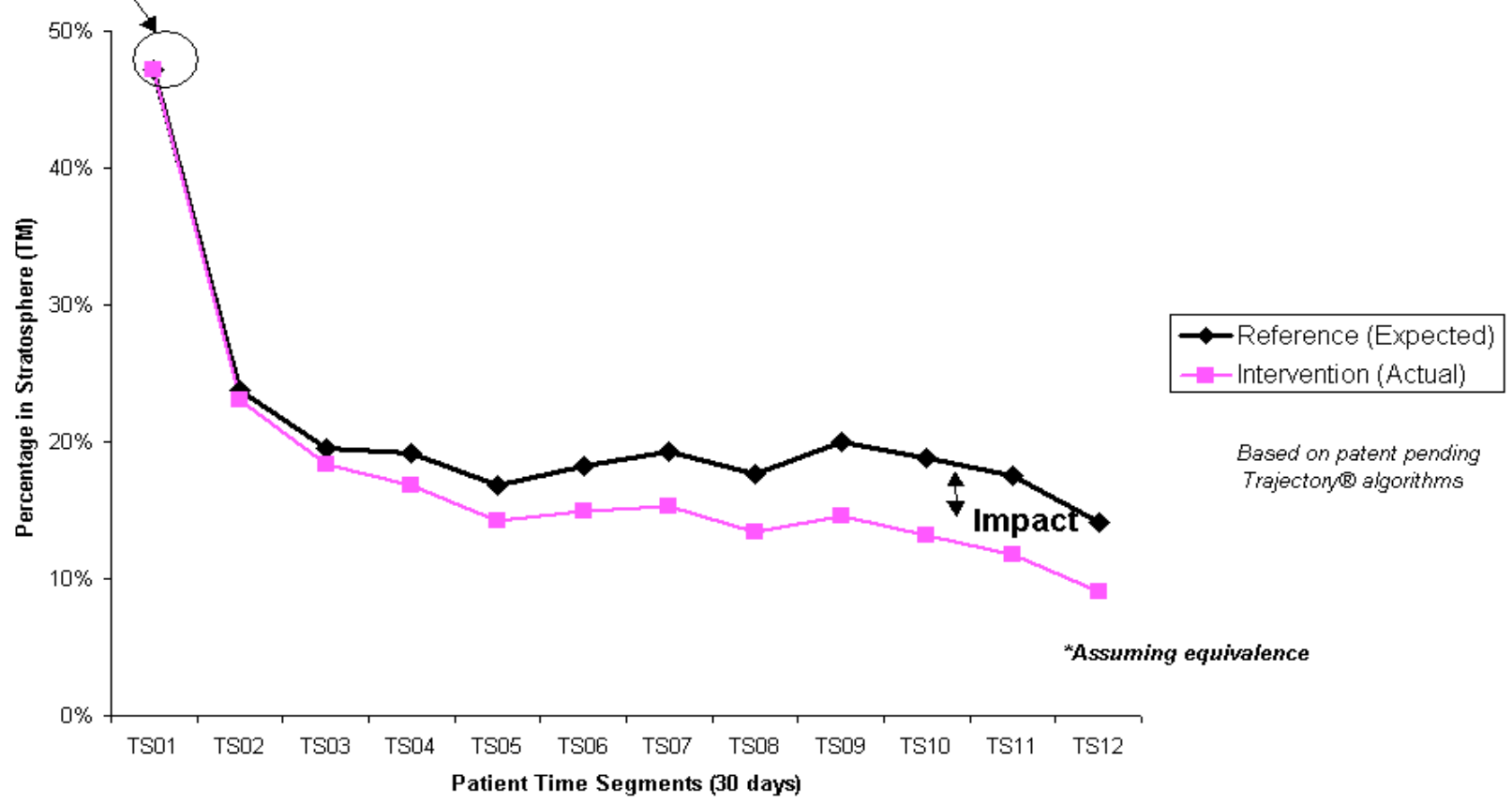
Impact Assessment

(Used for Forecasting too)

