MEETING OF THE ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES (ACIP)

JUNE 25-26, 2025
MEETING SUMMARY

Trade names are used for identification purposes only and do not indicate endorsement.

WEDNESDAY: JUNE 25, 2025

WELCOME AND INTRODUCTIONS

Call to Order/Roll Call

Dr. Martin Kulldorff, Chair of the ACIP, convened the meeting on June 25, 2025. He welcomed the members, thanked the current and former committee members and CDC staff, and emphasized the committee's commitment to evidence-based vaccine recommendations. Dr. Kulldorff stressed the importance of open scientific inquiry, rebuilding public trust, and addressing vaccine safety transparently to support public health.

Dr. Mina Zadeh (ACIP Executive Secretary, CDC) made opening announcements about the availability of presentation slides on the ACIP website, the scheduled oral public session, and the written public comment process. She reviewed conflict of interest policies for ACIP members. A list of Members, Ex Officios, and Liaison Representatives is included in the appendices at the end of this summary document. She welcomed the new committee members who introduced themselves: Dr. Martin Kulldorff, Dr. Joseph Hibbeln, Dr. Retsef Levi, Dr. Robert Malone, Dr. Cody Meissner, Dr. James Pagano, and Dr. Vicky Pebsworth. While no conflicts of interest were identified for the first day of the meeting, Dr. Vicky Pebsworth disclosed that she owns stock in a healthcare sector fund that includes holdings relevant to ACIP discussions, including vaccine manufacturers. However, the value of this stock falls below the Office of Government Ethics' de minimis threshold. Dr. Pebsworth confirmed that she understood, and therefore, she is permitted to participate fully in the ACIP meeting.

UPDATE ON WORK GROUPS

Dr. Kulldorff emphasized the critical role of ACIP work groups, which are composed of national experts who investigate vaccine-related issues and provide recommendations to the committee. New chairs are being appointed to lead these groups, while many current members will continue their work to ensure continuity and progress. There are currently 11 active work groups focusing on vaccines for chikungunya, COVID-19, cytomegalovirus, HPV, influenza, meningococcal disease, pneumococcal disease, and RSV. Dr. Kulldorff announced plans to establish new work groups, including one to evaluate the cumulative childhood and adolescent vaccine schedules. This group will assess potential interactions between vaccines, the total number of vaccines administered, ingredient amounts, and the timing of administration. The National Academy of Medicine has previously called for additional research in this area. Another new work group will review vaccines that have not been formally reassessed in over seven years, a practice intended to be routine but not yet systematically implemented. Future topics for review may include the timing of the hepatitis B birth dose, whether separate MMR and varicella vaccines should be preferred over the combined MMRV due to seizure risks, and the possibility of considering alternative MMR vaccines used in other countries. Dr. Kulldorff emphasized the importance of collaboration, open scientific discussion, and a commitment to evidence-based medicine in enhancing public health outcomes.

COVID-19 VACCINES

Dr. Adam MacNeil (CDC/NCIRD) provided a recap to summarize events of the past year. Last June, ACIP recommended the 2024–2025 COVID-19 vaccination for all individuals aged 6 months and older. In August, the FDA authorized or approved Moderna, Pfizer, and Novavax COVID-19 vaccines, and in September, ACIP's recommendations and CDC vaccination guidance were published in the Morbidity and Mortality Weekly Report (MMWR).

At the October 2024 ACIP meeting, the committee recommended additional doses for adults aged 65 and older and for individuals aged 6 months and older with moderate or severe immunocompromise. These recommendations were published in the MMWR in December 2024. As has been customary following changes in recommendations, CDC updated its interim clinical considerations accordingly.

The CDC updated its recommendations in May 2025. Per HHS directive, guidance shifted to shared clinical decision-making for healthy children aged 6 months through 17 years, and no recommendation was provided for pregnant individuals. Also in May, the FDA approved Novavax's NUVAXOVID (2024–2025 Formula) and Moderna's MNEXSPIKE (2024–2025 Formula) for individuals aged 12–64 at high risk for severe COVID-19, and for all individuals aged 65 and older.

On May 22, 2025, FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC) met to discuss strain selection for the 2025–2026 COVID-19 vaccine formula. FDA subsequently advised manufacturers to use a monovalent JN.1-lineage-based antigen composition, preferably the LP.8.1 strain.

Dr. MacNeil provided an overview of the current routine COVID-19 vaccine schedule by age group. Children aged 6 months to 4 years who are unvaccinated may receive a multidose initial series with a 2024–2025 COVID-19 mRNA vaccine, using shared clinical decision-making. Those who have previously completed an initial series may receive one dose of a 2024–2025 mRNA vaccine from the same manufacturer, under shared clinical decision-making.

Individuals aged 5–17 years may receive one age-appropriate dose of a 2024–2025 COVID-19 vaccine using shared clinical decision-making. Adults aged 18–64 years should receive one dose of any 2024–2025 COVID-19 vaccine, while those aged 65 and older should receive two doses of any 2024–2025 COVID-19 vaccine, spaced six months apart.

The current recommendations for individuals with moderate or severe immunocompromise were also reviewed. Those who are unvaccinated should receive a multidose vaccination series with an age-appropriate 2024–2025 COVID-19 vaccine, followed by one additional 2024–2025 vaccine dose six months after completing the initial series.

Individuals who have previously completed an initial series should receive two doses of an age-appropriate 2024–2025 COVID-19 vaccine, spaced six months apart. Additional age-appropriate 2024–2025 COVID-19 vaccine doses may be administered under shared clinical decision-making.

It was noted that COVID-19 vaccines have had interim recommendations since 2020, developed with the understanding they would be revisited as new information became available.

In recent years, the work group explored non-universal recommendations, which would apply only to specific age or risk groups. At the ACIP meetings in September 2023 and June 2024, the work group presented interpretation summaries outlining discussions on universal versus non-universal policy options for the 2023–2024 and 2024–2025 vaccines, respectively.

Based on the available evidence and implementation considerations, a universal recommendation was ultimately supported. Since November 2024, the work group has discussed recommendations for the 2025–2026 season. At the April 2025 ACIP meeting, members considered adopting a non-universal recommendation.

Dr. MacNeil summarized that between November 2024 and June 2025, the COVID-19 work group reviewed epidemiology and disease burden, vaccine effectiveness, safety, and implementation considerations. At the most recent work group meeting on June 5 and follow-up polling, the group agreed on recommendation categories for the 2025–2026 COVID-19 vaccines. These include age-appropriate vaccination for all infants and children aged 6–23 months, as well as for individuals aged 2–64 years who are at high risk for severe COVID-19 (including pregnant individuals), those at high risk of exposure, and those who desire additional protection under shared clinical decision-making. The group also supported a recommendation for two doses of the 2025–2026 COVID-19 vaccine for adults aged 65 and older, as well as for individuals aged 6 months and older with moderate or severe immunocompromise.

Dr. Adam MacNeil (CDC/NCIRD) provided an update on the current epidemiology of COVID-19. CDC estimates that since October 1, 2024, there have been between 9.8 and 16.1 million COVID-19–associated illnesses, 2.4 to 3.8 million outpatient visits, 270,000 to 440,000 hospitalizations, and 32,000 to 51,000 deaths related to COVID-19.

Long COVID remains a significant public health concern. 2023 national surveys estimated that approximately 9.2 million adults and 0.3 million children in the United States had long COVID. Among adults, 3.6% reported current long COVID symptoms and 8.4% reported ever having long COVID. Among children, 0.4% reported current symptoms, and 1.4% reported having the condition at some point in their lives. More than three in five adults and nearly four in five children with long COVID reported experiencing activity limitations due to their symptoms.

COVID-NET, a population-based surveillance system that monitors laboratory-confirmed COVID-19–associated hospitalizations, was used for the presentation. It is part of the Respiratory Virus Hospitalization Surveillance Network, along with RSV-NET and FluSurv-NET, and includes >300 hospitals in 185 counties across 13 states. The surveillance area represents approximately 10% of the U.S. population. Hospitalizations are included if a positive COVID-19 test occurs within 14 days before admission or during hospitalization. Basic demographic data are collected for all patients, and detailed clinical data are gathered from a random sample stratified by age and site. Seasons are defined in the presentation as July 2024–June 2025 for rates, and clinical data reflect the most recent 12-month period, from April 2024 through March 2025.

COVID-19–associated hospitalization rates tend to peak both in the winter and the summer. This pattern differs from RSV and influenza, which generally follow a more consistent seasonal trend with a single peak, typically in the winter. Cumulative COVID-19–associated hospitalization rates for the July 2024–May 2025 period were higher during summer and fall 2024 and lower during the winter months compared to July 2023–June 2024. From July 2024 to April 2025, a period that included a high severity influenza season, more infants <1 year and adults ≥75 years of age had hospitalizations associated with COVID-19 than influenza. Cumulative COVID-19-associated hospitalization rates are highest among adults aged ≥75 years, followed by adults aged 65–74 years and infants aged <6 months.

The weekly number of COVID-19–associated deaths reported to the CDC in the United States from June 8, 2024, to June 7, 2025, showed a decreasing trend and remained low in the winter. Deaths during the winter were lower than those reported in the summer and fall of 2024. The number of deaths with COVID-19 listed as the underlying cause of death from July 2024 to June 2025 showed that while COVID-19 causes deaths across all age groups, 70% occurred in

adults aged 65 and older. Death certificate data likely underestimates COVID-19-associated deaths. Among in-hospital deaths in patients with laboratory-confirmed SARS-CoV-2, the proportion with a COVID-19 cause of death listed decreased from 95% in 2020 to 60% in 2022–2023. CDC estimates that since October 1, 2024, between 32,000 and 51,000 people have died in the United States from COVID-19.

The highest rates for COVID-19 in the New Vaccine Surveillance Network were observed in infants <6 months of age.

More than half of pediatric COVID-19-associated hospitalizations in COVID-NET occur in children aged <2 years. COVID-19 causes severe disease in infants younger than 6 months, who have the highest rates of COVID-19–associated hospitalization among all pediatric age groups. During July 2024 to May 2025, the cumulative COVID-19–associated hospitalization rate among infants was 268 per 100,000, comparable to the rate of 266 per 100,000 among adults aged 65–74 years. As noted earlier in the presentation, hospitalization rates are higher among those aged >75 years and lower among those aged <65 years.

Among infants <6 months old who were recently hospitalized for COVID-19, 22% were admitted to the ICU, 71% had no underlying medical conditions, and only 3.5% had any record of maternal COVID-19 vaccination during pregnancy. No COVID-19 vaccine products are approved for use in infants <6 months, so any protection must come from transfer of maternal antibodies, either from vaccination during pregnancy or prior infection.

Among vaccine-eligible children and adolescents ages 6 months–17 years, 41% of COVID-19-associated hospitalizations occurred among children ages 6–23 months.COVID-19-associated cumulative hospitalization rates are highest among the youngest age groups. The youngest age groups have comparable rates of cumulative COVID-19-associated hospitalization to some adult age groups, but direct comparisons are challenging. While most adults aged 50–64 years admitted for COVID-19 had underlying medical conditions, more than half of children aged 6–23 months were otherwise healthy prior to their COVID-19 hospitalization.

Among children aged 6–23 months hospitalized for COVID-19, 54% had no underlying medical conditions. Among those with an underlying condition, the most common was prematurity. In the three older pediatric age groups (ages 2–17 years), >70% of hospitalized children and adolescents had at least one underlying condition, with asthma or reactive airway disease and neurologic disorders being the most common. The proportion of hospitalized children with no underlying medical conditions decreases with increasing age.

One in four children aged <18 years hospitalized for COVID-19 required ICU admission. Among children <2 years who were admitted to the ICU, the majority (53%) had no underlying medical conditions. 89% of COVID-19 vaccine-eligible children and adolescents who were hospitalized with COVID-19 had no record of receiving the most recent recommended COVID-19 vaccines.

From July 2024 to June 2025, the number of COVID-19–associated deaths among children <2 years was similar to the number of influenza-associated deaths. Among children aged 2–17 years, influenza-associated deaths were higher. COVID-19 deaths are likely underestimated, as pediatric flu deaths were nationally notifiable during this period, while pediatric COVID-19 deaths were not.

Since March 2020, 128 COVID-19–associated deaths among children and adolescents have occurred within the COVID-NET catchment area, either during hospitalization or within 30 days after discharge. Of the 25 pediatric deaths reported since July 2023, 10 occurred during the most recent 12-month period from April 2024 through March 2025. These are raw counts, and the COVID-NET catchment area represents approximately 10% of the U.S. population.

Among the 25 deaths since July 2023, 52% were in children <2 years, and 72% had at least one underlying condition. Of the 16 children eligible for COVID-19 vaccination, 14 had no vaccination record, and none were up to date. Death certificate data reporting to COVID-NET is delayed. Among the 25 most recent deaths with complete mortality data, 28% had COVID-19 listed as a specific cause of death, while an additional nine deaths were attributed to other respiratory or circulatory causes.

Dr. MacNeil summarized that most pediatric COVID-19 hospitalizations occur in children <2 years old, and many of these children have no underlying medical conditions, including 71% of infants <6 months and 54% of children aged 6–23 months. Hospitalization rates are highest among infants <6 months, followed by those aged 6–23 months. Rates among infants <6 months of age are comparable to those of adults aged 65–74 years. No COVID-19 vaccine products are approved for infants <6 months, so any protection must come from maternal antibody transfer through vaccination during pregnancy or prior infection. Outcomes among hospitalized children can be severe, with 1 in 4 admitted to the ICU. COVID-19–associated deaths continue to occur among infants and children, and the majority of hospitalized, vaccine-eligible children and adolescents had no record of receiving the most recently recommended vaccine.

Adults ages ≥65 years comprise more than 2/3 of all COVID-19–associated hospitalizations among adults. Most adults hospitalized for COVID-19 have ≥1 underlying medical condition; a majority have ≥2. Among adults hospitalized for COVID-19, 15% were admitted to the intensive care unit (ICU). During this period, 85% of all adults hospitalized with COVID-19 who died in-hospital were ages ≥65 years.

Moving to COVID-19 hospitalizations among adults. Among adults hospitalized for COVID-19 from October 2024 through March 2025, vaccination status varied by age group. For adults aged 65 years or older hospitalized for COVID-19, 65% had received neither the 2023–2024 nor the 2024–2025 COVID-19 vaccine. One-third of the patients had received at least one dose of the 2024–2025 vaccine before admission, and 17% had received two doses.

Pregnancy status was collected for women aged 15–49 years who were hospitalized with a laboratory-confirmed SARS-CoV-2 infection. Of those hospitalized, 28.5% were pregnant, and 50% of these had COVID-19-related signs or symptoms. Among 131 hospitalized pregnant women with confirmed infection and symptoms, 50% had no underlying medical conditions. At discharge, 68% were no longer pregnant. Among these, 83% had a healthy newborn, 11% had a preterm birth, 1% had an ill infant, and 5% experienced pregnancy loss. Vaccination coverage was low, with 92% having no record of receiving a COVID-19 vaccine since July 1, 2023, and only 5.8% having received a recommended 2024–2025 COVID-19 vaccine dose.

Dr. MacNeil summarized the adult data by noting that rates of COVID-19–associated hospitalization are highest among the oldest adult age groups. Adults aged ≥65 years accounted for 72% of adult COVID-19—associated hospitalizations, and those aged ≥75 years made up 50%. Although hospitalization rates have decreased over time, cumulative rates among adults aged 75 years and older remain high. The risk of COVID-19–associated hospitalization continues year-round, with peaks in both winter and summer.

Among adults aged ≥65 years hospitalized with COVID-19, 65% had no record of receiving one or more doses of the recommended 2024–2025 COVID-19 vaccine before admission. Most adults hospitalized for COVID-19 had at least one underlying medical condition, and the majority had two or more.

Among SARS-CoV-2-positive pregnant women admitted from April 2024 to March 2025 with COVID-19–related symptoms at admission, half had no underlying medical conditions, and 92% had no record of COVID-19 vaccination since July 1, 2023.

The last part of the epidemiology presentation was on SARS-CoV-2 genomics. Since SARS-CoV-2 emerged in late 2019, the virus has continued to evolve with accumulating substitutions in the spike protein, which binds to the ACE2 receptor and is the main target for neutralizing antibodies. Over time, there have been periods of gradual genetic drift as well as more significant shifts when new lineages emerged with numerous changes.

The first major shift occurred in late 2021 to early 2022, with the transition from the Delta variant to Omicron. Subsequent shifts included the emergence of XBB lineages from BA.4 and BA.5 viruses, and more recently from XBB to JN.1. These shifts necessitated updates to the COVID-19 vaccine formulation to ensure continued protection.

In winter 2023-2024, we observed a strain replacement of XBB.1.5-like viruses to JN.1-like viruses. Since the emergence of JN.1, SARS-CoV-2 lineages have continued to evolve from this variant, but no complete strain replacement has been observed. All lineages that have predominated since the emergence of JN.1 are currently descendants of JN.1.

LP.8.1, XFC, and NB.1.8.1 are JN.1 lineage viruses. When comparing amino acid substitutions in the spike protein to the 2024–2025 COVID-19 vaccine formulation, there are only 2 to 4 changes in the receptor binding domain. In contrast, circulating viruses last summer had 13 or more changes in the spike receptor binding domain compared to the vaccine formulation at that time.

Dr. MacNeil summarized that current circulating SARS-CoV-2 viruses are descendants of JN.1, with 2 to 3 substitutions in the spike receptor binding domain compared to the KP.2 spike. These viruses are effectively neutralized by serum from individuals who received the 2024–2025 COVID-19 vaccine. Antigenic cartography shows that JN.1 viruses are antigenically similar. In May 2025, FDA's VRBPAC reviewed genomic and phenotypic data and unanimously recommended a monovalent JN.1-lineage vaccine for the 2025–2026 vaccine. FDA has advised manufacturers to use a JN.1-based vaccine, preferentially using the LP.8.1 strain.

Dr. Adam MacNeil (CDC/NCIRD) provided an update on vaccine effectiveness. For respiratory viruses, the CDC primarily uses case-control studies, including the test-negative design (TND), to measure vaccine effectiveness (VE). In the TND, individuals seeking care for respiratory illness are included. Cases are those who test positive for SARS-CoV-2, and controls are those who test negative.

Controls represent the population from which cases arise and help estimate COVID-19 vaccine coverage among people seeking care for respiratory illness. By comparing vaccination status between cases and controls, we determine VE. Higher vaccine coverage among controls suggests the vaccine provides protection. Because both groups sought care for similar symptoms, this design helps reduce confounding factors, such as age and geography, thereby clarifying the relationship between vaccination and illness.

VE results were shared from three CDC platforms. The VISION Network, one of the platforms, encompasses data from over 300 emergency departments (ED) and urgent care (UC) clinics, as well as more than 200 hospitals nationwide. It uses a test-negative design to evaluate VE among individuals of all ages with COVID-19–like illness. Cases tested positive for SARS-CoV-2 and did not positive for RSV or influenza. Controls tested negative for SARS-CoV-2 did not test positive for influenza or RSV, depending on age. Vaccination status is confirmed through electronic health records and immunization registries.

The second VE platform, the Overcoming COVID-19 Network, focuses on children, with enrollment at 26 pediatric hospitals across 20 states. The analysis presented assessed the effectiveness of COVID-19 vaccination during pregnancy in preventing COVID-19–related hospitalizations in infants under 6 months of age.

The third VE platform, the IVY Network, includes 26 hospitals across 20 states. Like VISION, IVY uses a test-negative design but with active enrollment, including patient interviews and nasal swabs. The analysis focused on adults aged ≥18 years hospitalized with COVID-19–like illness. Cases tested positive for SARS-CoV-2, while controls tested negative for SARS-CoV-2, influenza, and RSV. Vaccination history was determined through medical records, registries, and plausible self-report, with specimens collected for central testing and sequencing.

COVID-19 VE measurement approaches have evolved over the years. Initially, absolute VE was used to compare outcomes in vaccinated versus unvaccinated individuals. During the bivalent vaccine era, relative VE was also measured, comparing outcomes between different vaccine types (e.g., bivalent vs. original monovalent). For the 2023–24 and 2024–25 COVID-19 vaccines, VE estimates combine both approaches by comparing disease frequency in individuals who received the current vaccine with that in individuals who did not, regardless of their prior vaccination or infection history. This method aligns with how seasonal influenza VE is measured and reflects the added benefit of annual vaccination.

COVID-19 vaccination coverage in children remained low during both the 2023–24 and 2024–25 seasons. Coverage was similar across both years, with the lowest rates observed among children aged 6 months to 4 years in the 2024–25 season.

COVID-19 vaccine uptake among adults aged ≥18 years was just under 25% by the end of August 2024 for the 2023-2024 vaccine and the end of April 2025 for the 2024-2025 vaccine. Coverage for the 2024–2025 vaccine began increasing slightly earlier due to earlier recommendations and availability, but reached a similar overall level to 2023-2024 coverage by the end of April 2025.

Among Medicare fee-for-service beneficiaries aged ≥65 years, overall COVID-19 vaccination coverage for the 2024–25 season reached 28% by January 2025. Coverage was highest in beneficiaries with immunocompromising conditions (32%) and lowest in those without underlying medical conditions (24%).

For the 2023–24 season, COVID-19 VE against ED and UC visits was evaluated through August 2024 in VISION. The reference group included individuals who did not receive a 2023–24 vaccine. For those aged ≥5 years, this included unvaccinated individuals and those who had only received monovalent or bivalent doses. For children aged <5 years, both vaccinated and comparison groups had to complete an initial series. VE was generally comparable across age groups, with estimates for children being similar or higher than those for adults, consistent with trends observed in previous seasons.

For the 2024–25 season, COVID-19 VE against ED and UC visits was assessed for the 7 to 179 days post-vaccination period in VISION. Due to the lower number of COVID-19 cases, VE could not be stratified by time since the doses were administered. Overall, VE appeared similar or higher in children compared to adults, consistent with findings from the 2023–24 season.

Between March 2022 and May 2023, maternal COVID-19 vaccination was shown to be effective in protecting infants under 6 months of age from COVID–19–associated hospitalization, based on data from the Overcoming COVID-19 Network. Infants in this age group are not eligible for vaccination and are at higher risk of severe disease. VE was 54% during the first two months of life and 35% during the first five months. Effectiveness declined with time since maternal vaccination, consistent with patterns seen in older children and adults.

Among pregnant women aged 18–45 years in VISION, COVID-19 VE against ED and UC visits was highest when the dose was received during pregnancy, providing 52% protection. A dose received <6 months before pregnancy provided 28% protection, while a dose given ≥6 months before pregnancy was not statistically different from zero. These data, collected during 2022 and 2023 when Omicron was the dominant variant, reflect the pattern seen in non-pregnant adults and children, where more recent vaccination offers the greatest protection.

For the 2023–24 monovalent COVID-19 vaccines, VE in pregnant women (median 77 days post-vaccination) was similar to VE in non-pregnant women aged 18–45 years (median 83 days post-vaccination) in VISION. Due to limited statistical power, VE by time since dose could not be assessed.

During the 2024–25 season, COVID-19 VE against ED and UC encounters among adults aged ≥18 years was 34% overall for the 7–179 days following vaccination in VISION. VE was 36% for 7–59 days, 35% for 60–119 days, and 28% for 120–179 days post-vaccination. VE was similar between adults aged 18–64 years and those aged ≥65 years. Among individuals in the reference group who did not receive a 2024–25 COVID-19 vaccine, the median time since their last dose was approximately 1,000 days.

COVID-19 VE against hospitalization among adults aged ≥65 years without documented immunocompromising conditions was similar in both the VISION and IVY networks. During the 7–179 days after vaccination, VE was 44% in VISION and 46% in IVY. VE started at 46% in VISION and 42% in IVY, declining to 32% and 40% respectively, during the 120-179 days post-vaccination. Wider confidence intervals for later periods reflect smaller numbers of vaccinated cases and controls 4–6 months before their encounter.

Among adults aged ≥65 years, COVID-19 VE against critical illness remained relatively stable over time in both the VISION and IVY networks. In VISION, critical illness was defined as ICU admission or in-hospital death. VE remained consistent even 120–179 days after vaccination, suggesting durable protection against severe outcomes. In IVY, VE during the 7–179 days post-vaccination was assessed for three escalating outcomes: acute respiratory failure, ICU admission or death, and invasive mechanical ventilation or death. VE was highest for the most severe outcome, with 70% protection against invasive mechanical ventilation or death.

Among adults aged ≥65 years with immunocompromising conditions, COVID-19 VE against hospitalization during the 2024–25 season was 38% in VISION and 36% in IVY. Although IVY did not have sufficient statistical power to estimate VE by time since dose, VISION appear to show a trend of increasing VE over time. This pattern has been observed previously and is likely due to faster waning of infection-induced immunity in immunocompromised individuals, making the reference group less protected over time. VE in this group was similar to that in non-immunocompromised adults, indicating the vaccine is providing meaningful protection.

A sub-analysis from the IVY Network assessed COVID-19 VE against hospitalization by viral lineage, using whole genome sequencing to confirm KP.3.1.1 and XEC lineages. VE was calculated separately for each lineage, with controls defined as patients with COVID-like illness who tested negative for SARS-CoV-2, influenza, and RSV. VE was similar across lineages, with overlapping confidence intervals. Point estimates were 45% for KP.3.1.1 (median 56 days since vaccination) and 34% for XEC (median 87 days), with the difference likely due to time since vaccination.

Dr. MacNeil concluded that, for both the 2023–24 and 2024–25 seasons, in-season COVID-19 vaccination provided additional protection compared to no in-season dose. This included protection against COVID-19–associated ED and UC visits among children and adults, hospitalizations among adults aged ≥65 years with and without immunocompromising

conditions, and critical illness in older adults. Protection was generally similar across age groups and appeared to be higher and more durable for more severe outcomes.

VE should be interpreted as the added benefit of the 2023–24 or 2024–25 COVID-19 vaccination in a population with high levels of infection-induced, vaccine-induced immunity, or both. Prior SARS-CoV-2 infection contributes to protection against future illness, but this protection, like that from vaccination, wanes over time. Increased SARS-CoV-2 circulation in late summer 2024, just before the approval of the 2024–25 vaccines, may have raised population-level immunity against JN.1 lineage strains, potentially contributing to lower VE estimates during the season.

Dr. Kulldorff asked about vaccine efficacy results from randomized, double-blind, placebo-controlled trials, which are considered the gold standard in medical research. He noted his appreciation for the focus on hospitalizations and deaths, emphasizing that these are the most important outcomes when evaluating COVID-19 vaccines.

Dr. MacNeil responded that many of the randomized controlled trials were conducted in largely SARS-CoV-2 naïve populations, whereas the current context involves individuals with multiple exposures to vaccines, prior infection, or both. As a result, clinical trial data are not directly comparable to present-day vaccine effectiveness estimates. Instead, current efforts focus on monitoring the real-world impact of COVID-19 vaccines. Across age groups, the added benefit of recent vaccination has generally ranged from 30% to 50%, reflecting the value of continued vaccination in populations with existing immunity.

Dr. Kulldorff responded by emphasizing the importance of having a control group that represents the general population in observational studies. He noted that this is best achieved through cohort studies. In case-control studies, controls should ideally be drawn from the general population. He expressed concern about the test-negative design, where controls are individuals with non-COVID respiratory illnesses, which may represent a distinct population with different vaccination behaviors. He asked whether most of the presented results were based on the test-negative design or if any were derived from cohort studies or traditional case-control designs.

Dr. MacNeil acknowledged that case-control studies have limitations compared to traditional cohort studies. He explained that all platforms used for the presented data rely on case-control designs, with most using a test-negative design. This approach allows for efficient data collection in large populations without being cost-prohibitive. He noted that with sufficient sample sizes, these designs can produce relatively accurate estimates of VE.

Dr. Meissner raised a concern about the definition of COVID-19–associated hospitalizations used in the data. He noted that many slides referenced hospitalization rates based on a positive RT-PCR test for SARS-CoV-2 but emphasized that this does not necessarily mean the patient was hospitalized due to COVID-19. He pointed out that being hospitalized with COVID-19 is different from being hospitalized for COVID-19. Citing a study previously conducted by the Commonwealth of Massachusetts, he mentioned that less than half of patients with a positive test were being treated for COVID-19, suggesting that the presented hospitalization numbers may overestimate the burden of severe COVID-19 illness.

