NVAC NATIONAL VACCINE ADVISORY COMMITTEE

June 6, 2017, Meeting Minutes

Committee Members in Attendance

Kimberly M. Thompson, Sc.D., Chair
Steve Black, M.D.
Jay C. Butler, M.D., CPE, FAAP, FACP, FIDSA
Melody Anne Butler, B.Sc.N., RN
Timothy Cooke, Ph.D.
John Dunn, M.D., M.P.H.
David Fleming, M.D., M.P.H.
Leonard Friedland, M.D.
Robert H. Hopkins Jr., M.D., MACP, FAAP
Mary Anne Jackson, M.D., FAAP, FPIDS, FIDSA
Melissa Martinez, M.D., FAAFP
Cody Meissner, M.D., FAAP
Saad Omer, M.B.B.S., M.P.H., Ph.D.
Larry Pickering, M.D., FAAP, FIDSA
Nathaniel Smith, M.D., M.P.H.
Geeta Swamy, M.D., FACOG

NVAC Ex Officio Members

Armen Donabedian, Ph.D. (for Rick Bright, Ph.D.), Biomedical Advanced Research and Development Authority (BARDA)
Karen Farizo, M.D. (for Marion Gruber, Ph.D.), Food and Drug Administration (FDA)
Amy Groom, M.P.H. (for Jeffrey McCollum, D.V.M., M.P.H.), Indian Health Service (IHS)
Heather Halvorson, M.D., M.P.H., M.S.H.I., LT COL, Department of Defense (DoD)
Troy Knighton, M.Ed., Ed.S., LPC, Department of Veterans Affairs (VA)
Nancy Messonnier, M.D., CAPT, Centers for Disease Control and Prevention (CDC)
Justin A. Mills, M.D., M.P.H., Agency for Healthcare Research and Quality (AHRQ)
Barbara Mulach, Ph.D., National Institutes of Health (NIH)
Narayan Nair, M.D., CAPT, Division of Injury Compensation Programs (DICP), Health Resources and Services Administration (HRSA)
Judith Steinberg, M.D., M.P.H., Bureau of Primary Health Care (BPHC), HRSA

NVAC Liaison Representatives

Nancy M. Bennett, M.D., M.S., Advisory Committee on Immunization Practices (ACIP)
Rebecca Coyle, M.S.Ed., American Immunization Registry Association (AIRA)
Kathryn M. Edwards, M.D., Vaccines and Related Biological Products Advisory Committee (VRBPAC)
Kristen R. Ehresmann, RN, M.P.H., Association of Immunization Managers (AIM)
Rhonda Kropp, B.Sc.N., M.P.H., Public Health Agency of Canada (PHAC)
Kimberly Martin (for James S. Blumenstock), Association of State and Territorial Health Officials (ASTHO)
James David Nordin, M.D., M.P.H., America's Health Insurance Plans (AHIP)
Kimberly Scott, M.P.H. (for Tiffany Tate, M.H.S.), National Association of County and City Health Officials (NACCHO)
Tiffany Tate, M.H.S., National Association of County and City Health Officials (NACCHO)

Acting Designated Federal Officer

Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, National Vaccine Program Office (NVPO), Department of Health and Human Services (HHS)

Welcome and Call to Order—Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, NVPO, HHS

Dr. Shen called the meeting to order at 8:30 a.m. She outlined key parts of the Federal Advisory Committee Act, its conflict-of-interest rules, and standards of ethical conduct for NVAC members. Dr. Shen thanked the NVPO staff for their support in organizing the meeting and called the roll.

Welcome—Thomas E. Novotny, M.D., M.P.H., Deputy Assistant Secretary for Health (Science and Medicine), HHS

Dr. Novotny welcomed the participants on behalf of the Acting ASH, Dr. Don Wright. He thanked the NVPO staff for all their tremendous work supporting NVAC. Dr. Novotny said that the vaccine system is necessary to protect the trust Americans have placed in the system over decades. Recommended vaccines work in preventing disease. While no vaccine is perfect, the strong and historically effective vaccine safety system ensures vaccines are safe and monitored. However, this effective system needs continuous improvements, and this NVAC meeting will address several of the most pressing issues for the National Vaccine Program. NVAC provides HHS with important scientific information, expert consultation, and policy analysis from both inside and outside of government that inform progress.

Dr. Novotny outlined the NVAC agenda, noting that he is particularly committed to the issue of improving U.S. adult immunization rates, especially addressing barriers associated with the lackluster uptake of adult vaccines. He said such low rates—for adult-specific vaccines, but also for influenza vaccine—are unacceptable given current knowledge and tools. More innovative approaches are needed to boost vaccine uptake, including systems-based surveillance practices, incentives for individuals, and accurate public education programs. Infrastructure improvements are vital to realizing the full promise that lifesaving vaccines can provide for children and adults. Dr. Novotny pointed out the very clear need to eliminate ethnic and racial disparities that persist in adult vaccine coverage rates. He described the health consequences of missed opportunities for vaccinating adults.

This year, HHS has been working hard to implement the bipartisan 21st Century Cures Act, enacted by Congress last December, which allocates $6.3 billion over the next decade to accelerate the discovery and development of cures (including vaccines) to improve health outcomes in the United States. The 21st Century Cures Act provides for increased research in key areas and stimulates structural changes needed, such as improving regulatory processes to help expedite drug approval for potentially lifesaving medications and vaccines. The Cures Act represents an opportunity to help improve patient-centered care around a number of HHS priorities, such as behavioral health, serious mental illness, substance abuse disorders, and vaccine innovation. NVPO will report to Congress on vaccine innovation this fall. The Office of the ASH will lead several public health efforts mandated by the Cures Act, ranging from vaccines for pregnant women to improving monitoring of antimicrobial resistance to expanding protection of human subjects in research to assessing the impact of tick-borne diseases.

Dr. Novotny said he is continuously learning about and impressed by the enormity of the vaccine enterprise. The analysis and feedback of NVAC will help in reaching the goals of the National Vaccine Plan and addressing the opportunity areas outlined in the mid-course review completed earlier this year. Dr. Novotny said the Office of the ASH will soon be working with NVPO on the next 10-year plan, and he looks forward to NVAC's input.

Dr. Novotny acknowledged the departure from HHS of Jewell Mullen, M.D., M.P.H., M.A., most recently the acting NVPO office director and Principal Deputy Assistant Secretary for Health, and thanked Richard Wolitski, Ph.D., Director of the Office of HIV/AIDS and Infectious Disease Policy, for taking on the role of acting director of NVPO.

Opening Remarks—Richard Wolitski, Ph.D., Acting Director, NVPO, HHS

Dr. Wolitski said he has been impressed with the commitment and quality of work of the NVPO staff in putting together this meeting. He sees himself as a bridge between the past and future leadership of NVPO and, as such, hopes to provide stability and continuity, ensuring that NVPO continues its strategic course. The transition to a new Federal administration should not get in the way of making effective vaccines available to the people who need them most. Dr. Wolitski said he seeks to translate research into practice by using data and evidence in planning and implementation monitoring and ongoing quality improvement of prevention efforts. He added that government works better with collaboration that includes input and interaction with researchers and people in the field. Dr. Wolitski looked forward to working with NVAC and all the NVPO partners to respond to gaps and strengthen efforts to make vaccines safer and more effective for all.

