Vaccine Social Media Intervention Trial

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Parental Vaccine Hesitancy

- Many parents in the US have concerns about vaccination
  - "Overwhelms the immune system"
  - "Too many too soon"
- 10 – 15% parents are requesting "alternative schedules" for their children

Ref: Dempsey et al., Pediatrics, 2011;
Glanz et al. JAMA Peds 2013

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Kaiser Permanente Colorado (KPCO)

- Group model, managed care organization
- >680,000 members
- 5,000 pregnant women and 130,000 children cared for each year
- Demographically representative of the state of Colorado, United States

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Mixed methods study: focus groups and survey

- Parents enrolled in KPCO
  - Pregnancy
  - Internet
  - Balance
  - Not enough time with pediatrician
  - Overall trust in pediatrician's advice, but less trust in their advice on vaccines

Ref: Glanz et al., Acad Pediatr 2014

Timing of vaccine information (Lieu et al, *Clin Pediatr (Phila)*, 2016)

- Survey of nationally representative sample of parents (n=1,222) in the US
- 22% selected “vaccine information” as the most important factor to improve the process of vaccination
- Among parents seeking better information
  - 20% wanted information before well-child visits
  - 19% wanted more information on vaccine safety

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The internet as a source of vaccine information

- Numerous websites with vaccine information
- Quality varies significantly
  - Government / professional societies
  - Industry
  - Advocacy groups
  - Non-profit
  - Parenting blogs, discussion forums

Refs: Grant et al., *J Med Int Res*, 2015; Larson et al., *Lancet Infect Dis*, 2013; Wolfe et al., *J Health Commun*, 2005;

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The internet as a source of vaccine information

- Anti-vaccination websites use anecdote and social media to disseminate misinformation
- Parenting blogs and discussion forums are often not moderated by experts, and sources of information often anonymous
- Exposure to anti-vaccine messages through social media can intensify parents' worries and reduce their intentions to vaccinate

Refs: Betsch et al., *Med Decis Making, 2012;* Betsch et al., *Med Decis Making, 2011;* Betsch et al., *J Health Psychol, 2010;* Witteman et al. *Vaccine, 2012;* Kata, *Vaccine*, 2012.

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Using social media to address parental vaccination concerns

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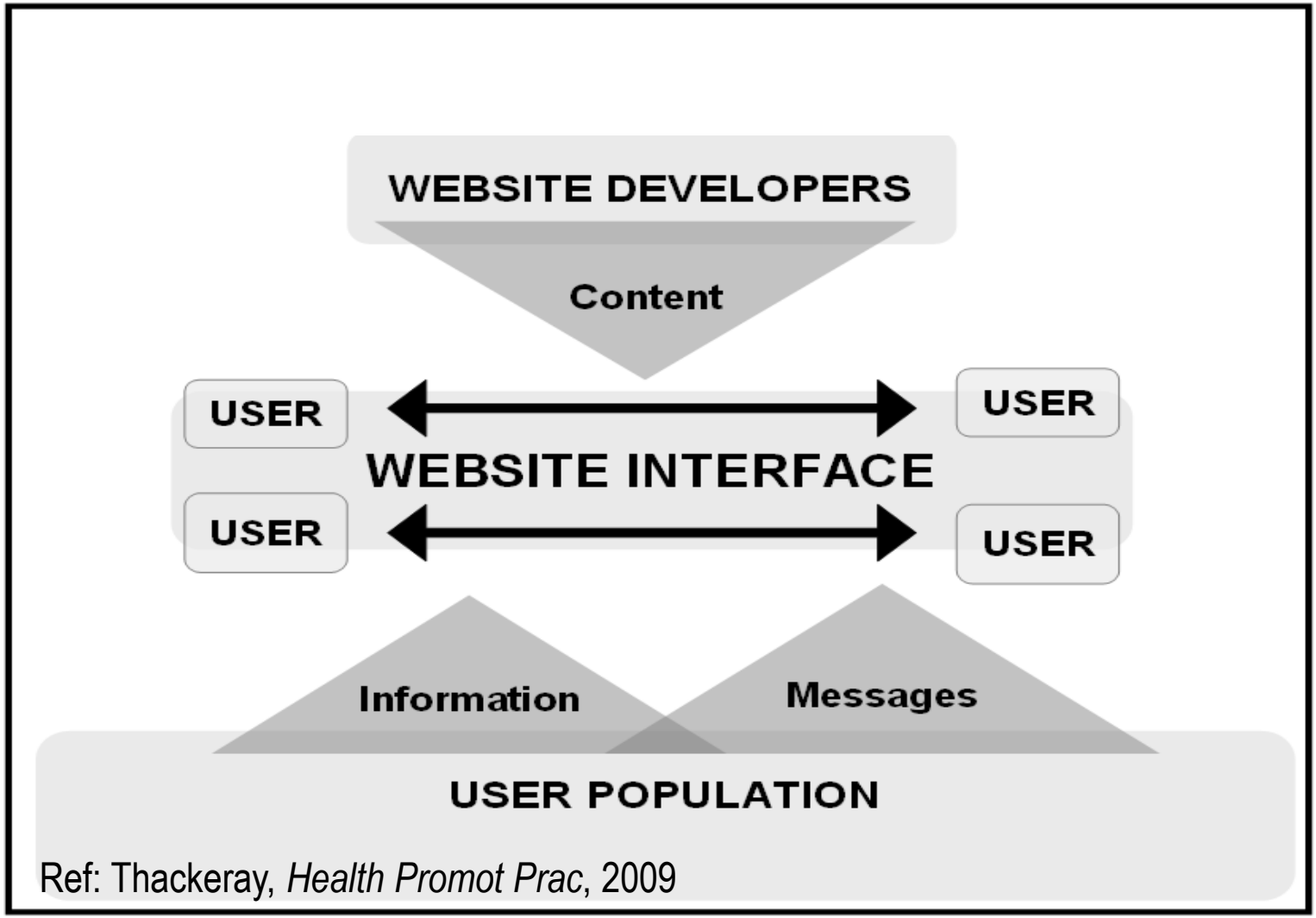
Web 2.0: Multi-directional communication model



