



# Sex in the City.... an Inside View

A Training  
Exercise  
for STD/HIV  
Prevention  
Providers

853 West Main Street  
Rochester, NY 14611  
(585) 753-5382  
[www.chbt.org](http://www.chbt.org)  
2010





## “Sex in the City – Part II. An InsideView

Educational Theatre – Group Level Intervention

**Goal: To increase participant’s understanding of how treating STDs is an important HIV prevention intervention.**

**Objectives:** To increase participants’

1. understanding of how HIV infection is transmitted through sexual behaviors
2. knowledge of how the presence of a STD increases a person’s chances of getting HIV and transmitting HIV to a sexual partner (HIV susceptibility and communicability - **the Double Edged Sword**)
3. awareness that STD screening & treatment is an important HIV prevention intervention

**Time:** 30 minutes - 1 hour

**Materials:**

Poster board – in 6 colors  
 Hole puncher  
 Elastic cord or clothespins  
 Magic Marker

**Directions to prepare for exercise:**

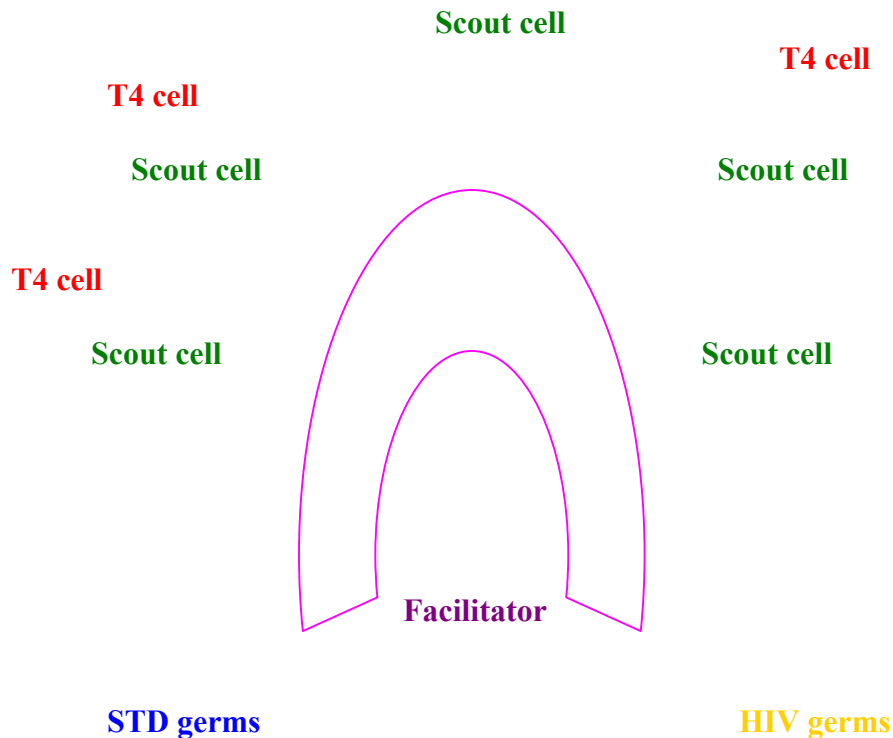
**1. Prepare the cards** indicated below prior to the exercise. The cards are used to assign each participant a ‘role’ in the educational theatre exercise. Cut each poster board into 8 x 11 size pieces. Hole-punch two holes into the top two corners of each piece and insert elastic cord so the card can be worn around a person’s neck (alternative; attach one or two clothespins, so that the card can be clipped to a person’s shirt). Magic markers or masking tape should be used to write the name of the part being portrayed in large print. The cards indicate either a type of white blood cell or a type of organism (germ). Suggested number of players and color for each type of card (23 total):

- 8 **Pink** – mucous membrane lining cells “pink parts” – write Vagina, Rectum, Mouth, Urethra on front
- 4 **Green** – Scout Immune Cells (including macrophage & dendritic cells) - Write Scout Immune Cells on front
- 3 **Orange** – T 4 white blood cells – write WBC T4 on front
- 4 **Blue** – STD germs – write STD on front
- 4 **Yellow** – HIV germs – write HIV on front

**2. Adjusting the Exercise to smaller or larger numbers of participants:** Using the numbers above would result in a total of 23 participants. This exercise can be done with smaller or large numbers of participants by adding or subtracting the number of persons assigned to be cells or germs. The entire group should be assigned a role and participate.

### 3. Setting up the Exercise:

1. Clear a space in the middle of the room
2. Give each participant a card and ask them to wear it.
3. Instruct the “Pink parts” to form an inverted U shape in the middle of the space.
4. Place the “Scout cells” around the outside of the U
5. Place the T4 cells around the outside of the U, further out
6. Ask the STD and HIV germs to stand by the facilitator at the open part of the U
7. Hand each HIV germ a small yellow card with “HIV” written on it



**Script:**

**Facilitator:** Welcome to this educational theatre exercise: “Sex in the City; An Inside View”. You will be a participant in this exercise and you will experience what really happens during sex; how HIV is transmitted and how STDs make it easier. My name is ----- and I will be your narrator. I’ll be walking you through each scene. I have the only speaking part. The **PINK PARTS** are non-moving, but the rest are moving parts. From time to time during the movements, I will issue a **FREEZE command**. At that time, all players should stop instantly.

Before we begin, let me introduce you to the players. First, we have a **BODY CAVITY** formed by the pink parts into the shape of a U. A body cavity is lined with **PINK PARTS**, which are really – squamous and columnar epithelial cells. This could be a vagina, rectum, urethra, or mouth. It doesn’t matter because the lining is the same in all sites. These cells overlap and form a barrier. All **PINK PARTS** now join hands. Choose the body cavity you would like to portray.

Next, meet the **SUBMUCOSA**. This is the layer just underneath the lining of the body cavity. Here you will find some **WHITE BLOOD CELLS (WBC)** who are soldiers in the ‘battle’ that takes place when germs enter any body cavity.