Dr. Taylor explained that COVID-NET comprises two components: population-based hospitalization rates based on laboratory-confirmed SARS-CoV-2 positive tests, and clinical data from a filtered sample of hospitalizations. While the rates include all lab-confirmed cases regardless of the reason for admission, the clinical data focus only on hospitalizations where COVID-19 was identified as the likely cause. He noted that this distinction is reflected in the footnotes on the slide. Dr. Taylor also referenced a peer-reviewed study published in *Influenza*

and Other Respiratory Viruses, which found that during the 2022–2023 period, 86 percent of adult hospitalizations with lab-confirmed COVID-19 were attributable to the virus. Attribution was based on factors such as illness related to COVID-19 at admission, treatment during hospitalization, or discharge diagnoses indicating conditions like pneumonia or ARDS.

Dr. Meissner responded by noting that the severity of COVID-19 has decreased since the 2022–23 period. He acknowledged that hospitalization rates are now much lower. He suggested that this could be due to viral mutations leading to less severe illness, increased population-level immunity from vaccination or prior infection, or a combination of both. He also raised a similar concern regarding COVID-19–associated deaths, questioning how many occurred in individuals with symptoms consistent with a viral infection versus those who were classified as COVID-19 cases solely due to a positive test upon hospital admission, as some hospitals require routine testing for all admitted patients.

Dr. Taylor responded that this is an important question and shared that an analysis is currently underway to examine deaths using the most recent years of death certificate data. The team is in the mid-stages of this work and plans to present its findings to ACIP once they are available. He also noted that, early in the pandemic, all hospital admissions were routinely screened for COVID-19; however, this is no longer standard practice in most hospitals. Preliminary data from the 2021–22 and 2022–23 seasons suggest that the proportion of hospitalizations attributable to COVID-19 has slightly increased over time. This is likely due to reduced screening, meaning that those now tested for COVID-19 are more likely to have symptoms consistent with COVID-19 illness, rather than being asymptomatic.

Dr. Meissner noted that, based on the most recent CDC data, hospitalization rates for children aged 0–4 years are less than one per 100,000. For children under six months, the rate is approximately 1.6 per 100,000. He asked if this was an accurate interpretation and emphasized that, in his view, COVID-19 is currently a very rare cause of hospitalization in both young children and adults.

Dr. MacNeil responded by emphasizing the importance of considering overall cumulative numbers, noting that COVID-19 continues to pose a substantial burden, particularly among the youngest and oldest age groups. He added that comparisons to influenza, as shown in the earlier slides, highlight that COVID-19 still presents areas for concern.

Dr. Meissner questioned whether Dr. MacNeil felt the rates were accurate.

Dr. MacNeil emphasized that COVID-NET has been a robust platform, capturing data from approximately 10% of the U.S. population and allowing for strong characterization of illness. He noted that while modeled national estimates based on this data come with some uncertainty, the confidence intervals are reasonable, and the resulting burden estimates fall within a reliable and consistent range.

Dr. Meissner commented on the reference to influenza, noting that while early comparisons between COVID-19 and influenza were common, including himself, it has become clear that the two viruses behave quite differently. He explained that orthomyxoviruses, like influenza, differ from coronaviruses in how they mutate and spread. He referred to the concepts of antigenic shift and drift, suggesting that continued comparisons may not be appropriate, as the viruses are fundamentally different.

Dr. MacNeil acknowledged Dr. Meissner’s point, clarifying that the intent was not to suggest that the pathophysiology of influenza and COVID-19 are the same, but rather to compare the overall population burden. He agreed that it's a valid distinction. He added that it may also be appropriate to consider using different terminology for COVID-19, rather than borrowing terms like "drift" and "shift" from influenza. He explained that the key point is the observation of large,

sudden changes in circulating COVID-19 variants that allow the virus to evade pre-existing immunity. He noted that it may be worth further discussion with influenza experts about adopting more accurate terms for these rapid changes in dominant COVID-19 variants.

Dr. Levi questioned the test-negative design, noting that it compares the proportion of vaccinated individuals among SARS-CoV-2–positive patients with those who test negative. He proposed that a lower vaccination rate in the positive group might still be consistent with vaccines increasing overall susceptibility to multiple respiratory viruses, with vaccinated people appearing in both groups but slightly less often among the positives. Such a scenario, he argued, could create the appearance of vaccine effectiveness even if vaccination provides no benefit or increases vulnerability. He added that some of the data presented suggest this may be occurring, as the rate of hospitalization among people with updated vaccination appears higher than their relative proportion in the general population. He stated this should raise concern and prompt further consideration of alternative explanations beyond vaccine efficacy.

Dr. Link-Gelles explained that the goal of the TND is to use controls that represent the vaccination coverage in the population from which the cases originated. A key strength of TND is that controls have the same symptoms as the cases and seek care and testing at the same facilities, making them population-based in this context. She emphasized that while the controls are not representative of the general population, they are representative of individuals who would have been hospitalized if they had COVID-19. In this analysis, controls are often older adults hospitalized with acute respiratory illness, so their vaccination coverage would not be expected to match that of the broader, generally healthier U.S. population. Due to this design, the controls are considered suitable for estimating the relative impact of vaccination.

Dr. Hoeg expressed concerns about the potential for confounding in the test-negative design, echoing the points raised by Dr. Kulldorff and Dr. Levi. She questioned why patients who test positive for influenza and, in people aged ≥60 years, RSV, are excluded if the goal is to compare groups with similar symptoms, with one group testing positive for COVID-19 and the other not. She noted that these groups may differ in meaningful ways, making it difficult to ensure they are truly comparable. Dr. Hoeg emphasized the importance of randomized controlled trials in minimizing bias and avoiding uncertainty about whether observational data accurately reflects VE.

Dr. Link-Gelles responded that including individuals who test positive for another vaccine-preventable disease as controls or cases could introduce bias into the study. She explained that vaccine status is correlated across diseases, and individuals who test positive for influenza or RSV are often less likely to have received those vaccines, which also makes them less likely to have received the COVID-19 vaccine. This correlation can distort the results. She cited published literature supporting this concern and explained that, for this reason, controls who test positive for influenza or RSV are excluded. She also noted that the study teams work closely with sites to ensure that cases and controls have similar symptoms, and they have analyzed and published data confirming that symptom profiles and severity are balanced between groups.

Dr. MacNeil added that while randomized clinical trials are valuable, there are real-world limitations related to time and cost. He emphasized that the test-negative design provides a robust and efficient method for generating real-world vaccine effectiveness data promptly. For example, reviewing VE data from the most recent season in June would not be feasible using randomized trials due to the time required for enrollment, follow-up, and analysis. He noted that for the CDC, the test-negative design is a practical and effective approach to assess the real-world impact rapidly.

Dr. Levi commented on the genomic evolution of SARS-CoV-2 variants, noting that while there is continuous evolution, two major jumps stand out. He raised two questions related to this

observation. First, he asked whether any analysis has been done to compare this pattern to other viruses, such as influenza, to determine how common such large evolutionary jumps are. Second, he inquired about the evolutionary pressures that might be driving these shifts, as such changes typically result from natural selection. He also questioned whether there has been any analysis of a possible connection between vaccination policies and the observed evolution of the variants, noting that the pattern appears striking.

Dr. MacNeil responded that the evolution of COVID-19 has indeed been full of surprises, with the emergence of major variants, such as Omicron, representing sudden and significant changes. He noted that these large shifts likely reflect a combination of selective pressures within the human population, such as pre-existing immunity, as well as unique characteristics of the virus itself. He emphasized that the situation is complex and dynamic. Dr. MacNeil also emphasized the importance of ongoing genomic surveillance and real-time sequencing, which enable experts to detect and monitor variant changes as they emerge. He emphasized the importance of maintaining this capacity to respond quickly to any unexpected shifts in the virus.

Dr. Meissner added to the discussion by noting the increasing complexity of SARS-CoV-2 evolution, particularly the emergence of convergent evolution, where different strains develop the same mutations in specific regions of the spike protein. He emphasized that this makes the situation even more challenging to analyze. Shifting to the topic of study design, Dr. Meissner acknowledged that the case-control approach, including the test-negative design, is not perfect and carries certain limitations, such as a potential bias toward individuals who are more likely to seek medical care. However, he pointed out that it remains the most practical option for evaluating vaccine effectiveness within a limited timeframe, as is done with influenza vaccines, which are updated annually. He concluded that, despite its flaws, the case-control design is a well-established method for evaluating vaccines.

Dr. Kulldorff emphasized the importance of distinguishing between traditional case-control studies and the test-negative design. He noted that, methodologically, these are very different approaches and that the quality of the information they produce can vary significantly.

Dr. Taylor clarified a question regarding the COVID-NET hospitalization rates presented earlier by Dr. MacNeil. He explained that the figures shown on the slides represent cumulative rates, which are the sum of weekly hospitalization rates over a period from July 2024 through May 2025. For children <6 months, the cumulative hospitalization rate was 268 per 100,000, comparable to the rate among adults aged 65 to 74 years. For children aged 6 to 23 months, the cumulative rate was 100 per 100,000, similar to the rate for adults aged 50 to 64 years, which was 103 per 100,000. Dr. Taylor emphasized that while weekly rates may seem small, the cumulative rates provide a more accurate picture of disease burden over time.

Dr. Levi asked whether the proportions of COVID-19–associated hospitalizations by age group differ from overall hospitalization patterns for all causes. Specifically, he questioned whether the distribution seen here deviates from general hospitalization trends across age groups or if it is consistent with typical patterns.

Dr. Taylor responded that COVID-NET, as one of the RESP-NET platforms, is specifically designed to collect data on SARS-CoV-2–positive, COVID-19–associated hospitalizations. As such, it does not include data on all-cause hospitalizations and cannot be used to directly compare COVID-19 hospitalization rates to general hospitalization rates across age groups. He noted that while previous ACIP meetings have included analyses comparing underlying conditions among adults hospitalized with COVID-19 to those in the general population, COVID-NET data do not support comparisons between COVID-specific and general hospitalization patterns.

Dr. Sarah Meyer (CDC/NCEZID) shared an update on how the CDC monitors vaccine safety. The CDC and interagency partners launched a comprehensive vaccine safety monitoring program for COVID-19 vaccines. A wide range of potential safety outcomes has been rigorously assessed through complementary passive and active surveillance systems. Myocarditis has been causally linked to mRNA COVID-19 vaccines. Common adverse events, such as local and systemic reactions and allergic responses, have also been observed. The CDC continues to actively monitor the safety of COVID-19 vaccines.

Vaccine safety monitoring is essential throughout the vaccine life cycle, from early research and clinical trials to regulatory review. After a vaccine is authorized or approved, the CDC begins safety monitoring in coordination with the FDA, the Indian Health Service, the Department of Defense, and the Department of Veterans Affairs.

The CDC employs a robust, complementary system of layered safety monitoring to promptly identify and evaluate potential concerns, enabling public health officials and policymakers to take timely action. Most systems have been in place for decades, but the CDC continues to improve existing systems and develop new ones to fill gaps, such as v-safe, which was launched to monitor the safety of COVID-19 vaccines.

The Vaccine Adverse Event Reporting System (VAERS) is the nation's early warning system for vaccine safety, co-managed by the CDC and the FDA. It relies on spontaneous reports from across the country to detect potential safety signals, including rare events. Healthcare providers and manufacturers are required by the National Childhood Vaccine Injury Act to report certain adverse events; however, patients or their family members can also submit reports. It's essential to note that reporting an event to VAERS does not necessarily mean that the vaccine caused it. VAERS is used for signal detection and hypothesis generation, not to determine causality.

The Vaccine Safety Datalink (VSD) is a collaborative system that generates high-quality data on vaccine safety. It includes 13 integrated healthcare organizations and serves approximately 15.5 million people annually. VSD uses active surveillance through electronic medical records and chart reviews, enabling rapid monitoring of both prespecified and unexpected events. Unlike VAERS, which is primarily used for signal detection, VSD can detect and assess safety signals. The network is also known for its strong expertise, which has led to the development of innovative methods for monitoring vaccine safety.

The Clinical Immunization Safety Assessment (CISA) Project is a network that supports vaccine safety from the individual to the population level. It includes eight medical research centers with vaccine safety experts and specialists. CISA provides clinical consultations on complex immunization issues to support patient care and research real-world vaccine safety questions not addressed in pre-licensure trials. CISA consultants also help inform the CDC’s public health guidance on clinical immunization safety issues.

V-safe After Vaccination Health Checker is the CDC’s newest tool for direct-to-consumer vaccine safety monitoring. It is a smartphone and web-based, self-reported active monitoring system established during the COVID-19 pandemic. v-safe can provide early information on reactogenicity and other health events, especially for new vaccines and populations not included in clinical trials. For example, it helped enroll over 23,000 pregnant women into a voluntary registry to monitor maternal and neonatal outcomes after COVID-19 vaccination. V-safe is flexible, quickly deployable, and plays a key role in emergency preparedness and response. It is also integrated with VAERS to streamline reporting serious adverse events.

These systems support the CDC’s comprehensive approach to COVID-19 vaccine safety, which includes surveillance of reported events, epidemiologic studies, clinical research, and a pregnancy registry. The approach also utilizes rapid cycle analysis, data mining of over 60,000

outcomes, and patient surveys to identify and assess potential safety concerns and health impacts following vaccination.

An overview of the extensive body of evidence on COVID-19 vaccine safety was provided. Since the rollout in December 2020, data have been documented in 17 Vaccine Safety Technical Work Group reports, 28 presentations to federal advisory committees, 29 publications in the MMWR, 114 peer-reviewed manuscripts, and through nearly 10 million participants enrolled in v-safe. This information was collected during the largest vaccination effort in U.S. history, with approximately 1 billion doses distributed.

Dr. Meyer recapped that three types of COVID-19 vaccines were authorized or approved for use in the United States: mRNA vaccines by Pfizer-BioNTech and Moderna, a protein-based vaccine by Novavax, and a viral vector-based vaccine by Janssen. The use of the Janssen vaccine became limited in April 2021 after the VAERS system detected six reports of thrombosis with thrombocytopenia syndrome (TTS). In response, the FDA and the CDC issued a 10-day pause in its use. By December 2021, ACIP issued a preferential recommendation for mRNA vaccines, and in June 2023, the EUA for Janssen was revoked. The vaccine is no longer in use in the United States. This situation highlighted how federal safety systems worked together to identify and address a concern regarding vaccine safety promptly.

Dr. Meyer noted that post-authorization safety data for Novavax remain limited due to its later authorization in July 2022 and low uptake in the U.S. Therefore, the remainder of the discussion focused on the safety of mRNA COVID-19 vaccines, which are supported by a large and growing body of evidence.

The CDC has evaluated at least 65 specific outcomes to assess the safety of the COVID-19 vaccine using a variety of systems and epidemiologic methods. Since December 2020, weekly rapid cycle analyses (RCAs) in the Vaccine Safety Datalink have tracked up to 23 prespecified outcomes in over 12 million people, based on clinical trial data, known vaccine risks, and biological plausibility.

Automated statistical testing compares rates of outcomes in post-vaccination risk intervals with those in comparison periods. When a signal is detected, further analysis or chart review is conducted. The system is designed to be sensitive, and not all signals indicate a true safety concern.

Between 2020 and 2025, eight statistical signals were identified through VSD's weekly rapid cycle analyses. These included acute myocardial infarction, venous thromboembolism, immune thrombocytopenic purpura, ischemic stroke, seizure, Guillain-Barré syndrome, Bell's palsy, and myocarditis.

When a signal is detected, the CDC conducts further investigations to determine if it reflects a true safety concern or a false positive. These follow-up steps include chart reviews, trend and cluster analyses, additional studies such as self-controlled case series, and a review of data from other monitoring systems, including VAERS and partner databases managed by the FDA and VA.

After completing these investigations, the CDC determined that there is an increased risk of myocarditis following mRNA COVID-19 vaccination. No clear or consistent evidence of a safety concern was found for the other outcomes mentioned.

Using data from the Vaccine Safety Datalink, the CDC assessed the incidence of myocarditis within seven days of COVID-19 vaccination among individuals aged 12–39 years, by season and dose. Rates were highest in males, peaking among those aged 16–17 years. Myocarditis was rare in children <12 years and in adults >50 years. The risk was highest after the second

dose in the primary series but remained elevated after the first monovalent booster. In later seasons, incidence declined and approached the background rate of <2 cases per million. Similar patterns have been observed in VAERS reports. Several factors may explain the decline in myocarditis rates in recent years, including increased overall population immunity, a longer interval between doses, and fewer people receiving more than one dose per year.

The FDA recently shared updated data on myocarditis and pericarditis following mRNA COVID-19 vaccination from the Biologics Effectiveness and Safety (BEST) system during the 2023–2024 season. In April, the FDA issued safety labeling change notification letters to vaccine manufacturers, instructing them to include new information on myocarditis and pericarditis. FDA approved safety labeling updates for Comirnaty and Spikevax to reflect this new safety information.

CDC follow-up studies show that most adolescents and young adults have recovered from myocarditis after receiving an mRNA COVID-19 vaccine. These studies included individuals aged 12–29 years with a VAERS report filed between January and November 2021, along with input from their healthcare providers. Based on assessments by cardiologists or other providers, 83% were considered fully or probably recovered within 90 days of symptom onset, and by one year, at least 90% had recovered.

Most individuals showed improvement in symptoms, as well as in cardiac imaging and testing results. A subset who underwent cardiac MRI one year after onset most commonly showed late gadolinium enhancement, which may suggest the presence of fibrosis. However, the clinical significance of this finding is unclear, as most were considered recovered and had been cleared for all activity. There were no known deaths or cardiac transplants in this group.

COVID-19 vaccine safety data for children aged 6 months to 11 years show a low risk of myocarditis, particularly in those under 5 years. No statistical signals for myocarditis have been detected in the Vaccine Safety Datalink, and no confirmed cases have been reported in VAERS or the VSD for children under 5. VSD rapid cycle analyses also found no increased risk for 22 other prespecified outcomes. Most cases of MIS-C after vaccination had evidence of prior SARS-CoV-2 infection.

The majority of COVID-19 vaccine reports submitted to VAERS for children <12 years were related to vaccine administration errors. From October 2021 to April 2025, approximately 74% of reports for children aged 6 months to 4 years and 70% for those aged 5 to 11 years involved errors, such as expired product, incorrect dose or formulation, administration to the wrong age group, or preparation issues. Few of these reports included an actual adverse event. The high number of administration error reports likely reflects the complexity of the pediatric COVID-19 vaccination program, particularly early in the rollout when dosing, recommendations, and storage requirements varied by product. CDC is expanding its efforts to prevent vaccine administration errors in collaboration with the FDA.

CDC has actively assessed the safety of COVID-19 vaccines in pregnant women through multiple efforts. A voluntary pregnancy registry enrolled over 23,000 pregnant participants to monitor outcomes. Additionally, the CDC has conducted seven observational studies using survey and medical record data. In the Vaccine Safety Datalink, over 45,000 pregnant women have been evaluated through 11 cohort, case-control, and surveillance studies to date.

Across these CDC studies, the evidence shows no increased risk of adverse maternal outcomes associated with COVID-19 vaccination, including 25 medically attended adverse events, serious acute events, pregnancy-related conditions, or maternal ICU admissions. Vaccination was also not associated with adverse pregnancy outcomes such as miscarriage,

stillbirth, preterm birth, or small for gestational age. Additionally, no association was found between maternal vaccination and major birth defects, neonatal ICU admission, or infant death.

The CDC has conducted studies to address public concerns about the safety of the COVID-19 vaccine. In response to reports of abnormal uterine bleeding, analyses using VAERS, VSD, and v-safe found no association between vaccine availability and the incidence of medically attended abnormal uterine or postmenopausal bleeding. The vaccine was also not linked to increased bleeding severity. CDC also assessed reports of tinnitus using data from VAERS and VSD. No safety signals were detected, and findings did not support an increased risk of tinnitus following COVID-19 vaccination.

CDC monitors death reports following mRNA COVID-19 vaccination through VAERS. As of May 30, 2025, 19,417 domestic deaths had been reported after vaccination. Under FDA emergency use authorizations and CDC provider agreements, healthcare providers were required to report all deaths occurring within 30 days after COVID-19 vaccination, regardless of cause or circumstances. This requirement does not apply to other vaccines.

VAERS is not designed to assess causality. CDC evaluated deaths reported following mRNA COVID-19 vaccination through January 31, 2023. During this period, the CDC received 17,631 domestic VAERS reports of death following COVID-19 vaccination. After clinical review, 52 were excluded as they did not represent actual deaths, 1,790 involved non-mRNA vaccines, and 2,940 lacked a confirmed cause of death.

This left 12,849 reports with confirmed causes of death, identified through autopsy, death certificate, medical records, or the VAERS report. Among these, 78% were aged ≥65 years, 15% were 50–64, 6% were 18–49, and 5% were <18 years.

CDC assessed all reported deaths in the general U.S. population during this period using death certificate data from the National Center for Health Statistics' multiple cause of death database, categorized by ICD-10 codes. Observed-to-expected ratio analyses were conducted for each age group by comparing the number of cause-specific deaths reported to VAERS within 42 days of mRNA COVID-19 vaccination to the number of expected deaths in the general U.S. population.

CDC found that reported death rates after mRNA COVID-19 vaccination were below background rates in the general U.S. population. The most common causes of death reported to VAERS, such as heart disease, COVID-19, cerebrovascular disease, and general signs and symptoms like shock, were consistent with the leading causes of death nationally. In children, congenital malformations were also reported, and among adults aged ≥18 years, malignant neoplasms were included.

Across all age groups, the observed-to-expected death ratio was <1, indicating fewer reported deaths than expected within 42 days of vaccination. Despite the limitations of VAERS, these findings suggest no association between mRNA COVID-19 vaccination and increased mortality.

In addition to reviewing VAERS reports, the CDC conducted two self-controlled case series evaluations using the Vaccine Safety Datalink, one in the general population aged 12 years and older and one in Medicare beneficiaries aged 65 years and older. Pfizer and Moderna vaccines were analyzed separately. Both studies found no increased risk of non-COVID-19 mortality, all-cause mortality, cardiac-related mortality, or non-COVID-19 cardiac-related mortality within 28 days following vaccination. Relative incidence rates were significantly <1 in all cases.

These findings are consistent with results from a separate cohort analysis in the VSD. The robust methods used across these analyses provide strong evidence of no increased risk of death after mRNA COVID-19 vaccination and suggest a potential protective effect.

CDC uses data mining in the Vaccine Safety Datalink to detect unexpected adverse events following COVID-19 vaccination. This approach evaluates over 60,000 possible outcomes within 70 days of vaccination using tree-based analysis of ICD-10 codes. Assessments have been conducted for the primary series, initial booster, and bivalent booster. No new safety concerns have been identified beyond known events such as myocarditis, pericarditis, allergic reactions, and common local or systemic reactions.

Dr. Meyer summarized that several adverse events have been identified following mRNA COVID-19 vaccination. Most, such as local and systemic reactions, acute allergic reactions, syncope, and shoulder injuries, are common to many vaccines. Myocarditis and pericarditis have also been observed specifically following COVID-19 vaccination. These conclusions are based on the evaluation of at least 65 specific safety outcomes, data mining of over 60,000 potential outcomes, investigation of multiple statistical signals, and numerous epidemiologic studies.

These findings align with the National Academies of Sciences, Engineering, and Medicine's consensus report on the adverse effects of COVID-19 vaccines, commissioned by HRSA and published in 2024. The report reviewed over 400 studies on vaccine safety. It concluded that there is evidence supporting a causal association between mRNA COVID-19 vaccines and myocarditis. It also found that the evidence favors rejecting a causal link between vaccination and six other outcomes: Guillain-Barré syndrome, Bell’s palsy, TTS, myocardial infarction, ischemic stroke, and female infertility. For 13 other outcomes, the evidence was deemed inadequate to accept or reject a causal relationship.

COVID-19 vaccines have been evaluated under the most extensive vaccine safety monitoring program in U.S. history. This surveillance quickly identified and characterized the risk of myocarditis following mRNA vaccination. No other confirmed safety concerns have been identified beyond those commonly seen with other vaccines, such as local reactions, systemic symptoms, or allergic responses. CDC continues to prioritize COVID-19 vaccine safety, with at least 30 ongoing studies or monitoring activities.

Dr. Hibbeln stated that he has long been interested in risk-benefit evaluations and asked whether a broad summary of the data presented would be accurate. He noted that the evidence suggests a minimal to no risk of death from receiving a COVID-19 vaccine, whereas Dr. MacNeil’s presentation indicated a substantial risk associated with not being vaccinated. He asked whether it would be reasonable to describe the benefit of vaccination as a 40- to 50-percent reduction in risk, with essentially zero risk of death from the vaccine. He framed this as a general assessment of the overall risk-benefit balance.

Dr. Meyer responded that several studies have been conducted to evaluate the risk of mortality following COVID-19 vaccination, and no increased risk has been observed. In VAERS analyses comparing observed to expected deaths, the data did not show a higher-than-expected number of deaths. Similarly, evaluations using the Vaccine Safety Datalink found no increased risk of mortality after vaccination. From a safety perspective, the data support confidence that COVID-19 vaccines are not associated with an increased risk of death. Regarding the overall risk-benefit assessment, Dr. Meyer noted interest in hearing the committee’s evaluation of those factors.

Dr. MacNeil added a rough estimate to illustrate the potential impact of vaccination on COVID-19 mortality. Using a hypothetical scenario, if there were about 40,000 COVID-19-related deaths in a year and none of those individuals had been vaccinated, then applying the observed vaccine effectiveness, approximately half, or about 20,000, of those deaths might have been prevented. This was presented as a general approximation to highlight the potential benefit of vaccination in reducing deaths.

Dr. Malone asked for clarification on the safety monitoring timeframes presented. Specifically, the question focused on whether the post-vaccination periods, defined as either 28 days or 42 days, apply to individuals who have completed at least two doses. Dr. Malone requested clarification on how "post-vaccination" is defined in the context of the data that was shared.

Dr. Meyer responded that the analyses included individuals who had received at least one dose of a COVID-19 vaccine. For the VSD analyses, three separate evaluations were conducted: one after completion of the primary series, one following the original booster, and one after receiving the Omicron booster.

Dr. Malone followed up by asking whether the analysis of adverse event associations, like the mortality analysis, was also limited to a 28-day post-vaccination window.

Dr. Weintraub explained that analyses for the Vaccine Safety Datalink were set up to examine 21-day and 42-day risk intervals following doses one and two of the primary series. This approach has been consistently applied with each new vaccine recommendation, including the most recent season. The 42-day window also allows for scanning of shorter time intervals within that period to identify potential clusters of increased risk, using Martin Kulldorff's clustering method. It is standard practice to use a 42-day risk interval and to compare it to a historical control period, typically days 43 to 84 after vaccination.

Dr. Malone commented on the presentation of the adverse events assessed, noting that the slide listing the 65 outcomes was difficult to interpret. He suggested that it would be helpful if the information were structured more clearly, such as in alphabetical order, to better understand the full range of events evaluated. Based on his review, he inferred that hypertension, tachycardia, and POTS were included in the analyses and were not found to be associated with COVID-19 vaccination.

Dr. Meyer responded by explaining that both VAERS and the Vaccine Safety Datalink (VSD) use prespecified lists of outcomes to monitor and flag for further review. In addition to tracking prespecified outcomes, VSD also investigates other emerging concerns as needed.

Dr. Meyer acknowledged that the slide listing the 65 outcomes was intended to provide a brief overview and could be made clearer. A more detailed list can be shared if needed. She also noted that data mining is used to detect unexpected outcomes without specifying them in advance. None of the conditions mentioned, including POTS, appeared as signals in the data mining. While some studies on outcomes, such as POTS, have been referenced in the National Academies report, the available data are limited. Based on the CDC's comprehensive approach, including both targeted analysis and broad surveillance, the primary safety concerns identified remain myocarditis and common vaccine-related reactions.

