HPV Uptake Communication in the Social Media Environment

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Agenda

Background: Using social media for environmental scanning and communication research

Phase 1: Social media-based **focus groups** for surveillance on HPV vaccination in rural areas

Phase 2: Leveraging social media and crowdsourcing platforms for **message-testing experiments**

Phase 3: **Social media campaigns** for HPV uptake communication in rural areas

Future directions and questions
Phase I. Virtual focus groups for surveillance on HPV vaccination in rural areas
Each year…

- 79 million Americans are infected with HPV
- 30,700 develop HPV-related cancers
- Incidence rate is increasing, fastest among men
- HPV causes as many deaths as measles did in the pre-vaccine era

Sources: CDC; NH DHHS
The current HPV vaccine prevents up to 93% of cancer cases caused by HPV.

Yet, rates of HPV vaccination in U.S. lag behind other countries; No state had reached the Healthy People 2020 goal of full vaccination of 80% of adolescents aged 13~15 years.

Percentage of adolescents who are current with their HPV vaccinations by state.

https://www.cdc.gov/hpv/infographics/vacc-coverage.jpg

National Immunization Survey – Teen, 2013; Stokley et al., 2014
• **HPV vaccination rates** among certain populations, such as adolescents in **rural areas** are not as high as other adolescent vaccines.

• Parents who decline the vaccine maintain **myths** and **negative/ambivalent attitudes** toward HPV vaccination.
Anti-Vaxxer

The HPV Vaccine: Why Parents Really Choose to Refuse

Join us as we expose one of the most controversial topics in healthcare today.

VACCINES

You can be sure that this $30 billion a year industry affects you, your children, and the rest of our society.

GARDASIL FULLY EXPOSED

REST IN PEACE, SHAZEL ZAMAN

DESPITE THOUSANDS OF Crippling ADVERSE REACTIONS AND DEATHS, INFANTS ARE NEXT

The Washington Post

Democracy Dies in Darkness

Teen who defied anti-vax mom says she got false information from one source: Facebook

MYTHS

Information Pollution

Public Health Threats
- Communication noise
- Exposure to misinformation
- Repeated exposure over time

Psychological factors: Barriers

Attitudes
Belief system
Knowledge base

Fail to perform health behavior

Identify psychological factors why parents in rural areas have or have not vaccinated their children against HPV.
Harnessing social technology

- Reach (e.g., underserved populations, geographically distant individuals)
- User engagement and interactive communication
- Social support
- Cost-effective
- Naturally occurring communication
- Scalability (intervention content, methods, and outcomes)

Kim et al., JMIR 2017
Methods:

Multiphase sequential designs of translational communication research

Virtual focus groups, Data-mining, surveys via social media

Phase 1

Message development

Message-testing experiments

Phase 2

• Implemented and disseminated HPV campaigns via social media
• Implement evaluation strategies (e.g., user comments, ad performance data, online surveys)

Phase 3
Two rural states, NH/VT. ➔ Feasible?

1,535,688 adult population in NH/VT

United States Census Bureau (2018)
Focus group questions on Facebook

- 6 sets of questions in a structured format
- Consistent format across virtual focus groups
- Disseminated focus group postings via rural and urban areas using zip codes on Facebook
- Data-mined user comments for thematic analyses
An integrative model of behavioral prediction

Distal variables
- Behavioral beliefs & outcome evaluations
- Attitude
- Normative beliefs & motivation to comply
- Perceived norm
- Intention
- Self-efficacy
- Environmenta constraint
- Behavior

Skills

Fishbein and Yzer 2006
Almost everyone will have HPV at some point in their lives. For most people, HPV goes away on its own, but can sometimes cause cancer and other diseases. Over 90% of cancer cases caused by HPV could be prevented with the HPV vaccine. It is recommended that all 11 and 12 year-olds should get two shots of the HPV vaccine 0-12 months apart and should not both shots before they turn 13. It is best given at this age range, because they are less likely to have been exposed to HPV and because they have a strong immune response. If they wait until they’re older, they will need three shots.

