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Diphtheria Epidemic in the Newly Independent States of the Former Soviet Union

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Although diphtheria was controlled for approximately 30 years after the institution, in the late 1950s, of childhood vaccination with diphtheria toxoid, epidemic diphtheria has reemerged in the newly independent states (NIS) of the former Soviet Union. Overall, reported cases of diphtheria in the NIS increased from 839 in 1989 to 47,802 in 1994. In 1994, a total of 1,746 persons died; case-fatality rates ranged from 2.8% to 23.0%.

The World Health Organization considers the rapidly expanding diphtheria epidemic in the NIS a public health emergency. In the Russian Federation, the epidemic has intensified each year. Although the reasons for the diphtheria epidemic in the NIS are not fully understood, one important factor is the presence of a large number of susceptible children and adults.

Spread of the organism may have been facilitated by crowding and population migration resulting from the dissolution of the Soviet Union. In addition, adequate control measures (particularly aggressive mass vaccination in affected areas) were not implemented during the early phase of the epidemic.

Increases in the number of susceptible children in the NIS probably resulted from a combination of low vaccination coverage in many areas and inappropriate primary vaccination of substantial numbers of infants with Td, a formulation for adults containing decreased amounts of diphtheria toxoid. The existence of large numbers of susceptible adults is a new phenomenon. In the prevaccine era, most persons acquired immunity to diphtheria naturally before adulthood through exposure to *Corynebacterium diphtheriae*. Following the introduction of childhood vac-

ination diphtheria toxoid, circulation of toxigenic *C. diphtheriae* decreased substantially. In addition, vaccine-induced immunity wanes over time unless periodic boosters are administered. Lack of effectiveness of diphtheria toxoid is not considered to be an important contributing factor for this epidemic.

Control of the epidemic in the NIS requires immediate efforts to raise levels of immunity through extensive mass vaccination of adolescents and adults. Shortages of vaccine, antitoxin, and antibiotics exist in the NIS (except the Russian Federation); these needs must be addressed immediately through coordinated efforts of international public health and donor agencies.

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