OBJECTIVES

- Briefly describe the diagnosis and treatment of syphilis.
- Describe the changing epidemiology of syphilis in North Dakota.
- Identify three strategies that can be used when screening the target population within a community during an outbreak.
- Describe role and needed preparedness of public health nurses during a sexually transmitted disease outbreak.
CLINICAL MANAGEMENT OF SYPHILIS

Electron photomicrograph, 36,000 x.

Source: CDC/NCHSTP/Division of STD Prevention, STD Clinical Slides
TRANSMISSION

Infection:
- *T. pallidum* enters the body through abrasions in the skin or mucous membranes usually through sexual contact
- Transmitted across the placenta from mother to baby during pregnancy

Dissemination:
- Travels through the lymphatic system to regional lymph nodes and then throughout the body via the bloodstream
- Invasion of the CNS can occur during any stage of syphilis
  - Neurosyphilis

NATURAL HISTORY OF SYPHILIS INFECTION

Stages of Syphilis:
- Primary
- Secondary
- Latent
  - Early latent (Infected less than 1 year ago)
  - Late Latent (Infected more than 1 year ago)
- Tertiary

- Neurosyphilis can occur at any stage.
Primary lesion or "chancre" develops at the site of inoculation

Chancre:
- Progresses from macule to papule to ulcer
- Typically painless, indurated, and has a clean base
  - The bacteria destroys the nerves around the site of the infection.
- Highly infectious
- Heals spontaneously within 1 to 6 weeks
- 25% present with multiple lesions

Regional lymphadenopathy: classically rubbery, painless, bilateral

Serologic tests for syphilis may not be positive during early primary syphilis
Secondary Syphilis

- Secondary lesions occur 3 to 6 weeks after the primary chancre appears; may persist for weeks to months
- Primary and secondary stages may overlap
- Mucocutaneous lesions most common
- Manifestations:
  - Rash (75%-100%)
  - Lymphadenopathy (50%-86%)
  - Malaise
  - Mucous patches (6%-30%)
  - Condylomata lata (10%-20%)
  - Alopecia (5%)
- Serologic tests are usually highest in titer during this stage
**LATENT SYPHILIS**

- After clinical presentation, the host suppresses infection
  - No lesions are clinically apparent
  - Patent does not have signs or symptoms of disease
- Only evidence is positive serologic test
- May occur between primary and secondary stages, between secondary relapses, and after secondary stage
- Categories:
  - Early latent: \(<1\) year since infection
  - Late latent: \(\geq1\) year since infection or unknown

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**TERTIARY SYPHILIS**

- Cardiac abnormalities
- Ophthalmic abnormalities
- Gummatous lesions
- Auditory abnormalities
**SYPHILIS TESTING**

- **RPR—** non-treponemal test
  - Followed by antibody titer
    - Example (1:32 or 1:128)
- **FTA or TP-PA—** treponemal
  - Syphilis is confirmed

**NON-TREPONEMAL TESTS**

**RPR and VDRL**
- Titer values are important for clinical management of the case
  - Can not stage the disease based on titer
  - Treatment Response
    - Fourfold change in titer (i.e. 1:4 to 1:16) indicates a clinical difference or treatment response
- **Cannot compare RPR and VDRL**
  - If you first start with one test, you must stay with that test for monitoring the patient’s titers.
- **Can remain positive after treatment**
  - However, titers may be low
- **False positives occur due to other clinical conditions**
**TREPONEMAL TESTING**

FTA-ABS and TP-PA
- Required confirmatory test
- Generally remain positive for life (15-25% revert to seronegative)
- Cannot be used to gauge clinical response

**FALSE-POSITIVE REACTIONS IN SYPHILIS**

<table>
<thead>
<tr>
<th>Disease</th>
<th>RPR/VDRL</th>
<th>FTA-ABS</th>
<th>TP-PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autoimmune Diseases</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular Disease</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermatologic Diseases</td>
<td>Yes</td>
<td>Yes</td>
<td>--</td>
</tr>
<tr>
<td>Drug Abuse</td>
<td>Yes</td>
<td>Yes</td>
<td>--</td>
</tr>
<tr>
<td>Febrile Illness</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucosamine/chondroitin sulfate</td>
<td>Possibly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leprosy</td>
<td>Yes</td>
<td>No</td>
<td>--</td>
</tr>
<tr>
<td>Lyme disease</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Pinta, Yaws</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Yes*</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Recent Immunizations</td>
<td>Yes</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>STD other than Syphilis</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*May cause increase in titer in women previously successfully treated for syphilis

*Source: Syphilis Reference Guide, CDC/National Center for Infectious Diseases, 2002*
TREATMENT OF SYphilis

- Benzathine penicillin G: 2.4 million units IM
  - Primary, Secondary and Early Latent Syphilis
    - 1 dose
  - Late Latent Syphilis or Late Unknown
    - 3 Doses at one week intervals