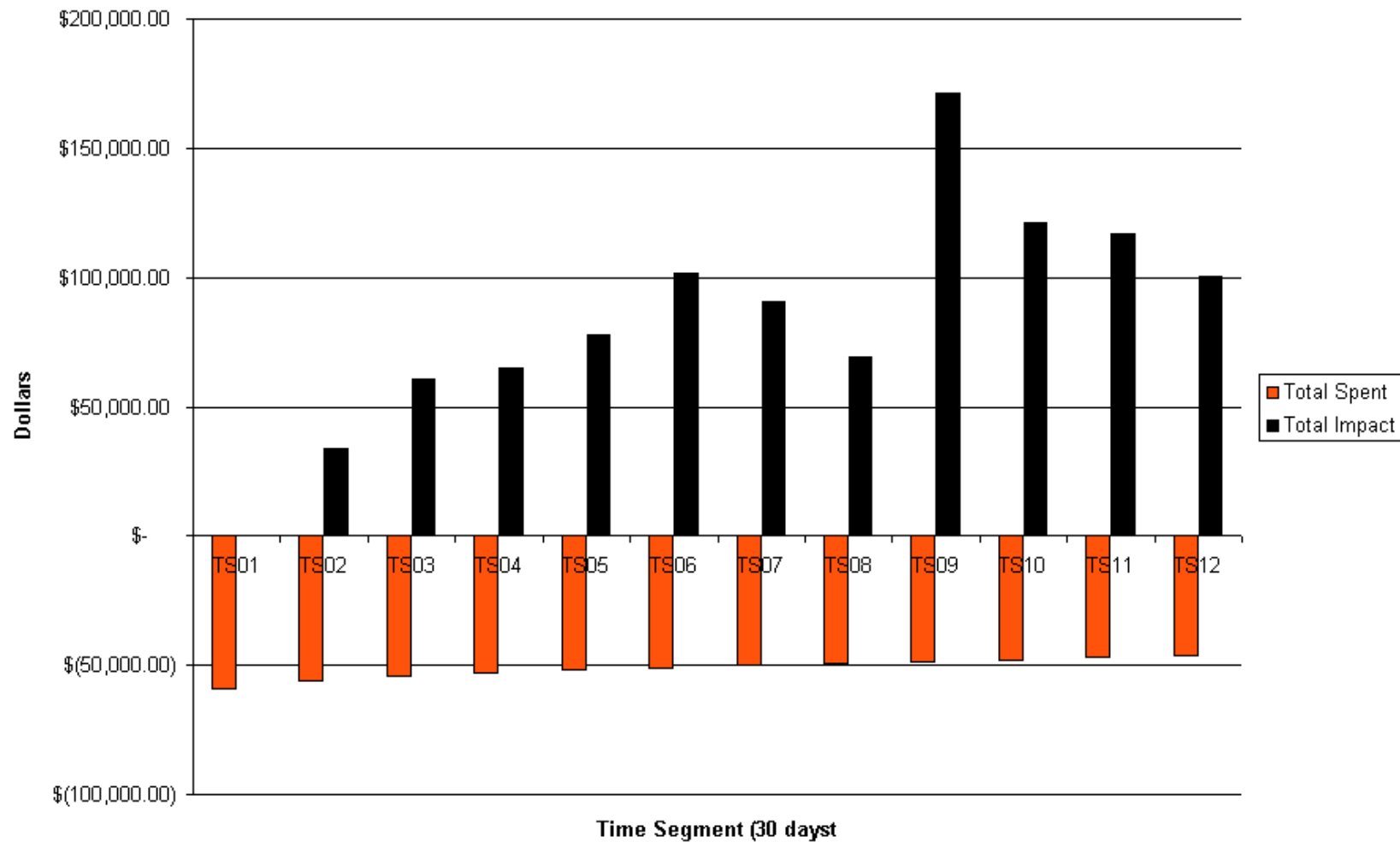
IMPACT

The Difference between the Intervention Group and