

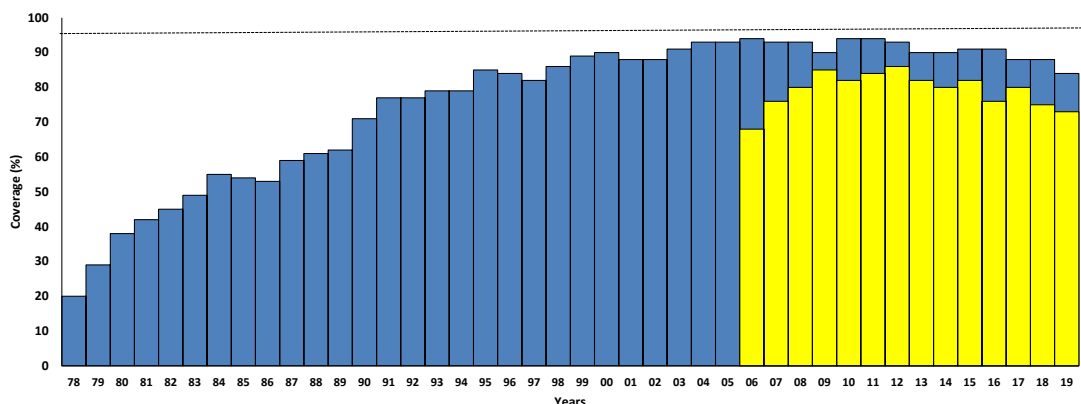
In the context of the COVID-19 pandemic, the Pan American Health Organization / World Health Organization (PAHO/WHO) reiterates to Member States that vaccination and epidemiological surveillance of vaccine-preventable diseases should be considered an essential health service that should not be interrupted. PAHO/WHO also reminds Member States that a single laboratory-confirmed case of diphtheria should trigger a public health response.

Summary of the situation in the Americas

In 2021, between epidemiological week (EW) 1 and EW 15, two countries have reported confirmed cases of diphtheria: the Dominican Republic with 12 confirmed cases including 9 deaths, and Haiti with 11 confirmed cases including 2 deaths. Both countries are located on the island of Hispaniola.

In the Region of the Americas, between 1978 and 2019, the vaccination coverage with three and four doses of the diphtheria, tetanus, and pertussis vaccine (DTP3 and DTP4) were each below 95%. The annual DTP3 coverage since 1978 has been less than 95%, with an average of 90% between 2010 and 2019 (range: 84%-94%). Meanwhile, data on DTP4 coverage has been available since 2006, and reached a maximum coverage of 86% in 2012. (**Figure 1**)

Figure 1. Distribution of DTP3 and DTP4 vaccination coverage by year. Region of the Americas. 1978-2019.

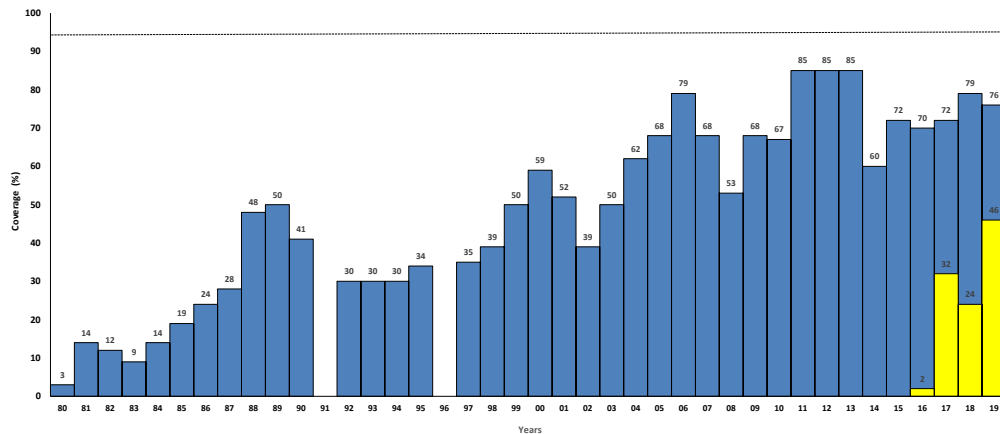


Source: WHO vaccine-preventable diseases: monitoring system 2020 global summary. Available at: <https://bit.ly/3aoRDcg>

In *Haiti*, since 1980, DTP3 coverage has been less than 95%, with an average of 75% between 2010 and 2019 (range: 60%-79%), while DTP4 coverage reached a maximum coverage of 46% in 2019. (**Figure 2**)

