NATIONAL QUALITY FORUM

Priority Setting for Health Care Performance Measurement: Getting to Measures that Matter for Adult Immunizations

DRAFT REPORT FOR COMMENT *June 16, 2014*

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Contents

Priority Setting – Project Purpose and Scope

Over the past ten years, the use of U.S. healthcare performance measurement has exploded, yet it is widely recognized that many important gaps in measurement still exist. Section 1890(b)(5) of the Social Security Act requires the National Quality Forum (NQF), as the consensus-based entity, to describe gaps in endorsed quality and efficiency measures in the Annual Report to Congress and the Secretary of the Department of Health and Human Services (HHS). Building on work done by NQF in 2011 and 2012 on the status of measure gaps more broadly[1-2], this project advances the aims and priorities of the National Quality Strategy[3] by identifying priorities for performance measurement; scanning for potential measures and measure concepts to address these priorities; and developing multistakeholder recommendations for future measure development and endorsement.

In 2013, HHS contracted with NQF to systematically and comprehensively identify, analyze, prioritize, and make recommendations for the filling of measure gaps related to five specific measurement areas: Adult Immunizations, Alzheimer's Disease and Related Dementias, Care Coordination, Health Workforce, and Person-Centered Care and Outcomes. The recommendations generated through these projects will be instrumental in aligning broader measure development efforts by ensuring that financial and human resources are strategically targeted to lead us to creating the measures that matter to patients and families, and that will drive improvement in health and healthcare.

Setting Priorities for Adult Immunization Measurement

Vaccine-preventable diseases cause unnecessary illness, hospitalizations, morbidity, and mortality for Americans of all ages. According to the Alliance for Aging Research, vaccine preventable diseases or their complications account for 50,000 to 90,000 adult deaths in the U.S. each year.[4] Additionally, the annual direct and indirect medical cost of infectious diseases is 120 million dollars. Unfortunately, adult immunization rates remain low for most recommended vaccines and are well below Healthy People 2020 Objectives.[5] The majority of existing performance measures are focused on immunization for seasonal influenza and pneumococcal infections and many are process measures with few outcome measures. Substantial measure gaps exist for other recommended adult vaccines, and few measures addressing adult immunization other than influenza and pneumococcal disease are used in federal programs.

HHS requested NQF to identify critical areas for performance measurement to optimize immunization rates and health outcomes across adult populations, and to provide recommendations on priorities for performance measurement development and endorsement related to adult immunization. This work contributes to other ongoing HHS activities including the National Adult Immunization and Influenza Summit (NAIIS), the HHS Interagency Adult Immunization Task Force, and the national strategic plan for adult immunization supported by the National Vaccine Program Office.

Identifying and Prioritizing Measurement Gaps

Formation of Multistakeholder Committee

NQF convened a multistakeholder committee (Appendix A) to identify and prioritize measure gaps for adult immunization that would have the greatest potential for improving healthcare quality, healthcare affordability, health disparities, and the overall health of Americans. The committee was also asked to consider harmonization and alignment of measures; measurement of disparities; availability of data sources (including electronic health records [EHRs]); and technical issues, such as capturing, analyzing,

and reporting performance measures at different levels of analysis across all patient populations and all providers of immunization.

Environmental Scan of Measures and Measure Concepts

NQF staff conducted an environmental scan of existing measures and measure concepts related to adult immunization to inform the development of the conceptual measurement framework, the measure gap analysis, and ultimately the committee's prioritization of measurement gaps for measure development. The scan facilitated a broader understanding of the existing adult immunization performance measurement landscape. A total of 225 unique measures or concepts were identified as relevant to adult immunization (see accompanying Excel spreadsheet). An analysis of the identified measures revealed:

- Seventy nine measures address influenza immunization (35 percent).
- Sixty measures address pneumococcal immunization (26 percent).
- The majority of measures are process measures (69 percent).
- Only four of the 46 outcome measures are at the provider level; the majority are population surveillance measures.
- Fifteen composite measures provide examples of how separate measures can be combined. The composites include measures that combine different vaccines as well as composites that include immunizations with other preventive services.

Conceptual Measurement Framework

To assess the comprehensiveness and adequacy of available measures for adult immunization for specific populations, types of care, and sites and providers of care, the multistakeholder committee developed and used a conceptual measurement framework to prioritize measurement needs (Appendix B). The framework was built on concepts identified by the Quality and Performance Measures Workgroup of the HHS Interagency Adult Immunization Task Force in 2013 that include process and outcome measures, and the two critical purposes of federal measures: 1) quality improvement/provider accountability, and 2) population health and planning.[6]

The framework illustrates measure gaps in specific age groups and subpopulations including young adults, pregnancy, adults, the elderly, people with chronic disease, and healthcare workers. The age and condition-appropriate vaccinations for these groups are listed in the adult immunization schedule issued by the Advisory Committee on Immunization Practices (ACIP) and Centers for Disease Control and Prevention (CDC).

For purposes of the framework and the committee's deliberations, process measures generally were considered to assess tasks associated with the administration of a vaccine, while outcome measures were considered primarily in the context of public health or health care system surveillance and could include health outcomes such as hospitalizations, morbidity, mortality, and the costs of vaccine-preventable diseases. Another important distinction was provider- versus population-level measures, defined by NQF as follows:

> Provider-level measures: Performance measures for which the level of analysis is a provider of healthcare services that is accountable for the care delivered to their patients, e.g., clinician, hospital, clinic, health plan, pharmacies, etc.
>
> Population-level measures: Performance measures for which the level of analysis is a community or other individuals defined by geography that are appropriate for government, community, healthcare system and multistakeholder accountability, including measures that can be utilized and assessed at multiple levels of analysis such as state, county, city, and/or community.

The committee discussed further distinguishing between provider- and system-level measures. While some suggested defining providers as people, and defining systems as entities (e.g., immunization tracking systems, claims databases, or hospitals in which people are working together), the committee ultimately agreed that it was sufficient for the term "provider" to encompass both individual and system-level providers.

The committee emphasized the importance of including measures of Immunization Information Systems (IIS) use and capabilities in the framework to advance adult immunization measurement.

Measure Gap Analysis

Using the conceptual framework and committee input, NQF staff identified more than 30 potential measure gaps (Appendix C). The gaps were grouped into several measure categories requested by HHS: adult vaccines for which there are no NQF-endorsed measures; vaccines for specific age groups consistent with the adult immunization schedule issued by ACIP/CDC; vaccines for specific populations such a persons with diabetes, or other chronic conditions; vaccines for healthcare personnel; composite measures including both immunizations alone and composite measures that include other clinical preventive services; outcome measures; and measures for Immunization Information Systems.

Key Informant Interviews

NQF staff interviewed key informants to identify important measurement issues related to adult immunization (Appendix D). The informants included health plans that use measures; organizations using measures for adult immunization; organizations that have developed or are developing composite adult immunization measures; consumers; EHR vendors; and federal agencies involved in IIS and EHR development. The committee received summaries of the interviews prior to the in person meeting to aid their deliberations.

Prior NQF Work on Adult Immunization

The committee received reports from several earlier NQF projects that evaluated immunization measures for adult immunization and addressed harmonization of related measures (National Voluntary Consensus Standards for Influenza and Pneumococcal Immunizations[7] [2008] and Population Health [Phase I] – Prevention Endorsement Maintenance Technical Report[8] [2012]). The committee noted that in the 2012 review of immunization measures for renewal of NQF endorsement, most of the measures endorsed by NQF used by the federal government have been harmonized[i] as recommended in the 2008 NQF report.

Priorities for Measure Development

To prioritize the identified measure gaps, committee members individually submitted their initial priorities among each of the identified gap areas prior to the in-person meeting. Committee members were asked to identify their priorities (more than one priority could be selected) among each of the measurement gaps areas detailed in Appendix C (i.e., adult vaccines for which there are no NQF-endorsed measures, vaccines for specific age bands, vaccines for special populations, etc.). The

[i] Harmonization is the process of editing the design of similar measures to ensure they are compatible. Measure developers can make changes to the way a topic or population is defined. Harmonization helps reduce the confusion of having measures that are similar but different.

committee then discussed the results (Appendix E) at the in-person meeting and agreed upon the ten measure gap priorities listed in Table 1.

