

**Big Bad Bacteria:
Invasive Bacterial Diseases and
VISA/VRSA**

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Objectives

- 1. Recognize the public health significance of invasive bacterial diseases**
- 2. Locate control measure guidance for these diseases**
- 3. Know which invasive bacteria must be sent to the state lab for serotyping**
- 4. Identify VRSA as a public health emergency**

Conditions Covered

- *Haemophilus influenzae* invasive disease
- Invasive meningococcal disease
- Pneumococcal meningitis
- Group A streptococcal invasive disease / toxic shock syndrome
- VISA/VRSA

Invasive Disease

- Isolation from a normally sterile site
 - Blood*
 - CSF*
 - Joint fluid
 - Bone
 - Pleural fluid
 - Pericardial fluid

Meningococcus, Pneumococcus, Haemophilus: Similarities

- **Colonize the upper respiratory tract**
- **Person to person spread**
 - **Respiratory droplets, oral secretions**
- **Can invade after viral infection**
 - **Secondary bacterial infections**

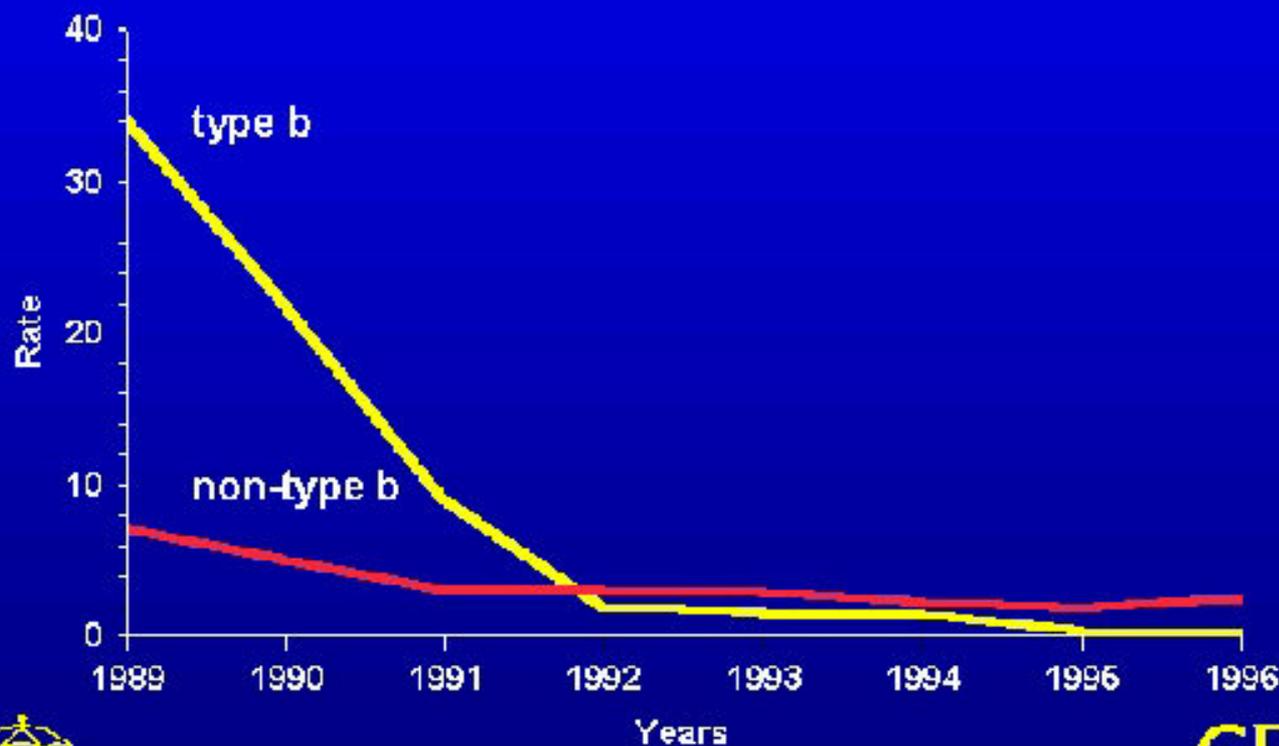
Haemophilus influenzae: Overview

- Clinical syndromes
- Serotypes
 - a-f (capsule)
 - Nontypeable (no capsule)
- All serotypes can cause invasive disease
 - *Haemophilus influenzae* serotype b (Hib) is the most virulent

***Haemophilus influenzae* Type b**

- **Leading cause of bacterial meningitis in children < 5 before vaccination**
- **4–5% of cases were fatal**
- **20% of children had permanent sequelae**

Haemophilus influenzae* type b (Hib) and non-type b Invasive Disease, per 100,000 Population, United States, 1989-1996



* For children aged <6 years; calculated from four active laboratory-based surveillance areas.