#1 is the Scout Immune Cell affectionately known as a **SCOUT CELL**. Scout Immune Cells include Macrophage Cells and Dendritic Cells. The Scout Cell’s job is to rush to the pink parts if any germs or irritants get into the body cavity. The Scout Cell then tries to destroy the germ.

#2 are the **T4 LYMPHOCYTE CELL**. When a germ gets into the body cavity, the T4’s cells signal other cells in the bloodstream to start making antibodies to fight off the infection.

A strange coincidence is that both Scout cells and T4s have a specific receptor on the outside called a **CD4 RECEPTOR**. These players please raise one arm and open your hand. Keep your arm raised.

Now, meet the **HIV GERM**. HIV is a scary germ, but really is sort of wimpy in that it can’t live on its own. It has to get inside a cell and live there. If HIV doesn’t infect a cell and get inside it after 24 hours (often only 6 – 8 hours), it will die. The HIV germ has a protein on the outside called an **ATTACHMENT PROTEIN**. These players raise one arm and make a fist. In order for HIV to infect a cell, the attachment protein has to find a cell with a specific receptor. It just so happens that the one and only receptor that fits HIV, is the CD4 receptor (see the raised open hands). These of course, are on the Scout cells and the T4 cells. If this connection is not made, then infection can’t happen.

Lastly, meet the **STD GERMS**. These can be bacterial ones like gonorrhea and chlamydia, or viral ones like herpes. They all have the same effect in connection with HIV. Unlike HIV, **STD GERMS** directly infect **PINK PARTS**. These players should do a doggie paddle motion with your hands and paddle against the joined hands of the **PINK PARTS**. **PINK PARTS** drop your arms to indicate that you have been infected and the layer of protection is disrupted. Now, let the action begin.

**SCENE 1:**

Here is a healthy body cavity. See how the cells are joined and form a barrier (hands held). The Scout cells and T4 cells are under the surface, but not on the lining of the pink parts. Sex happens. It could be oral sex, vaginal sex or rectal sex, it doesn't matter. The body fluid (either semen or cervical/vaginal secretions) gets into the body cavity. The body fluid has HIV germs in it. **HIV germs please go into the BODY CAVITY with your arms raised with fists.** The HIV germs are desperately looking for a CD4 receptor – in order to live. But, they can't find one. The pink parts don't have CD4 receptors and HIV can't infect them. They also can't reach the Scout cells or the T4 cells because the lining is intact. **Scout cells please wave your raised arms with open hands.** The HIV germs are dying.....dying.....dying.....dead. **HIV germs please run out of the body cavity.** The HIV germs are now just part of the wet spot on the sheet. CUT!

Any questions, any answers? Process responses.

**SCENE 2:**

Here is the same healthy body cavity. See how the cells are joined and form a barrier (hands held). The Scout cells and T4 cells are under the surface, but not on the lining of the pink parts. Sex happens. This time, STD germs are in the semen or cervical/vaginal secretions. Unlike HIV, STD germs do attack the pink parts and infect those cells. **STD germs please go into the BODY CAVITY and start paddling the joined hands of the pink parts. Pink parts should drop their hands after being struck.** This wakes up the Scout cells that rush into the cavity to fight off the STD germs. Now, let's say the person who owns this body cavity actually goes for care and gets treatment for the STD infection. The STD germs die. **STD germs please run out of the body cavity.** The Scout cells still hang out in the body cavity, because they're not really sure what is happening. Maybe, the STD germs are coming back? CUT!

Explain that STDs aren't the only things that cause Scout cells to come out into the body cavity. Things that cause inflammation, like douches, products, ectopy, etc. can have the same effect.

Any questions, any answers? Process responses.

**SCENE 3:**

Sex happens again. This time there are HIV germs in the semen/cervical vaginal secretions. **HIV germs please enter the body cavity with your raised fists.** This time, the HIV germs find their lifeline, the CD4 receptors on the Scout cells. **Scout Cell - please grab the fist of the HIV germ with your raised open hand.** The Scout cells are now infected. They go back to the submucosa and they take the HIV germs with them. **Attached Scout Cells and HIV germs please move to the submucosa.** There, they find the T4 cells and give some HIV to them. **HIV germs give the T4 cells your small yellow card with HIV written on them.** The T4 cells run to the

bloodstream to alert other immune cells to begin making antibodies – but HIV finds more CD4 cells to attach to in the bloodstream and this is how the bloodstream becomes infected. **T4 cells take the HIV card and run to the bloodstream.** Meanwhile, infected Scout cells remain in the submucosa. CUT!

Any questions, any answers? Process any responses.

---

#### **SCENE 4:**

Now, this is the body cavity of a person who is living with HIV/AIDS. The HIV is in the bloodstream in the T4 cells and also still in the Scout cells under the surface of the pink parts. The pink parts are healthy, with just a little HIV being shed. **Pink parts please join hands again and one HIV germ should stay in the cavity. The rest of the HIV germs please stay joined to the Scout cells in the submucosa.** Sex happens AGAIN. This time, a STD is in the semen or cervical/vaginal fluids. **STD germs please run into the body cavity.** The STD germs again attack the pink parts and destroy some of the lining. **Pink parts; please drop your joined hands. The Scout cells again come out to fight off the STD infection, but they bring the HIV germs with them.** So, more HIV is being shed out making it more likely to be passed to other sex partners – more communicable. Now, let's say that this person living with HIV/AIDS actually got STD testing and treatment. The STD germs will die. **STD germs please run out of the body cavity.** The Scout cells eventually go back to the submucosa and the amount of HIV germs in the body cavity goes down again. **Scout cells please take the HIV germs and go back to the submucosa. One HIV germ should stay in the body cavity.** So, by getting STD treatment, the person living with HIV/AIDS can reduce their chances of passing HIV to a sexual partner. CUT!