Suggested citation: Pan American Health Organization / World Health Organization. Epidemiological Update: Diphtheria in Hispaniola. 23 April 2021, Washington, D.C.: PAHO/WHO; 2021

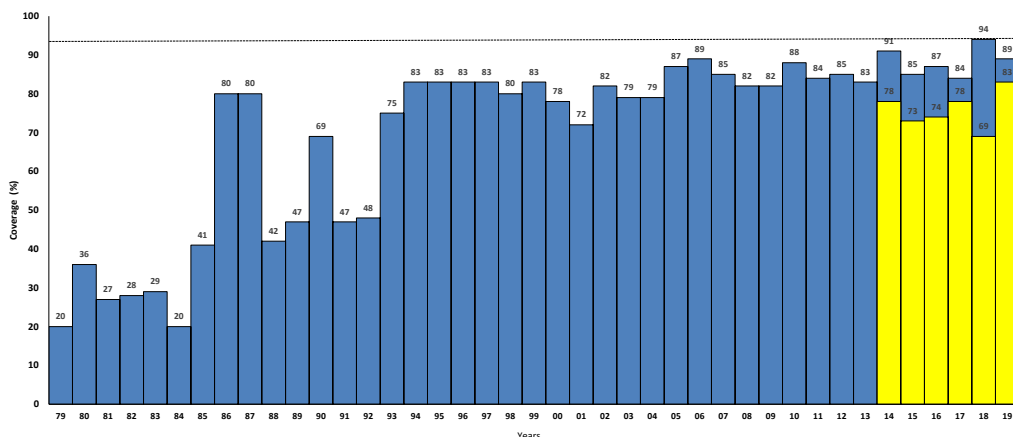
Figure 2. Distribution of DTP3 and DTP4 vaccination coverage by year. 1980-2019, Haiti.



Source: WHO vaccine-preventable diseases: monitoring system 2020 global summary. Available at: <https://bit.ly/3aoRDcg>

In the *Dominican Republic*, since 1979, DTP3 coverage has been less than 95%, with an average of 87% between 2010 and 2019 (range: 83%-94%), while DTP4 reached a maximum coverage of 83% in 2019. (**Figure 3**)

Figure 3. Distribution of DTP3 and DTP4 vaccination coverage by year. 1979-2019, Dominican Republic.



Source: WHO vaccine-preventable diseases: monitoring system 2020 global summary. Available at: <https://bit.ly/3aoRDcg>

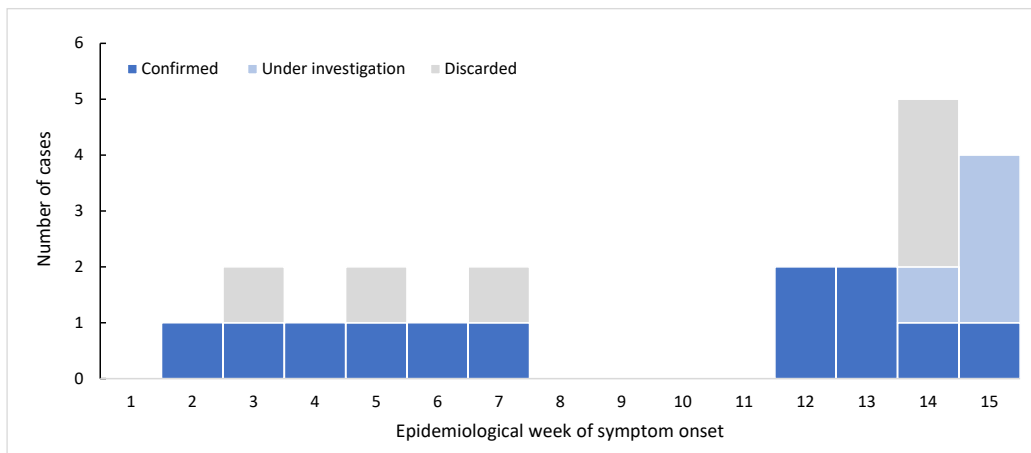
In recent years, Latin America has experienced a decline in coverage of the third dose of the diphtheria, tetanus, and pertussis vaccine (DTP3) among infants less than 1-year-old. Additionally, vaccination among young population and adults, especially men, continues to be very low. Therefore, the occurrence of cases in Hispaniola is considered a risk for the rest of the countries and territories in the Region of the Americas.

