Emergency Settings: Be Prepared to Vaccinate Persons Aged 15 and Over Against Measles

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(See the major article by Navarro-Colorado et al on pages 1863–70.)

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In their landmark article on measles prevention in emergency settings, Toole and colleagues recommended in 1989 that all children aged 6 months to 5 years should be immunized with measles vaccine at the time they enter an organized camp or settlement [1]. In 2000, Salama and colleagues documented substantial mortality during a famine emergency in Ethiopia, with measles and malnutrition as major contributing factors. In a retrospective study of mortality, measles alone, or in combination with wasting, accounted for 35 (22.0%) of 159 deaths among children younger than 5 years and for 12 (16.7%) of 72 deaths among children aged 5–14 years. The setting was a rural population without routine childhood immunization and exposure to natural measles virus infection [2]. The authors concluded that measles vaccination, in combination with vitamin A distribution, should be implemented in all types of complex emergencies. Vaccination coverage should be 90% and extended to children up to age 12–15 years [2]. A vaccination age range up to 14 years was included in the World Health Organization (WHO)/United Nations Children’s Fund (UNICEF) statement to reduce measles mortality in emergencies [3], and the revised SPHERE project guidelines [4]. However, since then, the discussion about target age groups has increasingly included the potential need to vaccinate adults. As early as 2000–2001, Kamugisha and colleagues documented 21% of measles cases that were 16 years and older in a major outbreak in Tanzanian camps with refugees from Burundi [5]. The authors concluded that in some emergency settings, achieving population immunity adequate to prevent virus transmission may require vaccinating persons older than 15 years, and the selection of target age groups for vaccination should consider measles epidemiology in source and refugee populations [5]. A recent review documented additional measles outbreaks in emergencies that included adult cases [6], and the recommendation to review the measles epidemiology to inform decisions about vaccination target age groups has increasingly become standard in emergency [7, 8] and nonemergency settings [9]. This shift in recommendations has been a result of the changing epidemiology of measles in Africa [10].

In this issue of The Journal of Infectious Diseases, Navarro-Colorado and colleagues remind us of the need to consider those changes in epidemiology when responding to measles outbreaks in displaced populations, and to be prepared to vaccinate adolescents and adults. In 2011, a massive influx of refugees occurred to camps in Dadaab, Kenya, and Dollo-Ado, Ethiopia, when Somalis fled severe drought and ongoing armed conflict in their countries. Given that these refugees, after walking for weeks without food or services, generally arrived in poor health and often malnourished, and reports that implementing comprehensive measles control and elimination strategies in Somalia remain challenging [11], the authorities implemented vaccination on arrival to camps and routine immunization in clinics for children aged 6–59 months (Ethiopia) and 9–59 months (Kenya). In Dadaab, Kenya, a nonselective measles vaccination campaign was conducted for children aged 9 months to 14 years from 28 March to 7 April 2011. Measles outbreaks started 6 June 2011 in camps in Kenya and 9 July 2011 in camps in Ethiopia. The authors reported that the outbreak was known to affect adolescents and adults aged ≥15 years in Kenya in week 27, which corresponds to 3–9 July 2011; and in Ethiopia in week 29, which corresponds to 17–23 July 2011. However, because of lack of a policy agreement and limited availability of vaccines, no refugees aged ≥15 years were vaccinated before August 2011, when vaccination on arrival in camps...
in Kenya was expanded to age 29 years, and September 2011, when nonselective vaccination campaigns were conducted in camps in both countries that included refugees up to age 29 years. Navarro-Colorado and colleagues concluded that expanding age in the outbreak response apparently contributed to ending the outbreak; however, the failure to change the response strategy earlier in the outbreak might have resulted in higher attack and case-fatality rates.