Table 1. Priorities for Measure Development
Age-specific Priorities
HPV vaccination catch-up for females – ages 19-26 years and male – ages 19-21 years
Tdap/pertussis-containing vaccine for ages 19-59 years
Zoster vaccination for ages 60-64 years
Zoster vaccination for ages 65+ years (with caveats)
Composite Measure Priorities
Composite including immunization with other preventive care services
Composite of Tdap and influenza vaccination for pregnant women
Composite including influenza, pneumococcal and hepatitis B vaccination measures with diabetes care processes or outcomes for individuals with diabetes
Composite including influenza, pneumococcal and hepatitis B vaccinations measures with renal care measures for individuals with kidney failure/end stage renal disease (ESRD)
Composite including Hepatitis A and B vaccinations for individuals with chronic liver disease
Composite of all ACIP/CDC recommended vaccinations for healthcare personnel

Age-Specific Priorities

HPV vaccination catch-up for females ages 19-26 years and males ages 19-21 years. Although HPV vaccination is primarily recommended for adolescents, the committee unanimously agreed that a measure for HPV (human papillomavirus) vaccination "catch-up" for young adults was important in the short-term, particularly for women ages 19-26 who were not previously vaccinated. While HPV vaccination measures exist for adolescents, the environmental scan did not identify measures related to HPV vaccination catch-up. Similar to zoster (described below), a measure for HPV vaccination catch-up is applicable to a whole population of a specific age (as opposed to people with specific risk factors). The efficacy of the vaccine will reduce cervical, anal, and other HPV-related cancers in the future.

Tdap/pertussis-containing vaccine for ages 19-59. Pertussis (whooping cough) is a common disease with many cases that go unreported, particularly among adults. Although recent outbreaks have drawn attention to recommendations that pregnant women should receive Tdap vaccine during each pregnancy to reduce the risk of pertussis in new mothers and their very young infants, ACIP/CDC recommends pertussis-containing immunization for all adults. After much discussion about whether to restrict measurement to pregnant woman, the committee agreed that a significant proportion of the population does need protection from pertussis to reduce the risk to infants.

Zoster vaccination for ages 60-64 years. While generally supporting zoster vaccination, the committee pointed out that this vaccine is most beneficial (prevention of herpes zoster and post-herpetic neuralgia) to an individual rather than the public because the disease is not communicable. The committee also considered issues related to vaccine efficacy declining with age and frailty, insurance coverage gaps in Medicare, and the lack of mandatory reporting to capture data to measure outcomes. However, the committee ultimately recommended a measure for zoster vaccination, noting that herpes zoster and post-herpetic neuralgia pose a significant burden of disease and uptake of the zoster vaccine is relatively low to date.

Zoster vaccination for ages 65+ years (with caveats). Measures for zoster vaccination were also identified as a priority for those ages 65 and older with specific considerations for measure development. The committee discussed at length the declining immune response at older ages and limited life expectancy, and argued that measures for this age group would need to be nuanced. Some suggested excluding frail elders, since frailty is one of the biggest drivers of immune senescence, but issues around feasibility were raised since frailty is difficult to define and measure. Other suggestions were to exclude individuals over a certain age or keep the measure broad and further specify at the implementation level. The committee was generally confident that a measure could be developed without causing undue burden or unnecessary vaccination but that its application would need to consider the population measured. Even for the oldest adults, it was thought that it is better to vaccinate rather than leaving them completely unprotected.

Composite Measure Priorities

Composite including immunization with other preventive services. Rather than separate measures for adult immunization, the committee recommended combining core preventive services with ACIP/CDC-recommended vaccines into a composite measure. Several committee members envisioned a composite measurement "framework", comprised of general preventive services recommendations, including the ACIP/CDC immunization recommendations, specific to an individual's age. If the individual belonged to a special population (e.g., those with diabetes or ESRD), components of the composite would reflect the appropriate preventive services for that specific group. The composite could adjust for the patient's age and specific disease status. Since immunizations often are located at the bottom of a clinical preventive services list, the inclusion of adult immunizations in a preventive care composite may raise the profile of adult immunizations among providers.

Composite of Tdap and influenza vaccination for pregnant women. A significant gap exists for measures that assess the provision of Tdap and influenza vaccines during pregnancy, and a composite measure that addresses these two vaccines during pregnancy is urgently needed. Because few prenatal care measures exist and there is a perceived difficulty in creating measures for this population, the committee recommended developing a composite measure for Tdap and influenza and not combining it with other prenatal care services. Although there may be a timing issue related to vaccinating pregnant women for influenza given influenza's seasonal nature, within a nine-month span, the vast majority of women would have the opportunity to be immunized. Also, since measurement is usually retrospective, the Tdap and influenza vaccinations would not have to be administered at same time (since Tdap is recommended for late in pregnancy).

Composites for other special populations. For the remaining special populations from the APIC/CDC immunization schedule (individuals with diabetes, kidney failure/ESRD, and chronic liver disease), the committee supported the concept of including recommended immunizations into a composite with other recommended care processes for each specific population. A composite measure for each specific risk group was thought to be ideal since each population has specific needs and recommendations. Combining vaccination with measures of specialty care may be particularly effective since patients visit the doctor regularly for chronic care needs. A specific measure gap was identified for the provision of hepatitis B vaccination for patients with chronic liver disease or hepatitis C. Because a measure of hepatitis A vaccination for hepatitis C patients already exists, the recommendation was to broaden it to include receipt of the full series for both hepatitis A and B vaccines.

Composite of all ACIP/CDC recommended vaccines for healthcare personnel. The committee discussed the implications of developing measures for hepatitis B vaccination and a composite measure for influenza and hepatitis B vaccination for healthcare personnel including determining a health care personnel's immune status and the potential for over immunizing. The committee acknowledged potential implications for hospitals and long-term care facilities, particularly around long-term care facilities' ability to enforce and report on these measures. The committee, however, ultimately recommended a composite measure for all ACIP/CDC-recommended vaccines, as they did not want to "pick and choose" among the recommended vaccines.

Short- and Long-Term Priorities

To provide further guidance, the committee identified its top two short-term and long-term priorities among the list of ten priority gap areas. Short-term measure gaps (Table 2) should be filled quickly within 1-2 years. Longer-term measure priorities (Table 3) may be challenged by data sources or require more development time (2-4 years).

	Table 2. Top Short-Term Priorities
1.	Composite measures for T-dap and influenza vaccination for the pregnant population
2.	Measures for HPV vaccination catch-up for females ages 19-26 years and males ages 19-21 years

	Table 3. Top Long-Term Priorities
1.	Composite measures that include immunization with other preventive care services
2.	Composite measures for healthcare personnel of all ACIP/CDC recommended vaccines

Key Leverage Points to Drive Performance

The current use of performance measurement for promoting and increasing vaccination rates must be considered. A wide range of existing and potential leverage points (i.e., ways in which measures are (or could be) used that have an impact or promote change among various stakeholder groups) were suggested by the committee. The leverage points generally relate to reporting programs, financial or other incentives, or technology and infrastructure supports as presented in Table 4. As measures are developed, their potential use should be considered along with which mechanism will have the highest potential impact for improving vaccination rates and outcomes.

TABLE 4. KEY LEVERAGE POINTS TO DRIVE PERFORMANCE			
	Providers	States/Communities	Purchasers/Payers
Reporting Programs	• Internal health system reporting. • Public reporting of vaccination rates at the facility-level (i.e., measures in Hospital Compare). • Public reporting by medical groups at individual clinician-level on PQRS measures. • Mandatory, rather than voluntary, reporting of vaccination rates or minimum threshold requirements. • Reporting of health care personnel vaccinations (i.e., influenza for healthcare personnel measure in federal reporting programs).	• Mandatory, rather than voluntary, reporting of vaccination rates. • Public reporting of national adult immunization coverage (i.e., CDC reports on national adult immunization coverage, 2012 National Healthcare Quality Report). • Public reporting of adult immunization coverage at the state- or county-level (i.e., Commonwealth Fund's website, "Why Not the Best?" www.whynotthebest.org and New York state reporting at county level).	• Minimum vaccination rate thresholds for insurers. • Inclusion of adult immunization measures in programs, e.g., NCQA HEDIS and CMS Stars programs.
Incentive Programs	• Status recognition or accreditation and certification programs. • Incentives under the Meaningful Use of Health Information Technology program. • Incentives for integrating adult immunization with preventive services. • Payment incentive programs for providers that report on immunization measures. • Payment incentive programs for providers that attain a certain threshold of vaccination rates.	• Payment incentives for states/communities to achieve a certain threshold of immunization rates. • Need-based funding for evidence-based and innovative initiatives to increases vaccination rates where lowest.	• Offering reduced premiums or copays to employers or geographic areas that achieve higher vaccination rates. • Selection of health plans or providers that have lower costs associated with vaccine preventable disease (hospitalization, complications, mortality, etc.).
Technology Supports	• Incorporation of immunization measures in computer-based decision support systems.	• Additional funding for Immunization Information Systems (IIS) that accept and encourage submission of adult immunization data.	
Other		• Achieving – or exceeding – Healthy People 2020 vaccine-related objectives. • Harmonization of grant reporting (especially federal grants) across public health immunization programs, emergency preparedness, maternal-child health, and chronic disease management programs.	