Ref: Thackeray, *Health Promot Prac*, 2009

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Social media to address parental vaccine concerns

- Expert moderated
- Provide forum for parents to voice opinions, ask questions and interact with other parents
- Build trust
- Combat misinformation

Can social media be used to reduce vaccination concerns and improve immunization rates?

Ref: Betsch et al., *Vaccine*, 2012

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The Vaccine Social Media Project (R01HS021492, AHRQ)

Randomized, controlled trial to evaluate the efficacy of a vaccine information website with interactive, social media applications

1) Evaluate impact on immunization behavior (vaccination rates)
2) Evaluate impact on vaccine knowledge, attitudes and beliefs (KAB)
3) Assess efficacy separately in pregnant and postpartum enrollees

Vaccine Social Media Intervention

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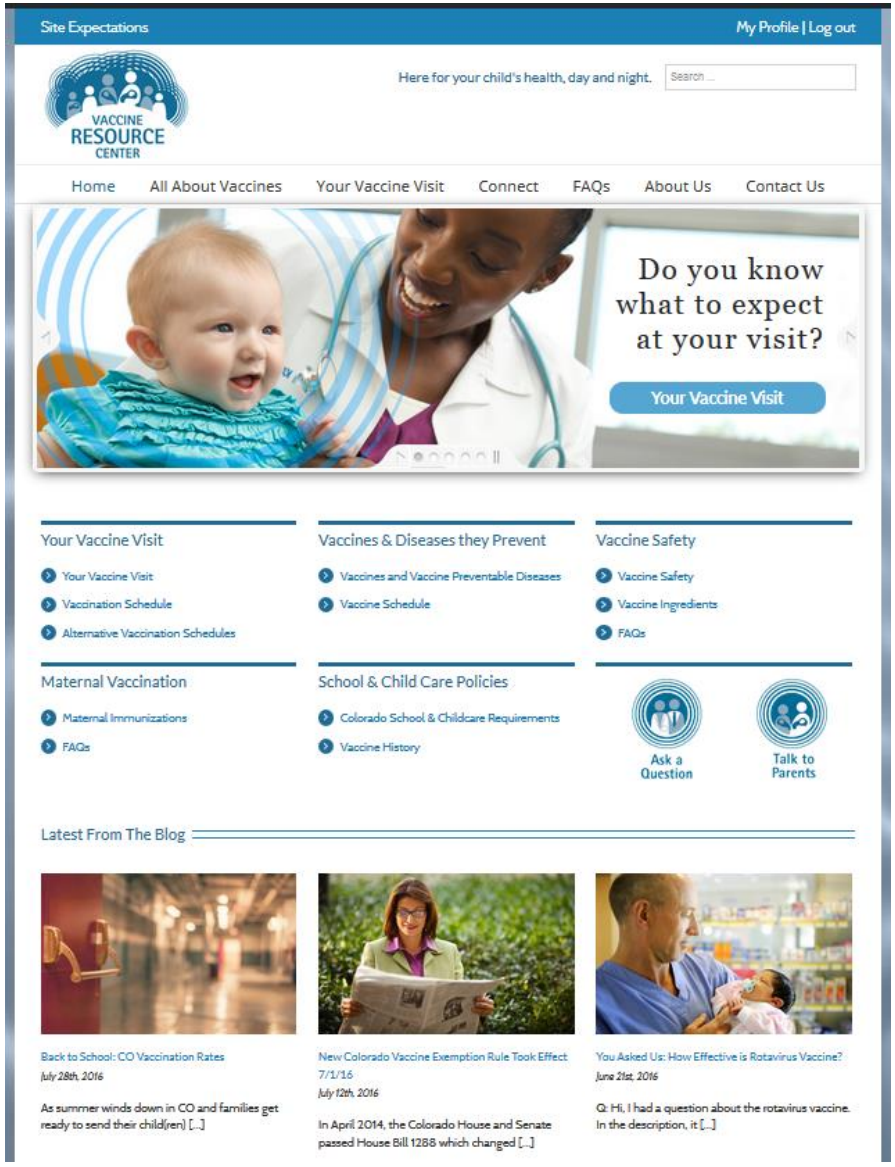
Vaccineresourcecenter.com