the Reference Group*

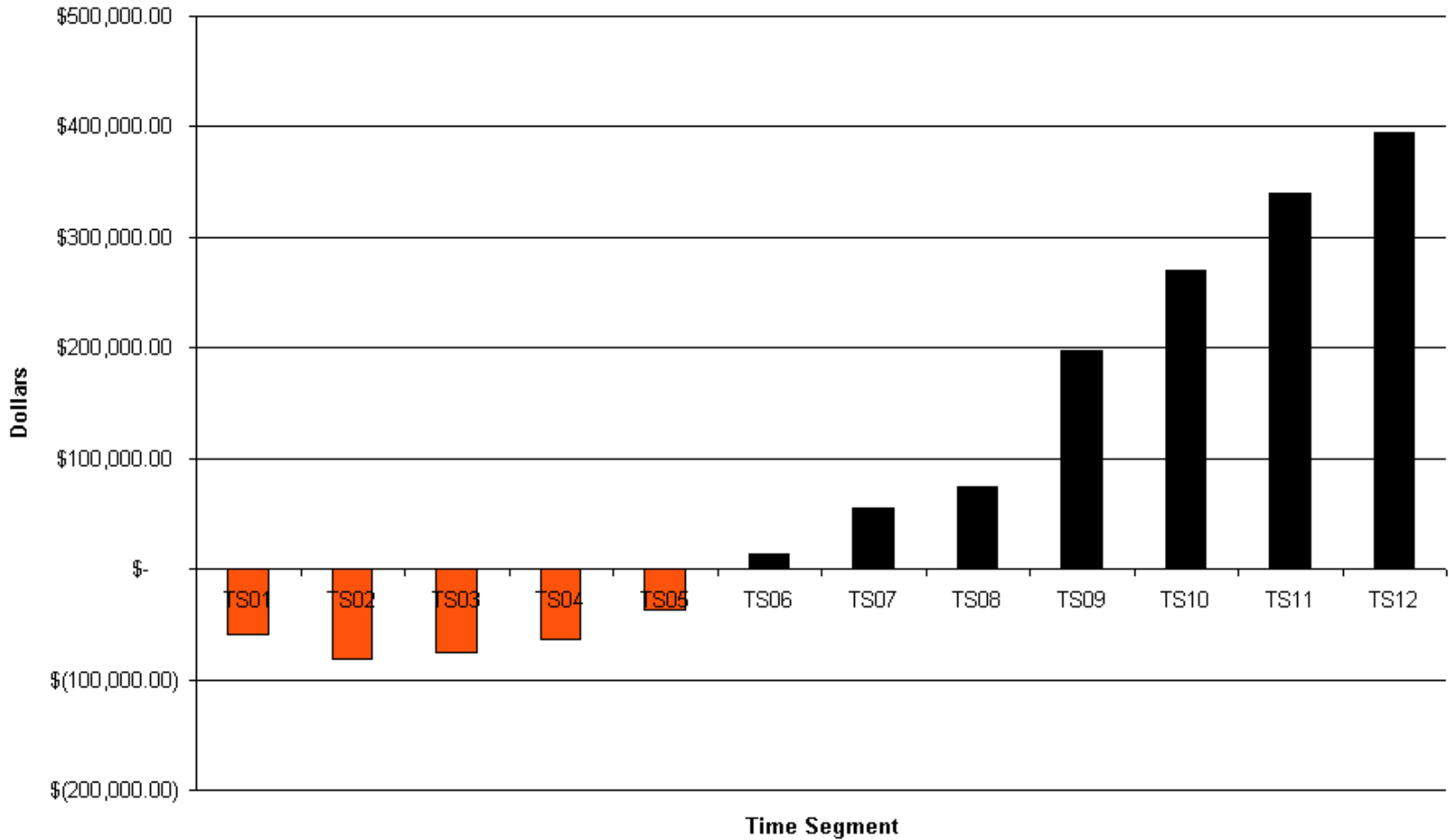
Administrative
Incidence (TM)



