Examining the Effectiveness of Push-To-Web Mixed Mode Approaches on Response Rates in an Emergency Department Setting – A Randomized Study

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Disclosure

The data on which this presentation is based were collected under contract number HHSM-500-2016-00093G, entitled, “Preparation for National Implementation of the Emergency Department Patient Experience of Care Discharged to Community Survey,” funded by the Centers for Medicare & Medicaid Services, Department of Health and Human Services. The content of this publication neither necessarily reflect the views or policies of the Department of Health and Human Services nor does the mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government. The authors assume full responsibility for the accuracy and completeness of the ideas presented.
What I plan to cover

- Overview
- Experiment Design
- Response Rates
- Protocol Comparisons
- Respondent Characteristics
- Contact Method
- Timing of Completes
- Paradata
- Lessons Learned
Emergency Department Visits Are Common

- Nationwide >130 million ED visits annually
  - ~42 visits per 100 persons per year
- Most patients walk in
  - ~15% arrive by ambulance
- Common reasons for visit:
  - Stomach/abdominal pain, Chest pain, Cough
  - Fever, Headache, Back symptoms
  - Shortness of breath, Pain, Vomiting
  - Throat symptoms
Majority of ED Patients are Discharged Home

- Discharged to Community: 80%
- Admitted to Hospital: 4%
- Admitted to Observation: 2%
- Left before completing visit: 1%
- Other: 0%

Percentage of All Visits
EDPEC Survey Development

- Development began in 2012
  - Call for Topics, Literature Review, Focus Groups, Technical Expert Panel
  - Ongoing meetings with the CAHPS® Instrument Team
  - Cognitive testing of potential survey items

- Field test conducted in 2013-2014 with 12 hospitals
  - Response rate 19.8%
  - Contact information for ED DTC patients less accurate and less complete vs. admitted patients
EDPEC Survey History

- Mode experiment conducted in 2016 with 50 hospitals
  - To examine effect of survey mode on who responds, and how
  - Response rate 20.3%

- Feasibility Test I conducted in 2016 with 8 hospitals
  - To explore novel administration modes
  - Within-ED survey distribution was logistically infeasible
    - Response rate 9.3%
  - Web-only survey administrations had very low response
    - Response rate < 5%
Feasibility Test II (2018): Objectives

- Test novel approaches to improve response rates to the EDPEC Survey
- Improve representativeness of respondents
- Examine different push-to-web strategies
- Decrease lag time (time from ED discharge to survey completion)
- Explore challenges associated with collection of contact information needed for a web-first approach
Feasibility Test II Design

- 16 participating hospitals
- January 1 to March 30, 2018 discharges
- Sampled ~ 1,600 DTC patients per hospital
- Patients randomized within hospital to 1 of 9 survey arms
Push-to-Web Strategies

- 8 experimental arms involved some form of push-to-web
  - Email invitations/reminders
  - Text message invitations/reminders
  - Mailed survey invitations containing login URL + PIN code
    and scannable QR code

- Note a standard mixed mode (mail followed by phone follow-up) was also included in the design for comparison purposes
## Feasibility Test II Design

<table>
<thead>
<tr>
<th></th>
<th>Arm 1</th>
<th>Arm 2</th>
<th>Arm 3</th>
<th>Arm 4</th>
<th>Arm 5</th>
<th>Arm 6 (SMM)</th>
<th>Arm 7</th>
<th>Arm 8</th>
<th>Arm 9</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Push-to-Web</strong></td>
<td>Web Invite</td>
<td>Email</td>
<td>Mail with QR</td>
<td>Email</td>
<td>Email</td>
<td>-</td>
<td>Text</td>
<td>Mail with QR</td>
<td>Mail Non-QR</td>
</tr>
<tr>
<td></td>
<td>Web reminder</td>
<td>Email Day 2,4,6</td>
<td>Email Day 6,8</td>
<td>Email Day 2,4,6</td>
<td>Email Day 2,4,6</td>
<td>-</td>
<td>Email Day 2</td>
<td>Email Day 6</td>
<td>Email Day 6,8</td>
</tr>
<tr>
<td><strong>Other Modes</strong></td>
<td>Survey mailing Day 8, 22</td>
<td>Survey mailing Day 8, 22</td>
<td>Survey mailing Day 14</td>
<td>Phone Day 8</td>
<td>Survey mailing Day 8</td>
<td>Survey mailing Day 8, 22</td>
<td>Survey mailing Day 14</td>
<td>Survey mailing Day 8, 22</td>
<td></td>
</tr>
</tbody>
</table>
Feasibility Test II Results: Response Rates

