• Concerns that the decline in chickenpox cases following the 1996 marketing of varicella virus vaccine for children would lead to earlier onset of herpes zoster in adults have not yet borne out, according to a study of the annual incidence of herpes zoster in adults from 1991 to 2016 (Clin Infect Dis. 2020;70[6]:995–1002). The exogenous boosting hypothesis postulates that repeated exposure to chickenpox virus delays the onset of herpes zoster, and this led to anticipation of an earlier onset of herpes zoster beginning about 15 years after vaccine use began. In the study, the annual incidence of herpes zoster rose through 2012 and then plateaued, but the annual rates of change in each age category rose at about the same rate over the study period, failing to support the hypothesis. The impact of the decrease in exposure could happen later, perhaps as late as 2031.

• An international study provides epidemiological and clinical insights into hospitalizations of pregnant women for influenza (J Infect Dis. 2020;221[10]:1703–1712). Using data from Australia, Canada, Israel, and the United States for 2010 to 2016, retrospective cohorts of pregnant women with acute respiratory infection or febrile illness were compared with pregnant women with laboratory-confirmed influenza illness. About one-third of women with influenza were in lower socioeconomic groups, one-fifth had underlying conditions, and two-thirds were in their last trimester of pregnancy. Pneumonia was diagnosed in 10% of those with influenza, 5% required intensive care, and fewer than 1% had respiratory failure.
Because measles outbreaks are increasingly common and the condition is more severe in adults than in children, waning of immunity following vaccination is a concern. An Italian study of 2,000 medical students and residents showed that 15% did not have protective levels of measles immunoglobulin G 10 years after vaccination, and this was higher in those who received their first dose of measles–mumps–rubella (MMR) vaccine before 15 months of age (J Infect Dis. 2020;221[5]:721–728). In the residents and students with low titers, MMR boosting resulted in seroconversion in 74% and 93% of individuals with 1 or 2 doses, respectively.

Beliefs that influenza immunizations are not effective are a major factor in parental hesitancy that results in children not receiving this annual vaccine, according to a report in Pediatrics (2020;145[6]:e20193852). Providing insights relevant to hesitancy about adult vaccines, this February 2019 survey shows that 1 in 15 parents were hesitant about routine childhood vaccines in general, 1 in 4 were hesitant about influenza vaccines, and only 1 in 4 believed that influenza vaccines are effective.

RESOURCES

Medicare spent $106 billion treating vaccine-preventable diseases in 2016 to 2018, according to a new Avalere report. Over those 3 fiscal years, beneficiaries paid $9.6 billion in out-of-pocket costs for these conditions, which included pneumococcal disease and influenza as well as Clostridium difficile and respiratory syncytial virus, pathogens for which vaccines are in development but not yet marketed.

COVID-19 VACCINES: WHO WILL TAKE THEM — AND WHY

For members of the immunization community, vaccine hesitance has long been confusing. We know the “what”—there are nonvaccinators among us, their numbers seem to be growing, and the reasons they mention are often personal and not connected to the hard statistics on effectiveness and safety cited in clinical trials. But the “why” remains elusive. Why would people not protect themselves, their loved ones, and those in their community against the sickness, disability, and death that infectious diseases can cause? Why?

Then a serious pathogen comes along such as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). We vaccinators think, “OK, here’s an opportunity to break through with those who are vaccine hesitant or resistant. Surely no one would pass on a vaccine against this virus.” But, alas, we would be wrong again.

At last month’s virtual meeting of the National Vaccine Advisory Committee (NVAC), presenters focused on coronavirus disease 2019 (COVID-19) and progress in understanding what a vaccine needs to do, what people think about a vaccine, and a start on messages that might work in overcoming hesitancy about a COVID-19 vaccine.
HERD IMMUNITY: HOW MUCH OF THE POPULATION IS ENOUGH?

With a basic reproductive number \( R_0 \) for SARS-CoV-2 of 2.5 (an infected person spreads the virus to an average of 2.5 other people), about 60% to 70% of a population needs antibodies to achieve herd immunity, explained David Dowdy, MD, PhD, of the Johns Hopkins Bloomberg School of Public Health, in presenting 5 key principles of herd immunity. This “threshold” of people with protective antibodies can come from either a vaccine or exposure to SARS-CoV-2.

