The Use of Web-Based Electronic Surveys to Promote Pertussis Vaccination in University Employees

Elizabeth Gardner, MSN, FNP
Capstone Defense
May 2011
Introduction

• Pertussis- well known to cause serious illness in children and adults (Kretsinger et al. 2006)

• Previously controlled by effective childhood immunization programs

• Now reemerging, especially in adults and teens (Wendelboe, Van Rie, Salmaso, & Englund, 2005).

• Scattered outbreaks and epidemics in some states
Problem

• Educational facilities more susceptible to outbreaks  
  (Berger, et al., 2010, Kretsinger et al., 2006, Matthews, Armstrong & Spencer, 2008).

• Effective, underused vaccination available

• Question: How to effectively inform university employees they need to be vaccinated?
Possible Solution: Web-based surveys

• Advantages
  • Inexpensive
  • Design options
  • Easy to handle data
  • Work well in closed populations  

• Drawbacks
  • Poor response rates (33%)  
    (Dobrow et al., 2008; Manfreda et al. 2008)
Purpose

1. Determine to what degree a web-based survey stimulates TWU employee intention to obtain a pertussis booster vaccination.

2. Investigate effectiveness of web-based survey as compared to public awareness campaigns.
Research Questions

Research Question
Is the use of a web-based, interactive educational survey an effective means of stimulating intention to obtain pertussis vaccination as compared to public awareness campaigns?

Hypothesis
There will be significant difference in survey respondents’ levels of intention to obtain a pertussis vaccine as compared to respondents surveyed following a Texas public awareness campaign.

Null Hypothesis
There will be no significant difference in survey respondents’ levels of intention to obtain a pertussis vaccine as compared to respondents surveyed following a Texas public awareness campaign.
Theoretical Frameworks and Assumptions

Persons commit to engaging in behaviors that they believe they will benefit from.

Health care providers can influence health-promoting behaviors

Perceived barriers to care as constrain commitment to action.

There is a need to commit to a plan of action. (Health Promotion Model, 2010)

The relationship between awareness, knowledge, intention and behavior

Awareness is a state of knowledge. (Awareness, 2011)

Knowledge is associated with intention to perform certain health-seeking behaviors: colorectal cancer screening, be screened for cognitive difficulties, to seek help from professional sources (Galvin, et al. 2008, McCaffery, Wardle, and Waller 2003, Werner, 2003)

A person is likely to perform a behavior if they have knowledge, skills and strong intention (Glantz et al., 2008)
<table>
<thead>
<tr>
<th>Definition of Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Awareness</strong></td>
</tr>
<tr>
<td>A state having or showing realization, perception, or knowledge (Awareness, 2011)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Intention</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>A purpose or an anticipated outcome that guides planned actions (Intention, n.d.b).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Public Awareness Campaign (PAC)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Informs the public about an issue or new obligation, almost of all of which are considered to be in the public interest (Public Awareness Campaigns, n.d.).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Web-based Interactive Educational Survey</strong></th>
</tr>
</thead>
</table>
| • Hypertext markup language (HTML) common-gateway-interface (cgi) to construct, format, and administer questionnaires  
• Systematically collects data about populations  
• Develops knowledge through a learning process.  
• A two-way electronic communication structure provide feedback in response to the input of the participant. | Texas Woman’s University Pertussis Immunization Survey. (Smith, 1997; Surveys, 2010; Education, 2009; Interactive, 2011). |
Study Population

Study population
- TWU employees (1996)
- Gender (faculty and staff): female- 69%; male-31%.
- Age (staff) :8% <30; 20%, 30 -39; 24 %, 40- 49; 30% , 50 - 59, 19%,> 60 (TWU 2010b).
- Faculty-21.7%, ;staff- 41.5%;adjuncts -7.2%; GA-19.6%
- Employment Site :Denton -81.0% Houston 10.0% Dallas 7.1% Presbyterian -1.8%.