Any questions, any answers? Process responses.

#### **FINAL SCENE:**

Ask participants to come out of role now and to explain how the STD/HIV inter-relationships are like a double-edged sword. Ask participants what this information means for them. Ask how they could apply what they learned to their work with their clients.

## **STD/HIV INTER-RELATIONSHIPS**

### **Learning Objectives:**

Upon completion of this content the learner will be able to:

1. Describe the three main areas of inter-relationships between STDs and HIV.
2. List the determinants of infectivity for individuals and how they are altered in the presence of an STD.
3. Explain how the presence of an STD increases both susceptibility to and communicability of HIV.
4. Recognize how clinical providers should use this new information to change STD and HIV prevention practice patterns with clients.

This curricular outline was developed by the Part II. Health Behavior Training Center's Curriculum Committee of the National Network of STD/HIV Prevention Training Centers. This project was funded through a grant by the US Centers for Disease Control and Prevention.



National Network of STD/HIV Training Centers – Curriculum Committee  
STD/HIV Inter-relationships. Wd Date Written: 7/15/99 Page 1 of 6

## **STD/HIV INTER-RELATIONSHIPS**

New information has emerged about the increasingly complex inter-relationships between sexually transmitted diseases (STDs) and sexually transmitted HIV.

**Behavioral** – both STDs and HIV can be sexually transmitted by rectal, vaginal, and oral intercourse. The risk of transmission is greatest per coital episode of rectal intercourse and least for oral intercourse.

**Epidemiological** – populations with high rates of STDs demonstrate disproportionately high rates of sexually transmitted HIV, particularly among women.

**Immunological** – the presence of STDs cause changes in mucosal immunity, which facilitates HIV acquisition and transmission.

This new information should be used by clinicians to alter STD/HIV clinical practices and prevention strategies with clients. Clinicians need to provide clients with information to answer two essential questions:

**What factors determine whether an STD or HIV will be transmitted through a sexual exposure?**

**How does the presence of an STD affect those factors for both HIV seropositive and HIV seronegative persons?**

---

### **I. INFECTIVITY**

**A. Definition:** Infectivity is a term that refers to the probability of transmission (STD or HIV) from an infected person to an uninfected person after an exposure;

**B. Determinants:** Infectivity depends on three main factors, which can also be called the individual determinants of infectivity:

1. Viral (organism) dose – V
2. Blood/mucous membrane Exposure – E
3. Host factors/Resistance – R

## II. INFECTIVITY FORMULA – individual determinants

A. **The formula** for determining infectivity is:

$$\frac{\text{Viral Dose (V) X Exposure (E)}}{\text{Resistance (R)}}$$

**B. Organism dose (V)** refers the amount of organism present during a given exposure. For the purposes of understanding STD/HIV inter-relationships, organism dose will refer to how much HIV is present and so will be called viral dose throughout this module. Viral dose in relation to HIV depends on:

**1. Sexual practices** – sexual practice affects which body fluid is present. The following body fluids are known to contain high amounts of HIV and have been documented to have resulted in the sexual transmission of HIV:

- a) Blood
- b) Semen
- c) Cervico-vaginal fluids

The viral dose is clinically measured in the circulating blood when clinicians perform an HIV Viral Load test. The amount of HIV in a person's blood roughly corresponds to the amount of HIV in the person's semen or cervico-vaginal fluids (with notable exceptions), therefore HIV Viral Load in the blood is an indicator of the amount of virus in the semen or cervico-vaginal fluids at any given time. The amount of HIV present in these fluids varies with the clinical course of the infection and whether or not there is adherence and appropriate response to anti-retroviral therapy.

**2. Clinical course of disease of the infected partner** – from a clinical perspective, here are three main stages of HIV disease: 1) acute, primary stage, 2) asymptomatic, carrier stage, and 3) early disease/AIDS stage. Without anti-retroviral treatment, HIV viral load is elevated in the acute, primary stage and the early disease/AIDS stage and is lower during the asymptomatic, carrier stage.

**3. Anti-retroviral treatment** – anti-viral treatment can significantly lower the viral load in all three stages. Therefore, whether or not a sexual partner is adhering to an effective anti-retroviral treatment regimen can significantly affect Viral Dose.

C. **Exposure (E)** to STD/HIV depends on:

**1. Type of sexual exposure** – the type of sexual exposure affects the duration of the exposure, which influences infectivity. STDs and HIV are known to be “sexist”, in that women are more efficiently infected than men. However, this is a heterosexual perspective, in that gay men who are the receptive partners during rectal intercourse are also more efficiently infected than those who are the insertive partners. The duration of exposure refers to how long the organism can remain viable on mucous membrane

surfaces and thus capable of establishing infection after the sexual experience has ended. Organisms (STD/HIV) within semen ejaculated in the vagina or rectum can remain viable for up to 72 hours. In contrast, significant amounts of cervico-vaginal or rectal fluids are not introduced into the insertive male partner's urethra during rectal or vaginal sex. Thus the insertive male partner's urethra is only exposed during the act of intercourse itself – an average of 20 minutes per coital episode. In the case of the uncircumcised male however, fluids are retained under the foreskin and can remain viable for several hours. The longer the duration of exposure for a given sexual experience, the greater the infectivity.

**2. Number of sexual exposures** – even though vaginal receptive female partners are infected more efficiently per coital episode compared to insertive male partners, the male/female ration for reported cases of Gonorrhoea is roughly 1: 1. Insertive male partners can increase their risk of acquiring STD/HIV by having a greater number of sexual exposures.

**3. Chance that one's sexual partner is infected** – the type of sexual exposure and the number of exposures will not result in transmission unless the sexual partner is actually infected. This explains why risk behavior alone does not confer true risk.

The prevalence of STD/HIV in a given population as well as the partner's individual risk behavior(s) influences the chance that a selected sexual partner within a given population will actually be infected. STD core populations are known to have higher prevalence.

