



THE VACCINE CONFIDENCE MEETING

Collaborating to Advance Vaccine Confidence

**Meeting Report
August 15–16, 2017
Atlanta, Georgia**





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Introduction

As vaccine-preventable diseases become increasingly less visible, and new vaccines become available to address new and emerging disease threats, health care providers, parents, and individuals need to have confidence in vaccines and their decisions to receive recommended vaccinations. Critical steps towards achieving those ends include facilitating partnerships and sharing knowledge on research and practice.

What is vaccine confidence?

The trust that parents, patients, or providers have in:

- Recommended vaccines
- Providers who administer vaccines
- Processes and policies that lead to vaccine development, licensure, and recommendations for use

The Vaccine Confidence Meeting, cohosted by the National Vaccine Program Office (NVPO) and Emory University, brought together stakeholders from academic research groups, government agencies, and health care provider organizations, along with members of the broader vaccination enterprise to examine the latest insights from research and practice on increasing vaccine confidence in the United States and around the world.

Recommendations from the National Vaccine Advisory Committee (NVAC) and feedback from stakeholders informed the meeting's structure and content (see Appendix A for the meeting agenda). Held August 15–16, 2017 in Atlanta, Georgia, the meeting placed particular emphasis on identifying and examining the practical implications of the presentations. Meeting objectives for attendees included:

- Learning more about the work being done to address vaccine confidence, hesitancy, and acceptance
- Sharing new research and identifying research gaps
- Strengthening the community of professionals working to increase vaccine confidence
- Meeting and speaking with leaders in related fields

This report summarizes perspectives and comments made during the Vaccine Confidence Meeting (see list of sessions and speakers below; speaker and moderator bios are in Appendix B). Judy Mendel of NVPO and Saad Omer of Emory University planned and facilitated the meeting. Representatives from government agencies, academia, health care agencies, nonprofit organizations, and the private sector gave presentations while attendees provided input, recommendations, and queries as necessary. The meeting was organized into 4 thematic sessions:

- Measuring and monitoring vaccine confidence
- Building and fostering confidence using public communication approaches, which included an interactive session on using advertising concepts to promote influenza vaccination
- Values, confidence, and vaccine acceptance
- System approaches to building confidence

Sectors Represented at the Meeting 76 individuals attended the meeting:

- 55% ($n = 42$) from academia
- 17% ($n = 13$) from the federal government
- 16% ($n = 12$) from nonprofit, advocacy, and membership organizations
- 4% ($n = 3$) from state or local health departments
- 8% ($n = 6$) from other sectors such as health care systems and advertising

Opening Plenary

- Judy Mendel, MPH, NVPO (cohost)
- Saad Omer, MBBS, MPH, PhD, Emory University (cohost)
- Brendan Nyhan, PhD, Dartmouth College (keynote speaker)

Measurement and Monitoring: Research Insights into the Vaccine Confidence Landscape

- Glen Nowak, PhD, University of Georgia (moderator)
- Gaëlle Vallée-Tourangeau, MSc, PhD, Kingston University
- Allison Kennedy Fisher, MPH, Centers for Disease Control and Prevention (CDC)
- Paula Frew, PhD, MA, MPH, Emory University
- Sandra Quinn, PhD, University of Maryland School of Public Health

Building and Fostering Confidence Using Public Communication Approaches

- Ann Aikin, MA, NVPO (moderator)
- Alisa Johnson Athen, MA, Hennepin County, Minnesota, Public Health Department
- Amelia Burke-Garcia, MA, Westat
- Leslie Schrader, MA, Ketchum
- David Rauch, Creative Director and Health Care Consultant
- Norma Birnbaum, Publicis LifeBrands

Values, Confidence, and Vaccine Acceptance

- LJ Tan, MS, PhD, Immunization Action Coalition (moderator)
- Robert Bednarczyk, PhD, Emory University
- Amanda Dempsey, MD, PhD, MPH, University of Colorado at Denver
- Melissa Gilkey, PhD, University of North Carolina at Chapel Hill
- Noni MacDonald, MD, MSc, FRCPC, FCAHS, Dalhousie University



Systems Approaches to Building Confidence

- Allison Kennedy Fisher, MPH, CDC (moderator)
- Saad Omer, MBBS, MPH, PhD, Emory University
- Jason Schwartz, PhD, Yale University
- Sean O’Leary, MD, MPH, University of Colorado at Denver
- Dan Salmon, PhD, MPH, Johns Hopkins University
- Catherine Flores Martin, California Immunization Coalition
- Mimi Kiser, DMin, MPH, Emory University

Closing Plenary

- Judy Mendel, MPH, NVPO (cohost)
- Saad Omer, MBBS, MPH, PhD, Emory University (cohost)
- Walt Orenstein, MD, DSc (Hon), Emory University (closing speaker)

Meeting Summary

Opening Plenary

Judy Mendel of NVPO and Saad Omer of Emory welcomed attendees to the Vaccine Confidence Meeting. Ms. Mendel provided an overview of the meeting objectives, structure, and content. She also reviewed the development of the NVPO’s Vaccine Confidence Strategy. Dr. Omer thanked the audience for participating in this first-of-its-kind meeting and then introduced the keynote speaker, Brendan Nyhan.

Keynote presentation. Dr. Nyhan of Dartmouth College presented a talk entitled “Echo Chambers and the Challenges of Communicating in the 21st Century.” The purpose of his presentation was to “prime the pump” and encourage dialogue among the attendees regarding approaches to overcoming communication challenges in vaccine promotion.

Even when providing factual information and proven science, 2 barriers to communication exist:

- *Selective exposure*, where individuals only pursue information that is consistent with their attitude and beliefs. Selective exposure runs the risk of developing an “echo chamber,” where particular ideas, beliefs or even data are reinforced through replication within a closed system that forbids unrestricted movement of alternative or competing ideas or concepts. In this case, certain notions or

Facts are not enough.
Selective exposure and selective acceptance create barriers to effective communication about vaccines.

conclusions are adopted because of an inherent unfairness in how information was gathered.

- *Selective acceptance*, where individuals deny information that is inconsistent to their attitude and beliefs. The foundation of selective acceptance is *directionally motivated reasoning*, which causes individuals to validate their beliefs while ignoring contrary facts, and develop reasoning to defend their logic.

With the increase of fake news and myths regarding vaccines, more research on overcoming selective exposure and selective acceptance is needed to combat vaccine hesitancy. To this end, Dartmouth College, in collaboration with the Vermont Department of Health, will conduct a field experiment through the National Academy of Sciences (Building Capacity for Science Communication Partnership Award). This study will examine the effects of messages sent to parents regarding vaccines. There will be registry outcomes to test effectiveness in changing behavior.

What works best for messaging is an unresolved area. While no magic bullet or a one-size-fits-all message exists, Dr. Nyhan recommended some strategies to counteract the communication barriers relating to vaccines:

- Work within communities to determine the most effective approaches
- Quickly stop myths before they spread widely
- Minimize controversy and value conflict, which enhance directionally motivated reasoning
- Promote social norms and defaults
- Find effective points of intervention, like trusted intermediaries
- Avoid conflicts in the media
- Maintain, when possible, consensus across the political and ecological spectrum in favor of vaccines

He also noted areas needing more investigation to improve the science of vaccine promotion:

1. Better early warning systems
2. More experiments
3. More behavioral measures
4. More systematic training of providers
5. Better estimates of regulatory effects

Discussion. One attendee raised a concern about the growing wellness industry, whose claims of effectiveness are rarely confirmed by science and research. How can messages effectively contradict claims from the wellness arena? Dr. Nyhan suggested working with the public where they are and meshing vaccine messages into the wellness concept. Another attendee warned

against overselling vaccine safety in messaging. Honest dialogue, she expressed, could lend more credibility. She also suggested meeting parents where they are to decrease resistance. Another recommendation was to engage parents before beliefs are internalized, using opportunities for obstetricians to educate them before their babies arrive. Dr. Nyhan agreed but noted that obstetricians may not prioritize this education in their work.

Measuring and Monitoring: Research Insights into the Vaccine Confidence Landscape

Glen Nowak of the University of Georgia moderated this panel discussion. Topics in this session included conceptualizing the determinants of vaccine uptake, surveying vaccine confidence, and measuring vaccine confidence.

Conceptualizing the determinants of vaccine uptake. Gaëlle Vallée-Tourangeau of Kingston University presented a talk entitled “The 5 A’s: A Practical Taxonomy for the Determinants of Vaccine Uptake.” The development of this taxonomy arose from an attempt to answer a practical question: How can research diagnose the likely root causes of the vaccination coverage gap? A gap exists between what public health officials deem as suitable coverage rates for vaccination and the actual coverage rates. Research shows the influences of values, experiences, context, and culture ultimately shape individuals’ behaviors with regards to vaccinations.

From this research were derived these root causes of vaccine-related behavior:

1. *Access*: the ability of individuals to be reached by, or to reach, recommended vaccines
2. *Affordability*: the ability of individuals to afford vaccination, both in terms of financial and nonfinancial costs (e.g., time)
3. *Awareness*: the degree to which individuals know of the need for, and availability of, recommended vaccines and their objective benefits and risks
4. *Acceptance*: the degree to which individuals accept, question, or refuse vaccination
5. *Activation*: the degree to which individuals are nudged towards vaccination uptake

Dr. Vallée-Tourangeau described the 5 A’s as “levers.” The optimal adjustment and pulling of these levers will ultimately increase vaccine uptake.

One approach used to test the validity of the 5 A’s was to review articles on vaccination and immunization acceptance to uncover factors that lead to uptake. Those factors were then

Finding and Using Levers of Change

The optimal adjustment and pulling of these levers — root causes of the vaccination coverage gap — will ultimately increase vaccine uptake.

classified in the taxonomy of the 5 A's. Another strategy employed was to review studies that used a variety of methods (e.g., surveys, interviews) across populations (e.g., parents of infants, the elderly), which found that meaningful categorization of the "levers" identified in study findings could be made using the 5-A taxonomy. Dr. Vallée-Tourangeau stressed that the 5 A's are not a solution but instead a tool or a roadmap that can help create strategies to address any gaps in a contextualized setting using questions to identify which levers to tweak to increase vaccine uptake.

Surveying vaccine confidence. Allison Kennedy Fisher of CDC presented a talk entitled "CDC National Center for Immunization and Respiratory Diseases Efforts around Surveillance of Vaccine Confidence." CDC has completed research regarding parents', patients', and health care providers' knowledge and attitudes regarding vaccines that were used to inform education and outreach efforts to be used across an individual's lifespan. Ms. Fisher's presentation focused on 3 recent projects completed by CDC: the 2016 National Poll of Parents, the Longitudinal Mothers Survey, and several cognitive interviews with vaccine-hesitant parents.

2016 National Polls of Parents

The goal of this study was to assist CDC in better understanding the behaviors, questions and concerns surrounding childhood immunization, and to develop messages, communication products, and recommendations to help improve national immunization rates.

The specific objectives were to:

1. Assess vaccine knowledge attitudes and beliefs
2. Determine self-reported vaccination behaviors and vaccination plans
3. Explore parental perceptions of health care professional communication

CDC collected data via GfK KnowledgePanel®, an online survey of 2,510 parents of children under the age of 7 years old. Key findings of the study included the following:

- Most parents surveyed stated that they consented to vaccines for their children as suggested
- Irrespective of vaccination beliefs, most parents considered their child's doctor a trusted source of vaccine knowledge
- The number of vaccines, vaccine ingredients, and potential side effects were common apprehensions

Longitudinal Mothers Survey

The goal of this study was to examine mothers' knowledge, attitudes, beliefs, behaviors, and information needs throughout the vaccination process, from the second trimester of pregnancy to their child's 19th month of life.

The specific objectives were to:

1. Understand how mothers' needs, expectations, and attitudes change over time
2. Identify how best to meet those needs and expectations
3. Identify any critical decision points in the vaccination process

CDC collected data through a series of 7 online surveys conducted for a panel of 200 pregnant women or first-time moms beginning in their second trimester of pregnancy and ending when their child was 19 months old. Key findings of the study included the following:

- Maternal choices on vaccine acceptance were almost always made before a child was born and stayed relatively unchanged over time
- Confidence in vaccines was relatively high and stable, but did rise with time and experience
- Participants most commonly spoke with their child's doctor about their vaccine questions and concerns — these conversations were most common at the 2-month well visit
- There is room for improvement in mothers' perceived satisfaction with vaccine discussions during office visits

Interviews with Vaccine-Hesitant Parents

The goal of this study was to test messages and materials with vaccine-hesitant parents. The specific objectives were to:

1. Explore thoughts and perceptions on messages and materials designed for parents about childhood vaccination
2. Examine whether existing messages and materials address vaccine-hesitant parents' questions and concerns
3. Identify possible improvements in how CDC communicates with this audience
4. Identify whether additional informational opportunities or outstanding informational needs exist

CDC collected data via interviews with 24 parents or caregivers of children ages 0 through 23 months with an expressed hesitancy toward childhood vaccinations. Key findings of the study included the following:

- Interview participants wanted to know more about the potential short-term and long-term side effects of vaccines, as well as the potential consequences of not vaccinating

- Parents did discuss vaccines with their child’s doctor, but trust in the doctor’s information and advice varied
- Materials were well-received by parents

Ms. Fisher concluded her talk by describing CDC’s future directions regarding surveillance of vaccine confidence:

- Continuing to perform lifespan exploration on vaccine knowledge, attitudes, and practices
- Continuing to aid parents and health care professionals in their conversations about vaccines
- Discovering new ways to involve parents and prenatal health care professionals earlier in the decision-making process
- Strengthening collaborations and capacity to address vaccine confidence locally

Measuring vaccine confidence among parents. Paula Frew of Emory presented a talk entitled “Development of an Index for Measurement of Parents’ Vaccine Confidence and Linkage to Pediatric Immunization Acceptance.” This index is a proof-of-concept psychometric endeavor to gauge changes in parents’ confidence at national, state, and community levels; and to measure vaccine confidence over time among parents in health systems. Data were collected via a national survey of 893 parents, guardians, and caregivers over the age of 18 in the U.S. who have children 7 years old or younger, and are able to read and comprehend English. Surveys included questions about the child’s vaccination history and sociodemographic characteristics. Factor analysis was used to cluster 30 survey items into broader classes for the Vaccine Confidence Index (VCI): vaccine attitudes and beliefs, vaccine information, trust in government and experts, and social norms. The research team then created a summation scoring rubric for the VCI, calculated correlation between the VCI and immunization status, and ran logistic regression models for each vaccine.

Key findings from the development phase of the study included the following:

- There was a robust correlation between reported vaccine receipt and VCI score
- Increasing VCI score is parallel to increased odds of vaccine receipt
- Confidence, as measured by the VCI, appears to act autonomously of sociodemographic characteristics, which suggests scale robustness

Dr. Frew and her colleagues then fashioned an 8-item version of the VCI with strong internal reliability. To validate the results of the survey, 2 subsequent rounds of psychometric testing were added. The first occurred in July 2017, and the other is planned for December 2017. In the first validation sample, 831 respondents were matched to the 700 in the final dataset on criteria such as gender, age, race, education, and region using the 2013 American Community Survey

as a frame. The first-round validation results found very similar trends in robustness and recorded confidence values.