NVPO Update—Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, NVPO, HHS

Dr. Shen reiterated that NVPO is working on a report to Congress on vaccine innovation through an interagency working group that includes BARDA, CDC, FDA, and NIH. To inform the report, HHS will convene a group of experts later in June to discuss obstacles, potential solutions, and processes.

Efforts around adult immunization include implementing the National Adult Immunization Plan, taking part in the Federal Interagency Adult Immunization Task Force, and co-hosting the National Adult Influenza Immunization Summit (NAIIS) with CDC and the Immunization Action Coalition. Also, NVPO continues to support research on quality and performance measures, including work around maternal and adult composite measures and quality and measurement with the Centers for Medicare and Medicaid Services (CMS) on end-stage renal disease.

Through a partnership between NVPO and the 10 HHS regional offices, the regions will convene a diverse set of stakeholders to facilitate a coordinated action plan focused on promoting priority areas of the National Vaccine Plan and helping with local messaging and efforts to improve vaccine coverage, particularly in adults. In another effort to disseminate NVAC recommendations broadly, NVAC's report on maternal immunization was published in May, and its report on the mid-course review of the National Vaccine Plan will be published in July.

NVPO UpShot Awards—Richard Wolitski, Ph.D., Acting Director, NVPO, HHS

Dr. Wolitski said NVPO established the UpShot awards in February 2016 to recognize the diverse group of stakeholders at the heart of optimizing vaccine immunization systems. Through the UpShot award program, NVPO and its Federal partners honor individuals and organizations whose leadership, collaboration, innovation, research, and practice are advancing the National Vaccine Plan. Dr. Wolitski thanked those from across HHS agencies and offices who helped review the nominations and select the following winners (details about the awards and winners are available online at https://www.hhs.gov/nvpo/national-vaccine-plan/awards):

- **UpShot Award for Excellence in Vaccine Safety**: Roger Baxter, M.D., Co-Director, Kaiser Permanente Vaccine Study Center; Infectious Disease Physician, Kaiser Oakland Medical Center; and Research Scientist, Kaiser Department of Research
- **Honorable Mention**: Vaccine Safety Datalink
- **UpShot Award for Excellence in Vaccine Communication**: William Schaffner, M.D., Medical Director, National Foundation for Infectious Diseases; Professor of Medicine and Infectious Disease, Vanderbilt University School of Medicine
- **Honorable Mention**: Douglas J. Opel, M.D., M.P.H., Physician, Professor of Pediatrics, Seattle Children's Hospital
- **UpShot Award for Excellence in Vaccine Supply, Access, and Use**: HLN Consulting, LLC

- **UpShot Award for Excellence in Global Prevention**: PATH

Award winners received a commemorative statuette; each briefly thanked NVPO for the recognition. Dr. Wolitski encouraged participants to nominate candidates for the 2018 awards.

Chair's Report—Kimberly M. Thompson, Sc.D., NVAC Chair

Dr. Thompson welcomed the participants and congratulated the UpShot Award winners. She noted that this in-person NVAC meeting is public and is also being broadcast online. The minutes and presentations of past meetings are available online at http://www.hhs.gov/nvpo/nvac/index.html. Dr. Thompson called for review of the February 2017 NVAC meeting minutes. NVAC members unanimously approved the minutes with no changes.

Dr. Thompson reviewed the agenda, which was organized around the first three of the five opportunity areas identified by NVAC in its mid-course review of the 2010 National Vaccine Plan:

- Strengthen health information and surveillance systems to track, analyze, and visualize disease, immunization coverage, and safety data, both domestically and globally
- Foster and facilitate efforts to strengthen confidence in vaccines and the immunization system to increase coverage rates across the lifespan
- Eliminate financial and systems barriers for providers and consumers to facilitate access to routinely recommended vaccines

She then reminded the group of NVAC's recommendations in support of these opportunity areas. (The report and recommendations are available online at https://www.hhs.gov/sites/default/files/evaluation-2010-nat-vaccine-plan-midcourse-review-1.pdf).

At the end of the day, NVAC will hear public comments. Dr. Thompson emphasized that the public comment period is not a question-and-answer session; rather, it is an opportunity for the public to give comments that will appear in the public record. Time for public comment is limited; written comments can be sent to the NVAC for consideration by e-mail (nvac@hhs.gov).

Finally, Dr. Thompson introduced the newest NVAC members: John Dunn, M.D., M.P.H.; Leonard Friedland, M.D.; Mary Anne Jackson, M.D., FAAP, FPIDS, FIDSA; Melissa Martinez, M.D., FAAFP; Cody Meissner, M.D., FAAP; Larry Pickering, M.D., FAAP, FIDSA; and Geeta Swamy, M.D., FACOG. (Biographies of all NVAC members are available online at https://www.hhs.gov/nvpo/nvac/members/index.html). The next NVAC meeting is September 26–27, 2017.

Immunization Information Systems (IIS)

Relevant NVAC Recommendations—Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, NVPO, HHS

Dr. Shen introduced the session with an overview of NVAC recommendations and initiatives related to IIS since 2007. All of the efforts share a vision of a fully functional system that captures vaccine doses across all providers, for all residents, within States and across jurisdictions. Over the past decade, NVAC, NVPO, and Federal and non-Federal partners have wrestled with such topics as protecting privacy and confidentiality, balancing the pros and cons of legislative approaches and provider incentives, and harmonizing policies across Federal and State agencies. Recent NVAC recommendations related to the NVAC mid-course review identified existing indicators that can be used to track progress toward improved health information and surveillance systems.

IIS Fundamentals: Overview and Development—Warren Williams, Branch Chief, National Center for Immunization and Respiratory Diseases, Immunization Services Division, Immunization Information Systems Branch, CDC

Mr. Williams explained that IIS (also known as "immunization registries") are electronic databases for immunization records and inform healthcare decision-making at the individual and population levels. All 50 States have State-owned IIS. However, many IIS capabilities require functional standards that range from technical requirements to policies ensuring privacy and confidentiality. Notably, States must address their own laws and regulations that hinder IIS' functionalities. Mr. Williams said IIS are needed to consolidate immunization information into a reliable source for providers and families. Numerous stakeholders use IIS, and they have different needs and requirements. Data are entered into IIS from various sources. Most States use one of three commercially available as well as open-source IIS software, but at least 20 States use unique or homegrown software.

CDC is supporting efforts to make IIS and electronic health records (EHRs) interoperable—for example, by educating EHR vendors so that they will build IIS functionality into their systems. Mr. Williams outlined numerous challenges, such as incomplete reporting, varying standards and policies, and variations in implementation. Most States have immunization registries that cover the whole lifespan and most registries have opt-out consent for adults. Still, interstate data sharing remains a challenge. Over 90 percent of children's immunization records are captured in State registries compared to only 39 percent for adults; although that figure is improving slowly. IIS play a critical role in vaccine ordering and inventory. Partnerships are key to the successful development and utilization of IIS. Mr. Williams concluded that as IIS mature and provider participation increases, the value of IIS to all stakeholders increases.

IIS Implementation: Perspective from Minnesota—Kristen R. Ehresmann, RN, M.P.H.