The article by Navarro-Colorado and colleagues provides the opportunity for the following considerations and lessons learned. First, when assessing measles epidemiology and vaccination history of specific birth cohorts in source and refugee populations, decision makers have to consider both the changes in measles control and emergency settings in the last decade. Both the African (where Ethiopia and Kenya are member states) and the Eastern Mediterranean (where Somalia is a member state) WHO regions have adopted measles elimination goals, and measles vaccination coverage rates have increased considerably. Between 2000 and 2011, WHO/UNICEF estimates of coverage of first-dose measles containing vaccine (MCV) increased from 36% to 68% in Ethiopia, 78%–87% in Kenya, and 24%–46% in Somalia [12]. As a result of increased vaccination coverage, we are seeing a shift to more adult cases as force of infection at young ages has decreased secondary to vaccination programs, allowing more children to age into adulthood without exposure to natural virus infection, in particular because countries have not achieved 2 doses of MCV with >95% coverage that are needed to interrupt endemic measles transmission (90% coverage is not sufficient for measles elimination) [9, 13]. In addition, age distribution of measles cases in the source population of refugees that arrived in 2011 from Somalia has been influenced by the fact that birth cohorts currently aged ≥15 years were targeted for measles vaccination through routine immunization services prior to 2000, when coverage was much lower. Furthermore, because increasing numbers of refugees and displaced persons are now residing among host communities rather than in camps [6], decision makers have to consider the mixture of potentially different susceptibility rates and different susceptible age groups in host and arriving populations, and the need to design outbreak response interventions that take those combinations into account. Second, rapid assessments have to be preceded by policy and supply considerations in case older age groups have to be vaccinated. As Navarro-Colorado and colleagues stated, new arrivals in Ethiopia and Kenya were considered to be integrated in protracted camps (defined as a refugee population of ≥25 000 living in exile for ≥5 years); however, the unexpected massive influx changed the situation more into an acute emergency setting where new camps had to be constructed (3 in Ethiopia, 1 in Kenya). The somehow lengthy process to reach a policy agreement under these circumstances may have contributed to the delayed vaccination of refugees aged ≥15 years. Navarro-Colorado and colleagues also recommended that outbreak response plans should include contingency plans for vaccine supply to avoid shortages. Those plans need to allow for vaccination of older age groups. Third, when a policy agreement was reached, a decision was made to vaccinate persons up to 29 years, although 19.4% of measles cases in Dadaab, Kenya, and 15.6% of cases in Dollo-Ado, Ethiopia, were aged ≥30 years. Also, 9 of 32 measles deaths in Dadaab and 2 of 23 deaths in Dollo-Ado were aged ≥30 years. The age cutoff was decided based on outbreak characteristics and vaccine availability. Decision makers need to consider vaccinating adults ≥30 years, especially when they contribute considerably to mortality. Fourth, 15 of 32 deaths in Dadaab were unvaccinated women aged ≥15 years; of those, 7 were aged ≥30 years. In camps in both countries, overall case fatality rates were relatively high (2.3% in Kenya and 5.6% in Ethiopia) and gender-specific case fatality rates were about twice as high in female than in male refugees. Navarro-Colorado and colleagues also reported overcrowding, high global acute malnutrition among children aged <5 years, and other infectious diseases in addition to measles. Given that children with wasting are more likely to develop measles complications and have higher case-fatality rates [2], additional information about malnutrition status in measles cases, including adolescents and adults, other infectious diseases, pregnancy status in women, routine provision of vitamin A in age-appropriate doses, case management, and healthcare-seeking behavior would have helped interpreting measles mortality in adults and especially gender differences. Finally, as part of measles outbreak response activities, standard infection control measures, including initial triage and respiratory isolation, should be enforced to prevent the spread of measles through health facilities, and health workers should be vaccinated against measles if verification of vaccination and/or immunity is not possible, as recently recommended by WHO’s Strategic Advisory Group of Experts on immunization (SAGE) [14].

Note

Potential conflict of interest. Author certifies no potential conflicts of interest.

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