The following is the epidemiological situation for diphtheria in Haiti and the Dominican Republic. Both have reported new confirmed cases of diphtheria since the Epidemiological Update for Diphtheria in Hispaniola published on 2 March 2021¹.

¹ Pan American Health Organization / World Health Organization. Epidemiological Update: Diphtheria in Hispaniola. 2 March 2021, Washington, D.C.: PAHO/WHO; 2021. Available at: <https://bit.ly/3gqsOTz>

In the **Dominican Republic**, between EW 1 and EW 15 of 2021, a total of 22 probable cases of diphtheria were reported, of which 12 were confirmed (10 by culture and 2 by epidemiological link), 4 remain under investigation, and 6 were discarded. There were 9 deaths confirmed by culture. **(Figure 4)** Information regarding the first 5 cases was shared in the 2 March 2021 Epidemiological Update ¹.

Figure 4. Distribution of reported cases of diphtheria by epidemiological week (EW) of symptom onset. EW 1 to EW 15 of 2021, the Dominican Republic.



Source: WHO vaccine-preventable diseases: monitoring system 2020 global summary. Available at: <https://bit.ly/3aoRDcg>

Of the 12 cases confirmed between EW 1 and EW 15 of 2021, 9 are male, ages range from 1 to 14 years old (median 5 years old), and none had a vaccination history nor a reported travel history. One is Haitian and 11 are Dominican. Confirmed cases were reported in the provinces of Monte Plata (5 cases, including 4 deaths), Santo Domingo (2 fatal cases), San Cristóbal (2 cases, including one death), Peravia (1 fatal case), Bahoruco (1 fatal case), and Hato Mayor (1 case).

Between EW 1 and EW 15 of 2021, a total of 9 deaths confirmed by culture were reported, of which 6 were male and ages ranged from 3 to 14 years old (median 6 years old).

Corynebacterium diphtheriae was isolated by culture from samples for 10 cases. Four of the samples were confirmed by the United States Centers for Disease Control and Prevention (US CDC) as toxigenic *Corynebacterium diphtheriae* biovar mitis (diphtheria toxin production confirmed by the Elek test).

In 2020, a total of 3 confirmed cases of diphtheria, including 2 deaths, were reported, including a 14-year-old pregnant female. No epidemiological link was identified between these cases. Information regarding these cases was shared in the Epidemiological Updates published on 22 September 2020² and 17 November 2020³.

The diphtheria vaccination schedule in Dominican Republic includes 3 doses for children under 1 year of age, and 2 boosters, which are administered at 18 months and 4 years of age. Vaccination is not done routinely with the third diphtheria booster.

² PAHO/WHO. Epidemiological Update: Diphtheria. 22 September 2020, Washington, D.C.: PAHO/WHO; 2020. Available at: <https://bit.ly/3r7H042>

³ PAHO/WHO. Epidemiological Update: Diphtheria. 17 November 2020, Washington, D.C.: PAHO/WHO; 2020. Available at: <https://bit.ly/3sFjJ9X>

The country has a national vaccination policy for health personnel.

The country does not meet the 95% vaccination coverage target established in the regional immunization action plan for DTP3 for children under 1 year of age. DTP4 coverage is less than 90%.

In **Haiti**, between EW 32 of 2014 and EW 14 of 2021, there were 1,235 suspected cases⁴ of diphtheria reported, including 146 deaths. Of the total cases, 399 were confirmed (385 laboratory-confirmed and 14 by epidemiological link), including 79 confirmed deaths (**Table 1, Figure 5**).

Table 1. Suspected and confirmed cases of diphtheria reported in Haiti, 2014-2021 (until epidemiological week 14 of 2021)⁵.

Year	Suspected cases	Confirmed cases*	Confirmed Deaths*	Case-fatality rate** (%)
2014	18	4	2	50%
2015	77	31	7	23%
2016	118	54	21	39%
2017	194	73	6	8%
2018	375	105	14	13%
2019	195	55	12	22%
2020	193	66	15	23%
2021	65	11	2	18%
Total	1,235	399	79	20%

*Confirmed by laboratory criteria or epidemiological link

**Among confirmed cases

Source: Haiti Ministère de la Santé Publique et de la Population (MSPP)

Between EW 1 and EW 14 of 2021, the number of suspected cases reported (65 cases) is higher than the number reported during the same period in both 2019 (44 cases) and 2020 (50 cases). Of the 65 cases reported, 11 were laboratory-confirmed, including 2 deaths. Considering the long duration that the disease has been transmitted within the country, diphtheria is considered endemic in Haiti.

