Moving from R&D to Sales and Marketing: the business analytics experience of a statistician at Lilly

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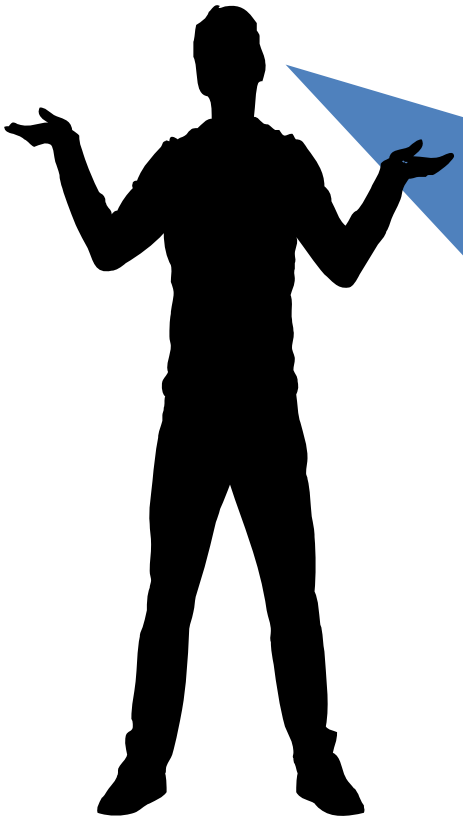
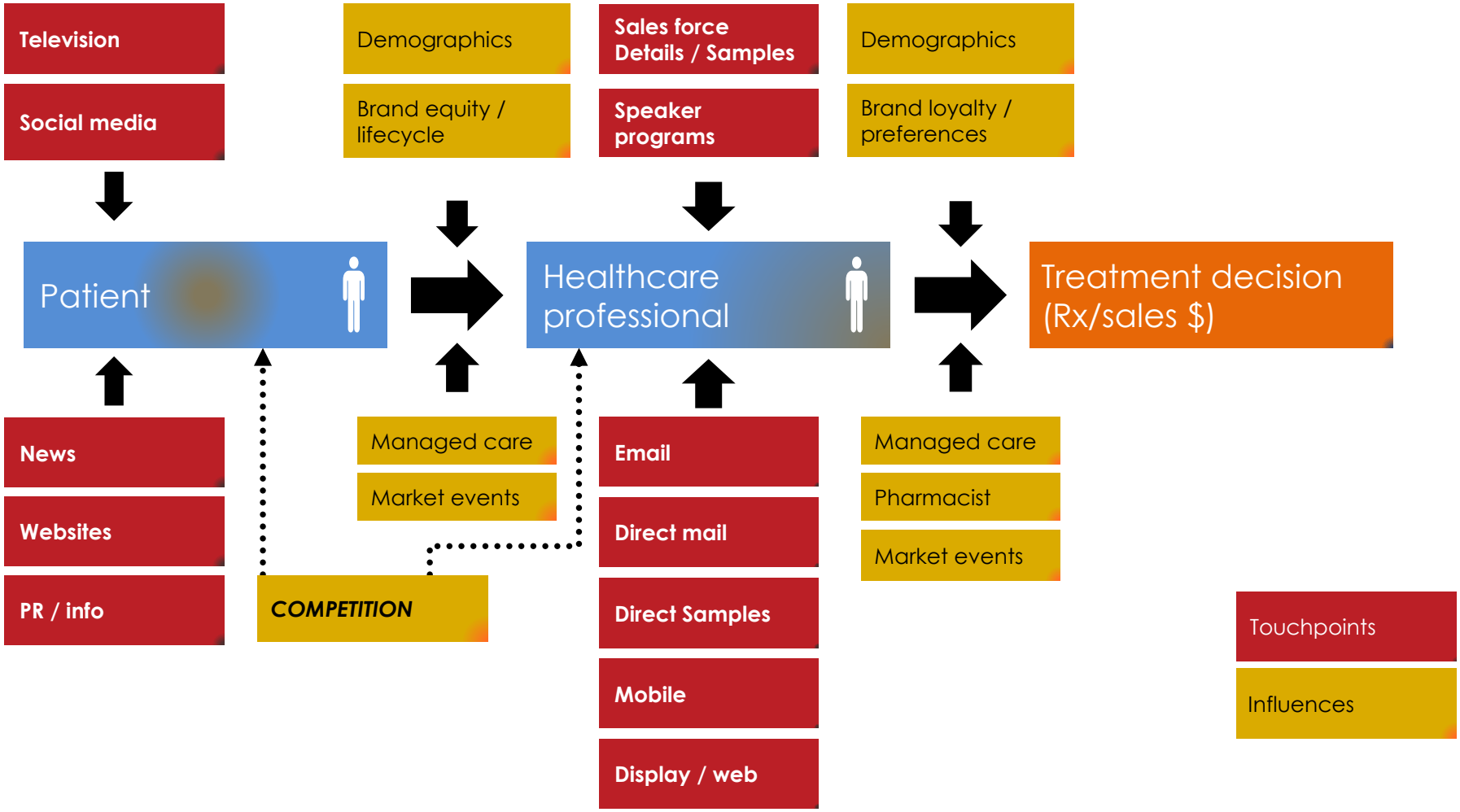
Questions in Sales and Marketing



