

# FACT SHEET



## Routes, Risks, and Realities of Infectious Disease Transmission, Prevention, & Care: Information & Resources for NYC Prosecutors & Law Enforcement Professionals (2022)

Infectious disease exposure is an ongoing concern for all Americans, and directly affects the work of prosecutors handling cases involving individuals living with infectious diseases. In 2021, major prosecutors and their representatives from the five New York City (NYC) boroughs gathered with public health officials from the NYC Department of Health and Mental Hygiene to discuss issues, concerns, and updated scientific data on HIV and infectious diseases. The product of the convening and ensuing discussions resulted in this reference sheet that encapsulates basic information about the mechanisms of infectious disease transmission, prevention, and treatment to assist prosecutors and other law enforcement professionals to make informed decisions in cases that may involve HIV or other infectious diseases.<sup>1</sup>

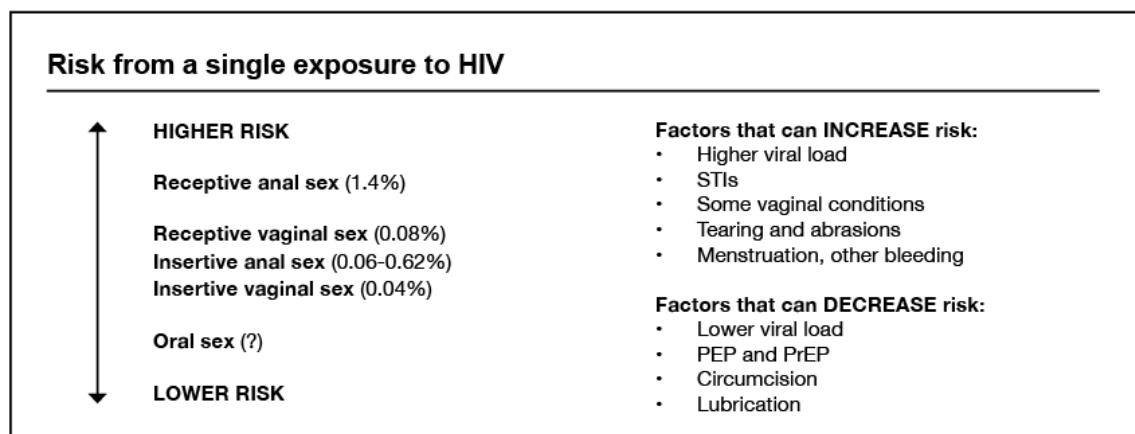
### HIV

The overall rate of HIV transmission through the primary route of sexual contact is very low and much smaller than other sexually transmitted diseases.<sup>2</sup> According to the CDC, effective treatment reduces the already-low risk of transmission to zero.<sup>3</sup>

#### HIV can only be transmitted three ways:<sup>4</sup>

1. Contact with blood and blood products (including contact through intravenous drug use);
2. Sexual intercourse (penis-vaginal contact, penis-anal contact, and rarely, if ever, by fellatio); or
3. Mother-to-child during pregnancy, delivery, or breastfeeding.

The chart below shows the chance of HIV transmission when you or your sexual partner have HIV, from the highest risk (receptive anal sex) to the lowest risk (oral sex) and without factoring in either treatment or other STIs. It also shows factors that would raise or lower that risk.



Source: <https://www.thebodypro.com/article/putting-a-number-on-it-the-risk-from-an-exposure-t>

## HIV transmission through sex

**Anal intercourse:** Receptive anal intercourse poses the highest risk of HIV transmission in the U.S.<sup>5</sup> The rate of transmission for receptive anal sex with a partner who has HIV and is not on treatment is about 1% to 2%, or about 13 cases of transmission for every 1,000 acts of unprotected receptive anal sex with a person living with HIV.<sup>6</sup>

**Vaginal intercourse:** The transmission risk from penile to vaginal intercourse is approximately 8 in 10,000 sex acts (.08%), or less than a tenth of 1%; the risk of transmission from unprotected vaginal to penile intercourse is even less, approximately 4 in 10,000.<sup>7</sup>

**Oral intercourse:** The transmission risk for receptive and insertive oral sex is extremely low to zero.<sup>8</sup> Fellatio (mouth to penis) is the only type of oral sex that carries more than a theoretical risk of HIV transmission, and only for the partner providing oral sex.<sup>9</sup> There are no documented cases of transmission from cunnilingus (mouth to vulva/clitoris) or anilingus (mouth to anus).<sup>10</sup>

### Factors that can affect transmission risk:

The risk of HIV transmission varies based on 1) infectiousness (amount of virus present) of the source person; and 2) the susceptibility of the recipient.