Ms. Ehresmann described the robust Minnesota Immunization Information Connection (MIIC), noting that Minnesotans have vaccination rates higher than the national average. She gave the following examples of how the State uses the MIIC:

- By matching birth certificate data with MIIC data, public health authorities corroborated concerns that people in the Somali community were vaccinated at lower rates than others. The State launched information and outreach efforts to counter misinformation about vaccines that had been spreading in Somali communities.
- Birth certificate information matched with MIIC data also helped the State assess compliance with recommendations for maternal tetanus, diphtheria, and pertussis vaccination. The effort identified lower rates among certain ethnicities. As a result, public health authorities were able to target resources to improve outreach and education.
- Minnesota encouraged health care systems and long-term care facilities to take advantage of the MIIC to track influenza immunization coverage among employees. Access to an interactive program with real-time information led to higher vaccination rates, especially in long-term care facilities.
- Child care centers can use the MIIC to complete required annual immunization reports, freeing up staff time, improving the quality and accuracy of data, and helping such centers promote immunization.

During an infectious disease outbreak, the State uses the MIIC to verify immunization status quickly, determine needs, and monitor overall trends. For example, during the current measles outbreak and with over 8,000 exposed individuals, public health authorities were able to identify and verify the immunization statuses of 600 individuals quickly as well as track doses administered in Somali children efficiently in responding to the outbreak.

Discussion

Mr. Williams said that in many—but not all—States, health care providers have access to IIS. He agreed that evaluation of State IIS is needed to make the case for return on investment of the system. Ms. Ehresmann said Minnesota is working with pharmacies to capture vaccines administered in retail settings, but doing so is a big undertaking that many States find daunting. Mr. Williams said CDC is considering ways to make it easier to capture pharmacy vaccinations. Dr. Shen stated NVAC may wish to explore the topic further.

Dr. Thompson offered how NVAC may be of assistance in supporting IIS, particularly in encouraging increased coverage of immunization records in IIS as well as interstate data exchange. Melinda Wharton, M.D., M.P.H., director of CDC's National Center for Immunization and Respiratory Diseases, said the major barriers are mainly at the State level, and she hoped NVAC would encourage States to look at their systems and determine their needs. She clarified that States share their data with CDC, but there is no national system, and it is not possible now to use State data to assess coverage at the national level.

Mr. Williams said lots of efforts are underway to ensure that data migrate from EHRs to IIS even when the clinician does not use the IIS. He believes that, over time, the two types of systems will become more integrated and there will be more tools that providers can use, for example, for forecasting.

IIS Interjurisdictional Data Exchange Community of Practice—Mary Beth Kurilo, M.P.H., M.S.W., AIRA, and Kimberly Martin, ASTHO

Ms. Martin said ASTHO's Infectious Disease Policy Committee began its focus on interjurisdictional data exchange in 2014. The decision was spurred by the recognition that people moving to North Dakota to fill temporary jobs in the oil industry received vaccinations, but there was no way to exchange information reliably with providers in the workers' home States. Stakeholders in North Dakota and four other States from which most of the workers came got together to discuss barriers to IIS. Stakeholders categorized the barriers as programmatic, technical, or legal:

Programmatic
- Difficulties devoting time, money, and resources to establishing connections and agreeing on procedures
- Lack of prioritization by the State health department

Technical
- Need for technological system upgrades (requiring time and resources)
- Limited consistent business processes to support an entire network of interstate data exchange
- Differences in IIS between States

Legal
- Laws prohibiting data sharing
- Laws requiring data sharing agreements
- Laws requiring individual user agreements for out-of-State providers to query an IIS

ASTHO turned its attention to the legal barriers, working with the Network for Public Health Law and the five States to create a memorandum of understanding (MOU) that has since been signed by those five States and one other. ASTHO and AIRA maintain a community of practice among the five States to provide technical assistance and continue to encourage other States to adopt the MOU. Ms. Martin said ASTHO is now thinking about the next steps toward interjurisdictional IIS.

Ms. Kurilo elaborated on the interjurisdictional project, noting that AIRA is developing a strategic roadmap for IIS data exchange. AIRA is acting as the central repository for MOUs and information about interjurisdictional IIS, facilitating communication with CDC and other stakeholders, providing technical

assistance, and working with other public health organizations to leverage resources. Ms. Kurilo said many states agree that interjurisdictional IIS are a good idea but find them difficult to prioritize.

In the short term, efforts are targeting the ability to use EHRs to query the State IIS. Eventually, it is hoped that users can employ their EHRs to query IIS in multiple States. Using a uniform MOU, Ms. Kurilo explained, States will figure out how to work with their neighbors around information exchange using a point-to-point approach. Those relationships will form the foundation for a hub system that supports links nationally.

Ms. Kurilo outlined various solutions to address the technical barriers, all of which require funding. Overcoming the programmatic barriers requires prioritization. Without funding, States cannot prioritize IIS. It will be necessary to identify high-value partners by determining migration patterns and focusing on border cities. AIRA will continue to work with partners on a strategy and provide technical and administrative assistance. It will also cultivate more partners and advocates and seek funding sources.

Public Health Immunization Data Exchange (PHIZ) Project—James Daniel, M.P.H., Public Health Coordinator, Office of the National Coordinator for Health Information Technology (ONC), HHS

Mr. Daniel set the stage by pointing out that the stage-3 meaningful use requirements (under the Health Information Technology for Economic and Clinical Health [HITECH Act]) dictate that by 2018, EHRs must be able to send a query to an IIS, and the IIS needs to have the capabilities of real-time response with a consolidated patient history and forecast of recommended vaccines. Recognizing this required function, CDC, NVPO, and ONC collaborated on a pilot program to facilitate data exchange across jurisdictions using a central hub. The pilot takes into account three scenarios in which an individual (provider or consumer) needs information from an IIS in a different jurisdiction.

The hub is hosted by the Association of Public Health Laboratories (APHL) and meets government standards for security. In addition to building infrastructure, the pilot program aims to determine how to trigger and generate queries. On the legal front, Mr. Daniel said, the ASTHO MOU could replace the data sharing agreements across States that the pilot program is using. Entities still need a data use agreement to allow data to pass through the APHL hub. Surprisingly, States have found it very difficult to install the digital security certificates that APHL requires to verify the authenticity of the State system when accessing the APHL hub. Several States and the District of Columbia are participants of the pilot program, which means they have taken initiatives in addressing legal barriers, securing leadership buy-in, and enhancing IIS that allow for testing and readiness for a production environment through the central hub.

CMS HITECH 90-10 Program: Expanded Support for Medicaid Health Information Exchanges—James Daniel, M.P.H., Public Health Coordinator, ONC, HHS (on behalf of Thomas Novak, Medicaid Interoperability Lead, ONC, HHS)

Mr. Daniel introduced a program that may be helpful to States that are seeking financial support in strengthening their IIS and interoperability with EHRs. Through the HITECH Act, CMS provides dedicated funding to eligible providers through States' Medicaid programs in encouraging meaningful use of health information technologies, including IIS. To be eligible for this so-called 90/10 funding and be supported by a 90% Federal Match, a State must allocate 10 percent from its State. The ONC provides technical assistance to States in navigating the application process for this funding.