Dr. Frew concluded her talk by describing the next steps for the Index development process:

- A tool to identify populations, not topics
- Second validation test in December 2017
- Validation of the index using the vaccine confidence IIS surveillance system
- VCI extension testing for other populations
- Testing in clinical, research, and surveillance settings

Measuring vaccine confidence among African American and white adults. Sandra Quinn of the University of Maryland School of Public Health then presented a talk entitled “Exploring the Continuum: Measuring Vaccine Confidence and Hesitancy among African American and White Adults.” This study was part of a larger line of research about cultural beliefs behind racial disparities in vaccines, in particular the influenza immunization. During flu season, hesitancy can contribute to increased morbidity, mortality and costs from flu.

The conceptual foundation of this study is the “3-C model” developed by the SAGE Working Group on Vaccine Hesitancy in 2015. According to this model barriers to vaccination fall into the following categories:

- *Complacency*: perceived risk of vaccine-preventable diseases is low, so individuals do not feel under enough threat to engage in protective behavior
- *Confidence*: strong negative attitudes toward vaccination, misinformed understanding about risks of vaccination, and/or conscious reactance against complying with vaccination norm or perceived coercion
- *Convenience*: when impediments to vaccination such as lack of access, cost, or travel time are stronger than the intention to vaccinate

The purpose of this study was to identify relationships and meaningful measures of general and flu vaccine specific hesitancy and confidence. Specifically, the research team sought to determine:

- The relationship between vaccine hesitancy and the 3 C’s (complacency, convenience, and confidence)
- The relationship between vaccine hesitancy, vaccine confidence, and trust

Data were collected via the GfK online panel of U.S. adults: 63.1% whites and 51.2% African Americans (total sample size of 1,643). Overall, African Americans had a lower level of education and income compared to whites. Fewer African Americans got the flu vaccine

compared to whites but neither group was close to the Healthy People goal of 70%. Only data from those who had received a recommendation from their health care provider for an adult vaccine (flu, Tdap booster, Hep A and Hep B, shingles, or pneumococcal) were analyzed. The outcomes of interest were having had the flu vaccine this year and consistent acceptance of flu vaccine over 5 years.

Measures for the General Vaccine Hesitancy Model addressed the:

- Likelihood of acceptance if a doctor recommends a vaccine
- Acceptance of recommended vaccines
- General hesitancy about being vaccinated
- Trust in vaccines in general
- Necessity, importance, safety, effectiveness, convenience, and affordability of vaccines in general

Guided by the literature, the research team used confirmatory factor analysis to compare models that indicated different relations of the 3 C's and hesitancy. The final model defined the 3 C's (complacency, confidence, and convenience) and the hesitancy factor with shared indicator variables in a bifactor configuration (that is, the variances of the items that are not explained by one factor are further explained by the other factor). The indicators for the hesitancy factor included:

- The likelihood of accepting a doctor's recommendations for vaccines
- General hesitancy about vaccines
- Actual behavior on a set of recommended adult vaccines

These indicators for hesitancy were shared with the complacency, confidence, and convenience factors. Key findings based on measures for the General Vaccine Hesitancy Model included the following:

- Trust in vaccines was positively associated with confidence and convenience but negatively associated with complacency and hesitancy
- Adults with higher confidence in the flu vaccine were *less likely* to get the flu vaccine this season and in the past 5 years
- Those with greater vaccine hesitancy were less likely to get the flu vaccine this season and in the past 5 years

Regarding the unexpected finding that higher confidence in the flu vaccine was associated with lower likelihood to have been vaccinated, qualitative research conducted by Dr. Quinn and colleagues suggests that having confidence in the vaccine is not sufficient under conditions of high complacency and low perceived risk, as there is such significant complacency and a sense that the vaccine is not necessary.

The Flu Vaccine Hesitancy Model was created by adding 2 flu vaccine specific hesitancy items. Confirmatory factor analysis also found a good fit for a 4-factor model with confidence, convenience, and complacency as separate factors, now all specific to the flu vaccine, and shared with hesitancy, which is a separate factor. Key findings based on measures for the Flu Vaccine Hesitancy Model include:

- Trust in the flu vaccine was positively associated with confidence and convenience but negatively associated with complacency and hesitancy
- Adults with higher confidence in the flu vaccine are more likely to get the flu vaccine this season and in the past 5 years
- People with higher flu vaccine hesitancy are less likely to get the flu vaccine this season and in the past 5 years

Dr. Quinn noted that the 3 C's are similar to the 5 A's (discussed by Dr. Vallée-Tourangeau earlier) in that convenience is similar to access, and that affordability and complacency may contain similar items from awareness, including identifying need and benefits of the vaccine. Furthermore, hesitancy and confidence seem to echo acceptance, and convenience may have a part in activation and can assist in weakening complacency. From the findings of this study, she concluded that:

- We can most effectively measure hesitancy and confidence with the flu vaccine specific model
- Vaccine hesitancy and confidence are important concepts in flu vaccine uptake among adults
- Trust remains a key component associated with the 3 C's
- Complacency may be a more significant challenge than confidence

This research illustrates that monitoring and addressing complacency, for example through social media, is as important as addressing confidence and trust. It also demonstrates that the most effective communication messages are likely to be those that combine verbatim information with bottom-line meaning.

Discussion. One audience member noted the importance of separating awareness and compliance in adults versus children. For children, there is a mandate to vaccinate, which is not the case for adults. Mortality and morbidity burden of disease in adults is an important part of the discussion of vaccination compliance. The audience member stated that there was a danger in thinking too much about confidence in vaccine versus confidence in awareness of the disease burden itself. Dr. Quinn agreed with these sentiments but stated that while the perceived risk of the disease is important, it will not drive behavior. Particularly for African Americans, perceived risk of side effects from vaccines can trump disease risk.

Another audience member wondered if the VCI presented by Dr. Frew would help in studying, maybe over the course of 6 months or a year, the messages impacting vaccine confidence. Dr. Frew said the hope is to enable the VCI to be embedded in polls or surveillance systems to gauge the impact and to use the VCI to monitor over time whether sentiments change. A second validation test will be needed to identify any trends that have developed.

One audience member suggested that there may be a parallel to some vaccines in the past that caused concerns, as well as to lessons learned about how public health stakeholders listen to the public's concerns regarding safety and make changes. This could help to increase vaccine confidence and acceptance.

Finally, audience and panel members discussed the importance of proper conceptualization of the determinants of vaccine uptake to making progress in vaccine confidence. Dr. Vallée-Tourangeau suggested use of the 5-A taxonomy to help desegregate and unpack the problems and highlight where resources should be focused. One attendee observed that the 3-C model does not include religious context, which is a component that cannot be ignored.

Building and Fostering Confidence Using Public Communication Approaches

The second panel was moderated by Ann Aikin from NVPO. Topics in this session included communicating during an outbreak, promoting vaccine confidence using social media, and viewing vaccine confidence through the lens of advertising.

Communicating during an outbreak. Alisa Johnson Athen of the Hennepin County, Minnesota Public Health Department presented a talk entitled “Communications Planning and Implementation during an Outbreak.” The unfounded claims of measles vaccinations being linked to autism caused a growing problem for Hennepin County, Minnesota. The county has approximately 1.2 million residents and of those residents, 13% are foreign born, mainly Somali-Minnesotan immigrants and refugees. It is not certain how the measles outbreak began, but the first confirmed case was in April 2017. Ultimately, 70 cases of measles showed up in Hennepin, with the majority of cases occurring in unvaccinated Somali-Minnesotan children. Approximately 9,000 individuals were exposed, and 22 cases resulted in hospitalization. Measles, mumps, and rubella (MMR) vaccination rates for the entire state remain at a good level of 89%, but the rates are only 42% for Somali Americans.

The county has effectively executed surveillance efforts due to its coordination with public health partners like state and county health departments and the Health Alert Network System. Responses were coordinated through an incident command structure. To support increased immunization, the state health department issued an accelerated MMR dosing schedule.

Clinicians were advised to assess MMR status among every patient they saw — and to recall children and adolescents whose records showed a gap in getting MMR.

Community outreach efforts proved to be the turning point in getting the outbreak under control. Community leaders trusted among Somali Americans made more than 150 visits to apartment buildings, businesses, community centers, and mosques to expose myths, provide education, and encourage immunization. Families excluded due to cases of exposure and individuals unreachable by phone received home visits. These visits particularly helped with reluctant individuals and provided a comfortable setting for candid discussions about their reluctance. This community outreach approach and messaging increased the number of vaccinations of Somali-Minnesotans in Hennepin County from about 200 to 1,600, a stunning 8-fold increase. During the 13-week period of the campaign (4/2/17 to 7/1/17), over 25,000 vaccines were given to Hennepin County residents compared with about 8,000 during the preceding 13-week period, an over 3-fold increase.

Ms. Athen ended her presentation with the following recommendations for mass communications and media relations:

- Seize the opportunity when the media is interested
- Anticipate and guide the “life cycle” of coverage
- Issue only facts and correct all misinformation
- Own your messages, stick to them, and shed the rest
- Let others own their parts
- Let the media do some work
- Trust the uncontrollable

Promoting vaccine confidence using social media. Amelia Burke-Garcia of Westat presented a talk entitled “The New Normal: Using Digital and Social Media in Support of Vaccine Communication.” Ms. Burke-Garcia began by defining social norm marketing as the “[delivery of] normative information as a primary tool for changing socially significant behaviors.” This type of marketing uses a non-confrontational tone and positive, reassuring messages, which may engender less resistance than policies that control behavior. She expressed her belief that social media can be used to help normalize health behaviors.

Approximately 70% of Americans use social media connect with others, explore news outlets, and disseminate information. In addition, social media is widely used among sociodemographic groups (e.g., members of racial and ethnic minority groups, older

Social media users are not a niche population.

Almost 3 in 4 Americans use social media. This diverse group includes members of racial/ethnic minority groups and older adults.

adults). Ms. Burke-Garcia highlighted a few success stories using social media. CDC's Flu Vaccination Program is a digital ambassador initiative to increase flu vaccine uptake. The effort employed 13 ambassadors, who shared more than 800 posts and garnered over 127 million impressions related to flu vaccination promotion. Another successful effort, blog relays, has generated 7 blog posts, 124 social media posts from collaborating partners, and 21.6 million total impressions emphasizing the importance of flu vaccinations. The #VaxWithMe hashtag campaign showcases famous athletes and entertainers receiving flu vaccinations. The effort has 575 participants, who assisted in generating 866 posts and 19 million impressions.

Ms. Burke-Garcia recommended thinking about people's social networks when considering social marketing. For the CDC influenza campaign, Meetup.com was used as a vehicle for social marketing. For this effort, 75 groups were selected and 17 recruited, with more than 300 people receiving vaccinations together. The messages reached more than 10,000 people. She ended the presentation with the following takeaway messages:

- All audiences are involved in social media
- Influencers can help spread the message in positive, appropriate ways
- Think about virtual and real life as being connected

Creating a social media strategy to reach millennials. Leslie Schrader of Ketchum presented a talk entitled "Promoting Flu Vaccination and Disease Prevention to Young Millennials." Most millennials think that the flu will not happen to them or that they are immune to it, so they are unlikely to internalize prevention messages. However, millennials are very moved when disease prevention is paralleled with aversion of pain and not missing out on personal activities. Clorox's hashtag education campaign, #FluFOMO, used the fear of missing out (FOMO) as part of its campaign strategy.

Clorox partnered with Sickweather, an online social health network with sickness forecasting and mapping features, to use trends in social media discussions about the flu to accomplish flu prevention education. By scanning social media platforms, Sickweather can predict where large outbreaks may occur. Clorox integrated this information into its website along with the tag #FluFOMO. Clorox also used these data to create public service announcements (PSAs), where individuals shared their FOMO. Celebrities also promoted the #FluFOMO PSA with their personal stories, and influencers started the conversation with blogs and social posts about their flu encounters and prevention tips. Experts also participated in interviews about flu prevention with leading media outlets providing medical advice.

Sickweather data were also used to create engaging content and infographics at key moments during the flu season to remind the public about flu prevention. One product was a transportation hub infographic listing of the 10 "sickest" travel hubs for Thanksgiving travelers. In

January 2017, Clorox used these data points to illustrate the impact of flu on absenteeism in schools and workplaces. Then, during March Madness, Clorox again employed the data points to promote flu vaccinations, using the top basketball rivals, with their risk for cold, flu, and other illnesses.

Several spinoffs were created as a result of the #FluFOMO Campaign. One was the Do Over Sweepstakes, which asked consumers what they missed out on due to #FluFOMO. The Sympathy Button allowed people to share get-well messages and receive coupon codes for Clorox disinfection products for family, friends, and coworkers who use the Sickweather app. Clorox also used social media listening to search out sick celebrities and influencers, and the company sent them “Survival Kit” care packages.

The ultimate results of all the programs included:

- 3,800 #FluFOMO social posts
- 700,000 organic social impressions
- 2,200 sweepstakes entries
- 3 million influencer impressions
- 3,000 media placements
- 21 million media impressions
- 5.4 million Pandora users reached

Ms. Schrader concluded with key learnings from these campaigns about health promotion for young millennials:

- *Tone is key:* not all doom and gloom — draw people in by being relatable and bringing some humor
- *Start a conversation:* people aren’t naturally talking about vaccination (unless something goes wrong), so start the conversation with what they are already talking about and what’s relevant to them — when it’s flu, it’s about what you miss out on
- *Evolve the message:* depending on prevention vs. control and severity of flu season
- *Reach people where they already are:* if it takes an extra step, they won’t engage, so reach them with social media channels, apps, influencers, and celebrities that they are already engaging with
- *Make their life easier:* go beyond being informative — no one wants to be lectured, so if you make their life easier in some way they will be more likely to engage, participate, and take action
- *Real time = Relevant:* repeating the same message over and over gets stale, so the message needs to be tied to real-time conversations and topics to be relevant and fresh

Vaccine confidence through the lens of advertising. David Rauch, freelance Creative Director, presented a talk entitled “From Strategy to Implementation: Insights from HPV and Zoster Campaigns.” Insight, he said, is the key to opening the mind. Several companies have used insight to inspire people to think differently about their products.

The HPV “What will you say?” campaign, focused on facts, the target audience, and supporting CDC’s recommendation to vaccinate adolescents. To succeed in this effort, it was decided that the message should be shifted from being about preventing a sexually transmitted infection (STI) to being about preventing devastating cancer. This tactic was employed in recent HPV PSAs, which chronicle the lives of 2 adults, a man and a woman, who have cancers that would have been prevented by HPV vaccination when they were children and who had the option to accept the HPV vaccine that would have protected them. The short videos end with the children asking their parents if they knew that the vaccine would prevent them from having cancer as adults. In the case of HPV, parents often have a hard time envisioning their child having sex and, therefore, tend to reject the idea of their child getting the HPV vaccine. The PSA helped tie the adult suffering from cancer back to the young child who needs protection, thereby making it easier for parents to embrace the idea of vaccinating their children.

Similarly, the shingles campaign also required a new message approach. Oftentimes, older adults think shingles will not affect them. The only ones motivated to be vaccinated for shingles are those who have had the disease or those who know someone who had the disease. Therefore, the PSA sought to help the public understand that the shingles virus may already be living inside of them if they previously had chickenpox.

Mr. Rauch emphasized the importance of testing messages with the intended audience and the importance of tone. He ended his presentation by suggesting that with intensive study of the target audience when developing advertising, the audience will provide the insight of how to convey the message effectively.

