

Human Sexuality October 7, 2009

STIs, HIV, and AIDS

- Sexually Transmitted Infections (STI) preferred over Sexually Transmitted Diseases (STD) because:
 - some infections are asymptomatic
 - “disease” implies “observable”
 - “disease” is stigmatizing

Who do STIs affect?

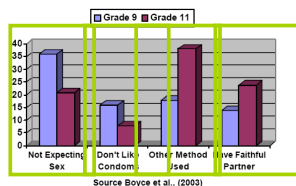
- Disproportionately affect adolescents
- Recent trends:
 - Highest rates of HPV in women under age 25
 - Gonorrhea rates highest in age group 15-24
 - HSV-2 affects 5-7% of all 15-19 year olds
 - Subgroups of adolescents at high risk for HIV (e.g., homeless youth, young gay men)

Why the increase in some STI rates?

- Better methods of detection
- Sex education promoting abstinence
- By promoting abstinence, programs neglect teaching about safe sex practices

Is the pill increasing one's chance of acquiring an STI?

Figure 9 Top Four Reasons Grade 9 and 11 Females Give for not Using Condoms at Last Intercourse (%)



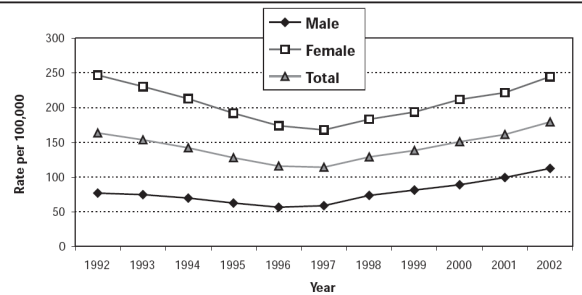
Reportable vs non-reportable STIs to Health Canada

- | | |
|---------------------|-------------------------|
| • Reportable | • Non-reportable |
| • Chlamydia | • HPV |
| • Gonorrhea | • HSV |
| • Syphilis | |
| • HIV/AIDS | |

Chlamydia

- Due to bacteria from sexual contact
- Symptoms:
 - Men: 50% asymptomatic
 - clear, thin discharge and mild discomfort
 - Women: 75% asymptomatic
 - Abdominal pain, abnormal discharge, bleeding between periods, low-grade fever, bleeding after intercourse, urge to urinate more than usual
- Provides an accurate and highly relevant indicator of adolescent sexual health behaviour in Canada

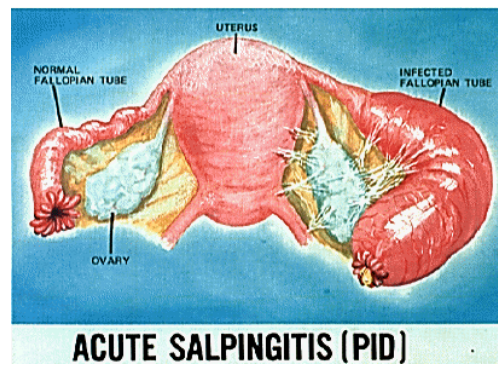
Figure 1: Reported (Genital) Chlamydia Rates¹ in Canada, 1992-2002²



¹Rate per 100 000 population. Population estimates provided by Statistics Canada.
²2002 numbers are preliminary, and changes are anticipated.
 Source: Public Health Agency of Canada, Centre for Infectious Disease Prevention and Control, Community Acquired Infections Division, Sexual Health and STI.

Chlamydia (cont.)