Dr. Malone emphasized the public's need for transparency and recommended that a clear, comprehensive list of all safety outcomes and analyses be made publicly available. He also asked whether potential lot-to-lot variability in vaccine manufacturing had been examined, noting that such variability could mask clusters of adverse events when data are viewed in aggregate, and requested details on how this issue has been addressed.

Dr. Meyer responded that the CDC works closely with interagency partners on vaccine safety, with each agency having distinct roles. She noted that lot-specific issues are typically assessed by the FDA and deferred to FDA colleagues for any additional information on that topic.

Dr. Meissner emphasized that physicians are trained to report any adverse event (AE) after vaccination to VAERS, regardless of causality. Given the high volume of vaccinations, many reported AEs are unrelated to the vaccine. He clarified that VAERS is not used to determine incidence rates but to detect safety signals, which are then evaluated further using systems like

VSD. He noted most VAERS reports do not indicate a causal relationship. Dr. Meissner then asked Dr. Meyer about the long-term follow-up of myocarditis cases, particularly regarding individuals with late gadolinium enhancement on cardiac MRI, which may suggest scarring and potential risk for arrhythmias or sudden death. He also inquired about data from manufacturers on troponin levels and markers of subclinical myocarditis, which he understood had been requested but had not yet been reported.

Dr. Meyer responded that some studies have evaluated subclinical myocarditis, including those that measure biomarkers such as troponin in asymptomatic individuals. These studies have not shown adverse clinical outcomes in those cases. However, the long-term significance remains uncertain and requires ongoing monitoring. CDC is closely tracking this issue, and FDA is conducting similar studies with comparable findings. This information is expected to be included in upcoming safety labeling updates, and both the CDC and the FDA plan to continue long-term monitoring.

Dr. Levi questioned whether traditional vaccine safety surveillance methods, which focus on short-term adverse events, are sufficient for COVID-19 vaccines, given evidence that residual mRNA and spike protein may persist in the body for months. He suggested this could reduce the sensitivity of current approaches and called for broader methods. He cited a VA study showing higher adverse events with Pfizer compared to Moderna. He emphasized the importance of accounting for factors like the healthy vaccinee effect when comparing mortality rates. He asked whether surveillance systems are adapting to address the unique characteristics of COVID-19 vaccines.

Dr. Meyer responded that the United States has one of the strongest vaccine safety systems in the world and expressed confidence in its current approach. However, efforts are ongoing to identify ways to improve the system, especially in monitoring long-term outcomes after vaccination. She noted that detecting long-term effects is challenging because, over time, confounding factors such as infections or unrelated health events make it more difficult to separate vaccine-related effects from other causes. Dr. Meyer welcomed input from the committee on how to enhance long-term safety monitoring.

Dr. Malone followed up by emphasizing that the pharmacokinetics of mRNA vaccines differ significantly from traditional vaccines. He noted that prolonged antigen presence in the body, up to 700 days according to a Yale study, is unprecedented in vaccinology. This extended exposure has been linked in animal models to immune system effects such as broad immunoglobulin class switching, which are not currently captured by existing safety monitoring systems. Dr. Malone suggested these changes could affect overall immune function and influence vulnerability to other infectious diseases. He related this concern to Dr. Levi's earlier question about vaccine effectiveness estimates. While acknowledging the rigor of the current safety framework, he encouraged expanding safety analyses to consider the unique profile of mRNA vaccines, including the potential for delayed or immune-related effects. He recommended broadening the scope of monitoring to include potential long-term immunologic risks and benefits, which could help address public concerns and improve understanding of these products.

Dr. Meyer explained that since vaccination efforts began in December 2020, the CDC has maintained robust monitoring for several years. The current systems are designed to detect any adverse events, including those that may be cumulative over time or result from multiple doses. If there were any emerging safety concerns or effects on organ systems, the existing surveillance infrastructure would be well-positioned to identify them.

Dr. Thornburg noted that preclinical animal studies have shown spike protein detection up to nine days after injection, but not in the liver, and no detection beyond that time. In humans,

limited data from an autopsy study of 20 individuals revealed that vaccine mRNA was detected only in axillary nodes within 30 days post-vaccination, and not in the spleen or mediastinal lymph nodes. Protein was not detected in lymph nodes, the left ventricle, liver, or other organs, with only nonspecific staining observed.

Dr. Georgina Peacock (CDC/NCIRD) presented on COVID-19 vaccine coverage and implementation. One of the primary data sources used by the Immunization Services Division at CDC to assess vaccine coverage, including COVID-19 vaccination, is the National Immunization Survey (NIS). The NIS is a random-digit-dial cellular telephone survey of U.S. adults aged ≥18 years across all states, 5 local jurisdictions, and U.S.-associated territories. For children, data is reported by a parent or guardian. All responses are self-reported. The survey collects data from about 15,000 adults per week or around 60,000 adults per month. The data is weighted to represent the non-institutionalized U.S. population.

From September 2024 through April 2025, COVID-19 vaccination coverage for at least one dose reached 44% among adults aged 65 years and older and 23% among adults aged 18 years and older.

COVID-19 vaccination coverage among older adults increased between the 2023–2024 and 2024–2025 seasons. For adults aged 65–74, coverage increased by nearly 5 percentage points, while adults aged 75 years or older saw an increase of about 8 percentage points by the end of the 2024–25 season.

As of April 2025, approximately 5.6% of children under 4 years old were up to date with COVID-19 vaccination for the 2024–2025 season. Among children aged 5–17 years, about 16% had received at least one dose since August 2024. Overall, 13% of children aged 6 months to 17 years were up to date with their COVID-19 vaccination for the 2024–2025 season.

Among immunocompromised adults who received their first 2024-2025 COVID-19 vaccine dose in August or September 2024, 8% were fully vaccinated with two doses by the end of March 2025. When stratified by age, full-vaccination coverage was 16.6% for adults aged 50–64, 2.4% for those aged 18–49, and 0.8% for adults aged 65 years and older.

Dr. Peacock summarized that COVID-19 vaccination coverage for older adults improved in the 2024–2025 season compared to the previous year. Coverage among adults aged 18 years and older remained similar between seasons, and approximately 13% of children aged 6 months to 17 years were up to date with their COVID-19 vaccinations by the end of April 2025.

Dr. Levi asked about vaccine uptake among healthcare professionals, as their vaccination behaviors can influence public trust and recommendations.

Dr. Peacock responded that data on COVID-19 vaccination rates among healthcare professionals is not included in the specific dataset presented. However, the National Immunization Survey and other sources do collect this information. Dr. Peacock offered to bring relevant data to a future ACIP meeting or share it with the work group, noting that it is not currently available for discussion.

Dr. Meissner noted that COVID-19 vaccine uptake remains low, with less than 20% coverage among young children and even among high-risk adults over 75. He asked whether low public uptake influences the recommendations made by ACIP, specifically if low vaccination rates among children affect whether ACIP continues to recommend the vaccine for that group.

Dr. Peacock responded that this is a discussion for the committee to consider. She noted being encouraged by the increase in vaccination among adults over 65, especially those over 75. She suggested that this may reflect healthcare providers recommending the vaccine to patients with

a higher risk of hospitalization or death. She added that the final recommendation ultimately comes from the committee.

Dr. Meissner expressed concern that if the CDC issues recommendations that the public does not follow, it could erode confidence in those recommendations. He acknowledged that there may not be an easy solution but emphasized the importance of considering public acceptance when developing guidance.

Dr. Kulldorff emphasized that the committee must base its recommendations on evidence-based medicine. However, he acknowledged that the low COVID-19 vaccination rates among children likely reflect a lack of trust among many parents in the recommendations issued by the ACIP. He agreed that Dr. Meissner raised an important and timely concern.

Dr. Daskalakis added that part of the evidence-to-recommendation framework used in the work group includes an assessment of both feasibility and acceptability. He clarified that these factors have historically been part of all vaccine-related discussions and are built into the process that informs committee discussions and ultimately leads to recommendations.

Dr. Meissner asked whether there is a defined threshold at which continuing to make a recommendation may no longer be beneficial, particularly if uptake remains persistently low.

Dr. Daskalakis responded that this is precisely why the committee holds these discussions. As feasibility, acceptability, and uptake are reviewed within the work group, that information is brought to the committee for consideration. Based on this feedback, the committee ultimately makes recommendations, which can then be further reviewed.

Dr. Pebsworth expressed concern about the low uptake of COVID-19 vaccines and the high volume of reports submitted to VAERS compared to other vaccines. She noted that, as of her last review, approximately 1.6 million reports had been submitted, and cited studies suggesting that only about 10% of adverse events are typically reported, raising the possibility of underreporting. Given these concerns, she emphasized the importance of transparency and access to data not typically shared, including findings from preclinical animal studies, reproductive toxicity data, and biodistribution studies. She believes these data could help clarify current uncertainties.

Dr. Meyer addressed concerns about underreporting in VAERS by clarifying that studies often cited to support underreporting typically include mild events, such as sore arms or rashes, which are often not reported. She noted that CDC research has shown significantly higher reporting rates for serious adverse events. For example, VAERS captures up to 76% of anaphylaxis cases and up to 64% of Guillain-Barré Syndrome cases, depending on the vaccine. She added that similar findings have been observed for intussusception after rotavirus vaccination and vaccine-associated polio. Dr. Meyer emphasized that the CDC is confident that a majority of serious adverse events are reported to VAERS.

Dr. Levi acknowledged improvements in reporting but maintained that underreporting of adverse events, particularly myocarditis, likely still exists across systems. He emphasized that comparing rates from VAERS, clinical diagnoses, and studies measuring biomarkers, such as troponin levels, before and after vaccination, reveals discrepancies. While the underreporting may not be to the extent of 10%, it remains significant. He also noted that some serious adverse events appear in VAERS at rates exceeding those seen with other vaccines, even after adjusting for the number of doses administered, which may indicate a signal that warrants further investigation.

Dr. Adam MacNeil (CDC/NCIRD) concluded the COVID-19 session with a partial presentation on evidence-to-recommendations (EtR). The EtR framework outlines key domains used to guide

decision-making, including public health problem, benefits and harms, values, acceptability, feasibility, resource use, and equity. Each domain is linked to specific guiding questions. The first two domains, public health problem and benefits and harms, were reviewed and discussed by the workgroup. The remaining domains and final polling were scheduled for the final workgroup call.

The work group has consistently reviewed data related to the public health problem and benefits and harms domains of the EtR framework. Most recently, summaries of these domains were discussed during the May 29 and June 5 work group calls. These domains are largely informed by the epidemiology, vaccine effectiveness, and safety data previously presented, and were reflected in the June 12 ACIP meeting presentations. The work group had planned to review the remaining EtR domains and complete final polling before the ACIP meeting. However, because the scheduled work group call did not take place, the EtR was not finalized, and final polling was not conducted.

Dr. MacNeil summarized the work group's considerations on the public health problem, noting that while the burden from COVID-19 has declined year over year since 2021, substantial illness and death continue. Hospitalization and death rates remain highest among adults 65 years and older and infants six months and younger. Children under two years have the highest illness and death rates among pediatric groups, though deaths can occur at any age. Maternal vaccination remains the best protection for pregnant women and infants under six months who are not eligible for vaccination.

For the benefits and harms domain, the work group concluded that the 2024–2025 COVID-19 vaccination provides clear benefits in reducing hospitalizations and severe disease, particularly in adults. The vaccine has demonstrated consistent effectiveness across age groups based on prior formulations. Safety surveillance has identified myocarditis and pericarditis following mRNA vaccination, but no other serious risks have been confirmed beyond typical vaccine-related reactions. The work group also recognized that pregnant individuals face higher risks from COVID-19, and maternal vaccination offers protection to infants under six months, who are not yet eligible for vaccination.

Dr. Kulldorff thanked the presenters for their informative updates and acknowledged the thoughtful discussion that followed. He noted that no vote was scheduled on the topic and that the committee looks forward to receiving the working group's report before the next meeting. He expressed appreciation for both the CDC presenters and the many contributors behind the scenes.

AGENCY UPDATES

The Centers for Disease Control and Prevention (CDC)

Dr. Demetre Daskalakis from the National Center for Immunization and Respiratory Diseases (NCIRD) provided an update on current domestic outbreaks. He reported that as of the meeting date, the CDC has identified 1,227 measles cases across 37 U.S. jurisdictions in 2025, with 23 outbreaks accounting for 89% of cases. A significant portion of these cases is linked to a large outbreak in the Southwest, with Texas reporting 750 cases across 35 counties and New Mexico reporting 81 cases. There are signs that the outbreak is plateauing, with a decline in new cases in the Southwest. However, the CDC continues to monitor for global introductions of measles into the U.S., though recent cases have resulted mainly in short, self-limiting transmission chains. The overall risk to the U.S. population remains low; however, continued vigilance is

necessary, particularly in under-immunized populations. Dr. Daskalakis also provided an update on H5N1 (Avian influenza). Historically associated with birds and poultry, H5N1 was detected in cattle in 2024, resulting in over 1,000 affected herds. There have been 70 human cases, primarily among individuals with direct contact with animals. Recent data show a decrease in infections among both non-human mammals and birds, with no new human cases reported in over 15 weeks. He credited the USDA's early detection efforts, including bulk milk testing, for this progress. Dr. Daskalakis concluded by noting that the CDC remains focused on seasonal respiratory virus preparedness, including COVID-19, influenza, and RSV, to ensure Americans have the tools to prevent these infections.

Dr. Chris Braden, Principal Deputy Director of the National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) provided additional updates on outbreak investigations. NCEZID is currently monitoring several foodborne outbreaks, including Salmonella linked to pistachio cream and eggs, which were detected through the PulseNet system. This system utilizes whole-genome sequencing to identify related cases. Dr. Braden also highlighted a cluster of systemic illnesses in Massachusetts linked to unauthorized Botox injections by an unlicensed provider. The CDC is supporting this investigation by supplying botulinum antitoxin, which is stored at CDC quarantine stations nationwide. Additionally, Dr. Braden noted emerging concerns regarding the New World screwworm, an animal parasite making its way from Central America into Mexico. Although primarily an animal health issue, human cases can occur, resulting in severe myiasis (infestation of live tissue). CDC is collaborating with the USDA to monitor this situation, as it poses risks to animal agriculture and, to a lesser extent, human health.

Food and Drug Administration (FDA)

Dr. Tracy Beth Hoeg from the FDA provided several updates. She began by addressing a recent FDA announcement regarding a safety label change for mRNA COVID-19 vaccines to reflect the ongoing risk of myocarditis, particularly in males ages 12 to 24. FDA data from 2023 and 2024 identified a myocarditis rate of 27 cases per million in this group. She clarified that this differs from the CDC's reported rate of 2 cases per million, as the FDA's data are more stratified explicitly by age and sex. Additionally, FDA data showed instances of late gadolinium enhancement on MRI six months post-vaccination, suggesting potential myocardial damage of uncertain clinical significance. Based on these findings, the FDA implemented the safety label change.

Dr. Hoeg also noted that the FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC) recommended the JN.1 variant antigen for the 2025 to 2026 COVID-19 vaccine, consistent with the previous year, due to slower viral mutation rates. The FDA has approved two updated vaccines, Numovoxid and MN.X Spike, both with narrowed indications for individuals ages 12 to 64 with at least one risk factor for severe COVID-19, and for adults 65 and older. Both manufacturers have committed to post-marketing randomized controlled trials to evaluate vaccine efficacy, particularly in adults ages 50 to 64.

Dr. Hoeg also referenced a recent FDA decision to pause use of the live chikungunya vaccine in adults 60 and older due to reports of 17 adverse events, including two deaths. She concluded by highlighting a study by Albertson et al., published in *Infectious Diseases and Therapy*, that

addresses subclinical myocarditis post-vaccination in individuals ages 5 to 30. This study fulfills part of a post-marketing requirement and provides additional data on this safety concern.

Indian Health Services (HIS)

Dr. Matthew Clark from IHS provided an update on vaccination efforts in tribal communities. He emphasized that IHS is working closely with federal, tribal, and urban Indian organization partners to mitigate the risk of vaccine-preventable illnesses among vulnerable populations. In alignment with its mission, IHS is committed to raising health status and improving health outcomes in American Indian and Alaska Native communities through a comprehensive approach. This includes promoting healthy lifestyles, supporting traditional culture and healing, providing preventive screenings, and managing both acute and chronic diseases. As a health care system serving 2.1 million American Indian and Alaska Native beneficiaries, vaccination remains a key component of IHS's strategy. The agency advances this work through proactive education, informed consent, and respect for the values of patients, their families, and the communities they serve. Dr. Clark noted that tribal communities face unique challenges that impact access to preventive care, and IHS is actively collaborating with tribal health partners to identify vaccine priorities and establish best practices that meet the specific needs of Indian Country.

RSV VACCINES-MATERNAL/PEDIATRIC

Dr. Adam MacNeil (CDC/NCIRD) introduced the Maternal/Pediatric RSV Vaccine Work Group. RSV is the leading cause of hospitalization in U.S. infants, with most infected in their first year and nearly all by age two. About 2 to 3% of young infants are hospitalized, and 80% of those have no underlying conditions. All young infants are at risk for severe RSV. Before 2023, no long-acting preventive products were available.

In 2023, two products to prevent severe RSV in infants were approved by the FDA and recommended by the CDC and the ACIP. All infants should be protected through either maternal RSV vaccination or a long-acting monoclonal antibody. Pregnant women should receive one dose of the maternal RSV vaccine between 32 and 36 weeks of pregnancy. Nirsevimab is recommended for infants younger than 8 months entering their first RSV season and for some children aged 8 to 19 months at increased risk entering their second season.

A new long-acting monoclonal antibody, clesrovimab, is a third option to protect infants from severe RSV disease. Clesrovimab was approved by the FDA on June 9, 2025, for use in infants born during or entering their first RSV season.

The work group and ACIP have been reviewing data on clesrovimab since September 2024. In September, the work group reviewed safety and efficacy data from Merck. In October, ACIP reviewed these data along with the work group's interpretation. From November 2024 through April 2025, the work group reviewed the GRADE assessment and the EtR framework for clesrovimab.

Since the April 2025 ACIP meeting, the work group has reviewed data on the uptake, safety, and effectiveness of the maternal RSV vaccine and the long-acting monoclonal antibody from the 2024–2025 season.

Dr. MacNeil shared that the session would include updates on current RSV prevention products, including uptake, effectiveness, and impact, and safety data for the maternal RSV vaccine and long-acting monoclonal antibody. The session would also cover the evidence-to-recommendation framework for clesrovimab, the work group's interpretations, and clinical considerations for clesrovimab.

Dr. Georgina Peacock (CDC/NCIRD) presented on the implementation and uptake of Nirsevimab and maternal vaccination for infant protection from RSV. Data sources include the National Immunization Survey, a random-digit-dial cellular phone survey of U.S. adults aged 18 and older across jurisdictions and territories; Immunization Information Systems (IIS), which are confidential, population-based databases that record immunizations administered by participating providers. CDC funds 64 jurisdictions to operate IIS, which provide monthly aggregate data for COVID-19, influenza, and RSV, as well as quarterly de-identified line-level data. The Vaccine Safety Datalink (VSD) provides vaccination coverage estimates based on electronic health records, including maternal RSV vaccination coverage.

Immunization Information Systems data show monthly administration of nirsevimab to infants under eight months of age during the 2024–2025 RSV season. More infants received protection through nirsevimab in the second season than in the first season, 2023–2024.

Infants born during the 2023–2024 RSV season (October to March) typically received nirsevimab closer to birth, while those born before September received it more than one month after birth. This pattern aligns with the availability and recommendations for nirsevimab, which typically begin shortly before the RSV season in most states.

During the second season of implementation, more infants born during the RSV season received nirsevimab within the first month of life compared to the 2023–2024 season. This suggests an improved understanding of administration guidance among healthcare providers and better access to nirsevimab.

From September 2024 through January 2025, 38.5% of pregnant women ages 18 to 49 received the RSV vaccine. Coverage varied by race and ethnicity, ranging from 25.7% among Black pregnant women to 52.6% among Asian pregnant women. These patterns are consistent with other vaccines during pregnancy, which typically show higher coverage among Asian and White non-Hispanic women and lower coverage among Black non-Hispanic and Hispanic/Latino women. Fifty-seven percent of infants born between April 2024 and March 2025 were protected against RSV through either maternal vaccination or receipt of nirsevimab.

For infants who become eligible, nirsevimab is recommended within the first week of life for those born between October and March in most of the continental United States. Birthing hospitals play a vital role in ensuring timely administration, especially for infants without commercial insurance. Approximately 45% of U.S. children ages 0 to 17 lack commercial insurance and are less likely to be seen by a primary care provider within one week of birth.

Providing nirsevimab in the hospital helps prevent missed opportunities for RSV immunization and supports coordination of care with pediatricians.

Participation in the Vaccines for Children (VFC) program by birthing hospitals promotes access to all ACIP-recommended vaccines. It allows newborns to receive necessary immunizations, such as nirsevimab and hepatitis B, before hospital discharge without upfront costs to the hospital for VFC-eligible children. This supports equitable, high-quality care for all infants at risk for RSV, regardless of insurance status.

In 2023, only 10% of U.S. birthing hospitals were enrolled in the VFC program when nirsevimab was added to the routine schedule. Through updated policies, new partnerships, and strong outreach, enrollment has grown to over 1,000 hospitals in under two years.

For the 2025–2026 RSV season, the supply of monoclonal antibodies is expected to meet demand and arrive earlier than in the previous season, supporting broad availability and a smooth program rollout. CDC is working with state partners, professional organizations, and the Indian Health Service to improve access and uptake of both maternal vaccines and infant monoclonal antibodies. Preseason technical assistance is underway to support ordering and logistics. Increased availability of 50 mg doses of nirsevimab is expected early in the season, and the newly licensed clesrovimab will be available once added to the CDC's VFC contracts.

Dr. Peacock summarized that during the 2024–2025 season, more infants born during the RSV season received nirsevimab within their first month of life compared to the previous year. This improvement was likely due to greater awareness among healthcare providers and families, as well as better supply availability. Maternal vaccination and RSV monoclonal antibodies protected 57% of infants born between April 2024 and March 2025, demonstrating the value of offering both options. Increased enrollment of birthing hospitals and improved early supply should enhance access to RSV protection in the upcoming season.

Dr. Adam MacNeil (CDC/NCIRD) presented the effectiveness and impact of RSV prevention products in infants during the 2024–2025 season. The CDC utilized data from three primary networks to evaluate RSV product effectiveness (PE) in the U.S., all based on variations of the case-control design. Two networks, VISION and NVSN, used a test-negative design, where infants with acute respiratory illness who received medical care (emergency department visit, hospitalization, or ICU admission) and were tested for RSV. Those who tested positive (cases) were compared to those who tested negative (controls) in terms of their RSV immunization status. The third, the Overcoming COVID-19 Network, used a matched case-control design comparing RSV-positive children with ICU admissions with matched RSV-negative controls. In all three networks, effectiveness was estimated by comparing the odds of RSV immunization between RSV-positive and RSV-negative infants. Each network has unique strengths: VISION uses electronic health records from emergency departments and hospitals in six states, NVSN conducts active surveillance in seven pediatric academic centers, and the Overcoming Network collects data from 26 pediatric intensive care units across 23 states.

Each network verified immunization status through electronic health records and immunization registries; NVSN and the Overcoming Network also included provider records and parental reports. VISION and NVSN analyzed data from October 2024 to March 2025, while Overcoming

analyzed data from December 2024 to April 2025. In all platforms, cases were children who have tested positive for RSV. NVSN systematically tested all enrolled children, including those who have not undergone clinical testing. Controls were children who tested negative for RSV; in NVSN, this may have included children without clinical testing. The Overcoming Network enrolled matched controls based on site, age, and date of hospitalization of cases.

All three studies included infants who were <8 months old on October 1, 2024, or born after that date during the study period. For maternal RSV product effectiveness, VISION included infants born on or after September 14, 2024, which is 14 days after vaccine availability in most of the U.S., while NVSN included infants under 6 months of age during the study period. All analyses used multivariable logistic regression, adjusting for site, age in months, and enrollment timing. VISION analyses also adjusted for race, ethnicity, and sex. For nirsevimab effectiveness, NVSN and Overcoming analyses also adjusted for presence of at least one high-risk medical condition. Overcoming analyses additionally adjusted for the Social Vulnerability Index, and NVSN also accounted for race and ethnicity and insurance status in the maternal vaccine analysis.

Nirsevimab showed strong effectiveness against RSV-associated emergency department visits during infants' first RSV season. In the VISION analysis of over 4,000 ED visits, 79% of RSV-positive children did not receive nirsevimab, compared to 64% of RSV-negative children. In the NVSN analysis of nearly 500 ED visits, 86% of RSV-positive children did not receive nirsevimab, compared to 56% of RSV-negative children. Among immunized children, the median time since the last dose was 68 days. The adjusted product effectiveness against RSV-associated ED visits was 63% in VISION and 76% in NVSN, with overlapping 95% confidence intervals, indicating consistent protection across both networks.

In the VISION analysis of over 600 hospitalizations, 81% of RSV-positive children did not receive nirsevimab, compared to 55% of RSV-negative children. In the NVSN analysis of nearly 700 hospitalizations, 89% of RSV-positive children had not received nirsevimab, compared to 61% of RSV-negative children. Among those who had received the antibody, the median time since dose was 61 days in VISION and 52 days in NVSN. The adjusted effectiveness against RSV-associated hospitalization was 79% in VISION and 82% in NVSN, with overlapping 95% confidence intervals.

In the VISION analysis of 374 ICU admissions, 86% of RSV-positive infants had not received nirsevimab, compared to 55% of RSV-negative infants. In NVSN, 92% of RSV-positive infants did not receive the antibody, compared to 56% of RSV-negative infants. The Overcoming platform showed similar results, with 87% of RSV-positive infants having not received nirsevimab versus 56% of RSV-negative infants. Among those who had received nirsevimab, the median time since dose at ICU admission was 56 days in VISION, 52 days in NVSN, and 50 days in Overcoming. Adjusted product effectiveness against RSV-associated ICU admission was estimated at 82% for VISION, 88% for NVSN, and 88% for Overcoming, with overlapping 95% confidence intervals across all three platforms.

During the 2024–2025 RSV season in the United States, the effectiveness of the maternal RSV vaccine against RSV-associated emergency department (ED) visits in infants during their first season was assessed using data from the VISION platform. Among nearly 1,000 ED visits, 79%

of RSV-positive infants did not have evidence of maternal RSV vaccination, compared to 65% of RSV-negative infants. Among infants whose mothers had received the vaccine, the median number of days since birth was 53, and the median number of days since maternal vaccination was 85. The estimated vaccine effectiveness against RSV-associated ED visits was 54%, with a 95% confidence interval of 35% to 67%.

During the 2024–2025 RSV season, maternal RSV vaccine effectiveness against infant hospitalization was 79% in the VISION network and 70% in NVSN, with overlapping confidence intervals. In both networks, over 80% of RSV-positive infants had no documented maternal vaccination. Among vaccinated groups, the median time since birth was around one month, and the median time since maternal vaccination was just over 70 days.

When interpreting these real-world product effectiveness findings, it's important to consider that differences in enrollment and population across systems may limit comparability. While study design and analysis help control confounders such as health-seeking behavior, residual confounding is still possible, although a variety of sensitivity analyses were performed to assess the influence of known confounders. There is also a risk of misclassifying RSV immunization status, although multiple data sources were used to verify immunization records.

RSV product effectiveness estimates align with clinical trial efficacy data for both nirsevimab and maternal RSV vaccination, particularly in terms of hospitalization and ICU admissions. Although ED visits were not measured in clinical trials, the real-world data suggest both products are effective in preventing RSV-associated emergency visits, hospitalizations, and severe illness. Ongoing monitoring will be important to evaluate additional outcomes.

To assess the impact of RSV prevention products on pediatric RSV-associated hospitalizations in the U.S., data were analyzed from two active, population-based surveillance systems. RSV-NET, part of the RESP-NET system, monitors RSV, influenza, and COVID-19 hospitalizations across all ages in 13 states. The second system, NVSN, tracks hospitalizations among children with acute respiratory illnesses across seven U.S. pediatric medical centers.

