let's talk science

Let's Talk About Sex

with **Kaity, Amy, Laila & Brianna**

THE UNIVERSITY OF BRITISH COLUMBIA

University of Victoria

Disclaimer - we aren't doctors haha :)

- We are second year medical students
- We are not physicians or experts in this field

Let's Talk Science - What is it?

Non-profit, national organization

UBC and UVic affiliated

Focused on providing education to communities in sciences, technology, engineering and mathematics

Outline

1. Sex & Gender
2. Hormone Cycles
3. Contraception & Protection
4. Sexually Transmitted Infections

Sex & Gender

Sex

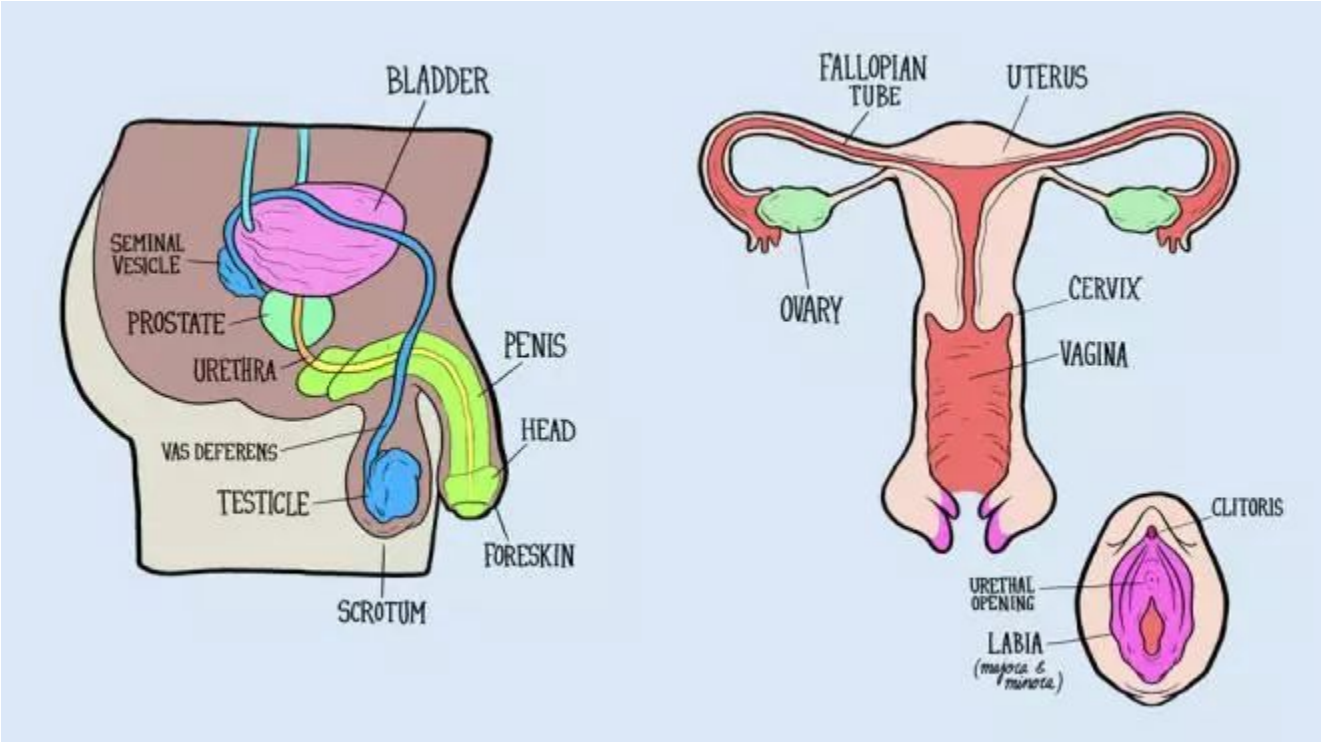
Typically refers to how someone is assigned at birth given their anatomy and chromosomes/genetics

- Male
  - Born with testes and a penis
- Female
  - Born with a uterus and a vagina
- Intersex
  - Born without a clear differentiation between male and female anatomically or genetically

Important: this does <u>not</u> necessarily dictate their gender identity

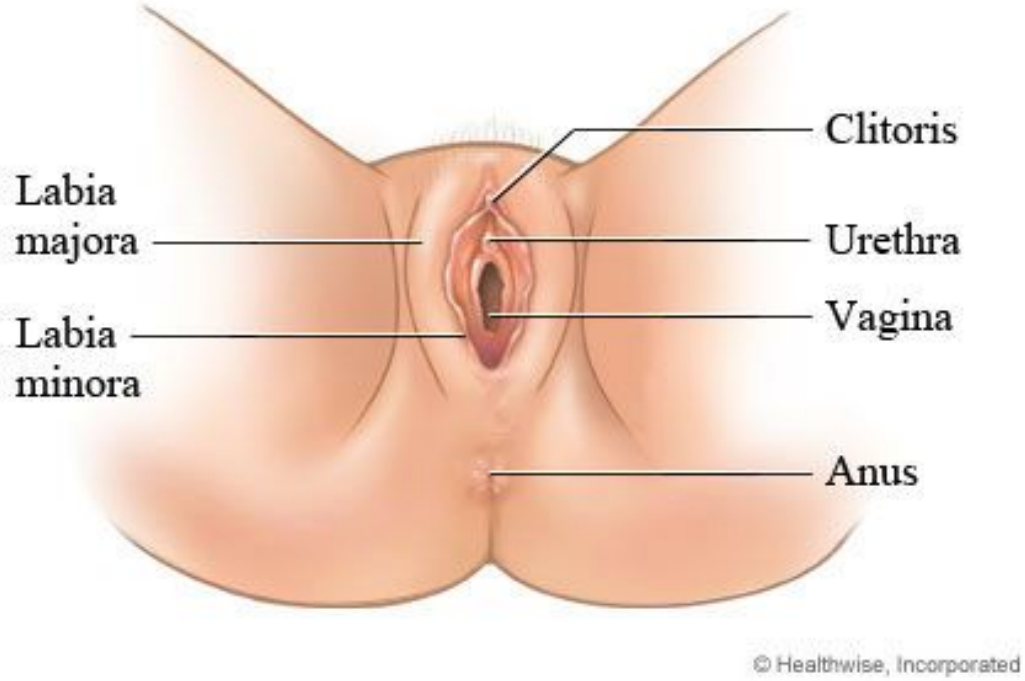
http://www.sexandu.ca/lgbttq/gender-identity/

Male and Female Anatomy



http://www.medicaldaily.com/male-and-female-reproductive-systems-harder-label-some-others-271039

More Detailed Female Anatomy



https://myhealth.alberta.ca/Health/Pages/conditions.aspx?hwid=tp9815

Gender Identity

Someone's most "inner concept" of if they are male, female, in between or neither

Cisgender: the sex assigned at birth matches the gender identity

Transgender: the sex assigned at birth does not match the gender identity

... And more

Important: Gender identity does <u>not</u> dictate your sexual orientation or attraction

https://www.hrc.org/resources/sexual-orientation-and-gender-identity-terminology-and-definitions

Sexual Orientation

Sexual orientation often refers to sexual attraction

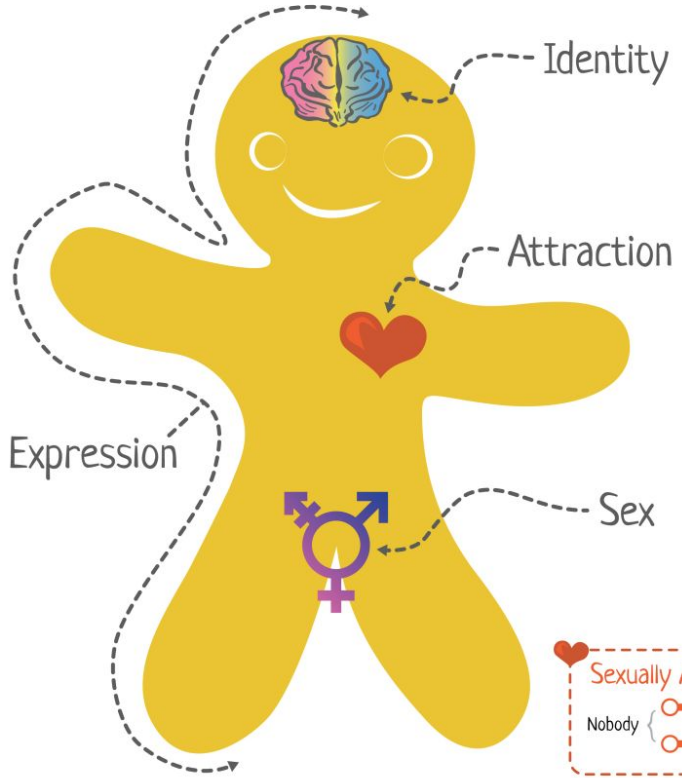
- **Heterosexuality**
  - Attraction between people of opposite sex or gender
- **Homosexuality**
  - Attraction between people of the same sex or gender
- **Bisexuality**
  - Attraction to both males and females
- **Pansexuality**
  - Attraction to all sexes or genders
- **Asexuality**
  - No sexual attraction to any sexes or genders

http://www.sexandu.ca/lgbttq/sexual-orientation/

The Genderbread Person v3.3

by it's pronounced METROsexual .com

Gender is one of those things everyone thinks they understand, but most people don't. Like *Inception*. Gender isn't binary. It's not either/or. In many cases it's both/and. A bit of this, a dash of that. This tasty little guide is meant to be an appetizer for gender understanding. It's okay if you're hungry for more. In fact, that's the idea.



Plot a point on both continua in each category to represent your identity; combine all ingredients to form your Genderbread

4 (of infinite) possible plot and label combos

Gender Identity

⊘ indicates a lack of what's on the right

Woman-ness

Man-ness

How you, in your head, define your gender, based on how much you align (or don't align) with what you understand to be the options for gender.

"woman" "man" "two-spirit" "genderqueer"

Gender Expression

Feminine

Masculine

The ways you present gender, through your actions, dress, and demeanor, and how those presentations are interpreted based on gender norms.

"butch" "femme" "androgynous" "gender neutral"

Biological Sex

Female-ness

Male-ness

The physical sex characteristics you're born with and develop, including genitalia, body shape, voice pitch, body hair, hormones, chromosomes, etc.

"male" "female" "intersex" "MtF Female"

Sexually Attracted to

Nobody { (Women/Females/Femininity) / (Men/Males/Masculinity)

Romantically Attracted to

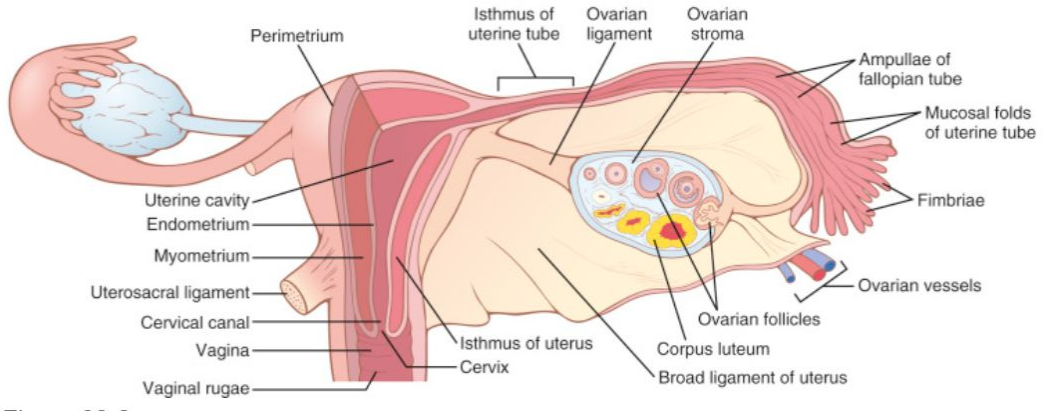
Nobody { (Women/Females/Femininity) / (Men/Males/Masculinity)

In each grouping, circle all that apply to you and plot a point, depicting the aspects of gender toward which you experience attraction.

For a bigger bite, read more at http://bit.ly/genderbread

Female Hormone Cycle

Ovarian Physiology



Women are born with all of the eggs they will have in their lifetime

From birth onwards, primary follicles (eggs) undergo apoptosis (self-death)

- At birth, ~**2 million** follicles
- By puberty (avg 13 yrs; range: 10.5-15.3), ~**400,000** remain
- Average female will ovulate **500x** in her lifetime
- Menopause (avg 51 yrs): 12 months of no menstrual cycles
- Post-menopause: 0 eggs

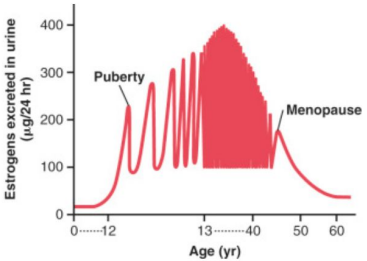
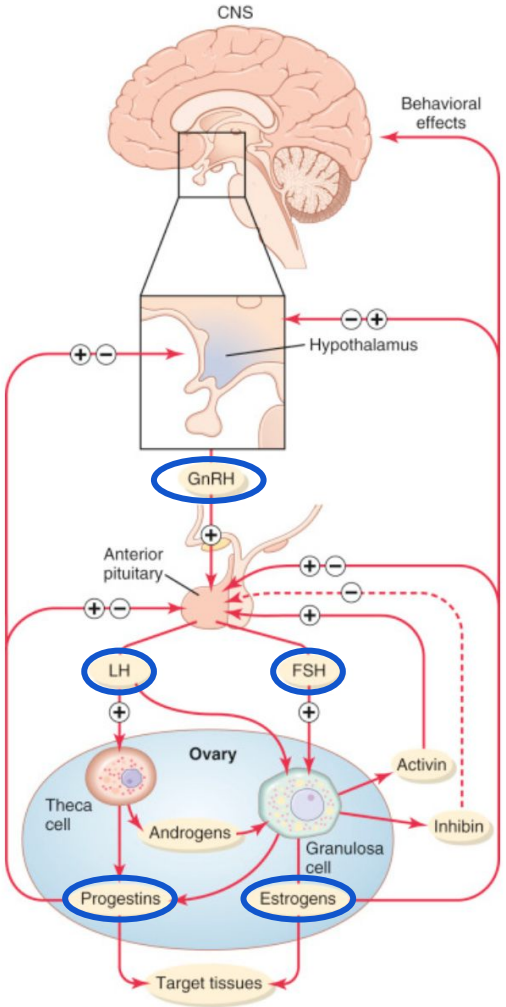


Figure 82-13

Estrogen secretion throughout the sexual life of the female human being.

Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

Hormonal Players



GnRH = Gonadotropin Releasing Hormone

LH = Luteinizing Hormone

FSH = Follicle Stimulating Hormone

Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

Ovarian Cycle

3 Phases:

1. Follicular phase
2. Ovulatory phase
3. Luteal phase

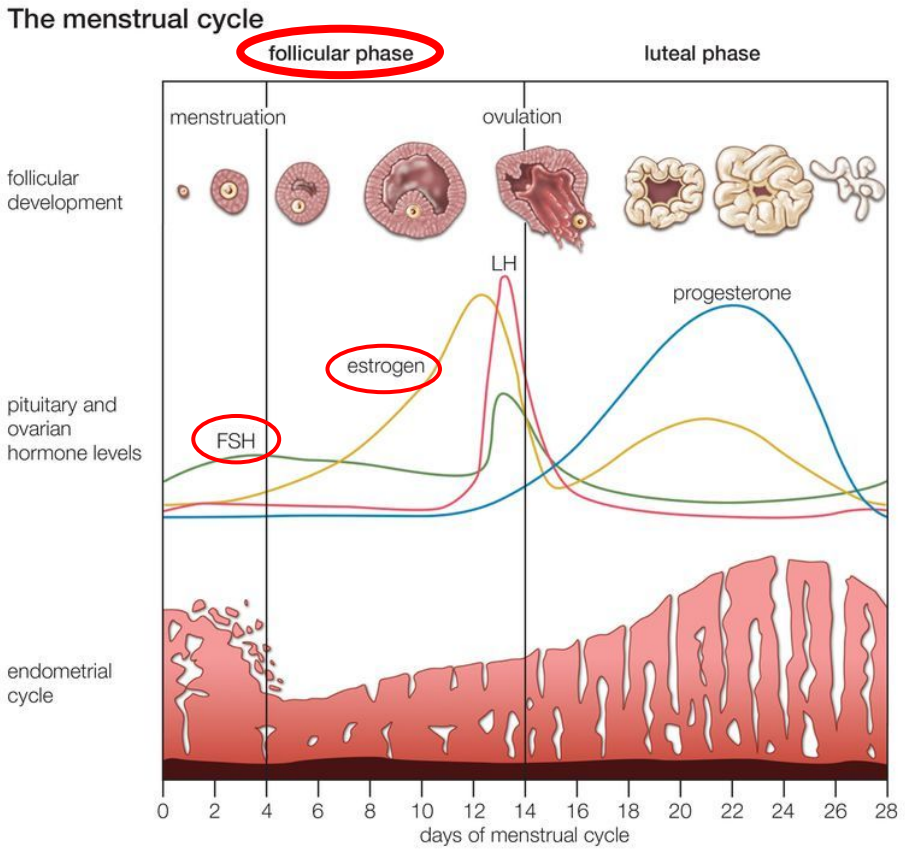
1. Follicular Phase

- Increase in Estrogen

- Initial increase in FSH leads to estrogen production, and eventually a spike

LH = Luteinizing Hormone

FSH = Follicle Stimulating Hormone



Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

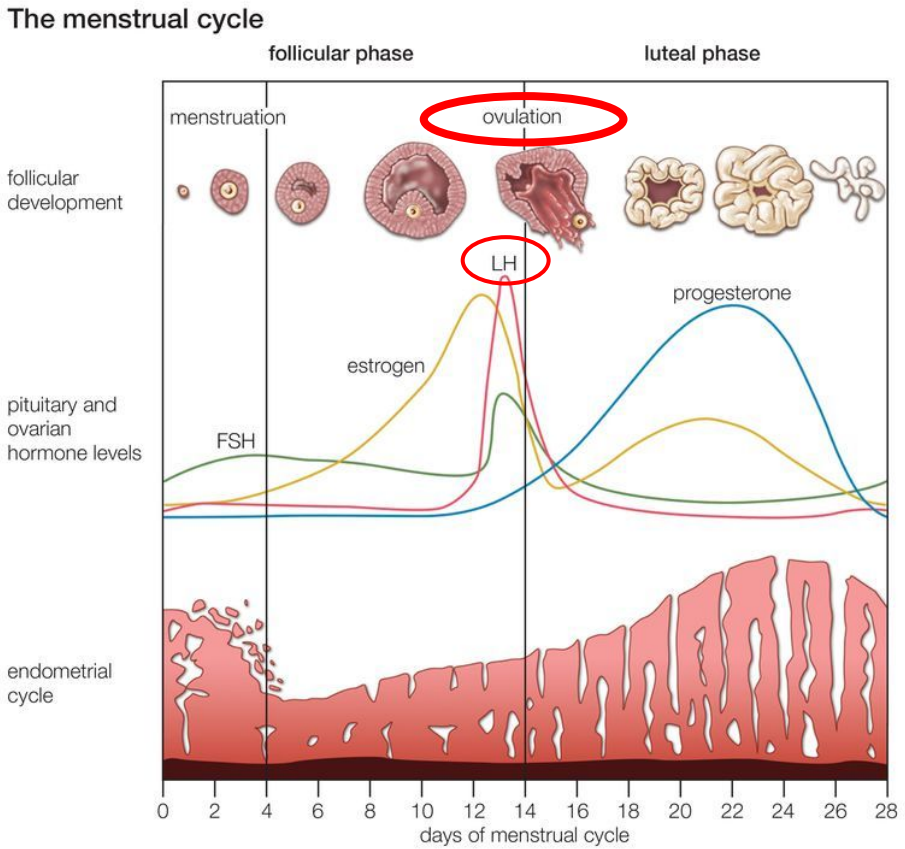
2. Ovulatory Phase

- Increase in Luteinizing Hormone
- Ovulation

- Spike in estrogen level leads to POSITIVE FEEDBACK (normally negative) on anterior pituitary, and leads to a spike in LH
- 1-2 days after the LH surge, ovulation occurs
- Progesterone levels increase in response to luteinizing hormone

LH = Luteinizing Hormone

FSH = Follicle Stimulating Hormone



Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

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LH = Luteinizing Hormone

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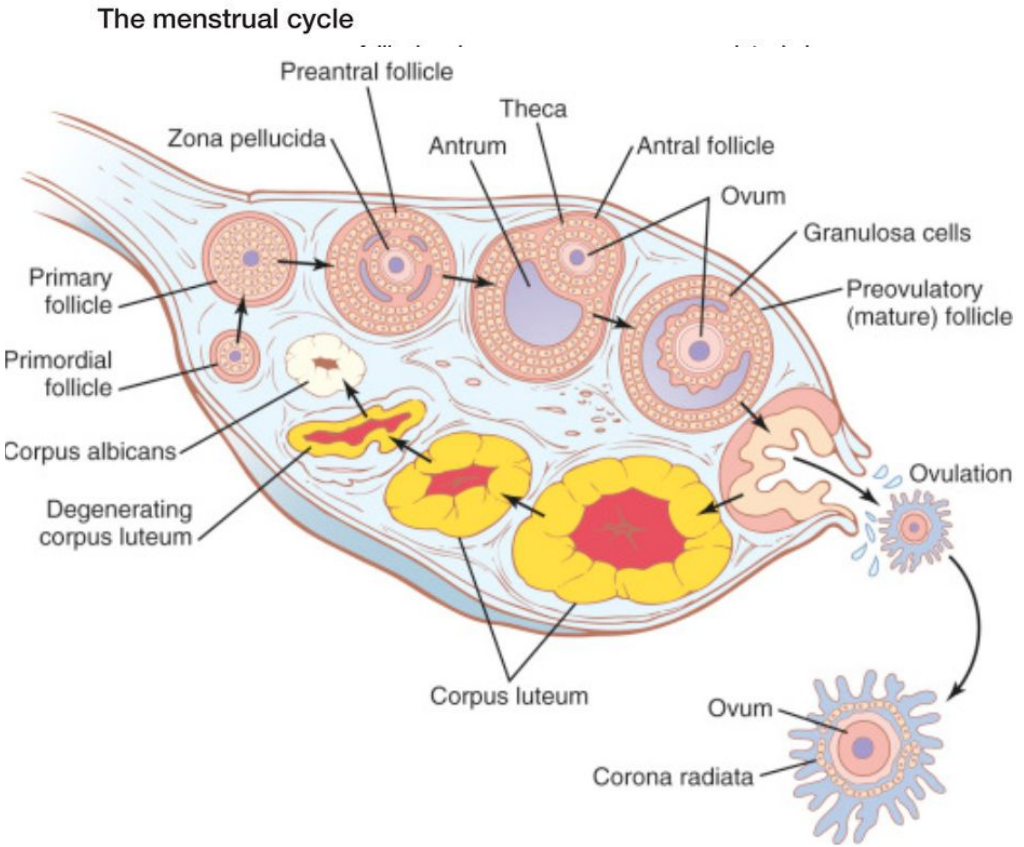


Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

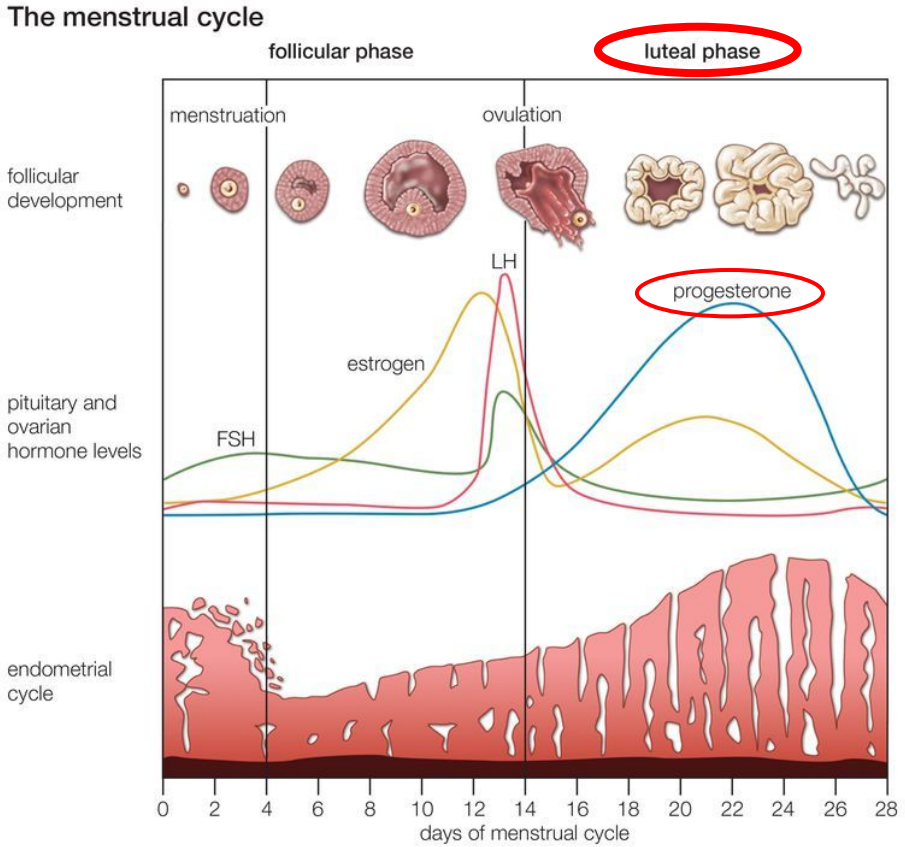
3. Luteal Phase

- Increase in Progesterone

- Rupture of the follicle initiates a series of chemical changes
  - Immediate decrease then subsequent rise in estrogen levels
- Increase in progesterone (preparing the endometrium for a fertilized egg), then rapid decrease with no fertilization

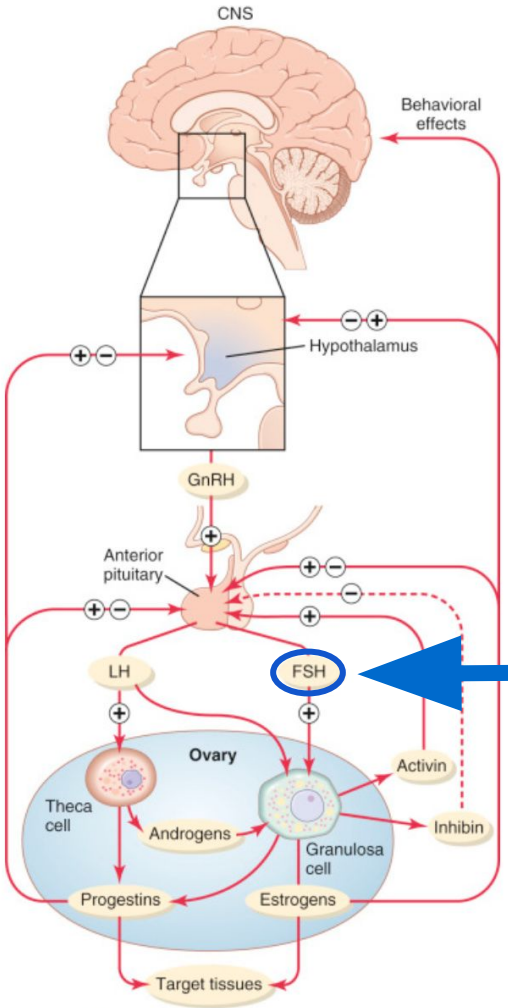
LH = Luteinizing Hormone

FSH = Follicle Stimulating Hormone



Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

How can a menopausal woman help a pre-menopausal woman who has infertility?



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Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

Contraception & Protection

61% of Canadian women have had an unintended pregnancy

~SOGC Survey 2017

https://www.youtube.com/watch?v=A5aDiRmN1yg

Male Contraception?

Efficacy and Safety of an Injectable Combination Hormonal Contraceptive for Men

Hermann M. Behre, Michael Zitzmann, Richard A. Anderson, David J. Handelsman, Silvia W. Lestari, Robert I. McLachlan, M. Cristina Meriggiola, Man Mohan Misro, Gabriela Noe, Frederick C. W. Wu, Mario Philip R. Festin, Ndema A. Habib, Kirsten M. Vogelsong, Marianne M. Callahan, Kim A. Linton, and Doug S. Colvard

Address all correspondence and requests for reprints to: Mario Philip R. Festin, MD, United Nations Development Programme/United Nations Population Fund/United Nations International Children's Emergency Fund/World Health Organization/World Bank Special Programme of Research, Development, and Research Training in Human Reproduction (Human Reproduction Progamme), World Health Organization, 20 Avenue Appia, CH-1211 Geneva 27, Switzerland. E-mail: festinma@who.int.

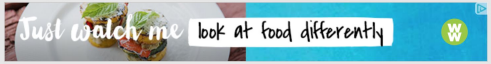
DOI: http://dx.doi.org/10.1210/jc.2016-2141
Received: May 18, 2016
Accepted: August 29, 2016
First Published Online: October 27, 2016

Conclusions:

The study regimen led to near-complete and reversible suppression of spermatogenesis. The contraceptive efficacy was relatively good compared with other reversible methods available for men. The frequencies of mild to moderate mood disorders were relatively high.

www.cnn.com/2016/10/30/health/male-birth-control/index.html

CNN Health » Diet + Fitness | Living Well | Parenting + Family Live TV U.S. Edition +



Male birth control shot found effective, but side effects cut study short

By Susan Scutti, CNN
Updated 2:33 PM ET, Tue November 1, 2016

https://www.menshealth.com/health/male-birth-control-genetic

Recommended by

HEALTH | PENIS

This Male Birth Control Will Actually Shut Off Your Sperm to Prevent Pregnancy

It's still early in the game, but the implications are promising

BY CHRISTA SGOBBA *October 11, 2017*

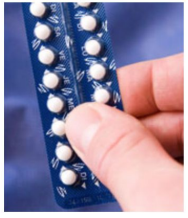
www.nhs.uk/Conditions/contraception-guide/Pages/male-pill.aspx

You are here: Health A-Z / Contraception guide /

What is the male pill?

In the past 50 years, there have been few changes in male contraception compared with the range of options available to women.

Today, the only contraceptive methods available to men are:



- condoms – a barrier form of contraception that stops sperm reaching and fertilising an egg
- vasectomy – a minor surgical procedure that stops sperm being ejaculated from the penis during sex (it is usually permanent)

Some men use withdrawal to try to prevent pregnancy, when they pull their penis out of their partner's vagina before ejaculating. However, this is not a recommended method of contraception. Sperm can be released from the penis before ejaculation.

EFFECTIVENESS OF FAMILY PLANNING METHODS*

*The percentages indicate the number out of every 100 women who experienced an unintended pregnancy within the first year of typical use of each contraceptive method.

MOST EFFECTIVE

Less than 1 pregnancy per 100 women in a year

6-12 pregnancies per 100 women in a year

18 or more pregnancies per 100 women in a year

LEAST EFFECTIVE

REVERSIBLE

Once in place, little or nothing to do or remember.

Implant

0.05%

Intrauterine Device (IUD)

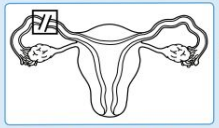
0.2% LNG

0.8% Copper T

PERMANENT STERILIZATION

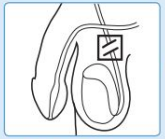
After procedure, little or nothing to do or remember.
Use another method for first 3 months (Hysteroscopic, Vasectomy).

Female (Abdominal, Laparoscopic, and Hysteroscopic)



0.5%

Male (Vasectomy)

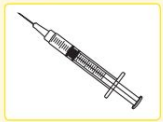


0.15%

REVERSIBLE

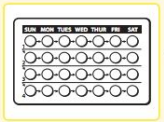
Get repeat injections on time. | *Take a pill each day.* | *Keep in place, change on time.* | *Use correctly every time you have sex.*

Injectable



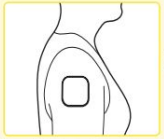
6%

Pill



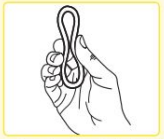
9%

Patch



9%

Ring



9%

Diaphragm

12%

REVERSIBLE

Use correctly every time you have sex.

Male Condom

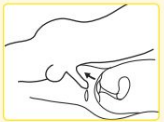
18%

Female Condom

21%

Condoms should always be used to reduce the risk of sexually transmitted infections.

Withdrawal



22%

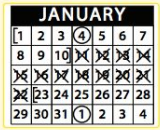
Sponge

12% Nulliparous Women

24% Parous Women

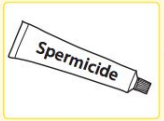
Fertility Awareness-Based Methods

Abstain or use condoms on fertile days.



