Sexually Transmitted Infections in the Young: Opening Up

MARY ANN C. BUNYI, MD, FPPS, FPIDSP
The speaker intends to:

A. Describe the epidemiologic pattern of sexually transmitted infections (STI)

B. Characterize the clinical features of STI in different pediatric age group

C. Impart what’s new in laboratory testing for sexually transmitted infections
There are nearly 30 sexually transmitted infections or disease syndromes that result from having sexually transmitted organisms.
Sexually Transmitted Infections

**BACTERIA**
- Gonorrhea (Neisseria gonorrhea)
- Chlamydia (Chlamydia trachomatis)
- Syphilis (Treponema pallidum)
- Chancroid (Haemophilus ducreyi)

**VIRUS**
- Genital warts and cervical – associated malignancy (human papillomavirus)
- Genital herpes (herpes simplex virus)
- Hepatitis B (hepatitis B virus)
Sexually Transmitted Infections

PARASITES

- Trichomoniasis (Trichomonas vaginalis)
- Pubic lice (Phthirius pubis)
Sexually Transmitted Infections

- **CURABLE**
  - Gonorrhea
  - Chlamydia
  - Syphilis
  - Trichomoniasis

- **INCURABLE**
  - Herpes simplex
  - Genital warts
  - HIV

Risk Factors in STI Spread

A. Biological
   ▪ gender
   ▪ age
   ▪ coexistence of other STIs
   ▪ pregnancy

B. Behavioral
   ▪ age at coital debut
   ▪ multiple sex partners
   ▪ sexual practice
   ▪ anal sex

C. Demographic
   ▪ population age structure
   ▪ sex ratio

Routes of Transmission

A. Sexual

B. Maternal
   1. in–utero transmission (syphilis)
   2. perinatal (gonorrhea, chlamydia, HPV, HSV)

C. Non-sexual: genital hygiene; fomites

Global Epidemiology of Sexually Transmitted Infections (STI)

- Profound impact on sexual and reproductive health worldwide
- More than 1 million STIs are acquired everyday worldwide with more than 2/3 in developing countries
- Each year, there are estimated 357M new infections with 1 of 4 STIs..chlamydia (101 M), gonorrhea (78M), syphilis (5.6M) and trichomoniasis (143 M)
- More than 500M living with genital HSV (herpes) infection
- More than 290 M women have an HPV infection

Epidemiology of STI in the Pediatric Age Group

- Every year one (1) in 20 adolescents contract a major curable STI
- STI disproportionately affect women and adolescent girls
- Age of acquisition is becoming younger. There is relatively high prevalence of genital chlamydial infection in the youth. Similarly, highest prevalence of HPV infections occur among adolescents aged 14 – 19 years.
- In sexually abused children, gonorrhea remains to be the most frequently transmitted disease; concurrent chlamydia infection is common
- Among sexually abused children, 36 – 83% of 0-12 years had gonorrhea and 90 -100% of 5 -12 years of age has sexual contacts
- With less than 1% of this age group brought to STD clinics, pediatric STIs remain a hidden and neglected problem.
In the Philippines, aside from the behavioral and HIV sentinel seroprevalence data, reliable STI data are rarely collected.

STI reports and surveys are currently inadequate to describe the true prevalence and trends of common STI in the country.

### Prevalence of STIs among different groups RTI/STI Prevalence Survey in Selected Sites in the Philippines February – May 2002 (n = 300)

<table>
<thead>
<tr>
<th>STI</th>
<th>Female (Gen. Pop’n)</th>
<th>Male (Gen. Pop’n)</th>
<th>Female Youth 15 – 24 y/o</th>
<th>Male youth 18-24 y/o</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlamydial infection</td>
<td>5.75</td>
<td>4.74</td>
<td>7.7</td>
<td>9</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>0.75</td>
<td>1.1</td>
<td>0.7</td>
<td>1.7</td>
</tr>
<tr>
<td>Syphilis</td>
<td>0.17</td>
<td>0.2</td>
<td>No data</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>3.2</td>
<td>9.6</td>
<td>No data</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>3.18</td>
<td>Not applicable</td>
<td>No data</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Bacterial vaginosis</td>
<td>28.56</td>
<td>Not applicable</td>
<td>No data</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Candidiasis</td>
<td>17.16</td>
<td>Not applicable</td>
<td>No data</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>
Epidemiology Bureau (EB) Data  
National HIV/AIDS & STI Surveillance and Strategic Information Unit. Department of Health, Philippines

Number of Syphilis screening tests done and Number of reactive test by year and by sex

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Total Number of Clients Screened for SYPHILIS</th>
<th>Total Number of Tests reactive for SYPHILIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2012</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>2013</td>
<td>384,703</td>
<td>326,909</td>
</tr>
<tr>
<td>2014</td>
<td>511,973</td>
<td>447,863</td>
</tr>
<tr>
<td>2015</td>
<td>349,081</td>
<td>309,645</td>
</tr>
</tbody>
</table>
Epidemiology Bureau (EB) Data
National HIV/AIDS & STI Surveillance and Strategic Information Unit. Department of Health, Philippines