- When a person has acute infection (i.e., the first few weeks after becoming infected) the amount of virus is very high and the transmission risk is about **7-10 times higher than the statistical risk cited in the previous section**.
- STIs such as chlamydia or gonorrhea can increase the amount of virus in the genital tract.<sup>11</sup> If either sexual partner has genital ulcers or STIs, the risk of HIV infection can increase.<sup>12</sup>
- The probability of sexual transmission of HIV goes from very small to zero when the partner with HIV is on antiretroviral therapy (ART) and the amount of virus in their blood is very low or undetectable.<sup>13</sup>
- PrEP (pre-exposure prophylaxis) is the use of smaller doses of ART by people without HIV to prevent HIV infection and is 99% effective at protecting against HIV transmission.<sup>14</sup>
- PEP (post-exposure prophylaxis) is the use of ART to prevent HIV transmission after a substantial exposure to HIV. PEP must be started within 72 hours after HIV exposure through an established route of transmission; PEP treatment should be started without delay. PEP is taken for 28 days and is 80-90% effective in preventing HIV transmission if taken immediately after exposure.<sup>15</sup> PEP can be discontinued later if the person is determined to already have HIV infection or if the source of the exposure is determined not to have HIV infection.<sup>16</sup>

Activity	Risk-per-exposure
Vaginal sex, female-to-male, no condom	0.04% (1 in 2,380)
Vaginal sex, female-to-male, no condom, undetectable viral load	0%
Vaginal sex, male-to-female, no condom	0.08% (1 in 1,234)
Vaginal sex, male-to-female, no condom, undetectable viral load	0%
Receptive anal sex, no condom	1.38% (1 in 72)
Receptive anal sex, no condom, undetectable viral load	0%
Insertive anal sex, no condom	0.11% (1 in 909)
Insertive anal sex, no condom, undetectable viral load	0%
Receptive fellatio, no condom, viral load not known	Estimates range from 0.00% to 0.04% (1 in 2,500)
Pregnancy and childbirth, no preventative measures	22.6% (1 in 4)
Pregnancy and childbirth, undetectable viral load	0.14% (1 in 715)
Injecting drug use	0.65% (1 in 158)
Needlestick injury with contaminated blood	0.23% (1 in 435)
Blood transfusion with contaminated blood	92.5% (9 in 10)

Source: <https://www.aidsmap.com/about-hiv/estimated-hiv-risk-exposure>

### Contact that ranges from extremely low to no risk:

- HIV is not spread by tears, saliva, sweat, or any bodily fluid that does not contain a significant amount of blood and virus. None of these alone can transmit HIV.<sup>17</sup>
- There are no documented cases of HIV transmission by contact with vomit, urine, or feces.<sup>18</sup>
- HIV transmission via biting is theoretically possible if blood is involved, but is a very unlikely route of transmission.<sup>19</sup> While there have been a very small number of alleged transmissions via biting, **over a 40-year period there has not been a single well-documented case of a bite resulting in HIV transmission**.<sup>20</sup>

### **HIV Testing (and what it can and cannot tell us):**

- The time period between exposure and an HIV [test's](#) ability to detect infection can range from 10 days to 90 days after exposure, depending on the type of test used.<sup>21</sup>
- [Testing](#) cannot determine the [direction](#) of HIV transmission between two individuals. No forensic test exists that can establish such a causal link of who infected whom beyond a reasonable doubt.

### **Living with HIV**

- HIV is a treatable chronic disease, although it remains incurable, like other viral STIs (e.g., human papillomavirus (HPV) and herpes).<sup>22</sup>
- With daily medication (for most people, one pill per day) and reasonably healthy lifestyle choices, people living with HIV live a normal life span and do not transmit HIV to others.<sup>23</sup>

## **HEPATITIS**

- Many people with [hepatitis](#) do not have symptoms and do not know they are infected.<sup>24</sup>
- If symptoms occur with acute infection, they can appear up to 6 months after exposure.<sup>25</sup>
- Symptoms of chronic viral hepatitis can take decades to develop.<sup>26</sup>

### **Hepatitis A Transmission, Prevention, and Care**

- Hepatitis A (HAV) is spread when a person ingests feces — even in microscopic amounts — and from sexual contact or contact with objects, food, or drinks contaminated by feces from an infected person. There is a vaccine that prevents HAV.<sup>27</sup>