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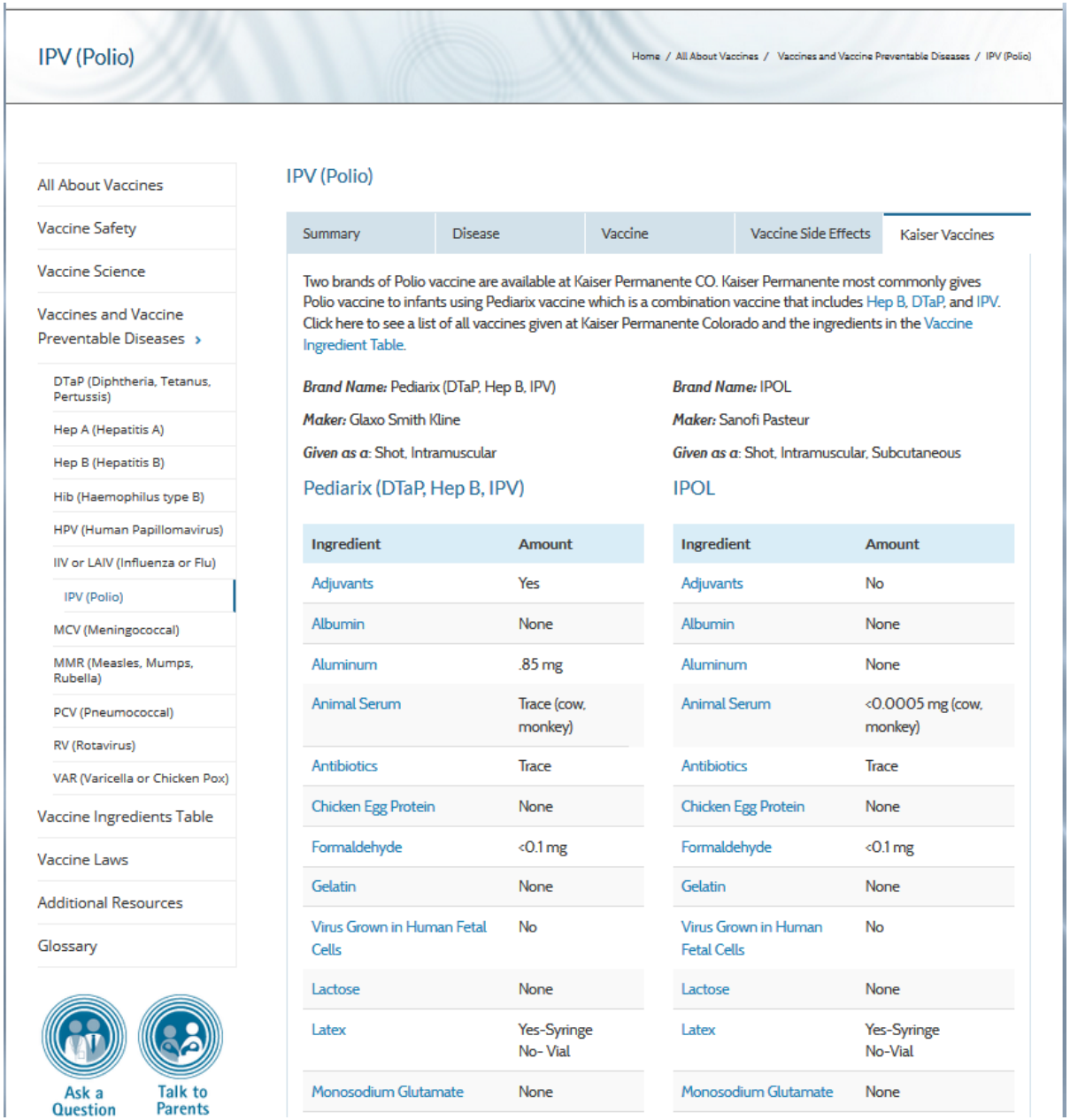