Based on what you just read, do you know enough about HPV and the HPV vaccine to get your child vaccinated?
Please tell us about any other information you’ve seen or heard about getting the HPV vaccine.
Do you have the resources and support you need to get your child vaccinated against HPV?
Has your child already received the HPV vaccine? If not, why not?
Would you consider the HPV vaccine for your child if your child hasn’t received it yet?
What, if anything, would you need in order to get your child this vaccine?

If you want to share your thoughts, experiences, and concerns anonymously, click “https://goo.gl/2rt3iF” to go to our online survey. Participation in this research study is voluntary. Your responses will be kept confidential with researchers at Dartmouth College. You can enter to win a drawing for an gift cards. Click “https://goo.gl/2rt3iF” for more details.

Please Note: Regarding comments on this post researchers at Dartmouth College will use your comments below for RESEARCH purposes to learn about people’s views on the HPV vaccine. Leaving comments and participating is completely voluntary, and we will not collect your name or any other identifying information. Please note: your comments on this post may be publicly available.
An integrative model of behavioral prediction

Fishbein and Yzer 2006
1. Normative beliefs and motivation to comply → perceived norm → behavioral intention → Behavior

- Do you believe that boys AND girls in this age range should get the vaccine? Would you be motivated in following this recommendation?
- Do you believe that the age range of 11-12 is appropriate?
2. Behavioral beliefs and outcome evaluations/response efficacy belief → attitudes → BI

- Do you believe HPV vaccine will protect your children against genital warts and cervical cancer?
- Do you believe the HPV vaccine is safe, beneficial, and important for children ages between 9 and 15? Or, do you have the opposite opinions about the HPV vaccine?
3. self-efficacy $\rightarrow$ behavioral intention

- As a parent, how challenging would it be for you to meet this recommendation?
- How confident are you that you have the ability to meet this recommendation?
4. Skills /lack of knowledge/ lack of exposure to recommendation

- 90% of people have HPV at some point in their lives. Although most people clear the virus without ever knowing they have it, the virus can persist in the cells and some types of HPV can, usually over decades, cause cancer.
- The HPV vaccine protects against nearly 90% of cervical cancers, and it provides protection against most of the genital cancers in men caused by HPV infection. The HPV vaccine also works effectively when given at a younger age. Children aged 11 and under only need two HPV vaccines instead of 3 doses.
- **Do you have enough knowledge about the HPV infection and the HPV vaccine?** Have you read or seen any information about the importance of receiving HPV vaccines? Please share if you think you have enough knowledge, access to the information, and support to accomplish the recommended doses of the HPV vaccine for your child. If not, please share what skills, knowledge, resources you would like to have.
5. Environmental constraint/Perceived barriers (access to care),

- E.g., Are there any obstacles or constraints that are preventing you from successfully giving the HPV vaccines for your child? If there are any things that make it difficult for you to get your child vaccinated, please let us hear. Share your concerns, barriers, and any difficult situations that made it hard for you to achieve the recommended doses for your child.
Audience geo-targeting

Geo-targeting by zip code levels on Facebook Ads Manager

NH = 297 zip codes
VT = 312 zip codes

609 zip codes in NH/VT
Audience Targeting by geographic & demographic characteristics

- **Custom Audiences**
  - **INCLUDE** people who are in at least ONE of the following
    - Add a previously created Custom or Lookalike Audience
  - **EXCLUDE** people who are in at least ONE of the following
    - Add a previously created Custom or Lookalike Audience

- **Locations**
  - **Everyone in this location**
  - **United States**
    - **Include**
    - Type to add more locations
    - **Browse**

- **Add Locations in Bulk**
  - **Age**
    - 13 - 65+
  - **Gender**
    - All, Men, Women

- **Languages**
  - English (US)
  - English (UK)
Data monitoring

- Anti-vaxxers
- Not relevant to the topic
- Swear, attack, trolls
- No intervention but observation
- 6 different Facebook Ads in a random order over time
Data analysis

