Using social media engagement to address parents’ concerns about childhood vaccines

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Kaiser Permanente Colorado— ideal setting to evaluate vaccine hesitancy
  • Integrated health care model, managed care organization
  • Use an electronic health record to capture administrative and clinical data

Colorado Vaccine Social Media (VSM) Study—3 phases
  1. Development
  2. Randomized controlled trial
  3. Comparison of vaccine content between VSM and public websites
Phase 1: Development of an interactive social media tool

Article

Development of an Interactive Social Media Tool for Parents With Concerns About Vaccines

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Phase 1: Development of an interactive social media tool

1. Conduct exploratory research using:
   • Survey
   • Focus groups
   • Usability testing

2. Incorporate results into design of tool:
   • Timing
   • Balance of information
   • Trusted, safe engagement

3. Revisions to content, design, functionality and “look and feel”
VSM Intervention:
vaccineresourcecenter.com

Users needed login and password to access website (not publicly available)

Interactive social media components:
• Ask the experts
• Discussion forum with other parents
• Blogs
• Podcasts (audio)
• Online chat sessions
Phase 2: Colorado Vaccine Social Media (VSM) Study: a randomized controlled trial

Conducted at Kaiser Permanente Colorado: September 2013 through July 2016

- Parents recruited
  - During pregnancy (primary focus)
  - With children ≤9 months old (secondary)

- Screened for vaccine hesitancy
  - Parent Attitudes and Childhood Vaccines (PACV) survey
  - Grouped into 2 categories of hesitancy (yes/no)

- Three study arms:
  - Website, vaccine information and interactive social media (VSM)
  - Website, vaccine information only (VI)
  - Usual care (UC)
Phase 2: Study Design

PAC-V Survey Randomization

Study Arm 1: Vaccine Social Media + Usual Care
Study Arm 2: Vaccine Information + Usual Care
Study Arm 3: Usual Care

Vaccination Outcomes:
1. Up-to-date Status
2. Days Undervaccinated

Weeks since birth of the child

Study Arm 1: Vaccine Social Media + Usual Care
Study Arm 2: Vaccine Information + Usual Care
Study Arm 3: Usual Care

PAC-V: Parent Attitudes and Childhood Vaccines
Vaccination Status

<table>
<thead>
<tr>
<th>Study Arm</th>
<th>n</th>
<th>Proportion Up-to-Date (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSM</td>
<td>442</td>
<td>92.5</td>
</tr>
<tr>
<td>VI</td>
<td>297</td>
<td>91.3</td>
</tr>
<tr>
<td>Usual Care</td>
<td>149</td>
<td>86.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Odds Ratio for Up-to-Date</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSM versus Usual Care</td>
<td>1.92 (1.07-3.47)</td>
<td>.03</td>
</tr>
<tr>
<td>VI versus Usual Care</td>
<td>1.62 (0.87-3.00)</td>
<td>.13</td>
</tr>
<tr>
<td>VSM versus VI</td>
<td>1.19 (0.70-2.03)</td>
<td>.52</td>
</tr>
</tbody>
</table>

Phase 2: Survey Design

Outcome: Change in KAB (T0 – T1, T1 – T2, T0 – T2)

KAB Survey (T0)  KAB Survey (T1)  KAB Survey (T2)

Study Arm 1
Study Arm 2
Study Arm 3

Months since birth of the child

-3  0  3  6  12  15

Study Arm 1: Vaccine Social Media + Usual Care
Study Arm 2: Vaccine Information + Usual Care
Study Arm 3: Usual Care

KAB: Knowledge, Attitudes, and Beliefs
### Vaccine Knowledge, Attitudes and Beliefs