An ecological analysis was conducted to assess changes in pediatric RSV-associated hospitalization rates before and after the introduction of RSV prevention products. RSV hospitalization rates from pre-pandemic seasons (2018–2020 for RSV-Net, 2017–2020 for NVSN) were compared to rates from the 2024–2025 season, the second year of product availability. Seasons from 2020–2023 and 2023–2024 were excluded due to pandemic disruptions and limited product uptake, respectively. Weekly and monthly hospitalization rates were analyzed, and cumulative rates were compared across seasons. Rate ratios and relative rate reductions were calculated to assess the impact of RSV prevention products. Analyses focused on three age groups with different RSV prevention options: infants 0–7 months (eligible for maternal vaccine or nirsevimab), children 8–19 months (limited eligibility for nirsevimab based on risk conditions), and children 20–59 months (not eligible for RSV prevention products, used as a comparison group).

During the 2024–2025 RSV season, prevention products were available before the season began in most states, with coverage increasing over time. By March 2025, nirsevimab coverage

among infants aged 0–7 months ranged from 21% to 48% across reporting jurisdictions. As of January 2025, 39% of pregnant women aged 18–49 had received the RSV vaccine.

The ecological analysis compared RSV hospitalization rates among infants (0 to 7 months), toddlers (8 to 19 months), and preschoolers (20 to 59 months) before and after the introduction of RSV prevention products. Historically, infants have experienced the highest hospitalization rates, followed by toddlers and preschoolers, with rates remaining relatively consistent within each age group. During the 2024–2025 season, new RSV prevention products became available for infants and some high-risk toddlers, while preschoolers remained ineligible for these products. By comparing changes in hospitalization rates within each age group, the analysis assessed whether the declines among infants eligible for prevention were greater than declines in the other two age groups, which would suggest a population-level impact of the new products.

Results from the analysis showed that the two networks identified over 20,000 RSV-associated hospitalizations in children under five across the compared periods. In the 2024–2025 season, the proportion of children aged <5 years with an RSV-associated hospitalization who were aged 0 to 7 months decreased from 51% to 29% in RSV-NET and from 46% to 38% in NVSN in 2024-2025 compared to prior seasons before the introduction of prevention products. The median age at hospitalization also nearly doubled, from 7.7 to 15.4 months in RSV-NET and from 6.3 to 12.7 months in NVSN. This indicated that children hospitalized with RSV during the 2024–2025 season were typically older than in prior seasons.

Cumulative adjusted RSV-associated hospitalization rates in the 2024–2025 season were compared to those in prior seasons before product introduction across three age groups. Among infants aged 0 to 7 months, rates dropped from 17 to 10.5 per 1,000 in RSV-NET and from 16 to 11 per 1,000 in NVSN, corresponding to a 38% and 31% reduction in hospitalization rates, respectively. No reductions occurred among children aged 8 to 19 months or 20 to 59 months, suggesting the observed decline was limited to the age group eligible for RSV prevention products.

Among infants aged 0 to 7 months, further analysis showed that RSV-associated hospitalization rates were reduced by nearly half among those aged 0 to 2 months. In the 2024–2025 season, rates among infants aged 0 to 2 months dropped by 47% in RSV-NET and 46% in NVSN compared to prior seasons.

Dr. MacNeil concluded that two population-based surveillance networks demonstrated significant reductions in RSV-associated hospitalizations during the 2024–2025 season among infants eligible for preventive products, with decreases of 38% and 31% among those aged 0 to 7 months compared to prior seasons before product introduction. The greatest reductions were observed in infants aged 0 to 2 months, the group at the highest risk for hospitalization, highlighting the importance of timely protection through maternal vaccination during pregnancy or the administration of nirsevimab in the first week of life. Ongoing monitoring of RSV disease trends, including severity and age distribution, remains crucial for evaluating the long-term impact.

Dr. Levi emphasized the need for more detailed analyses to better understand the impact of RSV prevention products. He suggested evaluating whether certain groups, such as preterm infants or those with comorbidities, benefit more than healthy, full-term infants. He also recommended assessing broader outcomes, such as all-cause lower respiratory tract infections and overall respiratory infections, to ensure that reductions are not due to changes in testing practices. Additionally, he proposed examining hospitalization severity, including length of stay and type of care provided, to capture the overall clinical benefit better.

Dr. MacNeil acknowledged the importance of reducing all respiratory infections, not just RSV, and emphasized that preventing infant and pediatric hospitalizations is highly valuable. RSV alone accounts for a large portion of hospitalizations in newborns, so RSV prevention products are already having a meaningful public health impact. Regarding more granular analyses, such as subgroup evaluations, it was noted that these would be useful. Still, limitations in statistical power may affect the ability to explore them in greater depth.

Dr. Hibbeln noted that combining small-sample clinical trials with large-scale ecological studies can be a challenging task. Still, it appears that both types of studies show similar effect sizes for RSV prevention products. He asked for confirmation on whether that observation is accurate.

Dr. MacNeil confirmed that although the clinical trials were not conducted in the United States, and some differences exist, the overall magnitude of effect appears consistent. The observed real-world impact aligns with expectations based on the clinical trial results.

Dr. Hibbeln noted that the major event between the two ecological studies was the COVID-19 pandemic and asked whether there is any evidence of an interaction or a potential protective effect of COVID-19 vaccination on RSV hospitalizations or related outcomes.

Dr. MacNeil responded that, biologically, there would not be a direct effect of COVID-19 or COVID-19 vaccination on RSV, as the two viruses are very different and unrelated in their mechanisms of infection.

Dr. Malone noted that monoclonal antibodies are particularly vulnerable to viral drift and suggested that it could be beneficial if the two available monoclonals target different epitopes. He asked whether there is information available on whether these two monoclonals are directed at distinct regions of the virus.

Dr. MacNeil explained that both monoclonal antibodies target the larger prefusion protein. However, there is a possibility that if resistance develops against one, the other could still offer protection. This consideration was part of the work group's rationale and deliberation in recommending the inclusion of a second monoclonal antibody.

Dr. Malone expressed support for the approach and noted that the discussion highlights the significant viral and infectious pressure currently present. He asked whether there is active monitoring in place to track changes that could impact the effectiveness of monoclonal antibodies due to viral drift.

Dr. MacNeil explained that RSV infects individuals multiple times throughout their lives, resulting in the continuous circulation of the virus. Because of this, protecting a relatively small population

is not expected to create significant population-level selective pressure. He added that while some genomic monitoring of RSV is conducted, widespread ecological selective pressure is not anticipated, since the virus continues to be transmitted broadly among the general population.

Dr. Malone noted that drug-drug interactions will be an important issue for ACIP to consider moving forward. He pointed out that among those receiving monoclonal antibody products, some infants are likely fully vaccinated under the standard birth schedule, while others may not be. If that is the case, he suggested it would be valuable to collect and analyze data comparing safety and effectiveness between these groups. He emphasized that demonstrating no difference in outcomes between those who receive standard vaccinations concurrently and those who do not would be useful if such monitoring is not already in place.

An SME clarified that the two monoclonal antibodies bind to different locations on the virus. While some viruses are known to drift away from the effectiveness of monoclonal antibodies, these monoclonals are likely less prone to such drift due to the virus's evolutionary characteristics. However, genetic surveillance is ongoing to monitor changes and ensure continued effectiveness.

Dr. Levi emphasized the importance of monitoring how vaccine efficacy changes over time, even within a single season. Referring to the maternal RSV vaccine data, he noted that between days 180 and 360, a signal appeared suggesting negative efficacy, with more hospitalizations occurring among vaccinated individuals compared to those who were not vaccinated. He acknowledged that RSV is a challenging virus that often responds unpredictably to interventions and stressed the need for careful interpretation and a deeper understanding of potential explanations for these findings.

Dr. MacNeil acknowledged that the effectiveness of RSV prevention products wanes over time. He emphasized that the goal is to protect infants during their most vulnerable period, particularly in the first two months of life, before their immune systems are fully developed. By providing protection early, the aim is to help children reach an age where, like healthy teenagers or adults, they may still get infected with RSV but are far less likely to develop severe disease. The primary objective is to reduce the risk of serious outcomes during the earliest and highest-risk stage of life.

Dr. Picaro addressed the question about monitoring protection beyond 150 days, explaining that the current challenge stems from the way these products are administered, typically at the beginning of the RSV season. As coverage increases over time, the number of children who have reached 120 to 180 days post-immunization during the observation period decreases. This limits the ability to assess long-term protection in current analyses. He noted that this challenge is tied to the seasonal nature of product rollout. However, he expressed hope that data from regions where RSV circulates more consistently throughout the year may help answer questions about the duration of protection.

Dr. Malini DeSilva (HealthPartners) shared updates on prenatal RSVpreF vaccine safety. Established in 1990, the Vaccine Safety Datalink (VSD) is a collaborative project between CDC's Immunization Safety Office and integrated healthcare organizations in the United States. The VSD primarily monitors vaccine safety through observational, multi-site studies that utilize

real-world data. It includes data on approximately 15.5 million individuals annually, representing about 4.5% of the U.S. population, with an annual birth cohort of roughly 115,000 live births. Data are organized using a common data model with standardized coding systems. Currently, 13 VSD sites provide clinical, methodological, and data expertise, with 11 of those sites contributing data.

The prenatal RSV vaccine was recommended for use by the ACIP in September 2023 for administration between 32 and 36 weeks of gestation, with seasonal use from September through January. In the phase 3 RSVpreF clinical trial, non-significant imbalances were observed among vaccinated women compared to placebo recipients in rates of preterm birth, gestational hypertension, and preeclampsia.

Prenatal RSVpreF vaccine safety outcomes evaluated in this study included acute outcomes occurring within 42 days of vaccination. These outcomes were preterm birth, small for gestational age at birth, stillbirth, and hypertensive disorders of pregnancy. Hypertensive disorders were assessed both as a combined outcome and as individual conditions, including gestational hypertension, preeclampsia, eclampsia, and HELLP syndrome.

A target trial emulation design was used to compare RSVpreF-vaccinated and unvaccinated pregnant women at each gestational week, aiming to mimic a randomized trial using observational data. The study included pregnant women aged 16–49 years with a gestational age of 32 to less than 37 weeks between September 22, 2023, and January 31, 2024 (or February 29, 2024, for two sites). Vaccinated individuals were matched one-to-one with unvaccinated individuals by site and likelihood of vaccination, based on the same gestational week. Outcomes were tracked from the index date through two weeks after pregnancy ended. Unvaccinated matches were assigned the same index date as their vaccinated counterpart, and pairs were censored if the unvaccinated individual later received the vaccine.

Risk ratios with 95% confidence intervals were estimated using a log-binomial model with robust variance, adjusting for nulliparity. For small-for-gestational-age infants at birth, matched sets were excluded if infant weight was missing for either infant. For hypertensive disorders of pregnancy, matched sets were excluded if disease onset occurred on or before the index date for either pregnant woman.

The analysis included 13,966 matched pairs; however, the cohort does not represent unique individuals, as some initially unvaccinated participants were later vaccinated and subsequently rematched. While overall characteristics were similar, RSV-vaccinated women were generally older than their unvaccinated matches. The vaccinated group had a higher proportion of Asian patients and a lower proportion of Black and Hispanic patients. Additionally, 98.5% of the vaccinated group had received at least one other vaccine during pregnancy, compared to 81% in the unvaccinated group. A higher percentage of nulliparous women was also observed in the vaccinated group.

The analysis found no significant differences in the risk of acute safety outcomes between RSVpreF-vaccinated pregnant women and their unvaccinated matches across all evaluated time intervals (1–6 days, 1–21 days, and 1–42 days).

The analysis found no association between RSVpreF vaccination during pregnancy and the risk of preterm birth, small for gestational age at birth, or stillbirth. However, there was a statistically significant association between RSVpreF vaccination and hypertensive disorders of pregnancy. The adjusted risk ratio for any hypertensive disorder was 1.09, with significant associations observed for both preeclampsia and gestational hypertension.

Among individuals with diagnosed hypertensive disorders of pregnancy, rates of cesarean delivery and post-birth hospitalization admissions were similar between RSVpreF-vaccinated and unvaccinated groups. Lengths of stay over 3 days were slightly higher in the vaccinated group, except for infants delivered by cesarean. Overall, the findings suggest comparable severity of hypertensive disorders of pregnancy between the two groups.

In the phase 3 clinical trial of the RSVpreF vaccine administered during pregnancy, there were more cases of gestational hypertension and preeclampsia among vaccine recipients compared to placebo recipients. However, these differences were not statistically significant.

A retrospective observational cohort study of patients who delivered at 32 weeks and 0 days gestation or later at two New York City hospitals between September 22, 2023, and January 31, 2024, found a significant association between RSVpreF vaccination and hypertensive disorders of pregnancy using a time-dependent Cox regression model. However, this association was not significant in either unadjusted or adjusted multivariable logistic regression models. In stratified analyses by site and insurance status, the association persisted only among patients with private insurance and at one of the two hospitals.

Dr. DeSilva concluded that the RSVpreF vaccine is not associated with increased risk for acute safety outcomes, preterm birth, small for gestational age at birth, or stillbirth. However, the vaccine is associated with a small but statistically significant increased risk for hypertensive disorders of pregnancy. These findings are consistent with results from the Phase 3 clinical trial and a large observational study; however, the association may be influenced by residual confounding or outcome misclassification. Importantly, the severity of hypertensive disorders appeared similar between vaccinated and unvaccinated individuals based on rates of cesarean delivery, post-birth hospital admissions, and length of stay. Results from the 2024–2025 season are pending and will provide additional insight into the safety of the prenatal RSV vaccine.

Dr. Matthew Daley (Kaiser Permanente Colorado) presented on monitoring the safety of nirsevimab in infants born through <8 months. Nirsevimab is a long-acting monoclonal antibody recommended for the prevention of RSV disease in infants. It is intended for infants from birth to under 8 months of age who have not received the RSV vaccine during pregnancy, as well as for select high-risk infants aged 8 to 19 months. Phase 3 clinical trials demonstrated high efficacy, and post-licensure data showed strong effectiveness. Although there was a severe shortage during the 2023–2024 season, uptake remained high within the VFC and VSD populations. A total of 72 percent received either nirsevimab or the maternal RSV vaccine.

The safety profile of nirsevimab is based on three randomized clinical trials, which included both healthy and high-risk infants. Across these trials, 3,184 infants received nirsevimab, 1,284 received a placebo (with a 2-to-1 randomization), and 304 received palivizumab, another monoclonal antibody targeting RSV. Adverse events were generally balanced between the

nirsevimab and comparator groups. Seven infants who received nirsevimab experienced rashes, primarily papular or maculopapular in nature. Importantly, no cases of anaphylaxis, serious hypersensitivity reactions, or immune complex diseases were reported.

Although clinical trials provided important safety data, additional post-licensure monitoring is needed to assess rare adverse events and evaluate safety when nirsevimab is administered during routine care in the general population. The objective of this study was to examine the safety of nirsevimab by analyzing prespecified adverse events among recipients in the Vaccine Safety Datalink (VSD). While nirsevimab is a passive immunization, the CDC and ACIP specifically requested that the VSD evaluate its safety.

The VSD is an observational system that utilizes EHR data from a birth cohort of approximately 115,000 individuals annually. It integrates data from electronic health records, claims, immunization registries, and diagnosis codes across inpatient, emergency, and outpatient settings. A key strength of VSD is its ability to conduct rapid manual medical record reviews to validate diagnoses and ensure accuracy. It also uses advanced analytic methods, including self-controlled designs, to address confounding.

During the 2023–2024 season, 36,719 infants received nirsevimab in the VSD. Prespecified adverse events were monitored using a self-controlled risk interval analysis, with results stratified by age group. No increased risk was identified for seizures, ITP, drug reactions, fever, or sepsis. No cases of anaphylaxis were reported. Some non-anaphylactic allergic reactions, primarily hives, occurred on the same day as administration. This finding is consistent with those from the clinical trials.

For the 2024–2025 season, this analysis included all VSD-contributing sites and focused on infants from birth to under 8 months of age who received nirsevimab between October 1, 2024, and February 1, 2025. All exposed infants were included, regardless of whether they received vaccines on the same day. Continuous health insurance enrollment through the control window was required to track both nirsevimab administration and potential adverse events. A self-controlled risk interval design was used. Infants whose mothers received an RSV vaccine during pregnancy were excluded from the study.

Self-controlled designs, such as the self-controlled risk interval, are commonly used in vaccine safety studies. These methods compare the risk of adverse events during a period shortly after vaccination with that of a later period in the same individual. This controls for fixed characteristics, such as chronic conditions, that could bias the results. These designs are useful because people who receive vaccines often differ from those who do not, and those differences may not be fully captured in health records.

Age was a significant factor in the design of this study. Diagnoses in the first month of life often reflect conditions related to pregnancy, delivery, or newborn care. Healthcare use and insurance enrollment patterns also differ in this period. Additionally, except for the birth dose of hepatitis B, routine vaccines are not given before 38 days of age. For these reasons, safety analyses were done separately for newborns (0 to 37 days) and older infants (38 days to 8 months).

The study assessed seizures, immune thrombocytopenia (ITP), drug reactions, fever, and sepsis using self-controlled risk interval designs. Anaphylaxis and non-anaphylactic serious allergic reactions were monitored by tracking case counts. Autoimmune and immune complex diseases are also planned for evaluation through a case-control study at the end of surveillance, as these outcomes are rare in infants and may have a delayed onset.

A total of 117,427 neonates and infants from birth to under 8 months of age were identified. Following enrollment criteria, 43,532 received nirsevimab. Exclusions included 1,663 infants with prenatal exposure to RSV vaccine, as some may still qualify for nirsevimab under specific clinical circumstances. Additional exclusions were made for infants who received nirsevimab at the end of the 2023–2024 season. The final safety analysis included 9,855 neonates (0 to 37 days old) and 28,054 infants (38 days to under 8 months old).

Nirsevimab was administered to infants at various ages from birth to under 8 months, with no single peak age. Dosing clustered in the first week of life and at typical well-child visit intervals, including 2 weeks, 2 months, 4 months, and 6 months of age.

Among neonates aged 0 to 37 days, administration frequently occurred on the day of birth, often with the hepatitis B vaccine. On day one, most neonates received nirsevimab alone, though some also received hepatitis B. For the remainder of the neonatal period, nirsevimab was typically given without same-day hepatitis B vaccination.

Among neonates aged 0 to 37 days, nirsevimab was often administered on the same day as the hepatitis B vaccine, particularly on the day of birth. Among infants aged 38 days to under 8 months, 84 percent received nirsevimab on the same day as other vaccines. The most common same-day combination included nirsevimab with hepatitis B, rotavirus, DTaP, Hib, pneumococcal, and polio vaccines.

No significant increased risk of seizures was observed in either the 2023–2024 or 2024–2025 seasons. Medical record reviews showed that some reported cases were not true seizures, while others were related to known genetic seizure disorders.

Regarding ITP, a single case was identified within the risk window among infants aged 38 days to under 8 months. No cases were observed in the neonatal group.

With respect to drug reactions, there were zero cases in both the risk and control windows for both the neonatal group and the older infant group.

Among neonates aged 0 to 37 days, there were four cases of sepsis or fever in the risk window and nine in the control window, yielding a relative risk of 0.44. This outcome was not evaluated in older infants due to differences in clinical management of fever by age. An exploratory analysis showed a numerical imbalance in sepsis workups, such as blood or spinal fluid cultures, between risk and control windows. However, medical record review found no consistent concerns, with cultures often performed for reasons other than fever. No increased risk of sepsis or fever was identified.

For anaphylaxis, no cases were reported in either the neonatal group (0 to 37 days) or the older infant group. For non-anaphylactic serious allergic reactions, there were 14 cases in the

neonatal group and 4 in the older group. These were primarily diagnosis codes for urticaria (hives) occurring on the same day as nirsevimab administration.

Dr. Daley summarized that among a combined population of 74,000 neonates and infants exposed to nirsevimab over two seasons, there was no increased risk of seizures, ITP, drug reactions, fever, or sepsis. No cases of anaphylaxis were reported. A small number of non-anaphylactic allergic reactions were observed, primarily coded as urticaria or hives, without more serious hypersensitivity in the same children. These findings support a reassuring safety profile for nirsevimab in routine clinical practice. Additional data collection is underway for later-season use, so these results should be considered preliminary.

Nirsevimab safety surveillance is ongoing. Three assessments were planned: post-2023–2024 results (already shared with the ACIP RSV Work Group), a preliminary 2024–2025 assessment (presented here), and a final cumulative analysis through July 2025. Medical records will be manually reviewed for any cases of anaphylaxis or other outcomes of concern. A case-control study of autoimmune and immune complex diseases was also planned, but only two cases were identified in 2024–2025, both related to isoimmunization and not associated with nirsevimab. As a result, this analysis could not be conducted, but the absence of cases is reassuring.

Dr. Adam MacNeil (CDC/NCIRD) shared the updates and summary of the Evidence to Recommendation (EtR) framework for clesrovimab. The policy question under consideration is whether clesrovimab should be recommended for all infants under 8 months of age born during or entering their first RSV season.

For the public health problem domain, Dr. MacNeil shared that RSV places a significant burden on young children. Without preventive products, the CDC estimates RSV caused approximately 2 million medical visits, 58,000 to 80,000 hospitalizations, and 100 to 300 deaths annually in U.S. children under five. Most infants are infected in their first year of life, with 2 to 3 percent of young infants hospitalized. Hospitalization risk is highest in the first months of life and declines with increasing age. About 80 percent of children hospitalized for RSV have no underlying medical conditions; therefore, all young children are at risk for hospitalization. When asked if RSV disease among infants <8 months of age is of public health importance, the work group unanimously voted “yes.”

The benefits and harms domain addressed three key questions: 1) the magnitude of anticipated benefits; 2) the magnitude of anticipated harms; and 3) whether the benefits outweigh the harms. To assess this, a GRADE analysis was conducted to evaluate the certainty of evidence for both beneficial and harmful outcomes. The PICO components (population, intervention, comparison, outcomes) were defined as follows: the population included all infants under 8 months of age born during or entering their first RSV season; the intervention was clesrovimab; the comparison was a placebo. Beneficial outcomes assessed included RSV-associated medically attended lower respiratory tract infections (LRTIs), hospitalizations, ICU admissions, all-cause medically attended LRTIs, and all-cause LRTI-associated hospitalizations. The harmful outcome evaluated was serious adverse events.

For RSV-associated medically attended lower respiratory tract infection (LRTI), the efficacy was 60%. In the certainty assessment, there was concern for indirectness because the trial excluded

infants eligible for palivizumab and was conducted during a season with disrupted RSV circulation due to COVID-19. This concern was noted for all outcomes but was deemed not serious. For RSV-associated LRTI with hospitalization, the efficacy was 91%. For RSV-associated LRTI with ICU admission, the efficacy was estimated to be 100%. There was serious concern for imprecision as the confidence interval contained estimates for which different policy decisions may be considered.

For harms, the relative risk of serious adverse events was evaluated through 365 days in the trial. The estimated relative risk was 0.93, with a 95% confidence interval ranging from 0.77 to 1.2, which included 1, suggesting that serious adverse events occurred at a similar proportion in those who received clesrovimab and those who did not. However, there was a serious concern for imprecision in this estimate, as too few infants were included to capture rare serious adverse events.

GRADE findings showed that clesrovimab was effective in preventing RSV-associated medically attended LRTI and RSV-associated hospitalization, with high certainty. It was effective in preventing ICU admissions due to RSV-associated LRTI with moderate certainty. It was not effective in preventing all-cause medically attended LRTI, with moderate certainty, but was moderately effective in preventing all-cause LRTI-associated hospitalization, with high certainty. No increase in serious adverse events was observed in the clesrovimab group compared to the placebo group with moderate certainty.

Beyond trial outcomes, additional benefits of having a second long-acting monoclonal antibody option include: having another product with a different binding site in case of resistance mutations, supply shortages, and pricing competition. Rates of injection site and systemic reactions were similar between groups (29.9% for clesrovimab vs. 30.9% for placebo), mostly mild or moderate. Fever rates were also similar (3.7% vs. 4.0%), suggesting no increased risk with clesrovimab.

Based on the data presented, the work group concluded that clesrovimab is an effective long-acting monoclonal antibody for preventing severe RSV disease in young infants during their first RSV season. As the second approved product of its kind, it may be helpful in mitigating any supply disruptions and potential resistance to any single product. Clesrovimab demonstrated a favorable safety profile, with no increase in serious or solicited adverse events, including fever. However, rare events may not have been detected due to the trial's size. The majority of the work group agreed that the anticipated benefits were large and the harms minimal. The group unanimously concluded that the benefits outweigh the risks.

For the values domain, data was presented on parents' and caregivers' views of the benefits of clesrovimab relative to its harms. A national survey conducted from December 2022 to January 2023 among pregnant and postpartum women found that 31% knew a baby hospitalized with RSV, 38% believed their baby would become moderately or severely ill if infected, and 69% were concerned about possible hospitalization. In a study conducted in April and May in Cascadia on parental preferences for RSV products, 37% preferred maternal vaccination, 12% preferred the infant monoclonal antibody, 3% preferred neither, and 48% had no preference, suggesting that either option may be acceptable to parents. Preliminary data from the National

Immunization Survey showed that as of February, 50% of infants under 8 months had received a long-acting monoclonal antibody, and another 7% of caregivers reported definite intentions to do so.

The work group felt that parents and caregivers probably viewed the desirable effects of clesrovimab as large relative to the undesirable effects. When asked whether there was important uncertainty or variability in how much parents and caregivers value the prevention of severe RSV disease, the majority of the work group felt there was probably not significant uncertainty or variability.

In the acceptability domain, data assessed whether clesrovimab is acceptable to key stakeholders, primarily providers and professional organizations. In a survey of 200 U.S. pediatricians conducted in October 2024, about 75% reported offering a long-acting monoclonal antibody in their practice. Over 90% agreed or strongly agreed that it is safe for infants, effective against severe RSV disease, and that they felt confident recommending and co-administering it with other vaccines. National organizations, including the American Academy of Pediatrics, the American Academy of Family Physicians, and the National Foundation for Infectious Diseases, have endorsed clesrovimab. The majority of the work group felt that clesrovimab is acceptable to key stakeholders. A minority of the work group said it is probably acceptable.

In the feasibility domain, the data focused on whether clesrovimab is practical to implement for all infants under 8 months of age born during or entering their first RSV season. If recommended by ACIP, clesrovimab would become the second long-acting monoclonal antibody included in the Vaccines for Children (VFC) program, which provides vaccines at no cost to eligible children. The product is a single-dose immunization, administered regardless of infant weight, which may simplify delivery. However, stocking could be a challenge for providers who also need to carry nirsevimab for high-risk children aged 8 through 19 months. Some may prefer to stock only one long-acting RSV monoclonal antibody. In a 2024 survey of pediatricians, the most frequently reported implementation challenges were determining maternal RSV vaccination status (34%), the financial burden of purchasing the product, and reimbursement issues from private insurers. The majority of the work group felt that clesrovimab is, or probably is, feasible to implement.

For the resource use domain, a cost-effectiveness model was developed by the University of Michigan and the CDC, building on methods previously used to evaluate nirsevimab. The model was updated with key inputs for clesrovimab, including its effectiveness and anticipated cost per dose. In the base case scenario, assuming 50% coverage of clesrovimab among an annual birth cohort and continued use of palivizumab for eligible high-risk infants, the model estimated prevention of approximately 120,000 outpatient visits, 43,500 emergency department visits, 20,000 hospitalizations, 4,500 ICU admissions, 20 deaths, and nearly 3,500 quality-adjusted life years (QALYs) gained.

Estimated incremental cost-effectiveness ratios were roughly $3,000 per outpatient visit prevented, $8,200 per emergency department visit prevented, $17,500 per hospitalization prevented, $80,000 per ICU admission prevented, and $104,500 per quality-adjusted year of life (QALY) gained. Extensive sensitivity analyses were conducted using a wide range of input

values. Results were sensitive to assumptions about inpatient costs, quality of life losses, and product price.

The majority of the work group felt that clesrovimab use among all infants under 8 months of age born during or entering their first RSV season is, or probably is, a reasonable and efficient allocation of resources at an average cost of $458 per dose.