How do we sell a portfolio of diabetes products?

Healthcare Ecosystem

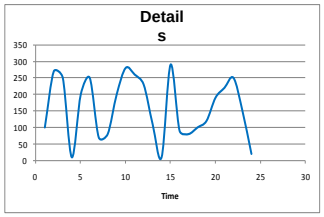


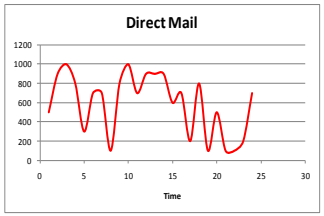
Data Sources

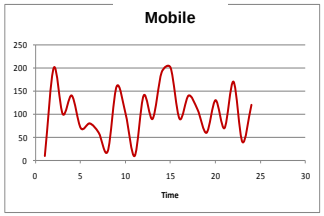
- Patient Longitudinal Data
- Health Care Professional Data
- Wholesaler Distribution/Inventory Data
- Market Research Data
- Marketing Touchpoints Data

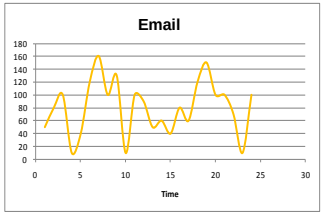
Modeling Process

Input data (touchpoints)