24%

Spermicide



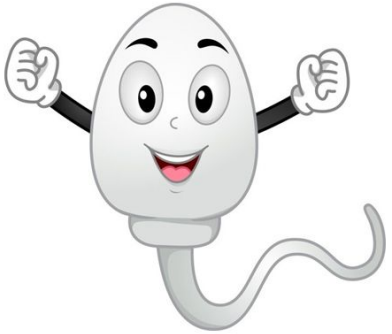
28%

Other Methods of Contraception: (1) **Lactational Amenorrhea Method (LAM):** is a highly effective, temporary method of contraception; and
(2) **Emergency Contraception:** emergency contraceptive pills or a copper IUD after unprotected intercourse substantially reduces risk of pregnancy.

Adapted from World Health Organization (WHO) Department of Reproductive Health and Research, Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (CCP). Knowledge for health project. Family planning: a global handbook for providers (2011 update). Baltimore, MD; Geneva, Switzerland: CCP and WHO; 2011; and Trussell J. Contraceptive failure in the United States. *Contraception* 2011;83:397–404.

CDC Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

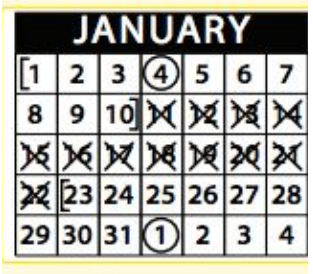
Sperm and Ejaculation



- **Sperm**: male reproductive cell
  - Sperm can live up to 5 days inside a woman's reproductive tract
- **Pre-ejaculate**: bodily fluid that comes out of the penis during sexual activity before orgasm
  - In some males, there is sperm present in pre-ejaculate along with other fluids
- **Ejaculate**: bodily fluid that comes out of the penis upon orgasm
  - Contains sperm and other fluid components

Killick,S.R., et al (2011). http://doi.org/10.3109/14647273.2010.520798
https://www.webmd.com/infertility-and-reproduction/guide/sperm-and-semen-faq#1
https://www.stayathomemum.co.uk/my-kids/conception-and-fertility/using-a-sperm-donor/

Fertility Based Awareness



Abstaining from sex or using condoms on fertile days

- CDC states that this method has a 24% failure rate
- Some other sources would argue that certain variations of this method are highly effective (when done correctly)
- Method based on timing of ovulation, changes in cervical secretions and changes in basal body temperature
    - This can be challenging measures to monitor
- Luteal phase of the ovarian cycle is generally fixed and ovulation occurs ~14 days before the beginning of next menses - need to have a reliable and consistent cycle in order to predict properly

https://www.cdc.gov/reproductivehealth/contraception/index.htm
Frank-Herrmann P. et al. 2007 Human Reproduction

Withdrawal

Removing the penis from the vagina before ejaculation during sexual intercourse

- One of the least effective methods for preventing pregnancy
- Timing can be tricky
  - Because sperm can live in the reproductive tract for days, this increases the chances of pregnancy around the time of ovulation (even if you think you're having sex in the safe zone)
- Does <u>not</u> protect against sexually transmitted infections (STIs)

https://www.plannedparenthood.org/learn/birth-control/withdrawal-pull-out-method/what-are-the-disadvantages-of-withdrawal
http://americanpregnancy.org/getting-pregnant/can-you-get-pregnant-with-precum/

Spermicide

Product that kills sperm that is placed into the vagina prior to sexual intercourse

- According to the Centre for Disease Control (CDC), spermicide results in a 28% chance of pregnancy
- The spermicide causes the sperm to get stuck at the entrance of the uterus (at the cervix)
- Considered one of the least effective forms of contraception
- Can be combined with condoms or other birth control methods
- Does not protect against STIs

https://www.plannedparenthood.org/learn/birth-control/spermicide
https://www.cdc.gov/reproductivehealth/contraception/index.htm

External (Male) Condoms

Barrier method; sheath that goes onto the penis prior to and during sexual activity - can be used for oral, vaginal and anal sex

- The CDC estimates external condoms result in 18 pregnancies per 100 women in a year
  - If used perfectly every time, rates as high as 98% efficacy have been reported
  - In reality, this is not accurate

- They are a very effective method to reduce transmission of STIs

https://www.plannedparenthood.org/learn/birth-control/condom/how-effective-are-condoms
https://www.cdc.gov/reproductivehealth/contraception/index.htm

External (Male) Condoms Continued

- Latex-free condoms available for those with sensitivity or allergies
  - Latex, polyurethane and natural condoms
- Condoms can only be used once (cannot be reused)
- Do not use more than one at a time
- They do come with expiration dates (check these before use)

TIP: using water-based lubricants helps increase sensitivity and decrease the likelihood of breakage

https://www.optionsforsexualhealth.org/birth-control-pregnancy/birth-control-options/barrier-methods/condom-male

How to put on a condom

1

Check the expiry date
& take the condom out
of the packet carefully.
Don't use scissors or your teeth!

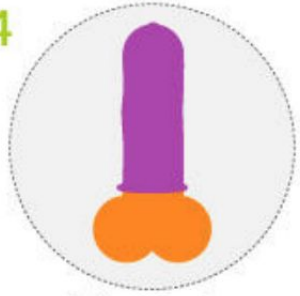
2

Pinch the air out of the top of the condom.
Make sure it is not inside out –
the rim should be on the outside.

3

Put the condom on top of the erect penis.
Put it on BEFORE it touches
a partner's mouth or genital area.

4



Roll the condom down
to the base of the penis.
Wear it the whole time
you are having sex.

5

Take the condom off once the penis has been
withdrawn completely but while it is still erect.
Don't wait around too long to pull out
as this risks semen spilling out,
or the condom slipping off.

Make putting on
a condom part of the fun!
Ask your partner
to put it on for you,
and keep stimulating
each other as the
condom goes on.

AVERT.org

https://www.avert.org/infographics/how-use-condom

Internal (Female) Condoms

Barrier method; goes inside the vagina prior to sexual intercourse

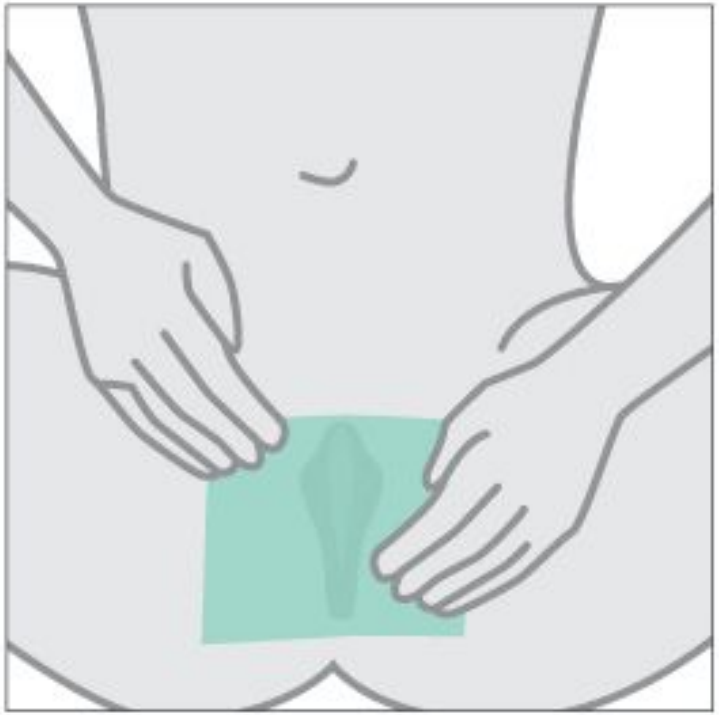
- According to Options for Sexual Health, internal condoms are 95% effective with perfect use - but with typical use, they are 79% effective

- They <u>are</u> a very effective method for prevention of STIs

Note: dental dams can be used for oral sex to cover the genitalia to prevent STIs

https://www.optionsforsexualhealth.org/birth-control-pregnancy/birth-control-options/barrier-methods/condom-female
http://www.newkidscenter.com/How-to-Use-Female-Condom.html

Dental Dams



https://www.cdc.gov/condomeffectiveness/Dental-dam-use.html

Diaphragm

Soft dome that is used with spermicide and is placed high in the vagina prior to sexual intercourse

- Options for Sexual Health states that the perfect use is 94% effective and 84% effective if used typically

- Diaphragm acts as a barrier between the cervix and the ejaculate to prevent sperm from traveling into the uterus
  - Spermicide is placed inside the dome prior to insertion into the vagina
  - Diaphragm must be kept in vagina at least 6 hours post-intercourse

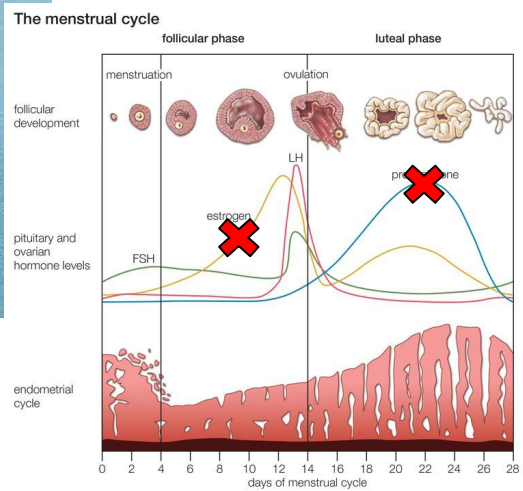
- Needs to be fitted be a physician to ensure proper coverage
- Not an effective method for prevention of STIs

https://www.optionsforsexualhealth.org/birth-control-pregnancy/birth-control-options/barrier-methods/diaphragm
https://sites.path.org/rhtech/silcs-diaphragm/silcs-features/

The Ring

A small, flexible ring that is placed in the vagina for 3 weeks, then is removed for 1 week

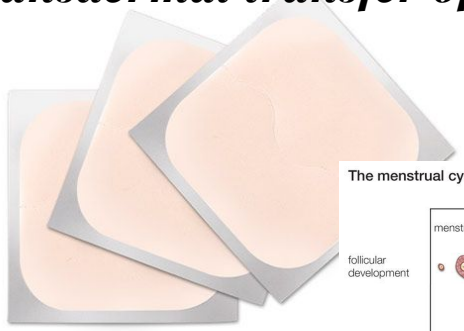
- NuvaRing (generic name: etonogestrel/ethinyl estradiol vaginal ring)
- CDC states 9% failure rate
- Contains a progestin and an estrogen to help prevent pregnancy by releasing low amounts of hormones
- The major advantage of this method is that you do not need to worry about it everyday
- Not an effective method for STI prevention



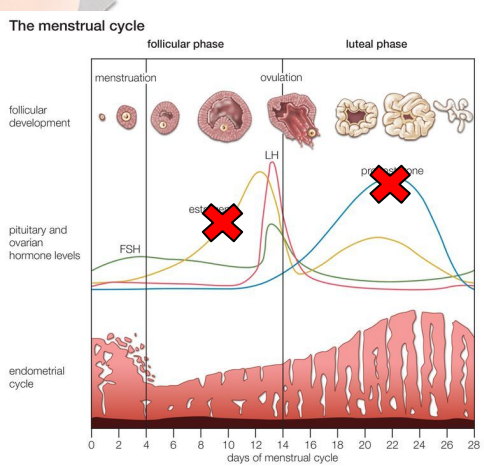
https://www.nuvaring.com/how-nuvaring-works/
https://www.optionsforsexualhealth.org/birth-control-pregnancy/birth-control-options/hormonal-methods/combined-hormonal-contraceptives/using-nuvaring
http://whisperedinspirations.com/2011/09/04/nuvaring-risks/
Colquitt CW et al. 2017 Journal of Pharmacy Practice.

The Patch

Patch that is placed on the skin to allow for transdermal transfer of hormones

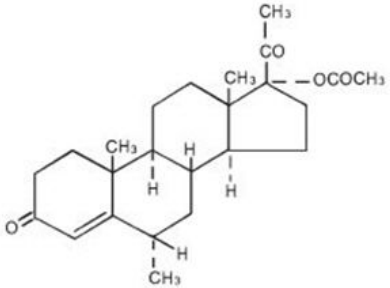


- CDC quotes a 9% failure rate
- Contains a progestin and an estrogen
  - Works by stopping ovulation and causing cervical mucus to thicken (making it harder for sperm to pass)
- Need to change patch once a week for three weeks; one week break
  - Buttocks, upper outer arm, upper body (except breasts) or abdomen
- Not an effective method for preventing STIs



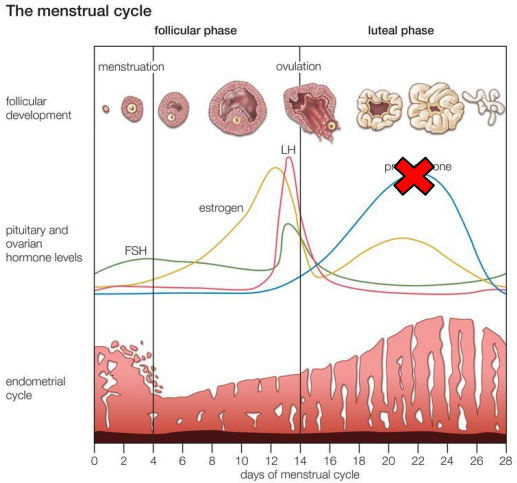
Colquitt CW et al. 2017 Journal of Pharmacy Practice.
https://www.optionsforsexualhealth.org/birth-control-pregnancy/birth-control-options/hormonal-methods/combined-hormonal-contraceptives/using-patch
https://www.your-life.com/en/contraception-methods/short-acting-contraception/contraceptive-patch/
https://www.cdc.gov/reproductivehealth/contraception/index.htm

The Shot



Long-acting birth control that is injected every 12 weeks

- Very effective form of birth control; 97-99% effective between typical and perfect use
- Known as “Depo-provera” or “medroxyprogesterone”
- Contains a progestin only
  - Stops ovulation, thickens cervical mucus and thins endometrial lining
- Does <u>not</u> protect against STIs



https://www.optionsforsexualhealth.org/birth-control-pregnancy/birth-control-options/hormonal-methods/depo-provera
Colquitt CW et al. 2017 Journal of Pharmacy Practice.

If I’m not ovulating because I’m on contraceptives, does that mean menopause will happen later for me?

NO.

- Time of menopause - mostly genetic
- Has nothing to do with how many times a person ovulates
- Follicles are mostly lost through atresia

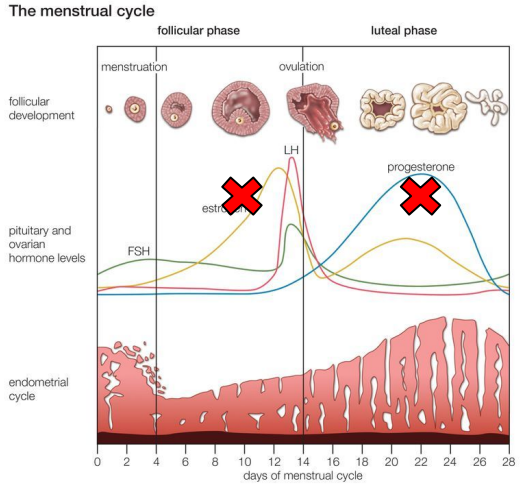
The Pill

- WHEN USED CORRECTLY:
  Oral Contraceptive Pills are >99% effective

- Can be in the forms of either progestin only or estrogen + progestin

How does it work?

- Inhibits gonadotropin secretion via negative feedback on pituitary & hypothalamus
  - Prevention of ovulation
- Continuous exposure to progesterone and estrogen leads to thin, fragile endometrial lining



Colquitt CW et al. 2017 Journal of Pharmacy Practice.

The Pill

“I forgot to take my pill last night...what should I do?!”

- Preventive rather than curative, therefore no on-going reinforcement
- Forgetting pills is common, especially in the adolescent age group

Chabbert-Buffet N, et al. 2017. European Journal of Contraception and Reproductive Health Care.

If ONE pill has been missed (48–72 hours since last pill in current packet **or 24–48 hours late** starting first pill in new packet)

Continuing contraceptive cover

- The missed pill should be taken as soon as it is remembered.
- The remaining pills should be continued at the usual time.

Minimising the risk of pregnancy

Emergency contraception (EC) is not usually required but may need to be considered if pills have been missed earlier in the packet or in the last week of the previous packet.