***Haemophilus influenzae*: Control**

- **Antibiotic prophylaxis only for type b (Hib)**
- **Only recommended for households with**
 - Under-immunized child <4
 - Immunocompromised child
- **Do not assume type b unless patient at increased risk**

***Haemophilus influenzae*: Reporting**

- 1. H. flu is not influenza**
- 2. All serotypes are reportable (if invasive)**
- 3. All isolates from normally sterile sites must be serotyped**
- 4. Positive latex agglutination tests (CSF) also reportable**

Neisseria meningitidis **(Meningococcus)**

- **Clinical syndromes**
- **Responsible for sporadic cases and outbreaks**
- **Many serogroups**
 - A, B, C, Y, W-135
- **Vaccine available**
 - All children 11–18
 - Adults at increased risk

Figure 7b. Severe Rash of meningococemia



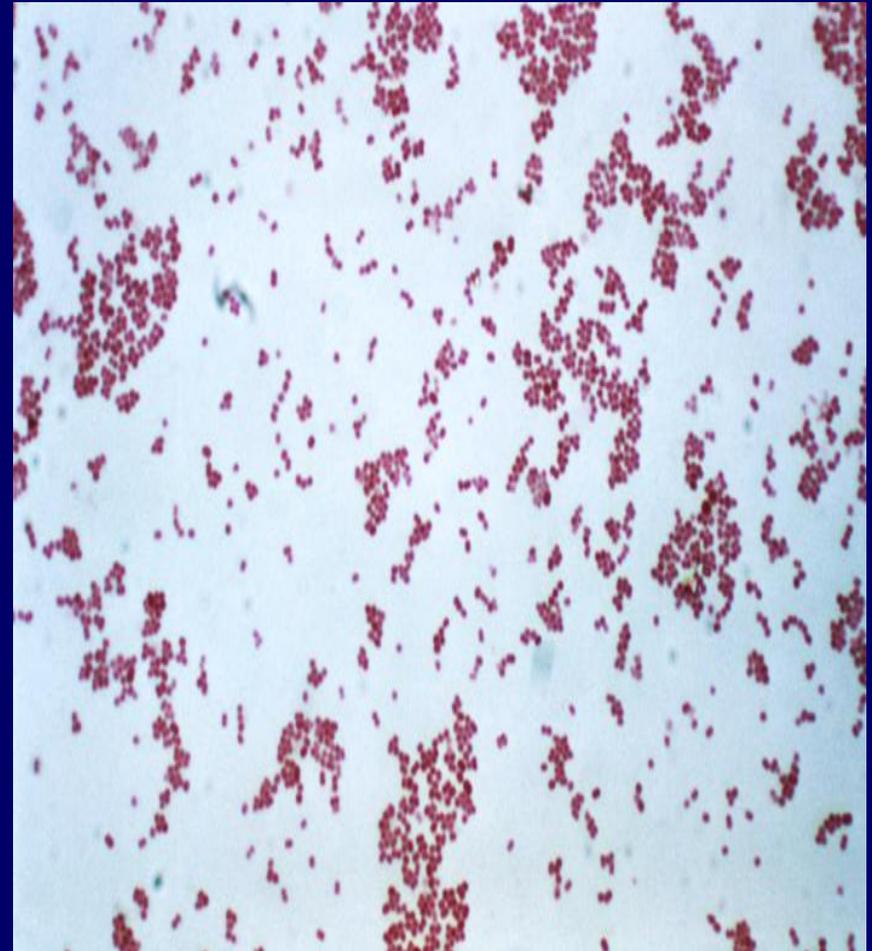
Close

Meningococcal Disease: Control

- **Antibiotic prophylaxis for close contacts**
 - Household contacts
 - Childcare contacts
 - Direct exposure to oral secretions
- **Timing of prophylaxis**
 - Infectious 7 days before onset–24 hours after tx
 - Prophylaxis within 24 hours after identification of index patient if possible; limited value if started >14 days after exposure

Meningococcal Disease: Reporting

- Reportable without positive culture if
 - Gram negative diplococci from sterile site
 - Purpura fulminans
- Isolates from normally sterile sites must be serogrouped