PAC population
- Women with infants two years of age or younger, average age= 35.
- 800 randomly contacted by phone
- 800 contacted after two months after media campaign
### Literature Review

| Advantages of using web-based surveys. | Fan & Yan, 2010; Sue & Ritter, 2007; Wright, 2005. | Inexpensive  
Easy data handling  
Flexible formats |
| --- | --- | --- |
| Disadvantages of web-based surveys. | Cook, Heath, & Thompson, 2000; Dobrow et al., 2008; Manfreda et al., 2008; Kaplowitz, Hadlock, & Levine, 2004; Wright, 2005 | Access to computer  
Response rates |
| Surveys as teaching tool | Weingart and Anderson (2000) | Inadvertent finding |
| Techniques to enhance response rates to electronic surveys | Anseel et al., 2010; Edwards et al., 2009; Fan and Yan, 2009 | • Short length  
• Anonymous  
• Deadline  
• White background  
• Avoid word “survey”  
• Reminder |
| Characteristics of survey respondents | Anseel et al., 2010; Fan and Yan, 2009 | Conscientious, agreeable openness |
| Effectiveness of Public Awareness Campaigns | Grilli, Ramsay, and Minozzi, 2009; Kretsinger et al., 2006. | Variably effective |
Instrumentation

1. Nine-question educational component
2. One question measured number of years since last pertussis vaccination
3. Two questions measured intention to obtain vaccination for self or recommend to family member.
4. Five demographic questions.

• Developed using the Lynn criteria (Lynn, 1983).
• Sent to all TWU employees with email address
Statistical Analysis Plan

- Survey response rate.
- Respondents:
  - Likelihood of obtaining
  - Likelihood of recommending
- Percentage already vaccinated
- A one-sample z-test for proportions.
  - Power Analysis:
    Group of 64 for a power of 0.90.
Results

Sample Size: N= 229:

147 (64.2 %) of response from first email, and 82 (35.8%) from second email

The total response rate :11.47%.

Age: Mean =49 (SD=12.031), range = 22 - 76.

Gender: Female=195 (87.8%) Male= 27 (12.2%).

Job Status: (full or part time), 40 (17.7%) part time and 185 (82.2%) full time.
Response Rates

Employment Classification
- Faculty: 61.5%
- GA: 2.8%
- Adjunct: 9.0%
- Staff: 26.7%

Employment Location
- Denton: 67.6%
- Houston: 11.6%
- Dallas-Parkland: 17.8%
- Presby: 3.1%
Response Rate By Job Classification

- Faculty: 61.5%
- GA: 2.8%
- Adjunct: 9.0%
- Staff: 26.7%
Response Rate by Job Classification

- Denton: 67.6%
- Houston: 17.8%
- Dallas-Parkland: 11.6%
- Presby: 3.1%
<table>
<thead>
<tr>
<th>Category</th>
<th>Rate of Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>13.6</td>
</tr>
<tr>
<td>Staff</td>
<td>16.4</td>
</tr>
<tr>
<td>Grad Assistant</td>
<td>1.5</td>
</tr>
<tr>
<td>Adjunct</td>
<td>5.8</td>
</tr>
</tbody>
</table>
Rate of Return By Campus

- Denton: 9.4%
- Houston: 13.0%
- Dallas: 28.0%
- Dallas Presby Hospital: 20.0%
Proportional Response Rates by Gender

![Bar chart showing response rates by gender](chart.png)

- Actual Percent: 31 (male) vs. 69 (female)
- Response Rate Percent: 12.2% (male) vs. 87.8% (female)

\(\chi^2 (1) = 31.712, p = 0.000\). There were significantly more female than male respondents.
Length of Time Since Last Pertussis Vaccination

- Less than 2 years: 5.2%
- 2 to 10 years: 7.0%
- More than 10 years: 24.5%
- Unknown: 58.5%
- Never vaccinated: 4.8%
Likelihood of Obtaining Vaccine for Self

- Not likely or a little likely: 37.8%
- Likely, very likely, or absolutely sure: 50.7%
- Vaccination is up-to-date: 11.6%
Likelihood of Recommending Vaccination for a Family Member

- Not likely or a little likely: 30.8%
- Likely, very likely, or absolutely sure: 69.2%
One-sample z-test

Proportions of likeliness to pursue vaccination vs. increased awareness:
z value= 10.15, CV= 1.96. Null hypothesis was rejected.