If TWO OR MORE pills have been missed (>72 hours since last pill in current packet **or >48 hours late** starting first pill in new packet)

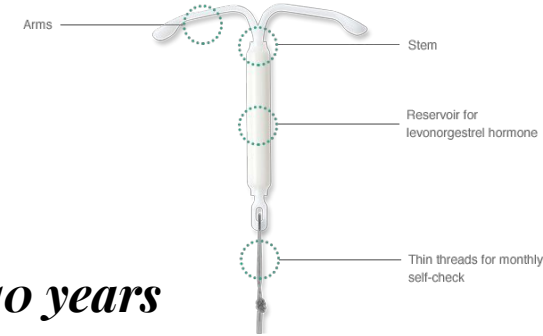
Continuing contraceptive cover

- The most recent missed pill should be taken as soon as possible.
- The remaining pills should be continued at the usual time.
- Condoms should be used or sex avoided until seven consecutive active pills have been taken. This advice may be overcautious in the second and third weeks, but the advice is a backup in the event that further pills are missed.

Minimising the risk of pregnancy

If pills are missed in the first week (Pills 1–7)	If pills are missed in the second week (Pills 8–14)	If pills are missed in the third week (Pills 15–21)
EC should be considered if unprotected sex occurred in the pill-free interval or in the first week of pill-taking.	No indication for EC if the pills in the preceding 7 days have been taken consistently and correctly (assuming the pills thereafter are taken correctly and additional contraceptive precautions are used).	OMIT THE PILL-FREE INTERVAL by finishing the pills in the current pack (or discarding any placebo tablets) and starting a new pack the next day.

Royal College of Obstetricians and Gynaecologists 2012

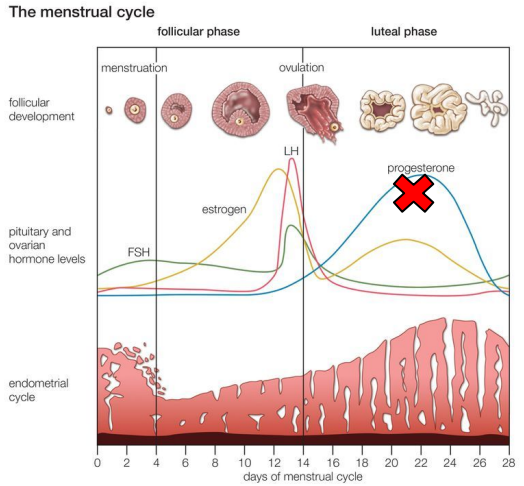


Intrauterine Device (IUD)

Long-acting birth control that is placed in the uterus for 3-10 years

Hormonal *Jaydess (3), Kyleena (5) & Mirena (5)*

- Progesterone only, 0.2% yearly failure rate
- Must be inserted by a trained HCP
- Ovulation still occurs (~40%)
- Changes cervical mucus
- Thinning of endometrium



Colquitt CW et al. 2017 Journal of Pharmacy Practice.

Intrauterine Device (IUD)

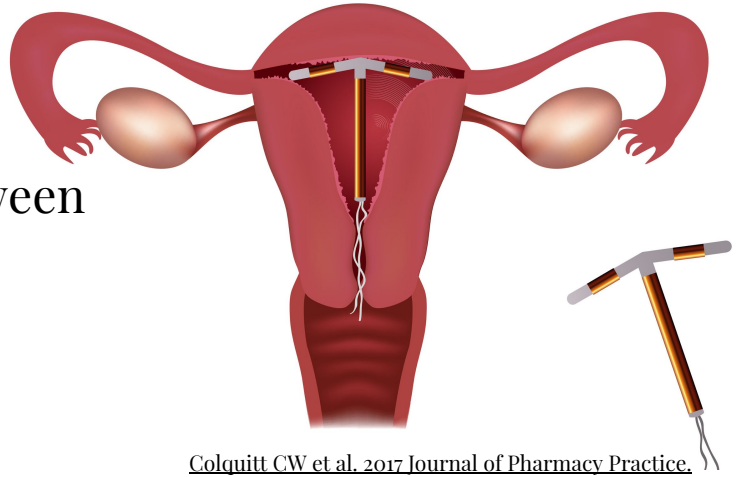
Long-acting birth control that is placed in the uterus for 3-10 years

Non-Hormonal *Copper IUD (5-10)*

- Continuous, slow release of copper into the uterine fluid - toxic to sperm
- 0.8% yearly failure rate

Common Side Effects:

- Heavier, longer periods with spotting in between

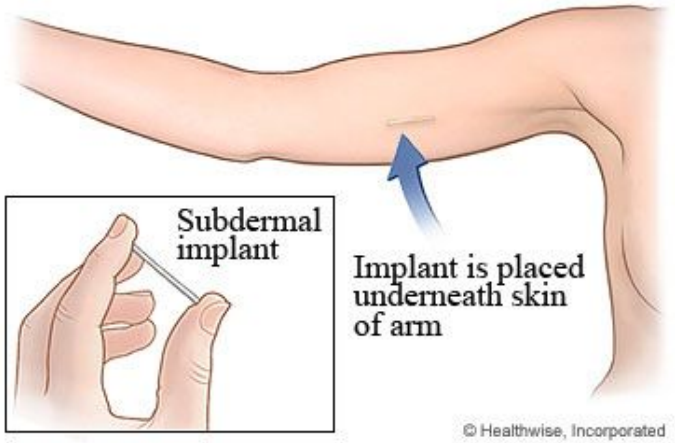


Colquitt CW et al. 2017 Journal of Pharmacy Practice.

The Implant

Long-acting hormone-releasing rod that is placed under the skin for 3 years

- Reported to be the most effective form of birth control - 0.05% yearly failure rate
- Progesterone-based rod that must be surgically implanted by a trained HCP
- Most common side effect:
  - Irregular bleeding in the first 6-12 months



- <u>NOT</u> an effective method against STIs

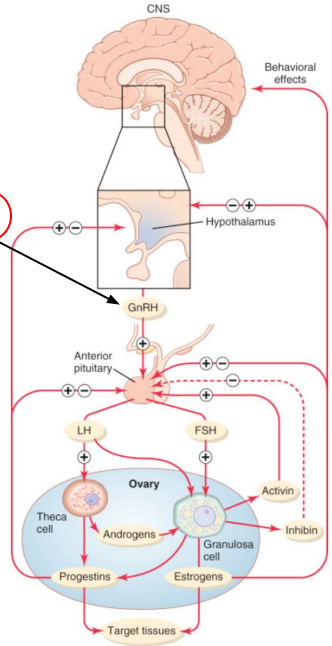
Colquitt CW et al. 2017 Journal of Pharmacy Practice.

The Breastfeeding Mother

The Lactational Amenorrhea Method (LAM)

Can be over 98% effective, IF USED CORRECTLY

Suckling → Prolactin ⊖



Journal of Midwifery & Women's Health 2012

The Breastfeeding Mother

The Lactational Amenorrhea Method (LAM)

Can be over 98% effective, IF USED CORRECTLY

LAM is only effective if:

1. You have not started your period yet
2. You are breastfeeding exclusively, and not giving your baby any other food
3. You are breastfeeding at least every 4 hours during the day, and 6 hours during night
4. Your baby is less than 6 months old

If any of the above 4 criteria is not being met, you no longer have good protection, and another form of birth control should be used

Journal of Midwifery & Women's Health 2012

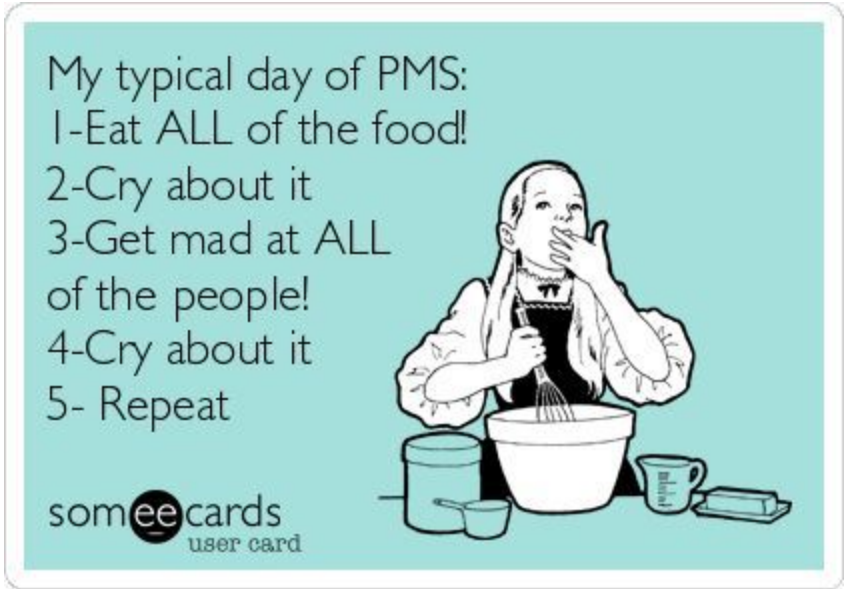
Non-Contraceptive Benefits of Hormonal Contraception

Treatment of :

- menorrhagia (abnormally heavy or prolonged bleeding)
- dysmenorrhea (cramps!)
- PMS
- Acne
- Perimenopausal symptoms

Decreased:

- Anemia related to menstrual blood loss
- Risk of epithelial ovarian cancer
- Risk of endometrial cancer



Colquitt CW et al. 2017 Journal of Pharmacy Practice.

Emergency Contraception

Emergency Contraception - Hormonal

Levonorgestrel (high dose progesterone)

A.k.a. "The morning after pill" "Plan B"

- Use within 72 hours for maximal benefit
- Can be used within 5 days of unprotected intercourse
- Effectiveness decreases if BMI >25
- Pregnancy rate = 2.2%
- Over the counter

How does it work?

- Interferes with ovulation
- Decreases likelihood of implantation
- NOT ABORTIVE

Canadian Medical Association Journal 2016

Emergency Contraception - Hormonal

Ulipristal Acetate (progesterone receptor modulator)

- Use within 72 hours for maximal benefit
- Can be used within 5 days of unprotected intercourse
- Effectiveness decreases if BMI >30
- Pregnancy rate = 1.3%
- Need a Rx

How does it work?

- Interferes with ovulation
- Decreases likelihood of implantation
- NOT ABORTIVE

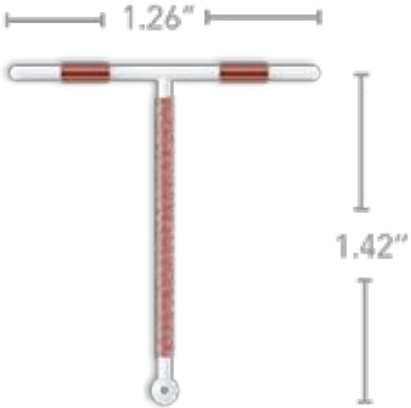
Canadian Medical Association Journal 2016

Emergency Contraceptives - Non-Hormonal

Copper Intrauterine Device

MOST EFFECTIVE (<0.01% pregnancy rate)

- Use within 7 days
- First line if BMI >30
- Need office visit



How does it work?

- Copper ions toxic to sperm & ova
- Inhibits implantation IF a blastocyst reaches uterus
- NOT ABORTIVE

Canadian Medical Association Journal 2016

Sexually Transmitted Infections (STIs)

Meet Taylor

Taylor is:

- 22 years old
- 3rd year student
- studying Kinesiology
- Most likely to be found taking a “study break” watching funny dog videos

You and Taylor bond over your love of funny dog videos and become BFF's

"Remember how I had that awkward date at the start of the year? The one with the hot sauce explosion incident? They kept messaging me, and they were pretty funny, so it's been nice. A few weeks ago we slept together and had sex - and we didn't use protection. Yesterday I asked if they have ever been tested for STI's (which they haven't) and neither have I -what should I do?

STI's and Ageing

15-29 years olds vs **40-59 year olds**
(1997-2007, Canada)

Chlamydia:
87% vs **166%**

Gonorrhea:
133% vs **210%**

Syphillis:
5x growth vs **11x growth**

Fang, L., Oliver, A., Jayaraman, G. C., & Wong, T. (2010). Trends in age disparities between younger and middle-age adults among reported rates of chlamydia, gonorrhea, and infectious syphilis infections in canada: Findings from 1997 to 2007. *Sexually Transmitted Diseases, 37*(1), 18. doi:10.1097/OLQ.0b013e318lb617dc

Sexually Transmitted Infections - What are they?

- Infections (bacterial or viral) that are (often) passed through sexual contact
- Variable symptoms
- Variable duration of symptoms

Bacterial:

- Can be “cured” with treatment
- Can be infected multiple times, even if you previously received treatment

Viral

- Cannot be “cured”, but can be suppressed
- Once infected, infected for life

Examples:

- Gonorrhea
- Chlamydia
- HSV
- HPV
- HIV
- Syphilis

This is **not** an exhaustive list

“Does STI testing hurt?”

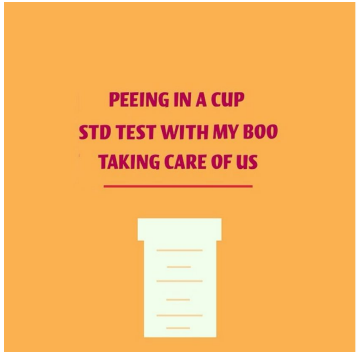
No!

STI Testing

STI testing is often quick, painless, and free

Different tests for different STIs:

- Swab sample
  - Oral, anal, genital
- Urine test
  - Most accurate if you have not urinated for 2 hours before the test
- Blood test



STI Testing Checklist

Here is a list of tests that you might get. You can show it to your health care provider to figure out which tests you need.

STI and other tests

- ☐ Chlamydia
- ☐ Gonorrhea
- ☐ Syphilis
- ☐ HIV
- ☐ Herpes Simplex Virus (HSV)
- ☐ Hepatitis A
- ☐ Hepatitis B
- ☐ Hepatitis C

Women Only

- ☐ Bacterial Vaginosis (BV)
- ☐ Pap Test
- ☐ Trichomoniasis
- ☐ Vaginal yeast

Call ahead if you have questions about:

- If you need ID (BC driver's license, BC ID, a student card)
- Care card (MSP) or other health insurance.
- Costs if you do not have a BC Care Card.

Things your health care provider will ask you about:

Your health care provider may ask you some personal questions about sex. You might be asked about sex partners, ways you have sex and condom use. You don't have to share anything you do not want to, but the information you give will help the health care provider decide what tests are best for you. You have a choice about what testing you will have done.

Provided by:

SMARTSEX RESOURCE

BC Centre for Disease Control
An agency of the Provincial Health Services Authority

https://www.instagram.com/p/m5bv90AZ3s/
https://smartsexresource.com/topics/sti-testing-checklist

Choose Your Own Adventure #1

- Unknown STI status of your sexual partner(s)

and/or

- Non specific changes (genitoanal itch, painful urination, tender abdomen)

and/or

- No symptoms

Gonorrhea

"The Clap"

Gonorrhoea

Culprit: *Neisseria Gonorrheae*

What type of STI? Bacterial

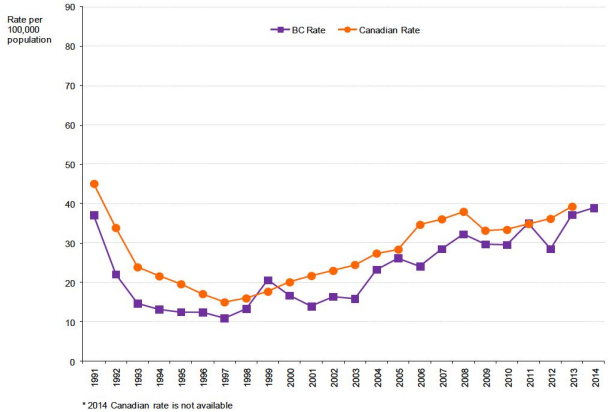
How is it transmitted?

- Oral, genital, anal sex

Who?

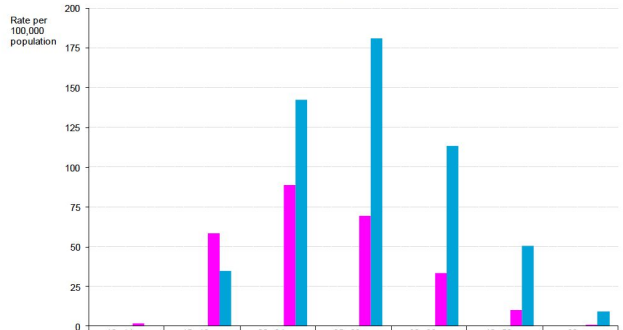
- Males>Females (2:1)
- Ages 20-29 (BC)
- Gradual & steady increase in cases in Canada and BC since 1997

13. Genital gonorrhea case reports in BC and Canada, 1991 to 2014*



* 2014 Canadian rate is not available

16. Genital gonorrhea case reports in BC by age group and gender, 2014



	10 - 14 yrs	15 - 19 yrs	20 - 24 yrs	25 - 29 yrs	30 - 39 yrs	40 - 59 yrs	60+ yrs
Reports - Female	2	76	136	110	104	68	5
Reports - Male	0	49	235	284	346	334	47
Reports - Other *	0	0	1	1	2	0	0
Rate - Female	1.8	58.3	88.9	69.5	33.4	10.0	0.9
Rate - Male	0.0	34.7	142.5	180.8	113.2	50.4	9.1

* Other - transgender and gender unknown

http://www.bccdc.ca/util/about/annreport/default.htm

Gonorrhoea

Why the increase in rates?