### **Hepatitis B Transmission, Prevention, and Care**

- Hepatitis B (HBV) is transmitted via blood, semen, and vaginal fluid, and from mother to infant during childbirth.<sup>28</sup>
- Most HBV infection happens through needle-sharing and unprotected sexual intercourse. It also can be transmitted through exposure of HBV-active blood to open sores or wounds.<sup>29</sup>
- HBV is not spread through sneezing, coughing, or spitting.<sup>30</sup> [HBV transmission by a bite is extremely rare.](#) Only a handful of plausible transmissions by biting have been documented.
- HBV is treatable, and there is a vaccine to prevent it. The vast majority of people living with HBV live healthy lives.<sup>31</sup>

### **Hepatitis C Transmission, Prevention, and Care**

- Hepatitis C (HCV) is transmitted through blood. Sexual transmission is also possible but is much less common.<sup>32</sup>
- The most common form of HCV transmission is through needle-sharing.<sup>33</sup>
- HCV is curable with medication; HCV also may also clear out of the blood on its own without treatment.<sup>34</sup>
- People who develop chronic HCV usually live healthy lives, and the majority live without any symptoms.<sup>35</sup>

## **OTHER SEXUALLY TRANSMITTED INFECTIONS (STIs)**

### **General Information**

- Testing alone cannot establish the source of STI transmission.<sup>36</sup>
- [It is possible to have a vaginal infection without sexual contact.](#)<sup>37</sup>
- [It is possible to have an STI without symptoms and still pass an STI on to another partner.](#)<sup>38</sup>

### **Syphilis**

- [Syphilis](#) is transmitted during vaginal, anal, or oral sex by direct contact with a syphilitic sore, known as a chancre, on or around the genitals, anus, or mouth.
- Syphilis can be cured with antibiotics.<sup>39</sup>

## Chlamydia

- [Chlamydia](#) is transmitted through sexual contact with the penis, vagina, mouth, or anus of an infected partner. [Risks of infection are about 1 in 36 sexual encounters.](#)<sup>40</sup>
- Chlamydia is known as a 'silent' infection because most infected people don't show symptoms.<sup>41</sup>
- Untreated chlamydia in women can cause pelvic inflammatory disease (PID), infertility, ectopic pregnancy, and chronic pelvic pain.<sup>42</sup> [Men rarely have health problems linked to chlamydia.](#)
- Chlamydia can be cured with antibiotics, typically in 2-4 weeks.<sup>43</sup>

## Gonorrhea

- [Gonorrhea](#) is transmitted through sexual contact with the penis, vagina, mouth, or anus of an infected partner.
- Many men and women with gonorrhea are asymptomatic.<sup>44</sup>
- Untreated gonorrhea can cause serious and permanent health problems in both women and men, such as PID, chronic pelvic pain and infertility.<sup>45</sup>
- Gonorrhea can be cured with antibiotics. However, treatment-resistant gonorrhea is a growing concern.<sup>46</sup>

## Herpes

- The herpes simplex virus (HSV) is categorized into 2 types: HSV-1 and HSV-2. HSV-1 is mainly transmitted by oral-to-oral contact; HSV-2 is an STI that causes genital herpes.<sup>47</sup>
- Most people with HSV-2 never know they have it [because they have no signs or symptoms or the signs and symptoms are so mild they go unnoticed.](#)
- When symptoms are noticeable, the first episode is generally the worst. Some people never have a second episode.<sup>48</sup> [Others, however, can have recurrent episodes for decades.](#)
- HSV-2 transmission risk depends on factors such as viral load, type of sex, and use of condoms.<sup>49</sup>

## HPV (Human Papilloma Virus)

- There are many types of HPV, the majority of which are asymptomatic or unrecognized. Most sexually active persons are exposed to HPV during their lifetime.<sup>50</sup>
- Two types of HPV are high-risk for cancer and cause the majority of cervical, penile, vulvar, vaginal, anal, and throat cancers and precancers. Other types of HPV infection cause genital warts.<sup>51</sup>