IPV (Polio)

Home / All About Vaccines / Vaccines and Vaccine Preventable Diseases / IPV (Polio)

- All About Vaccines
- Vaccine Safety
- Vaccine Science
- Vaccines and Vaccine Preventable Diseases ›
  - DTaP (Diphtheria, Tetanus, Pertussis)
  - Hep A (Hepatitis A)
  - Hep B (Hepatitis B)
  - Hib (Haemophilus type B)
  - HPV (Human Papillomavirus)
  - IIV or LAIV (Influenza or Flu)
  - IPV (Polio)
  - MCV (Meningococcal)
  - MMR (Measles, Mumps, Rubella)
  - PCV (Pneumococcal)
  - RV (Rotavirus)
  - VAR (Varicella or Chicken Pox)
- Vaccine Ingredients Table
- Vaccine Laws
- Additional Resources
- Glossary

Ask a Question

Talk to Parents

IPV (Polio)

Summary | Disease | Vaccine | Vaccine Side Effects | Kaiser Vaccines

Two brands of Polio vaccine are available at Kaiser Permanente CO. Kaiser Permanente most commonly gives Polio vaccine to infants using Pediarix vaccine which is a combination vaccine that includes Hep B, DTaP, and IPV. Click here to see a list of all vaccines given at Kaiser Permanente Colorado and the ingredients in the Vaccine Ingredient Table.

Brand Name: Pediarix (DTaP, Hep B, IPV)

Maker: Glaxo Smith Kline

Given as a: Shot, Intramuscular

Pediarix (DTaP, Hep B, IPV)

Ingredient	Amount
Adjuvants	Yes
Albumin	None
Aluminum	.85 mg
Animal Serum	Trace (cow, monkey)
Antibiotics	Trace
Chicken Egg Protein	None
Formaldehyde	<0.1 mg
Gelatin	None
Virus Grown in Human Fetal Cells	No
Lactose	None
Latex	Yes-Syringe No- Vial
Monosodium Glutamate	None

Brand Name: IPOL

Maker: Sanofi Pasteur

Given as a: Shot, Intramuscular, Subcutaneous

IPOL

Ingredient	Amount
Adjuvants	No
Albumin	None
Aluminum	None
Animal Serum	<0.0005 mg (cow, monkey)
Antibiotics	Trace
Chicken Egg Protein	None
Formaldehyde	<0.1 mg
Gelatin	None
Virus Grown in Human Fetal Cells	No
Lactose	None
Latex	Yes-Syringe No-Vial
Monosodium Glutamate	None

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Study Methods

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The Vaccine Social Media Project (R01HS021492, AHRQ)

Three arms:

1) Vaccine social media website (VSM)
2) Vaccine information website (VI)
3) Usual pediatric care (UC)

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Study procedures

- September 2013 to July 2016
- Recruited pregnant women and parents with children ≤ 9 months of age
- Screen for vaccine hesitancy
  - PACV survey (Opel et al.)
  - Create 2 strata of hesitancy (yes/no)

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Study procedures

- Randomization
  - VSM, VI, UC
  - 3:2:1 allocation ratio
- Need login and password to access website (not publicly available)

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Study Procedures

- Knowledge, attitudes and beliefs (KAB) survey at BL, 3-5 months, 12-15 months
- Link to electronic health record (EHR) for vaccination outcomes
  - Pregnant enrollees (birth to 200 days)
  - Postpartum enrollees (enrollment to 200 days post enrollment)