- Alternatives:
  - Primary, Secondary, Early Latent
    - Doxycycline: 100mg PO BID x 2 weeks OR
    - Tetracycline 500 mg PO QID x 2 weeks OR
    - Ceftriaxone 1-2 gm IM/IV QD x 10-14 days
  - Late Latent or Unknown Latent
    - Doxycycline 100mg PO BID x 4 weeks OR
    - Tetracycline 500 mg PO QID x 4 weeks

(2015 CDC Treatment Guidelines)

RISks FOR HIV TRANSMISSION

- Persons with a genital ulcer disease are at 2-5 times greater risk for HIV acquisition
- HIV-infected persons are more likely to transmit HIV if co-infected with a genital ulcer disease
- Integrated testing is recommended
**Management of Sex Partners**

- For sex partners of patients with syphilis in any stage:
  - Draw syphilis serology
  - Perform physical exam

- For sex partners of patients with primary, secondary, or early latent syphilis
  - Treat presumptively for early syphilis at the time of examination, unless:
    - The non-treponemal test result is known and negative AND
    - The last sexual contact with the patient is > 90 days prior to examination.

**Syphilis in Pregnancy**

- **Transmission rate by stage of maternal infection:**
  - Primary: 70-100%
  - Secondary: 90%-100%
  - Latent: 10-30%

- **Outcome in untreated early syphilis:**
  - 25% intrauterine death
  - 25% perinatal death
  - 50% congenital syphilis (50% asymptomatic)
*32 states and Washington, DC reported sex of partner data for 100% of cases of P&S syphilis for each year from 2007-2012.

† MSM = men who have sex with men; MSW = men who have sex with women only.

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**Reported Syphilis Cases by Year**

**North Dakota, 2009-2014**

- **Primary and Secondary**
- **All Stages**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>4</td>
</tr>
<tr>
<td>2010</td>
<td>3</td>
</tr>
<tr>
<td>2011</td>
<td>2</td>
</tr>
<tr>
<td>2012</td>
<td>4</td>
</tr>
<tr>
<td>2013</td>
<td>13</td>
</tr>
<tr>
<td>2014</td>
<td>14</td>
</tr>
</tbody>
</table>

In 2014, North Dakota reported the highest number of syphilis cases with 51 cases.
SYPHILIS OUTBREAK, ND-SD 2013-15

MULTI-STATE OUTBREAK SYPHILIS CASES BY STAGE
MULTI-STATE OUTBREAK
SYPHILIS CASES BY GENDER

Syphilis Cases by Gender, 1/1/13 - 7/13/2015

Male 43%
Female 57%

MULTI-STATE OUTBREAK
SYPHILIS CASES BY AGE GROUP

Syphilis Cases by Age Group, 1/1/2013 - 7/13/2015

Number of Cases

<table>
<thead>
<tr>
<th>Age Group, Years</th>
<th>Number of Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15</td>
<td>Male 2, Female 1</td>
</tr>
<tr>
<td>15-19</td>
<td>Male 1, Female 4</td>
</tr>
<tr>
<td>20-24</td>
<td>Male 4, Female 5</td>
</tr>
<tr>
<td>25-29</td>
<td>Male 7, Female 6</td>
</tr>
<tr>
<td>30-34</td>
<td>Male 6, Female 7</td>
</tr>
<tr>
<td>35-39</td>
<td>Male 5, Female 6</td>
</tr>
<tr>
<td>40-49</td>
<td>Male 3, Female 4</td>
</tr>
<tr>
<td>50-59</td>
<td>Male 2, Female 1</td>
</tr>
<tr>
<td>60+</td>
<td>Male 1, Female 1</td>
</tr>
</tbody>
</table>
Tribal Nation EpiAid
April 2014

Current Activities
Strategies that can be used when Screening the Target Population within a Community During an Outbreak

I H S Screening Prompt

- January 2013
- I H S implemented screening prompt in the electronic health record at Indian Nation Hospital and their community clinic
- All persons ages 12-65 will have this prompt in their medical chart
Interagency Outbreak Collaboration

- Tribal Health Director
- HEW committee
- Community Health Representatives
- Indian Health Service
  - Clinical Director
  - CEO
  - Infection Control Officer
  - Public Health Nurses
  - Great Plains/Aberdeen IHS
- State Health Departments
  - ND, SD STD Program Managers
  - ND, SD Disease Intervention Specialists
- CDC Response Team

Epi-Aid Activities (1)

- Indian Nation Tribal Council presentation
- Clinical presentations
  - I H S (Adobe Connect/Recorded)
  - Private Medical Center
  - Community Clinic I H S
- Partner Services presentation
  - I H S Hospital (Adobe Connect/Recorded)
  - CHRs, PHNs, State DIS
Epi-Aid Activities (2)