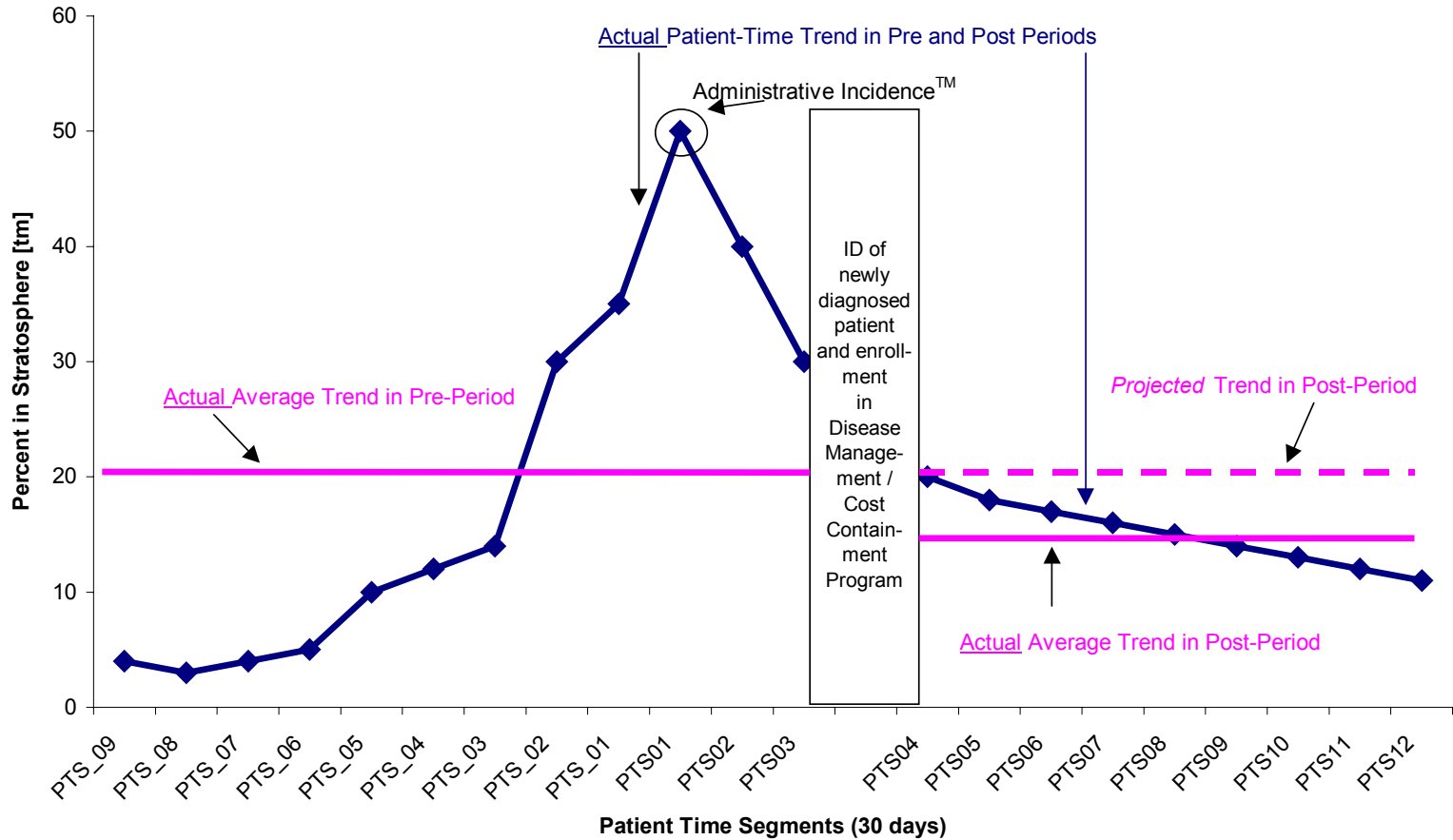
Cost (\$60.00/time segment)-Benefit: Incident Cases of CHF



**Cumulative IMPACT Showing Break-even point (at inputed impact and \$60.00 / month cost):
Incident Cases of CHF**



By The Way ... Useful for High Cost Cases Too (a new kind of pre-post ...)



