Sex in the City: An Inside View
The Role of STD Testing and Treatment in HIV Prevention

Maureen P. Scahill, NP, MS
Nurse Practitioner, Trainer, TA Provider
Center for Health & Behavioral Training, Rochester, New York

STD 101
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Objectives

Upon completion of this content the learner will be able to

- Explain how for persons who are HIV uninfected, the presence of an STD increases the likelihood of acquiring sexually-transmitted HIV infection.
- Explain how for persons who are HIV infected, the presence of an STD increases the likelihood of transmitting HIV infection to a sexual partner.
- Recognize how HIV prevention providers can use this information to offer STD testing & treatment as one HIV prevention strategy for their clients.
STD/HIV Inter-relationships

- **Behavioral**
  - Both are sexually transmitted

- **Epidemiological**
  - Populations with high rates of STDs show disproportionally high rates of sexually-transmitted HIV

- **Immunological**
  - STDs result in changes in immune cells of the mucous membranes ("Pink Parts"), which can facilitate sexual HIV acquisition & transmission

References:
- Cohen, M (2014) Webinar
- Cohen & Pilcher (2005) *JID, 191*
- Hitchcock, PJ (1996) *AIDS PATIENT CARE and STDs, 10 (3)*
- Rothenberg, RB et al. (2000) *STD, 27 (7)*
- Sullivan, AK et al (1997) *AIDS PATIENT CARE andSTDs, 11 (3)*
- St Louis, ME et al (1997) *AJP H, 87 (1)*
- Wasserheit, JN (1992) *STD, 19 (2)*
Two Part Presentation

- **Part 1 – Experiential: Sex in the City – An Inside View**
  - An educational theatre activity to increase understanding of the immunological connection

- **Part 2 – Didactic**
  - A slide presentation to further explain the role of STD testing & treatment in HIV prevention

- Let’s Get Started with Part 1 ……..

**Sex in the City – An Inside View**
Part 2 – The STD/HIV Connection

- How does the presence of an STD affect those factors for both HIV-positive & HIV-negative persons?

- Think about the exercise we just completed
  - *Sex in the City – An Inside View*

- The probability of transmission (STD or HIV) from an infected person to an uninfected person depends on 3 main factors...

- CDC. (1998) *MMWR*, 47 (RR-12)
- Cohen, M (2014) Webinar
- Hitchcock, PJ (1996) *AIDS PATIENT CARE and STDs*, 10 (3)
Transmission Dynamics

- There are 3 main factors that influence infectivity
  - Germ Dose
  - Exposure
  - Resistance

$D \ (Dose) \times E \ (Exposure)$

$R \ (Resistance)$

This applies to any infection

Sexual Transmission of HIV

- **Dose** – How much HIV is present?

- **Exposure** – the way the organism is in contact with the uninfected person
  - How long is the contact?
  - How often is there contact?
  - The chance a sexual partner is infected

- **Resistance** – How healthy are the *Pink Parts*?

HIV Dose Depends On...

- Stage of HIV infection
- Which body fluids are involved
- Whether an STD is present if there is sexual contact

- Sullivan, AK et al (1997) AIDS PATIENT CARE and STDs, 11 (3)
HIV Dose – The Amount of the Virus Present

- **Which fluids**
  - Semen
  - Cervical & Vaginal secretions
  - Blood (including menstrual blood)
  - Breast milk

- **Stage of HIV infection influences how much HIV is present in these fluids**
  - Acute Stage of Infection
  - Asymptomatic – a “carrier state”
  - Symptomatic – AIDS

- **The presence of an STD can raise the amount of HIV in these fluids in each stage**

  - Cohen, M (2014) Webinar
  - Pinkerton, SD (2007) *AIDS*, 21

Remember
*Sex in the City? What happened when the person living with HIV had an STD?*
- Urethral HIV DNA more than doubled when there was also the presence of an STD (gonorrhea)
- However, treatment cut the urethral HIV DNA in half – almost the same as those without STD

<table>
<thead>
<tr>
<th>STD Infection Status</th>
<th>HIV Genital Viral Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Gonorrhea</td>
<td>19%</td>
</tr>
<tr>
<td>Gonorrhea Pre-treatment</td>
<td>44%</td>
</tr>
<tr>
<td>Post-treatment</td>
<td>21%</td>
</tr>
</tbody>
</table>