Additional Recommendations

The committee provided supporting recommendations for measurement that addressed issues of accuracy, efficiency, and focus on that which is most meaningful.

Accuracy of Measurement

Measures that provide reliable and valid results encourage stakeholders to use the information to drive improvements in quality.

Attribution and Accountability

An important challenge related to adult immunization measurement is the issue of attribution—i.e., who will be measured and held accountable for providing vaccinations to adults. Provider attribution for measurement proves to be challenging for adult immunizations since adults receive vaccinations in a variety of places, including clinical settings (e.g., primary and specialty care, hospital, long-term care facility) and community-based settings (e.g., retail pharmacy, workplace, health fair, travel clinic). In comparison to children who are vaccinated in relatively fewer settings (i.e., school, physician office)—and where accountability generally lies with the parents— the lines of accountability are not well defined for adults. The lack of a definitive approach for attribution consequently leads to confusion in the provider community about roles and responsibilities, misalignment across performance measure development efforts, and lower implementation of adult immunization measures in quality improvement and/or accountability programs.

Process Measures at the Provider Level

An important consideration is the development of process measures of vaccination at the provider-level, while looking toward health outcome measures as the ultimate indicator of impact. Because vaccination is an evidence-based intervention closely linked to health outcomes, the focus for measure development should be on process measures at the provider-level that can drive overall vaccination rates. Process measures are incredibly important to promote shared accountability between all primary and specialty care providers. Additionally, if process measures are constructed to differentiate between patients who receive the vaccine, and those who have contraindications, declined vaccination, or were not offered the vaccine, an opportunity would exist to measure "missed opportunities" and to measure provider accountability without punishing providers who may serve more vaccine-averse populations. EHR vendors caution that some contraindications, and patient refusals may be difficult to capture in eMeasures.

Complementary Immunization Providers

The expanded role of "complementary (or non-traditional) immunization providers" — pharmacy, workplace, and other community immunizers —offers the opportunity for a shared approach to accountability. Committee members expressed concern about the burden of current measurement efforts on providers, specifically primary care physicians. With the Affordable Care Act (ACA) broadening access to care and a shortage of primary care doctors, primary care doctors cannot be expected to assume the responsibility of adult immunization alone and may gain needed support from complementary providers. Responsibility, and credit, for immunization should be shared across all immunizers, especially as health care delivery moves towards accountable care organizations and team-based care.

Committee discussion focused on the expanded role of pharmacists and how to include them in quality measurement efforts. Recognizing that better information transfer and communication between pharmacies and physician practices is a necessity, the pharmacy community has expressed a commitment to being held accountable in this area. Identifying a denominator for a pharmacy-based immunization measure could be challenging given that people frequently use multiple retail pharmacies.

Finally, it is important to recognize the patient's responsibility for seeking appropriate vaccinations, particularly given concerns about a perceived lack of need for vaccination among adults. It can be difficult to "make the case" for adult immunization since vaccines have varying degrees of effectiveness that may decline with age and frailty. Public awareness and education around adult immunization is needed to encourage patients to take ownership of their health and health information. As adult immunization quality measurement expands in the coming years, it also will be worth considering whether to hold employers accountable for ensuring that their employees are appropriately vaccinated.

Recommendations

Committee members generally agreed that measurement focuses resources and attention on processes of care while acknowledging measurement as a costly and burdensome endeavor that should be used only when it will drive improvement. Future quality measures should support responsibility for team- and system-level immunization, which could be strengthened by:

- Encouraging all immunization providers, including complementary providers, to submit data to Immunization Information Systems (registries);
- Including complementary immunization providers in adult immunization performance measure development; and
- Harmonizing measures for all providers.

Data Quality, Reliability, and Flow of Information

The lack of complete, accurate, and reliable immunization coverage data presents a particular challenge for adults, which has been further complicated by the growing number of sites that offer immunizations. Measures are dependent on quality data and the challenges in adult immunization measurement can largely be attributed to issues with the availability and quality of data, not the measures themselves. A committee member suggested that although measurement is important to drive improvement, measurement that is not reliable and accurate wastes resources and increases the possibility of harm.

Data Collection

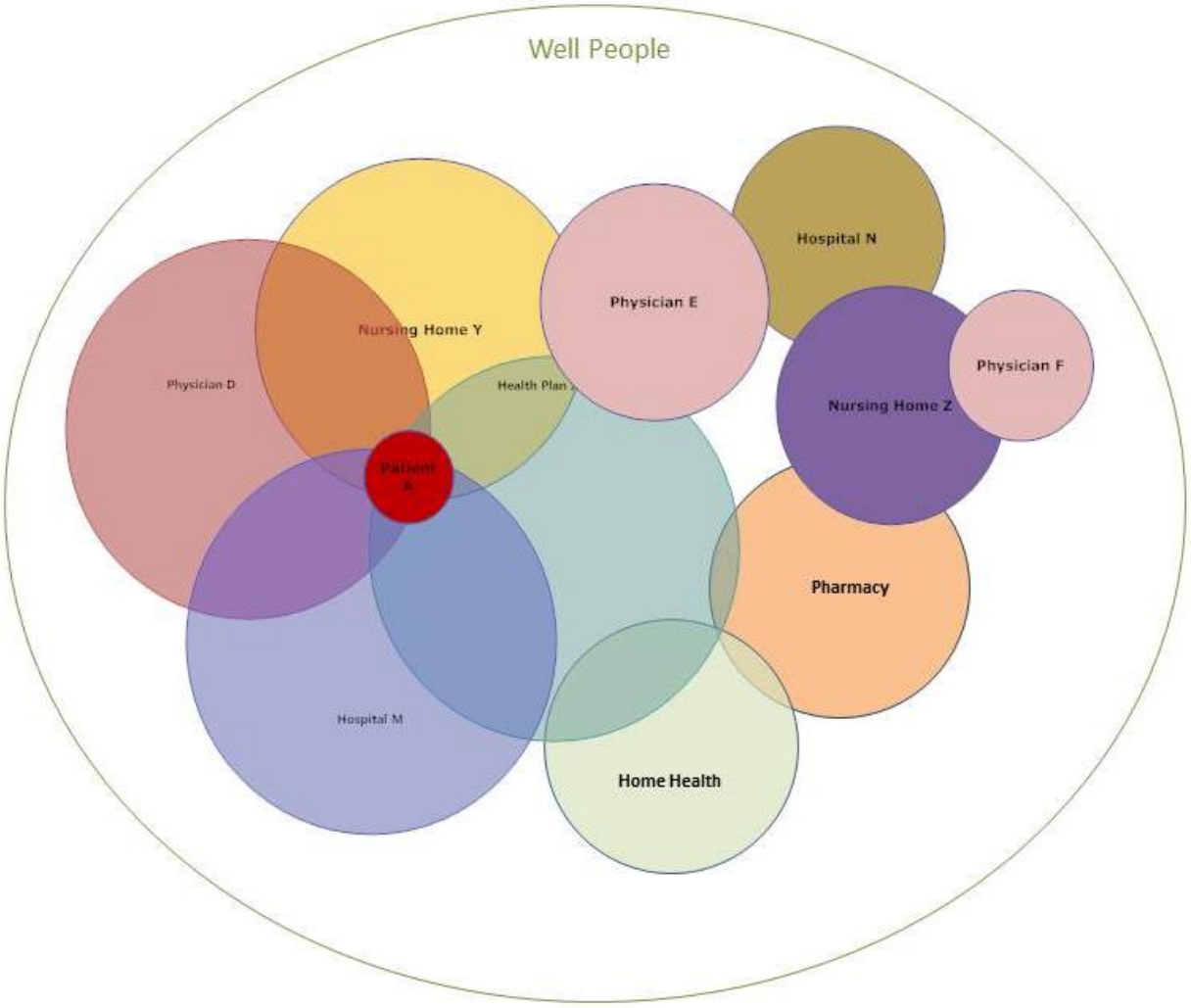
Data on adult immunization is currently collected through a number of sources, including administrative claims, Immunization Information Systems, EHRs, paper-based records, and patient surveys. Claims generally tend to be a readily available source of data; however, adults do not always submit a claim to their health plan when they receive a vaccination, which affects the reliability of claims data. Electronic- or paper-based records and surveys often rely on information reported by the patient—particularly in the case of vaccines received in the distant past—which leaves patients ultimately responsible for tracking and recording their vaccination history, adding to concerns about the reliability of adult immunization data.