Dr. MacNeil summarized the work group's discussion, considerations, and interpretation of the data. The group found that the phase 2b/3 trial of clesrovimab demonstrated high efficacy in preventing severe RSV through 150 days. Serious adverse events appeared to be balanced between the clesrovimab and placebo groups, although rare events may not be detectable in a trial of this size. The group noted that while clesrovimab has a shorter half-life than nirsevimab, its efficacy appeared sustained through 150 days. Direct comparisons between the two products are limited due to differences in trial endpoints; a head-to-head study would be needed to evaluate comparative efficacy.

The group emphasized the value of having multiple long-acting monoclonal antibody products and manufacturers, as this diversification supports resilience in the face of potential resistance or supply shortages and may help drive price competition. RSV remains the leading cause of hospitalization in infants, and immunization can significantly reduce this burden. To achieve a meaningful public health impact, timely administration is critical. For infants born outside the RSV season, high coverage before the season begins is essential. For those born during the season, administration should ideally occur within the first week of life, preferably during the hospitalization for birth.

When asked about the balance between desirable and undesirable effects, the work group concluded that the desirable consequences clearly outweigh the undesirable ones. In the final poll, the work group unanimously supported recommending clesrovimab for all infants under 8 months of age born during or entering their first RSV season.

Dr. Adam MacNeil (CDC/NCIRD) shared the updates on clinical considerations for clesrovimab. To summarize the effectiveness, uptake, and impact data: Nirsevimab was effective in preventing RSV-associated emergency department visits, hospitalizations, and critical illness among infants in their first RSV season. Maternal vaccination was effective against RSV-associated emergency visits and hospitalizations. An estimated 50% of infants were either born to a vaccinated mother or received nirsevimab. Following the introduction of RSV immunization, hospitalization rates declined by 30% to 40% among eligible infants and by 50% among infants aged 0 to 2 months.

The work group noted that the impact of RSV immunizations in reducing severe disease among infants during the 2024–2025 season in the RSV-NET and NVSN networks is clear. Increasing uptake is crucial to further reduce the burden of RSV. A greater impact has been observed in countries with higher immunization coverage. Maximizing availability, including providing the infant RSV antibody during the birth hospitalization, is important. Expanding birthing hospital enrollment in the VFC program is a crucial step, although challenges remain, and continued efforts are necessary to increase participation.

To summarize the FAERS post-marketing data for nirsevimab: Since approval through March 31, 2025, the most frequently reported adverse events involved RSV infections occurring after nirsevimab administration, including related symptoms and complications. No new safety

labeling updates have been made since the addition of serious hypersensitivity reactions on February 23, 2024. No additional safety signals have been identified. Errors involving incorrect dosing or product selection continue to be reported. FDA will continue routine pharmacovigilance for nirsevimab.

The VSD nirsevimab safety study for the 2024–2025 season included nearly 40,000 infants and employed a self-controlled risk interval design. No increased risk was observed for seizures, immune thrombocytopenia, drug reactions, sepsis, or fever. No cases of anaphylaxis were reported, and 18 cases of allergic reactions, primarily hives, were identified.

The work group found that FAERS and VSD safety data are reassuring and emphasized the importance of continued safety monitoring.

The VSD maternal RSV vaccine study included a matched cohort of 14,000 pregnant women who were either vaccinated or unvaccinated. No increased risk was observed for most outcomes. An association was identified between maternal RSV vaccination and hypertensive disorders of pregnancy, including preeclampsia, although the severity of the episodes of hypertensive disorders of pregnancy was similar among vaccinated and unvaccinated. VSD noted potential residual confounding, such as parity, and possible outcome misclassification due to challenges in determining the timing of onset and the absence of medical chart review.

The work group found the overall study findings reassuring, particularly the lack of association between maternal RSV vaccination and preterm birth. The group continued to conclude that the benefits of maternal RSV vaccination clearly outweigh the potential risks. Opinions were divided on the importance of the observed association with hypertensive disorders of pregnancy. Some members were not concerned, noting the small effect size, the absence of an increase in severity among vaccinated individuals, and the lack of association with preterm birth. The American College of Obstetricians and Gynecologists agreed with this assessment. Some were concerned that an imbalance of HDP was seen in multiple studies (phase 3 clinical trial, published retrospective cohort study, post-marketing study), and felt it was important that healthcare providers discuss the potential risk of HDP with pregnant women.

Clesrovimab is a long-lasting monoclonal antibody manufactured by Merck and is a form of passive immunization. It is administered as a single 105 mg dose in a 0.7 mL prefilled syringe, with the same dose recommended for all infants born during or entering their first RSV season, regardless of weight.

Dr. Adam MacNeil (CDC/NCIRD) presented the proposed recommendations. Clesrovimab and nirsevimab are recommended for use in infants under 8 months of age who are born during or entering their first RSV season. There is no preferential recommendation between the two products.

Only nirsevimab is recommended for children aged 8 through 19 months who are at increased risk of severe RSV disease and entering their second RSV season. Infants eligible for nirsevimab in their second season may have received either clesrovimab or nirsevimab during their first season. There are no safety or effectiveness concerns with using clesrovimab in the first season and nirsevimab in the second.

The proposed use of RSV antibody immunizations in infants, including nirsevimab or clesrovimab, is largely consistent with current nirsevimab recommendations. One dose is recommended for infants under 8 months of age during or entering their first RSV season, typically October through March in most of the continental U.S., if the mother did not receive RSV vaccine during pregnancy, if maternal vaccination status is unknown, or if the infant was born less than 14 days after maternal vaccination. Use may also be considered for infants born to mothers with reduced immune response or impaired antibody transfer, or for infants with

conditions that lead to loss of maternal antibodies, or infants with substantially increased risk for severe RSV disease.

To prevent severe RSV in infants, most will not need both maternal vaccination and an RSV antibody. Pregnant women should work with their healthcare provider to choose one of the two options.

Maternal RSV vaccine is recommended from September through January, and infant RSV antibodies are recommended from October through March. For infants already born before October, the optimal time to administer RSV antibody is just before the start of the season. In areas with varying RSV seasonality, providers should follow guidance from their state, local, or territorial health authorities.

Administration errors have occurred, including the incorrect distribution of RSV immunization products to the wrong population. Only RSV antibodies should be given to infants. RSV vaccines, such as Abrysvo, Arexvy, and mResvia, should not be administered to children. Only Abrysvo is approved for use in pregnant women. Arexvy and mResvia should not be given during pregnancy. Older adults may receive any of the three approved RSV vaccines. RSV antibodies should not be administered to pregnant women or older adults.

If an infant or child receives either nirsevimab or clesrovimab, palivizumab is not recommended during the same RSV season. Clesrovimab will be administered in the same manner as nirsevimab, as an intramuscular injection into the vastus lateralis muscle of the anterolateral thigh. The gluteal muscle should not be used for administration. It is acceptable to administer infant RSV antibodies concurrently with routine vaccines.

Clesrovimab should be stored in a refrigerator and used within 48 hours of being removed. It should not be frozen, shaken, or exposed to light.

If RSV antibodies are administered alone, suspected adverse events should be reported to MedWatch. If they are given at the same time as any vaccine, suspected adverse events should be reported to the VAERS. Additional reporting to MedWatch is not necessary in that case.

Proposed Recommendation:

> ACIP recommends that infants aged<8 months born during or entering their first RSV season who are not protected by maternal vaccination receive one dose of clesrovimab.

Dr. Georgina Peacock (CDC/NCIRD) shared updates on the RSV vaccines VFC resolution. The purpose of the resolution is to update the existing policy to include an additional long-acting monoclonal antibody for the prevention of RSV.

The first component of the resolution addresses the RSV maternal vaccine. There are no changes to the eligible groups, recommended schedule, or dosing intervals. However, the name of the individual product has been replaced with a product group name to reflect the availability of two licensed products. There are also no changes to the dosage, contraindications, or precautions.

The second component of the resolution has been retitled to reflect a product group name instead of a specific product. The eligible groups remain unchanged, as does the list of children at increased risk for severe RSV disease. The recommended schedule and intervals for nirsevimab are unchanged. A new row has been added to the table to include clesrovimab, the newly licensed long-acting monoclonal antibody for RSV prevention. As noted, clesrovimab is not indicated for use during a second RSV season.

Table notes have been added to define long-acting monoclonal antibodies and to provide a link to published information on the timing of administration. The language below the table has also been updated to reference the product group rather than an individual product. There are no changes to dosage, contraindications, or precautions.

Finally, ACIP recommendations published within six months of the resolution will be incorporated by reference, except for changes related to eligible groups.

Proposed Recommendation: VFC update

Approve the updated Vaccines for Children (VFC) resolution for prevention of RSV.

Dr. Levi acknowledged the consensus that RSV is a serious illness, particularly for young infants and those with underlying health conditions or born preterm. He expressed hope that newly developed RSV therapies will help prevent severe outcomes, including hospitalizations and deaths. However, he raised concerns based on clinical trial data related to the safety of these products. In the Melody trial, which tested nirsevimab in healthy infants, there were five deaths in the immunized group and none in the placebo group. Although serious adverse events (SAEs) were balanced overall, nervous system-related SAEs appeared more frequently in the immunized group. He noted that two deaths due to gastroenteritis in healthy infants were particularly unusual. In the Medley trial, which involved high-risk infants and compared nirsevimab to palivizumab, the imbalance in deaths continued (five in the immunized group versus one in the comparator group), with similar patterns in nervous system SAEs and gastroenteritis cases. The Harmony trial, conducted in Europe, showed no deaths in either group but still reflected a higher rate of SAEs in the immunized group, particularly involving the nervous system. Dr. Levi also highlighted data from the clinical trial of clesrovimab, the product under current consideration. In that trial, there were seven deaths in the immunized group compared to three in the control group. Nervous system SAEs were reported in 25 immunized infants versus four in the control group, and gastroenteritis cases occurred in 30 versus 10 infants. He pointed out the higher dose used for clesrovimab (105 mg) compared to nirsevimab (50 to 100 mg), suggesting the need to examine potential dose-related effects. Additionally, early reports from the Melody trial suggested that immunized infants had longer hospital stays upon admission, raising concerns about the potential for immunization-enhanced disease. Dr. Levi concluded by asking whether these patterns, though based on small numbers, might signal potential safety concerns. He noted that post-marketing analyses presented so far have been limited in scope and duration, and he urged CDC and committee colleagues to consider whether the observed imbalances warrant further investigation alongside the recognized benefits.

A representative from Merck Research Laboratories spoke about clesrovimab, a monoclonal antibody recently licensed by the FDA for the prevention of RSV disease in infants entering their first RSV season. The representative explained that the FDA conducted a thorough review of the product's safety and efficacy data and that Merck had shared detailed materials with the ACIP working group during its deliberations in November of the previous year. They emphasized that all adverse events reported during the clinical trials were extensively evaluated, and none were found by investigators to be related to RSV or the intervention given to the infants. No patterns or trends were observed in terms of cause, affected organ systems, or timing of events. The representative also pointed out that the main trial in healthy infants, known as Protocol 4 or

CLEVER, used a 2:1 randomization ratio, which should be considered when interpreting event numbers.

A member of the Maternal/Pediatric Workgroup addressed concerns about deaths observed in the pivotal Phase 2b/3 trial of clesrovimab. They noted that deaths were evaluated as potential harm over the 365 days following immunization. The events were balanced between the clesrovimab and placebo groups when accounting for the study's 2:1 randomization ratio. Specifically, there were seven deaths in the clesrovimab group and three in the placebo group, which aligns with the expected distribution based on the trial design. No patterns were observed in the cause or timing of deaths that suggested a link to the intervention.

An ex officio member clarified that clesrovimab was approved by the Center for Drug Evaluation and Research (CDER). As someone who works within CDER, they explained that they preferred not to speak on behalf of the review team and instead suggested deferring to CDER for an official comment on the safety review.

Ms. Hodowanik stated that she did not have much to add beyond Merck's summary but emphasized that the FDA carefully reviewed all case narratives. She confirmed that no trends or clustering were observed in the causes of death, and there was nothing to suggest a drug-related cause in any of the cases. She also noted that clesrovimab is a monoclonal antibody and that this class of products is generally well tolerated with limited toxicity.

Dr. Levi thanked the group for their responses and acknowledged the 2:1 randomization ratio used in the trials. However, he raised a concern about a possible trend in the data. He noted that across four separate trials, the number of deaths consistently occurred more frequently in the immunized groups. While he agreed that the trials were small and not powered to detect most safety signals unless those signals were very strong, he questioned whether seeing a similar pattern across multiple studies involving two similar products should prompt further consideration. He asked the group for their thoughts on whether this recurring outcome might be meaningful.

Ms. Hodowanik responded by acknowledging that the numerical counts of deaths in the studies appeared higher in the immunized groups. Still, she emphasized that the actual percentages were very close, at 0.3% versus 0.2%. She stated that this would not be considered a meaningful difference in death rates between the study arms. She noted that these are very small numbers and do not indicate a significant trend. Additionally, she explained that the FDA placed significant weight on reviewing the narratives of each case and assessing the potential biological plausibility between the causes of death and the administration of clesrovimab. No such connections were identified in their review.

Dr. Kulldorff commented that among the four trials discussed, three involved nirsevimab, which has already been recommended by ACIP and is not under consideration for a vote in the current meeting. He noted that the observed imbalances in those trials are important and should be closely monitored moving forward, particularly regarding mortality and other potential adverse events associated with nirsevimab. He clarified that the current vote pertains to clesrovimab, and based on the data presented, mortality appeared to be more balanced between the study arms for this product. Dr. Kulldorff suggested that it is possible clesrovimab may prove to be

superior to nirsevimab, although this is not yet known. He emphasized the importance of continuing to evaluate both products during the upcoming RSV season.

Dr. Levi requested clarification to ensure his understanding was accurate. He inquired whether there is currently an ongoing trial for clesrovimab in which the most recent reporting shows eight deaths in the immunized group compared to four deaths in the non-immunized group receiving standard care. He asked if that was an accurate interpretation of the available data.

A representative from Merck confirmed that, in addition to the healthy infant study (Protocol 4, also known as CLEVER), there is an ongoing trial in at-risk infants called Protocol 7, also referred to as SMART. In this study, infants are randomized one-to-one to receive either clesrovimab or palivizumab. An interim analysis was conducted to support FDA licensure, and as noted, it showed eight deaths in the clesrovimab arm and four in the palivizumab arm. Each of these deaths was thoroughly evaluated and reviewed by an independent external data monitoring committee. As with the earlier trial, no deaths were attributed to the study intervention. There was no evidence of clustering by cause, system organ class, or timing of the events. The representative emphasized that these events are rare and that the study remains ongoing.

Dr. Meissner stated that these issues were thoroughly discussed within the workgroup, which included over 60 members. He emphasized that the group carefully reviewed all available data in detail and appreciated Dr. Levi's close examination of the records. However, he noted that the workgroup was comfortable with the findings from the clesrovimab trials. He acknowledged that studies involving high-risk infants, including those born preterm, involve a particularly fragile population where unexpected deaths can unfortunately occur in both treatment and control groups. Dr. Meissner reiterated that there was no evidence of an imbalance or pattern in serious adverse events among clesrovimab recipients. He concluded by affirming the workgroup’s confidence in the recommendation they made.

Dr. Kulldorff expressed his gratitude to the work group, noting that the effort involved not only Dr. Meissner but many others who worked very hard on this review. He also thanked his fellow ACIP committee members, noting that while the presentations from the previous day primarily focused on the maternal vaccine and nirsevimab, which had already been recommended in a prior meeting, the work group members went beyond that information. They examined the data on clesrovimab in great detail, which is the product currently under consideration and was recently approved by the FDA. He commended the committee for stepping in and conducting a very thorough review.

Dr. Malone stated that there has been very active discussion and consideration within the committee regarding this product. For the record, he emphasized that the topic has been thoroughly debated internally. Despite the short timeframe available to address it, he expressed confidence that the committee had sufficient information. He noted that the committee had rigorously considered the various aspects of the product, had been appropriately briefed on the underlying issues and science, and had taken the time to investigate and discuss the matter to the best of its ability.

Dr. Hopkins, representing the National Foundation for Infectious Diseases, emphasized that RSV is the leading cause of hospitalizations in infants in the United States. He stated that the scientific evidence clearly supports the use of maternal RSV vaccines during pregnancy, as well as monoclonal antibodies for infants whose mothers were not vaccinated. He urged ACIP to ensure that any changes to RSV recommendations remain grounded in evidence. He reaffirmed NFID's commitment to protecting infants from serious RSV-related outcomes.

Dr. Levi shared a personal perspective, noting that while he is a scientist, he is also a father of six children. He emphasized the importance of considering the parents' viewpoint when evaluating the data. Reflecting on his own experience, he explained that if he were the parent of a baby born prematurely or with underlying health conditions, he would likely choose to use these products, given the serious threat RSV can pose to vulnerable infants. However, he stated that if his child were healthy and born full-term, he would feel hesitant about using a new product, even with scientific knowledge in hand. He expressed concern about introducing an immunization for a disease that has historically presented challenges in vaccine development. Dr. Levi emphasized that, beyond metrics such as hospitalization and disease burden, it is crucial to consider how parents might perceive and respond to the available data. He concluded by acknowledging that, as a father, he would feel cautious in such a situation and wanted to share that perspective with the committee.

Dr. Pepsworth asked for clarification on the differences in health outcomes between very sick infants and healthy children. She also inquired about available data on the effectiveness and safety of clesrovimab when administered according to the current immunization schedule. Specifically, she questioned whether there is information on the safety of administering clesrovimab concurrently with other routine vaccines, including those for hepatitis B, rotavirus, DTaP, Hib, pneumococcal, polio, COVID-19, and influenza. She emphasized the importance of understanding how simultaneous administration may impact safety outcomes.

Dr. Meissner responded by explaining that approximately 80% of children hospitalized for RSV are otherwise healthy, without prematurity, congenital heart disease, or chronic lung disease. These infants typically become symptomatic when infected, and about one-third of RSV cases in children lead to lower respiratory tract infections that require medical attention, such as visits to a pediatrician or the emergency department, even if hospitalization is not required. He emphasized that it is currently not possible to predict which healthy infants will develop severe disease, making it difficult to target monoclonal antibody use solely based on known risk factors. While RSV-related deaths in infants are very rare in the United States, with fewer than 100 annually and mostly among those with comorbidities, hospitalization is the most reliable primary endpoint to assess product effectiveness, with ICU admissions also being monitored. He clarified that products like clesrovimab and nirsevimab are monoclonal antibodies administered passively and are not vaccines in the traditional sense, as they do not stimulate an immune response. He addressed maternal vaccination, stating that if a pregnant woman chooses not to receive an RSV vaccine between 32 and 36 weeks of gestation, the alternative is to administer a monoclonal antibody to the infant at birth. He added that if he were Dr. Levi's pediatrician, he would strongly recommend that his wife either receive the maternal RSV vaccine or that the newborn receive a monoclonal antibody. He expressed strong support for the progress made in

RSV prevention, crediting much of it to the work of Barney Graham, who received NIH support. He described the new monoclonal antibody products and vaccines as remarkable, both safe and effective. He stated that the work group and the FDA had conducted extensive reviews, leaving no unresolved safety or efficacy issues in his view.

Dr. Kulldorff addressed Dr. Pebsworth's question about the concomitant administration of monoclonal antibodies with routine childhood vaccines given on the same day. He noted that the work group had reviewed this issue and requested follow-up from Dr. Meissner to provide additional context and information.

Dr. Meissner explained that there are three monoclonal antibodies used for the prevention of RSV. Palivizumab was the first-generation product, introduced around 1999, while clesrovimab and nirsevimab are second-generation antibodies that incorporate specific mutations in the Fc fragment, extending their half-lives. This allows a single dose to protect throughout the RSV season. In contrast, palivizumab required monthly dosing for five months to maintain coverage during the season. He noted that there is extensive experience with palivizumab, and despite its repeated dosing schedule, no interference has been observed with any of the standard, routinely recommended childhood vaccines. Based on this experience, he expressed confidence that concomitant administration with other vaccines is not a concern.

Dr. Goldman, representing the American College of Physicians and speaking as an individual, expressed support for the intervention under consideration. He thanked Dr. Meissner for his earlier remarks and added that, as a clinician, he sees firsthand the impact of diseases when they are not prevented or treated. He emphasized that healthy children do get RSV, and some become seriously ill, are hospitalized, or even die. He cautioned against limiting interventions only to those identified as high-risk, since risk is often not fully understood until illness occurs. He noted that this product is not a vaccine but rather provides passive immunity. As a father of two children, he wished it had been available when they were born. He called the product a major advancement in medical science and urged the committee to approve the resolution to help protect children and keep them healthy.

Dr. Meyer addressed Dr. Pepsworth's earlier question about the co-administration of monoclonal antibodies with other vaccines. She noted that real-world evidence from the Vaccine Safety Datalink, presented by Dr. Daly the previous day, showed that a high proportion of infants had received clesrovimab at the same time as another routine vaccine. She then turned the discussion over to Dr. Daly to provide further details from the real-world data.

Dr. Daley explained that the safety data presented the previous day covered approximately 74,000 infants who received nirsevimab, making the dataset roughly 20 times larger than the original clinical trial. This data reflects real-world use in routine practice. He highlighted that among the neonate cohort, 20 percent received same-day hepatitis B vaccination, and among the older infant group, 84 percent received same-day vaccination with routine childhood vaccines. He concluded that the safety evidence, particularly for infants aged 37 days to less than 8 months, does include and support safety with simultaneous vaccination.

Dr. Malone shared a concern raised by colleagues in the medical community, particularly among primary care providers, about the possibility that monoclonal antibody products may simply

delay RSV infection from the first year of life to the second. He noted that Dr. Meissner had previously discussed the current understanding of RSV pathophysiology and asked him to address this issue. Specifically, he requested that Dr. Meissner explain the role of terminal micro airway development in infants and how it relates to the effectiveness and implications of administering this product during early infancy.

Dr. Meissner explained that the most severe RSV disease typically occurs in the first 90 days of life, as this is when infants are at the highest risk of hospitalization. The increased risk is due to the small size of their bronchioles, which are the narrow airways that conduct air into the alveoli, the tiny air sacs in the lungs where oxygen and carbon dioxide are exchanged. In very young or preterm infants, these small airways can become completely blocked by inflammation during an RSV lower respiratory tract infection. By the second year of life, a child's airways are larger, making it much less likely that a small amount of inflammation will cause significant respiratory distress. Monoclonal antibodies are given to healthy infants to prevent RSV infection during the highest-risk period, particularly the first 90 days. Dr. Meissner noted that these antibodies do not fully prevent infection but instead reduce the likelihood of lower respiratory tract disease, allowing the child to build natural immunity. This may offer protection in the second year of life. Even if infection shifts to the second year, it is generally less problematic because the airways are larger and better able to tolerate inflammation without becoming obstructed.

Dr. Meissner recognized the contributions of Jefferson Jones, who led the work group throughout the process and was praised for doing an exemplary job.

Dr. Levi encouraged CDC colleagues to expand post-marketing analyses to include data on deaths and a broader range of potential adverse events. He emphasized the importance of understanding the risks alongside the benefits, regardless of the decision to use the product. He emphasized the importance of transparency in assessing the trade-offs involved. While he acknowledged that the analysis presented the previous day was very well done, he noted that it was limited in scope, focusing only on specific periods and certain adverse events, and expressed hope that future analyses would be more comprehensive.

Dr. Kulldorff expressed his deep appreciation to the work group for their thorough efforts, to the CDC staff for their support, and especially to his fellow committee members. He acknowledged that, despite very short notice, the group fully engaged with the review of clesrovimab, which was only approved by the FDA 16 days prior. He recognized the challenge of gathering and reviewing a large amount of information in a limited timeframe and thanked everyone for their commitment to carefully evaluating all the available data.

Vote: RSV Maternal/Pediatric Vote

Dr. Martin Kulldorff (ACIP Chair) read the following proposed ACIP voting language for the RSV Maternal/Pediatric vaccine into the record:

> *ACIP recommends infants aged <8 months born during or entering their first RSV season who are not protected by maternal vaccination receive one dose of clesrovimab.*

Motion/Vote: RSV Vaccines

Dr. Malone motioned to approve the recommended voting language, stating, "ACIP recommends infants aged <8 months born during or entering their first RSV season who are not protected by maternal vaccination receive one dose of clesrovimab." Dr. Pagano seconded the motion. No COIs were declared. The motion carried with 5 in favor and 2 opposed. The disposition of the vote was as follows:

5 Favored: Malone, Hibbleln, Pagano, Meissner, Kulldorff
2 Opposed: Levi, Pebsworth
0 Abstained:

Vote: RSV Maternal/Pediatric-VFC Vote

Dr. Martin Kulldorff (ACIP Chair) read the following proposed ACIP VFC vote for RSV Maternal/Pediatric into the record:

Approve the updated Vaccines for Children (VFC) resolution for prevention of RSV.

Motion/Vote: RSV Vaccines

Dr. Malone motioned to approve the recommended updated Vaccines for Children (VFC) resolution for prevention of RSV. Dr. Pagano seconded the motion. No COIs were declared. The motion carried with 15 in favor and 0 opposed. The disposition of the vote was as follows:

7 Favored: Malone, Hibbleln, Pagano, Levi, Meissner, Pebsworth, Kulldorff
0 Opposed:
0 Abstained:

*Dr. Pebsworth disclosed that she owns shares in a healthcare sector fund that includes holdings relevant to ACIP discussions, including vaccine manufacturers. However, the value of these holdings falls below the de minimis threshold set by the Office of Government Ethics. Based on this, she confirmed her understanding that she is permitted to participate in the ACIP meeting fully.

PUBLIC COMMENT

The floor was opened for public comment on June 25, 2025. The comments made during the meeting are summarized in this document. Members of the public were also invited to submit written public comments to ACIP through the Federal eRulemaking Portal under Docket Number ID CDC-2025-0024. Visit regulations.gov for access to read the comments received.

Kim Mack Rosenberg, Esq.
Children's Health Defense and Mack Rosenberg Law LLC

A representative from Children's Health Defense provided public comment expressing concern over the misuse of ACIP's best practice guidelines by several states, including California and New York, to restrict medical exemptions for school vaccine requirements. The commenter noted that ACIP guidelines define contraindications and precautions broadly, recognizing that the lists are not exhaustive and cannot account for every circumstance in which a child may need a medical exemption. However, many states and school districts are limiting exemptions to only those explicitly listed, or even further restricting them to cases of anaphylaxis, disregarding other serious medical risks identified by treating physicians. The speaker urged ACIP to amend its best practices guidelines or issue a public statement clarifying that the CDC is not authorized to provide individualized medical advice and that clinical decisions regarding exemptions should be made by treating physicians using CDC guidance, medical history, and clinical judgment. The commenter shared the case of a 16-year-old student in New York with multiple health conditions, including acquired von Willebrand's disease and a history of severe vaccine reactions. Despite certifications from six licensed physicians stating that a third hepatitis B vaccine dose could endanger her life, her school district denied the exemption because her conditions are not explicitly listed as contraindications by ACIP. The commenter emphasized that similar cases occur frequently, and some children have suffered serious injuries after being forced to vaccinate against medical advice. The speaker concluded by urging ACIP to act promptly to clarify its guidelines and protect both vulnerable students and physician autonomy.

Chrissie Juliano, MPP
Big Cities Health Coalition

Chrissie Juliano, Executive Director of the Big Cities Health Coalition (BCHC), provided public comment expressing concern over Secretary Kennedy's recent dismissal of all 17 prior ACIP members, including Dr. Mysheika Roberts, Columbus Health Commissioner and BCHC board member, who was scheduled to join the committee. Juliano emphasized the critical role of local health departments in vaccination efforts and the trusted relationships they build with communities. She stressed that ACIP's independent, science-based vaccine recommendations have guided public health for over 60 years, and sudden leadership changes risk increasing confusion and public distrust at a time when vaccine confidence is already fragile. She highlighted the resurgence of vaccine-preventable diseases, such as measles, and underscored the importance of maintaining equitable access to routine vaccines. Juliano urged the new committee members to continue ACIP's tradition of making decisions based on science and evidence to protect public health.