#### **D. Resistance**

**1. Resistance** is often thought of as systemic resistance, dependent on the humoral immune response. The humoral immune response is very important in determining the risk of progression of HIV to AIDS, but not as relevant to the risk of sexual transmission of HIV. The cellular immune response is increasingly recognized as being most critical and is sometimes referred to as “mucosal immunity”.

**2.** The mechanism of the establishment of HIV infection is clear. Specific proteins on the envelope of the HIV virus are known as “attachment proteins” – GP 120 and GP 160. These proteins have to bind to specific receptors known as CD4 receptors located on the cell membrane of human host cells in order for infection to occur. This binding reaction allows the HIV virus to enter the cell membrane and enter the nucleus of the cell where it proliferates. Any human cell with a CD4 receptor is a potential target cell for HIV infection.

#### **3. The presence of an STD:**

a) results in infection and desquamation of squamous or columnar epithelial cells, partially or completely exposing the submucosal layer of the mucous membrane forming clinically apparent or microscopic ulcerations;

b) results in an inflammatory cellular immune response which increases the recruitment of HIV target cells to the mucous membrane surfaces; HIV target cells include T4 lymphocytes and monocyte/macrophage cells that are present in the submucosa, as well as on the surface of the mucous membranes;

c) most strains of HIV in the United States are Type B, which has tropism for monocyte/macrophage cells. Infection occurs on the surface of mucous membranes and then is “carried” into the blood stream by the infected monocyte/macrophage cells.

### III. STD/HIV INTER -RELATIONSHIPS

#### A. For persons who are HIV seronegative, having an STD:

1. Increases the recruitment of HIV target cells to the surface of the mucous membranes, which significantly increases susceptibility to HIV transmission.
2. Decreases Resistance (R) by impairing mucosal immunity:

Viral Dose (V) X Exposure (E)

↓ Resistance (R)

#### B. For persons who are HIV seropositive, having an STD:

1. Increases the recruitment of HIV infected target cells to the surface of the mucous membranes, thus significantly increasing the HIV viral load of the genital secretions.
2. Increases HIV communicability by increasing Viral Dose (V):

↑ Viral Dose (V) X Exposure (E)

Resistance (R)

### IV. IMPLICATIONS FOR CLINICAL PROVIDERS

- A. Offer STD screening routinely to clients ages 15 – 35.
- B. Provide HIV behavioral counseling and offer HIV testing to all clients with an STD.
- C. Offer STD screening routinely to all clients who are living with HIV/AIDS.
- D. Screen and treat asymptomatic clients for STDs to prevent HIV transmission.
- E. Screen and treat asymptomatic HIV seropositive clients for STDs to prevent HIV transmission.

## V. REFERENCES:

- Centers for Disease Control and Prevention. (2007). *Prevention IS Care*. Materials available through CDC website ([www.cdc.gov/hiv/topics/treatment/PIC/order.htm](http://www.cdc.gov/hiv/topics/treatment/PIC/order.htm))
- Centers for Disease Control and Prevention. (1998). HIV prevention through early detection and treatment of other sexually transmitted diseases – United States. *Morbidity and Mortality Weekly Report*, 47 (RR-12).
- Cohen M, Frankel SS, et al. (2001). Chronic inflammation with increased human immunodeficiency virus (HIV) RNA expression in the vaginal epithelium of HIV-infected Thai women. *The Journal of Infectious Diseases*, 184, p 410-417.
- Cohen, MS and Pilcher, Christopher D. (2005). Amplified HIV transmission and new approaches to HIV prevention. *The Journal of Infectious Diseases*, 191, p 1391-1393.
- Ehrhardt, A & Wasserheit J. (1991). Age, gender, and sexual risk behaviors for sexually transmitted diseases in the United States, in Wasserheit, J et al (Editors) *Research Issues in Human Behavior and Sexually Transmitted Diseases in the AIDS Era*, p 97-121. American Society for Microbiology, Washington, DC.
- Fichorova, R, Tucker, LD, and Anderson, D. (2001) The molecular basis of nonoxynol-9 induced vaginal inflammation and its possible relevance to human immunodeficiency virus type 1 transmission. *The Journal of Infectious Diseases*, 184, p 418-428.
- Grosskurth, H et al. (1995). Impact of improved treatment of sexually transmitted diseases on HIV infection in rural Tanzania: randomised controlled trial. *The Lancet*, 346, p 530-535 (with Laga, M – accompanying Commentary, p 518).
- Hitchcock, PJ (1996). Screening and treatment of sexually transmitted diseases: an important strategy for reducing the risk of HIV transmission. *AIDS Patient Care and STDs*, 10 (3), p 10-15.
- Klein, J and Sato, A. (2000). Advances in Immunology: the HLA system (Part II or II). *The New England Journal of Medicine*, 343 (11), p 782-786.
- Laurence J. (1997). Preventing AIDS by targeting other STDs. *AIDS Patient Care and STDs*, 11 (4), p. 217-222.
- Medzhitov, R and Janeway, C. (2000). Advances in immunology: innate immunity (Part I of II). *The New England Journal of Medicine*, 343, p. 338-344.
- Moss, GB et al. (1995). Human immunodeficiency virus DNA in urethral secretions in men: association with gonococcal urethritis and CD4 cell depletion. *The Journal of Infectious Diseases*, 172, p 1469-1474.