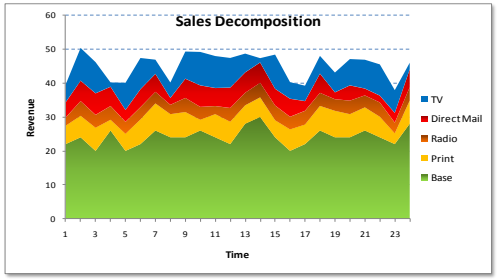






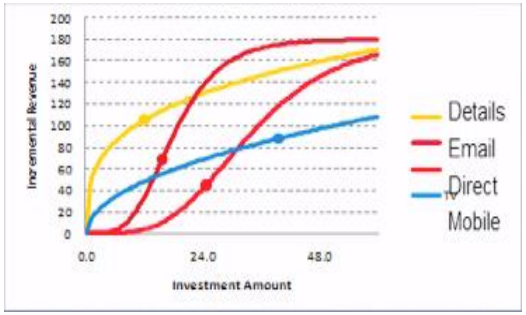
Statistical models

$$y_t = \alpha + \sum_{i=1}^{p} \beta_i x_{it}^{p_i} + \varepsilon_t$$

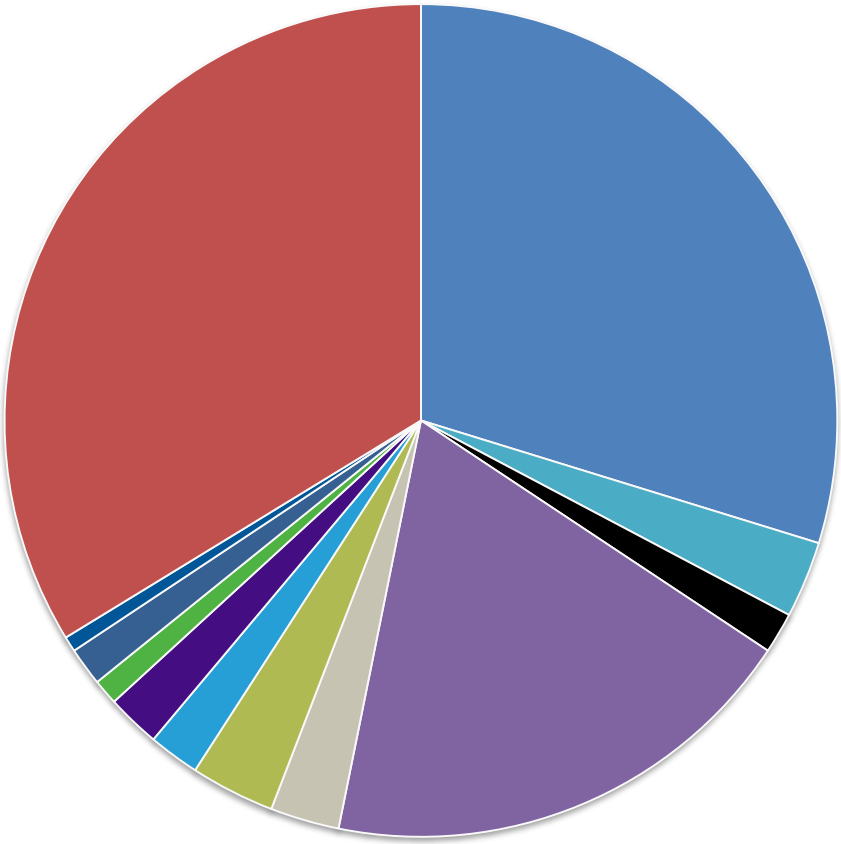


Brand sales = "*B*" x units of touchpoint

Output data (impact per touchpoint)



Touchpoint Contributions to NRx



34% carryover

1% Iconnect DM

1% email

1% direct mail

2% speaker programs

2% paid search

3% digital display

30% details

3% samples details

1% sports TV

19% national TV

3% print (news)

Design/Build Phase – Selection of Data Level

Analysis on disaggregated data with random effects yields insight refinement

Aggregation of Customers

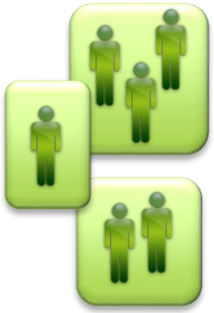
Provides directional insights by Touchpoint

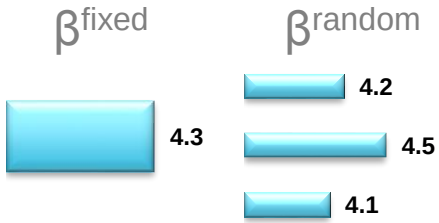
Level of Insights

Estimation of touchpoint impact on outcomes in **aggregate** ("fixed effect")

Segmentation of Customers

Provides granular insights by Touchpoint and Segment

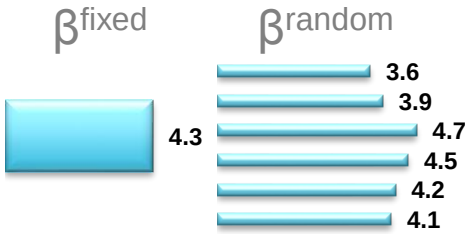




Estimation of touchpoint impact on outcomes by **Customer Segment** ("fixed and random effects")

Customer Level

Provides granular insights by Touchpoint and Customer

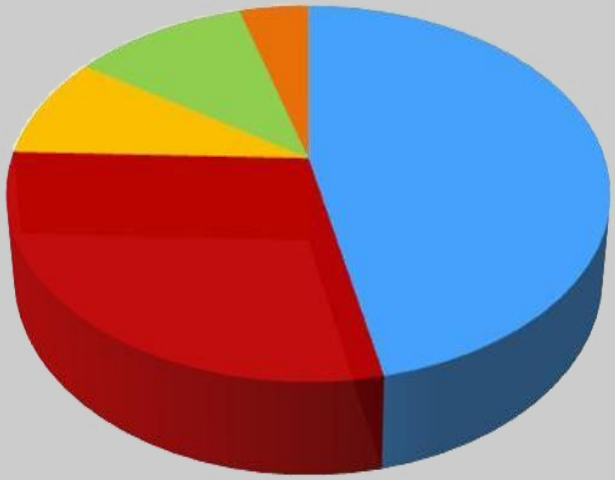


Estimation of touchpoint impact on outcomes by **Customer** ("fixed and random effects")