Gaining Insight

Human truth is what resonates.

- Focus on the target audience
- Try different ideas
- Use simple statements

Discussion. One audience member requested recommendations for evaluating effectiveness of communication initiatives. One speaker suggested monitoring impact by assessing increases in website traffic. Another speaker stated that surveys can be used to capture comments and feedback from the initiative.

Another audience member asked for ideas on developing insights for target audiences. Mr. Rauch said more than 50% of conceptualizing is focusing on the target. He noted that once one

becomes knowledgeable about the target, insights become intuitive. He suggested that people keep trying different ideas until the right insight is achieved. The next step is execution. Ms. Schrader added that insight is based on research and grasping the target audience. Insight will never be a compound sentence and is the simplest statement possible. She suggested looking at other campaigns targeting similar audiences or issues and noticing how they arrive at human truth or insight — human truth is what resonates.

Another audience question concerned how to strengthen immunization outreach through social media. Ms. Burke-Garcia said that from a social media perspective, the answer was to determine the right channel for the population. Community organizers and influencers can provide direction to the right areas; it is all about relationships. She recommended empowering people to work with the target audience and convey consistent messages throughout the year. Doctors and health care providers also have to be ready to provide information to support the messages, so they should be equipped and prepared to have these discussions. Ms. Athen also suggested being mindful of how the message is translated to avoid fueling the vaccination opponent's message.

Another audience member was under the impression that vaccination opponents do not challenge messages from Clorox but will go after drug manufactures like Merck. Ms. Schrader countered that Clorox is not immune to attacks from vaccination opponents but said one must be willing to stand one's ground. Ms. Burke-Garcia added that opposition is coming and people have to be ready for it. She suggested thinking of some online advocates, who can help convey the message — but no matter what, stick to the message. Mr. Rauch suggested incorporating both the pro-vaccination and anti-vaccination audiences into the discussion.

Participants then asked questions about which specific points should be pressed and in what combination to sustain behavior and how to incorporate multiple messages into a single, simple message. Ms. Schrader said human experience is always evolving and insight is never going to last forever. If one creates an issue, one must also create a solution. Ms. Athen suggested confronting fear by having the conversation. She has found conversation empowers the population to balance the message. Regarding messaging, Mr. Rauch said to personalize the communication to maintain it over time.

Another participant asked for ideas for communication techniques that help build trust. Ms. Schrader recommended examining how health care is delivered and then link it to something actionable and relatable. Building trust requires ongoing relationships, which need to be maintained online and offline.

Another audience member expressed that activities happening outside of the country may help provide some perspectives. Efforts to combat vaccine hesitancy in some countries outside of the

U.S. are in their infancy. People need more awareness of how the World Health Organization (WHO) is dealing with hesitancy. Moreover, slow vaccination uptake might not be caused by lack of understanding but instead by how the message is delivered.

Changes in how doctors address their community can help build trust. Tailoring the messages to the population can aid as well. Ms. Athen said her health department is working with the University of Minnesota to conduct studies to determine better ways to talk to the community. Allowing conversations about the fears of vaccinations has helped. These conversations also help with structuring responses that combat inaccurate information.

Applying the advertising lens to influenza vaccine uptake. Advertising can be a great force in aiding vaccine acceptance, but a clear goal and an appropriate strategy are needed. For her interactive session, Norma Birnbaum of Publicis LifeBrands reviewed a few examples of advertising to illustrate her points on clear goals and strategies and invited audience members to share their thoughts and feelings about each advertisement, including if they felt the advertisement had achieved its goal.

Get the tone and feeling right.

People will remember how they were made to feel long after they forget what was said to feel.

She began the session by describing the concepts that should be considered when constructing an effective advertisement. The *communication goal* is about creating a change or shift in behavior. The communication goal needs to be single-minded. *Target audience and insight* identifies who is at the core of the message. Being single-minded regarding the target is important as well, along with understanding what makes the core target tick or what brings them closer to the advertised product or service. Knowledge of the target can come from quantitative research or qualitative research, which is needed “to put meat on the bones.” Use of values, hopes, dreams, and ambitions come from this type of research and can be acquired from deep listening and dialogue with the target. *Core message* is the key product truth and should be framed to appeal to the target. Advertisers should talk about the desired outcome in a way that makes it a priority for the target audience. It is best to say as little as possible but as often as possible. All of these aforementioned concepts lead to determining *tone and feeling*. Long after a person forgets what was said, they will remember how the ad or message made them feel.

Ms. Birnbaum then presented a few examples of flu advertising and had the audience deconstruct them based on the core concepts that she had laid out earlier. She concluded the session with the following takeaway messages:

- Be ruthlessly focused in goals — and in the core message, “say as little as you can, as often as you can”
- Know your target intimately and how to speak in their terms

- Invoking strong emotions can be motivating — but the emotion has to be exactly right and one must consider whether to leverage fear or encouragement
- Leverage others' learnings

Wrap-Up and Closing of Day 1

Dr. Omer ended by briefly summarizing each presentation. After receiving some housekeeping reminders, attendees were thanked for their participation, and Day 1 of the meeting was adjourned.

Values, Confidence, and Vaccine Acceptance

LJ Tan moderated this panel. Topics included in this session included putting values in service of vaccine uptake, providing support to health care providers, and building vaccine confidence from the ground up.

Putting values in service of vaccine uptake. Robert Bednarczyk of Emory presented a talk entitled “Making a Values-Based Argument for Vaccines.” Nonmedical exemptions for school vaccine requirements have increased over the years, which may indicate a larger issue — vaccine hesitancy. Should the strategy to address vaccine hesitancy come in the form of vaccination reminders, educational materials, or value-based appeals? Dr. Bednarczyk and colleagues adopted the Moral Foundations Theory to answer this question. This framework defines 6 areas of moral concern that influence how individuals develop and change their mindsets on certain subjects:

1. Harm/Care
2. Fairness/Cheating
3. Loyalty/Betrayal
4. Authority/Subversion
5. Purity/Degradation
6. Liberty/Oppression

The research team conducted 2 studies to test this framework in relation to vaccination.

Study 1

The goal of this study was to determine

Dimensions of Moral Concern

Harm/Care: virtues of kindness, gentleness, and nurturance

Fairness/Cheating: ideas of justice, rights, and autonomy

Loyalty/Betrayal: virtues of patriotism and self-sacrifice for the group

Authority/Subversion: virtues of leadership and followership, including deference to legitimate authority and respect for traditions

Purity/Degradation: religious notions of striving to live in an elevated, less carnal, more noble way

Liberty/Oppression: reactance and resentment people feel toward those who dominate them and restrict their liberty

whether vaccine-hesitant and vaccine-acceptant individuals emphasized different moral foundations. The researchers analyzed survey data via 1,007 parents who were between 18 and 50 years old, residents of the United States, and whose youngest child was less than 13 years old. The survey consisted of the Parent Attitudes about Childhood Vaccines (PACV) short scale, Moral Foundations Questionnaire, Liberty Foundation Questionnaire, and sociodemographic items (number of children, gender, education, age). Key findings included the following:

- Medium hesitancy parents were more likely than low hesitancy parents to endorse purity concerns and, among those above the age of 40, less likely to endorse liberty concerns.
- High hesitancy parents were less likely to endorse authority concerns and more likely to endorse purity concerns and, among those age 40 and below, liberty concerns.
- Endorsement of harm and fairness concerns did not discriminate between vaccine-hesitant and vaccine-acceptant parents.

Dr. Bednarczyk noted that these studies provide empirical evidence that values are associated with vaccine hesitancy and suggested that herd immunity (i.e., fairness) and harm-based arguments may not be effective in combatting vaccine hesitancy. When engaging with hesitant individuals, he suggested assessing which values might be important and responding accordingly. These findings could also help with designing interventions and messaging campaigns, e.g., targeting different sets of moral foundations depending on the audience to persuade.

Identifying the values that underlie pro-vaccine attitudes, vaccine hesitancy, and late vaccination. Amanda Dempsey of the University of Colorado at Denver presented a talk entitled “Motivational Interviewing to Promote Vaccine Uptake.” Dr. Dempsey began by defining values as personal priorities and beliefs that influence attitudes and behaviors. Values are the criteria for evaluating actions and decisions, as well as the underlying attitudes and beliefs. In other behavior domains, aligning messages with an individual’s values improves acceptance of those messages, as is the case in self-affirmation and motivational interviewing interventions.

Values should inform pro-vaccination messaging. People’s attitudes and beliefs regarding vaccination, as well as their degree of vaccine hesitancy, are informed by their values. Aligning messages informed by specific sets of values may improve acceptance of those methods by the targeted population.

Dr. Dempsey and her colleagues created and validated a value scale to determine which values have the most impact on vaccine decision-making. The research team first reviewed the literature for immunization-related values and examined existing values scales. The Schwartz

Portraits Values Questionnaire (PVQ) domains (universalism, benevolence, conformity, tradition, security, and self-direction) were used for the scale because they could be applied to vaccinations. The researchers conducted exploratory and confirmatory factor analysis on data from 295 individuals (Kaiser Permanente Colorado data) to determine the factor structure of the measure. The analysis suggested a new 6-factor structure, where “security” factor was split into 2 (disease prevention and vaccine risk), and the “universalism” and “benevolence” factors collapsed into 1. Four items were dropped as they did not fit into any factor.

The following are key findings to date regarding the associations between values, vaccine hesitancy, and vaccination behavior:

- Conformity is associated with decreased vaccine hesitancy
- Universalism is associated with increased vaccine hesitancy
- Self-direction is associated with late vaccination
- All of the above associations were explained by attitudes

These findings regarding the association of specific values with pro-vaccine attitudes, vaccine hesitancy, and late vaccination may help with developing interventions. Specifically, values are a good target for interventions because they can explain vaccination behaviors better than vaccination-related attitudes.

Dr. Dempsey and her colleagues then conducted a 3-year, CDC-funded, pragmatic, cluster-randomized trial (PCOM) to determine the impact of the values on vaccination behavior. Participants were recruited from 12 pediatric clinics and 4 family medicine clinics to assess the influence of an HPV vaccine provider toolkit on adolescent HPV vaccination rates. The trial involved more than 30,000 adolescents.

The toolkit contained the following:

- Website tailored by the International Vaccine Access Center (IVAC)
- Fact sheet
- Disease images
- Decision aid

Health care providers were also provided with training in both the presumptive and motivational interviewing communication approaches. The presumptive (“blanket”) approach requires introducing the vaccine to the patient and family member as no different than any other recommended vaccine and to “tell” the patient, rather than “ask,” that the vaccine needs to be administered. The motivational interviewing approach is a way of being with the client and not just a set of counseling techniques. The provider becomes a “helper” in the change process and works to reinforce a person’s inherent motivation for a behavior. The focus is on making

behavior harmonious with values rather than changing attitudes. Motivational interviewing trainings focused specifically on the HPV vaccine conversation and emphasized using particular motivational interview techniques. Key findings of the PCOM trial included the following:

- Improved provider self-efficacy for addressing HPV vaccine hesitancy
- No increase in time spent discussing the vaccine with hesitant parents
- Decreased time spent discussing the vaccine with non-hesitant parents

The communication training and fact sheets were the most used components of the toolkit, with health care providers finding the communication training particularly valuable to their work. Use of those elements continued over a 12-month period.

Dr. Dempsey concluded her talk by noting that motivational interviewing, which capitalizes on parents' intrinsic values, is one of few interventions specifically shown to address vaccine hesitancy. Future research should explore use of this approach more broadly. Dr. Dempsey provided the following take away messages:

- Values are a relatively unstudied domain, and this work and others' suggest it may be an important leverage point for increasing vaccine confidence
- The immunization values scale begins to define what the values are
- The motivational interview result suggests values can be used to influence vaccine decision-making

Dr. Dempsey also mentioned that an ongoing trial is looking more explicitly at the role of values in influencing parents' vaccination behaviors.

Providing support to health care providers. Melissa Gilkey of the University of North Carolina Gillings School of Global Public Health presented a talk entitled "Improving Health Care Providers' Communication about HPV Vaccine." She reviewed 3 studies that examined HPV vaccine recommendations and messages. HPV vaccination in the U.S. is routinely administered to adolescents between the ages of 11 and 12. Thus far, the statistics show poor results in vaccination rates. By age 13, only 56% of girls have been vaccinated and 49% of boys. Parents' confidence or lack of confidence in HPV is directly related to the vaccination rates. It is believed that providers advocating in favor of the HPV vaccine can increase the numbers because, according to parents, the providers are the most influential and trusted sources.

Study 1: HPV Vaccine Recommendation Quality

The purpose of this study was to determine the extent to which physicians' HPV vaccine recommendations are consistent with national guidelines. Specific aims of the study were to:

1. Assess physicians' HPV vaccine recommendation practices on 5 quality indicators
2. Identify correlates of overall recommendation quality

Data were collected via the 2014 Physician Communication Study, a cross-sectional, online survey of pediatric or family medicine specialty providers of preventive care to patients ages 11 to 17. The national sample ($n = 776$) was 53% pediatrics specialty, 68% male, and 55% in practice 20 years or more. A “strong” recommendation to vaccinate included the following quality indicators:

- *Timeliness*: Recommended by target age
- *Strength of endorsement*: Provider says vaccine is very important
- *Consistency*: Provider delivers routine vs. risk-based recommendations
- *Urgency*: Provider recommends same-day vaccination

The majority of survey respondents reported high-quality practices:

- 74% recommended vaccination for HPV by target age for girls and 61% for boys
- 73% told patients and family members that the HPV vaccine is very important
- 61% delivered routine vs. risk-based recommendations for the HPV vaccine
- 60% recommended same-day vaccination

Overall recommendation quality was high (4 or 5 from a range of 0–5; timeliness for girls and boys assessed separately) for 46% of physicians surveyed. Dr. Gilkey and her colleagues then examined potential correlates of high recommendation quality:

- Physician characteristics (specialty, sex, years in practice)
- Clinic characteristics (practice type [private vs. other], size, national region)
- Physician perceptions (talking about a sexually transmitted infection [STI] is uncomfortable; parents feel that HPV vaccination is not important)

Key findings included the following:

- Only physician perceptions were significantly associated with recommendation quality. Respondents who did not strongly or somewhat disagree that talking about an STI was uncomfortable were less likely to have high recommendation quality scores (35% vs. 57%). Those who believed that parents feel that the HPV vaccine is not important or slightly important were less likely to have high recommendation quality scores (41% vs. 51%).
- Half of physicians reported 2 or more recommendation practices that likely compromise guideline-consistent delivery of HPV vaccine.
- Recommendation quality was lower among physicians with negative perceptions of HPV vaccine discussions.

Dr. Gilkey provided an example of a model effective recommendation: “Now that Michael is 11 [timeliness], he’s due for 3 shots that are really important [endorsement] for all kids his age [consistency]: meningitis, HPV, and Tdap. We’ll give these at the end of the visit [urgency].”

Study 2: Physicians’ Perspectives on Persuasive HPV Vaccine Messages

The purpose of this study was to determine which kinds of messages physicians find effective for persuading parents to vaccinate. Data were collected via an open-ended survey item in the Physician Communication Study: “What is the most effective thing to say to parents to persuade them to get HPV vaccine for their 11 to 12 year olds?” The team examined responses to this question for themes of experience, risk behavior, and comparisons. Exhibit 1 illustrates some of the messages.

