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DEGLI STUDI DI BARI
ALDO MORO

CORSO DI IGIENE

**Scuola
di
Medicina**

Diphtheria



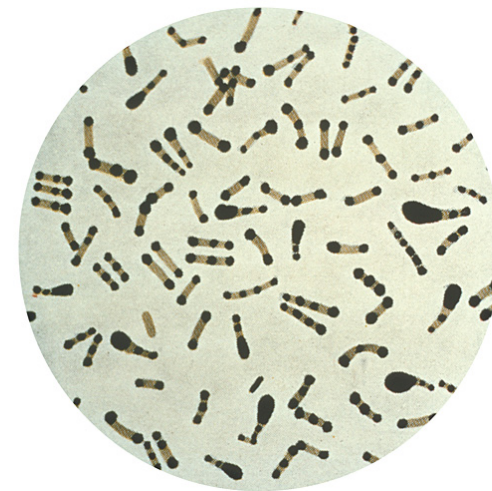
Diphtheria

- Greek diphthera (leather hide)
- Recognized by Hippocrates in 5th century BCE
- Epidemics described in 6th century
- *C. diphtheriae* described by Klebs in 1883
- Toxoid developed in 1920s



Corynebacterium diphtheriae

- Aerobic gram-positive bacillus
- Toxin production occurs only when *C. diphtheriae* infected by virus (phage) carrying tox gene
- If isolated, must be distinguished from normal diphtheroid





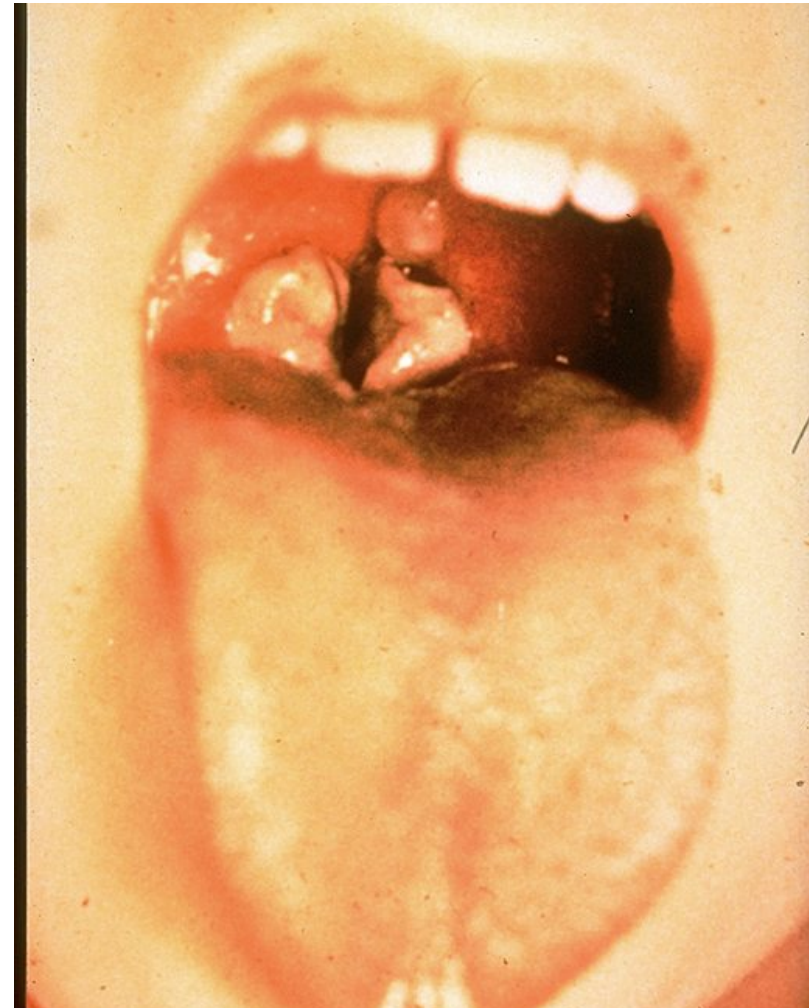
Diphtheria Clinical Features

- Incubation period 2-5 days (range, 1-10 days)
- May involve any mucous membrane
- Classified based on site of disease
 - anterior nasal
 - pharyngeal
 - tonsillar
 - laryngeal
 - cutaneous
 - ocular
 - genital