Information Flow

Figure 1 below offers a pictorial view of the current state of measurement, illustrating the challenges of vaccination information transfer. Individuals move between sites of care (bubbles) as they interact with various providers, but data generally do not flow with them—the result is data in silos. These silos can

lead to repeated vaccination and waste in terms of time, vaccines, and money. Each of these silos may be held responsible for patient vaccination status, increasing their burden—and burden on the system—due to the lack of data flow.

Figure 1. Participation of Patient A in Various "Health Care Populations"



Source: Dr. David Nace, University of Pittsburgh Institute on Aging. Developed for the committee in-person meeting.

Immunization Information Systems (Immunization Registries)

Immunization Information Systems (IIS) offer a potential common pathway to sharing immunization information. IIS are "confidential, population-based, computerized databases that record all immunization doses administered by participating providers to persons residing within a given geopolitical area".[9] An IIS system can provide immunization histories for use by a provider and also aggregate vaccination data for use in surveillance and program operations. The CDC provides funding to support IIS among the 50 states, five cities, the District of Columbia and eight Territories.[10] There has been a concerted effort in recent years to focus on recording adult vaccinations within IIS, which many stakeholders attribute to the program requirements and incentives of the Medicare and Medicaid Electronic Health Care Record (EHR) Incentive Programs otherwise known as "Meaningful Use" (MU). The MU program has promoted communication between EHRs and IIS by specifying that if an IIS can accept

data for adults, vaccination reporting by eligible providers and hospitals is optional for MU Stage 1 and required for MU Stage 2.

An important consideration is that IIS are a nationwide network of systems, not a national system or central registry. A central repository for adult immunization history does not exist in the United States. IIS are in varying stages of development and use across states and variation exists among the IIS, adding to their overall complexity. IIS do not have unique identifiers that are used across systems, making it difficult to track people over time if they relocate to another state. Key informants shared that a key concern for public health infrastructure, including IIS, is resource and funding constraints. IIS now have much more data to manage with the inclusion of immunization reporting in the MU program. While financial incentives from the MU program have catalyzed change among the provider and hospital communities, increased financial support for health information technology (HIT) has lagged for many state and local public health agencies.

Despite these challenges, the committee and key informants reiterated that ultimately, standardization of data fields and greater use of IIS has the potential to create a centralized data source for immunization measurement. Further investment in communication standards among IISs and between IIS and EHRs could establish a national network that allows data capture and transmission wherever and whenever the patient receives care. Additionally, as implementation of EHRs continues to increase, it will be important to consider the development of "eMeasures" that facilitate quality measurement using these systems Because eMeasures use the unique characteristics of EHRs to build measures, they may be more successful than simply "retooling" measures originally designed for other data sources.

Emerging Technologies

Lastly, emerging technologies, such as smart phones and mobile apps, should be considered in efforts to facilitate vaccination data capture, flow, and measurement. Although the technology is available, challenges persist related to privacy and confidentiality issues as well as data validation processes for patient-submitted data. The MyVaxIndiana web portal allows patients to look up and print out official immunization records from the state IIS regardless of their location. Another example of an emerging technology is the use of smart phones to capture vaccine bar codes, which then allows patients to send the information to providers, IIS, or apps, such as Immunize Canada. This app allows Canadians to easily record and store vaccine information, access vaccination schedules, and manage vaccination appointments for the entire family.

Recommendations

Strengthening and encouraging the use of IIS is essential to facilitating immunization data flow. Strategies to achieve this include:

- Encouraging further adoption of voluntary national data standards for IIS, which could eventually be written into legislation;
- Encouraging and incentivizing providers to submit immunization data to IIS (via EHR or other);
- Further developing IIS for all states, territories and DC to adopt CDC functional standards that include bidirectional interoperability with providers and other IIS; core data elements that include patient refusal and contraindications; and allowing patient access to IIS data; and
- Encouraging a focus on eMeasure development.

Efficiency of Measurement

Harmonization and Consolidation of Existing Measures for Adult Immunization

Reducing the burden and improving the value of measurement was a recurrent theme throughout the committee discussion. Variations in measure constructs likely contribute to the lack of reliable, high quality adult immunization data because many "similar but different" measures are used. In 2008, an NQF-convened committee recommended standard measure constructs for flu and pneumococcal immunization measures. Ten NQF-endorsed measures for flu and pneumococcal immunization used by CMS in various quality reporting programs are harmonized with the measure construct recommended in that project's report .

Although there is a need for additional adult immunization measures, there is also a need to reduce the number of current measures, particularly for influenza and pneumococcal immunization. Harmonization and reduction—or "consolidation"—of redundant measures is necessary to reduce the burden of data collection and measurement, and to make room for other important measures. At a minimum, all measures should be up to date with current ACIP/CDC recommendations. The committee emphasized that consolidation efforts must be clearly communicated and involve all interested parties and that there may be certain circumstances under which harmonization is not warranted.

The environmental scan of measures and measure concepts clearly point to the need for harmonization and consolidation. The measure constructs identified in the scan were found to be highly variable, even though most process measures addressed administration of the various vaccines. Variation in measure constructs included:

- Assessment of immunization status measures rather than vaccine coverage rates;
- Combining vaccine contraindications or refusals with vaccines received;
- Separate measures for different age groups rather than stratification of a single measure;
- Separate measures for vaccine refusal and contraindications rather than including refusals and contraindications as numerator categories or inclusions;
- Excluded patients removed from the denominator rather than accounted for in the numerator;
- Separate measures for special populations, such as patients with diabetes or heart disease, rather than applying a global measure for the special population; and
- Specifications that are outdated according to ACIP/CDC recommendations.

Recommendations

Focused efforts are needed to reduce redundancy, variation, and measurement burden of existing measures. Specific recommendations for measure developers include:

- Conducting measure maintenance on all existing Adult Immunization measures with an eye toward "aggressive consolidation" (i.e., reducing the total number of measures because of overlap, redundancy, etc.);
- Encouraging measure developers to begin harmonization by identifying and standardizing data specifications;
- Developing new measures using the standardized data elements defined by NQF in their consensus report;
- Striving for harmonization between population and provider level measures, being cognizant of the purpose of measurement (i.e., vaccination coverage at population level; accountability at the provider level);

- Developing composite measures to incorporate harmonized adult immunization into preventive services including important subpopulations; and
- Aligning all immunization measure with ACIP/CDC recommendations and retire all outdated measures.

Measuring What is Most Meaningful

In addition to prioritizing measure gaps the committee considered other aspects of measurement that are meaningful to audiences.

Disparities in Immunization

Known disparities in adult immunization rates exist between racial and ethnic groups, and measurement is an important mechanism for identifying and targeting such disparities for improvement. While robust national data around disparities exist, data samples often are inadequate to inform local action. The solution, however, is not to put the onus of collecting this type of information solely on providers, as this could significantly add to data collection and measurement burden. The Behavioral Risk Factor Surveillance System (BRFSS) survey is a major data source for disparities data, but limited sample sizes make it difficult to use for improvement locally. Some data sets from Medicare and Medicaid plans include race and ethnicity data that can be used to stratify immunization measure results, while alternative approaches—such as the RAND method using geocoding when self-reported race/ethnicity data are not available[11]—could be utilized to improve the data. Finally, data could be improved by encouraging more complete ascertainment of race and ethnicity in medical encounters.

Addressing disparities is not unique to immunization measurement, but it is an area in which disparities in coverage are well known. In addition to race and ethnicity, disparities also should consider socioeconomic status among other demographic characteristics. Collecting data related to disparities raises the question of how to define these terms (i.e., race, ethnicity), which is not specific to immunizations. Further exploration should consider recent work by NQF, which concerns the use of valid and reliable performance measures to address healthcare disparities and cultural competency in measurement.[12]

Recommendations

The committee recommended the following related to disparities for measure developers and providers:

- Gathering more robust information on disparities (e.g., through larger sample sizes or oversampling) for national surveys, such as BRFSS;
- Stratifying health plan, system- or ACO-level measures by race and ethnicity; and
- Promoting completeness of race and ethnicity data collection during health care encounters.

Outcome Measures

Outcome measures can demonstrate the impact and value of immunizations for preventing vaccine preventable disease, and health plans and employers use this type of information to quantify return on investment for immunization. However, the ability to obtain accurate outcome data from current tools, such as surveillance systems, especially when the disease is not reportable is unclear. While employers may have a cost/value proposition related to influenza immunization, one should exercise caution when using reduction in incidence of disease as measures of impact given the potential confounders, including

vaccine effectiveness. Further methodological investigation and research is warranted to develop outcome measures that sufficiently address such confounders.