Key findings included the following:

- Physicians’ messages for inspiring HPV vaccination were varied
- Some messages aimed to heighten perceived risk
- Other messages framed HPV vaccination as an unremarkable part of routine care

Exhibit 1: Themes of HPV Vaccine Messages from Physicians

Experience	Personal: “My own children, both my daughters and son, have gotten the vaccine, and I recommend it for yours.”	Professional: “I have seen this infection repeatedly. HPV vaccine will help protect them.”
Risk behavior	Patient’s: “Kids usually don’t share their thoughts on sex or their level of curiosity, which can lead to action. Don’t want to judge, but best to be safe.”	Partner’s: “I advise them that while their child may never have sex with anyone but their spouse on their wedding night, their spouse may have had a one-time occurrence in the past (college) and put their child at risk.”
Comparisons	Novel: “HPV vaccine is one of the first vaccines to prevent cancer. It’s an amazing scientific breakthrough.”	Similar: “Like all vaccines, HPV vaccine prevents serious diseases.”

Study 3: Parents’ Perspective on Persuasive HPV Vaccine Messages

The purpose of this study was to determine which messages that parents find persuasive. Data were collected via a cross-sectional, online survey in September 2016 of parents of adolescents

aged 11 to 17. The national sample ($n = 1,223$) was 51% male, 72% non-Hispanic white, and 35% who had a high school degree or less. This survey was scored on a best to worst scale, where parents were given 5 out of a pool of 11 messages to rate.

The study found that parents were most persuaded by messages about vaccination effectiveness (in order of persuasiveness):

- It can prevent cancer
- It can prevent a common infection
- It has lasting benefits
- It is a safe vaccine
- It works best at this age

The least persuasive messages relied on physician authority and experience or scientific justifications (in reverse order of persuasiveness):

- Your child is due for it
- I got it for my own child
- It is a scientific breakthrough
- Getting it on time will mean fewer shots
- I think it is important
- It should be given before sexual contact

Dr. Gilkey concluded by saying that providers have a great deal of influence on parents' decision-making about HPV vaccination but that raising coverage rates requires more frequent and effective recommendations by providers. HPV vaccination affords an opportunity to think conceptually about what makes recommendations for vaccination effective.

Building vaccine confidence from the ground up. Noni MacDonald of Dalhousie University presented a talk entitled "Building Resilient Pro-Vaccine Communities." Vaccine decisions are complex for several reasons. Risk perceptions are intuitive, involuntary and often instinctive. Emotions play a part in how people come to their determinations. Lastly, decisions are deeply affected by what others do and their expectations of others. Dr. MacDonald introduced a different way of dealing with vaccine decisions by focusing on vaccine acceptance. What makes a person a proponent of vaccinations?

She first defined pro-vaccine resilience. Among immunization programs, resilience is "programs that can withstand major shocks and disruptions, to quickly adapt to changing circumstances and to maintain high vaccine uptake and acceptance over time." Resilience is a relatively new term to the vaccine arena but is used readily in other areas of public health when developing strategies for overcoming emergencies or disasters. It is a complex concept, so strategies must

be fluid and able to change to fit the community's need. Dr. MacDonald proposed 5 strategies that could be used:

1. *Involve the whole community:* This involves bringing together a spectrum of groups like academics, private and civic organizations, public health, and government to promote vaccine acceptance as a social norm. Norms, behavioral intention, and behavior affect vaccine resilience. She recommended using pro-vaccine stories and reaching out to vaccine-accepting groups like HPV-immunized teens or flu-immunized pregnant women. These influencers can help readjust social norms.
2. *Develop effective communication strategies:* Dr. MacDonald suggesting employing existing information channels and taking note of concerns from both sides of the vaccine spectrum. Communities that are hesitant hear pro-vaccine messages differently. Dr. MacDonald also recommended tailoring both communications and interventions to the specific communities where they are being presented.
3. *Nurture trust:* Immunization programs and health care workers should be transparent. Being open to discussing issues such as vaccine manufacturing processes, safety, and risk can increase the trust in the relationship between patients and parents and also demonstrates care.
4. *Give positive reinforcement to vaccine acceptant and value acceptors individuals:* Very rarely are vaccine acceptors celebrated for protecting themselves and the public. Be sure to appeal to their social identity and seek out individuals or groups who can be champions.
5. *Nurture resilience in children, adolescents, and adults:* Dr. MacDonald suggested using civil service organizations, businesses, religious events and programs, as well as adult education as avenues for nurturing resilience in adults. For children or adolescents, she suggested using school vaccine education to:
 - Demonstrate that the community values immunization
 - Underscore vaccine acceptance as the norm
 - “Inoculate” against misinformation and anti-vaccine tactics

She concluded by recommending that vaccine proponents and programs continuously survey the landscape for misinformation. She emphasized the need to research changes in beliefs, to determine a plan of action to address fabrications, to correct distorted information quickly, and to unmask the tactics utilized.

Discussion. One participant asked for ideas on ways to award people for being vaccine acceptant. She also asked for curriculum suggestions. Dr. MacDonald said more research is needed on what positive reinforcements have the most impact. Denmark will have a curriculum next year to address current vaccine perceptions, and Ontario, Canada, has curriculum development as part of its 2020 plan. In the state of New York, vaccines are part of the education. Many schools are having a problem fitting it into the curriculum due to other demands, limited time, and testing restrictions. Curriculum alone may not be sufficient, and vaccine education will have to be built into other areas.

Another participant wondered if a survey could be given on motivators to find out what stops people from being promoters of change in their community or among their social community and what toolkit they need to make that transition. Dr. MacDonald agreed. She expressed that good listening skills are necessary, so that examiners can tease out the blocker. She added that self-beliefs are a main contributor but suggested the need for communication guidance.

Another attendee suggested using social media to draw in parents and train them to do vaccine advocacy. Parents have been very successful at blocking legislation. This could be an encouraging model of activating people to become promoters and provide concrete examples of actions they can take. A recommendation was made to start on a small scale with parents and friends and encourage them to pass it along to their social circle.

Another audience member asked Dr. MacDonald about the differences she sees in other countries versus the U.S. in her work. The suggestion also was made to involve children in advocacy efforts and messaging. Dr. MacDonald responded that all the ideas she put forward can be translated to any country. The only difference is how to translate the ideas to partners.

Ideas were solicited on how to work with providers, get them onboard, and shift the way they hold vaccination conversations. Dr. Dempsey suggested offering certification credits. Another motivator is reviewing their vaccination rates, which may move them to be more mindful of vaccination conversations. Dr. Gilkey felt that nurses could also be instrumental in vaccination education.

A question arose regarding the characteristics of the ideal person for conducting motivational interviewing and what should be offered to that individual to make this effort sustainable. Dr. Dempsey said anyone can do motivational interviewing and it normally takes 2 to 3 minutes at a clinic visit. Once providers become comfortable, it becomes a routine part of their discussions. Obstetrician-gynecologists (OB-GYNs), however, are different. An immunization champion may be needed for those physicians.

A recommendation was made to bring risk communication, risk of immunizing, and not immunizing back into the conversation. This audience member stated that numbers are not a good way of communicating; therefore, some tools should be developed to help in those discussions. Another attendee highlighted the importance of shifting anti-vaccine messages to a pro-parent choice or parent empowerment frame. Dr. Bednarczyk expressed that some of the ideas of liberty and authority could help develop messages that speak to that component.

Systems Approaches to Building Confidence

Ms. Fisher of CDC moderated the last panel discussion. Topics in this session included the power of policy, capacity building in medicine and public health around vaccine confidence, and partnerships and collaborations.

The power of policy. Dr. Omer of Emory presented a talk entitled “Vaccine Laws as Behavioral Interventions.” School immunization requirements in the U.S. are state-regulated and help aid in the low rates of vaccine-avoidable diseases. However, people can avoid immunization requirements by acquiring an exemption through the state. Most states accept exemptions for the following reasons: medical considerations, religious convictions, and personal or philosophical beliefs. A 2016 article in the *Journal of the American Medical Association* presented data showing that between 2000 and 2015, 69% of nonvaccination was due to nonmedical exemptions. School vaccine exceptions vary by states. Most exemptions are due to nonmedical reasons and only 3 states have no vaccine exemptions.

Another way of looking at exemptions is the ease of obtaining them by state. In some states, acquiring a nonmedical exemption is as easy as printing and filing an exception form. Expectedly, the states with easy exemption requirements had the most increases in exemptions.

So why not eliminate exemptions all together, as in California? To support the argument of elimination of exemptions aiding in decreasing disease burden, Dr. Omer suggested an assessment study to evaluate the correlation over a 5,10, and 15-year timeframe. From 2009 to 2012, no laws to expand exemptions have passed; therefore, another model has been proposed. SB 5005 is a law in Washington State that makes educational counseling a requirement for parents desiring an exemption for their child, as well a signed form from a state-licensed health care provider, in order to obtain a nonmedical exemption. The law went into effect on July 22, 2011 and since then, exemption rates went down by 42% (returning to rates seen a decade ago) and clustering of measles cases also decreased.

Several approaches have been suggested to deal with vaccine skeptics:

- Requiring signature on a form that discusses the risks of nonvaccination

- Requiring a letter elaborating on the reason that their child should be exempt
- Conducting in-person counseling
- Providing the exemption form only by specific request from a state or local health department instead of making it available online
- Establishing procedures to review each request for exemption
- Having an annual renewal requirement

Dr. Omer concluded his talk by providing a list of policy documents that have cited his and colleagues' work, which can aid in making an argument to states of the consequences of exemptions, disease management, and impact on vaccination rates.

Understanding the influence of policy on vaccine confidence. Jason Schwartz of the Yale School of Public Health presented a talk entitled "Policy as Intervention for Fostering Vaccine Confidence." Dr. Schwartz began by asking the audience the following question: How do issues related to vaccine confidence shape the deliberative processes that lead to vaccine policies and recommendations (and vice versa)? Attention to potential consequences of policy options regarding vaccine confidence, he stated, has been a part of decision-making, alongside assessments of risks and benefits, safety, effectiveness, and related evidence. The existing structures and processes for developing evidence-based vaccine recommendations are significant assets in promoting confidence in vaccines, vaccine policies, and vaccine policymakers, as well as additional opportunities to highlight them to providers and parents.

Dr. Schwartz then discussed the history of the Advisory Committee on Immunization Practices (ACIP) and the RotaShield vaccine, which was used from 1998 to 1999. This vaccine caused severe, and in some cases fatal, intestinal intussusception. In the summer of 1999, a research study revealed that 429 infants from a control group of 1,763 had been hospitalized with intussusception in 19 states. The vaccine heightened the risk of intussusception 3 to 14 days after the first dose of the vaccine. The ultimate finding was that 1 case of intussusception was attributable to the vaccine for every 4,670 to 9,474 infants vaccinated. However, the vaccine's considerable benefits were not discussed at that time, due to ACIP's recommendation of withdrawal in October 1999. Dr. Schwartz wondered if there could have been a possible way to move forward with the vaccine because of its effectiveness. This issue is an example of the politics of acceptable risk.

The ACIP can be an aid in these cases, as the ACIP is an interdisciplinary group of outside experts that includes a consumer representative as a voting member. ACIP meetings and deliberations were open to the public, who therefore had access to meeting presentations, minutes, transcripts, and the committee recommendations (and supporting evidence and rationale). The meetings also allowed the public to provide remarks during the public comments

time. This session is an important part of the meetings to engage the public and make them a part of the process.

Dr. Schwartz closed his talk by sharing some implications and opportunities for using the ACIP:

- Potential value of more explicit consideration to role of vaccine confidence in ACIP discussions and commendations (and vice versa)
 - Are new kinds of evidence needed (before and after new recommendations approved)?
 - Are new kinds of expertise needed (as members or consultants)?
- Potential value of improved endeavors aimed at emphasizing, demystifying (and, at times, humanizing) the activities and people that develop evidence-based vaccination recommendations

Building capacity in the public health system. Daniel Salmon of Johns Hopkins University presented a talk entitled “Building Vaccine Confidence in Public Health Settings.” In his remarks, he shared some personal reflections on the 2009 H1N1 epidemic. The decision to vaccinate for H1N1 became a very controversial issue. Over 77% of parents reported vaccine concerns for a variety of reasons, such as: it was painful for their child to receive so many shots, too many vaccines in the first 2 years of life, the vaccine may cause fever, and ingredients being unsafe. People perceived the risk from taking the vaccine to avoid having the virus as being greater than catching the virus. He paralleled this incident to the 1976 swine flu, where vaccinations were ceased when the risk of Guillain-Barre syndrome (GBS) was identified. This episode was considered a public health and political disaster.

In the end, H1N1 vaccine production took longer than expected. CDC led an enormous national effort to vaccinate everyone as rapidly as possible, which created substantial pressure on states and localities. Many in the vaccine safety community recognized challenges for safety monitoring and the potential for factual or perceived problems to destabilize the program. Additionally, on a political level, failure to implement this process correctly could have undermined health care reform legislation.

The National Vaccine Advisory Committee (NVAC) recommended the following steps for H1N1 safety monitoring:

1. Assembling background rates of adverse events that occur in the general population
2. Developing and disseminating a federal plan
3. Enhancing active surveillance for signal detection, assessment, and confirmation of possible associations between vaccines and adverse events
4. Establishing a transparent and independent review of vaccine safety data as they accumulate

5. Developing and, where possible, testing in advance a strong and organized response to scientific and public concerns about vaccine safety

A published paper also provided estimates of coincident, temporally associated events. The lesson learned was that science has to rapidly separate coincident from causality.

In an effort to prepare the media, 3 tabletop exercises were convened with Health and Human Services (HHS) leadership and the media. These drills were used to examine scenarios and stress possible events. Participating in the drills showed the science and government communities what questions might arise, how the media would report on the issues, and how the media would respond to the science and government communities' responses. The drills also helped to prepare the media for what was to come.

The Vaccine Safety Datalink (VSD) limitations caused problems with active surveillance during the 2009 H1N1 epidemic. People then recognized the need for a new system to address surveillance needs. Therefore, the Post-Licensure Rapid Immunization Safety Monitoring (PRISM) was developed.

The aims of PRISM are to:

- Link health plan data and state immunization registry data in new H1N1 vaccine safety surveillance network
- Conduct continuous active surveillance for pre-specified outcomes
- Provide timely information on unanticipated potential adverse events

PRISM identified GBS as the only outcome associated with vaccination for the H1N1 virus. Data from a chart review done for GBS contributed to a U.S. meta-analysis and an international study. The Food and Drug Administration (FDA) later picked up PRISM as vaccine component of a mini-sentinel project.

Dr. Salmon concluded his presentation with some policy questions that if answered can be useful in future policy efforts on vaccinations:

- Did vaccine safety efforts make a difference?
- What is worth keeping?
- How did 2009 H1N1 impact vaccine confidence?
- What was learned from H1N1 that could be useful in the U.S. and internationally?

Training physicians to communicate about vaccinations. Sean O'Leary of the University of Colorado at Denver presented a talk entitled "Training Providers: Beyond Vaccine Administration." Dr. O'Leary began by asking the audience to think about how many times

provider recommendations have been cited as being most effective in helping parents make decisions about vaccinating their children. However, in his formal education, he was not trained on vaccinations or how to have vaccination discussions.