Number of smears for GONORRHEA and Number of smears with intracellular diplococci by year and by sex

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Total Number of Smears</th>
<th>No. of smears with intracellular diplococci</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>2012</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2013</td>
<td>10,663</td>
<td>141,049</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2014</td>
<td>14,811</td>
<td>146,442</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2015</td>
<td>7,579</td>
<td>75,778</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
# Research Institute for Tropical Medicine
## Pediatric Data : 2016 – 1\textsuperscript{st} Q 2017

<table>
<thead>
<tr>
<th>DISEASE</th>
<th>2016</th>
<th>1\textsuperscript{st} quarter 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gonorrhea</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>culture proven</td>
<td>2</td>
<td>2 (4F y/o ; 13M)</td>
</tr>
<tr>
<td><strong>Syphilis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPR / TPPA</td>
<td>1+/+</td>
<td>1 -/+ (2-month old)</td>
</tr>
<tr>
<td><strong>Herpes Simplex (HSV)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCR</td>
<td>0</td>
<td>2 (1-month old)</td>
</tr>
<tr>
<td><strong>Chlamydia</strong></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Trichomonas</strong></td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Philippine Children’s Medical Center
Pediatric Gynecology and Adolescent Center Center
OPD Data : 2014 - 2016

<table>
<thead>
<tr>
<th>Disease</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>HSV</td>
<td>No data</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>PID</td>
<td>Not applicable</td>
<td>1</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Gonococcal urethritis</td>
<td>No data</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Unspecified STI</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISEASE FEATURES
GONORRHEA

- infects urethra, estrogenized endocervix, conjunctivae, prepubertal vagina, pharynx, and anorectum; can be disseminated (arthritis – dermatitis syndrome)

- perinatal colonization can persist for up to 6 months

- beyond neonatal period, transmission is almost always sexual

- transmission through fomites (toilet seats, towels) possible; can survive up to 24 hours in moist purulent sections

Jain, Nita. Sexually transmitted diseases in the pediatric patient. BCMJ. Vol. 46. No.3 April 2004
### GONORRHEA FEATURES

<table>
<thead>
<tr>
<th>NEONATES</th>
<th>CHILDREN</th>
<th>ADOLESCENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>purulent conjunctivitis within 2 – 5 days from birth</td>
<td>Conjunctivitis, exudative oropharyngitis, urethritis, infection of the vagina, endocervix and rectum</td>
<td>Same as for adults but with increased risk of PID</td>
</tr>
<tr>
<td></td>
<td>Infection of the vagina and urethra usually with yellow or green discharge with odor associated with painful urination or itching</td>
<td>In females: 85% asymptomatic</td>
</tr>
</tbody>
</table>

CHLAMYDIA INFECTION

- bacterial agent associated with neonatal conjunctivitis, trachoma, pneumonia in young infants, genital tract infection, pharyngitis and lymphogranuloma venereum.

- In children younger than 3 years old, consider perinatal colonization

- GUT infections in older than 3 years is indicative of sexual acquisition

- Fomite transmission not documented

Jain, Nita. Sexuallty transmitted diseases in the pediatric patient. BCMJ. Vol.46, No.3, April 2004
## CHLAMYDIA FEATURES

<table>
<thead>
<tr>
<th>NEONATES</th>
<th>CHILDREN</th>
<th>ADOLESCENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical transmission: conjunctivitis, 5-14 days after birth</td>
<td>Usually asymptomatic irrespective of site of infection</td>
<td>Same as for adults but with increased risk of PID</td>
</tr>
<tr>
<td>pneumonia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptomatic infection of vagina and rectum occurs in up to 15% of infants of infected mothers, and infection may persist for up to 3 years</td>
<td></td>
<td>In females: purulent vaginal discharge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In males: urethral discharge, painful urination and itching</td>
</tr>
</tbody>
</table>

SYPHILIS

- Motile spirochete
- Infection can occur in utero (congenital) at anytime of pregnancy or at birth
- Acquired is almost always obtained through sexual contact
- In any young child who presents with primary or secondary disease think: SEXUAL ABUSE
SYPHILIS FEATURES

- **PRIMARY:** ulcer or chancre at infection site
- **SECONDARY:** skin rash, mucocutaneous lesion, lymphadenopathy
- **TERTIARY:** multiorgan abnormalities – cardiac, respiratory, ear or gummatous lesions
- **CONGENITAL:** early (< 2 years old): may be normal at birth with signs developing at 3-12 weeks
  
late (> 2 years old): bone and CNS involvement

TRICHOMONIASIS

- Flagellated protozoa
- Transmitted by direct genital contact or from infected mother to neonate
- Neonatal infection can persist up to 1 year
- Beyond infancy, presence of organism in a vaginal specimen is highly suggestive of sexual abuse
- Fomite transmission undocumented

TRICHOMONIASIS FEATURES

- Among neonates, post-delivery infection persists for 3-6 weeks in the oestrogenized vagina, can persist in the urinary tract after clearance from the vagina.

