EDITORIAL

Sparing of Severe Covid-19 in Vaccinated Adolescents

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As a pediatrician who has studied the effect of respiratory viral infections in children for many years, I had difficulty reconciling data from early in the coronavirus disease 2019 (Covid-19) pandemic suggesting that the virus largely spared the pediatric population.[1,2] This finding differed from outcomes with influenza and respiratory syncytial virus, where young children had more severe effects than most adults and played a major role in transmission. Unfortunately, as time passed, the negative consequences of the pandemic on children became apparent, with hospitalizations and deaths reported.[3] In April 2020, a new, uncommon but serious manifestation of pediatric Covid-19, multisystem inflammatory syndrome in children (MIS-C), was identified.[4,5] Presumed to be a postinfectious immunologic event, MIS-C was characterized by fever, rash, conjunctivitis, abdominal pain, shock, and cardiac dysfunction. Now, after nearly 2 years of Covid-19, the overall effect of the pandemic on children has been profound, with restrictions on academic and social activities leading to isolation, depression, increasing obesity, and academic failure.[6]

The control of pediatric disease moved a step forward on May 10, 2021, when the Food and Drug Administration (FDA) issued an emergency use authorization for the BNT162b2 messenger RNA vaccine (Pfizer–BioNTech) in children between 12 and 15 years of age. (A previous authorization had been issued for adolescents starting at 16 years of age.) The authorization was based on encouraging data from a randomized, placebo-controlled trial involving more than 2200 children in which the immunogenicity and safety of the vaccine were shown to be similar to the results in adult vaccine recipients.[7] In addition, the vaccine efficacy against laboratory-confirmed disease was 100%. The confidence intervals were wide, given the small trial size, but no Covid-19 hospitalizations, intensive care unit (ICU) admissions, or deaths occurred in the trial.

With the arrival of the B.1.617.2 (delta) variant and the reopening of schools, brisk increases in pediatric infections and hospitalizations were reported, particularly in the adolescent population.[8] In a study now reported in the *Journal*, Olson et al. provide impressive evidence regarding the effect of the vaccine in hospitalized adolescents in the United States as part of the Overcoming Covid-19 surveillance network funded by the Centers for Disease Control and Prevention.[9] The investigators assessed data obtained at 31 selected hospitals in 23 states to determine the real-world effectiveness of the BNT162b2 vaccine against severe disease among adolescents between 12 and 18 years of age. A case–control, test-negative study design was used with two separate control groups, one in which hospitalized patients had negative results on testing for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (test-negative) and one in which patients had no symptoms of Covid-19 (syndrome-negative). A total of 445 case patients and 777 controls were enrolled. Nearly three quarters of both the case patients and the controls had underlying medical conditions, including obesity; 70% were attending in-person school. The median age of case patients and controls was 16 and 15 years, respectively. Only 17 case patients (4%) had been fully vaccinated, as compared with 282 controls (36%). Overall, 180 case patients (40%) were admitted to an ICU, and 127 (29%) required life support. Only 2 patients who had been admitted to an ICU and

none of the 7 children who died had been fully vaccinated. The vaccine effectiveness was 94% for the prevention of Covid-19 hospitalization and 98% for the prevention of both ICU admission and need for life support. These extremely encouraging data indicate that nearly all hospitalizations and deaths in this population could have been prevented by vaccination.

However, it is distressing that less than 39% of the adolescents in the control group had been immunized against Covid-19, despite uniform eligibility and widespread vaccine access. It is also highly problematic that three quarters of the case patients had underlying conditions, that a disproportionate percentage were either Black (24%) or Hispanic (25%), and that nearly half the patients were enrolled in southern states, where immunization rates among adolescents have lagged. Although these rates have increased somewhat since the data in this study were compiled, as of December 1, 2021, only 60% of U.S. adolescents had received a single dose of a Covid-19 vaccine, and only 50% had been fully vaccinated.[10]

On October 29, 2021, the FDA extended the emergency use authorization for the BNT162b2 vaccine to children at least 5 years of age. As of December 1, 2021, approximately 4.3 million U.S. children between 5 and 11 years of age (15%) had received at least one dose of a Covid-19 vaccine. These immunization rates are in sharp contrast to rates of more than 95% for routine pediatric vaccinations. The achievement of similar vaccination rates for protection against Covid-19 would have an enormous effect on the pandemic among children. Vigorous efforts must be expended to improve vaccination coverage among all children and especially among those at highest risk for severe Covid-19. In the United States, as of December 23, 2021, more than 7.5 million children had been infected during the pandemic and 721 had died.[10] The widespread use of vaccines would markedly reduce this toll. The highly effective surveillance network that is described in this study must also continue to monitor hospitalization data over time to assess waning of immunity, protection against new variants of concern (particularly the rapidly spreading B.1.1.529 [omicron] variant), and the need for and timing of additional vaccine doses.

Disclosure forms provided by the author are available with the full text of this editorial at NEJM.org.

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