While recognizing the inherent difficulty in measuring patient-reported outcomes, this is another area worthy of further investigation. Potentially significant patient-reported outcome measures may include amount of time missed from work or disability (such as reductions in activities of daily living) as a result of prolonged illness from vaccine-preventable diseases.

Composite Measures

Finally, the committee made overarching recommendations related to the development of composite measures. Composites often are easier for patients and policy makers to understand. The committee cautioned against all-or-nothing composite measures in which one cannot extrapolate data related to each component of the composite measure. While a single score from a composite is important to help drive performance, drilling down to the component level makes the measure actionable by creating a feedback loop to know where to focus quality improvement efforts. Harmonization of existing measures was discussed as a crucial first step related to the development of any composite measure.

[1]National Quality Forum (NQF). *NQF Report on Measure Gaps and Inadequacies*. Washington, DC: NQF, 2012. Available at http://www.qualityforum.org/Publications/2012/05/NQF_Report_on_Measure_Gaps_and_Inadequacies.aspx. Last accessed March 2014.

[2]National Quality Forum (NQF). *NQF Report on Measure Gaps and Inadequacies*. Washington, DC: NQF, 2012. Available at http://www.qualityforum.org/Publications/2013/03/2012_NQF_Measure_Gap_Analysis.aspx. Last accessed March 2014.

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[8]National Quality Forum (NQF). *Healthcare Disparities and Cultural Competency Consensus Standards: Disparities-Sensitive Measure Assessment*. Washington, DC:NQF;2012.

[9]Centers for Disease Control (CDC) website. Atlanta, GA:2012. Available at http://www.cdc.gov/vaccines/programs/iis/about.html. Last accessed March 2014.

[10]Centers for Disease Control (CDC) website. Atlanta, GA:2012. Available at http://www.cdc.gov/vaccines/programs/iis/annual-report-IISAR/index.html. Last accessed March 2014.

[11]Elliott MN, Fremont A, Morrison PA, et al. A New Method for Estimating Race/Ethnicity and Associated Disparities Where Administrative Records Lack Self-Reported Race/Ethnicity. *Health Serv Res*. 2008; 43(5 Pt 1):1772-1736.

[12]National Quality Forum (NQF). *Healthcare Disparities and Cultural Competency Consensus Standards: Disparities-Sensitive Measure Assessment*. Washington, DC:NQF;2012.

Appendix A: Adult Immunizations Committee and Staff Roster

COMMITTEE MEMBERS	
Roger Baxter, MD, FACP	Co-Director, Kaiser Permanente Vaccine Study Center
Howard Bregman, MD, MS	Clinical Director, Epic Model System
Eddy Bresnitz, MD, MSCE, FACP[ii]	Executive Director, Adult Vaccines, Global Vaccine Medical Affairs and Policy, Merck Vaccines
Jeffrey Duchin, MD	Chief, Communicable Disease Control, Epidemiology & Immunization Section Public Health – Seattle & King County
Jennifer Heath, RN, MPH	Immunization Outreach Nurse Specialist, Minnesota Department of Health
Robert Hopkins, MC, FACP, FAAP	Professor of Internal Medicine, University of Arkansas for Medical Sciences
Joseph Hunter, MD	Staff Physician, Methodist-Le Bonheur Healthcare (McClatchy Medical Center)
Janet Jennings, MS, BS	Director, Medical Informatics, Blue Care Network
Caroline Johnson, MD	Director, Division of Disease Control, Philadelphia Department of Public Health
Megan Lindley, MPH	Deputy Associate Director for Science, Immunization Services Division, Centers for Disease Control and Prevention
James McCabe, Dip, Pharm (SA) RPh	Corporate Director, Patient Care Services, Safeway Pharmacy
Ernest Moy, MD, MPH	Medical Officer, Agency for Healthcare Research and Quality
David Nace, MD, MPH	Director, Long Term Care, University of Pittsburgh Institute on Aging
Patricia Nuzzie, BS, LVN	Project Coordinator, The Immunization Partnership
Amir Qaseem, MD, PHD, MHA, FACP	Director, Clinical Policy, American College of Physicians
Laura Riley, MD, FACOG	Medical Director, Labor and Delivery, Massachusetts General Hospital
Douglas Shenson, MD, MPH, MS, MA	Associate Clinical Professor, Yale University School of Medicine
Sandra Sommer, PHD, MS, MT (ASCP)	Quality Assurance & Policy Manager, Virginia Department of Health
Samuel Stolpe, PharmD	Associate Director, Quality Initiatives, Pharmacy Quality Alliance (PQA, Inc.)
Litjen (L.J.) Tan, PhD	Chief, Strategy Officer, Immunization Action Coalition

[ii] After noting the vaccine effectiveness and the slow progress toward the Health People 2020 target, Dr. Bresnitz advised the committee of his conflict of interest and did not participate in the discussion of the herpes zoster vaccine.

NATIONAL QUALITY FORUM STAFF	
Karen Adams	Vice President, Strategic Partnerships
Reva Winkler	Senior Director, Performance Measures
Juliet Feldman	Project Manager, Strategic Partnerships
Taylor Myers	Administrative Assistant, Strategic Partnerships

DEPARTMENT OF HEALTH AND HUMAN SERVICES REPRESENTATIVES	
Cille Kennedy	Senior Policy Analyst, Office of the Assistant Secretary for Planning and Evaluation
Jody Sachs	Senior Scientist, National Vaccine Program Office
Shary Jones	Adult Immunizations Program Coordinator, National Vaccine Program Office

Appendix B: Conceptual Measurement Framework

The conceptual framework is built on age appropriate vaccinations consistent with the adult immunization schedule issued by the Advisory Committee on Immunization Practices (ACIP) and Centers for Disease Control and Prevention (CDC) and concepts of process and outcome measures, and the two critical purposes of federal measures: 1) quality improvement/provider accountability, and 2) population health and planning. The framework seeks to illustrate measure gaps in specific age bands and special populations including young adults, maternity, adults, and the elderly.

Definitions

Process (measure type): A healthcare service provided to, or on behalf of, a patient. This may include, but is not limited to, measures that may address adherence to recommendations for clinical practice based on evidence or consensus. Source: NQF Glossary

Outcome (measure type): The health state of a patient (or change in health status) resulting from healthcare— desirable or adverse. Source: NQF Glossary

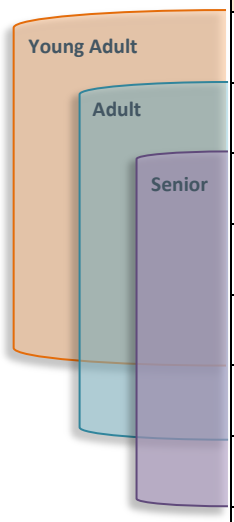
Composite measure: A combination of two or more component measures, each of which individually reflects quality of care, into a single performance measure with a single score. Source: NQF Glossary

Level of analysis: Level(s) at which measurement is assessed. Source: NQF Glossary

> **Provider-level measures**: Performance measures for which the level of analysis is a provider of healthcare services that is accountable for the care delivered to their patients, e.g., clinician, hospital, clinic, health plan, pharmacies, etc. Source: NQF Staff
>
> **Population-level measures**: Performance measures for which the level of analysis is a community or other individuals defined by geography that are appropriate for government, community, healthcare system and multistakeholder accountability, including measures that can be utilized and assessed at multiple levels of analysis including state, county, city, and/or community. Source: NQF report "Population Health Endorsement Maintenance: Phase II, December 2012"
>
> **Employer/facility-level measures:** Performance measures for which the level of analysis is the facility or employment setting that is accountable for ensuring appropriate immunizations for healthcare personnel. Source: NQF Staff

Age groups: Specific age ranges for targeted vaccine delivery. Source: Adult Immunization Schedule

> **Young adult**: Female – age 19-26 years; Male – 19-21 years
>
> **Adult**: 19-64 years
>
> **Senior**: ≥ 65 years
>
> To illustrate the measurement gaps, measure counts from the environmental scan were incorporated into the framework.
>
> (*#) denotes number of NQF endorsed measures.