The American Board of Pediatrics has the assigned task of making requirements for board certification. They provide a content outline that serves as the blueprint for initial certification and maintenance of certification. Immunizations are included under preventive pediatrics and well-child care and are 8% of the “exam weight.” However, the outline only says “current recommendations” and “special circumstances” (e.g., contraindications, lapsed immunizations). In the past, the outline did provide more detail regarding individual vaccines and included the phrase “plan an appropriate approach to addressing the needs of the vaccine-hesitant family.”

The Accreditation Council for Graduate Medical Education (ACGME) accredits residency and fellowship programs and sets the standards for each of the programs including explaining “milestones” and directing curriculum development. The words *vaccine*, *vaccination*, *immunization*, and *immunize* are not found in the 32 pages of competencies for pediatric training, however. Moreover, program requirements only state that the pediatric resident must be able to give immunizations.

NVAC gives clear recommendations for both safety training and communication training in regard to vaccines, but they have not been translated into the training requirements for the Board or the Council. To determine the extent to which medical training addressed vaccine safety, a survey was conducted of 199 U.S. pediatric training program directors (46% response rate). Of those surveyed, 59% reported no formal vaccine safety training.

Medical education about immunization is lacking.
NVAC recommendations regarding provider training about vaccines have not been translated into requirements by the American Board of Pediatrics or the Accreditation Council for Graduate Medical Education.

Of those who had received vaccine safety training:

- 37% received training through a continuity clinic didactic session
- 29% attended a standard in-person lecture
- 13% completed an online module
- 21% received training through other means (e.g., standardized patients, videos, Red Book, journal club, specific rotation)

Training topics included the following:

- Common adverse events following vaccines (100%)

- How vaccines are created, licensed, and recommended in the U.S. and who is responsible for making these decisions (44.7%)
- What resources are available for physicians who believe a patient may have experienced an adverse event (76.3%)
- How to talk with vaccine-hesitant parents about vaccine safety concerns (94.7%)

Among those without training, 82% showed an interest in participating in training, with a majority preferring online training as the form of delivery.

There are some existing online learning modules such as TIME (Teaching Immunization for Medical Education) sponsored by the Association for Prevention Teaching and Research, TIDE (Teaching Immunization Delivery Evaluation) sponsored by the Ambulatory Pediatric Association and CDC, as well as continuing education courses from the American Academy of Pediatrics (AAP). There are even smartphone apps like Shots Immunization and The Vaccine Handbook.

Dr. O’Leary also noted some existing curricula for individual residency programs like the University of California, San Diego; Children’s Hospital of Orange County; and Children’s Hospital Colorado. The MedEd portal also publishes curricula for training residents and medical students online, and Yale and Johns Hopkins have comprehensive primary care curricula designed to be delivered in continuity clinics. Most of the curricula content is regarding basic and vaccine-specific immunology, vaccine basics, vaccine-preventable diseases, vaccine safety, and communication. The first 4 elements address what is known about vaccines, but the area of communication (the “how”) is lacking.

Collaboration for Vaccine Education and Research for Residents (CoVER), is an industry-funded randomized trial to develop and evaluate a vaccine curriculum for pediatric and family medicine residents. This trial was performed at 28 sites using 4 one-hour online modules. The modules covered vaccine fundamentals, vaccine-preventable diseases, vaccine safety, and communication and vaccine confidence. The curriculum uses a “flipped learning” approach where activities traditionally done in the classroom (e.g., lectures, discussions, research) are conducted online and activities traditionally completed individually are done in a group setting, usually with guidance from a mentor.

He then outlined some challenges that he has observed regarding vaccination training for health care providers:

- Little, if any, evaluation of most curricula
 - No current curricula have been shown to increase vaccination uptake
 - How can we teach trainees when we know little about what works?

- Lack of uniformity
- Dependent on “champions” within individual programs
- Not enough “seat time”
- Vaccine-hesitant trainees

He also presented data from 2 other studies he and colleagues conducted on physician’s confidence in vaccine safety. The first was a nationally representative study of pediatricians and family medicine practitioners (response rate of 81%). When queried regarding confidence in pre- and post-licensure vaccine safety studies, less than 10% of pediatricians and 35% of family physicians reported little or no confidence in pre-licensure vaccine safety studies. Less than 5% of pediatricians and 10% of family physicians reported little or no confidence in post-licensure vaccine safety studies. In a study of residents conducted in October 2016, 101 pediatric and family medicine providers were asked, “Overall, how hesitant about childhood vaccines would you consider yourself to be?” and 78% said “not at all.” Then the providers were asked, “How concerned are you that one of the childhood vaccines may not be safe?” and 81% responded “not at all.”

Dr. O’Leary concluded with the following takeaway messages:

- No real requirements exist for residents to be trained about vaccines
- Many curricula have been developed, but these have taken a piecemeal approach
- Vaccine hesitancy appears to be a problem among trainees

Partnering to promote vaccine confidence. Catherine Flores Martin of the California Immunization Coalition presented a talk entitled “The California Immunization Coalition’s Work to Foster Vaccine Confidence.” Ms. Martin began by reviewing lessons learned about engaging parents and advocates from collaborative work with Vaccinate California. The mission of the California Immunization Coalition is to achieve and maintain full immunization protection for all Californians and to promote health and prevent serious illness. The collaboration is about the facts and science. Vaccinate California, a grassroots parent advocacy group, is part of this statewide coalition. They communicate messages focused on the human factor of vaccination through avenues such as billboards and ads. The California Immunization Coalition also spends a great deal of effort getting through to the “dark side” of vaccination issues. One of their activities is the “I Heart Immunity Campaign” to promote vaccine acceptance. Several major organizations came on board and provided a letter of support to the state legislature on behalf of the California Immunization Coalition. The Coalition also obtained a great deal of press coverage of their efforts.

There was also backlash. One anti-vaccination organization co-opted images and messages of the “I Heart Immunity” campaign and presented personal, medical, and religious freedom as

antithetical to SB 277, the bill about mandatory vaccinations for children. Unhappy parents demonstrated against the proposed legislation. Vaccine conspiracy events were held in Los Angeles to encourage the questioning of vaccines within communities of color. Advertising on billboards and social media stoked vaccination fears.

SB 277 passed, however, and Ms. Martin feels that the I Heart Immunity campaign contributed to this big win. She shared important lessons learned from collaborating with Vaccinate California:

- Know your goals — protecting vulnerable children and creating safer schools
- Control the message — no matter how the opposition responds
- Find supporters — you are not changing minds
- Recognize that it takes a huge team — it's not just about the numbers, but having the right people at the table

Challenges for leadership, in her experience, included:

- Inspiring supporters to believe that this is what is needed
- Trusting the team
- Keeping people productive and happy

Other lessons from the collaboration with Vaccinate California on the I Heart Immunity campaign included the following:

- Conveying how intensely controversial this issue is for some people is challenging
- Stay positive to bolster each other
- Working with thoughtful, professional leaders is very empowering for parents

Ms. Martin emphasized that the majority of Americans vaccinate their children and believe that vaccines in schools should be mandatory. They do not normally use social media as a platform to lash out at public health officials or doctors, or to criticize legislators. However, these parents are powerful and can act as advocates for vaccine acceptance just in their conversations with vaccine-hesitant people. They also find it inspiring to engage and work in collaboration with thoughtful and professional leaders.

The Coalition uses social media to educate parents through:

- Facilitate online discussions, providing evidence-based perspectives
- Active dismantling of medical (vaccine) myths and misinformation
- Educational videos on vaccine safety in advance of scheduled appointments

She concluded her presentation with the following lessons learned:

- Stay above the fray and stay on message

- Messengers matter
- Focus and timing
- Work together and trust each other

Collaborating with faith communities. Mimi Kiser of Emory then presented a talk entitled “Collaborating with Faith Communities to Promote Influenza Immunization.” The goal of the Interfaith Health Project is to build and mobilize capacity within networks of faith-based organizations and community organizations linked with public health to extend their reach to vulnerable, at-risk, and minority populations for improving influenza vaccination outreach and uptake. Emory University and CDC have trained 78 teams of religious and public health leaders in 24 states to work together on eliminating health disparities.

The HHS Center for Faith-Based and Neighborhood Partnerships worked with Emory University’s Interfaith Health Program (IHP) and 9 sites during the 2009 H1N1 epidemic. For that project, 10 sites with multi-sector partnerships:

- Modified evidence-based educational tools for hard to reach populations
- Incorporated participatory research findings about the meaning of trust into educational and outreach tools
- Led community leader trainings on emergency communication
- Employed trusted networks with different channels for information distribution, such as e-newsletters to congregations, radio, and family nurses
- Connected with low-income, uninsured, and minority populations

The project team employed a practice-based, discovery process using a modified Delphi technique to classify and combine distinctive elements from across the 10 sites. Other methods of data collection included:

- Document review and thematic analysis
- In-person inductive identification of key elements of practice (4 of 10 sites)
- Online survey to validate key elements and characteristics (16 respondents across 10 sites)
- Multisite, in-person meeting to define and describe operational components of the practices

The following are the outcomes from the project for 2 sites.

Buddhist Tzu Chi Medical Foundation: Compassion-Driven Flexibility

There is an unwavering commitment to find a way to serve the community that may risk or go beyond self-interest. How does one recognize and build this? An enduring and imaginative creative ability to see new resources, push the boundaries of convention, and think outside the



box is evident. There is a willingness to let go, reframe objectives, and find different solutions to new issues that arise in the face of changing policy or structural barriers. To address the needs of hard-to-reach populations, Buddhist Tzu Chi Medical Foundation has built itself to be agile in order to work when and wherever people are best served.

Lowell Community Health Center: Build and Maintain Trust

Trust is primarily relational. It is built over time when respect for differences, commitment to the good of the community, integrity, and transparency are experienced consistently in the face of challenging collaborative endeavors. The Lowell Community Health Center (LCHC) has a long history of responding to the needs of immigrant communities and making institutional adjustments to respond effectively to their needs with:

- Metta Health Center: a meditation room in the LCHC created in partnership with a local Buddhist center
- A strong outreach relationship to a network of African churches
- Staff who represent the ethnicities and cultures of those they serve
- A community health worker program adapted to different ethnic populations

Ms. Kiser emphasized that trusted and accessible messages outside of the health care system are often transmitted through:

- Trusted networks and relationships
- Partners who have flexible, adaptive organizational capacity
- Those who deliver messages in an appropriate language and with relevant cultural meaning

She concluded by saying that most communities have leaders with relationships and the kinds of commitments that can leverage connections and social capital resources for the well-being and health of all.

Discussion. During the brief question and answer session, an attendee asked Dr. O’Leary if he has examined the adult medicine training program for vaccination curriculum. Dr. O’Leary said there is no curriculum currently related to adult vaccinations. He also felt all providers regardless of specialty should be taught about vaccinations because they are important to wellness. Furthermore, specialists who take care of immune-compromised individuals are also not getting adequate training, so many gaps need to be addressed.

Closing Plenary

Ms. Mendel of NVPO began by thanking attendees for sharing their ideas and engaging in important discussions about the best ways to promote vaccine confidence. Dr. Omer of Emory also expressed his appreciation and then introduced the closing speaker, Walter Orenstein.

Closing presentation. Dr. Orenstein of Emory presented a talk entitled “The Effects of Vaccine Confidence on the Immunization System: A Retrospective.” A major outbreak of measles in the 1970s underscored the need for better prevention strategies. The significant component of those strategies was the requiring of vaccinations in order for children to enter school. A major measles outbreak in 1977 led health officials to prohibit unvaccinated children from entry into schools, which resulted in a decrease in measles cases. This practice soon became standard throughout the U.S. and led to the Childhood Immunization Initiative of 1977 that inaugurated a perpetual system to vaccinate the children born each year.

The beginning of modern-day vaccine hesitancy came with the 1974–1976 pertussis vaccine controversy in the United Kingdom. In January 1974, a newspaper article told the story of 36 children believed to have suffered severe neurological complications after receiving the diphtheria, pertussis, and tetanus (DPT) vaccine. Due to this occurrence, parents formed vaccination opponent groups to bring attention to the public of the risks of DPT. By 1977, coverage against pertussis (whooping cough) had declined from 77% to 33%. The decrease in vaccinations caused 3 major epidemics of whooping cough. A research study of the vaccine found that although the vaccine could be linked to an escalated risk of acute illness, the risk was very low.

As a result of the United Kingdom incident and the litigation pursued afterwards, the National Childhood Vaccine Injury Act of 1986 created the national Vaccine Injury Compensation Program (VICP) in the United States on October 1, 1988. This program allowed financial reimbursement to individuals who filed a petition and were found to have been injured by a VICP-covered vaccine. Even in cases where a finding was not made, petitioners could receive compensation through a settlement. The VICP covered both recipient and contact cases.

Dr. Orenstein’s experience with polio came in 1988 with an outbreak in Israel. There were 15 cases of paralytic poliomyelitis caused by type 1 vaccines, but Hadera, Israel, had been using an inactivated polio vaccine (IPV) schedule only since 1982. The investigators were divided in their reading of the findings. The pro-oral polio vaccine (OPV) investigators believed that IPV-vaccinated individuals silently transmitted wild polio virus (WPV) to older persons, while the pro-IPV investigators believed that WPV was transmitted through OPV vaccine failure. This was all theoretical and the groups submitted their findings to the *Lancet*. Data presented at the ACIP meeting held June 19–20, 1996, showed that OPV caused an average of 8 to 10 cases of

vaccine-derived polio per year. Among OPV recipients, the risk was higher with first doses, compared to subsequent doses. In the absence of wild-type disease, the public and authorities began to deem the risk from the vaccine unacceptable. The following statement was thus added to the ACIP recommendations: “ACIP recommends a transition policy that will increase use of IPV and decrease use of OPV during the next 3 to 5 years.”

Dr. Orenstein also discussed a retracted study that linked MMR vaccinations to autism. Wakefield and his colleagues conducted this study of 12 children in 1998. It suggested that MMR vaccination led to intestinal abnormalities and behavioral disorders. The findings were found to be false and were retracted, but unfortunately the damage had been done. Measles vaccinations decreased, and the measles resurfaced in the United Kingdom.

Then the thimerosal controversy occurred in 1999. Thimerosal is a preservative used in inactivated vaccines that contains ethyl mercury. Studies showed that a 6-month-old infant could be exposed to 187.5 micrograms of mercury if he or she received the recommended doses of vaccines. This exceeds EPA’s safety limits for *methyl* mercury, but not the limits set by Agency for Toxic Substances and Disease Registry (ATSDR), FDA, and WHO. Questions arose concerning obligations to make parents aware, the time it would take to test for validity, and moving to single dosages for safety. On July 7, 1999, after 2 weeks of deliberation, it was decided to delay the birth dosage of Hepatitis B vaccine. Manufactures were urged to remove thimerosal from vaccines as soon as possible, and the AAP released a statement to the public. The outcome from this event was that autism groups began alleging that the mercury led to autism.