The case-fatality rates among confirmed cases were 23% in 2015, 39% in 2016, 8% in 2017, 13% in 2018, 22% in 2019, 23% in 2020, and 18% in 2021.

Between EW 1 and EW 14 of 2021, among the 11 confirmed cases, 54% were among 6 to 14-year-olds and 27% among 1 to 5-year-olds. Regarding deaths, one was among 6 to 14-year-olds and the other among 1 to 5-year-olds.

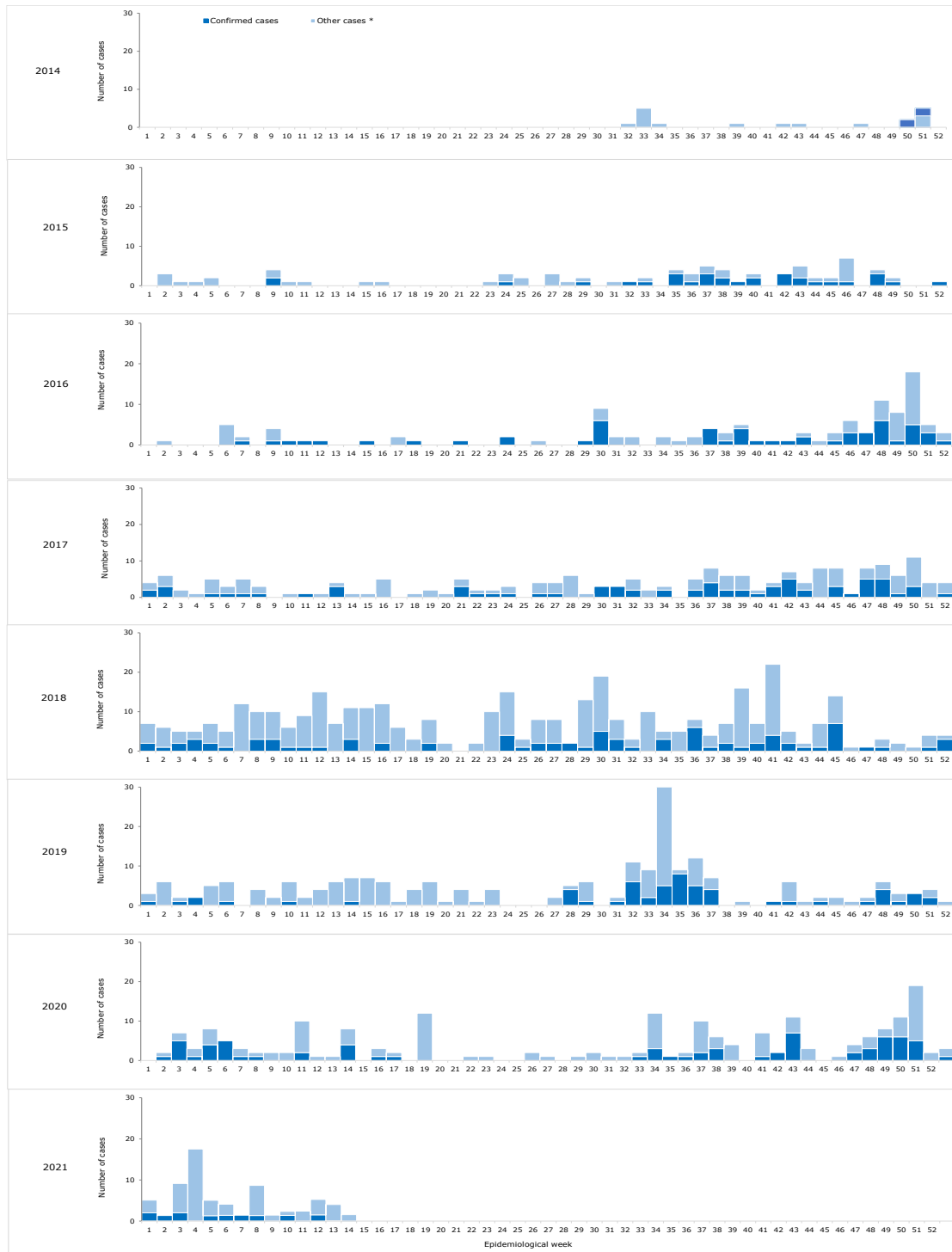
Between EW 1 and EW 14 of 2021, the highest cumulative incidence rates of suspected cases have been reported in the communes of Thiotte (16 cases per 100,000 population), Jacmel (7

⁴ According to the Haiti Ministère de la Santé Publique et de la Population (MSPP), a suspected case is defined as any person, of any age, that presents with laryngitis, pharyngitis, or tonsillitis with adherent pseudo-membranes in the tonsils, pharynx and / or nasal pits, associated with edema of the neck.