Streptococcus pneumoniae

- **Clinical syndromes**
- **Most prevalent during winter months**
- **High risk populations**
 - Children ≤ 2
 - Adults ≥ 65
 - Chronic medical conditions
- **Many serotypes**
- **Vaccines**
 - PCV7/PCV13 (Pneumovax™)
 - PPSV23

Pneumococcus: Control and Reporting

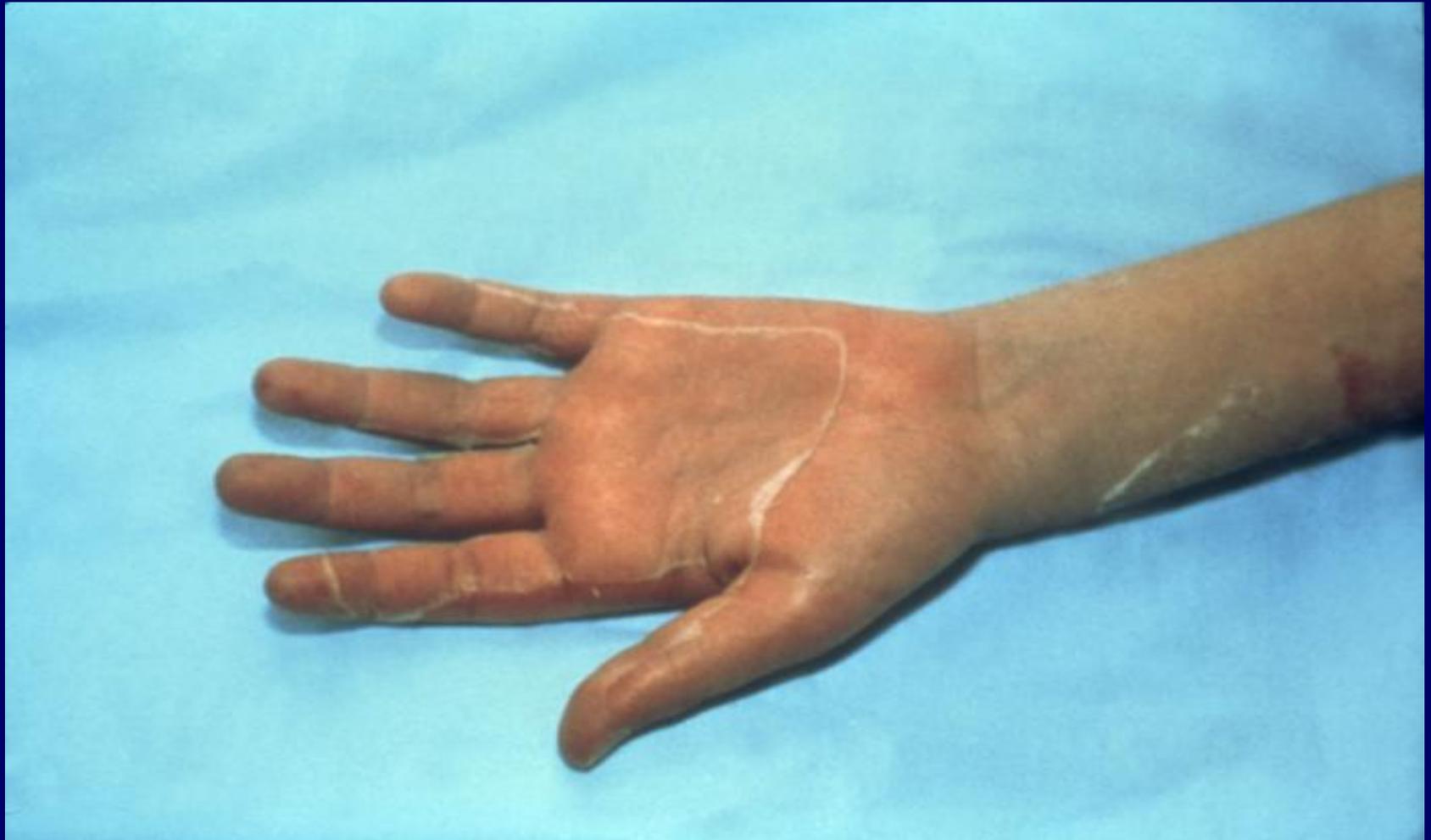
- **Only one invasive pneumococcal disease reportable in NC: Pneumococcal meningitis**
- **Antibiotic prophylaxis rarely indicated**

Group A Strep Invasive Disease

- Streptococcal toxic shock syndrome (STSS)