The last incident reviewed was the RotaShield vaccine and its relationship to intussusception. Removal of the vaccine triggered the need for large clinical trials of future rotavirus vaccines to rule out the risk of intussusception. NVAC issued recommendations to aid in increasing vaccine confidence, which included:

- Measuring and tracking vaccine confidence
- Communication and community strategies
- Health care provider strategies
- Policy strategies
- Continued support and monitoring

The 2015 NVAC report on vaccine confidence was triggered by the following factors:

- Pockets of low coverage
- Increasing school law exemptions, especially in states with personal belief exemptions
- Geographic clustering of individuals with exemptions

- Increase in parents stating they delayed at least 1 vaccine (from 21.8% in 2003 to 25.8% in 2009)
- 2010 survey that found 87% of pediatricians had parents who requested an alternative schedule
- 2012 physician survey that found that 93% of parents in a typical month requested spreading out of vaccines

Discussion. One audience member asked about the current administration’s position on vaccination. Dr. Orenstein reported that Secretary Tom Price and HHS are supportive of vaccine efforts, although conversations coming from the Executive Branch are concerning. A suggestion has been posed to form an Autism Commission. Decreased disease burden illustrates the success of the immunization community, but is often overlooked.

Another attendee noted that terms like “vaccine-hesitant” are problematic and expressed that a simple change in the nomenclature may make parents feel more at ease. Dr. Orenstein agreed and said this is why “vaccine confidence” is being used instead.

The last question regarded the use of an alternate ACIP schedule as a harm reduction strategy. Dr. Orenstein disagreed and stated the need for a continued focus on using the ACIP schedule as is. If necessary, providers should point out risks in using an alternate schedule and identify who could be harmed by its use.

Concluding thoughts. Dr. Omer ended the meeting first with a brief summary of each of the presentations from Day 2. He expressed that the conversations held at the meeting symbolized the maturing of the immunization discussions. He then recommended the following steps for moving forward the important work in building vaccine confidence:

- Develop evidence-based strategies on effective way to persuade physicians
- Think of the next advances in science that would modify assumptions
- Continuously absorb the science that is generated

Dr. Omer thanked the “giants of immunization,” including Barry Bloom, Kathy Edwards, Noni MacDonald, and Walt Orenstein, upon whose shoulders the vaccine community stands. He also thanked all the staff and contractors for making the meeting a success. Dr. Omer concluded by encouraging all attendees to share their thoughts via the evaluation sheets and to propose strategies for advancing vaccine acceptance via the ideas board.

Ideas Board

Participants were encouraged to share new ideas generated as the meeting progressed by writing thoughts on index cards, which were displayed on an idea board.

Below are participants' thoughts in their own words:

- Embrace the anti-vaxxer as a part of the conversation. Bring their voice into the same platform that pro-vaccine has. Would be powerful to watch an anti-vaxxer do a 180° and change course. Powerful transformation actions.
- Vaccine science curricula in schools
- Battery of all confidence/hesitancy measures
- More research/practice collaborations and interdisciplinary approaches
- Need for open data sharing
- Vaccine confidence reflects larger socioecologic landscape
- Please compile list of scales/indices and in what context they were developed/applied
- Begin to reframe vaccination as a complete maintenance program throughout one's life as a way to optimize health over a lifetime.
- Improve our ability to recognize vaccine confidence issues before they bubble up.
- Create ICD code so providers can be reimbursed for motivational interviewing or education towards vaccine acceptance.
- Trace trust in the system regularly (more than yearly). Maybe work up the trust parameter?
- Create a large social norming campaign (using positive reinforcement) to reinforce the norms of childhood vaccination with more tailored approaches for pockets with higher hesitancy.
- Develop some form of virtual committee to work on proactive "inoculation" of pro-vaccine communities with TPs, tips on unmasking fake news, new updates on fake news, etc.
- Create a tested message bank for use/customization during outbreaks that include vaccine confidence issues.
- How can we circumvent knee-jerk reactions against expert authorities?

Meeting Assessment

A total of 33 of the 76 attendees completed the meeting assessment (43.4% response rate). The majority of respondents worked in academic settings (see Exhibit 2).

Exhibit 2. Professional Sector of Assessment Respondents

Sector	% (n)
Academia	64% (21)
State or local health department	0% (0)
Health care system	3% (1)
Federal government	15% (5)
Nonprofit/advocacy/membership	18% (6)
Other	0% (0)
Total	33

Respondents felt that the meeting met its intended objectives and was a satisfying experience. Approximately 75% of respondents strongly agreed that they learned about important work being done to address vaccine confidence, hesitancy, and acceptance (see Exhibit 3). Over 50% strongly agreed that they were able to speak with leaders in the field and identify relevant research and intervention gaps. Respondents also strongly agreed the meeting strengthened the community of professionals working to increase vaccine confidence. Respondents reflected these positive views in their perceptions of the meeting as a whole. For example, over 50% strongly agreed that the meeting agenda met their expectations (see Exhibit 4).

Exhibit 3. Achievement of Meeting Objectives

	Strongly disagree % (n)	Disagree % (n)	Agree % (n)	Strongly agree % (n)	Total
a. I learned about the important work being done to address vaccine confidence, hesitancy, and acceptance.	3% (1)	0% (0)	21% (7)	76% (25)	33
b. I identified relevant gaps in research and interventions that address vaccine confidence, hesitancy, and acceptance.	3% (1)	9% (3)	33% (11)	55% (18)	33
c. I was able to share new ideas with colleagues.	3% (1)	9% (3)	47% (15)	41% (13)	32
d. The meeting strengthened the community of professionals working to increase vaccine confidence.	3% (1)	3% (1)	36% (12)	58% (19)	33
e. I was able to meet and speak with leaders in vaccine confidence-related fields.	3% (1)	3% (1)	33% (11)	61% (20)	33

Exhibit 4. Perceptions of the Meeting Experience

	Strongly disagree % (n)	Disagree % (n)	Agree % (n)	Strongly agree % (n)	Total
a. Overall, the agenda met my expectations.	0% (0)	0% (0)	41% (13)	59% (19)	32
b. I am satisfied with the amount of participation I had in the sessions.	0% (0)	6% (2)	47% (15)	47% (15)	32
c. I was given adequate opportunity to get answers to my questions.	0% (0)	9% (3)	44% (14)	47% (15)	32
d. I was able to clearly understand and follow the presentations.	0% (0)	0% (0)	34% (11)	66% (21)	32
e. The conference facilities were comfortable and appropriate for the meeting goals.	0% (0)	0% (0)	25% (8)	75% (24)	32

The meeting assessment form included 3 open-ended questions. Participants were asked what they liked best about the session content and the way sessions were delivered, what they would change about session content and the way the sessions were delivered, and what other suggestions they had for the meeting. A summary of their responses is included below.

The majority of the responses focused on the high quality of the speakers (perceived as leaders in the field of vaccine confidence) and the content of their presentations.

Specifically, respondents valued the variety of speakers from different disciplines, including research, practice, and policy issues, as well as the diversity and mix of new and seasoned researchers. Participants also liked the overall organization of the panel discussions, which offered a good mix of topics of relevance in the field of vaccine confidence. Participants found it useful to hear expert opinions not only of important concepts but also high-level ideas or the “big picture.” Participants also enjoyed the pace of the sessions and the opportunity to ask questions following each panel. A couple of participants also noted having enjoyed the opportunity to interact with colleagues, including speaking with experts that they would “typically not have access to” in their day-to-day work.

Participants recommended changing aspects of the content delivery — specifically, making the meeting more interactive. For instance, some participants noted that the flow and pace of the meeting could be improved by including activities between presentations such as group work, showing videos, extending the question and answer periods, or facilitating discussions that will make participants engage with each other in a meaningful way. Another suggestion was to have exercises that make participants engage in solving problems as a group. Related to adding interactive activities to the agenda, meeting participants noted that some sessions were too long and some panels could benefit from limiting the number of speakers. These concerns could be addressed by adding some of the suggestions noted above regarding interactive activities.

Respondents expressed a need for the Vaccine Confidence Meeting to continue in the future. A few respondents indicated wanting to make the meeting focus more on applied work, to show how programs are disseminating best practices and highlight possible solutions to key challenges that frontline staff face. One respondent recommended designing a panel that includes providers (e.g., obstetricians and pediatricians) who have experience engaging with vaccine-hesitant parents, as well as social media thought leaders who support vaccination to discuss challenges and share messages or strategies that work. Another respondent suggested engaging a keynote speaker from a different, but related, field to bring different ways of thinking to the vaccine confidence field. Finally, respondents cautioned not to let the meeting get too large in the future. The total number of participants was the right size according to some respondents.

The meeting requires follow up so momentum is not lost. Respondents noted the need for follow up from the meeting so that the momentum gained is not lost. One respondent recommended that the meeting summary serve as a basis for a call to action and that the presentations be shared and available to a wide audience. Another respondent realized the need for a vaccine confidence network to serve as a forum for discussion and collaboration on interventions that work. Another participant added that a forum could keep everyone informed of new publications, news about conference funding opportunities, and other relevant news on vaccine confidence. This forum could also include developing a “research sandpit” for individuals to discuss research that is needed on a particular topic.

A number of improvements to the meeting were recommended. Respondents recommended producing a document that summarizes research gaps in vaccine confidence and make it available to participants. Also, the presentation slides should be available during the meeting. A participant recommended that the presentations flow more quickly in a “rapid-fire talk” format to keep the conversation moving. Finally, the idea board that produced about 12 entries could have worked better by having someone read the ideas aloud so those ideas could spark other ideas during the meeting.

Meeting participants offered kudos and accolades to meeting hosts and planners. The majority of respondents expressed gratitude to NVPO and Emory for bringing together a diverse group of experts in vaccine confidence. The participants also mentioned how well the meeting was executed.

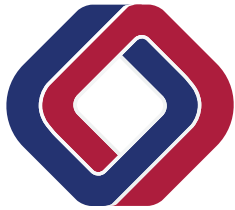


THE VACCINE CONFIDENCE MEETING

Collaborating to Advance Vaccine Confidence

Appendix A: Meeting Agenda





THE VACCINE CONFIDENCE MEETING

Collaborating to Advance Vaccine Confidence

Agenda

The Vaccine Confidence Meeting, co-hosted by the National Vaccine Program Office (NVPO) and Emory University, is being held on August 15-16, 2017, on Emory University's campus.

Meeting Location

Emory Conference Center and Hotel
Silverbell Pavilion
1615 Clifton Road NE
Atlanta, Georgia 30329

Background

Achieving high acceptance of recommended vaccinations requires that healthcare providers, parents, and people for whom vaccines are recommended have confidence in their safety, effectiveness, value, and need. Research and practice have seen much growth in recent years as healthcare providers, government agencies, and social/behavior scientists seek to better understand vaccine-related confidence and the factors that foster it. As such, it is increasingly important to facilitate partnerships and share knowledge around research and practice.

As vaccine preventable diseases become increasingly less visible, and new vaccines become available to address new and emerging disease threats, it is essential that healthcare providers, parents, and individuals have confidence in vaccines and their decisions to receive recommended vaccination. The Vaccine Confidence Meeting brings together researchers, government agencies, healthcare, and professional organizations to discuss the latest insights from research and practice for increasing vaccine confidence in the United States.

Objectives

The meeting will help attendees:

1. Learn more about the work being done to address vaccine confidence, hesitancy, and acceptance;
2. Share new research and identify gaps;
3. Strengthen the community of professionals working to increase vaccine confidence; and
4. Meet and speak with leaders in related fields.

Tuesday, August 15, 2017

Registration (8:00am – 9:00am)

I. Opening Plenary (9:00am – 10:00am)

- ◇ Judy Mendel, National Vaccine Program Office and Saad Omer, Emory University
Welcome and meeting overview
- ◇ Keynote speaker: Brendan Nyhan, Dartmouth College
Echo chambers and the challenges of communicating in the 21st century

II. Measurement and Monitoring: Research Insights into the Vaccine Confidence Landscape (10:00am – 11:45am)

- ◇ Moderator: Glen Nowak, University of Georgia
- ◇ Gaëlle Vallée-Tourangeau, Kingston University
The 5 A's: a practical taxonomy for the determinants of vaccine uptake
- ◇ Allison Kennedy Fisher, Centers for Disease Control and Prevention
CDC/NCIRD efforts around surveillance of vaccine confidence
- ◇ Paula Frew, Emory University
Development of an index for measurement of parents' vaccine confidence and linkage to pediatric immunization acceptance
- ◇ Sandra Quinn, University of Maryland School of Public Health
Exploring the continuum: measuring vaccine confidence and hesitancy among African American and White adults

Group Picture (11:45am – 12:00pm)

Lunch (12:00pm – 1:15pm)

III. Building and Fostering Confidence Using Public Communication Approaches (1:15pm – 3:00pm)

- ◇ Moderator: Ann Aikin, National Vaccine Program Office
- ◇ Alisa Johnson Athen, Hennepin County (MN) Public Health Department
Communications planning and implementation during an outbreak
- ◇ Amelia Burke-Garcia, Westat
The new normal: using digital and social media in support of vaccine communication

- ◇ Leslie Schrader, Ketchum
Promoting flu vaccination and disease prevention to young millennials
- ◇ David Rauch, Creative Director/Healthcare Consultant
From strategy to implementation: insights from HPV and Zoster campaigns

Break (3:00pm – 3:15pm)

IV. Interactive Activity (3:15pm – 4:00pm)

- ◇ Ann Aikin, National Vaccine Program Office
Introduction
- ◇ Norma Birnbaum, Publicis LifeBrands
Workshopping the influenza vaccine advertising landscape

V. Wrap Up and Closing of Day One (4:00pm – 4:15pm)

- ◇ Saad Omer, Emory University

Emory-sponsored Dinner (6:00pm)

Wednesday, August 16, 2017

VI. Welcome (9:00am – 9:05am)

- ◇ Judy Mendel, National Vaccine Program Office and Saad Omer, Emory University

VII. Values, Confidence, and Vaccine Acceptance (9:05am – 10:45am)

- ◇ Moderator: LJ Tan, Immunization Action Coalition
- ◇ Robert Bednarczyk, Emory University
Making a values-based argument for vaccines
- ◇ Amanda Dempsey, University of Colorado at Denver
Motivational interviewing to promote vaccine uptake
- ◇ Melissa Gilkey, University of North Carolina at Chapel Hill
Improving healthcare providers' communication about HPV vaccine
- ◇ Noni MacDonald, Dalhousie University
Building resilient pro-vaccine communities

Break (10:45am – 11:00am)

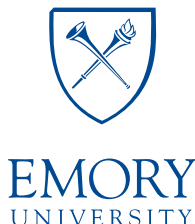
VIII. Systems Approaches to Building Confidence (11:00am – 1:00pm)

- ◇ Moderator: Allison Kennedy Fisher, Centers for Disease Control and Prevention
- ◇ Saad Omer, Emory University
Vaccine laws as behavioral interventions
- ◇ Jason Schwartz, Yale University
Policy as intervention for fostering vaccine confidence
- ◇ Dan Salmon, Johns Hopkins University
Building vaccine confidence in public health settings
- ◇ Sean O’Leary, University of Colorado at Denver
Training providers: beyond vaccine administration
- ◇ Catherine Flores-Martin, California Immunization Coalition
The California Immunization Coalition’s work to foster vaccine confidence
- ◇ Mimi Kiser, Emory University
Collaborating with faith communities to promote influenza immunization

Break (1:00pm – 1:10pm)

IX. Closing Plenary (1:10pm – 2:00pm)

- ◇ Saad Omer, Emory University
Introduction
- ◇ Closing speaker: Walt Orenstein, Emory University
The effects of vaccine confidence on the immunization system: a retrospective
- ◇ Judy Mendel, National Vaccine Program Office and Saad Omer, Emory University
Concluding thoughts





THE VACCINE CONFIDENCE MEETING

Collaborating to Advance Vaccine Confidence

Appendix B: Speaker & Moderator Bios



Ann Aikin
National Vaccine Program Office

Ann Aikin, MA is the Director of Communications at the National Vaccine Program Office (NVPO) and has spent her career advocating for smart and strategic use of media to meet communication and behavior change goals. At NVPO, Ann directs communications activities to inform vaccine decision-making, nurtures public support for vaccines across the lifespan, and increases compliance with immunization recommendations. She is responsible for the Vaccines.gov website and developing communication materials and tools targeting a variety of audiences. She is a frequent collaborator in advancing research on a number of vaccine-related communication issues, and works to ensure coordination among the many federal agencies and non-federal entities involved in vaccine and immunization activities. Ann was also the primary author of the first *Health Communicator's Social Media Toolkit* and a number of other efforts to advance health communication practice.