- In girls of all ages, vulvovaginitis with discharge occurs; may be asymptomatic in boys.

HERPES GENITALIS (HSV)

- Majority caused by HSV type 2
- Either HSV -1 or HSV -2 can be found in the oral or genital region
- Perinatal transmission of HSV 2 can occur by ascending infection or during birth through an infected maternal genital tract

# HERPES GENITALIS FEATURES

<table>
<thead>
<tr>
<th>NEONATES</th>
<th>CHILDREN AND ADOLESCENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localized skin lesions</td>
<td>Painful, vesicular or ulcerative lesions of the skin and mucous membranes for the male or female genital tract</td>
</tr>
<tr>
<td>Encephalitis or disseminated infection</td>
<td></td>
</tr>
</tbody>
</table>

GENITAL WARTS (HPV)

- More than 100 types of HPV and nearly 40 types associated with genital area infection
- Perinatal transmission occurs
- Autoinoculation or heteroinoculation from scratching, bathing or diapering

GENITAL WARTS (HPV) FEATURES

- Also called condylomata acuminata: painless, clustered cauliflower-like lesions on skin or mucosal surfaces.
  - In males, found on the penis, scrotum or anal or perianal area.
  - In females, appear on the vulva, anal or perianal area, vagina or on the cervix.
- Juvenile recurrent respiratory papillomatosis.

DIAGNOSTIC TESTS
<table>
<thead>
<tr>
<th>DISEASE</th>
<th>GOLD STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gonorrhea</td>
<td>Culture (infected specimens)</td>
</tr>
<tr>
<td>Chlamydia infections</td>
<td>Isolating chlamydial intracellular inclusions in tissue culture</td>
</tr>
<tr>
<td>Syphilis</td>
<td>Spirochetes seen by microscopic darkfield examination of lesion exudate, tissue or infected specimens</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>Protozoan seen in the urine or a wet mount of the vaginal discharge</td>
</tr>
<tr>
<td>Herpes genitalis (HSV)</td>
<td>Viral cell culture</td>
</tr>
<tr>
<td>Genital Warts (HPV)</td>
<td>Tissue biopsy</td>
</tr>
</tbody>
</table>
THE INNOVATIONS

GONORRHEA AND CHLAMYDIA: CDC RECOMMENDATIONS

- NAAT is the recommended test to diagnose genitourinary gonorrhea and chlamydia infections regardless of symptomatology.
- Optimal specimen types for NAAT: first catch urine (10cc) from men and vaginal swabs from women.
- Alternate specimens: urine or cervical swab from women; urethral swab from men.
- NAAT also recommended for detection of rectal and oropharyngeal infections caused by chlamydia or gonorrhea.

THE INNOVATIONS

TRICHOMONAS VAGINALIS

Methodologies clinically available:

<table>
<thead>
<tr>
<th>TEST</th>
<th>SENSITIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAAT</td>
<td>98 – 100%</td>
</tr>
<tr>
<td>CULTURE</td>
<td>75 – 77%</td>
</tr>
<tr>
<td>RAPID ANTIGEN</td>
<td>82 – 85%</td>
</tr>
<tr>
<td>WET MOUNT</td>
<td>50 %</td>
</tr>
</tbody>
</table>

THE INNOVATIONS

SYPHILIS

- Definitive methods: darkfield microscopy
  direct fluorescent antibody (DFA)

- Serologic tests
  
  Non-treponemal: VDRL and RPR
  
  Treponemal: Fluorescent Treponemal Antibody absorbed (FTA – ABS)
  T. pallidum particle agglutination (TP-PA)
THE INNOVATIONS

2009 Expert Consultation Meeting of the CDC and the Association of Public Health Laboratory findings on Syphilis

1. darkfield microscopy continues to be useful in the diagnosis of syphilis
2. proper serologic diagnosis of syphilis requires both a treponemal test and a nontreponemal test
3. since the standard of screening with a non-treponemal test is labor intensive, screening with an efficient treponemal test (reverse algorithm) as the initial screen is proposed for consideration.
THE INNOVATIONS

HERPES SIMPLEX VIRUS (HSV)

- culture and PCR on clinical lesions
- HSV – 1 and HSV – 2 antibody detection to document prior infection
- HSV – 1 and HSV – 2 PCR to test for current infections
- HSV DFA for direct microscopy of specimen

TAKE HOME POINTS

- Current available data reveal that the major curable STIs remain the same but the age of acquisition is becoming younger.

- In sexually abused children, gonorrhea remains to be the most frequently encountered STI.

- There is a need for a more robust and reliable STI data in children in the country.

- Despite the innovations in diagnosis, local laboratory facilities continue to utilize the traditional tests for determination of sexual transmitted infections.
THANK YOU