You can use the solid line as a reference population ...

Opportunities* ...

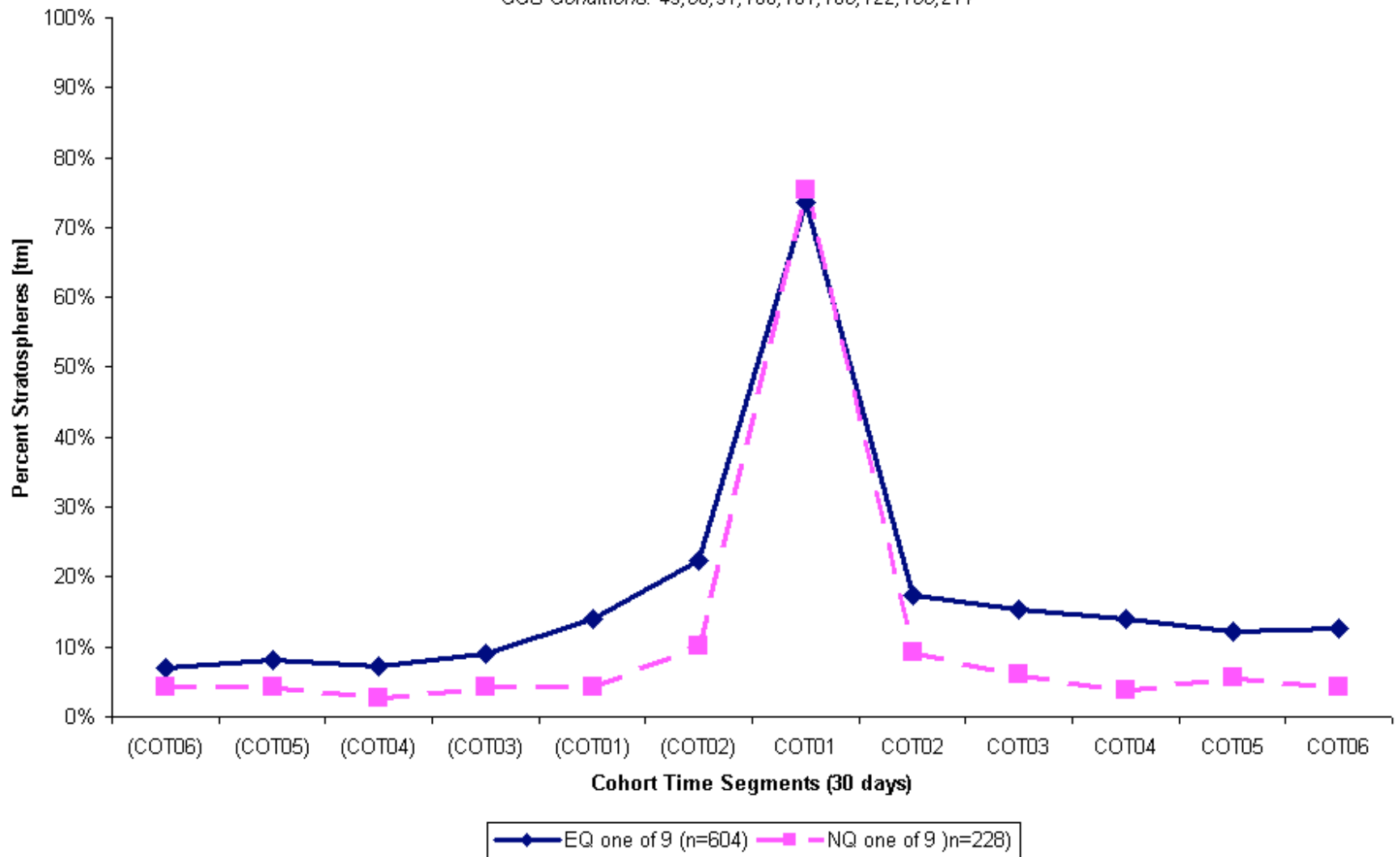
Medical Management Strategies

(real data on elderly CHF population)

