WEEKLY EPIDEMIOLOGICAL REPORT

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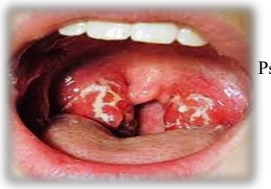
Diphtheria

This is the first article of two in a series on "Diphtheria"

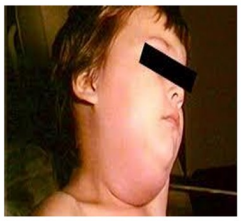
Diphtheria is caused by species of Corynebacterium, primarily by toxin-producing Corynebacterium diphtheriae, and less frequently by toxin-producing strains of C. ulcerans and C. pseudotuberculosis. The most prevalent form of diphtheria is classic respiratory diphtheria, characterized by a Gram-positive, non-spore-forming, non-capsulated bacillus. The exotoxin produced by these strains typically results in the formation of a pseudo membrane in the upper respiratory tract (nose and throat). It can cause damage to other organs, specially the myocardium and peripheral nerves.

Diphtheria, which primarily affects children, has historically been one of the most dreaded infectious illnesses in the world, creating devastating epidemics with high case-fatality rates. In classic cases, the exudate forms a pseudo membrane in areas such as the nose, pharynx, tonsils, or larynx, which can extend into the nasal cavity and larynx, potentially obstructi
ng airways and creating a medical emergency that often necessitates a tracheotomy. Rarely, systemic diphtheria may occur, affecting the heart, kidneys, and/or peripheral nerves.

A person remains infectious as long as the virulent bacteria are present in respiratory secretions, usually for about two weeks without antibiotics and rarely more than six weeks. Chronic carriers may occasionally shed the bacteria for six months or longer. Skin lesions can be chronic and remain infectious for extended periods. Effective antibiotic treatment, such as penicillin or erythromycin, can stop bacterial shedding within one to two days.



Pseudo-membrane in the pharynx



Bull neck appearance caused by enlarged lymph nodes

Photo credit: *Operational protocol for clinical management of Diphtheria Bangladesh, Cox's Bazar (Version 10th Dec 2017) Background. World Health Organization (WHO)*

Disease Severity

According to WHO operational guidance, the severity of diphtheria is categorized as follows:

- Mild disease: Localized laryngeal or pharyngeal disease lasting 2 days.
- Severe/extensive disease: Disease duration of 3 or more days, diffuse neck swelling (often referred to as "bull neck"), respiratory distress, or hemodynamic instability.

A recent systematic review indicates that the case fatality ratio in unvaccinated individuals infected with toxin-producing strains is 29%. In resource-limited settings, case fatality ratios vary significantly and can reach as high as 50% in some outbreaks.

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Transmission

Diphtheria primarily spreads from person to person through respiratory droplets, with less frequent transmission by direct contact with respiratory secretions or infected skin lesions. The incubation period typically ranges from 2 to 5 days.

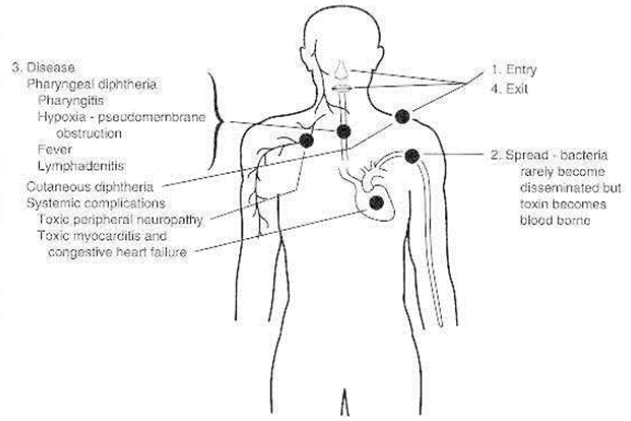

Photo credit: *Chapter 32, Corynebacterium Diphtheriae, Medical Microbiology. 4th edition, Baron S, editor, Galveston (TX): University of Texas Medical Branch at Galveston; 1996.*

Pathogenesis of diphtheria
Investigation

Diagnosis of diphtheria involves clinical evaluation and laboratory testing. Clinically, the presence of a pseudo membrane in the throat or nose, along with symptoms like sore throat, fever, and swollen neck glands, can suggest diphtheria. Laboratory confirmation is essential and involves isolating C. diphtheriae from throat swabs and identifying the diphtheria toxin. Rapid diagnostic methods, such as polymerase chain reaction (PCR) and enzyme-linked immunosorbent assay (ELISA), can also detect diphtheria toxin genes and antibodies, respectively. Countries should ensure access to laboratory facilities for the reliable identification of toxigenic C. diphtheriae.