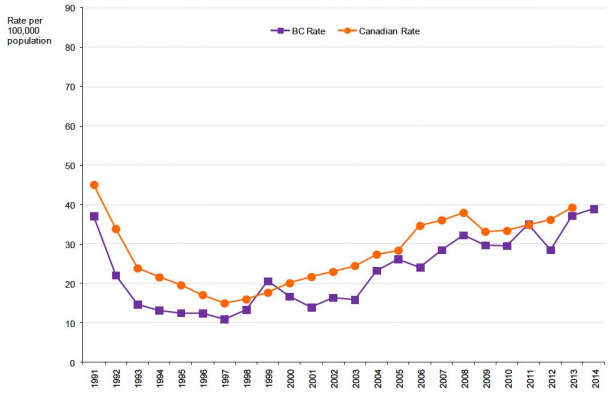
Are the rates increasing or is more being detected?

Changes in condom use?

Changes in testing methods ?
E.g Urine tests
E.g Inclusion during Chlamydia testing

Changes in public perception of STIs?

13. Genital gonorrhea case reports in BC and Canada, 1991 to 2014*



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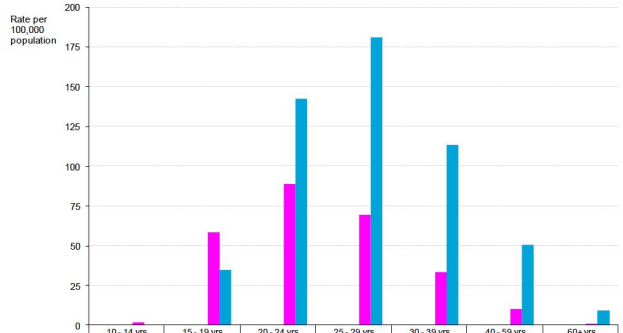

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http://www.bccdc.ca/util/about/annreport/default.htm

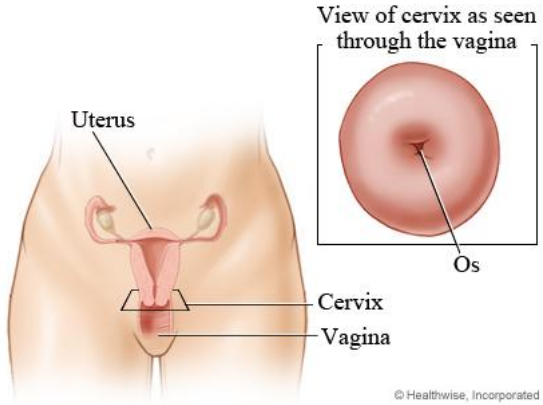
Gonorrhoea

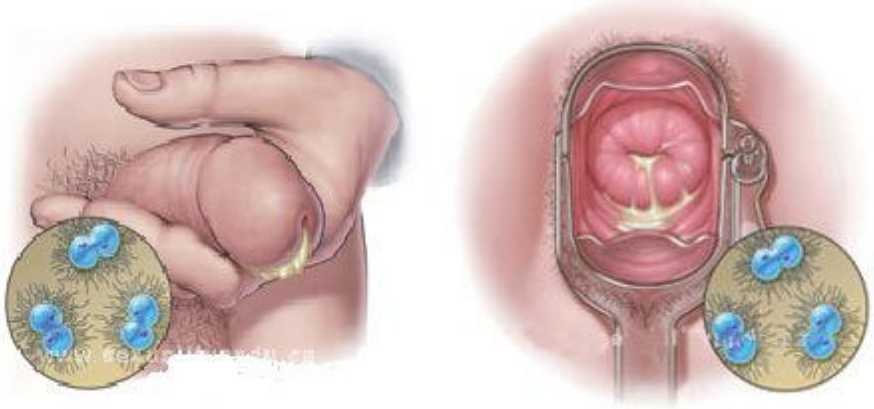
Symptoms appear:

- 2-7 days after contact

Looks & feels like:

- Discharge (yellow-white) & itch at the site of infection
- Possible burning sensation when urinating
- Asymptomatic





Gonorrhoea

Symptoms appear:

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Looks & feels like:

- Discharge (yellow-white) & itch at the site of infection
- Possible burning sensation when urinating
- Asymptomatic

People with penises are more likely to be symptomatic
- E.g. Testicular pain/swelling

For people with vaginas symptoms might be mistaken for a bladder or vaginal infection
- E.g. Lower abdominal pain

Gonorrhoea

Symptoms appear:

- 2-7 days after contact

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People with penises are more likely to be symptomatic
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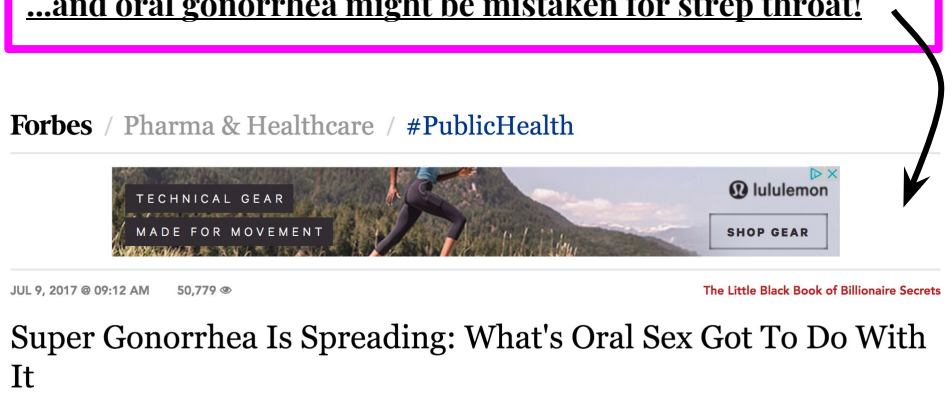
For people with vaginas symptoms might be mistaken for a bladder or vaginal infection
- E.g. Lower abdominal pain

...and oral gonorrhea might be mistaken for strep throat!

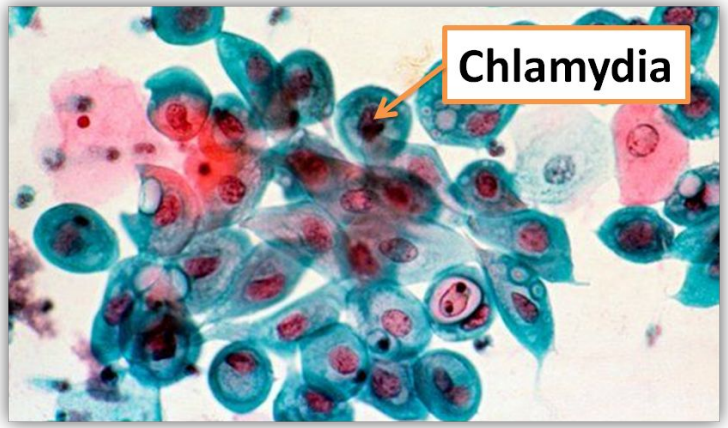


https://www.forbes.com/sites/brucelee/2017/07/09/super-gonorrhea-whats-oral-sex-got-to-do-with-it/#39d5599f982c

Chlamydia

"The Silent Infection"

Chlamydia



Culprit: *Chlamydia trachomatis*

What type of STI? Bacterial

How is it transmitted?

- Oral, genital, anal sex

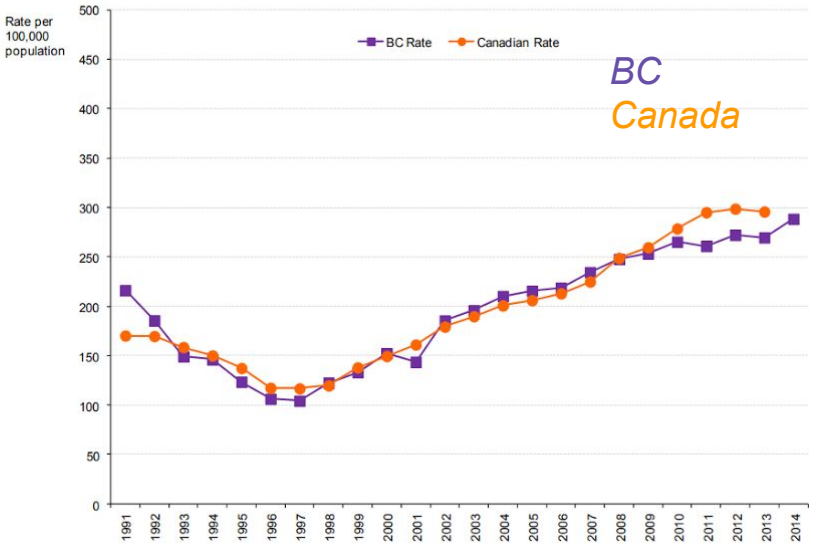
Who?

- Most commonly reported STI in BC
  - Gradual & steady increase in Canada since 1998
- Female > Men (2:1 ratio)
- Young adults aged 20-29, followed by adolescents aged 15-19 years

BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm
https://www.islandsexualhealth.org/
http://edguidance.com/sti/chlamydia-the-silent-disease/

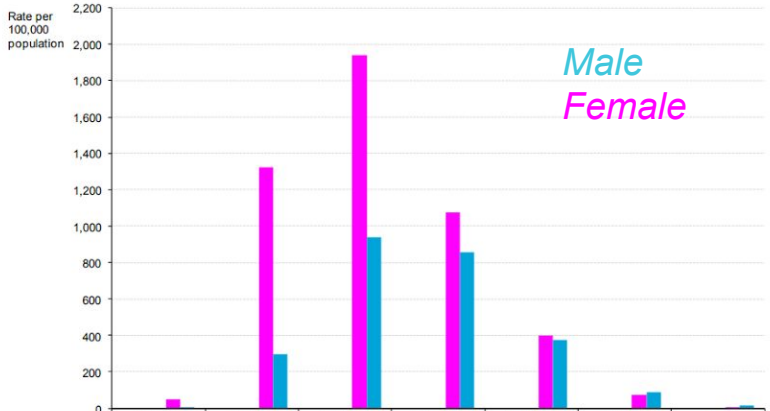
Chlamydia - “The Silent Disease”

2. Genital chlamydia case reports in BC and Canada, 1991 to 2014*



* 2014 Canadian rate is not available

5. Genital chlamydia case reports in BC by age group and gender, 2014



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Reports - Female	57	1,726	2,972	1,702	1,239	504	16
Reports - Male	3	417	1,545	1,345	1,149	586	67
Reports - Other *	0	3	3	3	1	1	0
Rate - Female	51.1	1,324.5	1,942.0	1,075.8	398.4	74.1	2.8
Rate - Male	2.5	295.5	937.0	856.1	375.8	88.4	12.9

* Other - transgender and gender unknown

BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm

“Can you have a chlamydia infection if you have no symptoms?”

Yes.

The majority of patients infected with chlamydia are asymptomatic

- Females are more likely to be asymptomatic than males:
  - 75% of infected females
  - 50% of infected males

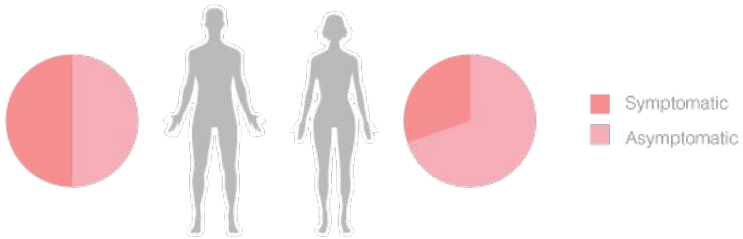
Chlamydia is under diagnosed due to a lack of symptom presentation.

https://www.islandsexualhealth.org/

Chlamydia - “The Silent Disease”

Symptoms appear:

- If symptoms present ↠ 3 weeks after exposure



Looks & feels like:

- People with penises:
  - Pain when urinating, itching, discharge, rarely pain and swelling of testicles
- People with vaginas:
  - Changes in discharge, burning during urination, breakthrough bleeding, and lower abdominal pain

https://www.islandsexualhealth.org/
BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm
https://evekit.com/healthinfo/ctng/

Gonorrhoea & Chlamydia

How is it tested for?

- Urine sample
- Swab samples
- Gonorrhoea-Chlamydia dual testing

How is it treated?

- Antibiotics
  - 1 dose (mostly), but full "therapeutic effect" takes 7 days to take place
- Antibiotic resistance is being observed for gonorrhoea
- Contact/treat any partners from previous 2 months

Outcomes:

- Not infectious after 7 days of (successful) antibiotic treatment
- Infection "cured"

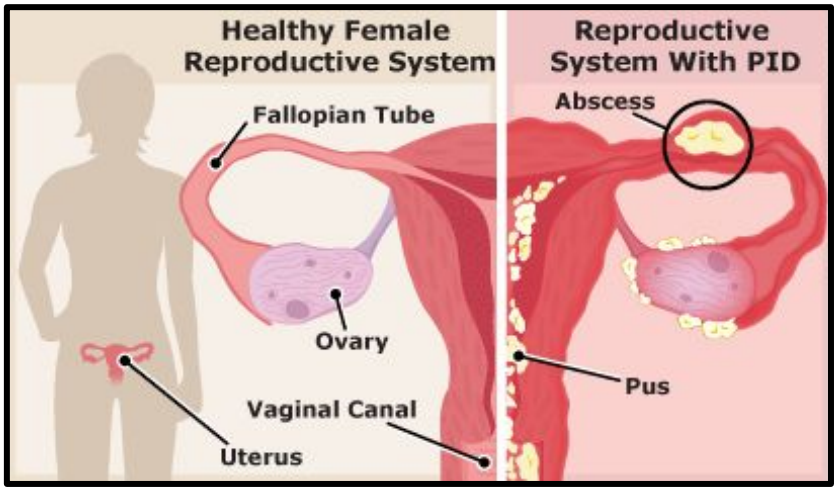
Chlamydia	*Gonorrhea*
Azithromycin 1g As a single dose **OR**	Ceftriaxone 250 mg **OR** cefixime 800 mg **PLUS**
Doxycycline 100 mg For 7 days	Azithromycin 1g All as a single dose

https://www.islandsexualhealth.org/
Government of Canada (2016). Canadian Guidelines on Sexually Transmitted Infections. Retrieved from canada.ca/publichealthagency/infectiousdieseases

Chlamydia and Gonorrhea

Complications of Untreated Infections:

- Pelvic Inflammatory Disease



- Epididymitis = Prostate swelling
  - Rarely results in infertility

- Arthritis with Skin Lesions
  - Reiter's Syndrome ↠ rare complication

https://www.islandsexualhealth.org/
https://www.tes.com/lessons/k7hycFCiLiWxFQ/sti-pelvic-inflammatory-disease

Screening Guidelines

The optimal screening interval is unclear:

- < 25 years
  - Chlamydia and Gonorrhea annually
  - HIV at one time

- > 25 years
  - HIV at one time
  - Other STIs (chlamydia, gonorrhea) if other risk factors

Risk Factors:

- New or multiple sex partners
- Sex partners with multiple concurrent partners
- Inconsistent condom use
- Previous or coexisting STI
- People who exchange sex for money or drugs
- MSM

Ghanem, K., & Tuddenham, S. (2016, August). Screening for sexually transmitted infections. Retrieved from https://www.uptodate.com/contents/screening-for-sexually-transmitted-infections
Government of Canada (2016). Canadian Guidelines on Sexually Transmitted Infections. Retrieved from canada.ca/publichealthagency/infectiousdieseases

Choose Your Own Adventure #2

- You just noticed a few small, clustered “bumps” (on your mouth and/or genitoanal area)

  or

- You have no symptoms

HSV1 & HSV2

Herpes (Oral and Genitoanal)

Herpes (HSV1, HSV2)

Culprit: Herpes Simplex Virus (HSV1, HSV2)

- Most often: HSV1 (mouth), HSV2 (genitoanal)

What type of STI? Viral

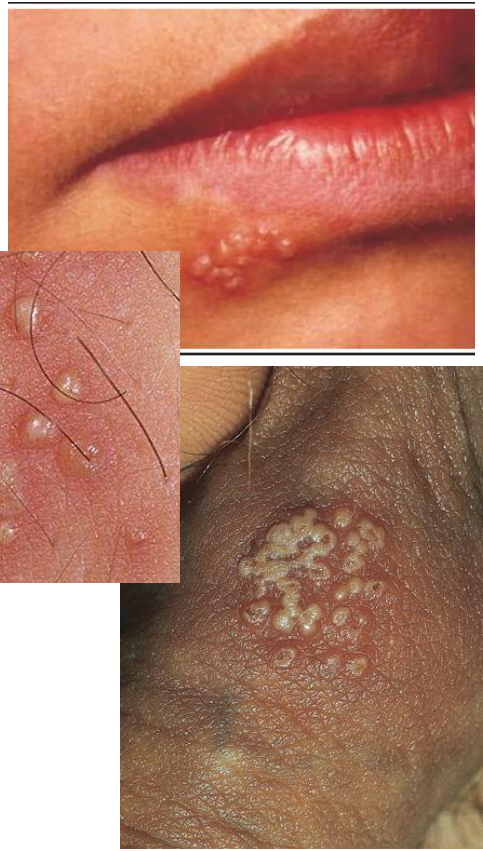
How is it transmitted?