Dr. Mary Koslap-Petraco
Pediatric Nurse Practitioner House Calls

Dr. Mary Koslap-Petraco, a pediatric nurse practitioner with over 30 years of experience, provided public comment expressing concern about the recent dismissal of 17 ACIP members. She stated that the former members had the expertise to design vaccine studies and voiced concern that the current committee has misinterpreted VAERS data, which provides safety signals but does not establish causality. Dr. Koslap-Petraco emphasized the need to keep COVID-19 vaccines available for children who need them, noting that misinformation has led parents to lose trust in healthcare providers. She shared personal experiences with vaccine-preventable diseases in her own family. She warned that if access to vaccines is reduced, more children will suffer and die from diseases that are currently preventable. As a Vaccines for

Children (VFC) provider, she urged ACIP to continue ensuring that all children have access to life-saving vaccines.

Marcia Cohen Zakai
Private Citizen

Marcia Cohen Zakai provided public comments, questioning the recent dismissal of all 17 ACIP members and calling the action unjustified, while raising concerns about its impact on public trust. She referenced a letter from the California Medical Association, the American Medical Association, and over 100 other medical organizations urging the reinstatement of the dismissed members. Zakai stressed that ACIP's evidence-based recommendations have historically ensured access to FDA-approved vaccines through a transparent process, and that the current vacancies risk creating confusion and undermining vaccine confidence. She warned that this could lead to preventable illness, disability, and death. Zakai emphasized the urgent need for expert vaccine guidance, especially amid ongoing COVID-19 and measles outbreaks, to protect the public and maintain widespread access to life-saving vaccines.

Caroline Brown, MD
The Children's Clinic of Winston Salem

Dr. Caroline Brown, a general pediatrician from North Carolina, provided public comment expressing deep concern about declining vaccination rates and the resurgence of vaccine-preventable diseases. Drawing from nearly two decades of clinical experience, she described firsthand encounters with severe illness in children, including cases of RSV, pertussis, and complications from diseases now preventable by vaccines. She noted that when she trained in the early 2000s, routine spinal taps were performed on febrile infants to rule out meningitis. Still, vaccines like Hib and pneumococcal conjugate have since spared many children from such procedures and outcomes. Dr. Brown reported that just one day before the meeting, the first confirmed case of measles was announced in her county. She has since been responding to concerned parents in her community. She emphasized that measles was eradicated in the United States 25 years ago. Still, its return is a direct result of declining vaccine uptake driven by misinformation, some of which she stated is amplified by members of the committee itself.

Dr. Alexandra Jones Packham
Private Citizen

Dr. Alexandra Jones Packham, a recent medical school graduate and incoming resident in internal medicine and pediatrics, provided public comment. She shared that she is currently pregnant and due in the middle of respiratory season, giving her a unique perspective as both a future pediatrician and a soon-to-be mother. Reflecting on her medical training, she described her experience in the pediatric ICU during the winter, where she saw numerous cases of bronchiolitis caused by RSV and influenza. She emphasized the limited treatment options for these infections, noting that supportive care is often the only intervention available while the body fights off the virus. Dr. Packham observed that during her rotations, every child she saw hospitalized with a severe respiratory infection had not been vaccinated against the pathogen involved, either due to parental choice or because they were too young to qualify for vaccination. She highlighted the effectiveness of vaccines and RSV monoclonal antibodies in preventing severe illness and stated her intention to receive the RSV, flu, and COVID-19 vaccines during her pregnancy. She also plans to ensure her child gets all recommended vaccines and antibody protections when eligible. Dr. Packham concluded by stressing the

importance of providing parents with the opportunity to discuss vaccination with their pediatricians and that vaccines and antibodies remain accessible and covered by insurance.

Diana Figueroa, LVN
Kaiser Permanente

Diana Figueroa, a licensed vocational nurse (LVN) with 16 years of experience, including 14 years in pediatric care, provided public comment. She expressed concern over the recent termination of 17 ACIP members, describing it as a poor decision given their extensive vetting and history of making evidence-based vaccine recommendations. She stated that the removal of these members undermines trust in the vaccine decision-making process and increases the risk of health policy being influenced by unqualified individuals making decisions based on personal opinions rather than scientific evidence. Ms. Figueroa also addressed shared clinical decision-making, noting that it creates barriers for LVNs and LPNs like herself to administer requested vaccines, ultimately delaying patient care. She emphasized that the healthcare system is already overwhelmed and that preventative care, including immunizations, is critical to reducing costly hospitalizations for both chronic and infectious diseases. She urged the FDA and CDC not to create additional barriers to vaccine access. She emphasized the importance of protecting vulnerable populations, including pregnant women, newborns, the immunocompromised, the elderly, and healthy individuals who choose to be vaccinated to protect their communities. Ms. Figueroa called for the reinstatement of the previously terminated ACIP members, the removal of recently appointed unvetted members, and the restoration of prior COVID-19 vaccine recommendations for pediatric and pregnant populations, which she believes have been effective in preventing disease.

Dr. Amy Hardin
Northside Pediatrics

Dr. Amy Hardin, a pediatrician in private practice in Woodstock, Georgia, provided public comment emphasizing the critical importance of vaccines in preventing severe childhood illnesses and deaths. She reflected on her training at Emory from 1990 to 1993, when, before the introduction of Haemophilus influenzae type B (Hib) and pneumococcal vaccines, pediatricians frequently admitted children with high fevers for complete septic workups. These included blood cultures, catheterized urine samples, and spinal taps to check for meningitis and sepsis. At that time, one in 200 children under five developed invasive Hib disease, resulting in conditions such as sepsis, epiglottitis, cellulitis, and meningitis. Many children died, while others were left with lifelong disabilities, including deafness, cerebral palsy, and severe learning challenges. Dr. Hardin noted that she has not seen a single case of Hib or pneumococcal meningitis or sepsis since 1999, a year she remembers vividly because it was the last time she attended a funeral for a child who died from a vaccine-preventable disease. She recounted the death of a two-year-old boy who missed his routine vaccination and died from pneumococcal infection three months later. She expressed concern that vaccine hesitancy and misinformation are causing a resurgence of vaccine-preventable diseases. Her colleagues in Atlanta are now treating new cases of Hib meningitis, primarily in unvaccinated children whose parents were influenced by misinformation online. Dr. Hardin urged ACIP members to protect the health of America’s children by continuing to promote evidence-based vaccine policies. She concluded by affirming that vaccines are safe, effective, and lifesaving, and warned against allowing the country to return to a time when preventable childhood deaths and disabilities were common.

Adrianna Williams
Private Citizen

Adrianna Williams, a private citizen, provided public comment expressing strong opposition to vaccines, including those under discussion at the meeting. She referenced the Hippocratic Oath and stated her belief that vaccines cause harm and should be abolished. Ms. Williams asserted that there are safer, natural alternatives for disease prevention. She described vaccines as a bioweapon mechanism, claiming that cumulative harm results from the interaction of vaccine ingredients with bodily systems. She cited data from the Vaccine Adverse Event Reporting System (VAERS), reporting over 8,000 adverse events and more than 70 deaths following RSV vaccination. She specifically referenced VAERS report ID 28021 as an example of an RSV vaccine-related death. Ms. Williams urged ACIP members to listen to individuals who report vaccine injuries and called for the immediate cessation of all vaccine recommendations, beginning with the RSV vaccines under consideration at this meeting. She concluded by asking the committee to act following the principle of "do no harm" and to prioritize the health and safety of both present and future generations.

Roselie Bright, ScD
Private Citizen

Dr. Roselie Bright, a retired epidemiologist from the FDA, expressed concern about the recent erosion of scientific integrity in federal health agencies. She described how, during her career, regulatory decisions were based on transparent documentation and collaboration among experts, which built trust in the process. However, she now questions federal decisions due to political interference, mass firings of scientists, and changes to the structures of advisory committees. Bright urged continued consideration of long COVID in vaccine recommendations, universal access to COVID-19 vaccines three times per year, and the development of more effective vaccines. She called for increased transparency in ACIP meetings, including simultaneous public access to meeting materials, more time for public comment, and summaries of those comments during meetings. She also advocated reinstating the 17 removed ACIP members, requiring scientific competency for all members, and barring anyone who disregards research ethics from serving in advisory roles.

Due to time constraints, Dr. Kulldorff announced that the remaining RSV discussion will continue on July 26, 2025; summaries of those discussions are included in the RSV section above. The meeting was then recessed until July 26, 2025, at 8:00 AM EST.

THURSDAY: APRIL 26, 2025

WELCOME AND INTRODUCTIONS

Call to Order/Roll Call

Dr. Martin Kulldorff, Chair of the ACIP, convened the meeting on June 26, 2025. Dr. Mina Zadeh, ACIP Executive Secretary from the CDC, welcomed the committee, followed by a roll call from members, each of whom announced their presence.

INFLUENZA VACCINES

Dr. Vivien Dugan (CDC/NCIRD) summarized the influenza vaccine session, which covered five presentations. These included data on the immunogenicity and safety of the Flublok

recombinant influenza vaccine in older children and adolescents, updated estimates of influenza burden and the impact of influenza vaccination for the 2024–2025 influenza season, an overview of the 2024–2025 influenza season with proposed influenza vaccine recommendations for 2025–2026, a review of thimerosal preservative and proposed updates related to the use of thimerosal-containing influenza vaccines.

Dr. Pedro Folegatti (Sanofi Pasteur) presented the results of a Phase 3 immunobridging non-inferiority trial evaluating the quadrivalent recombinant influenza vaccine (RIV4), which is licensed as Flublok in older children and adolescents, compared to adults. Dr. Folegatti disclosed that he was a full-time employee of Sanofi and held shares in the company.

Recombinant protein technology has been established a proven approach to vaccine development against infectious diseases since the late 1980s, demonstrating safety and effectiveness across multiple pathogens, including hepatitis B, HPV, zoster, COVID-19, and influenza. For influenza vaccines, this technology offers several advantages: it maintains the sequence integrity of flu antigens consistent with FDA-selected strains, operates independently of egg supply, and does not involve culturing or handling live influenza viruses. As a result, there is no egg adaptation of the virus. Additionally, the recombinant influenza vaccine avoids the inactivation step, preserving the native hemagglutinin conformation of the wild-type virus, which supports a more optimal protective immune response.

Key clinical evidence supporting Flublok includes several Phase 3 trials. In a randomized controlled efficacy trial among adults aged 50 and older, Flublok provided 30 to 43% greater protection against biologically confirmed symptomatic influenza compared to a U.S.-licensed standard-dose inactivated influenza vaccine during a predominantly H3N2 mismatch season. A Phase 3 immunobridging study in adults aged 18 to 49 demonstrated non-inferior immune responses to three of four strains when compared to the same standard-dose vaccine. The trivalent formulation of Flublok was first licensed in 2013, followed by the quadrivalent version in 2016 for individuals aged 18 and older. The label has since been updated and approved by the FDA to include children aged 9 and older, based on the data presented today. As of January 31, 2025, more than 43 million doses of Flublok have been distributed globally. The vaccine has an established safety profile and is well tolerated, with no safety signals identified to date.

The study presented was part of a pediatric research plan for Flublok, developed in coordination with the FDA and international regulatory authorities. It was a Phase 3, multi-center, open-label, non-randomized immunobridging study conducted at 36 sites across Spain, Poland, the Czech Republic, and the U.S. The trial aimed to enroll up to 1,334 healthy participants aged 9 to 49 years, all of whom received a single dose of Flublok. The primary objective was to demonstrate non-inferiority of immune responses in children and adolescents (ages 9–17) compared to adults, where vaccine efficacy had already been established. Immune responses were evaluated using hemagglutination inhibition antibody titers and seroconversion rates four weeks post-vaccination. The key secondary objective was to assess the safety profile of Flublok by age group.

Participants received their vaccination on Day 1, with a baseline blood sample collected. This was followed by a safety phone call on Day 9 and a clinic visit on Day 29 for a safety review and a second blood draw. They were monitored for six months after vaccination. Solicited local and systemic adverse events were collected over a seven-day period, while unsolicited and medically attended events were tracked for 28 days. Serious adverse events and adverse events of special interest were monitored throughout the study. Key exclusion criteria included receipt of any vaccine within four weeks before or after enrollment, except for COVID-19 vaccines, which were allowed if administered at least two weeks apart from the study vaccine, and receipt of any influenza vaccine within the six months before enrollment. The primary

immunogenicity endpoints were geometric mean titer (GMT) ratios and seroconversion rates at Day 29 for each of the four influenza strains. The study was designed with 80% power to demonstrate non-inferiority based on eight tests. Non-inferiority was met if the lower bound of the 95% confidence interval for GMT ratios was greater than 0.667, and the lower bound for the difference in seroconversion rates was greater than -10%.

Of the 1,334 participants initially planned, 1,308 were enrolled between October 27, 2022, and May 1, 2023. A total of 641 participants in the 9 to 17-year-old group and 658 participants in the 18 to 49-year-old group received the vaccine. Among them, 626 children and adolescents, as well as 634 adults, provided both pre- and post-vaccination blood samples for the primary endpoint. Overall, the study achieved high and comparable retention rates across both age groups.

The study included more females than males. The mean age was 13 years in the 9 to 17-year-old group and 34 years in the 18 to 49-year-old group. Most participants were White, with Black or African American individuals making up nearly 19% of the total enrolled population. Additionally, 87% of participants identified as non-Hispanic or Latino.

The primary endpoint assessed antibody responses four weeks after vaccination, comparing the 9 to 17-year-old group with the 18 to 49-year-old group. Geometric mean titers (GMTs) on Day 29 were evaluated for all four influenza strains in the vaccine. The data showed that antibody responses were comparable between the two groups, with children and adolescents generally exhibiting higher responses than adults. The GMT ratios, along with their 95% confidence intervals, all exceeded the non-inferiority margin of 0.667. The lower bounds ranged from 1.09 for B/Yamagata to 2.76 for H3N2, demonstrating that non-inferiority was met for all strains.

Seroconversion was defined as a four-fold or greater increase in antibody titers for participants with a baseline hemagglutination inhibition (HAI) titer of 10 or higher, or a post-vaccination titer of at least 40 for those who were seronegative at baseline. The differences in seroconversion rates between the 9- to 17-year-old group and the 18- to 49-year-old group ranged from (-) 0.59% for H3N2 to 14.3% for B/Yamagata. In all cases, the lower bound of the 95% confidence interval remained above the non-inferiority margin of –10%, indicating that the primary objective of demonstrating non-inferior immune responses was achieved for all four influenza strains, based on both Day 29 geometric mean titer ratios and seroconversion rates.

For the secondary objective, 10 participants, representing less than 1% of the total enrolled population, reported at least one serious adverse event, and 5.1% reported at least one medically attended adverse event. None of these events were considered related to the study vaccine by the investigators or the sponsor. No deaths or adverse events of special interest were reported, and there were no meaningful differences in the safety profiles between the two age groups.

Expected reactions within the first seven days following vaccination were slightly less common among children and adolescents compared to adults. Grade 3 solicited events were reported in 6.5% of children and adolescents and 4.5% of adults aged 18 to 49. Similar trends were seen for both local injection site reactions and systemic reactions. Most reactions were mild or moderate, began within the first three days after vaccination, and resolved on their own within one to three days.

Local injection site reactions were most commonly reported as pain, occurring in 34.3% of participants aged 9 to 17 and 40.2% of those aged 18 to 49. Other local reactions, such as bruising, swelling, induration, and erythema, were reported occasionally, with no significant

differences between the age groups. Most local adverse reactions were mild or moderate in severity.

Myalgia, malaise, and headache were the most frequently reported systemic adverse reactions, occurring in less than a quarter of participants in both age groups. Fewer than 3% of children and adolescents reported a febrile episode following vaccination. No differences in the profile of solicited systemic reactions were observed between children, adolescents, and adults. Most events were mild or moderate and resolved on their own.

Seven participants in the 18 to 49-year-old group reported nine serious adverse events (SAEs), and three participants in the 9 to 17-year-old group reported four SAEs. None of these events were considered related to Flublok by investigators, based on their assessment of underlying conditions, concurrent therapies, and risk factors.

Dr. Folegatti concluded that Flublok elicited robust hemagglutination inhibition (HAI) immune responses in both age groups. The primary objective of demonstrating non-inferiority of immune responses in older children and adolescents compared to adults was met for all four strains, based on both geometric mean titers and seroconversion rates. The safety profile was comparable between groups; the vaccine was well-tolerated, and no safety concerns were identified.

Dr. Vivien Dugan (CDC/NCIRD) shared the severity, disease burden, and prevention burden for the 2024–2025 influenza season. The 2024–2025 influenza season in the United States received significant media attention, with many reports describing it as one of the worst in recent history. However, using data to assess seasonal severity and estimate disease burden is essential for putting each influenza season into context, as each season is often unique.

To evaluate the severity of the 2024–2025 influenza season, three surveillance indicators were used across all age groups: the percentage of influenza-like illness, the rate of influenza hospitalizations, and the percentage of influenza-associated deaths. Influenza-like illness and hospitalization rates each had two peak weeks classified as high severity, while influenza-associated deaths had five peak weeks at the high severity level. Based on these indicators, the 2024–2025 influenza season was classified as a high severity season across all age groups.

When comparing the 2024–2025 influenza season to past seasons, it was the first to be classified as high severity overall and across all age groups since the 2017–2018 season.

Data-driven burden estimates for seasonal influenza are essential because the exact number of illnesses, hospitalizations, and deaths is unknown. Several factors contribute to this uncertainty. U.S. states are not required to report individual seasonal influenza cases or hospitalizations, except for deaths in children under the age of 18. Surveillance systems in healthcare settings do not capture all influenza infections. Many individuals who fall ill do not seek medical care, and those who do may not undergo testing. Testing may occur too late for influenza to be detected, and symptoms can resemble those of other respiratory illnesses, leading to a misdiagnosis. Due to these limitations, public health officials rely on burden estimates and severity assessments based on real-world data to understand the population-level impact, identify high-risk groups, assess the strain on health systems, inform policy decisions, shape public communication, and support economic and cost-benefit analyses.

The influenza disease burden is measured by a range of clinical outcomes, including symptomatic illness, medically attended visits, hospitalizations, and deaths. Estimates are routinely calculated for five age groups: 0-4 years, 5-17 years, 18-49 years, 50-64 years, and 65 years and older. In the United States, the influenza burden is estimated both during and after

each season. Final estimates are typically available about two years after the season ends, once all necessary data sources are complete.

Influenza disease burden is estimated using a multiplier modeling approach. First, hospitalization rates from sentinel surveillance are adjusted for testing practices and test sensitivity, then multiplied by the population. Second, deaths are estimated by applying a death-to-hospitalization ratio. Third, symptomatic illnesses are calculated using a ratio of cases per hospitalization. Finally, outpatient visits are estimated by multiplying the number of symptomatic illnesses by the probability of seeking care, as determined by survey data. Current estimates do not include deaths; those will be available once hospitalization data collection is complete, likely by late September 2025.

Preliminary estimates for the 2024-2025 influenza disease burden indicate that adults aged 18 to 49 years had the highest number of symptomatic illnesses and medical visits, while adults aged 65 and older had the highest number of hospitalizations. Compared to past seasons using the same methodology, all three outcomes (symptomatic illness, medical visits, and hospitalizations) were higher than in any previous season. These estimates are still preliminary and may change as additional data for the 2024-2025 season becomes available; however, the overall disease burden was high.

Similar to the disease burden models, influenza vaccine-prevented disease burden models use additional data to produce estimates. These models combine the number of illnesses, medical visits, and hospitalizations by age group with data on vaccine coverage and vaccine effectiveness. Vaccine effectiveness against outpatient visits is used to estimate the number of illnesses and medical visits prevented, while effectiveness against hospitalization is used to estimate the number of hospitalizations prevented. When sufficient data are available, the model also includes estimates of the number of prevented deaths.

To estimate the prevented disease burden, vaccine coverage and vaccine effectiveness data from the season are applied to the disease burden estimates. This helps estimate the risk of illness, medical visits, and hospitalizations in the susceptible population. These risks are then modeled in a hypothetical population without vaccination. The difference between the observed disease burden and the estimated burden in the absence of vaccination represents the disease burden that is prevented.

Preliminary estimates for 2024 to 2025 show that the highest number of symptomatic illnesses was prevented among adults aged 18 to 49 years. The most prevented medically attended illnesses occurred in adults aged 18 to 49 and 50 to 64 years. The greatest benefit of influenza vaccination was seen in the prevention of hospitalizations among adults aged 65 and older.

For the 2024–2025 season, all three prevented outcomes were higher than in any previous season using this methodology. Although these estimates are still preliminary and may change as more data become available, they highlight the significant impact of influenza vaccination in preventing illness, medical visits, and hospitalizations. A dashboard with past season estimates of disease burden prevented by vaccination is available on the CDC's Flu Burden Prevented by Vaccination website.

Dr. Dugan concluded that influenza continues to have a significant impact on healthcare systems and population health each season. The 2024–2025 season was classified as high severity for all ages and age groups, marking the first such classification since the 2017–2018 season. The estimated influenza disease burden was the highest in the United States over the

last approximately 15 years. Influenza vaccination is estimated to have prevented around 240,000 hospitalizations, with the majority among adults aged 65 and older. Both vaccine uptake and effectiveness likely played key roles in preventing the season from being even more severe.

Dr. Vivien Dugan (CDC/NCIRD) shared an update on the 2024–2025 influenza season and the vaccine recommendations for the 2025–2026 season. The 2024–2025 U.S. influenza season was classified as high severity overall and across all age groups. This was the first high-severity season since the 2017–2018 season. Influenza A viruses were the predominant type, accounting for over 94% of the more than 98,000 specimens tested by public health labs. Influenza B viruses co-circulated at much lower levels. Both A(H1N1)pdm09 and A(H3N2) subtypes were detected, with a relatively even distribution nationwide, ranging from 47% to 52%.

Two key indicators of severity were influenza-associated hospitalizations and pediatric deaths. From October 1, 2024, through April 30, 2025, the cumulative hospitalization rate was 128.1 per 100,000, the highest since the 2010–2011 season. This surpassed the rate of 102.9 per 100,000 reported during the 2017–2018 season. As of June 14, 250 influenza-associated pediatric deaths had been reported, marking the highest number recorded in any non-pandemic season since the condition became reportable in 2004.

Influenza-associated hospitalization data from FluSurv-NET, which covers about 9% of the U.S. population, show that the cumulative hospitalization rate for the 2024–2025 season reached 128.1 per 100,000. This exceeds the 102.9 per 100,000 rate reported during the 2017–2018 season and is the highest recorded since the 2010–2011 season, excluding the 2020–2021 season when influenza activity was historically low due to the early COVID-19 pandemic.

Hospitalization rates were highest among adults aged 65 years and older, at 403.4 per 100,000. Children aged 5 to 17 years had the lowest rate, at 39.8 per 100,000. Among all hospitalized patients, 16% required admission to an intensive care unit and 6% required invasive mechanical ventilation.

An influenza-associated pediatric death is defined as a death in a person under 18 years of age that occurs during a clinically compatible illness with a positive influenza test, without a complete recovery between illness and death. This condition has been nationally notifiable since 2004. As of June 14, 2025, a total of 250 influenza-associated pediatric deaths have been reported to the CDC for the 2024–2025 season. All age groups were affected: 6% were infants aged 0 to 5 months, 14% were aged 6 to 23 months, 18% were aged 2 to 4 years, 36% were aged 5 to 11 years, and 26% were aged 12 to 17 years.

Dr. Dugan summarized that among the 250 influenza-associated pediatric deaths reported for the 2024–2025 season as of June 14, 42% had no known high-risk underlying medical conditions, and 42% had a bacterial co-infection of a sterile site. She noted that 89% of vaccine-eligible children were not fully vaccinated, a higher proportion than the 82% reported during the 2023–2024 season. This total represents the highest number of pediatric deaths reported in any non-pandemic influenza season since reporting began in 2004.

Few changes are proposed for the 2025–2026 influenza vaccination recommendations. Annual influenza vaccination remains recommended for everyone aged 6 months and older without

contraindications. As in previous years, no vaccine product is generally preferred, except for adults aged 65 years and older, for whom high-dose inactivated, recombinant, or adjuvanted inactivated vaccines are preferred when available.

All individuals should receive an age-appropriate influenza vaccine approved by the FDA. An exception applies to solid organ transplant recipients aged 18 to 64 years on immunosuppressive therapy, who may receive high-dose or adjuvanted inactivated vaccines without preference over other appropriate inactivated or recombinant vaccines. Recommendations regarding vaccine timing, vaccine selection, and contraindications and precautions remain unchanged.

There are three updates for the 2025–2026 influenza season, all reflecting recent FDA approvals. First, the influenza vaccine composition has been updated for the upcoming season. Second, FluMist, the intranasal trivalent live attenuated influenza vaccine, is now approved for self-administration by adults or caregiver administration to children. This was presented to the ACIP in April 2025. Third, the approved age indication for Flublok, the trivalent recombinant influenza vaccine, has been lowered from 18 years to 9 years. The committee reviewed these updates at the start of the session.

For the 2025–2026 season, all influenza vaccines marketed in the United States will be trivalent, as they were in the previous season. Each vaccine will contain antigens from three influenza viruses: one A(H1N1)pdm09, one A(H3N2), and one B virus.

The vaccine composition includes an updated A(H3N2) component. For A(H1N1), the FDA has recommended A/Victoria/4897/2022-like virus for egg-based vaccines and A/Wisconsin/67/2022-like virus for cell-based and recombinant vaccines. These are the same as last season. The updated A(H3N2) component is A/Croatia/10136RV/2023-like virus for egg-based vaccines and A/District of Columbia/27/2023-like virus for cell-based and recombinant vaccines. The B component remains unchanged and will include the B/Austria/1359417/2021-like virus from the B/Victoria lineage.

FluMist for self or caregiver administration was approved by the FDA in September 2024 and presented to the ACIP in April 2025. It is expected to be available for the 2025–2026 influenza season. Consumers will be able to order FluMist for delivery through an online pharmacy, which will screen for eligibility based on ACIP criteria.

For individuals aged 18 through 49 who are eligible, self-administration is permitted. For recipients aged 2 through 17 years, the vaccine may be administered by a caregiver who is at least 18 years old. FluMist remains approved for individuals aged 2 through 49 years and will continue to be available for administration by healthcare providers. No changes have been made to recommendations regarding appropriate populations, contraindications, or precautions.

The third update concerns Flublok. In March 2025, the FDA approved Flublok for use in individuals aged 9 through 17 years. Previously, it was approved only for those aged 18 and older. With this new approval, Flublok is now indicated for individuals aged 9 years and older. This change has been reflected in the updated table of available U.S. influenza vaccines for the 2025–2026 season.

Dr. Hibbeln expressed concern about the number of reported significant psychiatric adverse events, including major depression, suicidal ideation, and intentional overdose, in the 9–17 and 18–49 age groups. As a psychiatrist, he emphasized the importance of monitoring and reporting psychiatric side effects in vaccine trials. He commended Dr. Folegatti and Sanofi for identifying and reporting these events and noted the connection between the immune system and mental health. Dr. Hibbeln acknowledged the limitations of the study design and asked how it was determined that these events were unrelated to the vaccine. He also inquired whether Sanofi has plans to prospectively evaluate psychiatric outcomes, particularly suicidal ideation and overdose, in future studies.

Dr. Folegatti responded that all reported cases of suicidal ideation were classified as unrelated to vaccination. He noted that all affected participants had a prior history of mental health conditions. The study did not include specific screening for mental health disorders in its eligibility criteria. In most cases, investigators identified clear alternative triggers for the events. All SAEs observed in the study were considered to fall within expected background rates for the respective age groups. Dr. Folegatti stated that Sanofi currently has no plans to conduct additional psychiatric evaluations beyond standard post-marketing safety surveillance.

Dr. Hibbeln thanked Dr. Folegatti for his response and expressed concern about whether the reported cases involved a worsening of suicidal ideation or the enrollment of participants with pre-existing suicidal ideation. He noted that without mental health pre-screening, it is unclear how a determination could be made that these events were unrelated to the vaccine.