Proportions of likeliness to recommend vaccination vs. increased awareness:
z value= 14.40 ,CV= 1.96. Null hypothesis was rejected.
Quiz Results

• Questions 1, 2, 3, 4, 8, and 9. (93% to 100% correct answers)
• Q5- 17.9% - thought was a yearly vaccination
• Q6- 33.2%- knew immunity waned
• Q7 -30.6%- didn’t know who did not need booster
Participant Comments

• 55 comments.
• Themes-
  – Unaware of need
  – Questions about age limit
  – Questions about immunity after having pertussis
  – Had recently had vaccination
  – Had had pertussis
  – Recommendations for improvement of survey content
  – Did not access traditional medicine
Conclusions

• Vaccination rate twice as high
• Incremental potential change after survey
• Survey response rate low- ? from technical problems, survey fatigue
• Women more likely than men to respond- topic salience
• Web survey more effective than PAC
• Educational Points
  – Immunity wanes after vaccination and infection
  – Vaccination of persons over 65
  – Utilize Immtrac
Limitations & Recommendations

• Population vary by age, level of education, language, geographical location, and research methodology.

• Compare use of web-based survey in university and general population

• Repeat study with incentives, add PAC

http://www.youtube.com/watch?v=CQo2FJPLeQk
References


References


http://www.youtube.com/watch?v=CQo2FJPLeQk

# TWU Campus Stats

**As of 02/28/2011**

<table>
<thead>
<tr>
<th>Faculty</th>
<th>DEN</th>
<th>HOU</th>
<th>DED</th>
<th>DPH</th>
<th>Total Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Full-time faculty)</td>
<td>282</td>
<td>69</td>
<td>46</td>
<td>15</td>
<td>412</td>
</tr>
<tr>
<td>(Part-time faculty)</td>
<td>12</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total Faculty</strong></td>
<td>294</td>
<td>76</td>
<td>47</td>
<td>16</td>
<td>433</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Staff</th>
<th>DEN</th>
<th>HOU</th>
<th>DED</th>
<th>DPH</th>
<th>Total Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Full-time staff)</td>
<td>693</td>
<td>54</td>
<td>35</td>
<td>8</td>
<td>790</td>
</tr>
<tr>
<td>(Part-time staff)</td>
<td>26</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td><strong>Total Staff</strong></td>
<td>719</td>
<td>60</td>
<td>40</td>
<td>9</td>
<td>828</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grad Assts (GA)</th>
<th>DEN</th>
<th>HOU</th>
<th>DED</th>
<th>DPH</th>
<th>Total GA &amp; Adj</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>363</td>
<td>15</td>
<td>8</td>
<td>5</td>
<td>391</td>
</tr>
<tr>
<td>Adjuncts (ADJ)</td>
<td>242</td>
<td>49</td>
<td>48</td>
<td>5</td>
<td>344</td>
</tr>
<tr>
<td><strong>Total GA &amp; Adj</strong></td>
<td>605</td>
<td>64</td>
<td>56</td>
<td>10</td>
<td>735</td>
</tr>
</tbody>
</table>

| TWU Totals       | 1618 | 200 | 143 | 35  | 1996         |

---

**PLEASE NOTE:**

These figures exclude undergraduate students and temporary staff employees. Compensation & Classification
Fiscal Year 2010 Workforce Demographics

Summary

Of the institution’s staff employees, 72.3 percent are 40 years of age and older. The average length of employment at the institution for staff employees is 9.0 years.

In fiscal year 2010, 56.6 percent of faculty FTEs were tenure or tenure-track. The institution had a ratio of 17 student FTEs to 1 faculty FTE compared to a statewide ratio of 21 student FTEs to 1 faculty FTE.

Age: Staff

<table>
<thead>
<tr>
<th>Age</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 30 yrs</td>
<td>8%</td>
</tr>
<tr>
<td>30 - 39 yrs</td>
<td>20%</td>
</tr>
<tr>
<td>40 - 49 yrs</td>
<td>24%</td>
</tr>
<tr>
<td>50 - 59 yrs</td>
<td>30%</td>
</tr>
<tr>
<td>60 yrs and older</td>
<td>19%</td>
</tr>
</tbody>
</table>

Gender: Faculty and Staff

<table>
<thead>
<tr>
<th>Gender</th>
<th>Staff</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>69%</td>
<td>31%</td>
</tr>
<tr>
<td>Female</td>
<td>31%</td>
<td>69%</td>
</tr>
</tbody>
</table>