- Olmscheid B and Boyle B. (2001) Behavioral interventions and host mucosal factors in the transmission of HIV. *The AIDS Reader*, p 238-262.
- O'Reilly, KR et al. (1996). International perspectives on individual and community approaches to the prevention of sexually transmitted disease and human immunodeficiency virus infection. *Journal of Infectious Diseases*, 174 (Supp 2), p S214-S222.
- Padian, N et al (1991). Risk factors for acquisition of sexually transmitted diseases and development of complications, in Wasserheit, J et al (Editors) *Research Issues in Human Behavior and Sexually Transmitted Diseases in the AIDS Era*, p 83-96. American Society for Microbiology, Washington, DC.
- Rebbapragada, A and Kaul, R. (2008). More than their sum in your parts: the mechanisms that underpin the mutually advantageous relationship between HIV and sexually transmitted infections. *Drug Discovery Today: Disease Mechanisms*, doi: 10.1016/j.ddmec. s007.12.003, p 1-10
- Reynolds, SJ and Quinn, TC. (2005). Developments in STD/HIV interactions: the intertwining epidemics of HIV and HSV-2. *Infect Disease Clinics of North America*, 19, p 415-425
- Rice, R et al. (1991). Sociodemographic distribution of gonorrhea incidence: implications for prevention and behavioral research. *American Journal of Public Health*, 81 (10), p. 1252-1258.
- Rothenberg, R. (1990). Analytic approaches to the epidemiology of sexually transmitted diseases. In Holmes, KK et al (Editors), *Sexually Transmitted Diseases*, 2<sup>nd</sup> ed. McGraw-Hill, New York 1990, p 37-42.
- Royce, R et al. (1997). Sexual transmission of HIV. *The New England Journal of Medicine*, 336 (15), p 1072-1078.
- Stein, ZA. (1996). Editorial: Family planning, sexually transmitted diseases, and prevention of AIDS – divided we fail? *American Journal of Public Health*, 86, p 783-784.
- St. Louis, ME et al. (1997). Editorial: Janus considers the HIV pandemic – harnessing recent advances to enhance AIDS prevention. *American Journal of Public Health*, 87 (1), p 10-12.
- Sullivan, AK et al. (1997). Factors facilitating the sexual transmission of HIV-1. *AIDS Patient Care and STDs*, 11 (3), p 167-177.
- Wasserheit, JN. (1992). Epidemiological synergy – interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. *Sexually Transmitted Diseases*, 19 (2), p 61-77.
- Wasserheit, JN. (1999). HIV infection and other STDs. So close and yet so far. *Sexually Transmitted Diseases*, 26 (10), p 549-550.

# **STD-HIV Connection**

## **The Double-edged Sword**

2010

CHBT 585-753-5481  
[www.urmc.rochester.edu/chbt](http://www.urmc.rochester.edu/chbt)

1

## **Understanding the Science of Communicable Disease Epidemics**

- **For Individuals**
  - Factors that determine a person's chance of getting or giving HIV/STDs
- **For Communities**
  - Factors that determine how fast HIV/STDs will spread in a given community

2010

CHBT 585-753-5481  
[www.urmc.rochester.edu/chbt](http://www.urmc.rochester.edu/chbt)

2

## For Individuals

### Infectivity – What are my chances if.....

– Depends on 3 Main Factors for all communicable diseases

- How Much Germ (Organism Dose)
- What Kind of Sex, How Often, and With Whom
- Mucosal Immunity of the Person Exposed

## The STD/HIV Connection

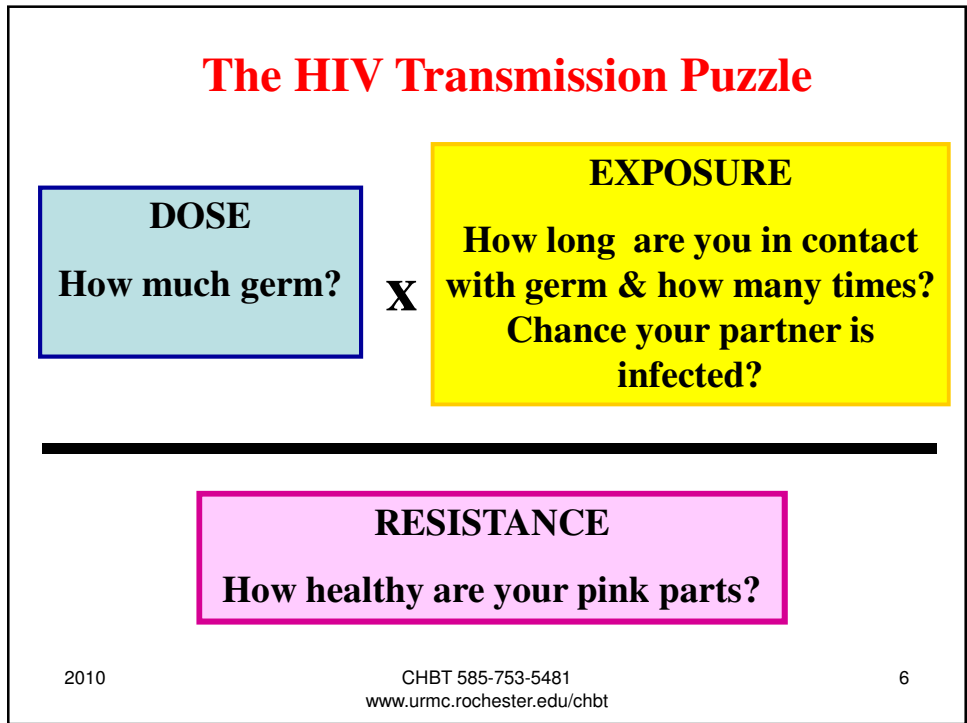
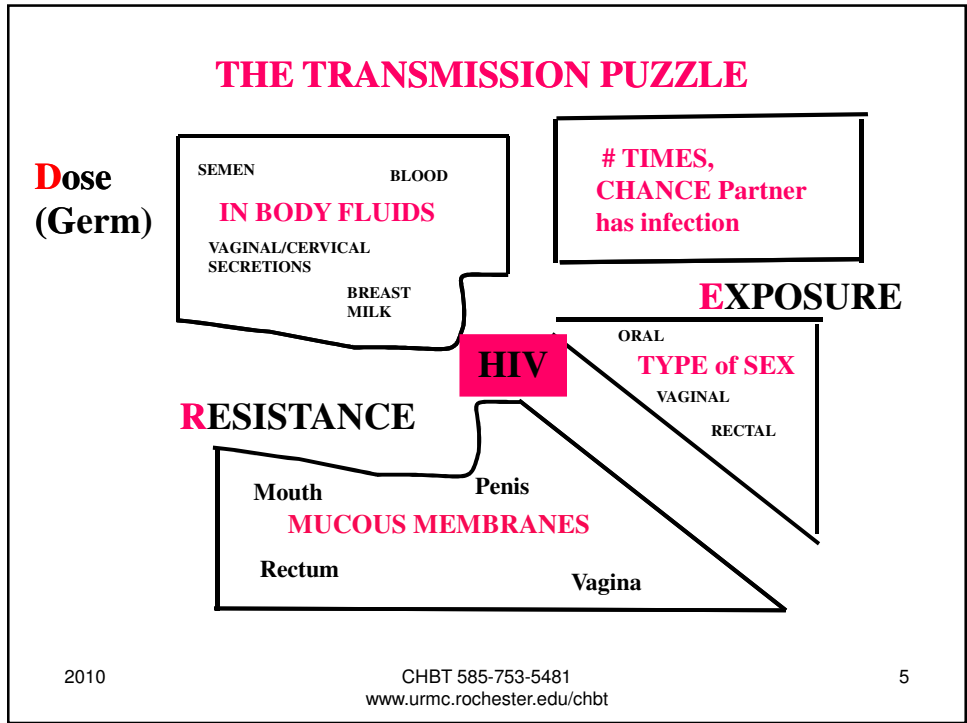
**Infectivity =**