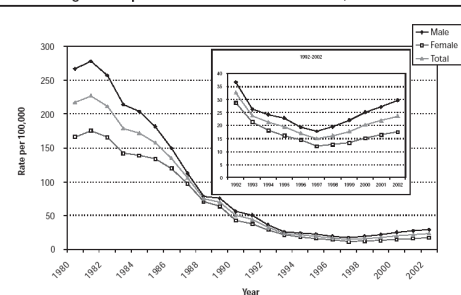
- Longterm effects:
 - Men: urethral damage, epididymis infection
 - Women: damage cervix, fallopian tubes, pelvic inflammatory disease, infertility
 - Increases susceptibility to HIV
- Prevention: vaccine in progress, use of a condom
- Treatment: curable with antibiotics



Gonorrhea

- One of the oldest STIs
- Due to bacterial infection and penile-vaginal intercourse
- Also transmitted through mouth, throat, anus, rectum, and eyes
- Prevalence:
 - dropped dramatically from 1980 to early 1990s
 - From 1997 – 2001 increase in men aged 30-39 by 68%
 - In 15-19 year olds, rate has increased from 1997 - 2001

Figure 1: Reported Gonorrhea Rates¹ in Canada, 1980-2002²



¹Rate per 100 000 population. Population estimates provided by Statistics Canada.
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 Source: Public Health Agency of Canada, Centre for Infectious Disease Prevention and Control, Community Acquired Infections Division, Sexual Health and STI.

Gonorrhoea (cont.)

- Symptoms:
 - In men: pus-like substance from urethral meatus
 - In women: invades cervix but can spread to urethra, anus, and rectum
- Treatment: women are asymptomatic early so many do not receive treatment until late
 - Antibiotics
 - Recent resistance to common antibiotics

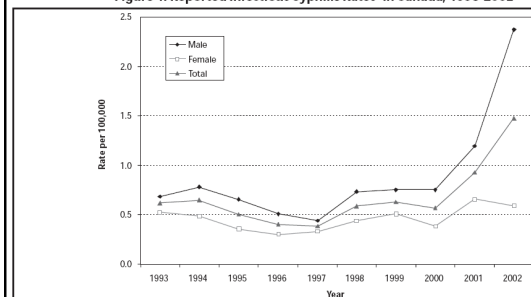
Highly contagious

- In a woman: 50% chance of contracting gonorrhoea with one exposure
- In a man: 25% chance of contracting gonorrhoea with one exposure
- Prevention: latex condoms

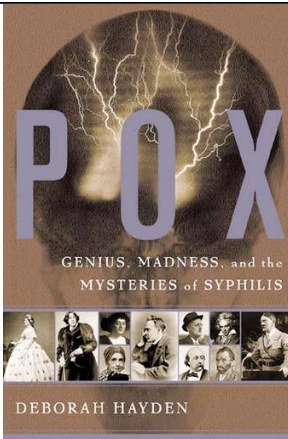
Syphilis

- Very old STI
- Due to bacteria
- Can be transmitted through genital contact but also cut in the skin or touching chancres
- Very common in Vancouver sex-trade
- Increases susceptibility to HIV
- Can lead to cognitive impairment and death

Figure 1: Reported Infectious Syphilis Rates¹ in Canada, 1993-2002²



¹Rate per 100 000 population. Population estimates provided by Statistics Canada.
²2002 numbers are preliminary, and changes are anticipated.
 Source: Public Health Agency of Canada, Centre for Infectious Disease Prevention and Control, Community Acquired Infections Division, Sexual Health and STI.



- Christopher Columbus
- Beethoven
- Abraham Lincoln
- Van Gogh
- Adolph Hitler

Syphilis (cont.)

- Symptoms:
 - 1st stage: chancre sore on cervix, mouth, external genitals
 - 2nd stage: 1-6 months later: hair loss, generalized rash
 - 3rd stage: latent; no symptoms of bacteria, but still very active in blood vessels, CNS, and bones
 - After 1st year, no longer infectious unless during pregnancy
 - Late stage: heart and major blood vessels & brain attacked
- Completely curable with a single dose of penicillin

Contagious

- 1/3 of individuals are infected with one exposure
- Prevention: avoiding contact with chancre sore of an infected person

Herpes Simplex Virus

- Non-reportable virus
- 2 types:
 - HSV I & HSV II
- Infectious all the time, but especially during an outbreak
- Can remain dormant for lifetime
- 20% of Canadians have HSV-II

Transmission

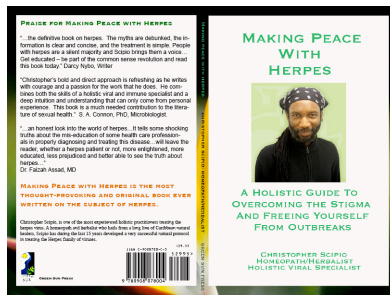
- Sexual contact with infected person
- Can be transmitted via oral sex
- Latex condoms can reduce the risk of genital herpes by 30%, but only when the infected areas are covered or protected by the condom

Herpes (cont.)