* Fixed effect example; 1 detail generates 4.3 Rx

HYPOTHETICAL DATA

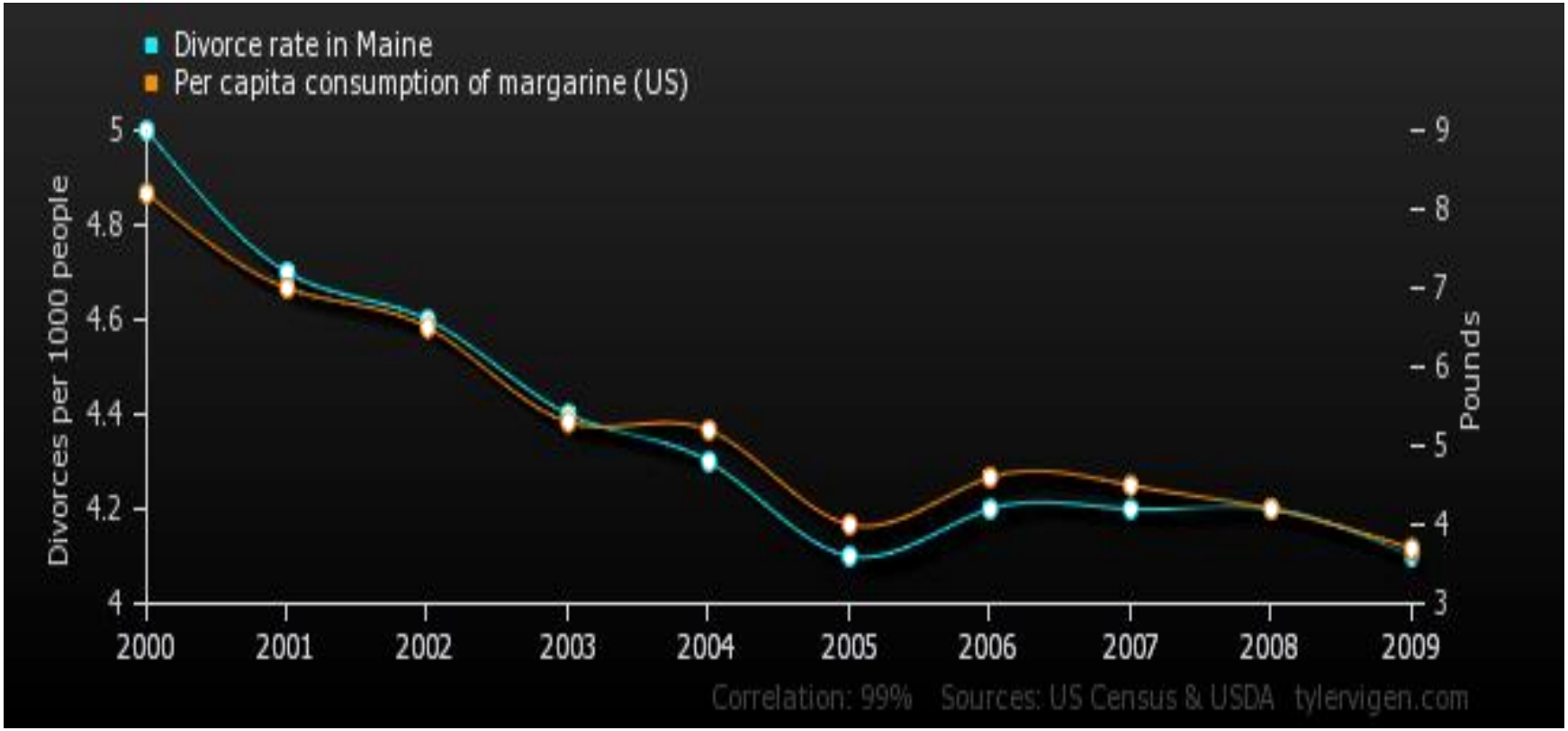
Aggregate Touchpoint Impact vs Customer Experience



While the models will produce a result that can be summarized as a "total Trx contribution" of each touchpoint…

…the reality is that "total contribution" is an aggregation of a unique set of touchpoint impact experiences that vary by customer