AGE GROUP	VACCINE	PROVIDER-LEVEL		POPULATION-LEVEL	
		PROCESS	OUTCOME	PROCESS	OUTCOME
	HPV	2			4
	MMR				9
	Influenza	51 (*9)		26 (*1)	1
	TD/Tdap	3			
	Varicella				
	Zoster	1		3	
	Pneumococcal	36 (*6)	5 (*2)	11	9 (*1)
	Composite - immunizations only	3	1	6	2
	Composite - immunization with preventive care				

SPECIAL POPULATIONS	VACCINE	PROVIDER-LEVEL		POPULATION-LEVEL	
		PROCESS	OUTCOME	PROCESS	OUTCOME
Maternity	Influenza	1		3	
	Tdap				
	Composite				
Diabetes	Influenza	3			
	Pneumococcal	1			
	Hepatitis B				
	Composite				
	General	1			
Chronic liver disease	Hepatitis A and B	6		1	6
	Composite				

Heart disease, chronic lung disease, chronic alcoholism	Influenza	**4**			
	Pneumococcal	**2**			
	Composite	**1**			
Community Acquired Pneumonia	Influenza	**4**	**1**		
Kidney failure, ESRD, dialysis	Influenza	**6**			
	Pneumococcal	**2**			
	Hepatitis B	**1**		**1**	
	Composite				

		PROVIDER-LEVEL		**POPULATION-LEVEL**	
SPECIAL POPULATIONS	**VACCINE**	**PROCESS**	**OUTCOME**	**PROCESS**	**OUTCOME**
Immunocompromised (except HIV)	Influenza	**1**			
	Td/Tdap				
	HPV				
	Pneumococcal				
	Composite	**2**			
HIV/AIDS	Influenza	**2**			
	Pneumococcal	**2**			
	Hepatitis B	**6**			
	Other Infections Disease	**1**			
	Composite				
MSM	Hepatitis A and B			**1**	**2**
	Composite				

HEALTHCARE PERSONNEL	EMPLOYER/FACILITY – LEVEL		POPULATION - LEVEL	
VACCINE	PROCESS	OUTCOME	PROCESS	OUTCOME
Influenza	7			
Hepatitis B			2	
Tdap				
MMR				
Varicella				
Zoster				
Composite				

IMMUNIZATION INFORMATION SYSTEMS (IIS)

PROVIDER-LEVEL	SYSTEM-LEVEL
3	4

Appendix C: Adult Immunization Measure Gap Areas

NQF staff used the conceptual framework to identify potential measure gaps in the areas specified by HHS in the contract. Committee members were encouraged to prioritize them and suggest additional gaps using a survey tool as part of preparation for the March 31-April 1 meeting. The following list of potential gaps for prioritization considered by the committee in their initial prioritization exercise. The committee's initial results are presented in Appendix E.

Adult Vaccines for which there are no NQF-endorsed Measures

- Measures for zoster vaccination
- Measures for Td/Tdap vaccination
- Measures for varicella vaccination
- Measures for "catch-up vaccination" (HPV, MMR)

Vaccines for Specific Age Bands

Ages 19-59 years:

- Measures for HPV "catch-up"
- Measures for meningococcal vaccination in appropriate patients
- Measures for Td/Tdap

Ages 60-64 years:

- Measures for zoster vaccination
- Measures for Td/Tdap vaccination

Ages 65+ years:

- Measures for zoster vaccination
- Measures for Td/Tdap vaccination

Vaccines for Special Populations

Pregnancy:

- Measures for Tdap vaccination
- Measures for Influenza vaccination (most current flu measures exclude pregnant patients)
- Measures for Tdap and influenza vaccination
- Measures for Post-partum varicella vaccination

Diabetes:

- Measures for Hepatitis B vaccination

Kidney failure/ESRD:

- Measures for Hepatitis B vaccination

Chronic liver disease:

- Measures for Hepatitis A vaccination
- Measures for Hepatitis B vaccination

Vaccines for Healthcare Personnel

- Measures for hepatitis B
- Composite measure for flu and Hep B

Composite Measures of Adult Immunization

- An "up to date for all age-appropriate vaccines" measure for all adults
- Composite measure of required vaccines for different age groups, i.e., 19-59 years, 60-64 years, 65+ years
- Composite measure(s) for preventive care that include vaccinations
- Composite measures for special populations that include vaccination with other important care processes for a disease or condition

Outcome Measures

- Patient-reported outcome measures
- Outcome measures for health plans, systems or ACOs, e.g., hospitalizations, morbidity, mortality or resource use, for vaccine preventable diseases.

Immunization Information Systems

- Measures of proportion of providers that submit adult immunization information to an IIS via EHR or other means).
- Measures of other vaccine providers (pharmacies, occupations health clinics, etc.) that submit adult immunization information to an IIS.
- States that track adult immunizations in their registry.

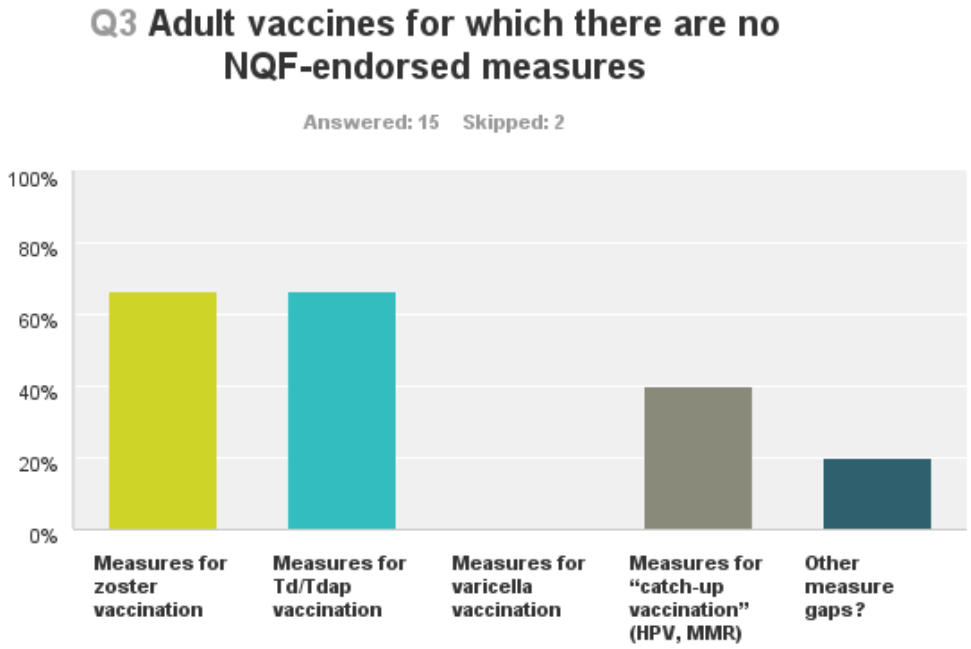
Appendix D: Key Informants

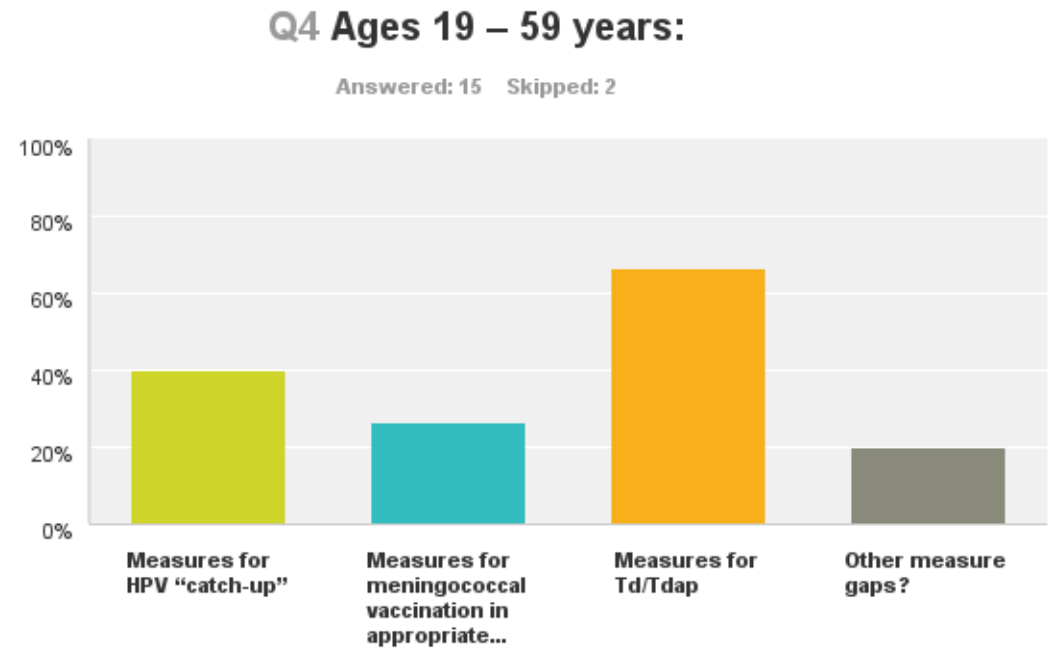
NQF staff interviewed the following individuals to explore specific aspects of adult immunizations performance measurement to provide additional input to the committee prior to their in-person meeting.