- No treatment / No cure
- Acyclovir reduces recurrences and transmissibility
- Long-term consequences:
 - Scarring can lead to meningitis or urethra damage
 - Increases risk of contracting HIV
 - Transmitted to infant during childbirth → serious illness or death

Herpes and Stress

- Significant increase in outbreaks with stress
- Holistic healing and natural remedies to reduce herpes outbreaks, severity



Christopher Scipio

Human Papilloma Virus (HPV)

- Most common STI
- Viral transmission
- Symptoms:
 - May cause local cell proliferation which can develop into plantar or common warts
 - Warts internally or externally on genitals or on extragenital areas (face, oral cavity)
- Most sexually active people will be exposed to HPV
- **condoms reduce the risk but do not eliminate spread of HPV

HPV and cervical cancer

- 40 types of HPV
 - 13 are considered oncogenic (i.e., cancer-causing)
- Persistent infection with high-risk HPV established as a necessary cause of cervical cancer
 - HPV DNA found in 99.7% of cervical cancer patients

Cancer type and HPV involvement

Cervix	100%
Anus	88%
Vulva	55%
Vagina	54%
Tonsil	51%
Conjunctiva	50%
Penis	42%
Larynx	25%
Oral	22%
Nasal	22%

Financial burden

- Annual B.C. cost associated with HPV infection:
- Women: \$43.3 million
- Men: \$6.8 million

\$50.1 million

Gardasil

- Tetravalent HPV 16,18, 6, 11
 - 16,18: 70% of cervical cancers
 - 6,11: 90% of genital warts
- Produces high level immunity in host
- No viral DNA
- Approved in Canada and Europe
- Started 2008-9 school year for grades 6 and 9

HPV Vaccine

- N = 2391 adolescents aged 16-23
 - Half received placebo
 - Followed for 4 years
- Placebo group: 750 → 111 developed HPV → 12 developed cervical cancer
- Vaccine group: 755 → 7 developed HPV → none developed cancer
- HPV virus-like particle (VLP) vaccine has demonstrated effectiveness in preventing persistent HPV infection

(Mao, 2006)

The Bivalent HPV Vaccine Prevents High Grade Cervical Lesions HPV PATRICIA Study Group, Lancet 2007

- Interim analysis of a Phase III multinational trial
- N = 18 644 ♀; 15 - 25 yo
 - Recruitment 2004-5
 - Inclusion: ≤ 6 lifetime sexual partners, using contraception, intact cervix
- Randomized to bivalent HPV vaccine vs Hep A vaccine
- Goal of the interim analysis: Compare rates of
 - CIN 2, 3
 - in women who were seronegative and DNA - at month 0
 - Invasive Squamous Cell Carcinoma
 - Adenocarcinoma in situ

Paavonen et al. Efficacy of a prophylactic adjuvanted bivalent L1 virus-like-particle vaccine against infection with human papillomavirus types 16 and 18 in young women: an interim analysis of a phase III double-blind, randomised controlled trial. Lancet. The 2007;369(9550):216-221.

The Bivalent HPV Vaccine Prevents High Grade Cervical Lesions

Summary Of Results

- Vaccine Efficacy
 - vs CIN 2 + --- 90.4 % ($p < 0.0001$)
 - vs. CIN 1 --- 89.2 % ($p < 0.0001$)
 - vs. 6 month persistent infection --- 80.4 %
 - vs 12 month persistent infection --- 75.2 %
- Partial cross Protection vs other oncogenic strains
 - Decreased 6 month persistent infection with HPV 31, 45, 52
 - Broad protection vs all 14 strains at 12 month mark

Paavonen et al. Efficacy of a prophylactic adjuvanted bivalent L1 virus-like-particle vaccine against infection with human papillomavirus types 16 and 18 in young women: an interim analysis of a phase III double-blind, randomised controlled trial. *Lancet*. The 2007;369(9580):2161.