States can use the 90% Federal Match to update their systems to support bidirectional messaging. They can also use it to recruit and onboard Medicaid providers in connecting their EHRs to IIS. Mr. Daniel encouraged States to contact him or Mr. Novak to learn more.

Discussion

Mr. Daniel said States with strong registries have State commitment, longevity, and funding. While Federal dollars are available, States must still invest upfront, and many States have no funding to support IIS. Dr. Wharton added that the ongoing maintenance of IIS is expensive and not covered by Federal funding incentives, and IIS are constantly growing in size. Dr. Nancy Messonnier noted that States may be reluctant to sign MOUs without a long-term funding commitment to maintain the IIS. Mr. Williams said anticipating maintenance costs is complicated, as new providers link to the system continuously and users demand more services from their IIS.

Interjurisdictional exchange necessitates that States address legal barriers around privacy and data sharing. Rebecca Coyle, M.S.Ed., said the MOU assumes that once data are transferred, the data are subject to the laws and regulations of the receiving State.

Dr. Messonnier said operational standards are set at the Federal level, but the operational barriers arise at the local level. One lesson from Minnesota's experience is that IIS become more valuable when providers begin to rely on them. Dr. Messonnier said that IIS will move forward when providers see them as central and valuable to their operations (e.g., for ordering). Encouragement by public health entities will not be enough. Dr. Thompson said NVAC can consider how to help more people appreciate the value of IIS and how to address the challenges.

Ms. Coyle said AIRA seeks ways for States to streamline their operations and disseminates best practices. One goal is to ensure more users adhere to recognized standards, which can reduce the cost of unnecessary customization of the technology. Dr. Wharton said she sees more States using commercial (not customized) platforms and some consolidation among technology vendors in the market. Mr. Williams added that AIRA's work toward certification of IIS will help improve standardization and sustainability.

Ms. Coyle observed that updating clinical decision support tools for vaccines is difficult (because the schedules are complicated), but it is easier to update them within IIS than EHRs. Mr. Williams added that IIS are effective at pulling information together in lieu of paper reporting.

Robert H. Hopkins Jr., M.D., MACP, FAAP, suggested considering a Federal IIS model, similar to Canada's, given the challenges of connecting pediatricians, adult providers, pharmacies, EHR systems, consumers, child care centers, schools, payers, and accountable care organizations—and possibly VA and DoD systems—to IIS. He acknowledged that would require a significant investment upfront. Dr. Wharton responded that the current system may not be as efficient as it could be, but it reflects States' desires to maintain control and determine their prerogatives. She anticipated that efficiency will improve as more States adopt national standards, but she could not foresee a national system that would be widely accepted.

Ms. Coyle pointed out that only about 20 States have the capacity to apply for the 90/10 funding. Ms. Ehresmann said Minnesota received some funding to support IIS in 2017, but those dollars were difficult to access.

Vaccine Confidence

Overview of Vaccine Confidence and NVPO's Approach—Judy Mendel, M.P.H., Health Communications Specialist, NVPO, HHS

Ms. Mendel defined "vaccine confidence" as the trust that parents, patients, or healthcare providers have in the recommended vaccines, those who administer recommended vaccines, and the process and policies involved in vaccine development, licensure, manufacturing, and recommendations for use. The terms

vaccine hesitancy and vaccine acceptance are both related to and affected by vaccine confidence and other factors. A model for vaccine uptake involves the 5 A's: access, affordability, awareness, acceptance, and activation. While overall childhood vaccination rates are at, near, or above historical highs in the United States, they are low in some communities, raising concerns about adequate protection from vaccine-preventable diseases.

NVPO's strategy for building vaccine confidence involves supporting collaborations and partnerships to increase understanding; providing leadership; strengthening vaccine and vaccination confidence-related communication; and facilitating identification and visibility of research efforts and findings, that could have or show promise, Ms. Mendel summarized numerous findings from focus groups conducted by NVPO with mothers and female guardians of young children, all of whom had demonstrated vaccine hesitancy. Among the key findings were the following:

- Lack of confidence was related to lack of trust, skepticism, and feeling uninformed or lacking in knowledge.
- Many concerns about vaccination were related to misinformation or lack of understanding about vaccines, how they work, and the schedule of their administration
- Many participants felt pressured by health care providers to vaccinate and lacked trust in the health system.

During the focus groups, NVPO tested some educational materials as short videos and infographic print outs that described how vaccines work, the concept of herd/community immunity, and vaccine safety. Overall, the participants preferred short videos over infographics. Although considered fairly informative, the materials did not have a strong impact on their levels of confidence. Nonetheless, the exercise did reveal some of the elements of effective communication, such as the importance of having a clear message, using a respectful tone, and incorporating details such as statistic sand references. Participants wanted materials to cover the pros and cons of vaccination and to use credible sources (although what constitutes credibility varied).

Ms. Mendel said the focus group findings underscored that confidence involves trust, knowledge, and control. Parents who are hesitant about childhood vaccines have concerns about vaccine ingredients, the schedule, and the mainstream medical system. Perceptions about vaccines and immunization are deeply held and often emotional. The findings also indicate that no single message appeals to all, and vaccine communicators should consider using short, engaging videos for education. Ms. Mendel stressed that all parents want the best for their children, and there are many opportunities to help parents make decisions.

CDC Update on Vaccine Confidence-Related Activities—Allison Fisher, M.P.H., CDC

Ms. Fisher presented findings from three CDC studies related to vaccine confidence. A national online survey of 2,510 parents of young children found that most (86 percent) of the children received all the recommended vaccines according to the schedule. Ms. Fisher explained that nearly 18 percent of parents whose children got all the recommended vaccines reported that they thought about refusing a vaccine, and they were categorized as "hesitant acceptors." In many cases, these parents changed their minds on the basis of conversations with the child's health care provider. Most of the parents, regardless of category, sought information about vaccines on Internet search engines or through other sources.

The most frequently delayed vaccines were influenza, varicella, and measles-mumps-rubella (MMR), and reasons for delay varied. Concerns were similar between hesitant acceptors and those who delayed (e.g., side effects, ingredients, the number of vaccines recommended, and general safety). A number of parents expressed concerns about specific ingredients and the (disproved) link between vaccines and autism.

A longitudinal study of a cohort of mothers from the second trimester of pregnancy through 19 months postpartum sought to explore knowledge, attitudes, and beliefs over time and to identify critical points in the decision-making process about vaccines. Respondents took part in seven online surveys over the course of the study. Notably, by the second trimester, most (90 percent) had a plan for vaccinating their newborns, and nearly all followed through on that plan.

Mothers were most interested in learning about vaccines during pregnancy, but over one third remained very interested over a year and a half later. Their satisfaction with their level of knowledge about vaccines increased with visits to their child's health care provider, but nearly three quarters still did not feel very satisfied with their knowledge after several visits. Mothers talked mostly with the physician treating their child at office visits about concerns, but they also talked with nurses and other clinicians in the office. Ms. Fisher pointed out that there is room for improvement around education, and she sees opportunities to partner with prenatal care providers and others about childhood vaccines.