Dr. Malone began by expressing his enthusiasm for joining the current influenza subgroup and noted that he looks forward to future collaboration. He highlighted two influenza vaccine products discussed during the meeting. First, he praised Flublok as an innovative, cell-based vaccine manufactured using insect cells and baculovirus technology. He noted its key advantage of bypassing the need for antigen adaptation to egg or cell culture, allowing for a faster, more accurate production process that more closely matches circulating strains. Second, he acknowledged the cold-adapted live attenuated influenza vaccine (LAIV), developed by MedImmune, for its historical effectiveness in the pediatric population and its needle-free delivery method. He emphasized the importance of expanded access and ease of administration by less specialized personnel. Dr. Malone commended both manufacturers for their commitment to safe and innovative vaccine development through well-designed non-inferiority trials. He concluded with a specific question for Sanofi, asking whether any fetal-derived products are used in the manufacturing of Flublok, noting this as a potential concern in some communities.

Dr. Marais, Medical Head for Influenza and COVID Vaccines in North America, responded that no fetal-derived products are used in the manufacturing of Flublok.

Dr. Malone thanked Dr. Marais for the clarification, noting that the absence of human fetal tissue–derived material in Flublok is an important consideration for certain U.S. communities with religious concerns. He then asked whether microneutralization data had been collected for Flublok, acknowledging that while the hemagglutination inhibition (HAI) assay is the accepted correlate of protection for influenza, there has been a long-standing interest in microneutralization as an exploratory endpoint.

Dr. Folegatti explained that the study included a seroneutralization subset of approximately 400 participants, with results available for about 363 individuals. This included 185 participants aged 9 to 17 years and 178 participants aged 18 to 49 years. He reported a substantial increase in seroneutralization responses in both age groups, noting that no significant differences were observed between adolescents and adults.

Dr. Meissner posed several questions regarding the Flublok study. First, he asked why age nine was chosen as the lower limit for comparison with the 18 to 49 age group. Second, he inquired whether baseline serologic status in children affected their immune response to Flublok. Third, he noted that the immune response appeared stronger in 9 to 17-year-olds compared to older individuals, except for the B/Yamagata strain, and questioned the rationale for presenting data from a quadrivalent vaccine that included B/Yamagata, which is no longer in use. He also inquired whether the study had assessed cellular immunity, noting the uncertain role of T-cells in influenza protection. Finally, Dr. Meissner expressed interest in the potential for a comparative trial between high-dose or cell-based vaccines, such as Flublok, and standard egg-based vaccines, and asked whether such a trial is anticipated in the future.

Dr. Folegatti responded that age nine was selected for the study population because a single-dose influenza vaccine is recommended starting at that age, and children nine years and older are expected to have immune responses similar to adults. He stated that subgroup analyses were conducted to examine the influence of baseline serologic status and prior season vaccination. The results showed consistent findings regardless of baseline serostatus or prior vaccination. He confirmed that although children had higher baseline titers, the fold increase in immune response was comparable to that of adults. In response to the question about cellular immunity, Dr. Folegatti noted that the study did not assess cellular immune responses.

Dr. Folegatti, in response to Dr. Meissner's question about a head-to-head comparison between Flublok and other influenza vaccines, noted that data are available, including a cluster-randomized efficacy study conducted at Kaiser Permanente. He stated that the results showed a relative vaccine efficacy in favor of Flublok compared to the standard-dose vaccine.

Dr. Meissner clarified that this was an efficacy study, not just a serologic one.

Dr. Folegatti confirmed and offered to share the reference and additional data following the meeting. He also confirmed that immune responses to the trivalent and tetravalent vaccine formulations should be similar.

Dr. Malone asked the CDC to confirm whether current methods for estimating influenza disease burden require laboratory-confirmed influenza diagnoses. He noted that, historically, influenza-like illness metrics have included a range of upper respiratory infections, and he sought clarification that the current approach is based specifically on confirmed influenza cases rather than an aggregate of viral respiratory illnesses.

Dr. Dugan confirmed that all current estimates of the influenza burden are based on laboratory-confirmed cases of influenza.

Dr. Malone acknowledged the 250 pediatric deaths as a relatively modest number and asked whether there is a calculated number needed to treat (NNT) to prevent a death in the pediatric population.

Dr. Reed, an epidemiologist in the Influenza Division, responded that the number needed to treat to prevent a pediatric death has been calculated in the past, although not recently. She noted that the team can work on updating that estimate and follow up.

Dr. Malone stated that the committee would likely appreciate future reports that include NNT estimates for major endpoints related to vaccine products. He then raised a question about the sharp decline in influenza activity during the 2020–2021 season, followed by an apparent increase in influenza severity in subsequent years. He asked whether the CDC has any

hypotheses to explain the sudden decrease in influenza burden during the early years of the COVID-19 pandemic.

Dr. Dugan responded that the COVID-19 pandemic significantly changed general behaviors, including reduced travel and interpersonal contact, which led to decreased transmission not only of influenza but also of other seasonal respiratory viruses. She noted that it is difficult to attribute the decline to a single factor. As normal activities resumed, influenza, RSV, and other respiratory viruses began circulating again. She emphasized that these viruses now co-circulate and are closely monitored to understand their patterns of transmission better. However, she added that respiratory viruses remain highly unpredictable, and each influenza season tends to be unique in its characteristics and impact.

Dr. Reed agreed.

Dr. Malone noted that some members of the scientific community have raised concerns that, following the COVID-19 pandemic, changes in population-level exposure to viruses and countermeasures may be contributing to the increased severity of influenza. He acknowledged that it may be too early to conclude. Still, he encouraged the CDC to remain vigilant in considering this hypothesis and to share data that could help support or refute the possibility of a broader population-based process influencing the severity of respiratory viral illnesses.

Dr. Daskalakis thanked the Influenza Division and Dr. Dugan for the presentation and acknowledged the relevance of Dr. Malone's question. He noted that, from the CDC's surveillance perspective, this question may be better suited for researchers focused on pathogenesis and suggested that institutions such as the NIH may be better positioned to explore that area further.

Dr. Meissner commented that although influenza vaccines may have lower efficacy compared to vaccines like the measles vaccine, their public health impact remains significant due to the large number of influenza cases each year, estimated at 30 to 40 million in the United States. He emphasized that even modest vaccine effectiveness can result in substantial benefits at the population level. He then asked whether data have been collected on the percentage of influenza vaccines administered at home by individuals over 18 years of age using FluMist, and how well this option has been accepted.

Dr. Dugan noted that, based on current estimates, approximately 1 million hospitalizations would have occurred during the 2024–2025 season without influenza vaccination. This highlights the importance of vaccination in reducing disease burden. She also clarified that self-administration of FluMist is anticipated to become available for the 2025–2026 season, but it is not yet in use.

Dr. Levi emphasized the importance of continuing clinical trials to compare the efficacy of different influenza vaccines. He raised a question about how vaccine efficacy is assessed year to year and what portion of the influenza burden is truly being averted through vaccination. He noted the challenges of accurately measuring this impact. He asked CDC colleagues whether negative control approaches are being used to account for the potential influence of the healthy vaccine effect. He also expressed concern that the CDC's model for estimating averted burden appears to increase in direct proportion to the observed number of hospitalizations. He pointed

out that rising hospitalizations could be due to either a higher baseline burden or lower vaccine effectiveness, and that models should account for both factors. He asked how the CDC addresses these concerns and what steps might improve the precision of burden and efficacy estimates.

Dr. Dugan responded that the CDC regularly reviews, tests, and refines its models to improve accuracy and incorporate new data sources. She acknowledged that many factors influence both influenza burden and vaccine effectiveness, including vaccine uptake, public attitudes, timing of the season, co-circulating viruses, the predominant strain, and the antigenic relatedness between the vaccine and circulating viruses. She emphasized the complexity of these interactions and the CDC's ongoing efforts to enhance the precision and clarity of its models.

Dr. Reed confirmed that the CDC's model for estimating prevented burden includes three main components: the observed burden during the season, vaccine coverage, and vaccine effectiveness, which is measured annually through vaccine effectiveness studies. She explained that in seasons with higher influenza activity, even a vaccine with the same level of effectiveness can result in a greater number of averted outcomes due to the increased risk and incidence in the population.

Dr. Levi emphasized the importance of recognizing potential endogeneity in burden estimates, noting that the observed burden may be influenced by vaccine efficacy itself. He suggested that additional efforts are needed to refine the models, as current estimates may be too coarse to accurately monitor key issues over time. He emphasized the need for more precise methods to evaluate vaccine efficacy and enhance the public health response to a serious illness, such as influenza.

Dr. Dugan shared that, overall, they regularly evaluate, test, and stress-test their models and explore new data types to gain greater clarity and granularity. She noted that when considering the overall burden, multiple factors can influence vaccine effectiveness, including vaccine uptake, attitudes toward vaccination, seasonal timing, co-circulating viruses, predominant virus strains, and antigenic relatedness between the vaccine and circulating viruses. She emphasized that there is significant complexity involved in assessing all these factors comprehensively.

Dr. Reed added that, as mentioned, the models estimating the burden consider several factors: the observed disease burden, which varies each season; vaccine coverage for that specific season; and the vaccine's measured effectiveness from annual studies. She explained that in seasons with higher influenza activity, even if vaccine effectiveness remains the same, the vaccine may have a larger overall impact by preventing more outcomes, due to increased influenza incidence and greater risk to the population.

Dr. Goldman emphasized that 250,000 pediatric deaths is not a small number, especially when considering the personal impact on families affected by a vaccine-preventable illness. He suggested that, in addition to modeling the health impact of influenza, it would be valuable to include studies on the financial burden of the disease and the benefits of vaccination. This includes the cost of hospitalizations, the strain on clinics and urgent care centers, lost income,

and the caregiving burden on families. He also highlighted the broader public health benefit of vaccinating younger individuals who care for elderly populations. Dr. Goldman encouraged the committee to consider economic modeling studies to fully capture the value of influenza vaccination in reducing both disease burden and financial strain on the health care system.

Dr. Dugan clarified that 250 influenza-associated pediatric deaths have been reported for the 2024–2025 season. She emphasized that the number is 250 and not a larger figure.

Lyn Redwood, RN, MSN, presented on thimerosal in vaccines and noted the presentation was given as a private citizen, not on behalf of any federal agency. The recognition of mercury exposure in infants and children from vaccines followed the passage of the FDA Modernization Act of 1997, which required the FDA to identify drugs and foods containing intentionally introduced mercury compounds. This review revealed that several pediatric vaccines in multi-dose vials, including inactivated influenza, DTaP, Hib, hepatitis B, and certain immunoglobulin therapies such as hepatitis B immune globulin, contained thimerosal.

In July 1999, the Public Health Service and the American Academy of Pediatrics issued a joint statement calling for the immediate reduction and eventual elimination of the mercury-based preservative thimerosal from infant vaccines. This recommendation was based on findings that infants and children receiving these vaccines could be exposed to mercury levels exceeding federal safety guidelines. Due to potential risks, the Public Health Service, AAP, and vaccine manufacturers agreed that thimerosal-containing vaccines should be removed as soon as possible.

In October 2001, the Institute of Medicine's Immunization Safety Review Committee released a report on thimerosal-containing vaccines and neurodevelopmental disorders. The committee supported earlier calls to remove thimerosal from childhood vaccines and noted that some non-routine vaccines, such as DT, TT, influenza, and pneumococcal, still contained it. They also expressed concern about remaining supplies of thimerosal-containing Hib, hepatitis B, and DTaP vaccines. The committee recommended using thimerosal-free versions and urged further removal of thimerosal from vaccines given to infants, children, and pregnant women. These recommendations were not implemented.

The FDA reviewed the use of thimerosal in vaccines between 1997 and 1999 and found that no clinical studies had formally evaluated its safety before its initial marketing in the 1930s. The only study identified was a 1931 paper in which thimerosal was used to treat meningitis. The study lacked clinical assessments and laboratory data and was not designed to evaluate toxicity. The treating clinician questioned its effectiveness, stating that the benefits had not been definitively proven. In 1930, industry scientists recommended further toxicity testing, but there is no evidence that these studies were conducted. The FDA allowed continued use of thimerosal without requiring formal animal safety data.

Thimerosal was introduced as a vaccine preservative in the 1930s, following its development and patenting in 1927 and its marketing by Eli Lilly under the trade name Merthiolate in 1928. Following a deadly incident in Australia where 12 children died from staphylococcal contamination in a diphtheria vaccine, the FDA began requiring preservatives in all multi-dose vaccines. Thimerosal was used during manufacturing and packaging to prevent bacterial and fungal contamination and became widely used in vaccines and other medical products by the 1930s.

Starting in the late 1970s, scientists began raising concerns about the effectiveness of thimerosal, with several articles arguing it was ineffective. In response, the FDA convened a panel of experts to evaluate its use in over-the-counter products. The panel found that

thimerosal was 35.3 times more toxic to embryonic chick heart tissue than to Staphylococcus aureus and was no more effective than water in protecting mice from fatal streptococcal infections. In 1982, the FDA published the panel's findings in the Federal Register, concluding thimerosal was not safe for topical use due to its potential for cell damage and that its antimicrobial action could be reversed. In April 1998, the FDA issued a final rule stating that thimerosal in over-the-counter products is not generally recognized as safe or effective.

Thimerosal has not been shown to prevent all bacterial contamination in vaccines. This is supported by reported clusters of group A streptococcus infections linked to multi-dose DPT vials that became contaminated after they were opened. Thimerosal was present at acceptable levels in unopened vials from the same lots. The authors concluded that preservatives in multi-dose vials do not prevent short-term bacterial contamination, and that the most feasible and cost-effective method of prevention is strict adherence to sterile technique when administering vaccines from these vials.

A 2023 in vitro study on the cytotoxic effects and antimicrobial activity of thimerosal confirmed findings from earlier research. The study found that effective antimicrobial activity required a concentration of 100 micrograms per milliliter, but cell viability was lost at concentrations as low as 4.6 to 6 micrograms per milliliter. The authors concluded that thimerosal was 333 times more toxic to human and animal cells than to bacterial or fungal cells. They called for further research to determine safer concentrations for use in biopharmaceuticals. Although earlier studies led to thimerosal not being recognized as safe and effective in over-the-counter products, these concerns remain relevant today.

In 1987, the Commission of the European Communities launched a research project on ten known or suspected spindle poisons. Thimerosal was found to significantly interfere with microtubule polymerization, disrupting the spindle machinery responsible for accurate chromosome separation during cell division. This disruption suggests a direct mutagenic potential, as it can lead to structural chromosomal abnormalities. These abnormalities are a well-known pathway to cancer and congenital defects. Thimerosal has shown strong mechanistic evidence of mutagenicity and developmental toxicity, even before in vitro confirmation.

California’s Proposition 65 requires the state to identify chemicals known to cause cancer, birth defects, or reproductive harm and to provide public warnings when exposure may occur. Thimerosal has been listed under Proposition 65 since 1990. In 2003, Bayer Corporation filed a petition requesting reconsideration of the classification of mercury and mercury compounds, including thimerosal, as reproductive toxicants. The California EPA denied the petition, stating that the scientific evidence supporting thimerosal’s reproductive toxicity is robust. Thimerosal breaks down into ethyl mercury in the body, and evidence includes cases of severe mental retardation and malformations in children whose mothers were exposed during pregnancy, along with animal studies showing developmental toxicity and conversion to other toxic forms of mercury.

A 2000 study published in *Pediatrics* measured blood mercury levels in preterm and full-term infants after receiving a hepatitis B vaccine containing 12.5 micrograms of ethyl mercury. The study found elevated mercury levels in all infants post-vaccination. Low-birth-weight infants had average levels of 7.36 micrograms per liter, and one infant reached 23.6 micrograms per liter, exceeding the CDC’s threshold of 10 micrograms per liter for mercury poisoning. Measurable mercury levels were present before immunization, indicating that risk assessments should also account for background exposure.

Experts have noted that there are windows of vulnerability during neurological development. These windows may vary depending on the type of outcome and may be relatively short.

Because thimerosal from vaccines has been shown to raise blood mercury levels above thresholds associated with developmental effects, there is concern that these critical periods may be affected. Even minor neurological impairments can have a substantial impact when they occur across the broader population and lifespan.

A 2005 study funded by the National Institutes of Health compared brain mercury levels in infant macaques exposed to injected ethyl mercury (thimerosal) and ingested methyl mercury in amounts modeled after vaccine exposure. The study found that ethyl mercury converted more rapidly to inorganic mercury in the brain, resulting in higher accumulation. Primates exposed to ethyl mercury retained twice as much inorganic mercury in the brain compared to those exposed to methyl mercury. Inorganic mercury was undetectable in eight out of 17 monkeys in the methyl mercury group, while the ethyl mercury group showed consistently higher levels. This is significant because once inorganic mercury enters brain tissue, it undergoes dealkylation into toxic forms, such as Hg 2 plus, which become trapped in neurons and cannot cross back through the blood-brain barrier.

A recent review summarized evidence from human case studies, animal models, and modeling assessments, estimating the half-life of inorganic mercury in the human brain to be at least 5 to 27 years. Mercury exposure during brain development can disrupt critical processes, including neuronal proliferation, migration, differentiation, synaptogenesis, and apoptosis. These disruptions can lead to long-term effects on the nervous system. The review also noted that the timing of exposure matters, with first-trimester exposure potentially causing different outcomes than exposure during the third trimester. The authors concluded that there may be no safe level of mercury exposure, particularly for unborn children.

Thimerosal is 49.6% mercury by weight. The standard concentration in flu vaccines is 0.01%, which equals 50 micrograms per 0.5 milliliter dose. This corresponds to 100 micrograms per milliliter of thimerosal and 50 micrograms of mercury. The EPA’s Toxicity Characteristic Leaching Procedure (TCLP) defines hazardous waste based on the potential to leach toxic substances into groundwater. The TCLP threshold for mercury is 0.2 mg/L, or 200 micrograms per liter. Flu vaccines containing thimerosal have a mercury concentration of approximately 50,000 micrograms per liter, which is 250 times greater than the TCLP limit. As a result, these vaccines are classified as D009 hazardous waste.

Ms. Redwood referenced an image containing online information about proper disposal guidelines for the 2025 flu season. She highlighted that the final paragraph states all full or partially used multi-dose vials of seasonal flu vaccine should be disposed of as federally hazardous waste. She noted that this information does not appear to be widely shared with clinicians or known by the public.

The most vulnerable populations to mercury exposure include pregnant women, developing fetuses, and young children. A 2003 study by Stern found that cord blood mercury levels were 1.7 times higher than maternal blood at birth. Due to rapid neurodevelopment, immature detoxification pathways, and potential genetic susceptibility, the Institute of Medicine recommended in 2001 that these sensitive groups not be exposed to mercury. Older adults may also be at risk, with recent studies linking elevated mercury levels to cardiovascular disease.

Ms. Redwood summarized that mercury is the third most toxic element, following polonium and plutonium, and has no physiological role in the human body. Thimerosal was grandfathered for use without adequate safety testing and has not been recognized as safe or effective by the FDA's over-the-counter division since 1998. Evidence suggests that thimerosal is not an effective preservative at vaccine concentrations and that it can cross both the placenta and the blood-brain barrier, converting to inorganic mercury in the brain at higher levels than methylmercury. Studies have documented infant blood mercury levels exceeding CDC

thresholds for mercury chemical poisoning following exposure to thimerosal-containing vaccines.

Thimerosal is recognized as a developmental and reproductive toxicant and has been listed under California Proposition 65 since 1990. Unused doses of thimerosal-preserved flu vaccines must be disposed of as hazardous waste. While significant progress has been made in reducing its use, data from the 2019–2020 flu season show that more than 60,000 pregnant women received thimerosal-containing flu vaccines through Medicaid. Thimerosal-free vaccines are currently available, allowing for the assurance that all pregnant women, infants, and children receive only thimerosal-free options. The Institute of Medicine made this same recommendation nearly 25 years ago. Removing a known neurotoxin from use in vulnerable populations was presented as an essential step towards making America healthy again.

Dr. Kulldorff stated that while mercury is a known toxin and exposure cannot be entirely avoided, it is a cumulative issue. Individuals are already exposed to mercury from various sources, so even small additional amounts from vaccines may contribute to an overall harmful load. He emphasized the importance of minimizing cumulative mercury exposure for the sake of public health. He noted that most seasonal influenza vaccines are now available in single-dose, thimerosal-free formulations, making the continued use of thimerosal unnecessary. He added that removing mercury-containing preservatives from vaccines could also help build public confidence, comparing it to the consumer rejection of mercury in other products, such as food. Dr. Kulldorff concluded that eliminating thimerosal from seasonal influenza vaccines is both feasible and beneficial for public trust and health.

Dr. Malone added that seasonal influenza vaccination is recommended annually, which raises concerns about repeated exposure for individuals receiving doses from multi-dose vials containing thimerosal. He noted that those receiving vaccines from multi-dose vials may disproportionately come from underserved or lower-income populations, as single-dose vials are more expensive. This creates the potential for ongoing, cumulative exposure to mercury over a lifetime rather than a single instance.

Dr. Levi agreed with the previous comments and emphasized the need to move away from the perceived trade-off between using mercury-based preservatives and the risk of bacterial or fungal contamination. He stated that vaccine and drug integrity should be maintained through strong supply chain practices and proper handling. He also highlighted the potential for real-time contamination detection technologies and urged further attention to prevention and detection measures to ensure safety without relying on mercury-containing preservatives.

Dr. Kulldorff noted that most influenza vaccines used today are single-dose and do not contain thimerosal. He added that single-dose formats eliminate the risk of contamination, as each dose is used only once.

Dr. Meissner responded that the topic of thimerosal is an old issue that has already been addressed extensively. He noted that thimerosal is metabolized into ethyl mercury and thiosalicylate, not methyl mercury, which is found in fish and shellfish. Ethyl mercury is excreted from the body more quickly and is not associated with the same level of neurotoxicity. He emphasized that all vaccines routinely recommended for children, adolescents, adults, and pregnant women in the United States are available in thimerosal-free formulations. Dr. Meissner added that thimerosal remains in widespread use globally because multi-dose vials are more cost-effective, and many countries cannot afford single-dose vials. He stressed that ACIP recommendations can influence global practices, and that removing thimerosal entirely may reduce vaccine access in lower-resource settings. He concluded by noting that no studies have shown harm from thimerosal and that the FDA’s decision to reduce its use was based on

minimizing overall mercury exposure, not on evidence of toxicity. He suggested that this is not a major issue for ACIP to focus on at this time.

Ms. Redwood pointed out that while some studies, such as the Burbacher study, found that thimerosal-exposed infants had lower blood mercury levels and faster clearance, this does not necessarily mean that the mercury had exited the body. She explained that thimerosal has a higher binding affinity for tissues, particularly the brain, which is the primary organ of concern for mercury toxicity. Ethyl mercury, the breakdown product of thimerosal, has a higher blood-brain ratio than methyl mercury, allowing more to accumulate in the brain despite lower blood levels. She cited data showing that inorganic mercury accounted for about 70% of brain mercury in ethyl mercury-exposed primates, compared to 10% in those exposed to methyl mercury. She stated that these findings challenge the argument that ethyl mercury is safer than methyl mercury. In addressing global use, she reminded the committee that alternative preservatives, such as 2-phenoxyethanol, are available and approved. Given advances in vaccine technology and safety, she urged reconsideration of the continued use of thimerosal when safer options exist.

Dr. Meissner responded that ACIP bases its recommendations on scientific evidence and stated that there is no evidence showing thimerosal has caused harm. He acknowledged that other preservatives, such as benzethonium chloride and 2-phenoxyethanol, are available, with the latter currently used in the polio vaccine. However, he noted that these alternatives have not been studied as extensively as thimerosal. He cautioned against requiring significant changes from manufacturers when there is no proven risk, suggesting the issue warrants further discussion.

Dr. Pebsworth stated that, based on the precautionary principle and the known neurotoxicity of thimerosal, efforts should be made to phase out and eliminate its use. She noted that women in early pregnancy could still receive flu vaccines containing thimerosal and emphasized the importance of reducing this risk where possible.

Dr. Levi offered a different perspective on how risk should be understood. He stated that “there is no evidence of harm” can be misleading without clearly defining what constitutes harm. If the concern is cumulative mercury exposure, efforts should be made to reduce controllable sources, since some exposures cannot be avoided. He emphasized the need for a more holistic and long-term view of risk, noting that while individual exposures may appear safe, their combined impact over time may lead to harm. In his view, the evidence clearly shows that cumulative exposure can be harmful.

Dr. Kulldorff emphasized the importance of considering cumulative mercury exposure. He explained that while individual sources may appear safe on their own, combined exposure from multiple sources could pose a risk. He noted that studying each source in isolation may not reveal harm, but the total exposure could still be dangerous. Since mercury is a known toxin, he stressed the need to reduce overall exposure wherever possible, even if some sources cannot be eliminated.

Dr. Hibbeln stated that if the committee votes in favor of the proposal, it should be noted that the precautionary principle does not override the committee’s usual requirement for demonstrable evidence of harm. He emphasized that no clear evidence of harm from thimerosal has been identified, and relying on precaution alone would represent a shift in the committee’s decision-making criteria. He also noted that public fear of mercury, regardless of the actual risk, may discourage vaccination, which poses its own public health risk.

Dr. Kulldorff agreed and added that psychological factors are an important aspect of public health. He emphasized that evidence-based decision-making should also account for public perception and behavioral responses, as these are part of the overall impact.

Dr. Malone requested input from the FDA representative regarding the potential impact of removing thimerosal. He asked what fraction of influenza vaccine doses in the United States still contain thimerosal, whether thimerosal is used in any other vaccine products beyond multi-dose influenza vials, and if the FDA could provide any additional information to help inform the committee's discussion.

Dr. Hoeg, representing the FDA, reported that for the 2024–2025 season, approximately 4–5% of influenza vaccine doses were thimerosal-containing multi-dose vials. The remaining doses were single-dose preparations. Looking ahead, there does not appear to be a limitation in supply if a shift were made to using only single-dose formulations. This information was confirmed in coordination with colleagues from CBER. Dr. Hoeg also noted that, to the best of current knowledge, the influenza vaccine is the only vaccine on the childhood immunization schedule that may still contain thimerosal and be administered to children or pregnant women.

Dr. Buchanan, representing the National Association of Pediatric Nurse Practitioners, emphasized that none of the vaccines currently on the childhood or adolescent immunization schedule contain thimerosal. After a brief review of the FDA website, she found that only about three multi-dose influenza products still contain thimerosal. She noted that thimerosal was removed from most pediatric vaccines in 2001 and highlighted that current potential exposures are very limited.

Ms. Arthur, representing the Biotechnology Innovation Organization, thanked Ms. Redwood for the presentation and requested the source of the data, stating that 60,000 Medicaid patients received thimerosal-containing flu vaccines. She also asked if a previously available CDC document on thimerosal could be reposted on the meeting website to accompany the presentation.

Dr. Malone responded that, to his understanding, the CDC document referenced was not authorized by the Office of the Secretary and has since been removed. He noted that the Office of the Secretary would take note of the comment and provide direction to the CDC as appropriate.

Dr. Zahn, representing NACCHO, emphasized that over 25 years of data show no evidence of harm from thimerosal-containing vaccines. He cited large cohort studies from countries like the UK, Sweden, and Denmark that found no link between thimerosal and adverse neurological outcomes in children, even with prenatal or early childhood exposure. He noted that while thimerosal is no longer in U.S. pediatric vaccines, the global evidence supports its safety. Dr. Zahn also cautioned against amplifying concerns that may create unnecessary fear and affirmed his confidence in the safety of these vaccines.

Dr. Joseph, representing the American College of Obstetricians and Gynecologists, emphasized strong, decades-long evidence supporting the safety of thimerosal, particularly in prenatal exposure. She affirmed that thimerosal has been removed from most products and noted that extensive data show no link between prenatal thimerosal exposure and autism spectrum disorders. She highlighted the importance of influenza vaccination during pregnancy, which protects both the mother and the infant. Maternal vaccination reduces the risk of severe disease, preterm birth, and hospitalization in infants who are too young to be vaccinated, offering protection during a critical developmental window.

