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?
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

\[ y_t = \alpha + \sum_{i=1}^{P} \beta_i x_{it}^{P_i} + \epsilon_t \]

Output data (impact per touchpoint)

Brand sales = “B” x units of touchpoint

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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

Level of Insights

- **β\text{fixed}**
  - Customer Level: 4.3
  - Estimation of touchpoint impact on outcomes in aggregate ("fixed effect")

- **β\text{random}**
  - Customer Segment: 4.2, 4.5, 4.1
  - Estimation of touchpoint impact on outcomes by Customer Segment ("fixed and random effects")

- **β\text{fixed}**
  - **β\text{random}**
  - Customer: 3.6, 3.9, 4.7, 4.5, 4.2, 4.1
  - 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