A third study consisted of interviews with vaccine-hesitant parents in which CDC messages and materials were tested. Many were concerned about short- and long-term side effects of vaccinations. All discussed vaccines with their child's doctor, and most eventually decided to vaccinate their children. Ms. Fisher said the research revealed that parents need information about disease prevalence, repercussions of not vaccinating, vaccine effectiveness, and vaccine ingredients. Participants appreciated the CDC's informational materials but thought they should more fully address concerns such as side effects, risks of not vaccinating, the use of combination vaccines, and the vaccine schedule. They also suggested the materials be shorter, focus on a single topic, and use more graphics and statistics. Ms. Fisher described several CDC resources for providers and parents about vaccines and outlined some ongoing research.

Improving Canada's Measurement of Vaccine Hesitancy Through the Childhood National Immunization Survey—Rhonda Kropp, B.Sc.N., M.P.H., PHAC

Ms. Kropp said Canada has conducted telephone surveys about routine childhood vaccinations biannually since 1994. About 30 percent of those interviewed consent to surveyors talking with the interviewee's health care provider to validate information collected. PHAC sought to update the survey to address new World Health Organization (WHO) reporting requirements for vaccine hesitancy, recommendations of the Canadian Vaccine Acceptance and Uptake Task Force, and recommendations of the WHO Strategic Advisory Group of Experts.

An international advisory group of experts was convened to review current evidence and suggest changes to the survey. New questions address barriers to vaccination, vaccine hesitancy, and trusted sources of information. Pretesting determined that most of the questions were well received. However, the pretest subjects found it difficult to answer questions about their perceptions of risk associated with not being vaccinated or the disease about which they are most concerned.

Ms. Kropp said she would share the full list of questions with NVAC, once finalized. The survey will be administered this fall, and results should be available in late 2018. Ms. Kropp added that PHAC has renewed funding for the Canadian Information Research Network and earmarked a portion of that funding for vaccine confidence research.

Development of a Vaccine Confidence Index (VCI) to Measure Parental Confidence in Childhood Vaccinations, Paula Frew, Ph.D., M.A., M.P.H., Emory University

Dr. Frew described the methodology and results of a survey conducted in partnership with NVPO around vaccine confidence. The comprehensive national survey of parents of young children addressed social norms; knowledge, attitudes, and beliefs; trust in government and experts; and vaccine information. The ultimate goal is to create a brief, reliable, validated questionnaire that can be used in clinical settings to

assess levels of vaccine confidence. Investigators have pared the survey down to eight questions, and the survey appears to work as well as a much longer survey.

Dr. Frew reported that the VCI score strongly correlates with reported vaccine receipt; that is, the higher the score, the more likely vaccine was received. Confidence appears to be independent of sociodemographic status. Dr. Frew cautioned that the tool is limited by parents' self-report of their children's vaccinations and has yet to be validated. Also, the sample population was not representative of the U.S. general population. Investigators are preparing to test the VCI in different settings, with other populations, and with verification of vaccine receipt by a third party. Dr. Frew said the next steps may include testing the VCI among college students, pregnant women, elderly people, and men who have sex with men.

The American Academy of Pediatrics Response to Vaccine Hesitancy—Kathryn M. Edwards, M.D.

Dr. Edwards summarized three publications in the journal *Pediatrics* in 2016 that together form the basis of the AAP's thinking about vaccine hesitancy and exemptions. First, a survey of pediatricians found that, compared with earlier surveys, more parents are refusing vaccine, and more patients are being dismissed from a practice because of vaccine refusal. Notably, the most common reason for refusal was not the cost or even concerns about safety but rather that parents believed the vaccines were unnecessary.

The more exemptions permitted from vaccine requirements (for school or child care), the less likely that children will be vaccinated. An AAP policy statement on medical versus nonmedical exemptions emphasized that AAP supports laws and regulations requiring vaccination as a way to provide a safer environment for children and employees. AAP also supports medically indicated exemptions from specific vaccines for individual children and recommends that State public health authorities eliminate nonmedical exemptions. AAP recommends that public health authorities provide communities with information about immunization rates in child care centers, schools, and other settings and use the information to assess risks to community immunity.

A third report on countering vaccine hesitancy highlighted the extensive testing of vaccines before and after licensure and detailed the medical need, disease burden, scientific feasibility, basic and clinical research, and manufacturing processes around vaccines. A graph depicted how vaccine acceptance spikes during a disease outbreak and drops dramatically once a disease is eradicated. Parents' concerns about vaccines fall into three categories: vaccine safety, necessity, and freedom of choice. The report stresses that pediatricians may consider dismissing patients who refuse vaccination but the decision should not be made lightly.

Dr. Edwards said AAP seeks to communicate that vaccines are safe, effective, and necessary; that the concerns of vaccine-hesitant individuals should be respected and addressed; and that vaccines are thoroughly tested and their use monitored. In addition, AAP stresses that nonmedical exemptions increase the number of unvaccinated children, who then put vaccinated and medically exempt children at risk.

Discussion

Saad Omer, M.B.B.S., M.P.H., Ph.D., pointed out that the research indicates that people trust their health care providers, yet gaps in vaccine acceptance persist. He believes more evidence-based interventions are needed, and NVAC can help synthesize the various approaches. He observed that health care providers—including nontraditional providers of vaccines—may not be communicating well with patients. Dr. Omer said physicians need a more effective approach than dismissal to manage those who refuse vaccines.

Ms. Kropp agreed, noting that Canada has partnered with organizations that providers trust and recognizes that different specialties encounter different issues around immunization. Dr. Edwards said

younger physicians have not witnessed the consequences of the diseases that are now preventable with vaccines. She questioned whether physicians get enough education about vaccines in medical school. She acknowledged that vaccine refusal is complicated and pediatricians struggle with how to respond.

Dr. Martinez pointed out that vaccination is an emotional issue, and changing patients' minds requires building a relationship over time. She reported having some success working through community health workers who can talk with patients. Dr. Martinez said gradual movement over time is progress, but indicators only track vaccine receipt or refusal, which puts providers in a difficult position when they are judged and paid on the basis of indicators. David Fleming, M.D., M.P.H., opined that presenting a rational, standardized medical approach that lays out the risks and benefits does not appear to be very effective. It may be time to consider the drivers that lead to vaccine hesitancy and refusal. Ms. Kropp said authorities must determine where to devote their resources.

Discussion returned to the amount of education physicians receive about vaccines. Dr. Edwards and Ms. Kropp gave examples indicating that clinicians lack understanding of, for example, vaccine testing and monitoring systems. Dr. Friedland added that a wide range of providers need more vaccine education, including nurses, midwives, pharmacists, and other clinicians. Dr. Messonnier said obstetrician-gynecologists (ob-gyns) do not yet see themselves as influential in the realm of vaccines. Dr. Dunn agreed with the need to think more broadly about messages conveyed by nontraditional providers and nonmedical people who influence patients. Melody Anne Butler, B.Sc.N., RN, added that nurses administer vaccines in most cases, so it is important that nurses are sufficiently educated.

Dr. Frew said there are few data to determine what leads to parental vaccine hesitancy. The biggest indicator identified so far is not having received vaccines prenatally; getting more pregnant women vaccinated may help ensure that they have their children vaccinated.

Dr. Hopkins reminded the group not to overlook the strong influence of the Internet and social media on patients and families. He noted that messaging around vaccination refusal may need to be different for adult vaccines than for childhood vaccines. He also observed that disparities in vaccination are greater among adults than children. Ms. Mendel responded that NVPO considers adult immunization a priority and would like to conduct some vaccine confidence research around adult vaccines.