- Overall response rate (across all 9 arms): 18.6%
- Highest overall response rate (Arm 5: email+mail+phone): 27.3%
  - Among patients with email, response rate in this arm was 34.7%*
  - Compared to standard mixed-mode (Arm 6) response rate among patients with email of 27.5%
- Higher percentage of web completions in text arms (Arm 7 & Arm 8)
  - However, number of completions in text arms still lower than in standard mixed-mode (Arm 6)
# Response Rates by Arm

<table>
<thead>
<tr>
<th>Arm 1</th>
<th>Arm 2</th>
<th>Arm 3</th>
<th>Arm 4</th>
<th>Arm 5</th>
<th>Arm 6 (SMM)</th>
<th>Arm 7</th>
<th>Arm 8</th>
<th>Arm 9</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email (x4) + Mail (x2)</td>
<td>Paper Invite + Email (x2) + Mail (x2)</td>
<td>Paper Invite + Email (x3) + Mail</td>
<td>Email (x4) + Phone</td>
<td>Email (x4) + Mail + Phone</td>
<td>Mail + Phone</td>
<td>Text + Email + Text + Email (x2) + Mail</td>
<td>Paper Invite + Email (x2) + Mail (x2)</td>
<td>Paper Invite (URL only) + Email (x2) + Mail</td>
<td></td>
</tr>
<tr>
<td>N Sampled</td>
<td>3195</td>
<td>2848</td>
<td>2846</td>
<td>3193</td>
<td>3192</td>
<td>2844</td>
<td>3191</td>
<td>2841</td>
<td>26991</td>
</tr>
<tr>
<td>N Ineligible</td>
<td>45 (1.4%)</td>
<td>49 (1.7%)</td>
<td>26 (0.9%)</td>
<td>152 (4.8%)</td>
<td>172 (5.4%)</td>
<td>137 (4.8%)</td>
<td>38 (1.2%)</td>
<td>36 (1.3%)</td>
<td>49 (1.7%)</td>
</tr>
<tr>
<td>N Respondents</td>
<td>482</td>
<td>433</td>
<td>378</td>
<td>697</td>
<td>824</td>
<td>690</td>
<td>555</td>
<td>405</td>
<td>429</td>
</tr>
<tr>
<td>Response Rate among Eligible</td>
<td>15.3%***</td>
<td>15.5%***</td>
<td>13.4%***</td>
<td>22.9%*</td>
<td>27.3%</td>
<td>25.5% (ref)</td>
<td>17.6%***</td>
<td>14.4%***</td>
<td>15.4%***</td>
</tr>
</tbody>
</table>

*p<0.05,**0.05≤p<0.01,*** 0.01 ≤ p<0.001
Protocol Comparisons

- The following protocol variations resulted in a significant increase in response rate (p<.05):
  - The use of a combination of text invitation/reminder and email reminders rather than only email invitation/reminders
  - Adding a second mailing instead of a third reminder email
  - The use of phone in place of the second mailing
  - The addition of a mailing on top of email and phone

- We saw no significant increase in response rate from these protocol variations:
  - A paper invitation instead of 2 additional email reminders
  - The addition of a QR code to the paper invitation
  - The addition of web to the standard mixed mode protocol
Characteristics of Survey Respondents

- Web respondents were more likely:
  - Female
  - More highly educated
  - Visiting the ED for a new health problem
  - But less likely to arrive to the ED in an ambulance

- Mail respondents were more likely:
  - Older
  - Use more proxy assistance
  - Arrive to the ED in an ambulance
Respondent Characteristics (Cont.)