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Group A Strep Invasive Disease

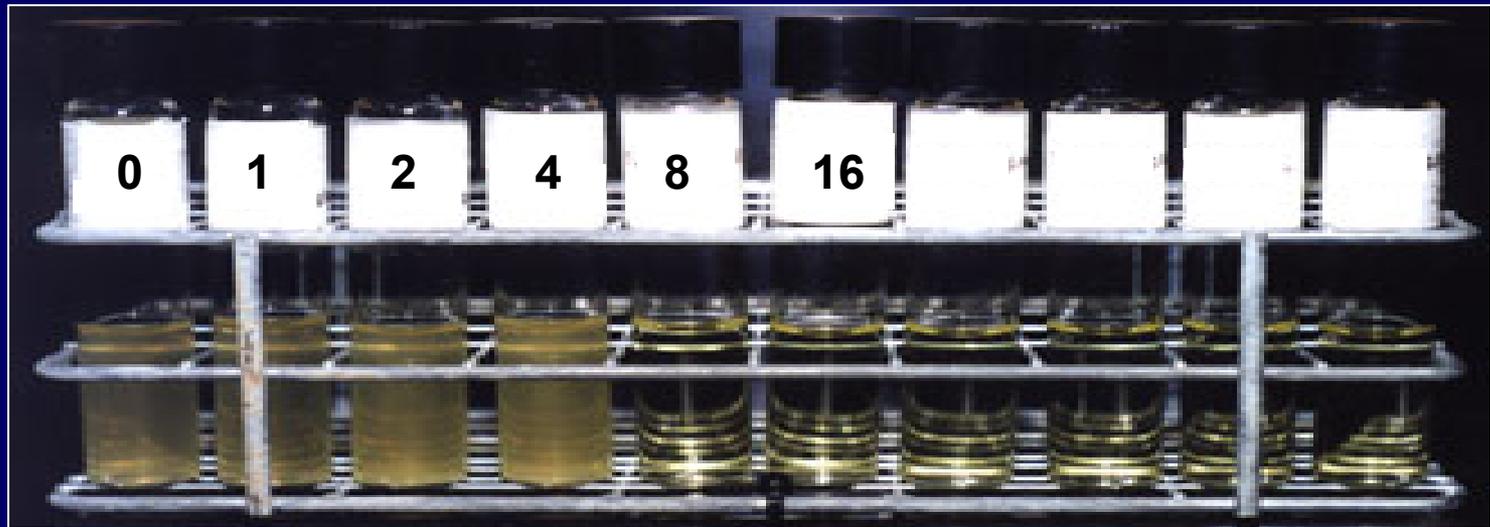
- **Streptococcal toxic shock syndrome (STSS)**
- **Necrotizing fasciitis**
- **Other clinical syndromes**
 - **Myositis/muscle infection**
 - **Bone/joint infections**
 - **Pneumonia**
 - **Bacteremia associated with skin/wound infection**

Group A Strep: Reporting and Control

- **Group A strep = *Streptococcus pyogenes***
- **Antibiotic prophylaxis not routinely recommended**
 - Consider for household contacts at increased risk for invasive disease
 - Outbreak settings
- **Post-surgical and post-partum infections**
 - Surgery or delivery ≤ 7 days before culture

VISA/VRSA

- Classified based on minimum inhibitory concentration (MIC) required to suppress bacterial growth



- MIC 4–8 = Intermediate (VISA)
- MIC ≥ 16 = Resistant (VRSA)

VISA versus VRSA

- **VISA:**
 - Exposure to vancomycin
 - Thickened cell wall
 - Reversible
 - Uncommon
- **VRSA:**
 - Resistance genes
 - Highly resistant
 - Rapid spread
 - Rare

VISA/VRSA: Control and Reporting

- VRSA is a PUBLIC HEALTH EMERGENCY!!!
- Confirm laboratory results
- Send isolate to SLPH
- Investigation and Control Guidelines in “Local Health Department Investigation Steps” section of CD manual

Conclusion

- **Invasive bacterial diseases are an important cause of illness and death**
- **Resistance is an increasing problem**
- **Surveillance is essential**
- **Opportunities for prevention and control**
 - **Vaccination**
 - **Education**
 - **Infection control**
 - **Prophylaxis**

References

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Photography Credits

- Slide 12:
National Foundation for Infectious Diseases,
http://www.nfid.org/library/meningococcal/fs_should_know.html
- Slides 14, 18, 19 and 22:
CDC Public Health Photo Image Library

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