- Oral, genital, anal sex
- Condoms might be less effective at preventing passage than some other common STIs
- Mother-baby (during delivery)

What are the trends?

- 90% of the global population (HSV1 or HSV2)
- HSV1 is more common (~ 67% world population (WHO estimate)

Risks: Might increase risk of acquiring other STI's (e.g. HIV)



http://www.who.int/mediacentre/news/releases/2015/herpes/en/
Wald A, Corey L. Persistence in the population: epidemiology, transmission. In: Arvin A, Campadelli-Fiume G, Mocarski E, et al., editors. Human Herpesviruses: Biology, Therapy, and Immunoprophylaxis. Cambridge: Cambridge University Press; 2007. Chapter 36. Available from: https://www.ncbi.nlm.nih.gov/books/NBK47447/
https://www.healthlinkbc.ca/healthlinkbc-files/preventing-sti

Herpes (HSV1, HSV2)

Primary: No prior exposure

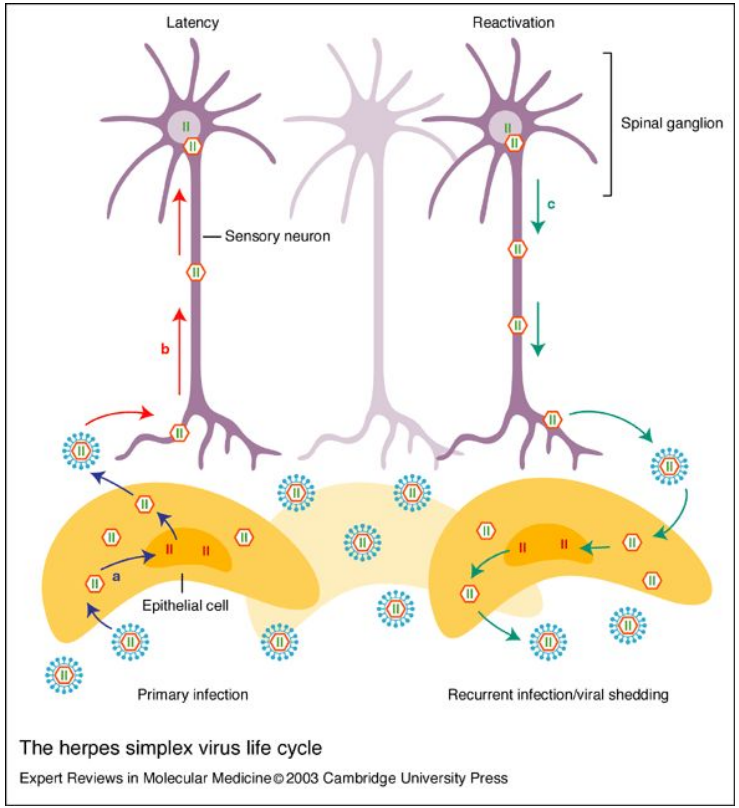
- Small cluster of vesicles (clear bumps), fever/aches, lymph nodes
- 2-14 days after contact
- Lasts 17-23 days

Non Primary: Prior exposure, but first clinical presentation

- Less obvious than primary (often)
- Lasts less than primary, ~16 days

Reactivation: Reactivation of latent (“sleeping”/”resting”) infection

- Triggered
- “Prodromal”/Early = Itching, tingling, vague discomfort
- Clusters of small vesicles (clear bumps)
- Lasts 9-11 days



http://www.yalescientific.org/2012/12/a-prime-new-strategy-for-herpes-vaccination/

“Can you pass herpes to another person if you have no symptoms?”

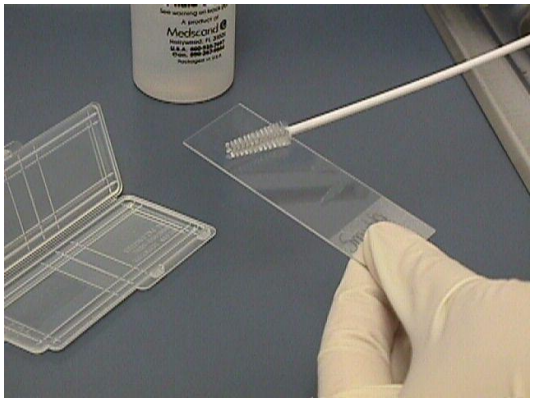
Yes.

= “Asymptomatic Shedding”

- Highest:
  - Within first few months of first outbreak
  - Approximately 1 week after an outbreak has cleared
  - Highest in the first year

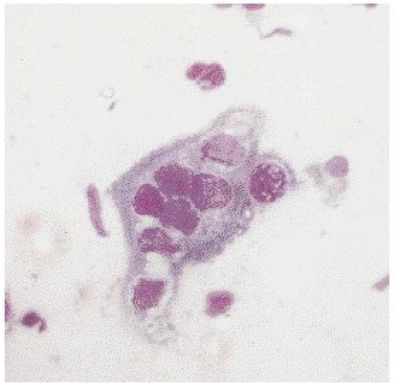
Transmission is most likely to occur when the individual is asymptomatic.

Herpes (HSV1, HSV2)



How is it tested for?

- Symptomatic:
  - Sample swab from the vesicles/bumps
    - Fluid ↠ viral culture
    - Scrape ↠ visualization for “Tzanck” cells
- *Asymptomatic:*
  - *Blood tests (rare) & not necessarily helpful*



How is it treated?

- Primary/Non-primary
  - Treat when symptomatic
- Recurrent
  - Medication on hand for flare ups
- Commonly used medication:
  - Acyclovir (inhibits viral multiplication)

http://www.nejm.org/doi/full/10.1056/NEJM199708213370805
https://www.canada.ca/en/public-health/services/infectious-diseases/sexual-health-sexually-transmitted-infections/canadian-guidelines/sexually-transmitted-infections/canadian-guidelines-sexually-transmitted-infections-32.html
Suazo, P.A., Tognarelli, E.I., Kalergis, A.M. et al. Med Microbiol Immunol (2015) 204: 161.
https://doi.org/10.1007/s00430-014-0358-x

HPV

Genital Warts and Cancer

HPV

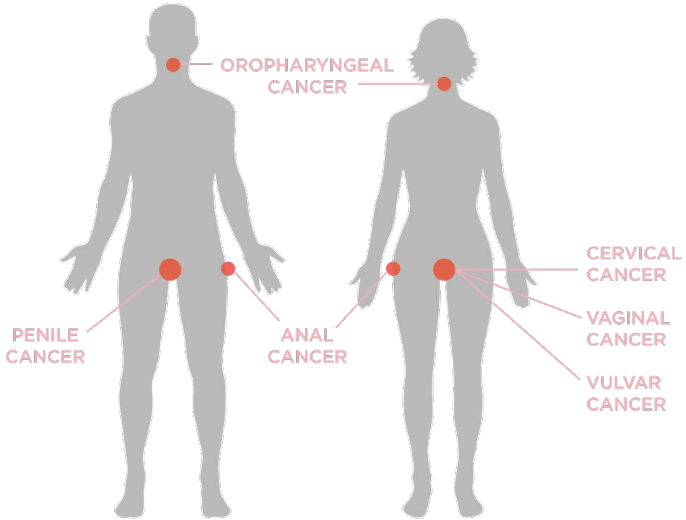
Culprit: Human Papilloma Virus

- Highly contagious group of viruses
- Most common STI in the world
  - Estimated >/= 70% of sexually active people will have at least 1 HPV infection in their lifetime

What type of STI? Viral

How is it transmitted?

- Skin to skin contact during oral, genital, and/or anal sex (penetration not necessary)
- Sharing toys



https://evekit.com/wp-content/uploads/2017/02/types-of-hpv-cancers.png
https://www.islandsexualhealth.org/

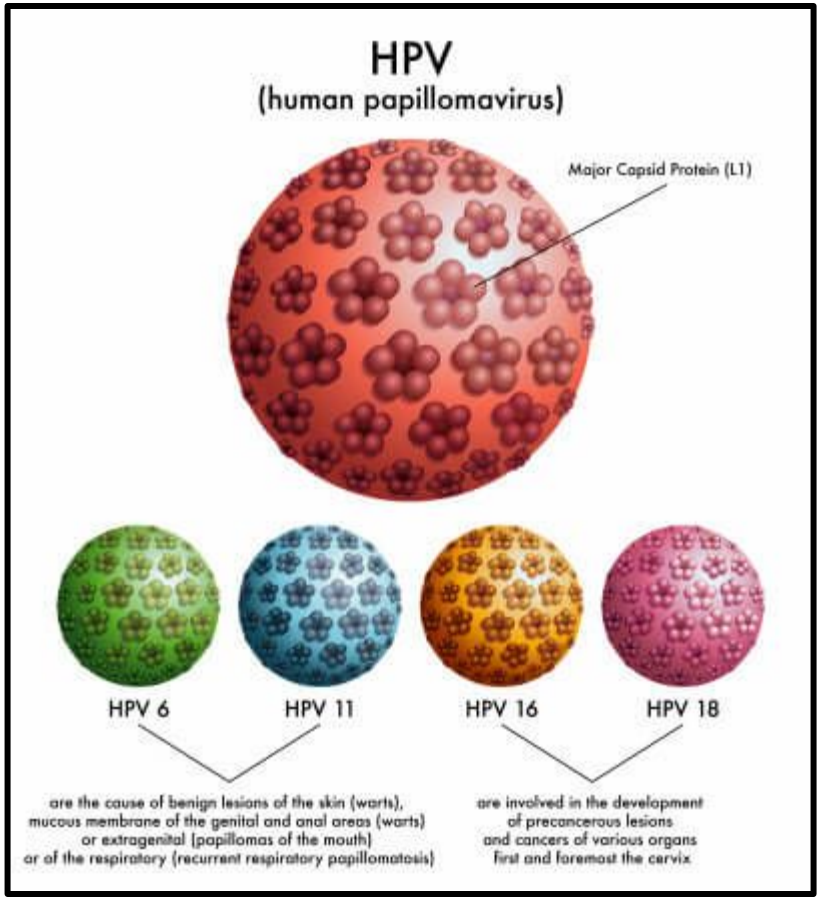
HPV

There are over 100 different types of HPV

- More than 40 types are sexually transmitted

High versus Low Risk Types

- High Risk Types ↠ cancer and precancerous lesions
  - HPV 16 and 18 = most cases
- Low Risk Types ↠ genital warts
  - HPV 6 and 11 = 90% of cases



https://www.islandsexualhealth.org/

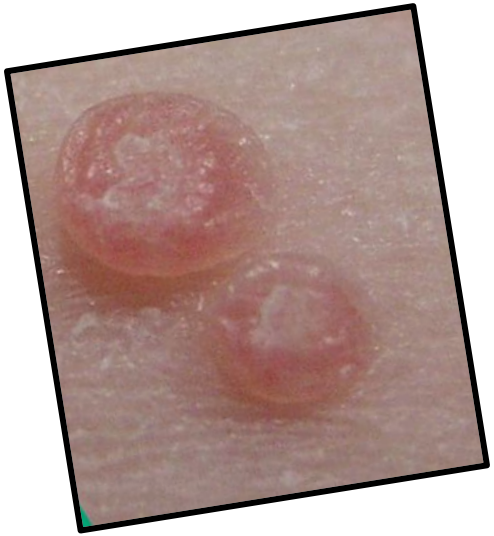
HPV

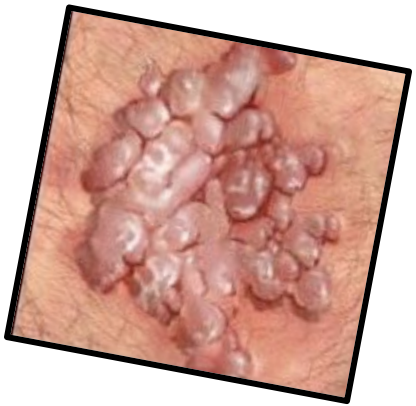
Symptoms appear:

- Most people will be asymptomatic

Looks & feels like:

- Visible genital warts or precancerous changes in the cervix, external genitalia, anus, and/or mouth





- Itchiness, discomfort during penetrative intercourse, bleeding with intercourse

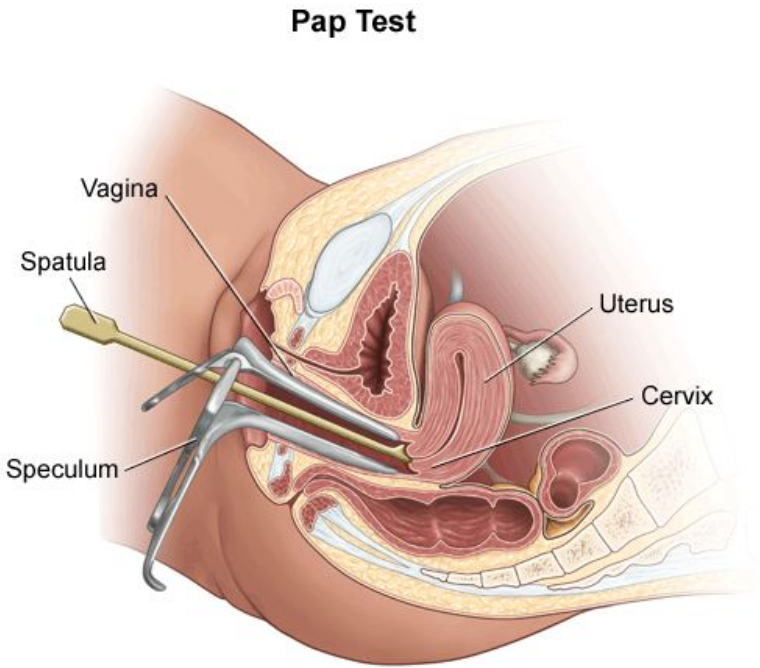
https://www.islandsexualhealth.org/
http://www.wartalooza.com/general-information/what-are-hpv-warts

HPV

How is it tested for?