Pharyngeal and Tonsillar Diphtheria

- Insidious onset of pharyngitis
- Within 2-3 days membrane forms
- Membrane may cause Respiratory obstruction
- Fever usually not high but patient appears toxic

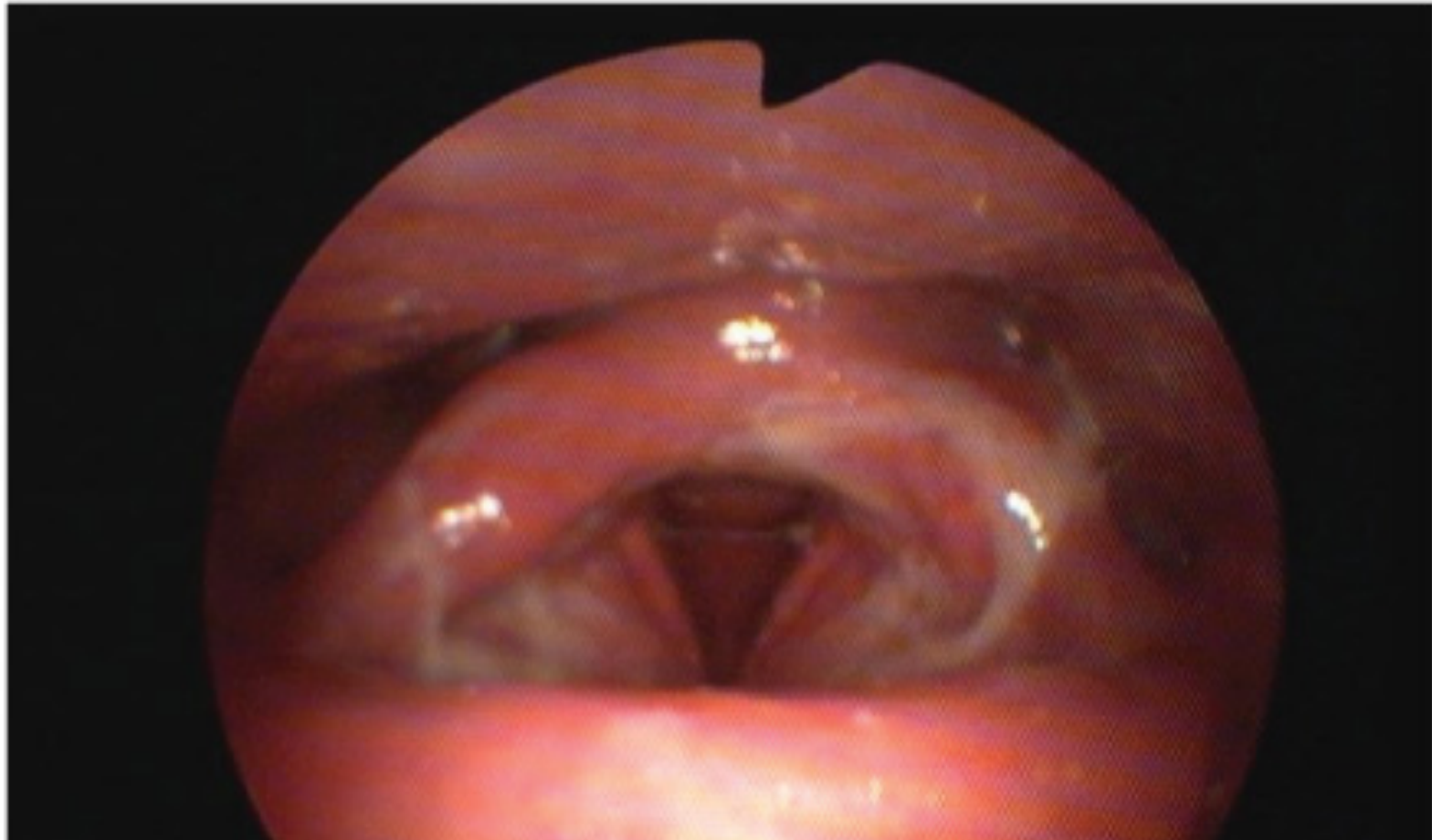




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Laryngeal Diphtheria





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Cutaneous (Skin) Diphtheria





Diphtheria Complications

- Most attributable to toxin
- Severity generally related to extent of local disease
- Most frequent complications are myocarditis and neuritis
- Death occurs in 5%-10%



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Diphtheria Complications





Diagnosis

- clinical presentation
- culture of the lesion (swab of the pharyngeal area)

In case of antibiotic therapy:

- PCR test for diphtheria tox genes
- isolation of *C. diphtheriae* from cultures of specimens from close contacts
- a low nonprotective diphtheria antibody titer



Medical Management

Diphtheria Antitoxin

- Produced in horses
- First used in the U.S. in the 1890s
- Used only for treatment of diphtheria
- Neutralizes only unbound toxin