⁵ Preliminary data subject to change based on retrospective investigation.

cases per 100,000 population), and Anse-à-Pitres (6 cases per 100,000 population) in the Sud-Est Department.

Figure 5. Distribution of reported diphtheria cases by epidemiological week (EW) of symptom onset and year. EW 32 of 2014 to EW 14 of 2021, Haiti.



*'Other cases' refers to all cases with negative laboratory results, those for which test results are pending, or those for which viable samples were not available.

Source: Haiti Ministère de la Santé Publique et de la Population (MSPP). Data reproduced by PAHO/WHO.

The diphtheria vaccination schedule in Haiti includes 3 doses in under 1-year-olds, and one booster, which is administered between 12 and 23 months of age. Vaccination with the diphtheria component after childhood is only carried out for pregnant women.

The country does not meet the 95% vaccination coverage target established in the regional immunization action plan for DTP3 among children under 1 year. Vaccination coverage with DTP4 is under 50%.

The country does not have a national vaccination policy for health personnel, and the vaccination of contacts of suspected cases is not systematically carried out.

Advice for Member States

The Pan American Health Organization / World Health Organization (PAHO/WHO) has issued guidelines for immunization programs in the context of the COVID-19 pandemic, updated on 24 April 2020, available at <https://bit.ly/2YK9SIV>, in consultation with members of the PAHO/WHO Technical Advisory Group (TAG) for vaccine preventable diseases (VPD). These guidelines are aligned with the recommendations from the WHO's Strategic Advisory Group of Experts on Immunization (SAGE).

PAHO/WHO reiterates the recommendations to Member States to continue their efforts in ensuring vaccination coverage of more than 95% with the primary series (3 doses) and booster doses (3 doses) in a homogeneous manner in all municipalities of the country. This vaccination schedule will provide protection throughout adolescence and adulthood (up to 39 years and possibly beyond). Booster doses of the diphtheria vaccine should be given in combination with tetanus toxoid, using the same schedule and age-appropriate vaccine formulations; namely diphtheria, tetanus, and pertussis (DPT), for children aged 1 to 7 years old, and diphtheria toxoid (Td) for children over 7 years old, adolescents, and adults.

PAHO/WHO reiterates and urges Member States to take the necessary measures to implement the WHO recommendation to replace the tetanus toxoid (TT) vaccine with the combined diphtheria toxoid (Td) vaccine, to ensure sustained protection against diphtheria and tetanus. This is in accordance with the TAG recommendation in 1997⁶ and the 2018⁷ joint statement from WHO and UNICEF for the replacement of TT by Td.

PAHO/WHO reminds Member States that diphtheria has been controlled due to vaccinations, but that the etiological agent associated with the disease has not been eliminated, nor is the subject of an elimination program. Therefore, given the reduction in vaccination coverage among children, the decline in immunity induced by vaccines over time, and the lack of (3) booster doses in adolescents / adults, it is highly probable that diphtheria cases will occur. If vaccination coverage is not increased following the primary schedule (3 doses) and the (3) recommended boosters, the disease may once again become endemic in the Region.

PAHO/WHO emphasizes that the unvaccinated population or those persons with an incomplete vaccination scheme (less than 6 doses) are at risk.

⁶ Conclusions and Recommendations of the XII TAG Meeting, held in Guatemala, Guatemala, 8-12 September 1997. Available at: <https://bit.ly/2QO9LW8>

⁷ WHO/UNICEF joint communique. Replacement of TT with Td vaccine for dual protection. 28 June 2018. Available at: <https://bit.ly/32tbm6h>

PAHO/WHO reiterates to the Member States that 1) opportunities should be taken to complete vaccine schedules for those who were not vaccinated, or incompletely vaccinated, mainly in densely populated areas or; 2) opportunities for catch-up vaccination during routine vaccination on entry into military services or other institutions with similar requirements, should be taken; 3) screening of vaccination status at school entry; 4) to further promote immunity against diphtheria, the use of Td rather than TT is recommended during pregnancy in the context of prenatal care, and when tetanus prophylaxis is needed following injuries.