Dr. Jason Goldman, representing the American College of Physicians, echoed Dr. Meissner's earlier remarks and highlighted the committee's longstanding commitment to transparency and

evidence-based decision-making. He expressed concern that many statements shared during the meeting lacked scientific backing and were based on opinion rather than data. He asked whether the committee would be presented with a comprehensive scientific review conducted by CDC staff, physicians, or subject matter experts, supported by peer-reviewed literature, rather than relying solely on presentations from non-expert or lay perspectives.

Molly Howell, representing the Association of Immunization Managers, thanked the committee and raised concerns about how removing thimerosal-containing vaccines could affect pandemic preparedness. She noted that multi-dose vials, which may contain thimerosal, could be necessary in a future influenza pandemic and asked how this decision might impact response efforts. She also questioned why, if there are concerns about thimerosal, the FDA has not restricted its use in vaccines and invited federal partners to address both points.

Dr. Kulldorff clarified that the vote under consideration applies only to seasonal influenza vaccines, not pandemic vaccines, as none are currently on the market. He noted that any future decisions regarding pandemic vaccines would need to be addressed in upcoming meetings of the ACIP and CDC.

Dr. Goode, representing the American Pharmacists Association, reiterated the question raised by Dr. Goldman regarding the ACIP process. She emphasized the importance of transparency and asked whether the committee would present a full evidence-to-recommendations framework that includes an assessment of benefits and harms, population values and preferences, resource implications, equity considerations, and feasibility before proceeding with the vote.

Dr. Kulldorff responded by affirming that the committee remains committed to openness and transparency. He acknowledged the presentation by Lyn Redwood and noted her expertise in vaccines. He emphasized that the committee welcomes input from a variety of perspectives, including those without advanced medical degrees, and that it is inappropriate to dismiss a presentation solely based on a presenter’s credentials. He highlighted that earlier in the day, comments were also received from pharmaceutical representatives and reiterated that diverse viewpoints are essential to the committee’s work.

Ms. Redwood provided additional comments regarding past studies on thimerosal-containing vaccines and autism. She referenced a 2004 report that examined the link between thimerosal and autism, noting that the committee acknowledged large epidemiological studies might not detect harm in genetically vulnerable subpopulations. She also pointed out that the committee's criteria shifted from "biological plausibility" in 2001 to requiring a defined "biological mechanism" in 2004, which limited consideration of findings at the time. Ms. Redwood cited a 2005 study by Dr. Carlos Pardo that found chronic neuroinflammation in the brains of individuals with autism, a result that has since been replicated and is now considered a hallmark of the condition. She also mentioned a CDC study by Dr. Thompson, which explored early thimerosal exposure and neuropsychological outcomes in children aged 7 to 10. That study found an association with tics, which she described as potentially debilitating. She concluded by emphasizing that evidence of harm does exist and offered to provide a list of supporting studies to the committee.

During a later session, Dr. Kulldorff relayed a correction from Dr. Thompson on behalf of the CDC regarding the previously cited Medicaid data. He clarified that the figure of more than 30,000 pregnant individuals receiving thimerosal-containing flu vaccines represents an annual estimate averaged across the 2019 and 2020 calendar years, not a single flu season.

Dr. Martin Kulldorff (ACIP Chair) shared the proposed recommendations for influenza vaccines, including those containing thimerosal.

Proposed Recommendation: Influenza Vaccines for influenza vaccination for the 2025-26 season:

> ACIP reaffirms the recommendation for routine annual influenza vaccination of all persons aged ≥6 months who do not have contraindications.

Proposed Recommendation: Thimerosal-containing influenza vaccines #1

> ACIP recommends children 18 years and younger receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative.

Proposed Recommendation: Thimerosal-containing influenza vaccines #2

> ACIP recommends pregnant women receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative.

Proposed Recommendation: Thimerosal-containing influenza vaccines #3

> ACIP recommends all adults receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative.

Dr. Levi expressed hope that collaboration with CDC colleagues could lead to improved and more reliable methods for evaluating overall flu vaccine efficacy, as well as comparing the relative effectiveness of different vaccines. He acknowledged the complexity of this task but emphasized the importance of providing the public with the most accurate scientific assessments possible.

Dr. Hibbeln noted the significant benefits of using multi-dose vaccines over single-dose vaccines. He acknowledged the availability of data supporting the use of alternative preservatives and expressed hope that the committee would consider adding to the agenda a discussion on the continued use of multi-dose vials with safer preservative options.

Dr. Malone commented on the current recommendations for seasonal influenza vaccination, which advise routine annual vaccination for all individuals aged 6 months and older who do not have contraindications. He expressed interest in a thorough evaluation by the subcommittee of the relative risks and benefits of the various influenza vaccine products currently available. Dr. Malone also noted the importance of considering the long-standing concern of immune imprinting, also known as original antigenic sin, and whether it may be relevant to routine annual influenza vaccination.

Dr. Meissner expressed concern that requiring multidose vials to be free of thimerosal could reduce access to influenza vaccines for some individuals. He acknowledged that it may be a difficult question to answer. Still, he emphasized that the risk of influenza is significantly greater than any known risk associated with thimerosal, which has not been shown to cause harm. Dr. Meissner stated that it would be difficult to justify someone missing a vaccination because the only available option contains thimerosal.

Dr. Pebsworth stated a personal belief that access to any FDA-approved and scheduled vaccines should not be restricted. The reason for abstaining from all votes was the concern over

how the voting question was written. Specifically, the question combined two separate issues: a recommendation for all adults to receive seasonal influenza vaccination, and a recommendation that such vaccines be free of thimerosal as a preservative. Dr. Pebsworth supported eliminating thimerosal but noted there was no discussion on the first part of the question. A request was made to separate future votes to allow for clearer decision-making on individual components.

Vote: Influenza Vaccines Vote

Dr. Martin Kulldorff (ACIP Chair) read the following proposed ACIP voting language for the Influenza vaccines into the record:

> ACIP reaffirms the recommendation for routine annual influenza vaccination of all persons aged ≥6 months who do not have contraindications

Motion/Vote: Influenza Vaccines

Dr. Malone motioned to approve the recommended voting language, stating, " ACIP reaffirms the recommendation for routine annual influenza vaccination of all persons aged ≥6 months who do not have contraindications." Dr. Pagano seconded the motion. No COIs were declared. The motion carried with 6 votes in favor, 0 votes opposed, and 1 abstention. The disposition of the vote was as follows:

6 Favored: Malone, Hibbleln, Pagano, Kulldorff, Levi, Meissner
0 Opposed:
1 Abstained: Pebsworth

Vote: Thimerosal Containing Influenza Vote #1

Dr. Martin Kulldorff (ACIP Chair) read the following proposed ACIP voting language for the Thimerosal-containing Influenza vaccines into the record:

> ACIP recommends children 18 years and younger receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative.

Motion/Vote: Thimerosal Containing Influenza Vaccines

Dr. Malone motioned to approve the recommended voting language, stating, " ACIP recommends children 18 years and younger receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative." Dr. Meissner

seconded the motion. No COIs were declared. The motion carried with 5 votes in favor, 1 vote opposed, and 1 abstention. The disposition of the vote was as follows:

5 Favored: Malone, Hibbleln, Pagano, Kulldorff, Levi
1 Opposed: Meissner
1 Abstained: Pebsworth

Vote: Thimerosal Containing Influenza Vote #2

Dr. Martin Kulldorff (ACIP Chair) read the following proposed ACIP voting language for the Thimerosal-containing Influenza vaccines into the record:

> ACIP recommends pregnant women receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative.

Motion/Vote: Thimerosal Containing Influenza Vaccines

Dr. Malone motioned to approve the recommended voting language, stating, " ACIP recommends pregnant women receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative." Dr. Meissner seconded the motion. No COIs were declared. The motion carried with 5 votes in favor, 1 vote opposed, and 1 abstention. The disposition of the vote was as follows:

5 Favored: Malone, Hibbleln, Pagano, Levi, Kulldorff
1 Opposed: Meissner
1 Abstained: Pebsworth

Vote: Thimerosal Containing Influenza Vote #3

Dr. Martin Kulldorff (ACIP Chair) read the following proposed ACIP voting language for the Thimerosal-containing Influenza vaccines into the record:

> ACIP recommends all adults receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative.

Motion/Vote: Thimerosal Containing Influenza Vaccines

Dr. Malone motioned to approve the recommended voting language, stating, " ACIP recommends all adults receive seasonal influenza vaccines only in single dose formulations that are free of thimerosal as a preservative." Dr. Meissner seconded the motion. No COIs were declared. The motion carried with 5 in favor, 1 opposed, and 1 abstention. The disposition of the vote was as follows:

5 Favored: Levi, Malone, Hibbleln, Pagano, Kulldorff
1 Opposed: Meissner
1 Abstained: Pebsworth

CHIKUNGUNYA VACCINES

Dr. Lyle Petersen (CDC/NCEZID) presented a partial EtR for the use of chikungunya vaccines among persons in U.S. territories at risk for chikungunya virus transmission. There are currently two licensed chikungunya vaccines: a live attenuated vaccine, licensed in November 2023, for individuals aged 18 years and older, and a virus-like particle vaccine, licensed in February 2025, for individuals aged 12 years and older. The Chikungunya Vaccines Work Group was established in May 2022. Since then, ACIP has approved recommendations for the use of both vaccines among travelers and laboratory workers. Most recently, the work group has been reviewing the potential use of these vaccines for persons living in U.S. states and territories at risk for local transmission. The work group completed its review of the public health problem and values domains within the Evidence to Recommendations framework. Additional components will be discussed in future meetings. The full presentation is available online.

For the public health problem domain, the work group concluded that acute chikungunya illness can be severe, particularly in vulnerable populations such as infants, the elderly, and individuals with comorbidities. Arthralgia associated with chikungunya can persist for months to years following infection. Additionally, future outbreaks are likely to evolve rapidly and could affect a substantial portion of the population, potentially overwhelming healthcare services. Finally, there are no highly effective control measures beyond vaccination. In summary, the work group determined that chikungunya virus can have a substantial impact in U.S. territories, with the public health importance primarily due to the risk of large-scale outbreaks.

For the values and preferences domain, the work group reviewed data from surveys conducted in Puerto Rico and the U.S. Virgin Islands. Most participants expressed interest in a hypothetical chikungunya vaccine, with higher interest observed in Puerto Rico. This difference might be attributable to the timing of the surveys relative to local outbreaks, differences in overall vaccine uptake, or varying attitudes toward vaccination. A common concern across both territories was the need for more information on vaccine safety. When considering whether the target population believes the benefits of vaccination outweigh potential risks, the work group

concluded that the answer is probably yes. However, they also acknowledged important uncertainty and variability in how individuals value the main outcomes.

Dr. Petersen provided a brief update on the safety of the live attenuated chikungunya vaccine in older adults. At the April 2025 ACIP meeting, the work group reported six serious adverse events in U.S. individuals aged 65 years and older that had occurred during 2024 and were submitted to the U.S. Vaccine Adverse Event Reporting System (VAERS). Following discussions at the meeting, the CDC determined that age 65 years and older should be a precaution for use of the live attenuated vaccine.

In the three weeks following that meeting, 11 additional serious adverse events were reported internationally among individuals aged 62 to 89 years, most with underlying medical conditions. These cases were largely from Réunion, an overseas department of France, where the vaccine was being used in response to a large outbreak. In response, the European Medicines Agency recommended a temporary pause in the vaccine's use for individuals aged 65 and older. Subsequently, the FDA and CDC also recommended a temporary pause in use for persons aged 60 and older to allow further investigation. The outcome of the FDA's investigation is currently pending.

ANTHRAX VACCINE

Dr. Brendan Jackson (CDC/NCEZID) introduced the Anthrax Vaccine Work Group. *Bacillus anthracis* is the causative agent of anthrax, a spore-forming bacterium that is naturally found in soil worldwide, including in certain parts of the United States. Humans are most often infected by exposure to infected animals or animal byproducts through the cutaneous, gastrointestinal, or inhalational routes. However, *B. anthracis* is also a Tier 1 select agent due to its potential and past use as a bioweapon, its high case fatality rate, and its ability to cause significant harm to public health and safety, particularly when aerosolized.

The work group proposes to review a newer vaccine called Anthrax Vaccine Adsorbed, Adjuvanted (AVAA), marketed under the trade name Cyfendus. This second-generation anthrax vaccine was licensed by the FDA in July 2023 for post-exposure prophylaxis in adults aged 18 to 65 who have been exposed to *Bacillus anthracis*. The Anthrax Vaccine Work Group plans to evaluate the safety and immunogenicity of AVAA to develop recommendations for ACIP consideration regarding its domestic use for anthrax post-exposure prophylaxis.

MMRV VACCINE

Dr. Martin Kulldorff (ACIP Chair)

Dr. Martin Kulldorff (ACIP Chair) provided updates on the MMRV vaccine. The MMRV vaccine is a single combined shot administered with one needle that protects against measles, mumps, rubella, and varicella. It was developed as an alternative to giving the MMR and varicella vaccines separately, which requires two injections: one injection for measles, mumps, and rubella, and the other for varicella. There are no known differences in efficacy between the combined MMRV vaccine and the separate MMR plus varicella vaccines.

The timeline is as follows: in 2005, the MMRV vaccine was licensed by the FDA for children aged 12 months to 12 years. In 2006, the ACIP recommended the use of the MMRV vaccine, with a preference for administering it over separate MMR and varicella vaccines.

CDC's Vaccine Safety Datalink rapid cycle analysis demonstrated the value of ongoing near real-time safety monitoring. As the new vaccine was rolled out, the CDC tracked weekly data. For the first dose administered to children aged 12 to 23 months, a signal was detected indicating an excess number of febrile seizures. This signal emerged after approximately 26,000 doses had been given.

At that time, there were 59 observed cases of febrile seizures compared to 38 expected cases, which was statistically significant and triggered a signal from the surveillance system. When a signal like this is detected, it prompts a more thorough evaluation to determine the cause, which may include data errors or other contributing factors. As a result, a more detailed investigation into febrile seizures following this vaccine was conducted.

Febrile seizures can occur at various times after vaccination, but a noticeable increase has been observed 7 to 10 days after receiving the MMRV vaccine. While a smaller increase may also occur after the MMR vaccine, the rise following MMRV is more pronounced, suggesting a higher risk.

A formal study found that the MMRV vaccine is associated with a relative risk of about two for febrile seizures compared to separate MMR and varicella vaccines. This translates to approximately four to five additional cases per 10,000 children vaccinated. While not extremely common, it is also not considered rare. The finding was statistically significant, indicating that the increased risk is unlikely due to chance. MMRV carries a higher risk of febrile seizures compared to giving the MMR and varicella vaccines separately.

This finding is consistent with the results of a study showing an increased risk of post-vaccination fever after administering the MMRV vaccine compared to administering MMR and varicella separately. These effects are observed in children who receive their first dose, typically administered between 12 and 15 months of age.

The MMRV work group was formed to examine this issue and voted on four recommendation options. The old ACIP guidance recommended both MMRV and separate MMR plus varicella vaccines, with a preference for MMRV. Following the review, the majority of the work group voted to revise the recommendation to support both options, but with a preference for administering MMR and varicella separately (MMR+V). A minority supported recommending both with equal preference, and one vote favored recommending only MMR+V.

At the June 2009 ACIP meeting, the committee voted on updated guidance for the use of the MMRV vaccine. The majority of members voted to recommend both MMRV and separate MMR plus varicella vaccines with equal preference. A minority of members supported maintaining a preference for MMR+V, due to the increased risk of febrile seizures associated with the combination MMRV vaccine.

ACIP serves as an advisory body, while the CDC ultimately issues the official vaccine recommendations. In this case, although the CDC typically follows ACIP's guidance, it made a notable adjustment. The CDC stated that either MMRV or separate MMR plus varicella vaccines may be administered at the recommended age. However, for the first dose in children aged 12 to 47 months, the CDC expressed a preference for administering MMR plus varicella separately.

Dr. Kulldorff summarized that there is no known difference in efficacy between the MMRV vaccine and the separate MMR plus varicella vaccines. However, for the first dose given to children aged 12 to 23 months, strong evidence shows a higher risk of febrile seizures following

MMRV. This equates to approximately one additional case per 2,300 doses when compared to separate administration. For the second dose, typically given at ages 4 to 6 years, no increased risk of febrile seizures has been observed.

[Clarification from Chair: The majority of pediatricians administer the MMR+V vaccines rather than the MMRV vaccine as the first dose given to one year old toddlers. To ensure the integrity and trust in the childhood vaccine schedule, it is imperative that ACIP recommendations minimize vaccine adverse reactions as much as possible.] A proposed recommendation, which may be considered for a vote at a future meeting, is that since a safer and equally effective alternative exists, the MMRV vaccine should not be administered to children under 47 months of age.

PUBLIC COMMENT

The floor was opened for public comment on June 26, 2025. The comments made during the meeting are summarized in this document. Members of the public were also invited to submit written public comments to ACIP through the Federal eRulemaking Portal under Docket Number ID CDC-2025-0024. Visit regulations.gov for access to read the comments received.

Elias Kass
Private Citizen

Dr. Elias Kass, a naturopathic physician specializing in pediatrics, provided public comment addressing vaccine hesitancy and the importance of evidence-based communication. He emphasized that relitigating settled vaccine safety issues, such as concerns about thimerosal, creates false doubt and undermines public trust. Dr. Kass warned against policy-based evidence-making, where conclusions are reached before evidence is gathered, and raised concerns about potential conflicts of interest beyond pharmaceutical ties, including financial incentives tied to supplement sales, expert testimony, or contrarian branding. He emphasized the need for accurate, contextual risk communication, noting that highlighting minor vaccine side effects without acknowledging the severe risks of vaccine-preventable diseases can mislead the public. Dr. Kass concluded by highlighting the role of public policy in shaping health outcomes and urged the committee to prioritize decisions that protect community health through scientifically sound vaccine recommendations.

Emmett Patterson
Locked Down and Out

Emmett Patterson, a public health professional specializing in health communications and outbreak response, provided public comment expressing concern about the rising rates of vaccine-preventable illnesses. Patterson highlighted the disproportionate impact of these illnesses, including long COVID, on LGBTQ communities, who experience higher rates of infection, more severe outcomes, and increased risk of disability. He stressed that COVID-19 vaccines remain the most effective protection against severe illness, disability, and death. Patterson urged ACIP to make decisions based on science, not politics, and called for the reinstatement of universal COVID-19 vaccine recommendations for all ages. He emphasized the importance of transparency, re-engagement with expert advisors, and equitable access to vaccines to ensure that no marginalized community is left behind.

Millicent Gorham

Alliance for Women's Health and Prevention

Millicent Gorham, CEO of the Alliance for Women's Health and Prevention, provided public comment expressing serious concern about the continuity and credibility of the nation's vaccine infrastructure. She warned that recent actions, including the dismissal of ACIP's previous members and the disregard of evidence supporting COVID-19 vaccination during pregnancy, threaten decades of public health progress and trust. Gorham emphasized that ACIP recommendations are essential not only for public health guidance but also for ensuring insurance coverage, which preserves access to and choice of vaccines. She cautioned that removing or weakening recommendations could lead to confusion, loss of coverage, and increased rates of preventable illness and death. Gorham urged ACIP to prioritize science, uphold the integrity of the nation's vaccine system, and protect equitable access to vaccines.

Niki Carelli
The Coalition to Stop Flu

Niki Carelli, Executive Director of the Coalition to Stop Flu, provided public comment emphasizing the critical importance of continued support for universal influenza vaccination. She described the coalition as a multi-sector federal advocacy group focused on preventing deaths from seasonal and pandemic flu, representing a wide range of public health, academic, healthcare, and industry organizations. Carelli highlighted the significant annual burden of influenza, including tens of thousands of deaths, hundreds of thousands of hospitalizations, and billions of dollars in costs. She stressed that flu vaccination is the most effective tool for reducing serious illness and complications, with decades of safety data supporting its use. Carelli noted the record number of pediatric flu deaths in the past season, with 90% of the children who died being unvaccinated, underscoring the importance of maintaining ACIP's current influenza vaccination recommendation. She concluded by urging the committee to preserve this recommendation to ensure continued insurance coverage, broad access, and life-saving protection for millions of Americans.

Ronald F. Owens, Jr.
Muzzled Truth 1

Ronald Owens, Jr., a former employee of the California Department of Public Health, provided public comments expressing strong concerns about the safety of the COVID-19 vaccine. He referenced statements made by HHS leadership in 2022 and cited personal outreach efforts to California public health officials regarding reports of adverse vaccine events. Owens stated that he retired early to share his concerns without restriction publicly and described his ongoing efforts to warn local officials and the public. He called for ACIP and federal health agencies to acknowledge and address reports of vaccine injuries, suggesting a COVID-19 vaccine injury listening tour to hear directly from affected individuals. Owens urged federal officials to inform the public about what he described as the risks of COVID-19 vaccines.

Katrin Werner-Perez
Alliance for Aging Research

Katrin Werner-Perez, Director of Health Programs at the Alliance for Aging Research, provided public comment with five key recommendations. First, she urged ACIP to vote on updated COVID-19 vaccine recommendations, emphasizing the continued risks of severe illness, hospitalization, and death, particularly among older adults and children. She expressed concern that the HHS Secretary's removal of COVID-19 vaccines from the schedule for healthy pregnant

individuals and children undermines ACIP's role and contradicts FDA guidance. Second, she recommended finalizing ACIP's April vote to expand RSV vaccine recommendations to adults aged 50 to 59, citing the high disease burden in this population. Third, she asked ACIP to reinstate the planned vote on this year's influenza vaccine strains to ensure CMS and insurance coverage. Fourth, she called for the restoration of all originally planned votes, including those for COVID-19, HPV, and influenza vaccines, as well as for the Vaccines for Children program, to ensure free vaccine access. Lastly, she opposed removing thimerosal-containing influenza vaccines, citing their safety record and critical role in settings such as nursing homes. Werner-Perez concluded by urging ACIP to prioritize scientific integrity and impartiality to protect public health.

Allison Howells
Vaccinate Your Family

Allison Howells, Communications Coordinator at Vaccinate Your Family, provided public comment emphasizing the critical role of ACIP recommendations in guiding public health education and vaccine access. She shared personal stories from families who lost loved ones to vaccine-preventable diseases, including influenza, meningococcal B, whooping cough, and COVID-19, underscoring the human cost of delayed or limited vaccine availability. Howells warned that changes to vaccine recommendations affecting insurance coverage or creating public confusion will lead to unnecessary illness, suffering, and death. She called on the HHS and CDC to ensure that ACIP members base their decisions on the whole body of credible scientific evidence, rather than personal beliefs or selective data. Howells stressed that vaccines remain one of the safest and most effective tools in public health, and she urged the committee to maintain vaccine availability, accessibility, and affordability to protect the health of all Americans.

Avraham Seff
Private Citizen

Avraham Seff provided public comment sharing a personal story about how his expressed concerns regarding the HPV vaccine during a custody dispute led to unintended legal consequences, including the severing of his relationship with his child. He emphasized that while ACIP recommendations are intended as expert guidance, they are sometimes misinterpreted or misused by courts and child protection systems as mandates, resulting in accusations of parental unfitness. Seff acknowledged the integrity and commitment of ACIP members but urged the committee to consider including a clear disclaimer stating that vaccine recommendations are not legal requirements and should not be the sole basis for determining parental fitness. He offered sample language for such a disclaimer and encouraged ACIP to address this issue with sensitivity to prevent unintended harm to families.

Dr. Paola Ballester
Johns Hopkins All Children's Hospital

Dr. Paola Ballester, a double board-certified pediatrician, pediatric hospitalist, and mother, provided public comment emphasizing the life-saving importance of vaccines. Drawing from over 15 years of experience, she shared firsthand accounts of children suffering severe outcomes from vaccine-preventable diseases, noting that these cases are now rare but typically occur in unvaccinated patients. Dr. Ballester highlighted the critical role of vaccines in preventing millions of deaths globally and warned against allowing misinformation or conspiracy theories to influence vaccine policy. She expressed concern about recent changes to ACIP

membership and the potential erosion of longstanding standards of scientific rigor and transparency. Dr. Ballester urged the committee to follow the evidence, maintain trusted immunization schedules, and ensure continued access to vaccines, stressing that reversing course would result in preventable suffering and loss of life.

Dr. Christine Martin
WakeMed Pediatrics

Dr. Christine Martin, a board-certified pediatrician with over 30 years of experience in primary care and public health, provided public comment advocating for the continued support of routine childhood vaccinations. She shared personal and professional experiences witnessing the devastating impacts of vaccine-preventable diseases, both early in her life and throughout her career, including cases of pneumococcal meningitis, congenital rubella syndrome, polio, and whooping cough. Dr. Martin highlighted the dramatic reduction of these diseases due to vaccines such as pneumococcal, Hib, meningitis, MMR, varicella, and Tdap, and emphasized the recent availability of RSV prevention tools for infants. She warned that misinformation and public fear are creating cracks in the protective barrier provided by vaccines, as reflected in the current measles outbreak. Dr. Martin urged ACIP to uphold the existing childhood vaccination schedule, emphasizing that it is based on decades of rigorous research and developed by highly qualified experts.

Dr. Elizabeth Hornbeck
AAP

Dr. Elizabeth Hornbeck, a pediatric hospitalist and mother of two, provided public comment sharing her perspective as both a clinician and parent. She described firsthand experiences caring for previously healthy children who suffered severe complications from vaccine-preventable diseases such as influenza and RSV, including lung damage and neurological devastation. Dr. Hornbeck emphasized that her decision to vaccinate her children is based on personal protection first, and public health benefit second, noting that vaccines are safe and prevent far more harm than they could ever cause. She urged ACIP to maintain the current vaccine schedule to ensure continued insurance coverage, access, and supply. Dr. Hornbeck warned that changing recommendations could weaken public health protections and leave children vulnerable to preventable illnesses, calling on the committee to make evidence-based decisions that protect the nation’s children.

Dr. Neil Patel
Practicing Pediatrician

Dr. Neil Patel, a general pediatrician and new father, provided public comment highlighting the critical role of vaccines in protecting children and families. He shared concerns voiced by parents in his practice who fear losing access to life-saving vaccines. Reflecting on his experience on the front lines during the COVID-19 pandemic, Dr. Patel emphasized the lives saved by the timely development of vaccines and praised the previous ACIP members for their contributions. He urged the committee to continue following evidence-based medicine and to ensure that vaccines remain accessible through insurance coverage and the Vaccines for Children program. Dr. Patel also expressed concern about the recent removal of a CDC document from the ACIP website that reaffirmed the safety of thimerosal-containing vaccines, stating that such actions can erode trust. He called on ACIP to protect access to vaccines and ensure that preventable diseases remain in history books, not in hospitals, schools, or homes.

Akshata Hopkins
American Academy of Pediatrics

Dr. Akshata Hopkins, a board-certified pediatric hospitalist, provided public comment emphasizing the importance of vaccines in preventing severe childhood illnesses. She shared personal clinical experiences treating children with meningitis, pertussis, and Hib infections, noting that she had not seen these cases in over a decade due to the success of vaccines. Dr. Hopkins expressed concern that many younger physicians may no longer be trained to recognize or manage these diseases, making a return of vaccine-preventable illnesses particularly dangerous. She urged ACIP to maintain evidence-based recommendations, protect public confidence in vaccines, and ensure that decisions remain guided by science rather than political influence. Dr. Hopkins stressed that weakening vaccine infrastructure or removing medical expertise from the process will create confusion, erode trust, and lead to the resurgence of preventable diseases, ultimately putting children at risk.

With no additional business to be addressed at the June 2024 ACIP meeting, the meeting was officially adjourned.

ACIP MEMBERSHIP ROSTER

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KULLDORFF, Martin, PHD
Biostatistician, Epidemiologist
Formerly Harvard University Professor of Medicine
6/13/2025 – 6/30/2029

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Leading expert in Healthcare Analytics
Term: 6/13/2025 – 6/30/2029

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Vaccinologist, Scientist, Biochemist
Contributor to mRNA Vaccine Technology
Term: 6/13/2025 – 6/30/2029

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Former CDC ACIP member
Former FDA's Vaccine & Related Biological Products Advisory Committee
Term: 6/13/2025 – 6/30/2029

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Term: 6/13/2025 – 6/30/2029

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Term: 6/13/2025 – 6/30/2029

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