The Tetravalent HPV Vaccine Prevents High Grade Cervical Lesions

Design

- Phase III multinational DBPCRC Trial
 - Europe 65%, Latin America 26 %
- N = 12 167 † 15 - 26 yo
 - No more than 4 lifetime sexual partners
 - No previous abnormal PAPs
- Tetravalent vaccine vs Placebo
- Sponsored by Merck
- Primary composite end point:
 - CIN 2 +
 - Adenocarcinoma in situ
 - Cervical SCC related to HPV 16 & 18

FUTURE 2. (2007). Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions. *New England Journal of Medicine*. the. 356(19). 1915.

The Tetravalent HPV Vaccine Prevents High Grade Cervical Lesions

Summary of Findings:

- 95% Efficacy for prevention of High Grade Lesions related to HPV 16 & 18
 - 98 % Efficacy if virus Naive
 - No prior abnormal PAP
 - No evidence of HPV 16 and 18 infection
 - 95% Efficacy (effectiveness?) with incomplete / incorrectly timed dosing
- Vaccine Efficacy is poor in patients with prior HPV 16, 18 exposure (44%)
- Immunogenicity remains high up to 24 months

FUTURE 2. (2007). Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions. *New England Journal of Medicine*. the. 356(19). 1915.

Current Status of HPV Vaccine in Canada

- Gardasil approved by Health Canada for women between 9-26yrs
- Given in 3 doses over 6 months
- Total cost ~\$400
- Huge media campaign to raise awareness



VOLUNTEER WITH US

- Looking for *women*
- 16-26 years old
- Study being conducted in Vancouver, BC
- Testing a new HPV vaccine for it's effectiveness



Consider Volunteering

Please call the HPV Recruitment Centre
604-875-2424 ext 4878
HPVStudy@cw.bc.ca

Barriers to implementing HPV vaccine

- **Aim:** vaccinate preteens before they are sexually active (age 9-12 boys and girls)
- Successful implementation into school programs will depend on:
 - Parents willingness to administer it to preadolescent children
 - Physicians willingness to suggest this to parents

Concerns about widespread HPV vaccination

- Possible adverse reactions
- Unknown long-term effects
- Religious opposition: Does administering an “STI vaccine” promote premarital sexual activity?
- Related to profit for the drug company

What is HIV/AIDS?

- HIV = human immune deficiency virus is the virus that causes AIDS = Acquired Immune Deficiency Virus
- A retrovirus that destroys the body's own immunity
- A reportable disease in B.C.