KEY INFORMANTS	
Andrew Baskin, MD	National Medical Director for Quality and Provider Performance Measurement, Aetna
Howard Bregman, MD, MS	Clinical Director, Epic Model System
Sepheen Byron, MHS	Director, Performance Measurement, National Committee for Quality Assurance
Jim Daniel, MPH & Lauren Wu, MHS	Public Health Coordinator & Policy Analyst, HHS Office of the National Coordinator for Health Information Technology
Amy Groom, MPH	Immunization Program Manager, Indian Health Services
Senka Hadzic, MPH	Immunizations Program Manager, Institute for Clinical Systems Improvement
Troy Knighton, M.Ed., Ed.S., LPC et al	National Seasonal Flu & IDPIO Program Manager, Veterans Administration
Karen Nielsen, MBA, MPA et al	R&D, Analytics and Business Intelligence, Siemens Medical Solutions
Lee Partridge	Senior Health Policy Advisor, National Partnership for Women and Families
Gary Urquhart, MPH	Chief, Immunization Information Systems Support Branch, Centers for Disease Control and Prevention

Appendix E. Preliminary Prioritization of Measure Gaps

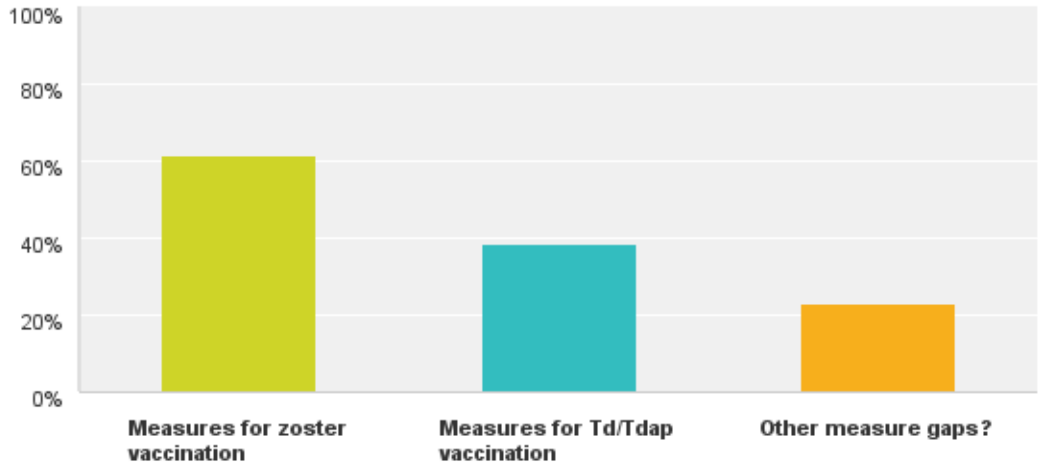
The committee used an iterative process to arrive at their recommendations on measure gaps. Below are the committee's initial prioritization results which informed the in-person meeting discussions.





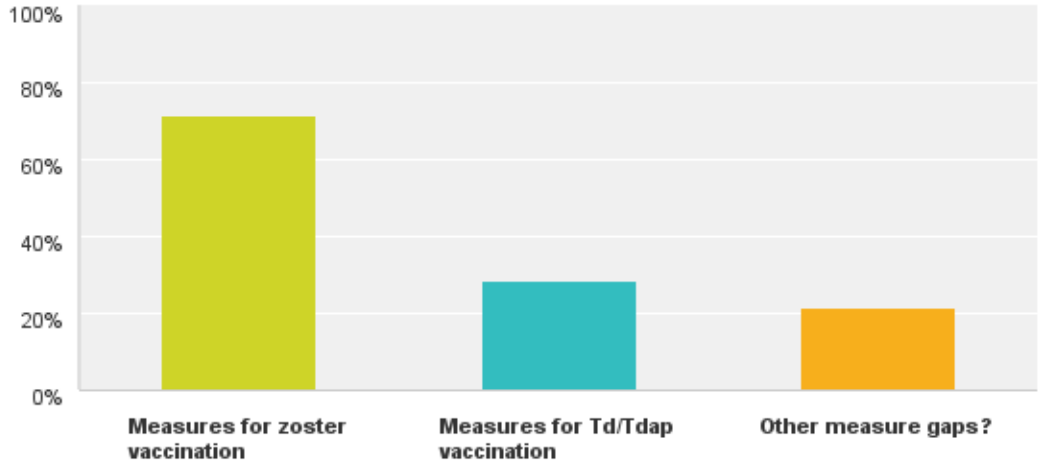
Q5 Ages 60-64 years:

Answered: 13 Skipped: 4



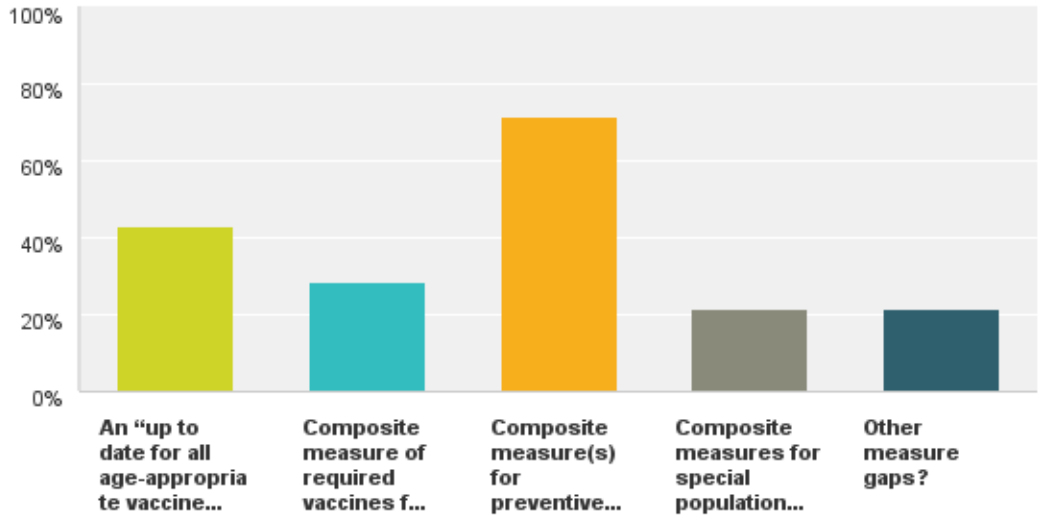
Q6 Ages 65+ years:

Answered: 14 Skipped: 3



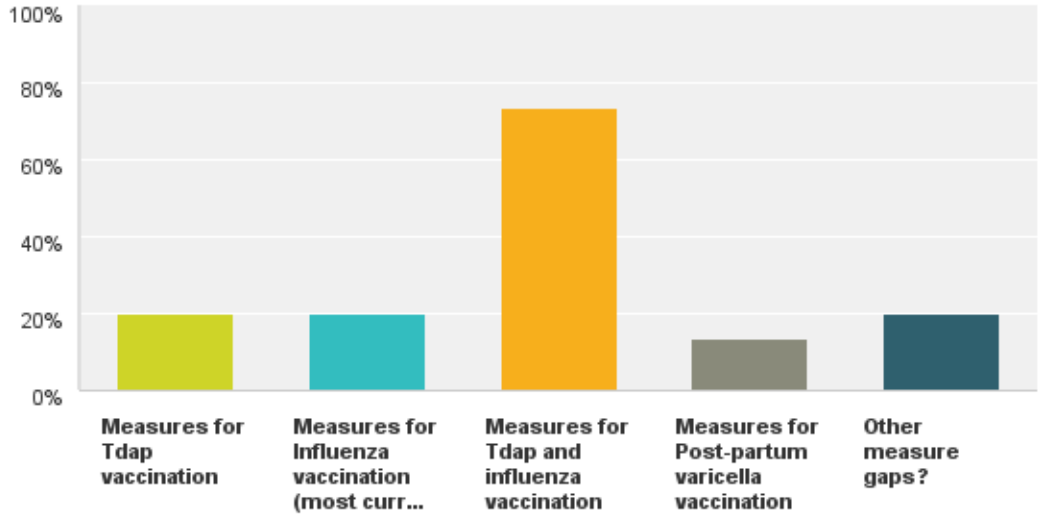
Q12 Composite measures of adult immunization