Dr. Meissner pointed to a recent controversial proposal to require children be vaccinated as a condition of their parents' eligibility for welfare benefits. Courts have supported the concept of vaccination as a necessary step to protect children and communities. He said incentives are needed to improve uptake.

Dr. Messonnier said NVAC seems to be searching for a national solution to very local problems. In the end, vaccination decisions involve one-on-one conversations between providers and patients and rely on cultural competency. Fewer than 1 percent of children receive no vaccines. Because of the Vaccines for Children (VFC) program, socioeconomic status should not be a barrier yet remains so.

Financial and Systems Barriers to Administration of Vaccines

Using Vaccination Technologies—Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, NVPO, HHS

Dr. Shen noted that two of the four goals of the National Adult Immunization Plan address infrastructure and the need for innovation in vaccine development and related technologies. Among the objectives of the plan is finding ways to address providers' logistic and technical barriers to offering vaccines to adults. Providers are responsible for ordering, tracking, and maintaining vaccine supply, which may be more complicated in practices with multiple providers. They must store and manage vaccine and supplies, which requires an upfront investment in equipment such as refrigerators, monitors, alarms, and backup power systems. Vaccine inventory also requires insurance and ties up a lot of operating dollars. Vaccine

administration involves time for counseling patients, supplies, documentation, and understanding of billing and coding protocols for multiple payers. (Providers can consult CDC's vaccine price list to see the federally negotiated vaccine price and the vaccine list price).

Attendees of the NAIIS indicated a lot of interest in coding and billing for adult vaccinations, which led to creation of several resources on common problems and solutions. Other business solutions exist to support providers, Dr. Shen said. They include automated purchasing, management, and dispensing solutions that reduce barriers to vaccine administration. Some of these services can also support mass vaccinations as part of emergency response.

Dr. Shen described some novel techniques in development for vaccine delivery. One storage solution on the market is known as the smart refrigerator. It includes mechanisms for monitoring temperature, sending alerts, managing inventory, and communicating with EHRs.

Adult Vaccination Coverage: National Household Interview Survey (NHIS) 2015—Cindy Weinbaum, M.D., M.P.H., CDC

Dr. Weinbaum presented results from the 2015 NHIS, which captures adult immunization coverage for seven vaccines, and compared them with 2014 findings. Vaccination rates for herpes zoster among people 60 years and older has reached the Healthy People 2020 target (30%), but that is not the case for any other adult vaccine. The number of people under 65 years and at high risk for pneumonia who received the pneumococcal vaccine increased slightly. Coverage with one of the tetanus-containing vaccines has not changed much but there was a statistically significant increase among adults. More health care personnel received the hepatitis B vaccine. Racial and ethnic disparities persisted for all the vaccines, even among health care personnel, and widened for pneumococcal and herpes zoster vaccines.

Dr. Weinbaum reported that insured respondents had higher rates of vaccine coverage than uninsured people. However, even insured people who had 10 or more health care visits over the past 12 months did not receive recommended vaccines in many cases, representing a missed opportunity.

Summary of the 2017 NAIIS and Adult Quality Performance Measures—Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, NVPO, HHS

The 2017 NAIIS in Atlanta, GA, in May brought together more than 350 participants representing more than 150 organizations across the spectrum of stakeholders. Dr. Shen described the topics and presentations. The agenda, posters, and presenters' slides are available online at https://www.izsummitpartners.org/summit/2017-naiis/.

The NAIIS working groups meet year-round to drill down into the issues raised at the annual meeting. Each working group is co-chaired by a Federal and a non-Federal representative. Recent efforts include the following:

Provider and Access Working Group

- Developing online billing and coding resources
- Creating fact sheets about immunization activities and the Medicare Merit-Based Incentive Payment System (MIPS)
- Updating the disparities fact sheet, IIS brochure, and online slide sets

Influenza Working Group

- Created and piloted checklist of best practices for offsite vaccination clinics; published honor roll of users, frequently asked questions, and summary of underlying principles
- Conducted checklist and CDC adult immunization webinars

Quality and Performance Measures Working Group

- Drafted maternal immunization composite measure and submitted it to the National Committee for Quality Assurance (NCQA) for testing
- Working with CMS on feasibility of immunization quality measures for Medicare's end-stage renal disease program

Also in relation to quality measures, Dr. Shen said NVPO is working on an adult composite measure and analyzing vaccine coverage through Medicare claims. She noted that the NAIIS is the first gathering to bring health care systems together to identify barriers to and facilitators of immunization. The 2018 NAIIS might involve more perspectives from insurance providers. A number of themes have come up repeatedly at the NAIIS, such as improving providers' access to their own data, increasing interoperability among EHRs and IIS, promulgating quality measures to spur systems change, addressing billing and reimbursement (especially for ob-gyns), and addressing State policy barriers. A white paper about the role of health care systems in adult immunization is in development.

Summary of the 2017 National Adult Influenza and Immunization Summit (2017 NAIIS) and Adult Quality Performance Measures—Angela Shen, Sc.D., M.P.H., CAPT, Senior Advisor, NVPO, HHS
Dr. Shen gave more insights from the NAIIS Quality and Performance Measures Working Group. She outlined the key considerations of measure development and current Federal quality improvement programs. The maternal immunization composite measure currently being tested by NCQA could be adopted by Healthcare Effectiveness Data and Information Set (HEDIS) in 2019 (targeted), so providers would have to begin tracking immunization status for pregnant women.

At an NAIIS session on quality measures, participants said the number of measures should be reduced and aligned. There was robust discussion about the IHS data on its adult composite immunization measure. Participants were asked whether influenza should be included in an adult composite measure. Those in favor argued that coverage remains low, that including influenza will compel providers to report missing data, and that converting from survey-based to electronic reporting could help smooth the process. Those against said that influenza involves a different provider set than other vaccines and multiple access points, so the measure could result in missing or duplicate data. Dr. Shen concluded that the NAIIS provides a valuable forum for interesting and helpful conversations around the issues and that one point she emphasized was moving beyond influenza and pneumococcal vaccines.

DISCUSSION

Dr. Weinbaum said CDC's NHIS does not have any mechanism for verifying subject reports against provider records, so the data are not comparable to Canada's survey. Dr. Shen noted that CDC does survey providers separately about their vaccine recommendations.

Dr. Messonnier said the Healthy People 2020 target for herpes zoster vaccination was set low deliberately because of concerns about supply and may be higher in the next iteration. Dr. Weinbaum added that a new herpes zoster vaccine may be available soon. Dr. Shen said working groups are forming around Healthy People to discuss the goals.

Dr. Dunn observed that including influenza vaccination in a composite measure skews the results. Dr. Shen acknowledged that, in the IHS composite measure, including influenza vaccine drove all the other components up. Dr. Hopkins said that given the complexities of the adult immunization recommendations, it may be difficult to design a composite measure effectively. Dr. Shen will circulate some of the information about the proposed measure among NVAC members for discussion.

