Response to Surveys of High-Profile Topics:
The Effects of Media Coverage and Public Engagement on Response to the National 2009 H1N1 Flu Survey

Nicholas D. Davis¹, James A. Singleton² and Lina Balluz²
¹ NORC at the University of Chicago
² Centers for Disease Control and Prevention

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The findings and conclusions in this paper are those of the authors and do not necessarily represent the views of Centers for Disease Control and Prevention.

Existing Literature Addressing the Effect of Topic Interest on Survey Participation
• Groves, Singer, Corning (2000) establish Leverage-Saliency Theory of survey participation
• Groves, Presser, Dipko (2004) show that interest in survey topic affects decision to participate, can induce response bias

Goal of this Study:
• Do large-scale, nationwide changes in media coverage and public interest in a survey’s topic affect response rates?
• What does this mean for administering surveys of timely topics?
• Case study: National 2009 H1N1 Flu Survey (NHFS)
  • Administered during a time of variable public awareness of the flu and flu illness related to spikes in media coverage

Introduction

• Sponsored by Centers for Disease Control and Prevention, October 2009 – June 2010
• Measures 2009 influenza A (H1N1) pandemic (pH1N1) and seasonal influenza vaccination coverage of persons in the U.S. aged 6 months+
• Landline and Cell Phone Sample Frames

NHFS Background
• Five-Week Rolling Sample
  • Sample released each week
  • Attempted contact continued for 5 weeks

We are conducting a nationwide study of the swine flu pandemic, also known as the 2009 H1N1 influenza virus...
Data

- NHFS Data:
  - Weekly CASRO and component (resolution, screener completion, interview completion) rates
  - Responses to survey items (complete interviews only)

- Behavioral Risk Factor Surveillance System (BRFSS) Data Compared as Control:
  - Monthly CASRO response rate
  - Monthly resolution and cooperation rate (screener x interview)
  - Responses to select survey items (complete interviews only)

- Media Coverage and Public Engagement Data:
  - Google News US hit volume by week; search terms "H1N1", "flu shot", "flu vaccine", and "swine flu"
  - Google Search volume by week; same search terms

Google Search and News Volume

- Media coverage and public engagement spiked in late October and early November, then declined
- Values shown are relative to baseline volume
- Natural log transformation used to linearize

NHFS Response Rates
Components of the CASRO response rate:
• Resolution: Resolved as residential, non-working, out-of-scope.
• Screener Completion: Households completing the screener
  • Landline – Verify adult is on the line
  • Cell – Verify adult is on the line, and household is cell only/mainly
• Interview Completion: Screened households completing survey
  • Provide current-season H1N1 and seasonal vaccination status

CASRO = (resolution rate) x (screener comp. rate) x (interview comp. rate)

NHFS CASRO Rate

• CASRO spiked in late October and fell through the first 34 weeks of survey
• Final five weeks of release removed to allow full response period

NHFS Resolution and Screener Completion Rates

Weaker trend seen in resolution rate.
No such trend in screener completion rate.
NHFS Interview Completion Rate

- Trend mostly explained by changes in interview completion rate

\[ R^2 = 0.2293 \]

40% 42% 44% 46% 48% 50%

Week of Sample Release

BRFSS CASRO Rate Comparison

- Monthly BRFSS CASRO displays a weaker similar trend
- Later peak
- Mostly due to changes in resolution rate

50% 52% 54% 56% 58% 60%

Oct Nov Dec Jan Feb Mar Apr May

Month of Sample Release

BRFSS Cooperation Rate Comparison

- No such trend in BRFSS cooperation rate
- Cooperation rate = (screener completion x interview completion)
Modeling the Effects of Media Coverage on the Interview Completion Rate

Removing the Linear Trend

Subtracting the linear trend from the raw interview completion rates yields residuals centered at zero.

Residual Interview Completion Rate

Residual Google Search and News Volume

• Perform the same transformation on the log of the relative Google News hit and Google Search volume
  • Log transformation necessary to linearize the data
  • Average data from week of release and prior week
  • For modeling, we use only Google News data
Correlation

Model Specification

- Linear Regression Model

  Dependent Variable:
  - Residual Interview Completion rate

  Covariate:
  - Residual log relative Google News hit volume, average over week of sample release and prior week

  34 Data Points (one per week of sample release)

  Weighted by number of screened, eligible households identified during each week of release

Results

- Results suggest that fluctuations in the volume of Google News hits can predict changes in NHFS interview completion rates in the short term.

<table>
<thead>
<tr>
<th>Model Selection Order</th>
<th>Covariate</th>
<th>Parameter Estimate</th>
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<th>P-Value</th>
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Conclusion and Limitations

- Some correlation between volume of influenza news on the internet and NHFS response rates

- Limitations:
  - Results may be explained by other external factors
  - Geographical variations
  - Availability of flu vaccinations
  - Small sample size
  - 34 observations
  - Single study results

Response Rates and Bias

- Previous work showed potential for non-response bias in survey estimates
  - Singleton, Copeland, Davis et al (2010) found that late responders to the NHFS were less likely to report H1N1 and seasonal flu vaccination
  - To the extent that late responders might be similar to non-responders, this suggests the potential for non-response bias

- Comparison of vaccination coverage estimates to BRFSS Kaplan-Meier estimates reveals higher NHFS estimates.
  - On average, monthly H1N1 coverage estimates about 3 percent higher than BRFSS
  - For seasonal, about 4 percentage points
  - Related to topic interest motivated by media coverage?
Implications for Surveys of High-Profile Topics

- Survey design should balance the need for timely estimates with allowing adequate time for response
  - NHFS allowed up to 5 weeks to respond
- Potential for response bias predicted by Leverage-Saliency theory may be mitigated
  - Including in other established, more general surveys
  - Strategic phrasing of introductory text
- Serial cross-sectional surveys should monitor response rates, sample characteristics, key outcomes, and external measures (e.g., Google volume) over time

Future Work

- Obtain Google data by state, or possibly metro area or media market
  - Larger sample sizes for regression analysis
  - Address potential regional differences in media and Google activity
- Examine changes in additional survey response items over time to further gauge potential for non-response bias
  - Demographic changes
  - Membership in high-risk or priority groups
- Compare NHFS and BRFSS outcomes by month of interview
  - NHFS:BRFSS estimates of pH1N1 and seasonal vaccination coverage by month

References

Thank You

davis-nicholas@norc.org