- Telephone respondents were more likely to be:
  - Somewhat younger than mail respondents
  - Hispanic, Black, or Multiracial
  - Primary Spanish speakers
  - In somewhat poorer mental and overall health
  - More frequent visitors to the ER in the last 6 months
  - But less likely to have a primary care doctor

- Inclusion of a phone component in a protocol (Arms 4, 5 and 6) increases representation of younger, minority, and less healthy respondents
Contact Method for Web Invitation

- 19.3% of sampled patients had both an email address and could be texted
- 10.5% of sampled patients had only an email address
- 39.9% of sampled patients could only be texted (not emailed)
- Remaining 30.3% of sampled patients had neither
- Texting dramatically increased the reach of the web survey
Time from First Attempt to Completed Survey

- Arm 6: Standard Mixed Mode (Mail + Phone)
Time from First Attempt to Completed Survey (Cont.)

- Arm 7: Text, Email, Text, Email, Mail x2
## Paradata – Device Type

<table>
<thead>
<tr>
<th></th>
<th>Arm 1</th>
<th>Arm 2</th>
<th>Arm 3</th>
<th>Arm 4</th>
<th>Arm 5</th>
<th>Arm 6 (SMM)</th>
<th>Arm 7</th>
<th>Arm 8</th>
<th>Arm 9</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Email (x4) + Mail (x2)</td>
<td>Paper Invite + Email (x2) + Mail (x2)</td>
<td>Paper Invite + Email (x3) + Mail</td>
<td>Email (x4) + Phone</td>
<td>Email (x4) + Mail + Phone</td>
<td>Mail + Phone</td>
<td>Text + Email + Text + Email + Mail (x2)</td>
<td>Paper Invite + Email (x2) + Mail</td>
<td>Paper Invite (URL only) + Email (x2) + Mail (x2)</td>
<td></td>
</tr>
<tr>
<td>Tablet</td>
<td>6.9% (12)</td>
<td>3.6% (5)</td>
<td>4.4% (8)</td>
<td>5.4% (8)</td>
<td>8.0% (13)</td>
<td>-</td>
<td>3.8% (9)</td>
<td>3.8% (8)</td>
<td>7.1% (11)</td>
<td>5.3% (74)</td>
</tr>
<tr>
<td>Computer</td>
<td>34.7% (60)</td>
<td>44.3% (62)</td>
<td>42.3% (77)</td>
<td>38.1% (56)</td>
<td>35.0% (57)</td>
<td>-</td>
<td>23.5% (56)</td>
<td>27.3% (57)</td>
<td>48.7% (76)</td>
<td>35.6% (501)</td>
</tr>
<tr>
<td>Smartphone</td>
<td>58.4% (101)</td>
<td>52.1% (73)</td>
<td>53.3% (97)</td>
<td>56.5% (83)</td>
<td>57.1% (93)</td>
<td>-</td>
<td>72.7% (173)</td>
<td>68.9% (144)</td>
<td>44.2% (69)</td>
<td>59.2% (833)</td>
</tr>
</tbody>
</table>

Note: All paradata includes an additional 4 late responders. One case had an unknown device type in Arm 3.
## Paradata – Access Method

<table>
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<td>Paper Invite + Email (x3) + Mail</td>
<td>Email (x4) + Phone</td>
<td>Email (x4) + Mail + Phone</td>
<td>Mail + Phone</td>
<td>Text + Email + Invite + Email (x2) + Mail</td>
<td>Paper Invite + URL only + Email + Mail (x2)</td>
<td>Paper Invite (URL only) + Email (x2) + Mail</td>
</tr>
</tbody>
</table>