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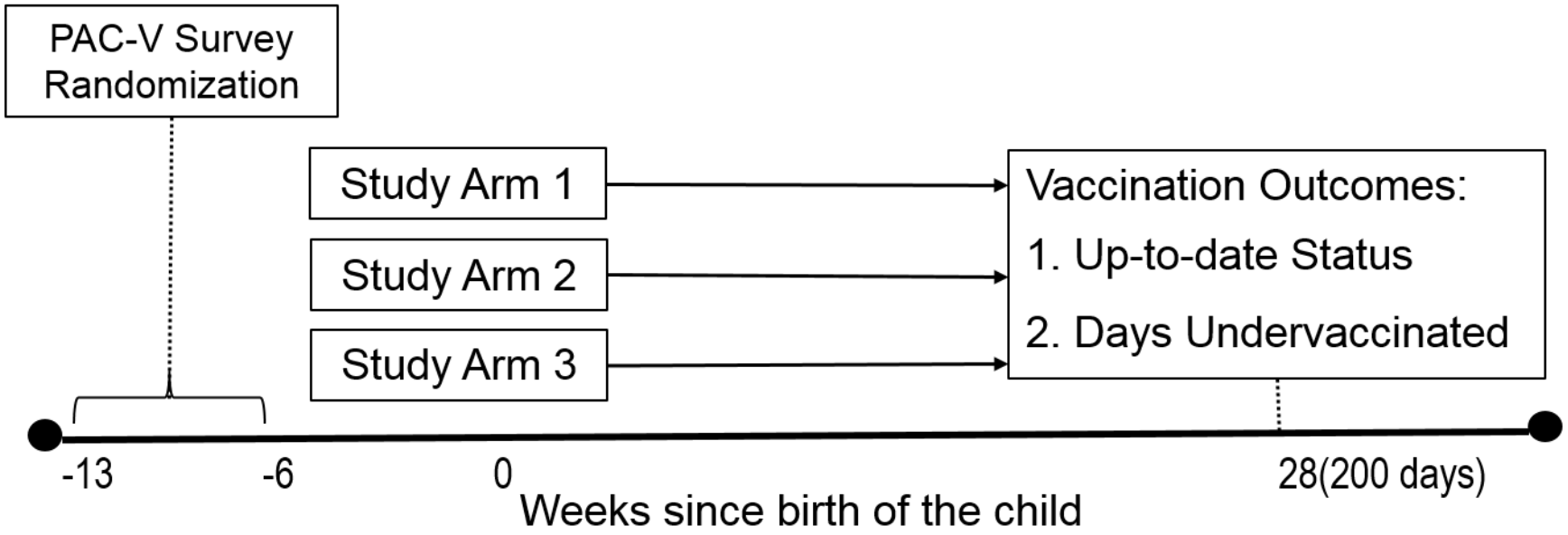
Intervention design – Vaccine outcomes



Study Arm 1: Vaccine Social Media + Usual Care (VSM)
Study Arm 2: Vaccine Information + Usual Care (VI)
Study Arm 3: Usual Care (UC)

PAC-V: Parent Attitudes and Childhood Vaccines

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Outcome: Up-to-date vaccination status

- Hepatitis B
- Rotavirus
- Diphtheria, tetanus, and pertussis (DTaP)
- Haemophilus influenzae type b (Hib)
- Pneumococcal Conjugate Vaccine (PCV)
- Polio (IPV)
- Measles, mumps and rubella (MMR)*
- Varicella*