NVAC Liaison and Ex Officio Updates

Highlight: Update on Shoulder Injury Related to Vaccine Administration (SIRVA)—Narayan Nair, M.D., DICP

Dr. Nair explained that SIRVA is thought to result from inadvertent injection of vaccine into the tissues under the shoulder muscle and appears to be related to deltoid bursitis. A 2010 review of 13 SIRVA cases that came through the Vaccine Injury Compensation Program found that all the cases occurred in adults, most were female, most had high body mass indices, and most reported experiencing pain within 24 hours of vaccination. Using a depiction of the shoulder joint and tissues, Dr. Nair showed how shoulder vaccination could result in pain. He presented DICP data on cases and compensation for SIRVA from 2011 through 2016, both of which have increased substantially. To be eligible for a claim, the individual must report symptoms that lasted longer than 6 months or that required hospitalization and led to surgery.

Several publications have offered guidance on mitigating the risk of SIRVA, for example, by avoiding injection in the upper shoulder and by ensuring that the administrator and recipient are both seated during injection. Dr. Nair emphasized that SIRVA is of particular interest to the DICP because it is preventable. His office has conducted outreach to professional organization and some academic centers; some high-profile media outlets have covered the topic. DICP is updating the 2010 study with new data. Also, SIRVA was added to the new Vaccine Injury Table, which helps streamline the compensation process.

DISCUSSION

Dr. Edwards and Dr. Nair agreed that providers need more education about vaccination technique. Dr. Omer suggested that more information about the types of providers involved in claims may help target education efforts. Some discussion revolved around the possible causes of long-term symptoms. Dr. Messonnier said CDC has some new materials for providers aimed at avoiding preventable errors; any guidance from DICP about whom to target would be helpful. Dr. Hopkins pointed out that, other than pediatricians, most providers do not receive vaccination training, so CDC materials should target providers broadly.

Steve Black, M.D., suggested NVAC take up the issue of educating providers about preventable vaccine-related errors and promote an intervention. Dr. Thompson agreed to consider the topic.

VA—Troy Knighton, M.Ed., Ed.S., LPC

This fall, VA begins testing its mobile application for influenza vaccinations. The app is intended for use on tablets by those administering vaccines in nontraditional settings (e.g., health fairs) and can transmit information directly the VA EHR system. So far this year, about 1.7 million veterans have received influenza vaccines in outpatient settings. About 16 percent of those received the high-dose influenza vaccine, up from 10 percent in recent years. However, these figures do not include all of the 90,000 veterans who received vaccines through the VA partnership with Walgreens. Mr. Knighton explained that it takes some time for VA to verify the claims submitted by Walgreens.

NIH—Barbara Mulach, Ph.D.

NIH started a Phase I clinical trial of an investigational new vaccine against mosquito-borne viruses that targets proteins in mosquito saliva. If successful, it would impact the mosquito's ability to transmit disease and could potentially be combined with vaccines for specific diseases. NIH recently launched a Phase I/II trial of a chikungunya vaccine that has been evaluated in clinical trials in Europe.

HRSA DICP—Narayan Nair, M.D., CAPT

DICP has received 674 claims so far this year and anticipates about 1,200 claims for this fiscal year. As of March 1, about $127 million in awards has been paid out. In addition, $13 million dollars went to attorneys' fees for both compensated and dismissed claims. The final Vaccine Injury Table revisions were published in January and became effective in March, and SIRVA and Guillain-Barré syndrome were added to the table. Typically the statute of limitations of the program is 3 years after the injury occurs. However, when an injury is added to the table, the look-back period extends to 8 years. So, for the next couple of years, DICP expects to see an increase in the number of claims for SIRVA and Guillain-Barré syndrome.

HRSA BPHC—Judith Steinberg, M.D., M.P.H.

Dr. Steinberg said that for the September NVAC meeting, BPHC will present 2016 data from the Uniform Data Set, which includes a measure of childhood immunization. BPHC participates in the Federal Interagency Adult Immunization Task Force and has given input on influenza vaccine communication for providers. BPHC continues to support its health centers in becoming recognized patient-centered medical homes, which are primary care delivery systems that will facilitate better immunization rates.

FDA—Karen Farizo, M.D.

In May, the Vaccines and Related Biological Products Committee (VRBPAC) met to discuss respiratory syncytial virus (RSV) vaccine, particularly for RSV-negative infants. The meeting was prompted by advances in clinical development of several novel RSV vaccines and the historical context of enhanced respiratory disease observed in RSV-negative infants who received the formalin-activated investigational vaccines in the 1960s. VRBPAC considered the data on immunological mechanisms for enhanced disease and recognized that the risk for enhanced disease depends on vaccine type and how the vaccine interacts with the immune system. VRBPAC provided input on the types and extent of animal data needed to support moving forward with some of the novel vaccines in clinical trials in RSV-negative infants and also clinical trial design considerations to mitigate any safety concerns.

DoD—Heather Halvorson, M.D., M.P.H., M.S.H.I., LT COL

Dr. Halvorson explained that DoD suspended and later restarted an adenovirus vaccination program for recruits, a situation that lent itself to studying the efficacy of the vaccine. Investigators found that, in the period during which adenovirus vaccination was suspended, acute respiratory disease and adenovirus returned to endemic levels. In 2011, DoD began universal immunizations of recruits with the new oral vaccine for adenovirus types 4 and 7. Since then, DoD has been conducting surveillance and has seen a very large decrease in all respiratory febrile illness and no uptick in any of the other virus types not covered by the vaccine. Dr. Halvorson said the vaccine appears to be doing a great job in the DoD population.

CDC—Nancy Messonnier, M.D., CAPT

Results from the Influenza Vaccine Effectiveness Against Pediatric Disease study showed that vaccination significantly reduced the risk of dying from influenza, in both children with underlying illnesses and also healthy children, and the protection spans multiple influenza seasons. Dr. Messonnier said the results send a great message to pediatricians about why to continue influenza vaccination. This fall, when New Hampshire implements its IIS, all 64 State, local, and territorial immunization programs supported by CDC's Immunization Service Division will have an IIS that acts as a registry. CDC created the interactive web-based visualization tool BACT FACTS, which leverages CDC's Active Bacterial Core surveillance data. It is hoped that the tool will make data more available to the public and health care providers.

BARDA—Armen Donabedian, Ph.D.

BARDA works in concert with CDC, FDA, NIH's National Institute of Allergy and Infectious Diseases, and industry partners to respond to the fifth wave of the H7N9 influenza outbreaks in Asia. Genetic sequencing suggests that some of these viruses have mutated to become highly pathogenic. The viruses appear to be antigenically distinct from the 2014 H7N9 viruses, making the U.S. vaccine stockpile inadequately matched to the new viruses.

HHS has six contracts with private companies under the Medical Countermeasures for Pandemic Influenza Preparedness and Response program. The vaccine production platforms available are egg-based, cell-based, recombinant, and live attenuated. Manufacturers will begin to produce H7N9 vaccine after their seasonal campaigns, and activities to prepare viruses for vaccine production are underway. Early clinical studies are underway for a recombinant vaccine in combination with adjuvants. BARDA hopes the new highly pathogenic viruses will be used in that study. BARDA has funding to purchase 40 million doses of new vaccine and additional adjuvant to meet the requirements to maintain a stockpile adequate to immunize 20 million persons against influenza strains that pose a pandemic threat.