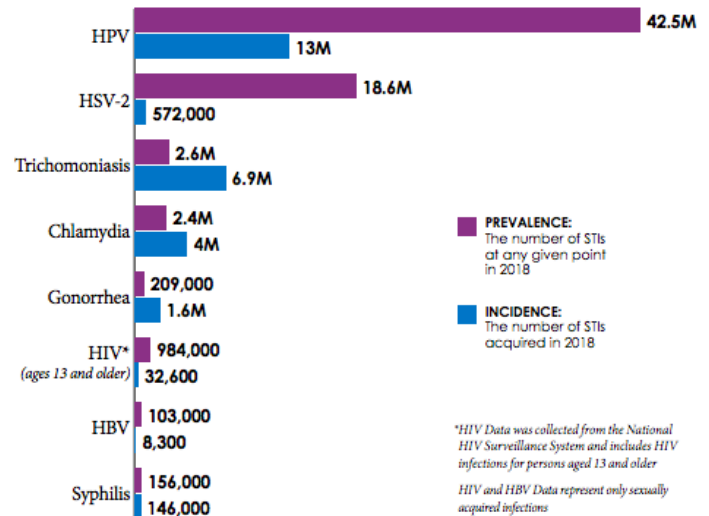
## NON-SEXUALLY TRANSMITTED INFECTIOUS DISEASES:

### Tuberculosis

- [Tuberculosis](#) (TB) is an airborne disease that primarily affects the lungs but can move to other body parts.
- An individual can become infected with [TB](#) when they are close to another person who has active TB and who coughs, sneezes, talks, or spits.
- Most people infected with TB do not develop symptoms; this is "latent TB" which is not transmissible. But without treatment the TB bacteria can remain in their bodies and can become "active TB" in the future.<sup>52</sup>
- Antibiotics are used to treat TB. In some cases, treatment can last for months.<sup>53</sup>

## LATEST CDC ESTIMATES REVEAL NEARLY 68 MILLION STIs IN THE U.S., AND MORE THAN 26 MILLION NEW INFECTIONS

Estimated number of new and existing sexually transmitted infections



Source: <https://www.cdc.gov/nchstp/newsroom/2020/2018-STI-incidence-prevalence-estimates.html>

## RESOURCES

- To locate New York City testing and treatment sites *for any infectious disease discussed above*, visit the NYC Health Map at <https://a816-healthpsi.nyc.gov/NYCHealthMap>. The Health Map is an online resource to help New Yorkers locate health care providers and services citywide.
- For information about the NYC Department of Health and Mental Hygiene's low-cost or free testing and treatments services *for HIV & other STIs* visit <https://www1.nyc.gov/site/doh/services/sexual-health-clinics.page>.
- If a person thinks they were *exposed to HIV* and wants information about post-exposure prophylaxis (PEP): Call the NYC PEP hotline at 844-3-PEPNYC (844-373-7692); or go immediately to a clinic or emergency department and ask for emergency PEP.
- The New York City Department of Health and Mental Hygiene's Tuberculosis Chest Centers provide free *evaluation and treatment for tuberculosis*. For more information, visit: <https://www1.nyc.gov/site/doh/services/tuberculosis-chest-centers.page>.
- For free and low-cost options for *hepatitis B testing and treatment* visit: <https://www1.nyc.gov/site/doh/health/health-topics/hepatitis-b.page>.
- For free and low-cost options for *hepatitis C testing and treatment*, visit: <https://www1.nyc.gov/site/doh/health/health-topics/hepatitis-c.page>.

***If you have questions about incidents or scenarios that have caused fears about HIV, HBV, HCV, other STIs, or TB, email or call:***

For questions about incidents involving HIV exposure, prevention, and treatment, email or call:

Dr. Jeffrey Birnbaum, MD, MPH

Director, HEAT Program, SUNY-Downstate

Brooklyn NY

Email: [Jeffrey.Birnbaum@downstate.edu](mailto:Jeffrey.Birnbaum@downstate.edu) Phone: 718-282-1199; 917-692-7812

For questions about incidents involving exposure, prevention, and treatment involving other STIs, email:

Dr. Stephan Kohlhoff, MD

Associate Professor, Pediatrics and Medicine

Chief, Pediatric Infectious Diseases

SUNY-Downstate

Brooklyn NY

Email: [Stephan.Kohlhoff@downstate.edu](mailto:Stephan.Kohlhoff@downstate.edu)

For referrals to medical experts within the NYC Department of Health and Mental Hygiene who can answer questions about infectious diseases, including STIs, email or call:

Adrian Guzman, JD, MPH

Director, HIV Policy and External Affairs

Bureau of Hepatitis, HIV, and Sexually Transmitted Infections

New York City Department of Health and Mental Hygiene

Email: [aguzman2@health.nyc.gov](mailto:aguzman2@health.nyc.gov) Phone: 929-271-6482