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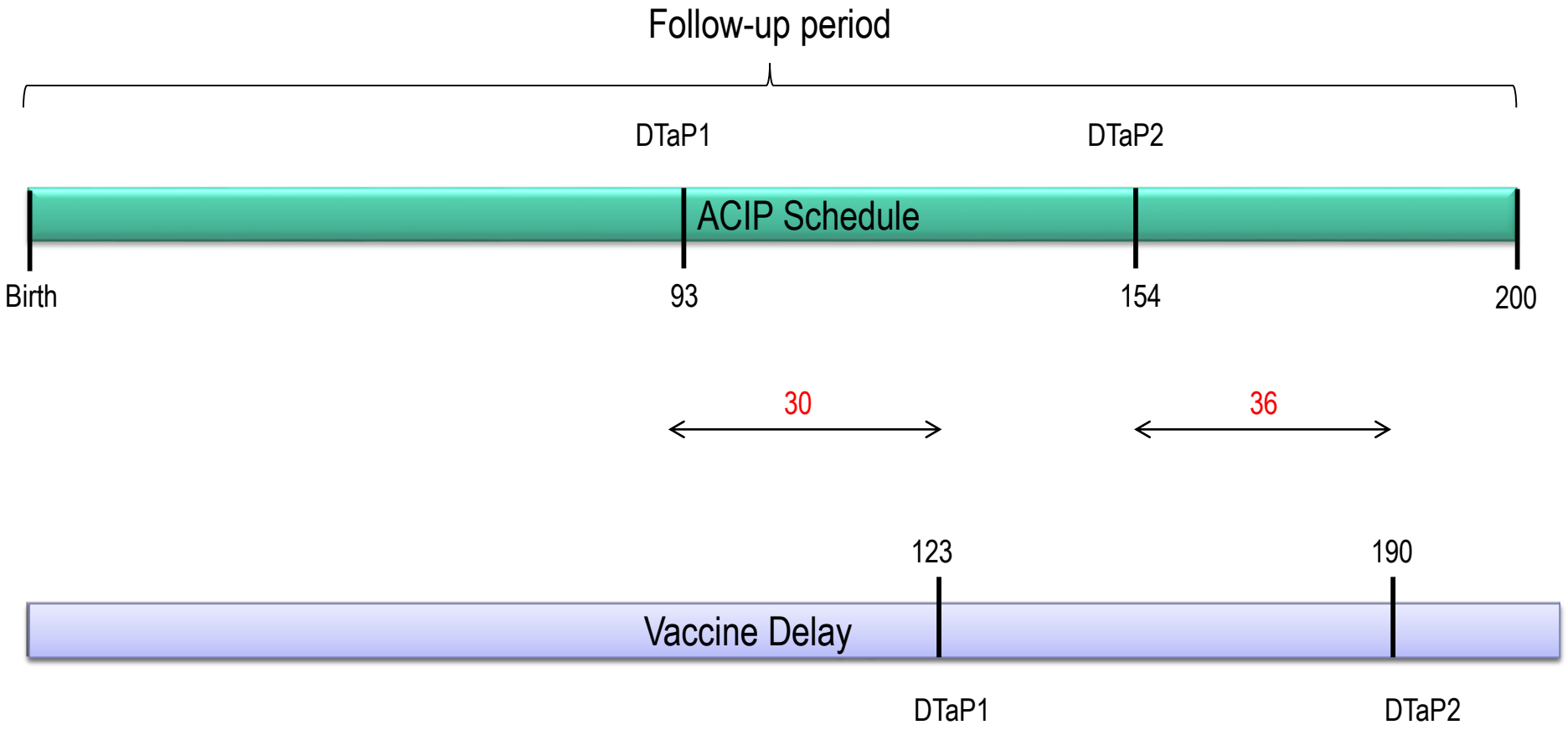
Outcomes: days undervaccinated



Total days undervaccinated for DTaP = 66 days

Refs: Luman et al. *JAMA* 2005; Glanz et al., *JAMA Pediatr*, 2013

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Analysis – Vaccination Outcomes

- Intent-to-treat
- Logistic regression to compare odds of up-to-date status across study arms
  - Up-to-date = 0 days undervaccinated
  - Not up-to-date > 0 days undervaccinated

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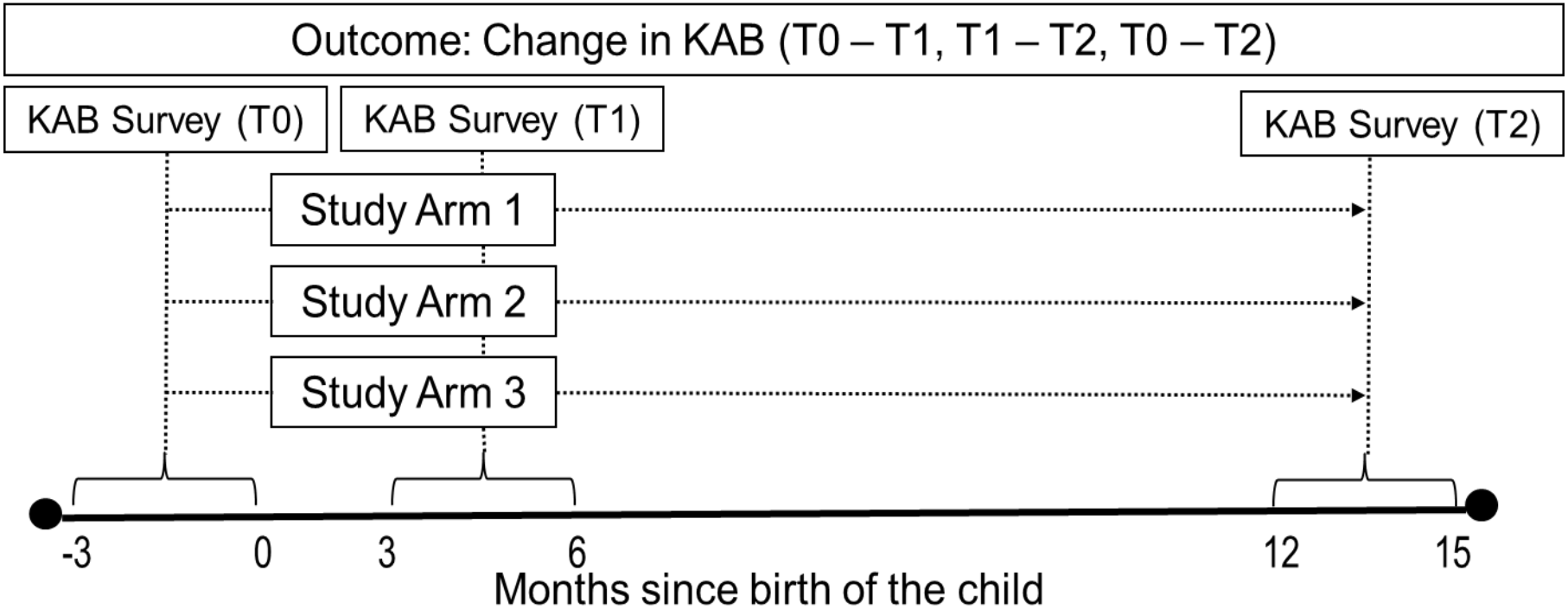
Intervention design – KAB outcomes