Antibiotics

- Erythromycin
- Penicillin G

Chemioprophylaxis of close contacts is strictly recommended

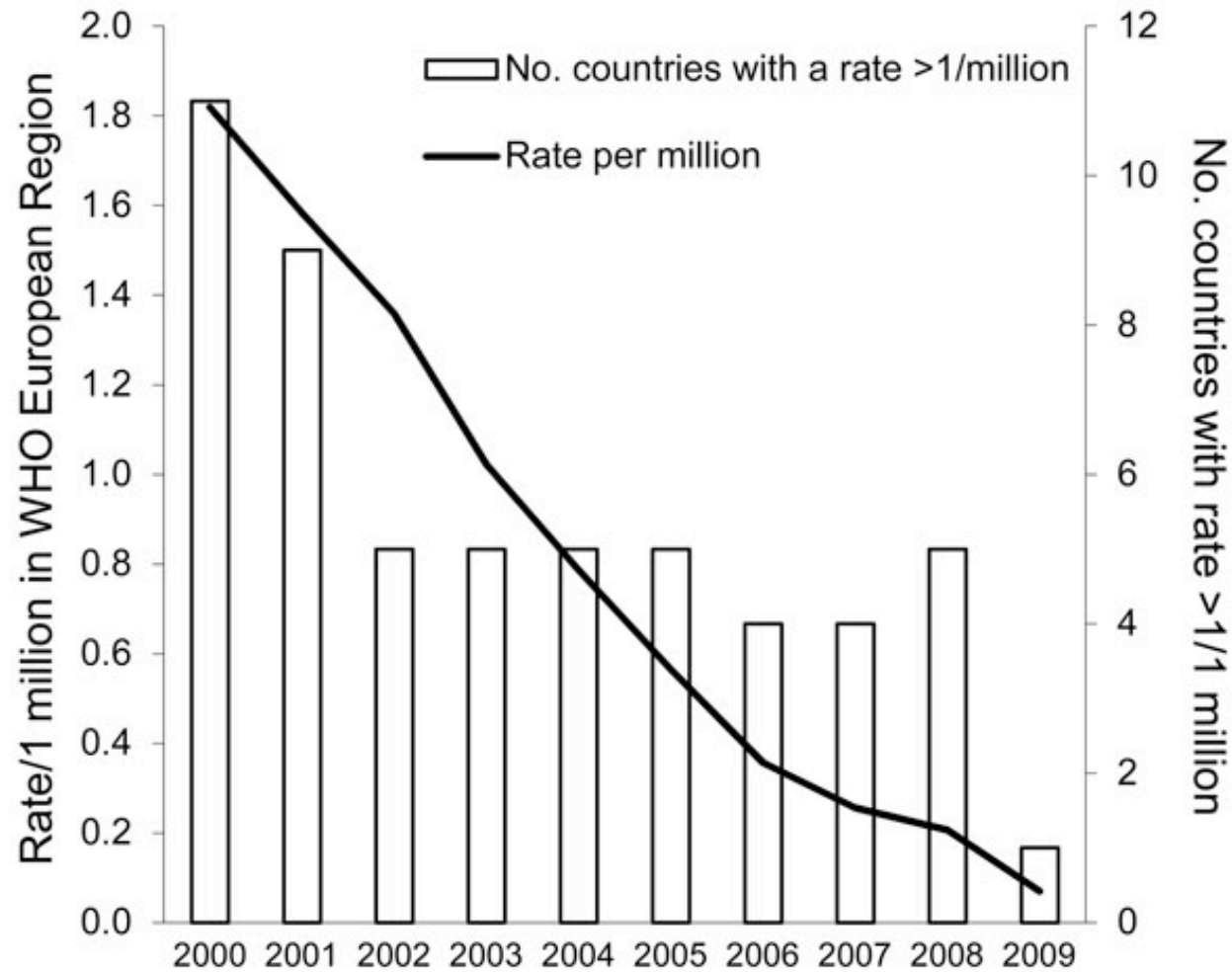


Diphtheria Epidemiology

- Reservoir
 - human carriers
 - usually asymptomatic
- Transmission
 - Respiratory
 - skin and fomites rarely
- Temporal pattern
 - winter and spring
- Communicability
 - without antibiotics, seldom more than 4 weeks



Diphtheria Epidemiology in Europe





Diphtheria Toxoid

Vaccine against Diphtheria

- Converted from toxin to toxoid
- Schedule
 - 3 or 4 doses plus booster
 - booster every 10 years
- Efficacy
 - approximately 95%
- Duration approximately 10 years
- Should be administered with tetanus toxoid as DTaP, DT, Td, Tdap, DTaP-IPV-HIB-HBV



Routine DTaP Primary Vaccination Schedule

Dose	Italy	USA
Primary 1	3 months	2 months
Primary 2	5-6 months	4 months
Primary 3	11-12 months	6 months
Primary 4		15-18 months
Booster 1	5-6 years	4-6 years
Booster 2	13-14 years (Tdap)	11-12 years (Tdap)
Booster 3	Every 10 years thereafter (Tdap)	Every 10 years thereafter (Tdap)



Routine Td Schedule for Unvaccinated Persons 7 Years of Age and Older

Dose*	Interval
Primary 1	----
Primary 2	4 weeks
Primary 3	6 to 12 months

**ACIP recommends that one of these doses (preferably the first) be administered as Tdap*



Diphtheria and Tetanus Toxoids Contraindications and Precautions

- Severe allergic reaction to vaccine component or following a prior dose
- Moderate or severe acute illness



Diphtheria and Tetanus Toxoids Adverse Events

Rare reports of severe systemic adverse events

- urticaria
- anaphylaxis
- neurologic complications



Diphtheria and Tetanus Toxoids

Adverse Reactions

- Local reactions (erythema, induration) are common
- Fever and systemic symptoms not common
- Exaggerated local reactions (Arthus-type) occasionally reported



Suspect Case Investigation and Control

- Contact Public Health authority
- Obtain appropriate **cultures** and preliminary clinical and epidemiologic information (including vaccine history)
- Begin early presumptive **treatment with antitoxin and antibiotics**
- Impose **strict isolation** until at least two cultures are negative 24 hours after antibiotics were discontinued.



Suspect Case Investigation and Control

- Obtaining swabs and making culture from close contacts
- all contacts should receive antibiotic prophylaxis
- inadequately immunized contacts should receive booster



Suspect Case Investigation and Control

- Treat any confirmed carrier with an adequate course of antibiotic, and repeat cultures at a minimum of 2 weeks to ensure eradication of the organism
- Treat any contact with antitoxin at the first sign of illness



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