**D – Organism Dose    X    E – Exposure**

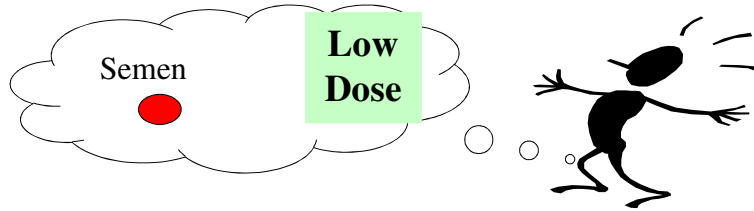
---

**R – Resistance**

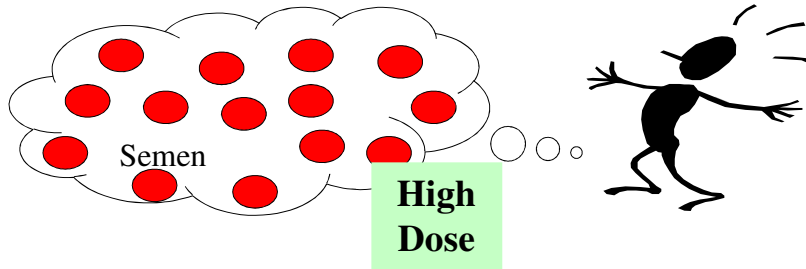




## The Transmission Puzzle



How much germ?



2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

7

## Germ Dose – How Much HIV?

Depends on type of fluid & the stage of HIV of the person you have sex with & whether the person also has an STD

### Which Fluid?

Semen    Blood  
Vaginal Discharge  
Breast milk

### HIV Stage?

Acute HIV    “Carrier”  
AIDS

### Is there a STD?

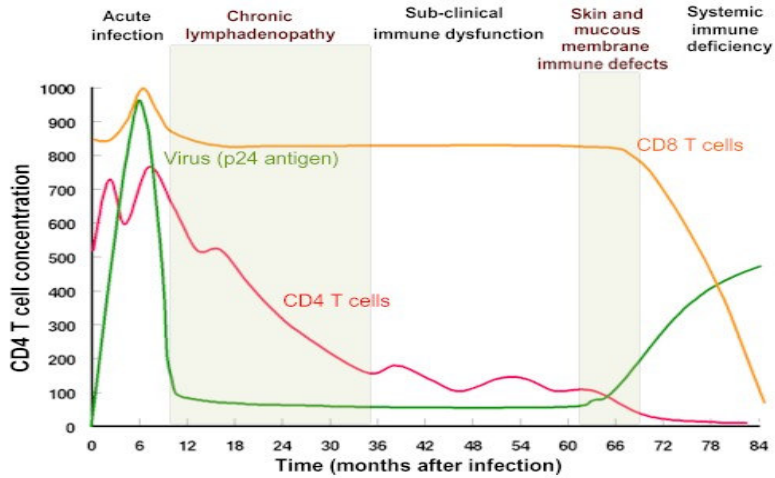
PLWH/A have more HIV in their genital secretions if they have another STD

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

8

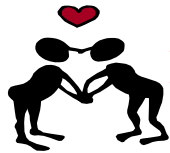
## Stage of HIV Infection



2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

9

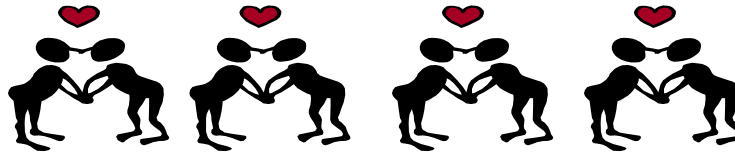


## Exposure – to the HIV Germ

**How long are you in contact with the germ?**

**How many times?**

**How likely is it that your partner has HIV or another STD?**



2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

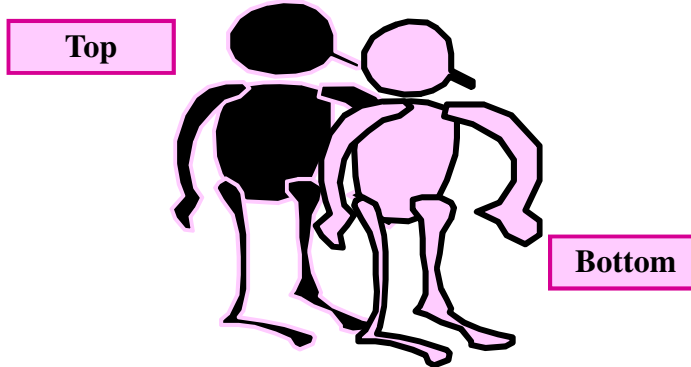
10

## Exposure – to HIV

### Duration – How long is the germ in my body?

Depends on type of sex: Rectal, vaginal, oral ...