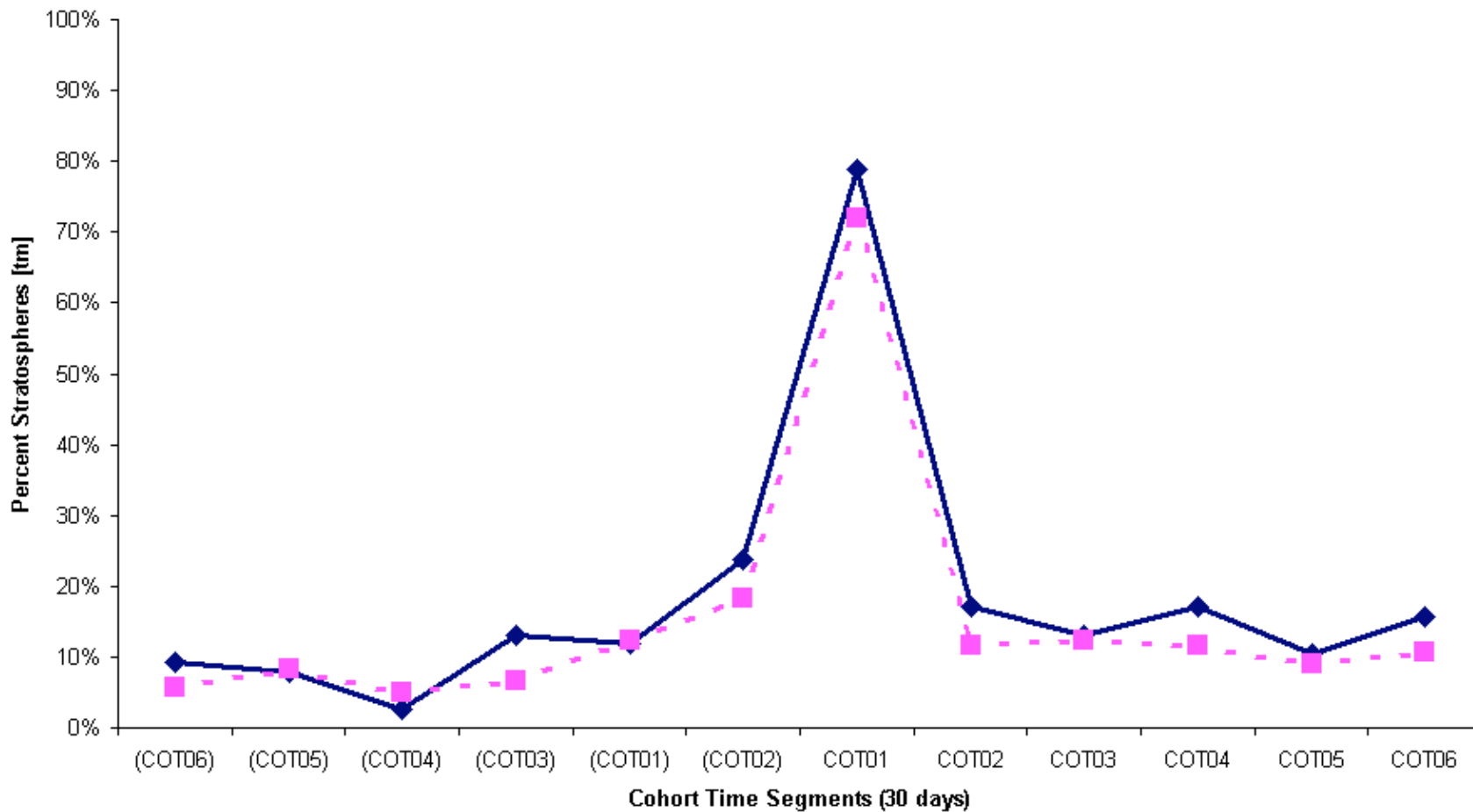
“Estimates of the fraction of physician’s care decisions that are supported by unambiguous clinical trial evidence ranges from **11 percent to 65 percent** depending on specialty and care setting. A strong case can be made that these estimates are upper bound, since the studies focus on major decisions only and not the full range of care decisions—such as whether to hospitalize a patient or consult with another specialist – that are made in any complex treatment regimen.” Source: Ginsburg PB, Nichols LM. The Health Care Cost-Coverage Conundrum: The Care We Want vs. The Care We Can Afford. Annual Essay 2002-3. Center for Studying Health System Change. (www.hschange.org/CONTENT/616/?words=cost-coverage)