Before joining NVPO, Ann worked at the U.S. Food and Drug Administration's Center for Tobacco Products, where she used health communication and behavior change theory and practice to develop campaigns and communication efforts aimed at reducing the burden of tobacco use in the United States. Prior to this, Ann worked at the Centers for Disease Control and Prevention on the Social Media Team. While at CDC, Ann developed integrated social media strategies and innovative communication products for use in a variety of health communication campaigns and health marketing efforts. She also led the social media efforts for a number of award-winning emergency responses, including the novel H1N1 pandemic (2009-2010), the Haiti Earthquake (2010), and the Peanut Butter and Peanut Containing Product Recalls (2008-2009). Additionally, Ann collaborated in the development of Text4Baby, a free text messaging service designed to promote maternal and infant health. This successful program won an HHSinnovates award in 2010. Ann has also worked on a variety of other mHealth projects and won the Golden Phone Award in 2009. Before working for CDC, Ann spent two years in the U.S. Peace Corps, working for the Jamaican Ministry of Health and the Kingston and St. Andrew Health Department. Additionally, Ann holds Bachelor of Arts degrees in journalism and political science and a Master of Arts in communications all from the University of Iowa.

Alisa Johnson Athen
Hennepin County (MN) Public Health Department

Alisa Johnson Athen is a dedicated public health professional with 24 years in public health service. She currently serves the Hennepin County, Minnesota community as the manager of Public Health Protection and Promotion, an area comprised of the following public health programs: Maternal and Child Health, WIC, EPSDT, Health Promotion, Better Together Hennepin Teen Pregnancy Prevention, Environmental Health, Epidemiology, ImmuLink regional immunization registry, Data Assessment/Evaluation, and Emergency Preparedness. She is in her fourth year of membership in the National



Association of County and City Health Officials (NAACHO) Immunization Workgroup. As part of her leadership role, she had led public health responses, including two measles outbreaks and H1N1 influenza. She previously led the Hennepin County Immunization Services programs which included ImmuLink as well as Perinatal Hepatitis B, Baby Tracks immunization support program, walk-in immunization clinics and Immunization Practice Improvement. She joined Hennepin County to assist in coordinating and growing ImmuLink in its infancy stages. She has a Bachelor's Degree in Child Psychology and a Master's Degree in Health and Human Services Administration. She also has a certificate in Organizational Development. Her areas of interest include policymaking, leadership development, operations and organizational change. While she loves the beautiful summers and falls in Minnesota, she spends winters eager to get to her condo on the gulf coast of Florida!

Robert Bednarczyk
Emory University Rollins School of Public Health

Dr. Robert A. Bednarczyk is an Assistant Professor of Global Health and Epidemiology in the Emory University Rollins School of Public Health. He is also a faculty member of the Emory Vaccine Center and the Winship Cancer Institute Cancer Prevention and Control Program. He received his PhD in Epidemiology from the University at Albany (SUNY) School of Public Health in 2010, and has been at Emory since 2011. Prior to coming to Emory University, he was the Assistant to Chair for the National Vaccine Advisory Committee. Dr. Bednarczyk's research interests are focused on adolescent and adult vaccination uptake, including identification of barriers and methods to address these barriers. He is currently the Principal Investigator of an NIH Career Development Award through which he is evaluating a practice-, provider-, and parent-level intervention to improve HPV vaccination in primary care pediatric practices.

Norma Birnbaum
Publicis LifeBrands

Norma Birnbaum is Senior Vice President and Director of Strategic Planning at Publicis LifeBrands (PLBM). Norma has had a life-long curiosity about people and what makes them tick. It's perhaps no surprise, then, that Norma has dedicated her career to understanding people as customers and what motivates them to choose the products and services that they do *and* don't. Norma has an uncanny knack for pushing past the rational and rationalized — to uncover important insights even for the most challenging categories. During her tenure at PLBM, Norma has had the opportunity to apply her strategic craft to numerous healthcare categories as far ranging as baby nutrition to breast cancer. Prior to PLBM, she had enjoyed a long-standing stint as a consumer marketer and insights specialist at Young & Rubicam. Norma holds a degree in anthropology from Princeton University.

Amelia Burke-Garcia
Westat

Amelia Burke-Garcia is Westat's Senior Director of Digital Media and Director of Westat's Center for Digital Strategy & Research. With nearly 15 years of experience in digital, social, and mobile media, she is an innovator in the digital space for the public sector. She currently acts as the Project Director for the Centers for Disease Control and Prevention's National Center on Birth Defects and Developmental Disabilities Communication Support Program where she is leading the development of an evaluation framework for social media and building an influencer platform for the broad dissemination of their messages. Prior to this work, she served as Campaign Director for CDC's National Influenza Vaccination campaign and Principal Investigator for the National Institutes of Health's National Children's Study looking at using social media to retain study participants in longitudinal research. Before joining Westat, she has served as the Social Media Group Supervisor for indie agency Horizon Media in New York City. In this role, she spearheaded first-to-market digital and social media campaigns for clients such as Cadbury Confections, GEICO insurance, Sobieski vodka, and A&E television. She also has led digital media initiatives for international non-profits, Academy for Educational Development and Management Sciences for Health. She is the author of the published S.O.C.I.A.L. framework for planning and evaluating digital campaigns, the author of the Socialilibrium Experiment blog, a member of the editorial board for *Social Marketing Quarterly journal*, and has been published in numerous books and journals. She holds a Master's degree from Georgetown University, a Bachelor's degree from McGill University, and is a PhD candidate at George Mason University, where her dissertation research is focused on online influencers as opinion leaders for health.

Amanda Dempsey
University of Colorado Denver

Amanda Dempsey is Associate Professor of Pediatrics at the University of Colorado Denver and a practicing general pediatrician. She has studied pediatric immunization delivery for the last 15 years, with a focus on adolescent vaccination, HPV vaccination and vaccine hesitancy. She has been involved in several large, pragmatic, randomized, controlled trials related to improving HPV vaccination in the primary care setting and is a practicing general pediatrician. She serves as a standing member of the American Cancer Society's HPV Vaccination Roundtable Provider Intervention workgroup and serves on the board of the Colorado Children's Immunization Coalition.

Allison Kennedy Fisher
Centers for Disease Control and Prevention

Allison Kennedy Fisher is a health communications specialist with CDC's National Center for Immunization and Respiratory Diseases. She has been at CDC since 2002, first in the Immunization Safety Office before joining the Immunization Services Division



in 2006 and the Health Communication Science Office in 2013. Her areas of research interest include: adolescent vaccines, health and risk communication, health care decision-making behavior, and vaccine acceptance and hesitancy. Allison's experience includes conducting communication and epidemiologic research; writing scientific manuscripts; and writing health education and health communication materials. She has authored or co-authored articles on parent and health care provider immunization attitudes and behaviors, and has presented at national conferences and meetings on various aspects of childhood and pre-teen immunization and communication research. Allison earned her undergraduate degree in anthropology from the University of Notre Dame in 1999. In 2002, she earned a Master's of Public Health degree with a concentration in behavioral science and community health education from Saint Louis University.

Catherine Flores Martin
California Immunization Coalition

Catherine Flores Martin is the Executive Director for the California Immunization Coalition based in Sacramento, California and works in partnership with coalitions and professional organizations that support their mission of ensuring that everyone has access to lifesaving vaccines.

Ms. Martin has over twenty five years of healthcare experience involving health care systems, private medical practices, public health departments, nonprofit organizations and numerous volunteer activities. She has worked in the immunization arena for nineteen years in health promotion, coalition development, registry recruitment and program management.

She coordinates and facilitates professional and community education programs, conferences and media events including webinars, on-line and in person trainings, provider updates, regional immunization events and statewide immunization coalition conferences. She earned her Bachelors of Science degree in Health Administration and Communication at California State University, Fresno.

Catherine works with public health leaders around the country to support coalition development and create effective advocacy and education campaigns; identifying resources, developing collaborative partnerships, and utilizing social media and other technologies to promote immunizations to local, state and national stakeholders. She is a board member of Every Child By Two and works closely with the National Public Health Information Coalition to coordinate the VICNetwork webinars and promotions such as National Immunization Awareness Month.



Paula Frew
Emory University School of Medicine

Dr. Paula Frew is currently Assistant Professor of Medicine within the Division of Infectious Diseases at Emory University School of Medicine and she holds a secondary appointment at the same rank within the Departments of Global Health and Behavioral Sciences and Health Education at the Emory Rollins School of Public Health. Her research interests focus on addressing health disparities and developing interventions with community-based organizations, clinics, state/territorial, and federal, global/international entities to promote immunization acceptance and uptake strategies. She is the Principal Investigator on projects on behalf of the U.S. Centers for Disease Control and Prevention, the National Institutes of Health, and foundations that address an array of vaccine issues from participation in vaccine clinical trials to evaluating strategies for improving vaccine uptake.

Melissa Gilkey
University of North Carolina Gillings School of Global Public Health

Melissa B. Gilkey, PhD, is Assistant Professor of Health Behavior in the University of North Carolina Gillings School of Global Public Health. With research interests in adolescent health, cancer prevention, and health services research, Dr. Gilkey studies individual and organizational approaches to improving the delivery of adolescent vaccines, including human papillomavirus (HPV) vaccine. Her work includes survey research to understand barriers to vaccination, such as provider and parental hesitancy, as well as intervention research aimed at improving vaccine delivery systems. Dr. Gilkey is co-PI of a study funded by the Robert Wood Johnson Foundation to evaluate the CDC's AFIX (Assessment, Feedback, Incentives, and eXchange) model for improving HPV vaccine coverage in primary care settings. She has also received a Transition Career Development Award (K22) from the National Cancer Institute to develop a brief communication training program aimed at supporting healthcare providers in delivering effective recommendations for HPV vaccine. Dr. Gilkey holds a PhD in the social and behavioral sciences from Johns Hopkins Bloomberg School of Public Health.

Mimi Kiser
Emory University Rollins School of Public Health

Mimi Kiser, DMin, MPH is an Assistant Professor in the Department of Global Health, Rollins School of Public Health, Emory University. Ms. Kiser joined the Interfaith Health Program in 1993 during its first seven years at The Carter Center and continues that work now at the school of public health. She teaches interdisciplinary courses at Emory in faith and health, religion and development, and social justice. Ms. Kiser has led the Academic Programs Working Group for Emory's Religion and Public Health Collaborative and work with Emory colleagues in teaching and community mobilization activities supported by the CDC and HHS throughout the US and in Africa. She directed

IHP's "Institute for Public Health and Faith Collaborations," funded by the CDC to provide multi-sector leadership development for the elimination of health disparities. Recently, she has worked with partners in Kenya to adapt this model for mobilization of social resources to support community members in long term HIV/AIDS care. For over 20 years, she has been working to facilitate faith community and public health partnerships that can successfully address the challenges of health disparities. Her roles in these activities have been network and interdisciplinary convener, project director, trainer, curriculum designer (leadership development), and manager of program evaluation operational activities. Ms. Kiser has conducted this kind of work in different contexts and scales – national in the U.S., state level in the U.S., and with multi-local networks in both the U.S. and Africa.

Noni MacDonald

Dalhousie University and the IWK Health Centre in Halifax, Canada

Dr. Noni MacDonald is a Professor of Pediatrics (Infectious Diseases) at Dalhousie University and the IWK Health Centre in Halifax, Canada. She is a former Dean of Medicine at Dalhousie University. Her two current major areas of interest are (1) vaccines including vaccine safety, hesitancy, demand, pain mitigation, education and policy, especially through her work with the World Health Organization, recently appointment to SAGE (the Strategic Advisory Group of Experts on immunization that provides advice to WHO on all aspect of vaccinology), and with the Canadian Centre for Vaccinology Health Policy and Translation Group; and (2) MicroResearch, building capacity in community focused research in developing countries and now also in Canada (www.microresearch-international.ca) to help interdisciplinary health professionals find local solutions for local maternal child health problems that fit the context, culture, and resources. She is a founder and co-director of the Centre for MicroResearch International. Dr. MacDonald has published over 380 papers; was the founding Editor-in-Chief of *Pediatrics & Child Health* and Editor-in-Chief for 20 years; and a former Editor-in-Chief of *CMAJ (Canadian Medical Association Journal)*. She has recently been appointed Editor for Child Health for a new Oxford University Press publication called the *Oxford Research Encyclopedia of Global Public Health*. Dr. MacDonald has long been recognized in Canada and internationally as an advocate for children and youth health and as a leader in pediatric infectious disease and global health.

Judith (Judy) Mendel

National Vaccine Program Office

Judith (Judy) Mendel, MPH is a Health Communications Specialist at the National Vaccine Program Office within the Office of the Assistant Secretary for Health at the U.S. Department of Health & Human Services. Judy joined NVPO in 2014 and leads or supports a number of NVPO's strategic communications efforts, manages NVPO's vaccine confidence portfolio, and serves as the communication research lead for the office.



Judy came to NVPO from George Washington University Milken Institute School of Public Department of Prevention and Community Health. There she worked on the development, management, and evaluation of mHealth programs targeting smoking cessation (Text2quit, Quit4Baby, SmokefreeMOM) and an eHealth program to aid in opioid relapse prevention (Recovery Warrior). Judy holds a Masters of Public Health degree from GW where she won a faculty-nominated Excellence in Culminating Experience award for her thesis.

Prior to graduate school, Judy worked at large advertising agencies (Deutsch, Ogilvy) in New York City where she managed complex client accounts in beauty care (Avon), OTC pharmaceutical (Tylenol, Imodium) and retail (Ikea) sectors. It was there that she discovered her passion for public health communications through work for Avon on breast cancer awareness and with the Ad Council on underage drinking prevention. As an undergraduate, Judy studied advertising at the Newhouse School of Public Communications and political science at the Maxwell School of Citizenship and Public Affairs at Syracuse University, where she was a Chancellor's Scholar.

Glen Nowak
University of Georgia Grady College of Journalism and Mass Communication

Glen Nowak, Ph.D., is director of the Center for Health and Risk Communication in the Grady College of Journalism and Mass Communication at the University of Georgia. He is also a professor of advertising and public relations in the Grady College. He is also currently serving as a visiting senior communications specialist with the National Vaccine Program Office in Washington, D.C.