Treatment

Due to the sporadic nature of these outbreaks, many clinicians in the affected regions lack experience in managing acute diphtheria and its complications. In response to the global rise in diphtheria outbreaks, WHO has swiftly developed a new clinical management guideline for the disease (Clinical Management of Diphtheria: Guideline, 2 February 2024). For patients with suspected or confirmed diphtheria, WHO recommends using macrolide antibiotics (such as azithromycin or erythromycin) over penicillin antibiotics. Routine sensitivity testing before administering diphtheria antitoxin is not recommended.

Diphtheria antitoxin (DAT) which neutralizes the diphtheria toxin is highly effective if administered promptly and is the gold standard for treatment, but global access to DAT is limited due to most manufacturers halting production. For symptomatic diphtheria, WHO suggests using an escalating dosing regimen for diphtheria antitoxin (DAT), which is adjusted based on the severity of the disease and the time since symptoms began, rather than a fixed dose for all patients. DAT is most effective when given early in the course of the disease. In severe cases where airway obstruction occurs, medical interventions such as tracheostomy may be necessary. Supportive care, including maintaining hydration and monitoring cardiac function, is also critical, as diphtheria can cause myocarditis and other systemic complications.

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References:

1. *Clinical management of diphtheria: guideline, 2 February 2024*. Www.who.int. https://www.who.int/publications/i/item/WHO-DIPH-Clinical-2024.1

2. *Diphtheria (Last updated: September 5, 2018) - Vaccine-Preventable Diseases Surveillance Standards - World | ReliefWeb*. (2024, February 15). Reliefweb.int. https://reliefweb.int/report/world/diphtheria-last-updated-september-5-2018-vaccine-preventable-diseases-surveillance-standards

3. *Diphtheria vaccines: WHO position paper – August 2017*. Www.who.int. https://www.who.int/publications/i/item/who-wer9231

To be Continued...

Table 1: Selected notifiable diseases reported by Medical Officers of Health 22nd – 28th June 2024 (26th Week)