That’s simple enough. He said that current estimates are that about 8% of the American population currently has antibodies, and this figure is rising at 1.5% per month. Without a vaccine and given an \( R_0 \) of 2.5, it will take a lot of time and COVID-19 to get the country to 60%, Dowdy said of the first principle.

However, if the susceptibility in the population is nonuniform, the herd immunity threshold is lower, Dowdy said. An example of this second principle is a situation in which most of the susceptible people get the virus first, leaving the rest of the population at lower risk. The herd immunity threshold could be as low as 30% in that case, he said. Or if an identifiable group is often encountering the virus and develops immunity—for instance, health care workers and first responders—and others are not often exposed, vaccinating the smaller group of those at high risk could be enough.

Even if the herd immunity is met in a population, outbreaks can still occur, Dowdy said. This third principle is cautionary, reflecting experiences such as the measles outbreaks that occur even though 91% of the U.S. population has immunity. The fourth principle notes that herd immunity depends on vaccine efficacy and the duration of immunity—the lower these numbers, the more difficult the process.

Dowdy closed by noting in his fifth principle that “herd immunity is a continuum, not a threshold.” As with physical distancing and stay-at-home orders, some protection from vaccine- or disease-induced immunity will help flatten the infection curves. “Even a vaccine that doesn’t achieve a prespecified threshold will save lives,” Dowdy said. “The goal of vaccination should really be to optimize the number of people we are able to render immune, not to meet a specific threshold.”
VACCINE EXPECTATIONS AND OPINIONS DIFFER

Vaccines are important in getting society reopened, many Americans think, but they rank other more feasible goals higher: mandatory quarantines for those exposed to the virus, widespread testing, use of face masks, and keeping people 6 feet apart. Those data, from a mid-May 2020 survey, were shared with NVAC participants by Jennifer Benz of the Associated Press–National Opinion Research Center (AP-NORC) at the University of Chicago.

One reason people don’t rank a vaccine higher is they have a realistic view of when effective products might become available. “Only 20% anticipate that a vaccine will be available before the end of this year,” Benz said, “and 61% think it will happen during 2021. Another 17% think it will take even longer than that.”

If a COVID-19 vaccine becomes available, women and blacks in the United States are more skeptical about whether they will want to receive it, according to survey findings reported by Chris Jackson of Ipsos Public Affairs. Working with Reuters, Ipsos conducted surveys during April and May showing that only 28% of women and 25% of blacks were very interested in COVID-19 vaccines, as shown in Figures 1 and 2. Older adults were also not confident about getting COVID-19 vaccine (Figure 3).

Benz reported similar data from the AP-NORC survey, with about half (49%) of people saying they will get the vaccine, one-third (31%) not sure, and one-fifth (20%) not intending to be vaccinated.

The speed with which COVID-19 vaccines are being developed was named by nearly half (48%) of the Ipsos survey respondents when asked why they were not interested in these products. Other reasons were the risks associated with taking new vaccines (42%) and lack of trust in the those developing them (35%).

The survey showed that people will have more confidence in COVID-19 vaccines when large scientific studies are available (62%), the vaccine is approved by the U.S. Food and Drug Administration (57%), U.S. health authorities reassure Americans that the vaccine will prevent a repeat of the pandemic (57%), taking the vaccine means that life can return to the way it was before the pandemic (57%), and their personal physician recommends the vaccine (54%), Dowdy said.
BUILDING VACCINE CONFIDENCE

Clear, uniform messaging will be critical in building confidence in COVID-19 vaccines, Benz and Dowdy agreed. “People are very reluctant to go toward things they don’t understand or that are novel,” Dowdy said. “They are less comfortable when trusted messengers are not clearly talking about why an intervention is a good and safe thing. If a vaccine comes out and discordant voices are disagreeing or pointing out safety risks, I think you will have the possibility of a lot of very mixed responses.”

“Americans have realistic expectations for vaccine development, time frames, acceptance that other measures can suffice to reopen the country in the meantime, and concerns about safety,” Benz said. “This means that rhetoric and messaging focused on the rapid speed of vaccine development may be counterproductive for people. Communities of color, young people, and women are targetable groups with significantly lower intentions to vaccinate at this point in time, and they may be a good place to focus public health messaging.”

Understanding the reasons people might refuse a COVID-19 vaccine provides a window into the challenges we face as vaccine advocates. We can build on such “why” findings in an effort to get herd immunity to as high a number as possible.