### Email
- **Arm 1**: 100% (173)
- **Arm 2**: 71% (100)
- **Arm 3**: 77% (123)
- **Arm 4**: 100% (147)
- **Arm 5**: 100% (163)
- **Arm 6**: -
- **Arm 7**: 50% (118)
- **Arm 8**: 45% (95)
- **Arm 9**: 73% (114)

### Text
- **Arm 1**: -
- **Arm 2**: -
- **Arm 3**: -
- **Arm 4**: -
- **Arm 5**: -
- **Arm 6**: -
- **Arm 7**: 50% (120)
- **Arm 8**: 33% (69)
- **Arm 9**: -

### QR Code
- **Arm 1**: -
- **Arm 2**: 6% (8)
- **Arm 3**: 3% (6)
- **Arm 4**: -
- **Arm 5**: -
- **Arm 6**: -
- **Arm 7**: 5% (10)
- **Arm 8**: -
- **Arm 9**: -

### Address Bar
- **Arm 1**: -
- **Arm 2**: 23% (32)
- **Arm 3**: 24% (44)
- **Arm 4**: -
- **Arm 5**: -
- **Arm 6**: -
- **Arm 7**: 17% (35)
- **Arm 8**: 27% (42)
- **Arm 9**: -

Note: All paradata includes an additional 4 late responders.
Lessons from Feasibility Test II

**CAUTION – Results are not generalizable across all EDs**

- Overall, response rates in the ED setting are low regardless of administration protocol. No arm performed significantly better than standard mixed mode.

- Email coverage varies dramatically by hospital

- Using text messages increases the reach of the survey, but hospitals need to consider TCPA regulations and administrative procedures before adding this mode of contact
Feasibility Test II Lessons (Cont.)

- Response rates were improved by offering multiple sequential modes for survey invitations and survey administration

- A push-to-web focus did result in respondents using the web survey
  - The majority of web completers used a smartphone device. Mobile optimization is important.
  - Web survey respondents are able to and did respond within a short timeframe
Feasibility Test II Lessons (Cont.)

- Respondent characteristics differ by mode and access to the web, so multiple modes are needed to ensure a representative sample

- Although the most expensive mode, phone surveys do capture a segment of the population that may not respond otherwise and increased response rates
Thank you

- Kirsten Becker, becker@rand.org
- Layla Parast, parast@rand.org
Back up slides if needed
## Responses by Completion Mode within Arm

<table>
<thead>
<tr>
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<td>Mail + Phone</td>
<td>Text + Email + Text + Email + Mail</td>
<td>Paper Invite + Text + Email (x2) + Mail</td>
<td>Paper Invite (URL only) + Email (x2) + Mail</td>
</tr>
<tr>
<td>Web</td>
<td>173 (35.9%)</td>
<td>140 (32.3%)</td>
<td>181 (47.9%)</td>
<td>146 (21.0%)</td>
<td>163 (19.8%)</td>
<td>--</td>
<td>237 (42.7%)</td>
<td>209 (51.6%)</td>
</tr>
<tr>
<td>Mail</td>
<td>309 (64.1%)</td>
<td>293 (67.7%)</td>
<td>197 (52.1%)</td>
<td>--</td>
<td>236 (28.6%)</td>
<td>280 (40.6%)</td>
<td>318 (57.3%)</td>
<td>196 (48.4%)</td>
</tr>
<tr>
<td>Phone</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>551 (79.1%)</td>
<td>425 (51.6%)</td>
<td>410 (59.4%)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total Response (RR)</td>
<td>482 (15.3%)</td>
<td>433 (15.5%)</td>
<td>378 (13.4%)</td>
<td>697 (22.9%)</td>
<td>824 (27.3%)</td>
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