Cost Trends over Cohort Time: Stratification based on "Comorbid Combo of 9 conditions"

CCS Conditions: 49,50,91,100,101,106,122,133,211



Diabetes Ascertained by Either Primary Dx on Claim (n=20) or Self-Reported (n=70)
 [both were n=14]

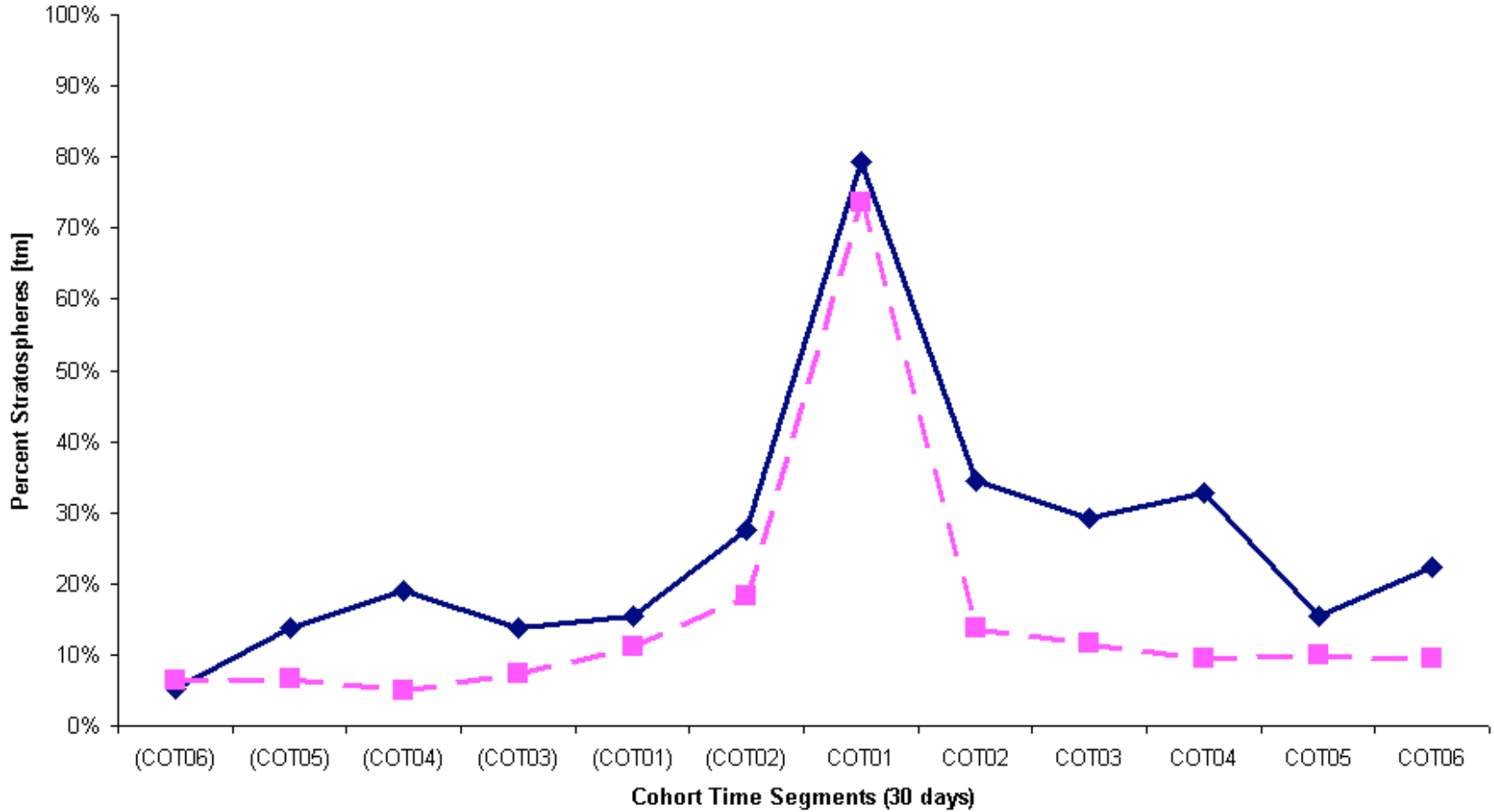


Based on patent pending
 Trajectory® algorithms

—◆— Diab=1 -■- Diab=0

N=197

Cost Trends over Cohort Time: Stratification based on Fluid and Electrolyte Disorders Category (CCS #55)



Based on patent pending Trajectory® algorithms

◆ F&E = Yes (n=58) ■ F&E = No (n=774)

55 & 158 (n=4)

Conclusion

- The Trajectory® System
 - Merges clinical trial methods (defining the population, longitudinal follow-up, credible impact assessment) with epidemiology (targeting interventions and testing them) to rationally improve resource allocations.
- Patient time is a useful, practical concept for managing resources in managed care
 - Credible measures the value of medical, disease, and population management interventions
 - Credible improvements in medical and disease management strategies.
- Health -- and the health care system response to health -- should be central to ROI and other impact assessments.
- It is not clear that enough data is available nor is any ROI system robust enough to support the proposition of “proven” savings” in DM.
 - On-going performance monitoring may be a better choice.

The future of health care ...

- “The locus of competition has to shift from ‘Who pays’ to ‘Who provides the best value’”
- “Providers should compete to be the best at addressing a particular set of problems”