RDHS	Dengue Fever		Dysentery		Encephalitis		En. Fever		F. Poisoning		Leptospirosis		Typhus F.		Viral Hep.		H. Rabiies		Chickenpox		Meningitis		Leishmania-		Tuberculosis		WRCD	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	T*	C**
Colombo	245	5837	3	16	1	7	1	43	1	11	26	251	0	8	0	7	0	0	17	272	3	19	0	0	49	1085	**100**	**100**
Gampaha	103	2575	0	22	2	12	1	9	0	69	22	387	0	3	0	2	0	0	13	202	2	73	3	13	28	607	**87**	**100**
Kalutara	63	1664	0	16	0	1	0	26	0	17	33	410	0	5	0	8	0	1	15	363	0	33	0	1	0	242	**100**	**100**
Kandy	91	2423	1	20	0	2	0	6	12	52	11	150	0	21	0	8	0	1	6	267	0	13	1	25	6	329	**100**	**100**
Matale	13	415	1	5	0	0	0	2	0	17	1	66	0	1	0	4	0	0	5	80	0	6	7	150	6	73	**100**	**100**
Nuwara Eliya	10	216	4	76	1	5	0	8	3	192	4	112	0	28	1	4	0	0	2	137	0	9	0	0	2	150	**92**	**100**
Galle	32	1269	3	30	4	15	1	8	4	57	33	438	3	63	1	7	0	1	27	398	2	46	0	3	12	223	**5**	**100**
Hambantota	10	575	1	24	0	2	0	3	4	42	4	307	3	27	1	4	0	1	2	170	2	21	12	285	3	80	**100**	**100**
Matara	13	496	0	4	1	4	0	2	17	24	31	254	2	12	0	2	0	0	0	201	2	51	6	66	4	79	**94**	**100**
Jaffna	20	5083	1	41	0	2	7	12	5	29	0	13	7	386	0	3	0	1	6	143	0	7	0	1	5	161	**93**	**93**
Kilinochchi	0	269	1	8	0	0	0	2	0	2	1	17	0	8	0	0	1	1	0	5	1	5	0	0	0	13	**100**	**100**
Mannar	3	193	0	4	0	0	0	1	0	0	1	19	0	7	0	1	0	0	0	5	0	3	0	1	5	40	**100**	**100**
Vavuniya	1	140	0	6	0	1	0	1	0	14	1	66	0	4	0	4	0	0	1	27	1	12	1	8	2	22	**50**	**100**
Mullaitivu	1	184	0	5	0	0	0	0	0	16	0	58	0	11	0	0	0	0	0	3	0	0	1	7	2	19	**83**	**100**
Batticaloa	15	1186	0	79	0	9	1	6	0	19	2	51	0	2	0	13	0	0	5	73	1	27	0	2	3	79	**93**	**100**
Ampara	7	177	0	20	1	3	0	0	1	14	1	137	0	1	0	5	0	0	3	68	0	26	2	10	3	85	**71**	**100**
Trincomalee	10	532	0	11	0	0	0	2	0	4	0	121	0	12	0	2	0	0	3	37	0	9	0	11	8	59	**100**	**100**
Kurunegala	47	1559	1	27	0	21	0	3	0	344	19	372	0	17	0	3	0	2	12	284	11	170	10	334	22	286	**93**	**100**
Puttalam	27	729	1	5	0	1	0	3	1	2	4	146	0	6	0	1	0	1	3	82	4	40	1	21	25	123	**100**	**100**
Anuradhapura	3	532	2	11	0	3	0	1	0	26	9	277	1	26	1	8	0	1	8	157	2	26	8	475	9	157	**87**	**100**
Polonnaruwa	13	240	0	14	0	0	0	1	4	6	9	188	0	1	0	5	0	0	0	81	0	20	12	300	6	61	**100**	**100**
Badulla	21	572	4	19	0	4	0	4	3	27	19	329	1	19	1	14	0	0	14	202	3	21	5	21	8	117	**81**	**100**
Monaragala	13	503	0	9	0	2	0	2	0	77	7	515	0	21	0	17	0	1	5	70	2	60	4	139	7	63	**82**	**100**
Ratnapura	58	1623	5	64	0	3	0	7	1	11	58	1028	0	14	0	17	0	2	10	192	3	77	8	109	7	167	**95**	**100**
Kegalle	40	1346	0	10	0	6	0	6	0	8	36	406	0	18	0	6	0	1	26	488	3	41	0	16	11	178	**91**	**100**
Kalmunai	16	574	0	15	0	0	0	0	0	5	1	48	0	2	0	3	0	0	7	139	1	10	0	0	4	80	**92**	**100**
SRILANKA	875	30912	28	561	10	103	11	158	56	1085	333	6166	17	723	5	148	1	14	190	4146	43	825	81	1998	**237**	**4578**	**88**	**99**

Source: Weekly Returns of Communicable Diseases (esurvillance.epid.gov.lk). T=Timeliness refers to returns received on or before 28th June, 2024 Total number of reporting units 358 Number of reporting units data provided for the current week: 358 **C****-Completeness

A = Cases reported during the current week. B = Cumulative cases for the year.

Table 2: Vaccine-Preventable Diseases & AFP

22nd – 28th June 2024 (26th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2024	Number of cases during same week in 2023	Total number of cases to date in 2024	Total number of cases to date in 2023	Difference between the number of cases to date in 2024 & 2023
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	01	00	00	01	00	00	00	00	02	02	39	48	-18.7 %
Diphtheria	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Mumps	00	01	01	00	00	00	01	01	02	06	05	150	112	33.9 %
Measles	01	00	02	00	00	00	00	00	00	03	10	216	23	839.1 %
Rubella	00	00	00	00	00	00	00	00	00	00	00	02	01	100 %
CRS**	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Tetanus	00	00	00	00	00	00	00	00	00	00	00	04	05	-20 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	00	00	00	0 %
Japanese Enceph-alitis	00	00	00	00	00	00	00	00	00	00	00	01	02	-50 %
Whooping Cough	00	00	00	00	00	00	00	00	00	00	00	25	04	525 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

NA = Not Available

Take prophylaxis medications for leptospirosis during the paddy cultivation and harvesting seasons.

It is provided free by the MOH office / Public Health Inspectors.

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

ON STATE SERVICE

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