Exposure Depends On…

- **Individual Behaviors**
  - What type of sexual contact (impacts length of contact with organism)
  - How often

- **Prevalence of HIV in the community**
  - Chance a sexual partner has HIV

- Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
Type of Sexual Contact

- Determines the duration of time HIV is in contact with the Pink Parts
  - Mouth & Throat – Minutes
  - Penis – the Urethra – Minutes to hours (if uncircumcised)
  - Vagina & Cervix – Hours to days
  - Rectum – Hours to Days

- So unprotected receptive anal intercourse & vaginal intercourse resulting in semen in the rectum or vagina are the MOST risky types of sex

- Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
If there is high prevalence of HIV or other STDs in a geographical area or in social & sexual networks – the chances of having sexual contact with someone who has an infection are greater

An individual might have low individual risk behaviors, but due to the prevalence in the population – his/her chance of exposure to an infected partner could be very likely

This results in disparities in HIV and STD rates of infection in some communities

- CDC (2005) *MMWR, 54* (24)
- CDC (2007) *Meeting Report: Consultation to Address STD Disparities in African American Communities*

Resistance

- **Systemic (also called humoral)** – this is the systemic immune system throughout the body – related to general health status

- **Mucosal (also called cellular)** – this is the local immune system of the mucous membranes
  - The *Pink Parts* – vagina and cervix, rectum, penis (urethra), mouth and throat

- **Genetic** – inherited resistance to an infection

- Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
Resistance of Pink Parts Depends On…

- Whether an STD is present
- Age
  - Post menopausal – vaginal mucous membranes (Pink Parts) are less flexible
  - Puberty – which could last for several years – vulnerable cervical cells are more available
- Inflammation due to other causes
  - Douching
  - Dry sex
  - Others

Think about the Sex in the City – Scenes 1-4
Sex in the City – Scene One

- **HIV negative person**
  - Sex happens – with HIV-infected genital secretions
  - HIV cannot find an entry door – the CD4 Receptor Cells (Scout Cells) are out of reach!

- **Resistance is high**
  - *Pink parts* are healthy

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Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
Sex in the City – Scenes Two & Three

- **HIV negative person**
  - Sex happens – with STD-infected genital secretions
  - STDs directly attach the *Pink Parts* – causing the CD4 Scout Cells to come into the body cavity to try to fight the STD
  - Sex happens with HIV –infected genital secretions
  - HIV finds CD4 Scout cells to attach to and HIV infection occurs

- **Resistance is low**

  - Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
Sex in the City – Scene Four

- **HIV infected person**
  - Sex happens – with STD-infected genital secretions – which can directly infect the *Pink Parts*
  - Scout Cells come into the body cavity – to fight the STD – but since they are CD4 Cells, they bring HIV with them
  - Now the body cavity is very crowded with STD, Scout Cells, & HIV

- **This raises the Dose of HIV in the genital secretions**
  - which makes it more likely that HIV will be passed to a partner during sex

(continued)

- Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
Sex in the City – Scene Four (continued)

- **HIV infected person**
  - Goes to Clinic – gets STD screened & Rx’d
  - CD4 Scout Cells on the Pink Parts are reduced – once healing is completed

- **Pink Parts** are healthy again – the Resistance (R) is high
  - Now the body cavity goes back to having a small amount of HIV and the person is less communicable to a sexual partner

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- Anderson, DJ, in Holmes et al (Ed), (2008) *Sexually Transmitted Diseases, 4th Ed*
Role of STDs in HIV Prevention

- Keeping the *Pink Parts* healthy reduces the chances of HIV sexual acquisition for those who are negative – routine STD screening annually & then every 3-6 months – depending on the risk behavior & factors

- Keeping the *Pink Parts* healthy reduces the chances of HIV sexual transmission for those who are living with HIV – routine STD screening annually & then every 3-6 months – depending on risk behavior & factors

- CDC (1998) *MMWR, 47 (RR-12)*N
- Hitchcock, PJ (1996) *AIDS PATIENT CARE and STDs*, 10 (3)
- NCSD (2013) *NCSD Fact Sheet* [www.ncsddc.org/publications](http://www.ncsddc.org/publications)
Thank You

For information on
Sex in the City – An Inside View
Contact www.chbt.org

CHBT is a CDC-funded Capacity Building Assistance Provider

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CDC
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov Web: http://www.cdc.gov

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