Pronouns: he/him/his

### **Additional Resources:**

[Chlamydia-CDC Fact Sheet](#)

[Gonorrhea-CDC Fact Sheet](#)

[Genital Herpes-CDC Fact Sheet](#)

[Hepatitis B Questions and Answers for the Public](#)

[Hepatitis C Questions and Answers for the Public](#)

[Genital HPV Infection-CDC Fact Sheet](#)

[Syphilis-CDC Fact Sheet](#)

[CDC, Sexual Assault and Abuse and STIs – Adolescents and Adults](#)

## Endnotes:

- <sup>1</sup> All of the information in this Fact Sheet is the product of peer-reviewed scientific studies and/or provided by national public health and science agencies.
- <sup>2</sup> <https://www.webmd.com/sexual-conditions/most-common-stds-men-women#1>; [CDC. STDs and Related Conditions.](#)
- <sup>3</sup> <https://www.cdc.gov/hiv/basics/livingwithhiv/treatment.html>
- <sup>4</sup> <https://www.cdc.gov/hiv/basics/hiv-transmission/body-fluids.html>
- <sup>5</sup> <https://www.cdc.gov/hiv/basics/hiv-transmission/ways-people-get-hiv.html>
- <sup>6</sup> <https://stanfordhealthcare.org/medical-conditions/sexual-and-reproductive-health/hiv-aids/causes/risk-of-exposure.html>
- <sup>7</sup> <https://stanfordhealthcare.org/medical-conditions/sexual-and-reproductive-health/hiv-aids/causes/risk-of-exposure.html>
- <sup>8</sup> <https://www.cdc.gov/hiv/basics/hiv-transmission/ways-people-get-hiv.html>
- <sup>9</sup> <https://www.verywellhealth.com/hiv-and-oral-sex-49604>
- <sup>10</sup> <https://www.verywellhealth.com/hiv-and-oral-sex-49604> (concerning oral HIV transmission; explaining difference between “documented” and “theoretical.”)
- <sup>11</sup> [https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-\(stis\)](https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis))
- <sup>12</sup> <https://www.cdc.gov/std/hiv/stdfact-std-hiv-detailed.htm>
- <sup>13</sup> <https://www.cdc.gov/hiv/basics/hiv-transmission/increase-hiv-risk.html>
- <sup>14</sup> <https://www.cdc.gov/hiv/basics/prep/prep-effectiveness.html>
- <sup>15</sup> CDC, Post-Exposure Prophylaxis, <https://www.hiv.gov/hiv-basics/hiv-prevention/using-hiv-medication-to-reduce-risk/post-exposure-prophylaxis>.
- <sup>16</sup> CDC, Updated guidelines for antiretroviral postexposure prophylaxis after sexual, injection-drug use, or other nonoccupational exposure to HIV—United States. Centers for Disease Control and Prevention; 2016. <https://www.cdc.gov/hiv/pdf/programresources/cdc-hiv-nPEP-guidelines.pdf>.
- <sup>17</sup> [CDC. What Body Fluids Transmit HIV?](#)
- <sup>18</sup> “Only certain body fluids from a person who has HIV can transmit HIV. These fluids include blood, semen (cum), pre-seminal fluid (pre-cum), rectal fluids, vaginal fluids, and breast milk. These fluids must come in contact with a mucous membrane or damaged tissue or be directly injected into the bloodstream (from a needle or syringe) for transmission to occur.” [CDC. What Body Fluids Transmit HIV?](#)
- <sup>19</sup> Dirk Schürmann, Christian Hoffmann, Christoph Ruwwe-Glösenkamp, Lutz Gürtler, *HIV transmission by human bite: a case report and review of the literature—implications for post-exposure prophylaxis*, [Infection](#). 2020; 48(6): 949–954. Published online 2020 Jul 26. doi: [10.1007/s15010-020-01477-6](https://doi.org/10.1007/s15010-020-01477-6)
- <sup>20</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3345645>; Cresswell FV, Ellis J, Hartley J, Sabin CA, Orkin C, Churchill DR., *A systemic review of risk of HIV transmission through biting spitting: implications for policy*. HIV MED. 2018;19:532–540. doi: 10.1111/hiv.12625
- <sup>21</sup> <https://www.cdc.gov/hiv/basics/hiv-testing/test-types.html>
- <sup>22</sup> <https://www.healthline.com/health/stds-that-cannot-be-cured#incurable-stds>
- <sup>23</sup> <https://www.cdc.gov/hiv/basics/livingwithhiv/treatment.html>
- <sup>24</sup> <https://www.cdc.gov/hepatitis/abc/index.htm>
- <sup>25</sup> <https://www.cdc.gov/hepatitis/abc/index.htm>
- <sup>26</sup> <https://www.cdc.gov/hepatitis/abc/index.htm>
- <sup>27</sup> <https://www.cdc.gov/hepatitis/abc/index.htm>
- <sup>28</sup> <https://www.who.int/news-room/questions-and-answers/item/hepatitis>
- <sup>29</sup> <https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm#treatment>
- <sup>30</sup> <https://www.cdc.gov/hepatitis/hbv/pdfs/hepbwhensomeoneclose.pdf>
- <sup>31</sup> <https://www.cdc.gov/hepatitis/abc/index.htm>
- <sup>32</sup> <https://www.who.int/news-room/questions-and-answers/item/hepatitis>
- <sup>33</sup> <https://www.who.int/news-room/fact-sheets/detail/hepatitis-c>
- <sup>34</sup> <https://www.cdc.gov/hepatitis/hcv/index.htm>
- <sup>35</sup> <https://www.who.int/news-room/fact-sheets/detail/hepatitis-c>
- <sup>36</sup> <https://www.sharecare.com/health/sexuality-teen-perspective/who-gave-sexually-transmitted-disease>
- <sup>37</sup> <https://www.fphandbook.org/common-vaginal-infections-often-confused-sexually-transmitted-infections>; CDC, Bacterial Vaginosis Statistics, <https://www.cdc.gov/std/bv/stats.htm>. Sometimes STIs can be transmitted nonsexually, such as from mothers to their infants during pregnancy or childbirth, or through blood transfusions or shared needles. <https://www.mayoclinic.org/diseases-conditions/sexually-transmitted-diseases-stds/symptoms-causes/syc-20351240>