Afterwards – who has the semen or genital secretions?



2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

11

## Exposure – to Germs

Germs can live in semen or genital secretions inside a body cavity (in contact with pink parts) – vagina or rectum – for:

STDs = up to 2 to 3 days after sex

HIV = up to 12-24 hours

**So, a person can be exposed for  $\frac{1}{2}$  to 3 days for each coital episode!**

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

12

## Exposure – to Germs

**That is why some kinds of sex are riskier than others**

**Duration of Exposure of HIV/STI greatest if:**

**Semen in rectum – hours to days**

**Semen in vagina – hours to days**

**Uncircumcised penis in rectum or vagina – hours  
(holds vaginal or rectal secretions)**

**Circumcised penis in rectum or vagina – minutes**

**Penis in mouth or mouth in vagina – minutes**

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

13

## Exposure – to Germs

**What are the chances the person I am having sex with has STD or HIV?**

Partner

A



**No high risk behaviors**  
**Recently tested neg**  
**Discussion**



Partner

B



**High risk behaviors**  
**Never tested**  
**No discussion**



2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

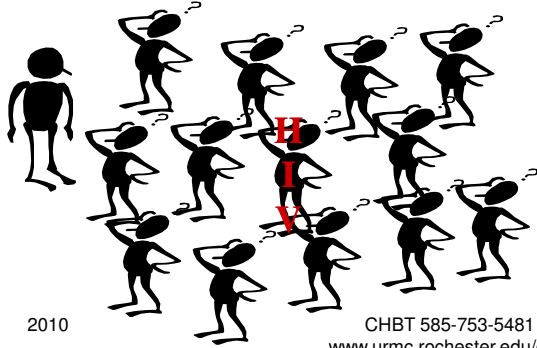
14

## Exposure – to Germs

### Why monogamy may not be low risk



Sex once/week with same partner  
for 3 months = 13 chances to get HIV



Sex once/week with  
13 different partners  
for 3 months = 1 chance  
to get HIV

2010

CHBT 585-753-5481  
[www.urmc.rochester.edu/chbt](http://www.urmc.rochester.edu/chbt)

15

## Resistance – to HIV



How healthy are my pink parts –  
the mucous membranes?

Pink parts = tissue inside the mouth, rectum, urethra, vagina

HIV infects certain types of white blood cells (WBCs) on pink parts – increased number if there is infection or inflammation

2010

CHBT 585-753-5481  
[www.urmc.rochester.edu/chbt](http://www.urmc.rochester.edu/chbt)

16

## The STD/HIV Connection – **Resistance**

**Resistance** – Immune Responses – that is

➡ Host factors – various, including

- Systemic (humoral)
- Mucosal (cellular)
- Genetic

➤ For STD/HIV sexual transmission, the focus is *mucosal immunity*

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

17

## **Mucous Membranes**

### **Oral**

- Mouth – Squamous
- Throat – Columnar

### **Vulva & Vagina**

- Vulva & Meatus – Squamous
- Urethra – Columnar
- Vagina – Squamous
- Cervix – Columnar

