

**2010 Haiti Earthquake
Pre-Decision Brief**

Diphtheria

Key Recommendations

Prevention

- Support implementation of a post-disaster vaccination plan to increase population immunity, including:
 - Vaccination of children aged 6 weeks-8 months with diphtheria-tetanus-pertussis vaccine (DTP);
 - Vaccination of children aged 9 months-6 years (likely in conjunction with DTP and measles-rubella vaccine (MR) and provision of vitamin A);
 - Vaccination of children ≥ 7 years, adolescents, and adults with tetanus-diphtheria vaccine (Td);
 - Vaccination first in temporary settlements and then other affected areas when the situation has stabilized.
- Conduct outreach to clinical facilities to refresh management guidelines for close contacts of diphtheria cases:
 - Vaccinate with the age-appropriate diphtheria vaccine if not up-to-date with vaccination;
 - Provide chemoprophylaxis to close contacts of diphtheria cases with a 10-day course of erythromycin or a single injection of penicillin G benzathine¹.
- Make diphtheria antitoxin (DAT) readily available in Haiti for treatment of disease.

Surveillance

- Promote clinical vigilance among healthcare workers for typical symptoms and signs of disease.
- Ensure laboratory capacity to confirm cases and outbreaks using throat swabs for culture with selective media at the National Public Health Laboratory (LNHP).
- Utilize, as needed, support and reference testing from CDC Diphtheria Laboratory.

Critical treatment and supplies

- DAT
- DTP, DTaP, DT, and Td vaccine (see footnote)
- Erythromycin and penicillin G benzathine injections
- Tellurite selective media for laboratory diagnosis

Supporting Information

1. What was the situation in Haiti prior to the earthquake?

- Haiti is one of the few remaining PAHO countries where diphtheria is endemic. During the past 5 years annual reported diphtheria cases ranged from 10–260; approximately 80% of cases occurred among children aged <10 years. Reported cases are most likely an underestimate of the burden of diphtheria in Haiti prior to the earthquake, given the evidence of circulation in Haiti and the Dominican Republic, a weak surveillance system, and traditionally low DTP3 coverage.
- Diphtheria cases are usually sporadic and are reported throughout the country, but outbreaks have occurred annually from 2004–2007 and in 2009. In 2009, CDC tested

25 specimens from suspected diphtheria cases in 5 of 10 departments in Haiti; of these, 50% were positive for *Corynebacterium diphtheriae* either by culture or PCR. The case-fatality rate for case-patients whose isolates were sent to CDC was 32%.

- Estimated DTP3 coverage in Haiti has been about 50% over the last decade, and was lower in the 1990s and 1980s.

2. What is the likelihood of cases/outbreaks of this disease developing in the near future?

- Due to the endemicity of diphtheria in Haiti, the low vaccination rates, and severe overcrowding, the risk for diphtheria outbreaks is high. Historically, diphtheria outbreaks have occurred in settings of displaced persons, including war camps during World War II.² After the Pakistan earthquake in 2005, there were reports of 6 diphtheria deaths and several clusters of suspected diphtheria, but it is unknown if these cases were confirmed.³

3. Should an outbreak occur, how would this be detected?

- Respiratory diphtheria is recognized clinically as an upper respiratory tract infection, with low-grade fever, sore throat, difficulty swallowing, and an adherent membrane ('pseudomembrane') of the tonsil(s), pharynx, and/or nose. Severe cases may present with severe neck swelling (bull neck), airway obstruction, myocarditis, and peripheral neuropathies. Diphtheria should be considered in the differential diagnosis of persons presenting with these symptoms, and an outbreak should be suspected if there is an increase in the number of cases with membranous pharyngitis.
- Laboratory confirmation is important for confirming cases and outbreaks. Before (and since) the earthquake, capacity for culture of *C. diphtheriae* was limited to Haiti's National Public Health Reference Laboratory (NPHRL). Throat swabs for culture should ideally be obtained from beneath the pseudomembrane, or a portion of the pseudomembrane itself can be submitted as a specimen. Collected specimens can also be placed in silica gel packs or any transport medium or sterile container and transported to a reference laboratory for culture. Special tellurite medium is required for growth and isolation. If needed, CDC's Diphtheria Laboratory can assist Haiti's NPHRL in testing specimens from suspected diphtheria cases by culture and PCR.

4. What options for public health action should be considered in the event of an outbreak?

- DAT should be made available in Haiti for treatment of diphtheria cases. DAT is available for purchase for Brazil, Croatia, and India. Treatment with DAT should be initiated based on clinical suspicion and should not await results of laboratory testing. Delay in administering DAT is associated with increased frequency of life-threatening complications and an increased case-fatality rate.
- Cases should be treated with a 14 day course of erythromycin or penicillin⁴. Chemoprophylaxis of close contacts should be given with a 10-day course of erythromycin or a single injection of penicillin G benzathine to prevent secondary cases. Close contact is defined by likelihood of direct contact with large respiratory

droplets (*e.g.*, household members, childcare center attendees, or persons with direct exposure to oral or respiratory secretions).

- Age-appropriate diphtheria vaccine (DTP, DTaP, DT, Td), in conjunction with chemoprophylaxis, should be administered to unvaccinated or inadequately vaccinated close contacts of cases.
- Immunization campaigns to increase DTP/DTap/DT/Td coverage should be conducted in communities with sustained diphtheria transmission to increase population immunity against diphtheria.
- Increasing primary vaccination series DTP/TD/Td coverage among children aged <10 years throughout Haiti was needed prior to the January earthquake and will continue to be the primary strategy to prevent cases of diphtheria.

Footnote:

DTP, DTaP (diphtheria-tetanus-pertussis) and DT (diphtheria-tetanus), for use in children <7 years

Td (tetanus-diphtheria, for persons aged 7 years and older)

References

1. AAP Red Book, 2009 Report of the Committee on Infectious Diseases.
2. Galazka, A. The Changing Epidemiology of Diphtheria in the Vaccine Era. *Journal of Infectious Diseases*. 2000;181:S2-S9.
3. <http://www.humanitarianinfo.org/hic-pakistan/documents/PAK-EQ-Sitrep-No21-07Nov.pdf>.
4. <http://www.hpa.org.uk/cdph/issues/CDPHvol2/no4/guidelines.pdf>