Ethnicity: Faculty and Staff

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>71%</td>
<td>12%</td>
<td>12%</td>
<td>4%</td>
</tr>
<tr>
<td>Faculty</td>
<td>82%</td>
<td>5%</td>
<td>3%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Welcome to this anonymous study. The return of your completed questionnaire constitutes your informed consent to act as a participant in this research. The purpose of this study to inform you of the reemergence of whooping cough (pertussis) and the need for adults and their family members to be vaccinated, to learn more about what you know about whooping cough, and to provide information and resources. It should take about five minutes to complete. Thank you in advance for your time.

TEST YOUR KNOWLEDGE!

Q1. Adults do not get ill from whooping cough.
Answer: False.
Although whooping cough usually does not make adults as sick as children, it can make some adults very ill.

Q2. Whooping cough (pertussis) is dangerous for infants and children.
Answer: True.
Before there was a vaccine, whooping cough was one of the most common causes of death in children. In California, ten infants have died in a pertussis outbreak in 2010.

Q3. Whooping cough no longer exists in the United States because of an effective vaccination program.
Answer: False.
Every year since 1976 there has been an increase in the number of cases in the US. In 2010, there was an outbreak in Texas and an epidemic in California.

Q4. Grandparents do not transmit whooping cough to their grandchildren.
Answer: False.
Whooping cough is easily passed from grandparents, parents, siblings, and caretakers to infants and children.

Q5. To prevent whooping cough, adolescents and adults must obtain a vaccination once a year, like the flu vaccine.
Answer: False.
The CDC is recommending that adolescents age 11 and older and adults up to the age of 64 get a tetanus, diphtheria, and whooping cough (Tdap) vaccination at least every 10 years.
Q6. Infants and children receive five pertussis shots. The last one is given at age 6. How many years does it take before you are no longer immune to pertussis?

1 to 4 years
5 to 10 years
11 to 20 years
d) It never wears off

Answer: b.
We have immunity to pertussis for 5 to 10 years after receiving childhood vaccinations. After that, a booster is necessary to maintain immunity against whooping cough.

Q.7 Which of the following groups DO NOT need a pertussis booster?
Adolescents between the ages of 11 and 18.
Adults up to the age of 64.
Children between the ages of 6-10
a and b

Answer: c. Children between the ages of 6-10 should be immune if they received all of their childhood vaccinations.

Q8. Of the following groups, which group especially needs a pertussis vaccination?
Grandparents up to the age of 64, parents, relatives, or caretakers who have close contact with an infant younger than 12 months of age.
Healthcare workers who have contact with patients in hospitals or clinics.
Women who are planning to become pregnant.
All of the above
None of the above

Answer: d. All of the above.

Q.9. Where can you obtain a Tdap vaccination?
State and local health departments ( $20-$55, depending on location)
Your primary care physician (TWU BCBS insurance pays 80%)
Retail health clinics located in national chain pharmacies (Like Minute Clinic in CVS or Take Care in Walgreen’s. With TWU insurance, the cost is $20 copay)
Texas Woman’s University Student Health Centers ($55)
All of the above locations
Q10. When did you last have a vaccine to prevent whooping cough?
Less than 2 years ago
Between 2 and 10 years ago
More than 10 years ago
I am unsure/ can’t remember
I have never been vaccinated against whooping cough

Q. 11. After taking this survey, how likely are you to pursue obtaining a pertussis vaccine?
Not likely at all
A little likely
Likely
Very likely
Absolutely sure
It doesn’t apply to me- I am sure my pertussis vaccination is up-to- date.

Q 12. How likely are you to recommend that a family member obtain a vaccine?
Not likely at all
A little likely
Likely
Very likely
Absolutely sure
It doesn’t apply to my situation.

Do you have any comments?

Demographics:
Age
Gender
Faculty  Staff  Graduate Assistant  Adjunct (choose one)
Part time    Full Time
Campus:   Denton  Houston Presbyterian  Dallas  Parkland

Web Resources
This video features stories from adults who had whooping cough.
http://www.helppreventwhoopingcough.com/real-stories.html