### **Penis**

- Meatus – Squamous
- Urethra – Columnar

### **Rectum**

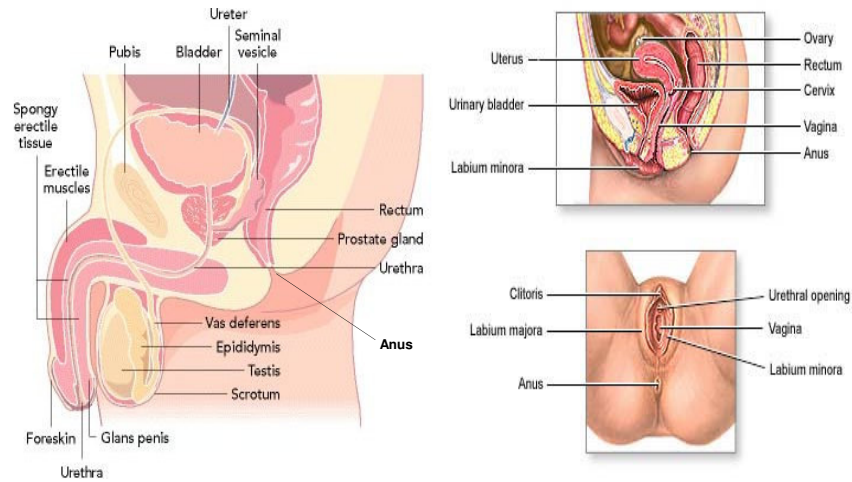
- Anus – Squamous
- Rectum – Columnar

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

18

## Mucous Membranes – “Pink Parts”



2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

19

## Male Foreskin

Uncircumcised penis



Circumcised penis



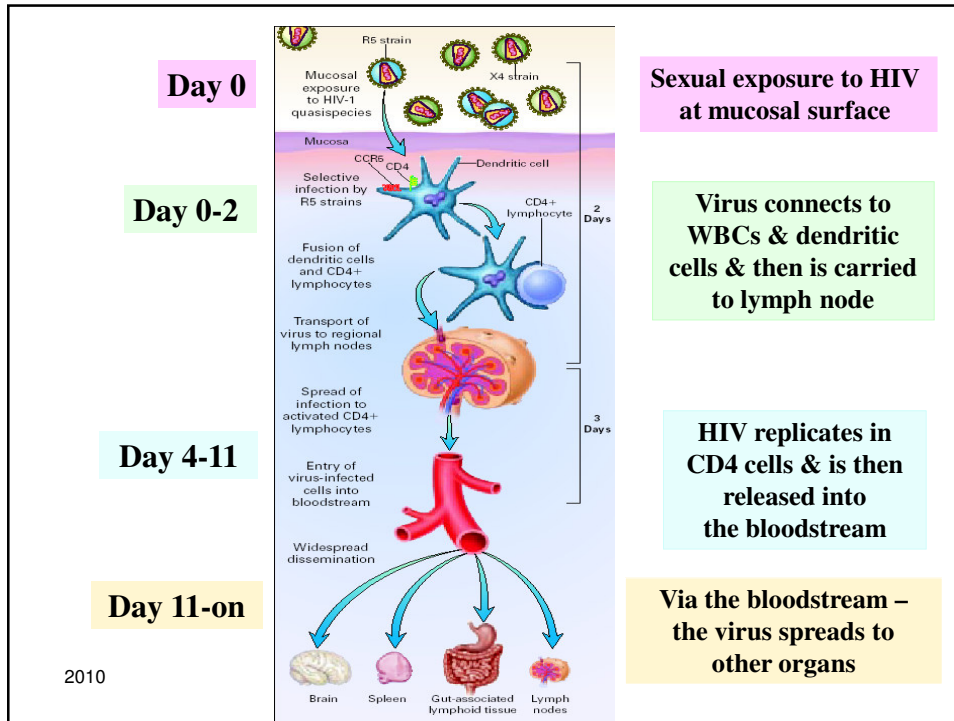
Rectal or Vaginal Secretions can remain  
**under the foreskin** for hours

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

20





## The Transmission Puzzle

**No sores or abrasions**

**No STDs or other source of inflammation – few WBCs**

**How healthy are my pink parts – the mucous membranes?**

**Sores – not intact**

**Has an STD or other source of inflammation – many WBCs**

2010
CHBT 585-753-5481  
www.urmc.rochester.edu/chbt
22

## Resistance – to HIV Structure Of Mucous Membranes

IgA antibodies Cytotoxic Lymphocytes	<b>Mucus Layer</b>
Langerhan Cells (Dendritic Cells)	<b>Squamous ~ or ~ Columnar Layer</b>
Monocytes/Macrophages T4 Lymphocytes	<b>Vascular Submucosa</b>

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

23

## HIV Positive ~ & ~ GC Infection \*

### Study of HIV rna in male urethras

• <b>No</b> Gonorrhea	6/35 (17%)	
• Gonorrhea ( <i>before</i> Rx)	21/48 (44%)	} p = 0.02
• Gonorrhea ( <i>after</i> Rx)	10/48 (21%)	

\* Moss et al (1995). *JID*, p 172

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

24

## STD/HIV Connection

### Mucosal Immunity

#### The presence of an STD

- Results in infection, breakdown of squamous tissue (desquamation) &/or columnar tissue (fissures, micro-abrasions, or ulcerations)
  - Inflammatory response – HIV target white blood cells increase in number on mucous membrane surfaces

## STD/HIV Connection

### Sexual Transmission of HIV

- In HIV sero-negative persons, having an STD **increases** the chances of HIV **acquisition**
- ~ & ~
- In HIV sero-positive persons, having an STD **increases** the chances of HIV **transmission**

## The Transmission Puzzle

Let's use some fake numbers to show how this works

$$\text{Chance of Infection} = 5 = \frac{\text{How much germ} = 5 \times \text{Number \& type of exposure} = 5}{\text{Resistance of pink parts} = 5}$$

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

27

## If you *don't* have HIV

If a sexual partner is shedding a lot of HIV, the chance of getting HIV goes up

$$\text{Chance} = 20 \uparrow = \frac{20 \times 5}{5}$$

Partner in Acute HIV Infection or has an STD

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

28

## If you *don't* have HIV

If you have sex with PLWHA a lot of times,  
your chance of getting HIV goes up

Chance = 10

$$\frac{5 \times 10 \uparrow}{5}$$

Applies to Tops and those having oral sex – the more  
times you do it, the higher your chances

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

29

## If you *don't* have HIV

If you have the semen in your rectum or  
vagina, your chance of getting HIV goes up

Chance = 10

$$\frac{5 \times 10 \uparrow}{5}$$

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

30

## If you *don't* have HIV

If you get an STD – your Resistance goes down  
& so your chance of getting HIV goes up

$$\text{Chance} = 25 \quad \frac{\boxed{5} \times \boxed{5}}{\boxed{1}}$$

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

31

## If you *don't* have HIV

If you get treated for an STD & recover, your  
resistance goes back up – so your risk of getting  
HIV goes down again

$$\text{Chance} = 5 \quad \frac{\boxed{5} \times \boxed{5}}{\boxed{5}}$$

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

32

## If you *don't* have HIV

If you get an STD, **your chance of giving HIV to your partner goes up**

Chance = 20

$$\frac{\uparrow 20 \times 5}{5}$$

The person's viral load for HIV is increased due to more WBCs (because of the STD)

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

33

## The STD/HIV Connection

### Double Edged Sword

If you don't have HIV & you get an STD – **your chance of getting HIV goes up**

If you do have HIV & you get an STD – **your chance of giving HIV to a sexual partner goes up**

2010

CHBT 585-753-5481  
www.urmc.rochester.edu/chbt

34

## Sexually Transmitted Diseases

- **Most STDs have signs & symptoms only about 2/3 of the time**
  - For those with ongoing risk – getting STD  
Screening every 3-6 months is a good way to keep the **“Pink Parts”** healthy
  - For those with ongoing risk – getting HIV  
Counseling & Testing is also recommended

**Protect your Pink Parts!**