• Thematic analyses
  – 327 user comments
  – Coding scheme: 23 pre-defined coding schemes concerning barriers and facilitators for HPV vaccination

• Linguistic analysis
  – 12,622 words from focus groups
5 most salient themes from virtual focus groups

• Theme 1: Safety/Side Effects/Risk/Ingredient Concerns and Long-Term or Major Adverse Events (of HPV Vaccine)
• Theme 2: Distrust of the System
• Theme 3: Effectiveness Concerns/HPV Vaccine Doesn’t Work
• Theme 4: Connected to Sexual Activity
• Theme 5: Mis-States Facts
Discussion and limitations

- To collectively inform communication strategies for public health campaigns.
- Social media platforms were effective in engaging parents in hard-to-reach areas for discussions on HPV vaccination.

- Important to monitor focus groups in real time (e.g., trolls, spiral of silence)
- Geo-targeting but no validation on locations
Phase 2: Messages Testing Experiment for HPV social media campaign
Methodological approach:
Multiphase sequential designs of translational communication research

Virtual focus groups, Data-mining, surveys via social media

Message development

Message-testing experiments

Phase 1

Phase 2

Phase 3

- Implemented and disseminated HPV campaigns via social media
- Implement evaluation strategies (e.g., user comments, ad performance data, online surveys)
Principles applied in the message development

• Developed 5~6 messages for each theme from focus groups
• Persuasion tactics:
  – Emotional appeal, rational appeal, concordance between image and text; neutral source; recency effect in promoting target statement
• Controlled for the length of messages
• Used neutral source
• Simulated social media environments within the message-testing experiment
Examples of stimulus materials

Theme 1: Countering ‘Side Effects/Risk/Ingredient Concerns’

Study results show that the human papillomavirus (HPV) vaccine is effective in preventing cancer caused by HPV. As you’ll learn from the video and article linked below, among women who were vaccinated in Finland 15 years ago, more than two-thirds had HPV infections that caused most HPV cancers and genital warts among women who were vaccinated. According to the CDC, all boys and girls who are 11 or 12 years old should get the HPV vaccine. Talk to your child’s doctor about the vaccines they need—including the HPV vaccine. Click “Learn More” for more information.

https://www.youtube.com/watch?v=dgmXkDhNy88

Theme 2: Countering ‘Distrust of the System’

The human papillomavirus (HPV) vaccine prevents against six types of cancer caused by HPV and is safe. Before the HPV vaccine was licensed by the FDA, each went through years of testing to make sure they were safe. The vaccine’s safety has continued to be studied in the 12 years since it became available in the U.S. As shown below, large safety studies throughout the U.S. and other countries continue to show that the HPV vaccine is safe. All boys and girls who are 11 or 12 years old should get the HPV vaccine to protect them against cancer. Talk to your child’s doctor about the vaccines they need—including the HPV vaccine. Click “Learn More” for more information.

https://www.youtube.com/watch?v=5yKgrPHD000

Theme 3: Countering ‘Effectiveness Concerns’

The human papillomavirus (HPV) vaccine prevents against six types of cancer caused by HPV. The vaccine is also safe. As you will hear in this video from the Minnesota Department of Health, the HPV vaccine has been recommended and licensed since 2006 and there are no serious safety concerns. All boys and girls who are 11 or 12 years old should get the HPV vaccine to help protect them from getting HPV cancers and genital warts. Talk to your child’s doctor about the vaccines they need—including the HPV vaccine—and watch this video to learn more about the HPV vaccine’s safety record. Click “Learn More” for more information.

https://www.youtube.com/watch?v=r4yKgrPHD00

Theme 4: Countering ‘Connection to Sexual Activity’

Human papillomavirus (HPV) causes six types of cancer, but there is a vaccine that can prevent these cancers. Some people worry that vaccines like the HPV vaccine are just helping drug companies make money. Fortunately, that’s not true. While vaccines protect each individual person against diseases, they also have an important role in protecting everyone. A 2013 study found that over 103 million cases of disease in the U.S. have been prevented by vaccination in the last century. With the HPV vaccine, we can increase that number even more. All boys and girls who are 11 or 12 years old should get the HPV vaccine. Talk to your child’s doctor about the vaccines they need, including the HPV vaccine. Click “Learn More” for more information.