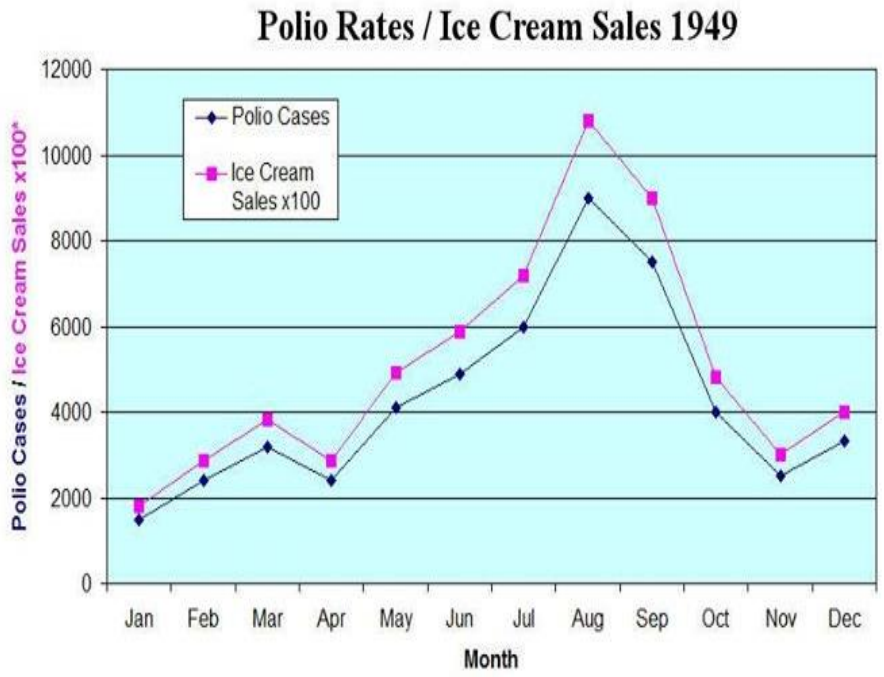
Some Pitfalls



Source: CDC and USDA

Some Pitfalls

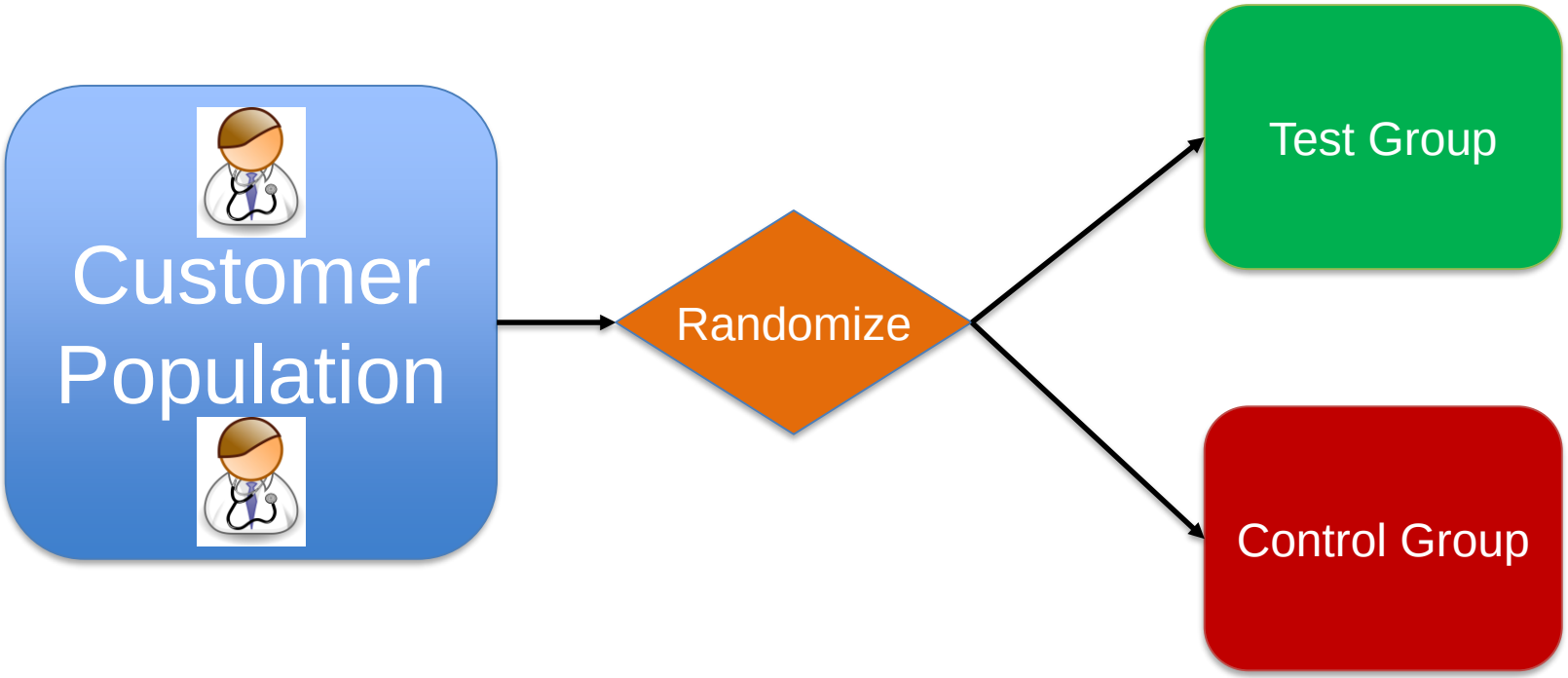
The Real Cause of Polio!