- <sup>38</sup> [https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-\(stis\)](https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis))
- <sup>39</sup> <https://www.cdc.gov/std/syphilis/stdfact-syphilis-detailed.htm>
- <sup>40</sup> See, e.g., <https://markmanson.net/std-guide#chlamydia>
- <sup>41</sup> <https://www.cdc.gov/std/chlamydia/stdfact-chlamydia-detailed.htm>
- <sup>42</sup> <https://www.cdc.gov/std/chlamydia/stdfact-chlamydia-detailed.htm>
- <sup>43</sup> <https://www.healthline.com/health/sexually-transmitted-diseases/how-long-does-it-take-for-chlamydia-to-show-up>
- <sup>44</sup> <https://www.cdc.gov/std/gonorrhea/stdfact-gonorrhea-detailed.htm>
- <sup>45</sup> <https://www.cdc.gov/std/gonorrhea/stdfact-gonorrhea-detailed.htm>
- <sup>46</sup> <https://www.cdc.gov/std/gonorrhea/arg/default.htm>
- <sup>47</sup> <https://www.cdc.gov/std/herpes/stdfact-herpes.htm>
- <sup>48</sup> <https://www.mayoclinic.org/diseases-conditions/sexually-transmitted-diseases-stds/in-depth/std-symptoms/art-20047081>
- <sup>49</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4725379/>. The risk for herpes transmission from women to men is approximately 1.7 transmissions per 1,000 *unprotected* sex acts and 0.6 per 1,000 *protected* sex acts. The risk for herpes transmission from men to women is approximately 28.5 transmissions per 1,000 *unprotected* sex acts (95% CI, 10.8-74.1) and 1.3 male-to-female transmissions per 1,000 *protected* acts. Genital transmission of HSV-2 between female sex partners is infrequent but can occur. See <https://www.cdc.gov/std/treatment-guidelines/wsw.htm>. See also <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4006256/> (discussing difficulty of pinpointing HSV 2 transmission probabilities).
- <sup>50</sup> <https://www.cdc.gov/std/treatment-guidelines/hpv.htm>
- <sup>51</sup> Genital HPV Fact Sheet – CDC <https://www.cdc.gov/std/hpv/stdfact-hpv.htm>; <https://www.cdc.gov/std/treatment-guidelines/hpv.htm>
- <sup>52</sup> [https://www.hivlawandpolicy.org/sites/default/files/HIV\\_AIDS%20Reporting%20Manual.pdf](https://www.hivlawandpolicy.org/sites/default/files/HIV_AIDS%20Reporting%20Manual.pdf)
- <sup>53</sup> <https://www.cdc.gov/tb/topic/treatment/tbdisease.htm>