PAHO/WHO emphasizes that vaccination during pregnancy is not necessary to protect neonatal infants against diphtheria, but diphtheria-containing vaccines combined with pertussis and tetanus can be used to protect young infants against tetanus and pertussis. Diphtheria toxoid-containing vaccines can be used in immunocompromised persons including HIV-infected individuals. All healthcare workers should be up-to-date with immunizations as recommended in their national immunization schedules.

PAHO/WHO urges countries with ongoing diphtheria outbreaks to implement vaccination strategies based on the epidemiology of the disease, focused on the affected geographic areas, it may include adult vaccination. It is important to comply with the guidelines established in the WHO Framework for Decision-Making: Implementation of Mass Vaccination Campaigns During COVID-19.

Although travelers do not have a special risk for diphtheria infection, it is recommended that national authorities remind travelers going to areas with diphtheria outbreaks to be properly vaccinated prior to travel in accordance with the national vaccination scheme established in each country. If more than five years have passed since their last dose, a booster dose is recommended.

PAHO/WHO recommends that Member States strengthen their surveillance systems and laboratory diagnostic capacity for diphtheria. Laboratory diagnosis is made by culture of the microorganism on selective media, biochemical tests, and the Elek test that confirms the production of diphtheria toxin. Polymerase chain reaction (PCR) detects the presence of the diphtheria toxin gene (*tox*) and is useful to detect the presence of the bacteria, especially in samples that have had difficulties in obtaining, handling, or transporting or in cases that have started antimicrobial treatment prior to obtaining the sample.

PAHO/WHO recommends performing the Elek test to confirm toxin production, mainly in sporadic cases and in countries with active outbreaks that report cases in new locations or that present cases with no direct epidemiological link to a confirmed case.

PAHO/WHO urge to Member States maintaining a supply of diphtheria antitoxin for its timely use and reduction of fatality rates, and training hospital personnel on its use and administration. It should be considered that there is a very limited market for this product, as well as the difficulties in transporting them due to the pandemic of COVID-19.

Vaccination is key to preventing cases and outbreaks, and proper clinical management reduces complications and mortality.

PAHO/WHO recommends conducting training courses on the epidemiology of diphtheria, clinical picture, laboratory diagnosis, management, epidemiological investigation, and response to outbreaks.

References and useful links

1. **Dominican Republic** International Health Regulations (IHR) National Focal Point (NFP) report received by PAHO/WHO via email communication.
2. **Haiti** Ministère de la Santé Publique et de la Population (MSPP) report received by PAHO/WHO via email communication.
3. WHO. Diphtheria. Surveillance standards for vaccine-preventable diseases. September 2018. Available at: <https://bit.ly/3qPWOsc>
4. Sixth ad hoc Meeting of the PAHO Technical Advisory Group on Vaccine-Preventable Diseases. United States of America (virtual meeting), November 16, 2020. Available at: <https://bit.ly/2NK2Ps8>
5. Fifth ad hoc Meeting of the Technical Advisory Group (TAG) on Vaccine-Preventable Diseases. USA, August 4, 2020 (virtual meeting). Available at: <https://bit.ly/3q6vpRA>
6. Diphtheria vaccine: WHO position paper – August 2017. Available at: <http://bit.ly/2CCN7UW>
7. WHO/UNICEF joint communique. Replacement of TT with Td vaccine for dual protection. 28 June 2018. Available at: <https://bit.ly/32tbm6h>
8. Final report of the 3rd ad hoc Meeting of the Technical Advisory Group (TAG). Ad-hoc Virtual Meeting, March 19, 2018. Available at: <https://bit.ly/3bVj39w>
9. Pan American Health Organization/ World Health Organization. The Immunization Program in the Context of the COVID-19 Pandemic. Version 2 (24 April 2020). Available at: <https://bit.ly/35lZwgQ>
10. World Health Organization. Framework for decision-making: implementation of mass vaccination campaigns in the context of COVID-19, 22 May 2020. Available at: <https://bit.ly/2Zkha0K>
11. Pan American Health Organization/ World Health Organization. Immunization throughout the Life Course at the Primary Care Level in the Context of the COVID-19 Pandemic. 17 June 2020. Available at: <https://bit.ly/3m50K6i>
12. Pan American Health Organization/ World Health Organization. Summary of the Status of National Immunization Programs during the COVID-19 Pandemic, 19 July 2020. Available at: <https://bit.ly/2GHpO2V>