https://www.youtube.com/watch?v=r4yKgrPHD00

Theme 5: Countering ‘Misinformation’
Message testing experiments:
- Kim & Hancock 2016 CR
- Kim & Niederdeppe 2014 JoHC

Pre-test survey measures:
- Demographic information,
- Environmental Factors
- Prior knowledge
- Issue involvement
- Attitudes toward HPV vaccine
- HPV vaccination status

Social media & Crowdsourcing for recruitment & screening

Post-test survey measures:
- Manipulation checks
- Attitudes toward HPV vaccine
- Behavioral intention to vaccinate their kids against HPV
- Message effectiveness
- Social Economic Status

Randomization / Message exposure

Themes
1
2
3
4
5

>30 people for each

Control
Control: Message 1.
Control: Message 2.
Control: Message 6
1,713 were recruited; 1,671 screened for eligibility

1,016 eligible and provided a consent

631 had no child and ineligible 42 (2.45%) dropped during the screening test 24 declined to consent

18 dropped before random assignment

834 Experimental conditions
- 167 Theme 1 “Safety/Side Effects/Risk/Ingredient Concerns and Long-Term or Major Adverse Events”
- 165 Theme 2 “Distrust of the System”
- 168 Theme 3 “Effectiveness Concerns/HPV Vaccine Doesn’t Work”
- 167 Theme 4 “Connected to Sexual Activity”
- 167 Theme 5 “Mis-States Facts”

164 Control condition

7 dropped during the post-test

991 started post-test measures and included in data analysis
Four of the five themes were more likely to increase behavioral intention to vaccinate, in part, due to the increased positive attitudes toward the vaccine (\textit{chi-square}=6.00, \textit{p} = \textit{ns}, RMSEA = .014, CFI = .91, SRMR = .031). The messages about safety/side effects (Theme 1) did not show this effect.
Message selection for social media campaigns

Theme 1: Safety/Side Effects/Risk/Ingredient Concerns and Long-Term or Major Adverse Events (of HPV Vaccine)

Theme 2: Distrust of the System

Theme 3: Effectiveness Concerns/HPV Vaccine Doesn’t Work

Theme 4: Connected to Sexual Activity

Theme 5: Mis-States Facts

- Message effectiveness scores
- Rank order
Methodological approach:
Multiphase sequential designs of translational communication research

Virtual focus groups, Data-mining, surveys via social media

Message development

Message-testing experiments

Implemented and disseminated HPV campaigns via social media
Implement evaluation strategies (e.g., user comments, ad performance data, online surveys)
Phase 3: HPV uptake social media campaign
A systematic implementation of selected messages via Facebook ads

- Facebook Ads manager platform offers a rich set of audience targeting features
  - e.g., geographic and personal interests-based targeting
- Rapid prototyping for campaigns
- Message exposure frequency
- Health communication delivery over time
- Coordinated campaign timeline schedules
Disseminated pre-tested messages in a random order while controlling for:

- Content (tested messages only, randomized)
- Cost (fixed)
- Days of ads promotion
- Geo-targeting of message exposure (rural vs. urban areas by zip codes)
Ad performance data

**Ad feature data**
- Days ad was running
- Delivery Status
- Delivery Level
- Result Type (reach, traffic)
- Cost per Result
- Amount Spent

**Ad engagement data**
- Reach
- Impressions
- Result Rate
- Frequency
- Link Clicks
- Page Engagement
- Page Likes
- Post Engagement
- Post Reactions
- Post Shares
- Unique Link Clicks
- Clicks All
- Post Comments

https://www.facebook.com/business/help
Harnessing social technology

Translational research

- Persuasive technology
- Health communication
- Social/health psychology
- Science of behavior change

Multiphase Sequential Designs

Phase 1. Focus Group
Phase 2. Message Testing
Phase 3. Campaign
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