Answered: 14 Skipped: 3



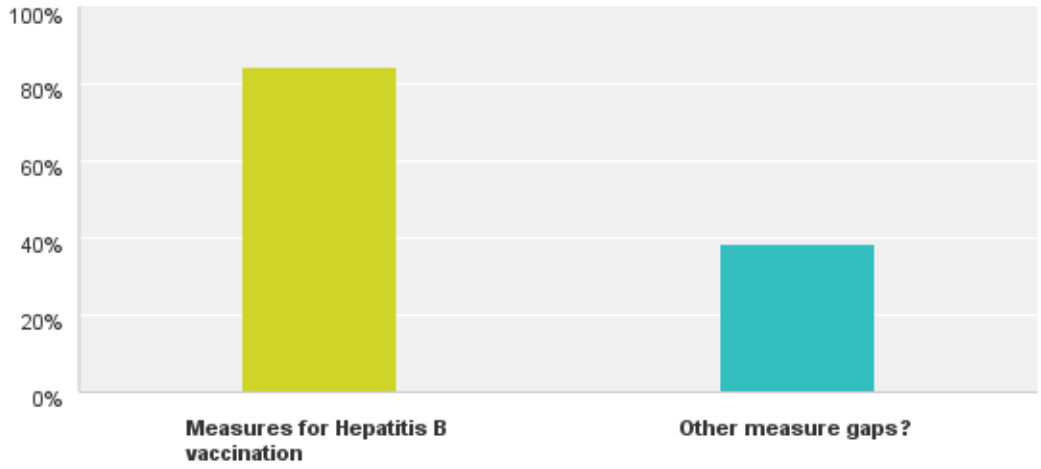
Q7 Pregnancy:

Answered: 15 Skipped: 2



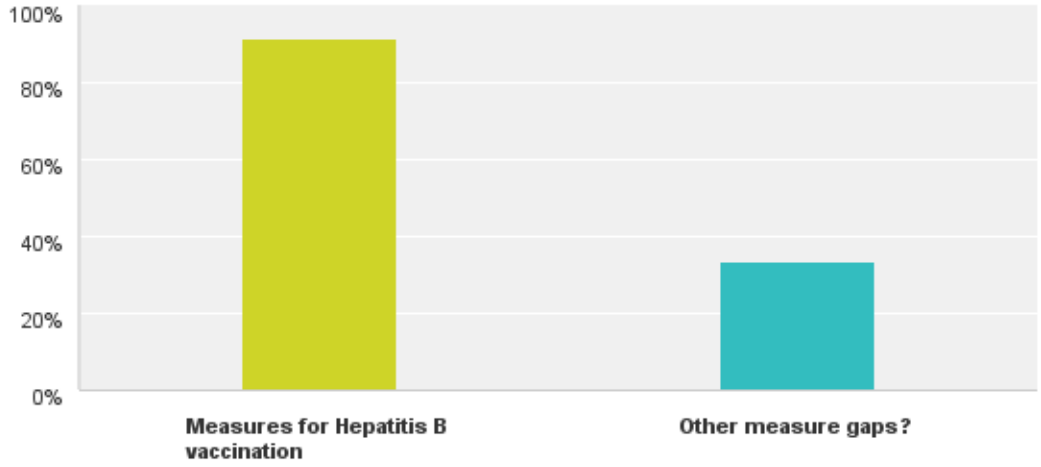
Q8 Diabetes:

Answered: 13 Skipped: 4



Q9 Kidney failure/ESRD:

Answered: 12 Skipped: 5



Q10 Chronic liver disease:

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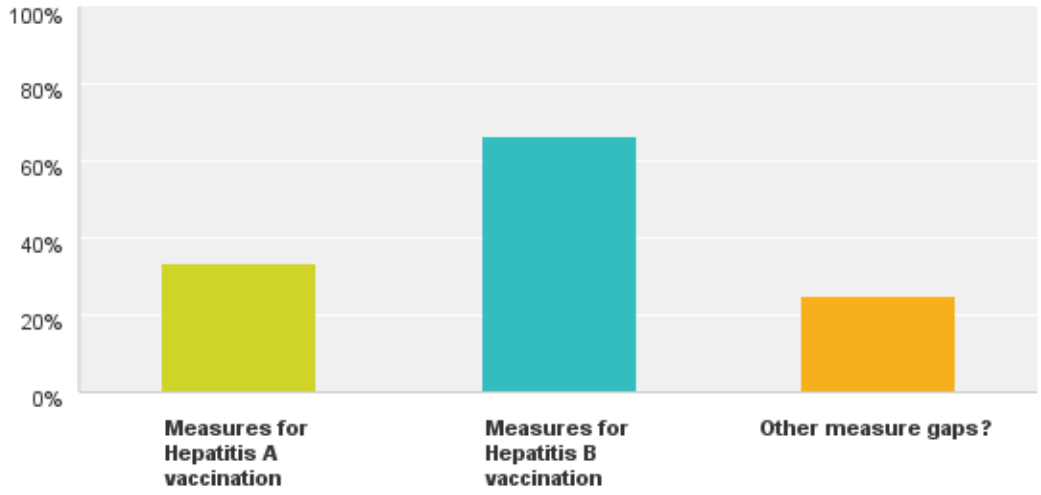

Q13 Outcome measures

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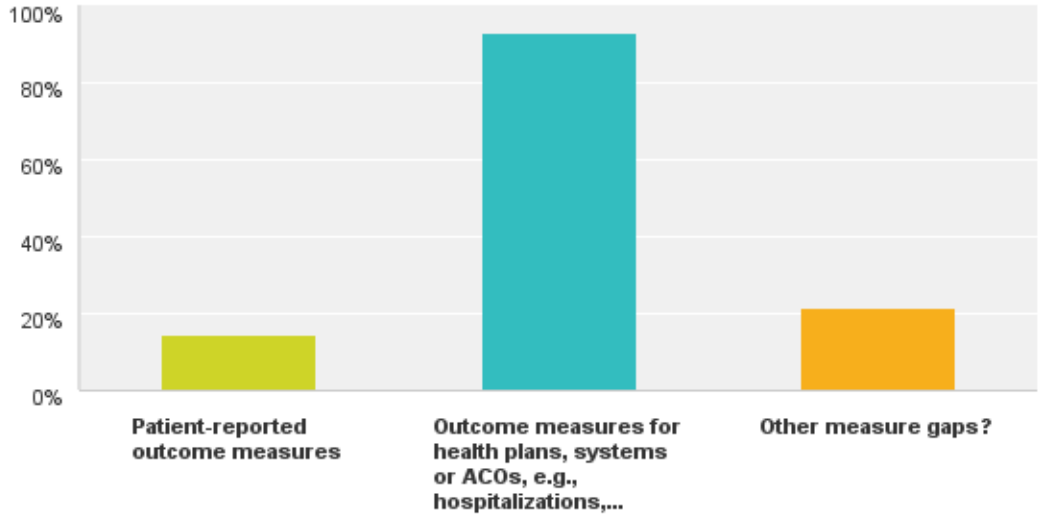

Q11 Vaccines for healthcare personnel

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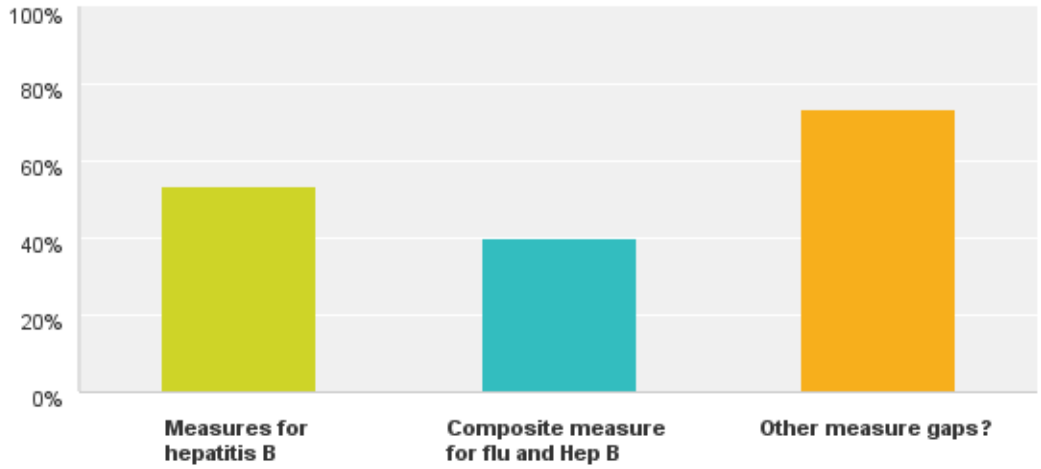

Q14 Immunization Information Systems

Answered: 15 Skipped: 2