- Genital warts ↠ visual inspection

- High Risk strains ↠ abnormal PAP tests
  - Pap testing = cervical cancer screening test
    - Done by collecting cervical cells and testing for any cellular changes

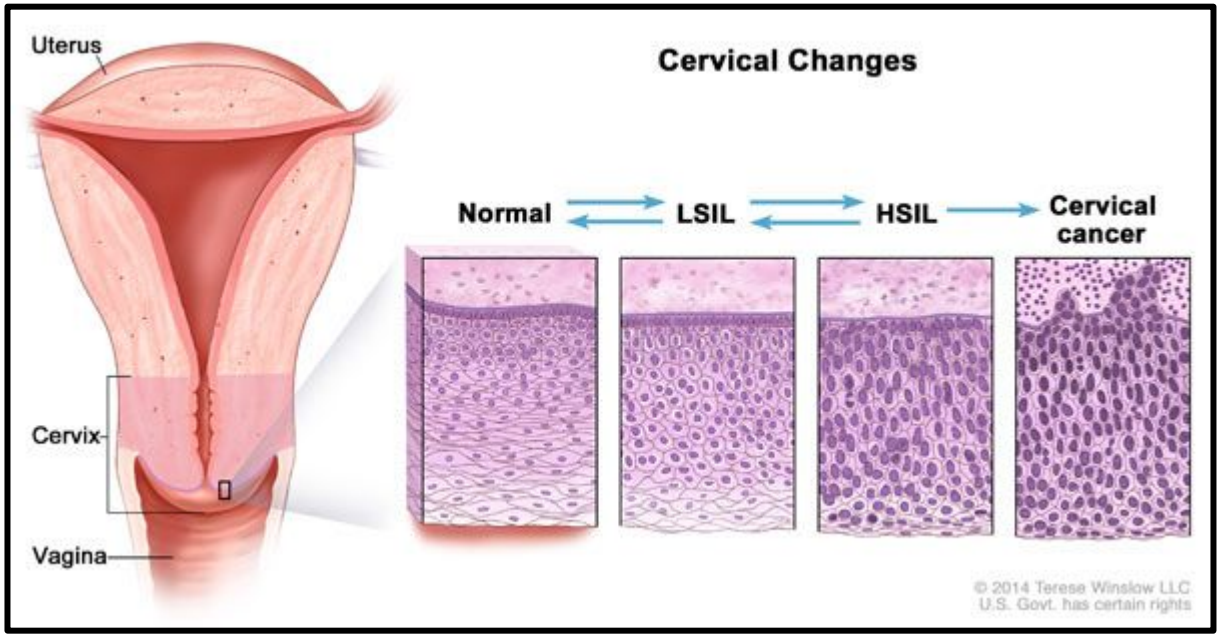


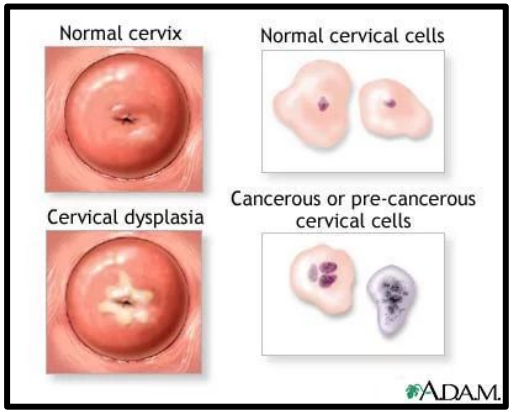
Did you know...

HPV is associated with approximately 150 cases of cervical cancer per year, in BC alone!

BC Cancer Agency. (2016). Cervical Cancer Screening Policy Change 2016 . Retrieved from http://www.screeningcancer.ca/cervix
https://www.rnpedia.com/nursing-notes/maternal-and-child-nursing-notes/papanicolaou-test-pap-smear/

HPV





LSIL = Low grade change

HSIL = High grade change

https://www.cancer.gov/types/cervical/understanding-cervical-changes
https://www.rnpedia.com/nursing-notes/maternal-and-child-nursing-notes/papanicolaou-test-pap-smear/

HPV

Revised Cervical Cancer Screening Policy (2016)

- Start Age = 25 years old + sexually active
- Screening Interval = 3 years if normal
- Repeat Cytology = 12 months for low grade abnormalities

- Screening not required if never had sexual contact of any kind
- More frequent testing for those with heightened risk

BC Cancer Agency. (2016). Cervical Cancer Screening Policy Change 2016 . Retrieved from http://www.screeningcancer.ca/cervix

HPV

How is it treated?

- There is no cure for HPV

  However,

- Many will clear the infection on their own within 18 months

  But the virus may remain dormant in the body and reactivate

Treatment options are directed to changes in the skin and/or mucous membranes:

- Genital warts can be removed by a health care provider
  - Cryotherapy or self-applied medication

- Cervical changes are closely monitored
  - Abnormal cells may be surgically removed or destroyed (colposcopy)

https://www.islandsexualhealth.org/
BC Cancer Agency. (2016). Cervical Cancer Screening Policy Change 2016 . Retrieved from http://www.screeningcancer.ca/cervix

HPV

Prevention

- 3 different vaccines that protect against certain types of HPV

1. Gardasil 4
   a. HPV 6 and 11 and HPV 16 and 18
2. Gardasil 9
   a. HPV 6, 11, 16, 18, 31, 33, 45, 52, and 58
3. Cervarix
   a. HPV 16 and 18
   b. No protection against genital warts

Each vaccine is a series of 3 injections given over the course of 6 months.

Neither vaccine will treat HPV infections present at the time of vaccination!

- Follow regular cervical screening guidelines

https://www.islandsexualhealth.org/
http://www.health.com/hpv
BC Cancer Agency. (2016). Cervical Cancer Screening Policy Change 2016 . Retrieved from http://www.screeningcancer.ca/cervix

HPV

Gardasil 9 is provided as part of the no cost vaccination series to children in grade 6.

And, as of September 2017...

B.C. extends free HPV vaccinations to Grade 6 boys

The vaccine will be provided as part of regular school-based, publicly-funded immunization clinics

By Michelle Ghoussoub, CBC News Posted: Jan 06, 2017 1:55 PM PT | Last Updated: Jan 06, 2017 4:59 PM PT

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The HPV vaccination will be provided to Grade 6 boys as part of the province's publicly-funded school immunization program. (CBC)

http://www.cbc.ca/news/canada/british-columbia/b-c-extends-free-hpv-vaccinations-to-grade-6-boys-1.3925212

Recommended for people with cervixes aged 9 - 45 years and people with penises aged 9 - 26 years

But, the cost of the vaccine is not funded.

Cost = approximately $300 for series

Talk to your family physician

https://www.healthlinkbc.ca/healthlinkbc-files/hpv-vaccines
http://www.thesmarthacks.com/2015/08/i-just-got-shot.html

Choose Your Own Adventure #3

- Your doctor recommended an annual bloodwork screen for bloodborne infections

and/or

- You have no symptoms

HIV

Human Immunodeficiency Virus

HIV

Culprit: Human Immunodeficiency Virus

What type of STI? Viral

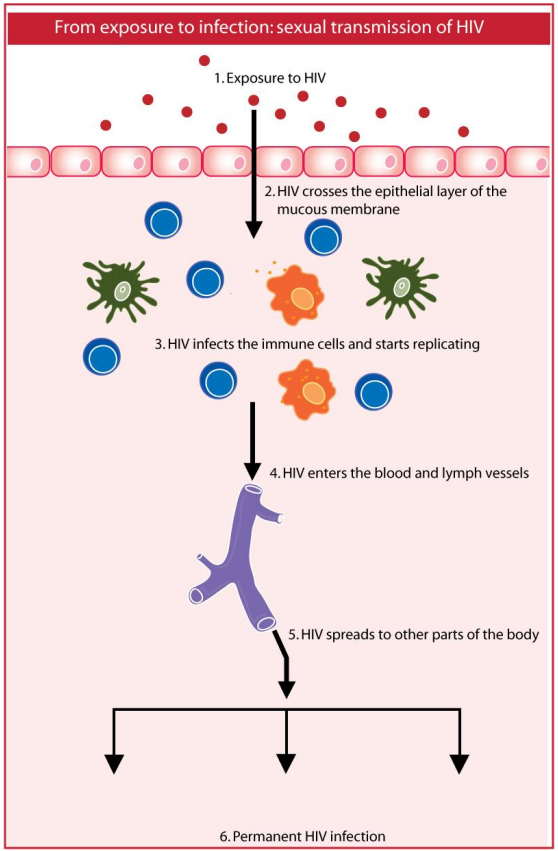
HIV is spread through direct contact with certain body fluids from someone who has HIV:

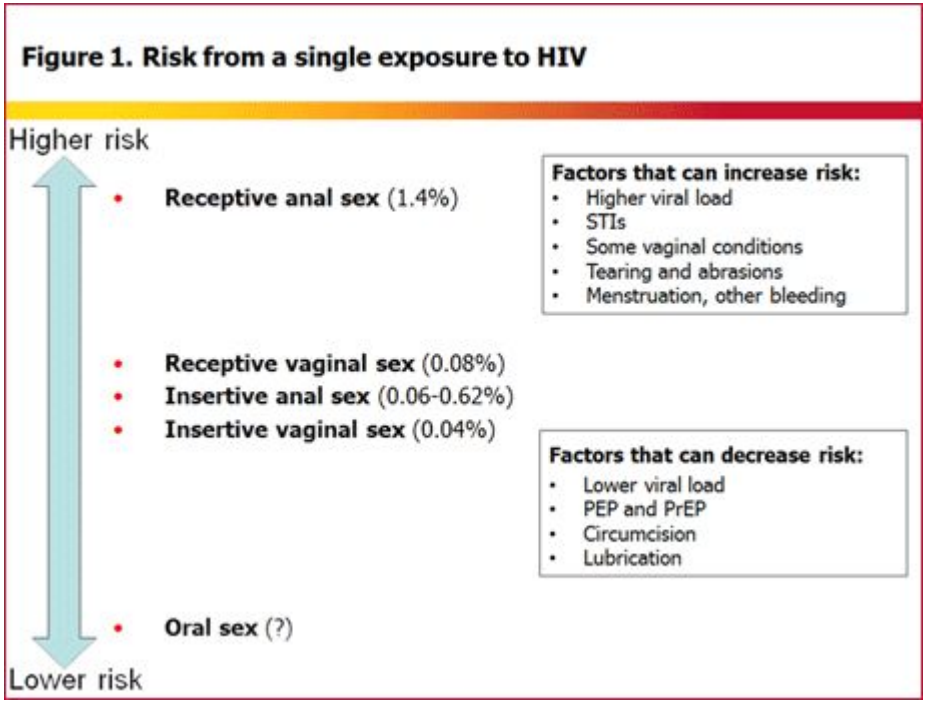
- **Blood**
- **Semen and pre-seminal fluid**
- **Rectal fluids**
- **Vaginal fluids**
- **Breast milk**

Approximately 20-25% of people in Canada are unaware of their HIV infection

https://www.avert.org/sites/default/files/styles/article_scale_style_780/public/YOU_CAN_GET_HIV.png?itok=nmfUZxBG&timestamp=1500022685
https://i.pinimg.com/originals/0b/7a/a7/0b7aa740db07471f361e619adab46725.png
https://i.pinimg.com/originals/0b/7a/a7/0b7aa740db07471f361e619adab46725.png
https://www.avert.org/hiv-transmission-prevention/myths

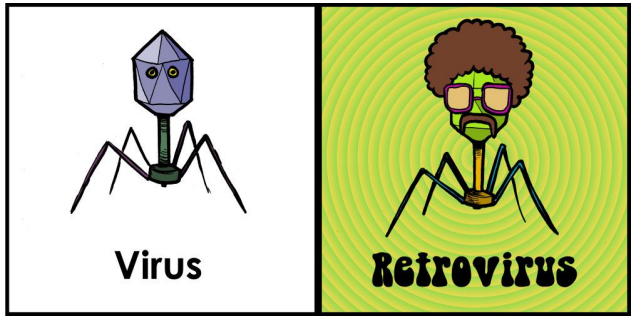
HIV





http://www.catie.ca/images/pif/exposure-diagram-eng.jpg
http://www.catie.ca/en/pif/summer-2012/putting-number-it-risk-exposure-hiv

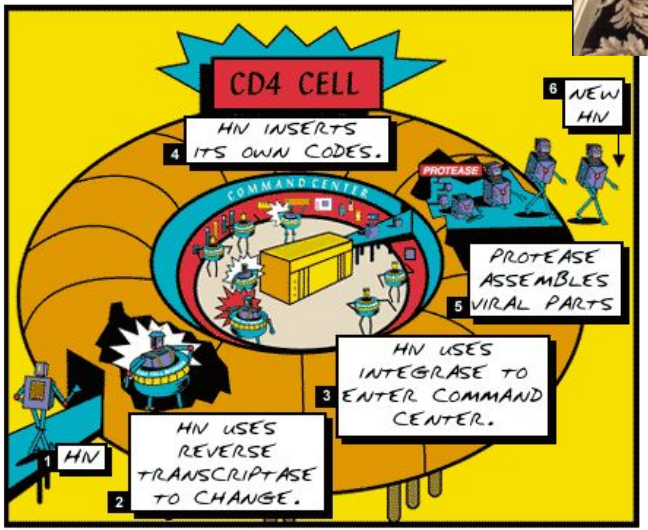
HIV



What is HIV?

- Retrovirus
  - RNA (not DNA)
  - Special “machinery” required
- Is needy and dependent
  - Cannot exist on its own! Needs host cells to multiply

- Hijacks an important cell type in the immune system so that it can multiply
  - CD_4 T Lymphocytes
- And then persistently and gradually destroys these cells



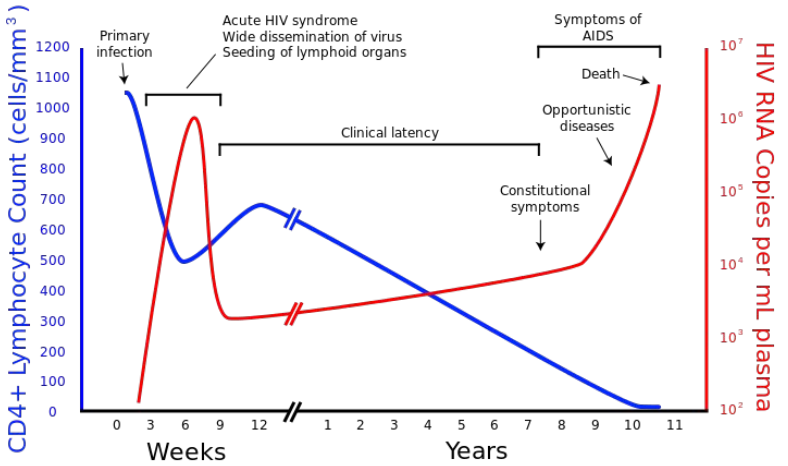
https://pics.onsizzle.com/Instagram-No-you-cant-see-me-b7ce04.png
https://userscontent2.emaze.com/images/cfb6e603-f7f0-4d08-9c1e-539797fd33fa/5ee1b574-8320-4a78-b981-e1b9dfde30cc.png
http://img.thebody.com/legacyAssets/37/08/4.2.1.4.overview.gif

HIV: Phases of Infection

1. **Infection after initial contact**
   - Asymptomatic
   - Contractable? Yes

2. **Primary/Acute Infection**
   - When: 2-6 weeks after exposure
   - What: 90% are symptomatic
   - Symptoms last for: 1-2 weeks
   - Contractable? Yes

3. **Chronic Infection**
   - When: after the primary infection phase has resolved; persistent & progressive
   - What: Asymptomatic
   - Contractable? Yes



4 . Untreated, long term
- At a CD_4 count of 200/mm³ the viral infection becomes classified as: Acquired Immunodeficiency Syndrome (AIDS)
- Immune system severely weakened
- Susceptible to infections that our bodies are normally able to defend against
- Contractable? Yes

https://en.wikipedia.org/wiki/HIV#/media/File:Hiv-timecourse_copy.svg

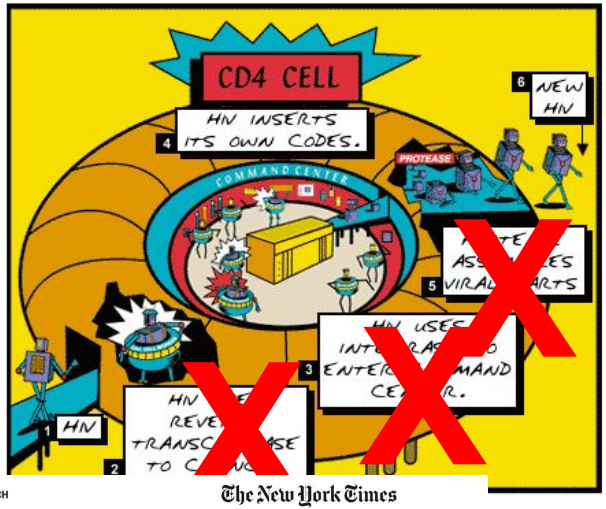
HIV

How is it tested for? Blood test

- 2 part diagnosis
- During the “window period”, the initial screening might be negative
  - Window period depends on the test (newer tests = ~2.5 weeks)

How is it treated?

- Anti-retroviral therapy (oral)
  - 3 drug combination
- Goals:
  - <u>Not curative, instead:</u>
  - Suppress/reduce “viral load” in order to:
    - Restore/preserve immune function
    - Reduce transmission



SECTIONS HOME SEARCH The New York Times

HEALTH

Scientists Report a Rare Case of H.I.V. Remission

By DONALD G. McNEIL Jr. JULY 24, 2017

How did the 'Berlin patient' rid himself of HIV?