Prior to re-joining the University of Georgia faculty in January 2013, Dr. Nowak worked 14 years at the Centers for Disease Control and Prevention. He joined CDC in 1999 as the Associate Director for Communications for the National Immunization Program. In 2004, he became CDC's Chief of Media Relations, including serving as Director of CDC's Division of News and Electronic Media. After six years as Chief of Media Relations, Dr. Nowak became a senior advisor to the director of CDC's National Center for Immunization and Respiratory Diseases. While at CDC, Dr. Nowak was extensively involved in efforts to communicate science and public health information and recommendations to the public and the media. He was also extensively involved in vaccine and immunization-related communication efforts, including vaccination promotion and vaccine safety. He has a Ph.D. in mass communication and an M.A. in journalism from the University of Wisconsin. Over the course of his career, he has authored or co-authored 30 peer-reviewed journal articles on communication practices, vaccine communications, social marketing, and health communications. A recently published study examined parents' confidence in childhood vaccines, including compared to childhood antibiotics, over-the-counter medicines, and vitamins.



Brendan J. Nyhan
Dartmouth College

Brendan Nyhan is a professor in the Department of Government at Dartmouth College. His research, which focuses on misperceptions about politics and health care, has been published in journals including the *American Journal of Political Science*, *British Journal of Political Science*, *Journal of Politics*, *Medical Care*, *Pediatrics*, *Political Analysis*, *Political Behavior*, *Political Psychology*, *Social Networks*, and *Vaccine*. Before coming to Dartmouth, he was a Robert Wood Johnson Scholar in Health Policy Research at the University of Michigan. Nyhan has also been a contributor to the *New York Times* website The Upshot since its launch in 2014. He previously served a media critic for *Columbia Journalism Review*; co-edited *Spinsanity*, a non-partisan watchdog of political spin that was syndicated in *Salon* and the *Philadelphia Inquirer*; and co-authored *All the President's Spin*, a *New York Times* bestseller that Amazon.com named one of the ten best political books of the year in 2004.

Sean O'Leary
University of Colorado School of Medicine and Children's Hospital Colorado

Sean O'Leary, MD, MPH, is an Associate Professor of Pediatrics at the University of Colorado School of Medicine and Children's Hospital Colorado, a pediatric infectious diseases specialist, and an investigator at the Adult and Child Consortium for Health Outcomes Research and Delivery Science (ACCORDS). Dr. O'Leary's research focuses on identifying barriers to vaccination and developing and testing interventions to address those barriers, with numerous publications in the areas of vaccine safety, vaccine hesitancy and refusal, immunization policy, vaccination in OB/GYN settings, and influenza vaccine. He is also the director of Colorado's pediatric practice-based research network, the Colorado Children's Outcomes Network. Dr. O'Leary is a member of the American Academy of Pediatrics' Committee on Infectious Diseases (aka the Red Book Committee) and is the liaison to the Advisory Committee on Immunization Practices for the Pediatric Infectious Diseases Society.

Saad Omer
Emory University Schools of Public Health and Medicine

Saad B. Omer is the William H. Foege Professor of Global Health and Professor of Epidemiology & Pediatrics at Emory University, Schools of Public Health and Medicine. He is also a faculty member at the Emory Vaccine Center. Dr. Omer has conducted multiple studies – including vaccine trials – in Guatemala, Kenya, Uganda, Ethiopia, India, Pakistan, Bangladesh, South Africa, and the United States. His research portfolio includes clinical and field trials to estimate efficacy and immunogenicity of maternal and/or infant influenza, pertussis, polio, measles and pneumococcal vaccines; studies on the impact of spatial clustering of vaccine refusers; and clinical trials to evaluate drug regimens to reduce mother-to-child transmission of HIV in Africa. He has conducted several studies to evaluate the roles of schools, parents, health care providers, and



state-level legislation in relation to immunization coverage and disease incidence. Dr. Omer has published widely in peer-reviewed journals including the *New England Journal of Medicine*, *JAMA*, the *Lancet*, *British Medical Journal*, *Pediatrics*, *American Journal of Public Health*, and *American Journal of Epidemiology*. Moreover, he has written op-eds for publications such as the *New York Times*, the *Washington Post*, and *Politico*.

In 2009, Dr. Omer was awarded the Maurice Hilleman Award in Vaccinology by the National Foundation of Infectious Diseases on his work on impact of maternal influenza immunization on respiratory illness in infants younger than 6 months – for whom there is no vaccine. He is currently a member of the National Vaccine Advisory Committee.

Walter A. Orenstein
Emory University

Walter A. Orenstein, MD, DSc (Hon) is Associate Director of the Emory Vaccine Center and Professor of Medicine, Pediatrics, and Global Health at Emory University. Dr. Orenstein has had a long and distinguished career at Centers for Disease Control and Prevention, Emory University, and the Bill & Melinda Gates Foundation (BMGF). Dr. Orenstein began his career in the Epidemic Intelligence Service of the CDC, focusing on immunization, particularly on smallpox eradication and measles elimination. Between 1988 and 2004, he was Director of the United States Immunization Program rising to become an Assistant Surgeon General of the United States Public Health Service. During Dr. Orenstein's tenure at the CDC, record high levels of immunization coverage among children were reached and indigenous transmission of measles and rubella was eliminated. Multiple new vaccines were introduced into the childhood immunization schedule. From 2004-2008, Dr. Orenstein was Associate Director of the Emory Vaccine Program with a major focus on policy issues related to influenza vaccination in the United States. In 2008, he left Emory University to become the Deputy Director for Immunization Programs at the BMGF, in charge of a large portfolio ranging from implementation of polio eradication activities to basic research on improved vaccines and diagnostics. Polio eradication was the number one priority of the BMGF.

Sandra Crouse Quinn
University of Maryland School of Public Health

Sandra Crouse Quinn, PhD, is a Professor in the Department of Family Science, Director of the doctoral program in Maternal and Child Health, and Senior Associate Director of the Maryland Center for Health Equity at the School of Public Health, University of Maryland. She is currently Principal Investigator (joint with Stephen Thomas) for the Center of Excellence in Race, Ethnicity and Health Disparities Research (P20 MD006737, National Institute of Minority Health and Health Disparities). Within the Center of Excellence, she is also the PI on a 5-year study, "Uncovering and Addressing Cultural Beliefs behind Vaccine Racial Disparities." She is joint PI (with

David Broniatowski, George Washington University) on a National Institute of General Medical Sciences grant, “Supplementing Survey-Based Analyses of Group Vaccination Narratives and Behaviors Using Social Media.” She was the PI on a recently-completed pilot study of “Public Attitudes toward Medical Countermeasures,” funded through the FDA’s MD Center for Regulatory Science and Innovation. Additionally, she was the PI on a grant from the U.S. Food and Drug Administration entitled “Investigating Factors Associated with Participation of Racial & Ethnic Minority Populations in FDA Regulated Research.” Dr. Quinn was PI (with Stephen Thomas) of a prestigious Grand Opportunity (“GO”) grant sponsored by the Office of the Director, NIH, NIMHD, and the American Recovery and Reinvestment Act titled “Bioethics Research Infrastructure Initiative: Building Trust between Minorities and Researchers” (7RC2MD004766; 2009-2012). As the PI of a CDC funded study, “Public Attitudes toward H1N1 Influenza,” she worked successfully on two national surveys on attitudes and behaviors during the H1N1 influenza pandemic, including the first study to examine public attitudes toward emergency use authorizations for drugs and vaccines. Her research interests include factors associated with vaccine acceptance in routine and emergency situations; racial disparities in vaccine uptake; crisis and emergency risk communication with a specific focus on minority populations; and engagement of minority and marginalized communities in research.

David Rauch
Creative Director/Healthcare Consultant

David is an award-winning creative director with 30 years of design and creative leadership experience on some of the world’s leading brands. While studying advertising at Syracuse University, he found that the majority of the advertising he loved was coming from an agency called Doyle Dane Bernbach. Armed with a student portfolio, he set out to the School of Visual arts to hone his craft and learn from the best in the business. In 1984, he was hired by his SVA teacher to be his assistant at DDB surrounded by the most creative minds of the era. The team concept of writer and art director working together was the formula for pushing creative thinking that would lead to not just awards but undeniable consumer action. Later in his career, David took this mindset to work in the healthcare arena. In 2003, he worked on the launch of Prilosec OTC, helping it to become a billion dollar brand for P&G. His campaign for Plavix landed on Adweek's best healthcare list in 2008. In 2014, he became the creative lead at Publicis NY overseeing Merck vaccines and creating the “What will you say” campaign urging parents to protect their children from HPV related cancer. David is currently working as a freelance consultant for multiple healthcare agencies.

Daniel Salmon
Johns Hopkins Bloomberg School of Public Health

Dr. Salmon’s primary research and practice interest is optimizing the prevention of childhood infectious diseases through the use of vaccines. He is broadly trained in vaccinology, with an emphasis in epidemiology, behavioral epidemiology, and health



policy. Dr. Salmon's focus has been on determining the individual and community risks of vaccine refusal, understanding factors that impact vaccine acceptance, evaluating and improving state laws providing exemptions to school immunization requirements, developing systems and science in vaccine safety, and effective vaccine risk communication. Dr. Salmon has considerable experience developing surveillance systems, using surveillance data for epidemiological studies, and measuring immunization coverage through a variety of approaches. Dr. Salmon has worked with state and federal public health agencies to strengthen immunization programs and pandemic planning.

Leslie Schrader Ketchum

Leslie personifies leadership in the PR industry, bringing more than 20 years of public relations agency experience and hands-on leadership of award-winning campaigns. Leslie led campaigns for America's most recognizable consumer packaged goods brands that target such key audiences including women, millennials and parents. She creates and brings her clients' biggest ideas to life, making her a key player on any team's roster. Leslie directs programming on behalf of The Clorox Company, Mattel, The Hershey Company and the Truth Initiative, as well as provides client counsel across the Ketchum network.

Several years ago, Leslie created Well-Connected, a dedicated specialty practice that takes the best in Ketchum's expertise and influencer relationships in the food and nutrition, healthcare and brand marketing spaces and helps companies develop high-impact campaigns that drive consumer behavior change. While heading up Well-Connected, she established an impressive client roster of pharmaceutical, over-the-counter and household-name brands. Leslie currently serves as the senior strategic counselor for the Truth Initiative client, focusing on campaigns to stop teen smoking. She worked with nonprofit Families Fighting Flu, which successfully encouraged CDC to expend its flu immunization recommendations to include children six months to eight years. Leslie also managed the successful "Say 'Boo!' to the Flu" on behalf of The Clorox Company, which encourages parents to have their children immunized against the flu.

Communications campaigns that Leslie has led have earned industry recognition including Cannes PR Bronze Lion, multiple Silver Anvils from the Public Relations Society of America, IRIS Awards from the International Association of Business Communicators and a Diamond SABRE Award for Superior Achievement in Measurement and Evaluation.

Leslie received her Master of Arts in Public Communications from American University and a Bachelor of Arts in English, with minors in political science and women's studies, from Gettysburg College.



Jason L. Schwartz
Yale School of Public Health

Jason L. Schwartz is an Assistant Professor of Health Policy and the History of Medicine at the Yale School of Public Health and Yale School of Medicine. He has written widely on vaccines and vaccination programs, decision-making in public health policy, and the structure and function of scientific expert advice to government. His general research interest is in the ways in which evidence is interpreted, evaluated, and translated into regulation and policy in medicine and public health.

Schwartz's publications on topics in public health policy and history have appeared in *The New England Journal of Medicine*, *JAMA*, *The American Journal of Public Health*, *Health Affairs*, and elsewhere. He is also an author of the chapter titled "Ethics" in *Plotkin's Vaccines*, the leading textbook of vaccine science and policy, and editor of *Vaccination Ethics and Policy: An Introduction with Readings* (MIT Press, 2017). He is currently working on a book manuscript, *Medicine by Committee: Expert Advice and Health Care in Modern America*, which examines the emergence, evolution, and continuing influence of expert advisory committees in American medicine and public health from the 1960s to the present, particularly regarding pharmaceuticals, vaccines, and screening technologies. His research and perspectives have appeared in *The New York Times*, *Washington Post*, *NPR*, *Time*, *Associated Press*, and elsewhere.

Prior to arriving at Yale, Schwartz taught at the Princeton University Center for Human Values and the Department of Medical Ethics and Health Policy at the University of Pennsylvania Perelman School of Medicine. He was also a staff member for President Barack Obama's Presidential Commission for the Study of Bioethical Issues.

Schwartz is a graduate of Princeton University, where he received an A.B. in classics, and the University of Pennsylvania, where he received a Ph.D. in the history and sociology of science and a master's degree (MBE) in bioethics.

Litjen (LJ) Tan
Immunization Action Coalition

Litjen (LJ) Tan, MS, PhD, is chief strategy officer of the Immunization Action Coalition, co-chair and co-founder of the National Adult and Influenza Immunization Summit, and former president of the Board of the Adult Vaccine Access Coalition. He is an associate editor of *Vaccine*, *BMC Infectious Diseases*, *Medscape Infectious Diseases*, and a member of the ESCMID Vaccine Study Group.

Dr. Tan received his Master of Science degree in biology at New York University and earned his Doctorate of Philosophy in microbiology/immunology from Northwestern University Feinberg School of Medicine in Chicago.



Dr. Tan's current appointments include serving as a special consultant for the European Union Influenza Summit and the Asia-Pacific Influenza Summit, and serving as a member of the Advisory Board for Unity (United for Adolescent Vaccination) Consortium, the 317 Coalition, and the AMGA's Adult Immunization Collaborative, to name a few. He was a voting member of the National Vaccine Advisory Committee from 2009 to 2013 and a liaison member of the Advisory Committee for Immunization Practices, Centers for Disease Control and Prevention (CDC), from 2002 to 2012.

Dr. Tan has also served on numerous national and international expert advisory committees on issues ranging from vaccine hesitancy, to adult immunizations, to immunization access and delivery.

His many recognitions include the 2011 CDC National Center for Immunization and Respiratory Diseases Honor Awards: Excellence in Partnering, and an American Pharmacists Association 2009 National Immunization Champion Award.

Throughout his career, Dr. Tan has been deeply involved with projects and publications on vaccine-related issues, including scientific and policy reports from the American Medical Association, where he was their director of Medicine and Public Health for 15 years. He is the proud father of three fully-immunized children.

Gaëlle Vallée-Tourangeau
Kingston University Business School

I am a professor of organisational behaviour, director of research for the department of management at Kingston University Business School and head of the Decision, Attitudes, Risk and Thinking research group. I studied at Paris Ovest University (1998, MSc Social Psychology) and the University of Hertfordshire (2004, PhD) then was a lecturer at the Leeds University Business School (2001-2004) and the University of Toulouse (2004-2009) before joining Kingston University in 2009. My expertise lies in behavioural sciences and my research focuses on the role played by social, physical and/or mental processes in decision-making, reasoning and uncertainty judgements, both in the lab and in applied settings. Current projects include a study of the role of intuition in judgements, a study of the role of autonomous drive in healthcare workers' vaccination decisions and vaccination advocacy, and a study of systemic thinking in work productivity. My work has been published in leading psychology journals such as the *Journal of Experimental Psychology - General*, *Psychological Science*, *Cognition*, *Memory & Cognition*, and *Acta Psychologica* among others. My research has been funded by the Fyssen Foundation (2004), the French National Research Agency (2008), the Leverhulme Trust (2011), and Sanofi-Pasteur (2013).