<table>
<thead>
<tr>
<th></th>
<th>VSM vs. usual care</th>
<th>VI vs. usual care</th>
<th>VSM vs. VI</th>
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</thead>
<tbody>
<tr>
<td><strong>Benefits of vaccination</strong></td>
<td></td>
<td></td>
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<tr>
<td>Baseline to T1</td>
<td>0.23 (0.05, 0.40)</td>
<td>0.22 (0.04, 0.40)</td>
<td>0.01 (-0.14, 0.16)</td>
</tr>
<tr>
<td>Baseline to T2</td>
<td>0.12 (-0.07, 0.31)</td>
<td>0.09 (-0.11, 0.29)</td>
<td>0.03 (-0.13, 0.19)</td>
</tr>
<tr>
<td><strong>Risks of vaccination</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline to T1</td>
<td>-0.19 (-0.39, 0.002)</td>
<td>0.18 (-0.39, 0.02)</td>
<td>-0.01 (-0.18, 0.16)</td>
</tr>
<tr>
<td>Baseline to T2</td>
<td><strong>-0.37 (-0.60, -0.14)</strong></td>
<td><strong>-0.31 (-0.55, -0.07)</strong></td>
<td><strong>-0.06 (-0.26, 0.14)</strong></td>
</tr>
<tr>
<td><strong>Perceived self-efficacy</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Baseline to T1</td>
<td>-0.12 (-0.40, 0.16)</td>
<td>0.01 (-0.28, 0.30)</td>
<td>-0.13 (-0.38, 0.12)</td>
</tr>
<tr>
<td>Baseline to T2</td>
<td>0.29 (-0.03, 0.60)</td>
<td><strong>0.37 (0.04, 0.69)</strong></td>
<td>-0.08 (-0.35, 0.19)</td>
</tr>
</tbody>
</table>

Phase 3: Tone and Content of the Social Interaction on Vaccine Websites

Vaccine Information From Health Care Providers and Social Media

Social Media Vaccine Websites: A Comparative Analysis of Public and Moderated Websites

Jo Ann Shoup, PhD¹, Komal J. Narwaney, PhD¹, Nicole M. Wagner, MPH¹, Courtney R. Kraus, MSPH¹, Kathy S. Gleason, PhD¹, Karen Albright, PhD², and Jason M. Glanz, PhD¹,³
Phase 3: Methods

**Step 1:** Archive all interactive content from VSM

**Step 2:** Content from publicly available parenting and vaccine-focused blogs and discussion boards using key words on search engines

**Step 3:** Duplicates and ineligible sites were removed

**Step 4:** Interaction was randomly selected and archived from each eligible site

**Step 5:** Qualitative coding of vaccine tone, stance and accuracy of information as a study team

**Step 6:** Inter-rater reliability on sample with naïve coder
Social Interaction on Websites

Publicly available parenting and vaccine websites
- more contentious
- negative stance towards vaccines
- inaccurate and uncorrected information

The expert moderated website
- more civil tone
- minimal posting of inaccurate information
- very little participant-to-participant interaction
To n e
VSM Website
(Post 1, study participant): “My baby is 9 mo. old and I have a few questions about the flu vaccine. First, why does he need two? Can he just get one?
(Reply to post 1, study team member): To answer your first question, children aged 6 months to 8 years old need two shots if it's the first time they are getting the flu vaccine...”

PUBLIC Website
(Post 2): “You are an idiot. People should have their kids get vaccinated.
(Reply to post 2): ...YOUR the (uneducated) idiot. Sorry, not sorry. I'm guessing you don't have children because you would have done your research just like most parents...
(Reply to reply of post 2): ...I do have a kid and you are still an idiot. You clearly are not doing research correctly.”
Accuracy of Information

**VSM Website**
(Post 7, study participant): “Babies are exposed to so many different things but they do not normally receive them directly into their muscles and blood stream.

(Reply to post 7, study team member): Vaccines are injected into muscle (or beneath the skin) but not into the blood stream...”

**PUBLIC Website**
(Post 6): “I am curious what you all do to support LO [Little One] before and after vaccines. My 7 week old has first vaccines in two weeks.

(Reply to post 6): Look into a charcoal poultice. I haven't done it...Charcoal draws out toxins, if you put a poultice over the kidneys it can draw out bad stuff. If the baby were older I'd give it orally...”
Conclusions and Next Steps

Parents concerns about vaccines can lead to vaccine hesitancy

• Allaying parents’ concerns during pregnancy is important to achieving immunized children
• Tools that measure parents’ concerns can assist provider communication and interventions to reduce hesitancy

Expert moderated social media is a promising step towards alleviating parents’ concerns

Further research in vaccine hesitancy is needed

• to evaluate the role of social media in a rapidly changing technology environment
• to evaluate effective communication messaging
• to address the public’s concerns
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