By Jon Cohen | Sep. 25, 2014 , 3:00 PM

Researchers are closer to unraveling the mystery of how Timothy Ray Brown, **the only human cured of HIV**, defeated the virus, according to a new study. Although the work doesn't provide a definitive answer, it rules out one possible explanation.

http://img.thebody.com/legacyAssets/37/08/4.2.1.4.overview.gif
https://www.nytimes.com/2017/07/24/health/aids-virus-free.html
http://www.sciencemag.org/news/2014/09/how-did-berlin-patient-rid-himself-hiv

“Can HIV transmission be prevented?”

YES.

Extremely well, actually.

HIV: Prevention

Can we cure/completely clear HIV from a person?

- No

Can we prevent it from being passed person to person?

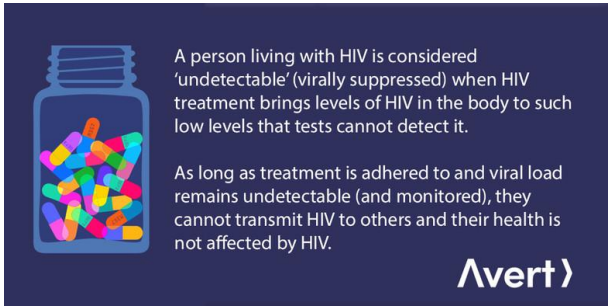
- Yes

HIV: Prevention

Can we cure/completely clear HIV from a person?
- No

Can we prevent it from being passed person to person?
- Yes

Passing: "Undetectable = untransmittable"



- Science: Breakthrough of the Year (2011)
  - ART with discordant couples
  - 96% Reduction in HIV Transmission
- JAMA (2016):
  - 1116 discordant couples, no condoms
  - ZERO transmission of HIV

Acquiring:

- Pre-exposure prophylaxis (PrEP, 1 tablet daily)
  - 90% reduction (sexually acquired)
  - 70% reduction (injection drug users)
- Post-exposure prophylaxis (PEP; within 72 hours)
  - Less common
  - "Emergency" use

Goldman JD, Frenkel LM, Mullins JI. HIV Transmission During Condomless Sex With a Seropositive Partner With Suppressed Infection. *JAMA*. 2016;316(19):2044–2045. doi:10.1001/jama.2016.16030
M.S. Cohen *et al*. Prevention of HIV-1 Infection with Early Antiretroviral Therapy. *New England Journal of Medicine*. DOI: 10.1056/NEJMoa1105243 (2011)
https://www.avert.org/infographics/undetectable-equals-untransmittable

Syphilis

"The Great Imitator"

Syphilis

Culprit: *Treponema Pallidum*

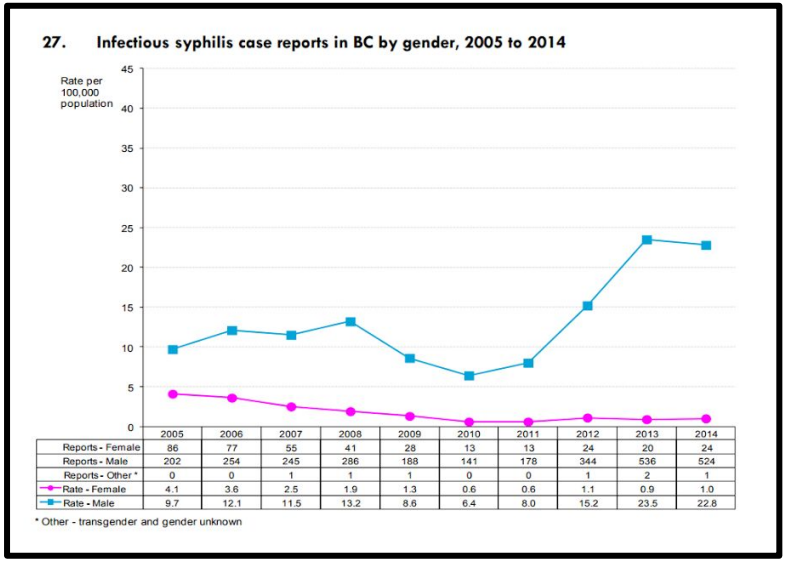
What type of STI? Bacterial

How is it transmitted?

- Skin to skin contact with syphilitic sore during oral, genital, and/or anal sex
- Transplacentally to fetus

Who?

- Rates began to increase in 2011
- Majority of BC cases are male, MSM
- Adults aged 25-39



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Reports - Female	86	77	55	41	28	13	13	24	20	24
Reports - Male	202	254	245	286	188	141	178	344	536	524
Reports - Other *	0	0	1	1	1	0	0	1	2	1
Rate - Female	4.1	3.6	2.5	1.9	1.3	0.6	0.6	1.1	0.9	1.0
Rate - Male	9.7	12.1	11.5	13.2	8.6	6.4	8.0	15.2	23.5	22.8

* Other - transgender and gender unknown

BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm
https://www.islandsexualhealth.org/

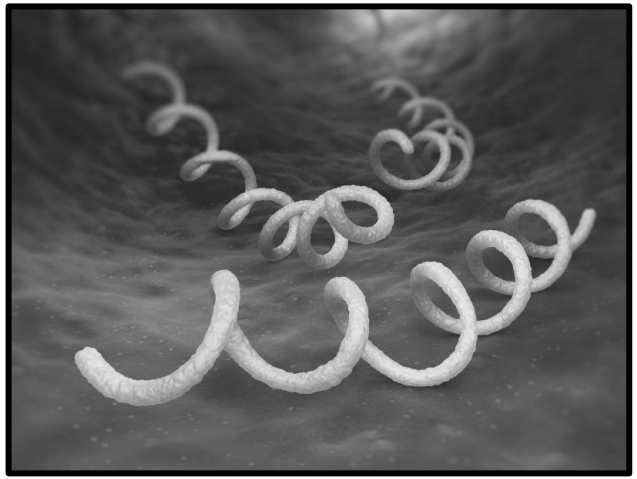
Syphilis

Symptoms appear:

- Initial sore appears 3 - 90 days post exposure
  - May not be recognized
- Without treatment individuals can enter a prolonged asymptomatic phase

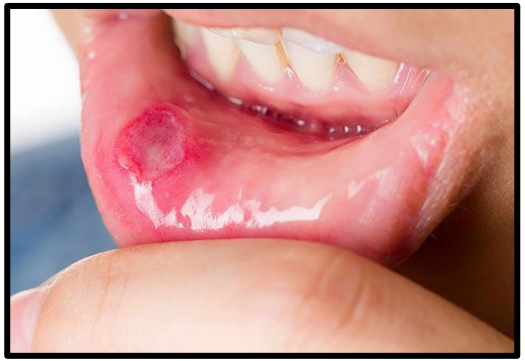
Looks & feels like:

- Varies based on stage of infection



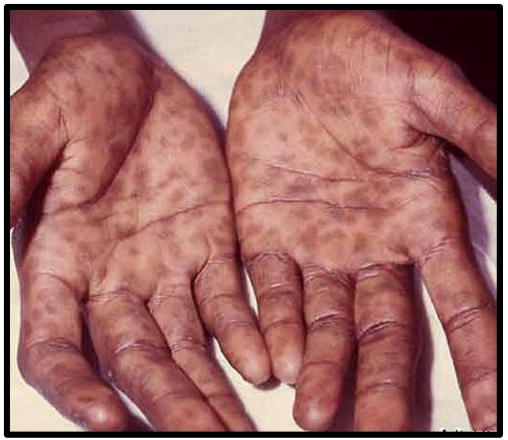
https://www.islandsexualhealth.org/
https://www.lifeline.de/krankheiten/syphilis-id39870.html

Syphilis



Infections are divided into several stages

- Primary (3 - 90 days post contact)
  - Lesion (chancre) is painless; may not be readily apparent
  - High proportion of individuals do not recall primary lesion



- Secondary (2 - 12 weeks)
  - Large spectrum of clinical manifestations

https://www.islandsexualhealth.org/
http://www.bestdentalhospital.com/mouth-sores.html
http://www.sterlingmedicaladvice.com/straight-no-chaser-syphilis-the-great-mimicker/
BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm

Syphilis

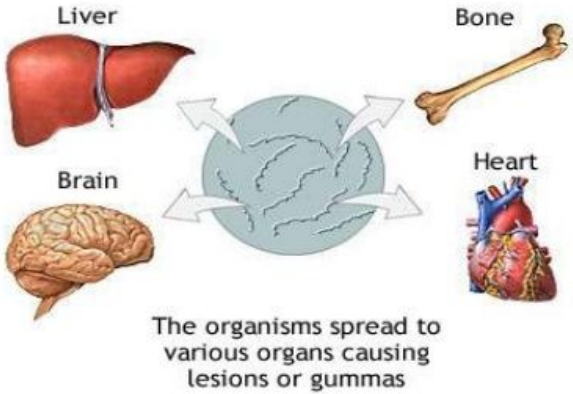
Infections are divided into several stages

- Early Latent (< 1 year duration)
  - Asymptomatic
  - Considered infectious because of the 25% chance of relapse to secondary stage

- Late Latent (> 1 year duration)
  - Asymptomatic
  - Considered non-infectious

https://www.islandsexualhealth.org/
BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm

Syphilis



Infections are divided into several stages

- Tertiary
  - Neurosyphilis (2 - 20 years post exposure)
    - Asymptomatic or symptomatic
  - Cardiovascular (10 - 20 years post exposure)
    - Aortic aneurysm, aortic regurgitation, coronary artery ostial stenosis
  - Gumma (1 - 46 years)
    - Tissue destruction of any organ

https://www.islandsexualhealth.org/
BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm
https://www.slideshare.net/shahparind/syphilis-and-neurosyphilis-101

Syphilis

How is it tested for?

- Blood Tests
- Swabs of sores

How is it treated?

- Antibiotics ↠ Benzathine penicillin G
  - Single dose (IM injection)
- Abstain from sex for 14 days after treatment started

Outcomes:

- Follow-up blood tests every 6 months for 3 years
  - More often if HIV +
- Treatment will not undo the damage caused by syphilis in the late stage

BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm
https://www.islandsexualhealth.org/
https://smartsexresource.com/topics/syphilis
https://www.healthnewsreview.org/review/strong-recap-on-cancer-blood-test-should-have-challenged-survival-claims/

HIV, Syphilis, Gonorrhea, and Chlamydia are reportable infections

You will be asked about previous sexual partners from the last 3 to 12 months.

This will be reported to public health anonymously

All partners will need to be tested and treated.

STI testing notification methods:

- In person
- Via public health

Expedited Partner Therapy

If you have been diagnosed with some STI's (e.g. Chlamydia) not only can you access treatment…

- But your partner(s)/sexual contact(s) can as well
  - Without needing to meet with the medical provider!

Why?

- Prevent passing to another person
- Prevent the possibility of your partner passing the STI back to you

https://www.canadapost.ca/shop/mc/assets/images/app/ecomm/large/141867.jpg

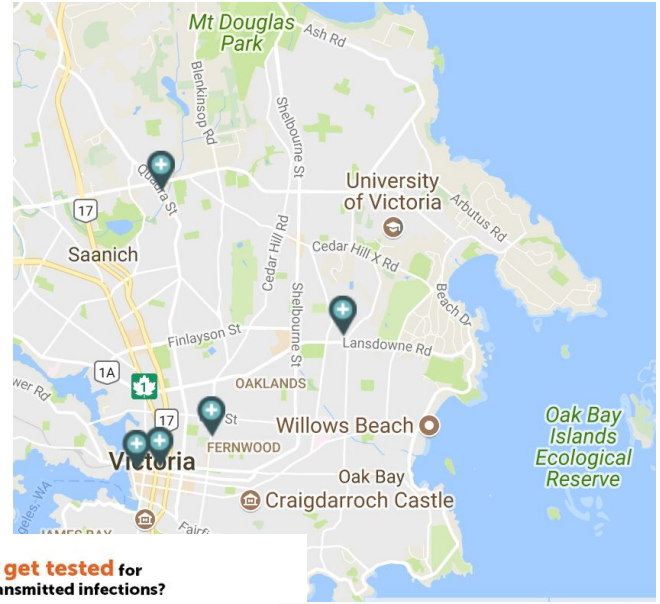
STI Testing in Victoria BC

UVIC Health Clinic (Peterson Health Centre)
-Phone: 250-721-8492
Reception phone answered 9am – 12 pm and 1-3pm

Island Sexual Health
-101-3960 Quadra Street, near McKenzie and across from Bottle Depot and White Spot

Victoria Youth Clinic

Walk in clinics, Family Doctor.. Etc.



SMARTSEX RESOURCE
A service provided by the BC Centre for Disease Control

https://smartsexresource.com

Take Home Messages

- There are many contraceptives available out there - talk to your health care provider, and choose what works for YOU

- Many STIs are asymptomatic so regular screening is important!

- Aside from barrier methods, contraceptives are not effective against STIs

Resources

Animation on birth control and how hormones work to prevent pregnancy
https://www.arhp.org/hormonalcontraception/

Thank you!

References (1)

Avert

Batur P, Kransdorf LN, Casey PM. Emergency Contraception. Mayo Clinic Proceedings 2016; 91(6): 802-807.

BC Cancer Agency. (2016). Cervical Cancer Screening Policy Change 2016 . Retrieved from http://www.screeningcancer.ca/cervix

BC Centre for Disease Control. (2015). STI in British Columbia: Annual Surveillance Report 2014. Retrieved from http://www.bccdc.ca/util/about/annreport/default.htm

Behre, H.M. et al. Efficacy and safety of injectable combination hormonal contraceptive for men. Journal of Clinical Endocrinology & Metabolism 2016; 101(12): 4779-4788.

Breastfeeding and Birth Control. Journal of Midwifery & Women's Health 2012;57(2): 209-210.

Canadian Guidelines on SExually Transmitted Infections (including their mobile app)

Catie

Centers for Disease Control and Prevention

Chabbert-Buffet N, Jamin C, Lete I, Lobo P, Nappi RE, Pintiaux A, Hausler G, Fiala C. Missed pills: frequency, reasons, consequences and solutions.

Colquitt CW, Martin TS. Contraceptive Methods: A Review of Nonbarrier and Barrier Products. Journal of Pharmacy Practice 2017; 30(1): 130-135.

European Journal of Contraception and Reproductive Health Care 2017; 22(3):165-169.

Faculty of Family Planning and Reproductive Health Care. Missed pills: new recommendations. J Fam Plann Reprod Health Care 2005; 31: 153-156

Fang, L., Oliver, A., Jayaraman, G. C., & Wong, T. (2010). Trends in age disparities between younger and middle-age adults among reported rates of chlamydia, gonorrhea, and infectious syphilis infections in canada: Findings from 1997 to 2007. *Sexually Transmitted Diseases, 37*(1), 18. doi:10.1097/OLQ.0b013e318lb617dc

Frank-Herrmann P. et al. The effectiveness of a fertility awareness based method to avoid pregnancy in relation to a couple's sexual behaviour during the fertile time: a prospective longitudinal study. Human Reproduction 22(5): 1310-1319.

Ghanem, K., & Tuddenham, S. (2016, August). Screening for sexually transmitted infections. Retrieved from https://www.uptodate.com/contents/screening-for-sexually-transmitted-infections

Government of Canada (2016). Canadian Guidelines on Sexually Transmitted Infections. Retrieved from canada.ca/publichealthagency/infectiousdieseases

Island Sexual Health Website

References (2)

Goldman JD, Frenkel LM, Mullins JI. HIV Transmission During Condomless Sex With a Seropositive Partner With Suppressed Infection. *JAMA.* 2016;316(19):2044–2045. doi:10.1001/jama.2016.16030

Government of Canada (Public Health - STI Facts and Information)

HealthLInk BC

Hall JE. Guyton and Hall Textbook of Medical Physiology. Philadelphia, PA: Elsevier, 2016.

Hsiang D, Dunn S. Emergency Contraception. Canadian Medical Association Journal 2016; 188(17/18): E536.

M.S. Cohen *et al*. Prevention of HIV-1 Infection with Early Antiretroviral Therapy. *New England Journal of Medicine*. DOI: 10.1056/NEJMoa1105243 (2011)

Suazo, P.A., Tognarelli, E.I., Kalergis, A.M. et al. Med Microbiol Immunol (2015) 204: 161. https://doi.org/10.1007/s00430-014-0358-x

SexandU.ca

The Society of Obstetricians and Gynaecologists of Canada, 2017.

Options for Sexual Health Website

Wald A, Corey L. Persistence in the population: epidemiology, transmission. In: Arvin A, Campadelli-Fiume G, Mocarski E, et al., editors. Human Herpesviruses: Biology, Therapy, and Immunoprophylaxis. Cambridge: Cambridge University Press; 2007. Chapter 36. Available from: https://www.ncbi.nlm.nih.gov/books/NBK47447/