Study Arm 1: Vaccine Social Media + Usual Care (VSM)
Study Arm 2: Vaccine Information + Usual Care (VI)
Study Arm 3: Usual Care (UC)

KAB: Knowledge, Attitudes, and Beliefs

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Outcomes: Vaccine Knowledge, Attitudes and Beliefs (KAB)

- 18 questions measured on 5-point Likert scale: Strongly agree to strongly disagree
- Constructs
  1. Benefits of vaccination
  2. Risks of vaccination
  3. Self-efficacy

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Analysis – KAB Outcomes

- Summary scores created for each construct
- Linear mixed model for repeated measures
- Separate models for each of the 3 KAB constructs
- 3 time points: -3-0 months (T0), 3-6 months (T1), 12-15 months (T2) since birth of child
- Time comparisons: T0 – T1, T0 – T2
- Stratified by hesitancy status at baseline

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Administering the intervention

- Website monitoring
  - Update content (1-2 blog entries / month)
  - Respond to questions (≤ 48 hours)
  - Create/send newsletters
  - Moderate the forums
  - Screen comments
  - Track usage

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Establishing trust and credibility

- Present both sides – risks and benefits
- Respond to questions quickly – tailored, personalized responses
- Acknowledge parents' concerns
- Try not to exaggerate risks or benefits
- Incorporate personal experiences into our posts and responses

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Establishing Trust and Credibility

- Transparency
  - Detailed “About Me” page
  - Funding source
    - Clear that website not funded by industry
  - Reference all material
  - Vaccination stance

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Risk Communication Messages

- Simple short sentences
- 1 – 3 messages per block of information
- Present information using an array of media
  - Text, video, audio, images
- Active voice
- Avoid jargon and scare tactics

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Results

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Recruitment and randomization

- 1675 recruited (21.0%)
  - 1093 pregnant (65.2%)
  - 582 parents with children 0-9 months (34.8%)
  - 241 hesitant parents (14.4%)
- Study Arms
  - Vaccine Social Media (n=837)
  - Vaccine Information (n=561)
  - Usual Care (n=277)

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Baseline Characteristics

- Hesitancy (median, 1 to 100): 17
- Mother's age [mean (SD)]: 31.6 (4.3)
- Number of Children: 47.4% first time parents
- Race: 86.9% white
- Education 82.8% college graduates
- Use of internet for health 90.5% monthly or more

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Website usage

- 1398 members in Social Media and Vaccine Information study arms
- 483/1398 (34.5%) members visited the website
  - 91/198 (46.0%) hesitant participants
  - 392/1200 (32.7%) non-hesitant participants
- 901 unique webpage visits
- Mean visits 1.87 (SD=1.59); range 1 - 15
- 152 questions and comments in social media arm (n=837 participants)

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Interaction: Qualitative results

- Most questions were about the “schedule” and safety
- Questions, comments and conversations were civil
- Some questions were complex
- Complex questions took hours to answer
- Chats sporadically attended
  - 14 out of 31 sessions (45%)
  - 1-5 participants per session
- Participants preferred to ask questions privately

Quantitative results

Pregnant Enrollees	VSM (n=442)	VI (n=297)	UC (n=149)	Diff.	Odds Ratio
Proportion Up-to-date	92.5%	91.3%	86.6%	5-6%	**VSM vs. UC: 1.92 (1.07,3.57)** VI vs. UC: 1.61 (0.87, 3.00) VSM vs. VI: 1.19 (0.70, 2.03)

Abbreviations: VSM, Vaccine Social Media; VI, Vaccine Information; UC, Usual Care; c

None of the associations were statistically significant for post-partum enrollees