- Disease Intervention Technical Assistance
  - Field based partner services training by CDC PHA
- Review of cases
  - I H S (ongoing)
  - State health department surveillance data
  - Private Health Clinic
- Two Mass Screening Events
  - Community number 1 (66 screened, 11 field treatments)
  - Jail Screening (38 screened, 5 field treatments)
- Media
  - Radio Live 20 min Phone-in
  - 4 minute PSA for replay

Epi-Aid Activities (3)

- Field treatment (18 patients)
  - 2 Community # 2
  - 11 Community # 1
  - 5 Corrections
- Review of Data Sharing and Case Investigation Plan
  - Draft flow charts with duties and timing
- Stillbirth and perinatal death review
- Partnership building
  - Corrections
  - Private facilities serving tribal members
Short Term Priorities (1)

• Continue active clustering activities
  • Jail screening
  • Youth drug/alcohol treatment facility
  • Group Youth Home
  • High School screenings
• Disease Investigation
  • DIS trained staff conduct at least one of two interviews with Tribal contact
  • Diagnosing provider contact DIS/PHN during patient encounter
  • Continue PHN field experience with partner services, including field blood draws
• Continue I H S screening
  • Ages 12-65, using standard counseling script

Standard Offer of STD Screening

• “Our area is experiencing high numbers of sexually transmitted diseases. If you are sexually active, you may be at risk and should be tested. Results will be available in 3 days (not including weekends) and you will be contacted if anything comes back positive.”
• If you are not contacted, you may call the clinic to get your results.
Short Term Priorities (2)

- Health record sharing between prenatal and delivering facilities for all pregnant women
- Develop referral system for desensitization of pregnant women with penicillin allergy
- Continue monthly case reviews between disease intervention staff (CHR, PHNs, DIS, IHS Infection Control, State Epi’s)
- Develop secure portal for sharing multi-state line list throughout course of outbreak accessible by IHS infection control

Long Term Goals (1)

- Advocate for designated STD specialist (PHN staff)
- Finalize flow charts for information sharing and case investigation (In draft now)
- Drafting and sharing public health codes and policies
- Data sharing MOUs with state health departments
- Continue and refine partnership with PHN, DIS, CHR for case investigation
- 6-month re-evaluation of activities in reference to case load
Long Term Goals (2)

- Continue collaborative communication for case investigation with PHN, DIS, CHR (buddy system)
- Continue partner services training with focus on timeliness of case investigation and closure
- Provider awareness activities for off-reservation contract and non-contract providers
- Follow up with KAT communications to produce local video education for waiting rooms

OUTBREAK RESPONSE PLANS

- What is recommended:
  - Education - On going
  - Know your data and providers
  - Develop relationships with field epidemiologists and public health nurses

- What to consider:
  - Threshold at which plan is initiated
  - Staffing considerations, including number, disciplinary mix and specific responsibilities of response team members
  - Evaluation of the effectiveness of the response

- Emerging Issues: Drug Use and Hepatitis C
**RISING EPIDEMIC OF HEPATITIS C**

- Increased opioid use has led to an increase of hepatitis C and HIV infections and overdose exist among people who inject substances
- The opioid epidemic is both a rural and urban issue
- The number of hepatitis C cases has almost doubled in North Dakota in the past 5 years
- Hepatitis C is affecting those under 30 years

![Reported Hepatitis C Cases* by Year North Dakota, 2010-2014](chart)

*Includes acute and “past or present” infections*
**NORTH DAKOTA HEPATITIS C CASES**

*BY AGE GROUP, 2012 - 2014*

<table>
<thead>
<tr>
<th>Year</th>
<th>Under 18</th>
<th>18-24</th>
<th>25-29</th>
<th>30-34</th>
<th>35-39</th>
<th>40-44</th>
<th>45-49</th>
<th>50-54</th>
<th>55-59</th>
<th>60-64</th>
<th>65 and over</th>
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<tbody>
<tr>
<td>2012</td>
<td>10</td>
<td>125</td>
<td>100</td>
<td>82</td>
<td>65</td>
<td>58</td>
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<tr>
<td>2013</td>
<td>12</td>
<td>128</td>
<td>138</td>
<td>99</td>
<td>69</td>
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<td>67</td>
<td>70</td>
<td>78</td>
<td>38</td>
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<tr>
<td>2014</td>
<td>10</td>
<td>150</td>
<td>155</td>
<td>124</td>
<td>99</td>
<td>80</td>
<td>71</td>
<td>98</td>
<td>92</td>
<td>51</td>
<td>36</td>
</tr>
</tbody>
</table>

* Includes acute and “past or present” infections

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**HIV OUTBREAK IN INDIANA**

- As of June 19th, 2015: 170 Cases
- Community Outreach Center: state-issued ID cards, birth certificates, job counseling and local training, enrollment in insurance, HIV testing, HIV care coordination, substance abuse referrals and vaccinations against tetanus, hepatitis A and B
- Needle exchange program
  - Estimated Needles Brought In: 25,187
  - Total needles provided: 25,739
Thank you!

Sarah Weninger
sweninger@nd.gov
701.328.2366

Jamie and Colleen