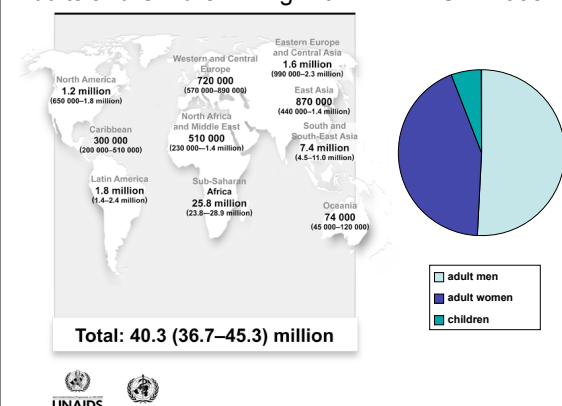
Features of the HIV retrovirus

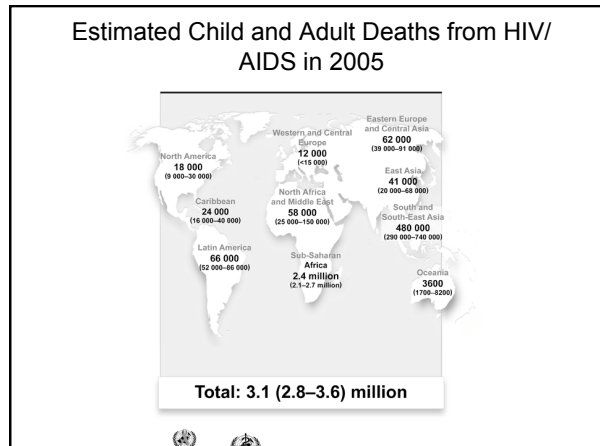
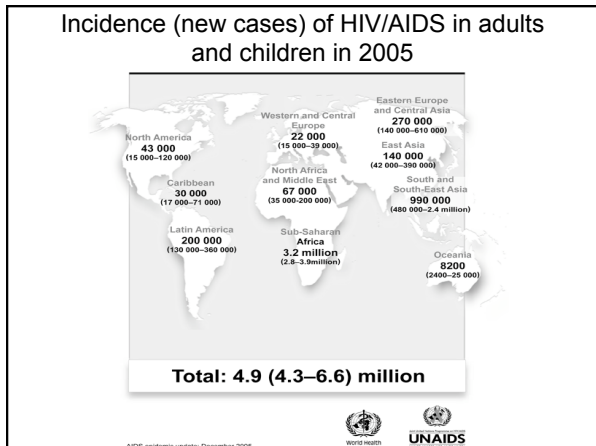
- Replicate backwards:
RNA → ssDNA → dsDNA → RNA → protein synthesis
- Steps: attachment to T cell receptor → fusion with cell membrane → penetration → uncoating → **reverse transcription** → DNA synthesis → migration to nucleus → **integration into host nucleus** → viral transcription → **protein synthesis** → RNA packaging and virion reassembly and reencapsulation → budding against cell membrane → release of virions
- Enzymes involved: **reverse transcriptase, integrase, protease**

Prevalence

- In the world
 - 40.3 million adults and children currently living with HIV/AIDS
- In Canada (Health Canada, 2005)
 - 61,000 Canadians living with HIV
 - An increase of 12% since 1999
 - 15,000 Canadians are infected with HIV and do not yet know

Adults and Children living with HIV/AIDS in 2005





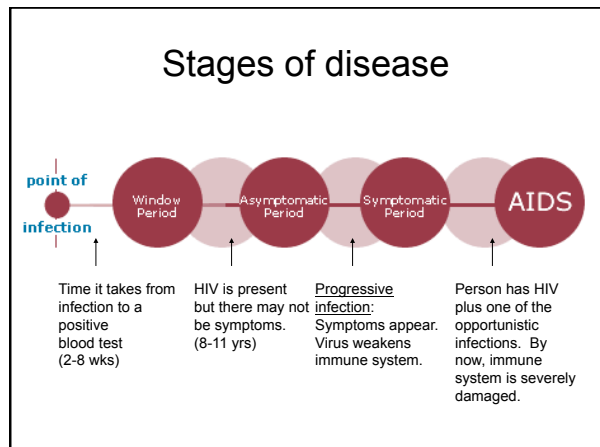
- ### Modes of Transmission
- Sexual intercourse
 - Includes penile-vaginal and anal
 - (Some evidence for oral sex)
 - Contaminated blood
 - Accidents, blood transfusions
 - Hypodermic needles
 - Injection drug use, accidents
 - Pregnancy and childbirth
- For both partners!*

- ### What does not lead to HIV transmission?
- Saliva
 - Urine
 - Tears
- As long as they are not mixed with blood*
- Kissing, hugging, cuddling, body rubbing, masturbation, or massaging
 - Rimming
- As long as neither giver nor receiver have cuts/abrasions*

Is HIV/AIDS only in the gay community?