Glanz et al. *Pediatrics* 2017

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Knowledge, attitudes and beliefs: Pregnant and hesitant

	Least Square Means	p-value
Benefits of vaccination		
(T0 - T1) for VSM vs UC	0.23	0.007
(T0 - T1) for VI vs UC	0.22	0.01
Safety of vaccination		
(T0 – T2) for VSM vs UC	-0.37	0.04
(T0 – T2) for VI vs UC	-0.31	0.004
Self-efficacy		
(T0 – T2) for VI vs UC	0.37	0.04

T0 – Baseline Survey; T1 – Survey at Time point 1; T1 – Survey at Time point 2
VSM – Vaccine Social Media; VI – Vaccine Information; UC – Usual Care

Daley et al. *AJPM* 2018

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Conclusions

- Infants of parents exposed to VSM intervention were more likely to be vaccinated on time than infants in usual care arm
- Both interventions only effective in pregnant enrollees
- Timing of information is important

Limitations

- Little participant to participant interaction
- Generalizability of results?
- VSM intervention may not be cost effective

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Study Team

Breanne Barela	Deb Ritzwoller
Chris Boyd	Jo Ann Shoup
Matt Daley	Nikki Wagner
Kathy Gleason	Kris Wain
Kristin Goddard	Stan Xu
Courtney Kraus	
Komal Narwaney	
Sean O'Leary	
Saad Omer	

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Extra Slides

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Qualitative data from blogs

Two New Studies Look at the Safety of Rotavirus Vaccines

Rotavirus Vaccine Studied	CDC Study Results	FDA Study Results
Rotarix (RV1)	Increased risk for intussusception	The FDA did not look at this
RotaTeq (RV5)	No risk for intussusception	Small increased risk for intussusception
Rotarix (RV1) vs RotaTeq (RV5)	Rotarix (RV1) is more risky than RotaTeq (RV5)	The FDA did not look at this

Refs: Weintraub et al., *New Engl J Med*, 2014; Yih et al., *New Engl J Med*, 2014

Qualitative data from blogs

Participant Comment # 1

With in seconds of reading this I was put off, the fact the it was discussed on how to publish results regardless of outcome makes me wonder are you really telling us the truth? It says the rotavirus causes diarrhea, and you want me to inject my kid with all the additives, preservatives and who knows what else to 'protect' them from something the the cdc says most kids under three contact at least once. Then a side effect could be diarrhea, or worse and the vax is not even 100% effective. Um no thanks

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Qualitative data from blogs

Staff Response #1

This is a topic many parents feel passionately about, and we appreciate that you took the time to bring up these points. We encourage all parents to share their comments, questions and concerns about vaccines.

To your first point, maybe we weren't clear about what we meant by publishing results regardless of the outcome. Our goal is to be open and transparent. We want to give you as much available information as possible on the risks and benefits of vaccination. For this blog post, our intent was to explain the results from two different studies showing that the rotavirus vaccines have some risks.

You also brought up some really good points about weighing the risks and benefits of vaccines. We agree that it sounds odd that the vaccine could both prevent and cause diarrhea at the same time. The difference is in the severity of the diarrhea. In other words, clinical studies have shown that the rotavirus vaccine can cause mild diarrhea in healthy babies. These studies also show that the rotavirus vaccine prevents severe diarrhea that can lead to hospitalization. So based on this research, it appears as though the benefits of the vaccine greatly outweigh the risks. This is the type of information that we in the public health field use to make our vaccine recommendations.

Thanks again for your comments. If anyone wants to explore this further, you can find more information about the effectiveness of the vaccine and other safety concerns on the rotavirus page: http://www.vaccineresourcecenter.com/all-about-vaccines/vaccines-and-vaccine-preventable-diseases/rv-rotavirus/

We also have an ingredients page where we list all of the ingredients in all of the vaccines given at Kaiser, including for rotavirus: http://www.vaccineresourcecenter.com/all-about-vaccines/vaccine-ingredients-table/

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Qualitative data from blogs

Respect all Opinions: “We encourage all parents to share their comments, questions and concerns about vaccines.”

Balanced Information: “Our goal is to be open and transparent. We want to give you as much available information as possible on the risks and benefits of vaccination. “

Acknowledge Concerns: “You also brought up some really good points about weighing the risks and benefits of vaccines. We agree that it sounds odd that the vaccine could both prevent and cause diarrhea at the same time. “

Sources Referenced:” If anyone wants to explore this further, you can find more information about the effectiveness of the vaccine and other safety concerns on the rotavirus page: http://www.vaccineresourcecenter.com/all-about-vaccines/vaccines-and-vaccine-preventable-diseases/rv-rotavirus/”

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