Eliminating ice cream was recommended as part of an anti-polio diet!

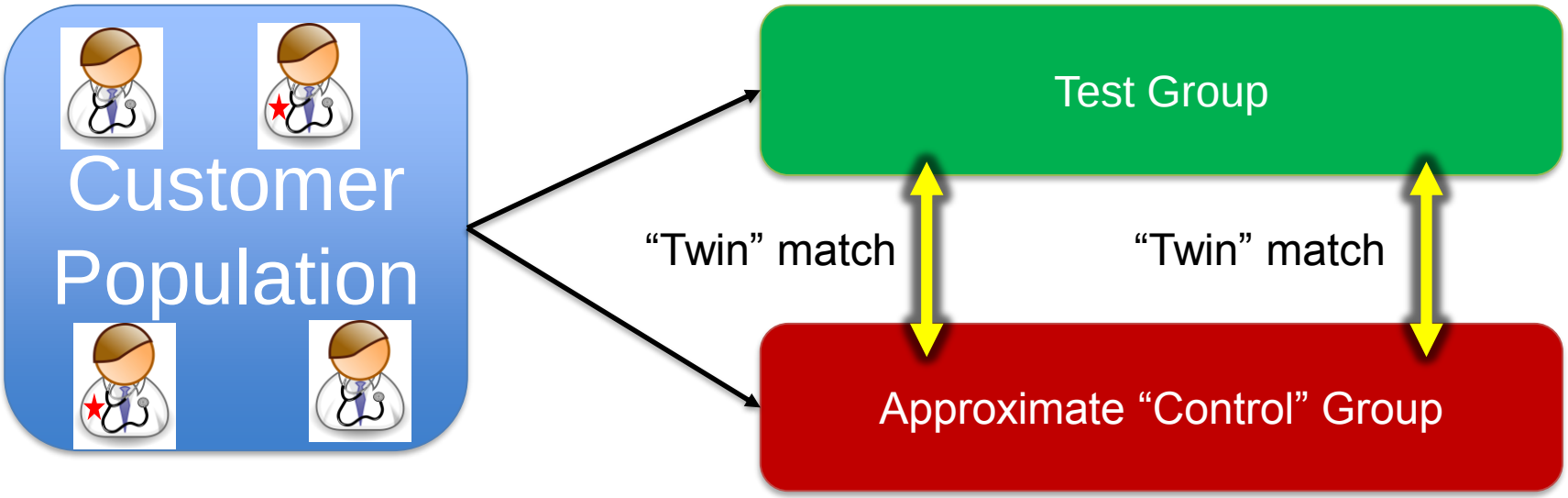
Remedy: Prospective Test-Control

- Gold standard method of determining effectiveness
- Only way to scientifically prove cause-and-effect relationships
- The process of randomization into test groups and control groups guarantees that the observed difference between them must be due to the treatment, and no other extraneous factors



Remedy: Retrospective Match-Control

- Next best option to prospective test-control
- Does NOT guarantee cause-and-effect relationships, but gets us closer
- The idea is that for each customer in the test group, we find a “twin” customer that did not receive the treatment (“control” group)
- “Twins” are customers that are similar to the test customer based on the criteria that we specify (historical Rx behavior, Details, emails, etc.)



Conclusions

- Vast amount of data in healthcare space available for drawing insights
- We need to understand how to use it properly
- Right data, even if not big, can be more valuable than Big data that is not right
- While data is useful, smart analytics is needed to make the data come alive