Positive HIV test reports in adults (15 or over) by exposure category

Exposure Category	Male		Female	
	2004	Cumulative total until June 2005	2004	Cumulative total until June 2005
Men who have sex with men (MSM)	558	17,225	-	-
MSM and injection drug use	29	691	-	-
Injection drug use	141	3,315	99	1,550
Blood/blood products	7	622	5	209
Heterosexual contact	198	2,512	199	2,134
Other	29	574	8	195
No identified risk/no reported risk	860	19,832	352	4,478
Total	1,822	44,771	663	8,566



Opportunistic infections



Kaposi's sarcoma = vascular malignancy first seen on the skin or mucous membranes

Treatment

4 classes of drugs:

1. Nucleoside Reverse Transcriptase Inhibitors – chemically modified nucleosides are incorporated which prevents replication
 - E.g., AZT, DDI
2. Non-nucleoside Reverse Transcriptase Inhibitors
 - Attach directly to reverse transcriptase to prevent translation from RNA into DNA
3. Protease inhibitors
 - Attack the viral enzyme, protease
 - E.g., Lopinavir, Indinavir
4. Fusion Inhibitor
 - Target and block how HIV enters the CD4 cell

Psychological aspects of HIV/AIDS

- Can be equated to the experience of having a fatal illness diagnosis
- Process of reaction: denial, anger, depression
- The stigma
- Common psychological reactions: dysphoria, anxiety, and new onset depression
- www.aidsvancouver.org has support groups throughout the lower mainland

Barebacking

- Bug chaser: a gay man who deliberately attempts to contract HIV by having unprotected sex with a man/men who are known to have HIV
- Gift-giver: an HIV positive gay man who deliberately transmits HIV, often to bug chasers
- Bug party: sex parties where unsafe sex with every participant is encouraged. (1) One member is HIV positive but his status unknown to the group; (2) One member is not HIV positive and others are or may be

Why the wish for HIV?

- The chase is pragmatic: HIV is inevitable so welcoming the virus is a way to take control
- It is the ultimate taboo = erotic appeal
- A way to feel part of a cohesive group
- Want to be like HIV+ lover
- An anxiety disorder propelled by fear of contracting HIV. Contraction relieves them of anxiety

Cognitive-behavioural coping skills groups for individuals with HIV/AIDS

- 10 session cognitive behavioural stress management tested in a dozen studies with HIV + men
- Findings:
 - Sig improved mood, anxiety, and distress
 - Sig improved positive reframing and acceptance
 - Sig improved social supports
 - Sig decreased HSV-2 antibody titers
 - Sig reduced cortisol and norepinephrine
 - Sig increased testosterone and DHEA-S (independent of cortisol)

What are my actual risks of contracting an STI?

- HPV prevalence in women: 20-33% Highly contagious
- HSV prevalence in men and women: 20% F: 0.2% chance
M: 0.05% chance
- HIV/AIDS: 56,000 / 32,440,000 F: 0.1-20%; M: .01-10%
 - 0.17% of Canadians have HIV/AIDS
- Chlamydia (age 20-24): 981 / 100,000
 - 1.0%
- Gonorrhea (age 20-24): 93 / 100,000 Highly contagious: F: 50% with 1 exposure
M: 25% chance with 1 exposure
 - 0.09%
- Syphilis (age 20-24): 1.9 / 100,000 30% in M and F
 - 0.002%

Do condoms help?

- Chlamydia (and possibly Gonorrhea): impermeable
- Syphilis: need to cover chancres
- Herpes: decreased risk but sores can be difficult to find
- HPV: can pass through condoms (but do reduce risk)
- HIV: decrease risk by 87% in hetero contact

Safer Sex

- There is no absolutely safe sexual practice
 - A harm reduction approach
1. If you are sexually active, have sex in a stable, faithful, monogamous relationship
 2. If you have > 1 partner, use latex condoms
 3. If you might be infected, abstain from sex, always use a condom, or consider other kinds of sex
 4. Do not have intercourse with someone who has had many partners unless they have been tested
 5. Do not have anal intercourse if your partner is infected
 6. If you might be infected, have a blood test
 7. Think carefully before getting pregnant

Where to get STI testing in BC

- www.optionsforsexualhealth.org clinics
- BC Centre for Disease Control clinics
 - 655 West 12th Ave
 - 2450 Ontario Street
 - 1170 Bute
 - 569 POWELL ST
- Your family doctor