BARDA and partners are working to develop two Zika virus vaccine technologies. Three companies are working on whole-virus inactivated vaccines based on the success of other *Flavivirus* vaccines, which are known to be both safe and reasonably immunogenic. Sanofi Pasteur licensed technology used to develop inactivated Japanese encephalitis vaccine. The company is conducting Phase I clinical studies. Data are just beginning to come in, but the vaccine appears to be reasonably immunogenic. Takeda is just begun its manufacturing process development and preclinical planning. BARDA is supporting the Institute Butantan in developing the capability to make Zika vaccine. Moderna Therapeutics is pursuing a novel approach using synthetic messenger RNA. The company is beginning preliminary clinical studies. Data will be available at the end of the summer.

AHRQ—Justin Mills, M.D., M.P.H.

AHRQ's Center for Delivery, Organization, and Markets is collaborating with CDC on using Healthcare Cost and Utilization Project data to look at the effectiveness and safety of rotavirus vaccine and the impact on intussusception. AHRQ is funding a project looking at a sustainable model for delivery of health services in rural communities that sends patients reminders about primary preventive health services (including immunization), directs them to providers, and tracks them through registries. One explicit objective of the project is to increase immunization rates. AHRQ is also funding a project to investigate the potential advantages of text messaging and health information technology interventions. The study will compare personalized human papillomavirus (HPV) vaccine text messaging reminders with two conventional text message reminders among minority adolescents.

VRBPAC—Kathryn M. Edwards, M.D.

In March, VRBPAC met to decide which strains of influenza would be included in the upcoming seasonal vaccine. There will be a change in the H1N1 pandemic-like strain; it will include the A/Michigan, A/Hong Kong, and B/Brisbane strains. On the basis of very recent data, Dr. Edwards said it looks like VRBPAC made the right choices.

PHAC—Rhonda Kropp, B.Sc.N., M.P.H.

Ms. Kropp gave an overview of PHAC for the benefit of new NVAC members. Recent activities include the first round of funding for implementing immunization programs or scaling up best practices. One award went to the C. D. Howe Institute to assist in improving vaccination rates in Canada. Its report is on

the PHAC website and is being disseminated to State health agencies so that they can learn about promising practices to increase immunization rates among uninsured adults. Also, PHAC is updating the national goals for immunization coverage and vaccine-preventable disease reduction targets. This iteration is going through multiple levels of review, and PHAC is securing full Federal and provincial sign-off on the document by December.

NACCHO—Tiffany Tate, M.H.S.

NACCHO's immunization workgroup met in person recently to review annual activities and priorities; members then went to Capitol Hill to talk to with Congress members. Ms. Tate said the visit with representatives was the first for this group and was successful. NACCHO is also collecting data from local health departments about their operations, activities, and partnerships; monitoring immunization legislation and policy efforts; communicating to Congress its support for continued Section 317 immunization funding; and signing on to the National Viral Hepatitis Roundtable letter urging the Trump administration to implement the National Academies of Sciences, Medicine, and Engineering's recommendations to eliminate viral hepatitis. NACCHO supports awareness and education around immunization through various social medial platforms and educational materials.

NACCHO's HPV Vaccination Project, funded by CDC, now includes 20 organizations. As part of that project, NACCHO is developing a guide to HPV resources for local health departments. Earlier this year, NACCHO initiated its Infectious Disease and Immunizations Forum to bring together program leaders at local health departments in large jurisdictions. The forum serves as a platform for members to engage in peer learning and provides a voice to advocate for local health departments on Federal laws, policies, and regulations.

ASTHO—Kimberly Martin

ASTHO has been working to identify promising practices among State health agencies with adult immunization programs for uninsured or underinsured people. Interviews have been held with 13 State health departments and partners about how to locate uninsured people, how to recruit providers to serve them, and tools to improve vaccination rates. A report is posted on ASTHO'S website and will be disseminated to State health agencies.

AIRA—Rebecca Coyle, M.S.Ed.

In light of NVAC's earlier discussion about using resources thoughtfully, Ms. Coyle described AIRA's address cleansing project, which officially launched June 1. It entails a service agreement with Smarty Streets, an address cleansing and geocoding service, and is now available to all IIS in the country, free of charge. Using the service can save an IIS anywhere from $5,000 to $50,000. It is a great use of resources to help improve data quality. AIRA is also involved in assessment and certification of some measurement and improvement efforts. The organization has looked at a lot of the interoperability components and assessed the IIS in terms of their ability to respond to the best practices and standards that exist.

For the future, AIRA is looking at clinical decision support and ways that IIS are measuring it, with the goal of ensuring consistent communication across jurisdictions. Ms. Coyle noted that AIRA is celebrating its 25th anniversary. The organization dates back to the All Kids Count program, which began in 1992. CDC, AIRA, and others have been trying to catalog the history of IIS, because there are a lot of lessons to be learned. In April, AIRA held its national meeting with more than 400 participants from across the country coming together to learn best practices and share opportunities.

AIM—Kristen R. Ehresmann, RN, M.P.H.

AIM participated in the AIRA national conference. Immunization program managers are actively involved in AIRA work groups to advance the testing and assessment of IIS, improve joint development of IIS, and implement functional standards. In addition, AIM partnered with the American Cancer Society to host a call-to-action webinar in February to focus on building and sustaining partnership between cancer coalitions and immunization programs. AIM also participates in the National HPV Vaccination Roundtable and NAIIS. At the May NAIIS, an AIM representative presented on challenges and successes of the VFC program.

AHIP—James David Nordin, M.D., M.P.H.

Dr. Nordin introduced himself as the new representative for AHIP.

ACIP—Nancy M. Bennett, M.D., M.S.

In February, ACIP voted on the language for single-dose revaccination for infants born to mothers who are positive for hepatitis B surface antigen. In June, the group will vote on the influenza vaccine recommendations for the upcoming influenza season and consider the use of Flublok influenza vaccine in pregnancy. ACIP has been working to clarify how its Grading of Recommendations, Assessment, Development and Evaluation (GRADE) process factors into decision making about recommendations so that the whole process is more transparent. It is writing standard operating procedures that include more intensive training for new members. The work of the ACIP and the tools it uses have not been transparent to others in the past, said Dr. Bennett.

Other Liaison Reports

The Advisory Commission on Childhood Vaccines, IHS, and U.S. Department of Agriculture submitted written reports.

Public Comment

Thomas Netzer of TruMed Systems said, in response to Dr. Shen's presentation on vaccine-related technology, that his company and others are introducing "smart" refrigerators, formally known as vaccine management systems. Uptake is starting to build among high-volume immunizers, such as pediatricians. Adult providers who rarely or never give immunizations do not see the value proposition of these systems, because they are not currently doing any of the things that the system would automate for them. TruMed seeks to partner with vaccine manufacturers to test the use of these systems among adult providers, which it believes would increase immunization rates for adults.

Judi Grupp of Vax Atlas commended NVAC for including an AHIP representative on the committee. Much is being done on the technology side to bring information systems together. At the same time, health plans are doing something very different with their claims data, and bringing that together is going to be critical to reaching goals. Ms. Grupp recommended that health plan representatives be included in efforts to address IIS.

Closing Remarks and Adjournment—Kimberly M. Thompson, Sc.D., NVAC Chair

Dr. Thompson thanked the NVPO staff for their hard work and all those who attended for their participation. She adjourned the meeting at 4:55 p.m.