- Source: ME Porter & EO Teisburg. Redefining Competition in Health Care. Harvard Business Review, June 2004.

References

Wilson T, MacDowell M. Framework for Assessing Causality in Disease Management Programs: Principles. Disease Management, Fall 2003.

Wilson T. Evaluating ROI in State DM Programs. Robert Woods Johnson Foundation's State Coverage Initiative Program, 2003.
www.statecoverage.net.

NMHCC ROI in DM Workgroup: Gruen J, Nash D, Wilson T, Lewis A, Fetterolf D, Thar W, Popiel R, Patel M. "Crossing the Measurement Chasm: Evaluating Disease Management Measurement Methodologies." Presented at the 8th annual Disease Management Congress, San Diego, California, September 30, 2003 (*www.jacksonmediagroup.com/DMC/*). *Paper submitted for publication.*

Abstract

- There is no unambiguous scientific tool or method that provides an unbiased solution to the ROI problem of disease management programs. The ambiguity regarding the true value of population health should be seen in the same light as Dr. Osler's saw medicine in the 19th century: "Medicine is a science of uncertainty and an art of probability." Health of individuals and populations are in constant motion over time ... regressing, progressing, and the tools needed to optimize the value of population health are also a "science of uncertainty and an art of probability."
- This seminar will discuss a probabilistic science of population health assessment--one based on time and motion of individuals and population--and its use in making pragmatic decisions about the optimization of resource allocation in population health management.