

9-1 Risk Factor Ascertainment

A. Definitions

The following are risk-related terms as defined by the CDC:

1. Cases of public health importance (COPHI)

These are cases initially reported with a rare or unusual risk factor for HIV infection. Examples of these types of cases are occupational exposure, a human bite or tattoo, blood transfusion, or transplant recipient. COPHI cases should be highest priority for follow-up. See *Appendix A: Cases of Public Health Importance (COPHI) and Protocol 776*.

2. Epidemiologic follow-up

This is the investigative process for obtaining additional information on a reported HIV/AIDS case.

3. No reported risk (factor) (NRR)

A case is classified as an NRR if it is reported without any risk factor information or with unconfirmed COPHI risk factor information.

4. No identified risk (factor) (NIR)

This is an NRR case for which an HIV risk factor cannot be identified or confirmed 1) although all available data sources have been reviewed or contacted; or 2) epidemiologic follow-up was either not initiated or not completed, but 12 months have elapsed since the date of the initial case report.

5. Risk factors

The collective term for the individual routes of exposure/transmission on which data are routinely collected for surveillance of HIV/AIDS cases. All risk factors listed on the case report form require a "yes," "no," or "unknown." See *Appendix B: Risk Factors* for a list of risk factors.

6. Transmission category

The term used to summarize multiple risk factors (defined in *Appendix C: Transmission Categories*) that an individual may have been exposed to by selecting the most likely mode of transmission. The selection of the most likely route of transmission is based on a presumed hierarchical order of transmission. See *Appendix C: Transmission Categories* for a list of transmission categories.

B. Risk Factor Ascertainment

Surveillance staff should make every effort to obtain accurate and complete information on all risk factors when completing a case report form (CRF). Central Office expects to have an identified HIV risk factor for at least 85% of cases reported in a given year.

In order to improve completeness of risk factor information, all newly-reported HIV cases should have their medical record reviewed within 1 month of learning about the case. Medical records should be reviewed thoroughly to ensure that any recorded risk factor information is captured. Depending on the facility of abstraction, risk factor information may be in any part of the medical record, so all sections of a medical record must be reviewed. Within three months of learning about a case, surveillance staff should also investigate other data sources (e.g. STD*MIS) or other

facilities at which the case has received care in addition to the initial reporting facility when conducting epidemiologic follow-up of cases. These additional data sources should be prioritized based on where risk factors are most likely to be found.

There are a number of sources from which risk factor information may be found, including:

- Medical record of a testing provider
- Medical record of a treating provider
- Telephone call or visit to a social services case manager
- STD*MIS
- Patient Interviews

Sites should continue to investigate cases with no reported risk until all reasonable sources of information have been reviewed. Sites should use every opportunity, such as telephone contact and facility visits, to continue to look for risk on cases.

To assist in the collection of risk factor information, Central Office will provide each surveillance site with a list of cases missing an identified risk factor each month.

C. Complete Risk Factor Reporting

After reviewing a particular document source, the following risk factors must be completed for all cases (i.e. "yes," "no," or "unknown" must be checked). None of these risk factors should be left blank:

- Sex with male
- Sex with female
- Injected non-prescription drugs
- Received clotting factor for hemophilia / coagulation disorder

The following risk factors must have a response option checked if the case is a male and "Sex with female" was marked "Yes" or if the case is female and "Sex with male" was marked "Yes":

- Heterosexual contact with intravenous/injection drug user
- Heterosexual contact with person with hemophilia / coagulation disorder
- Heterosexual contact with transfusion recipient with documented HIV infection
- Heterosexual contact with transplant recipient with documented HIV infection
- Heterosexual contact with person with AIDS or documented HIV infection, risk not specified

Additionally, female cases with a "Yes" response to "Sex with male" must also have a completed response marked for the following risk factor (i.e. "Yes," "No," or "Unknown"):

- Heterosexual contact with bisexual male

The following unusual risk factors should only be completed for cases where it is believed that the unusual risk factor was how the case may have acquired HIV. Selecting "Yes" to any of the following risk factors will initiate a COPHI investigation (see section 3-2):

- Received transfusion of blood / blood components (other than clotting factor)
- Received transplant of tissue / organs or artificial insemination
- Worked in a health care or clinical laboratory setting
- Other documented risk

Surveillance staff should collect all applicable risk factors and not stop when a single risk factor has been identified.

9-2 Cases of Public Health Importance (COPHI)

Cases of public health importance are those cases with an unusual reported risk factor. Below is a summary of the risk factors that are considered to be cases of public health importance by the CDC. For more specific details on each of these risk factors refer to *Appendix A: Cases of Public Health Importance (COPHI) and Protocol 776*.

A. NRR Risk Factors

Risk factors that occur in persons who are NRR (i.e. have no identified transmission category) that must be investigated include:

- Received transfusion of blood/blood components in the United States after March 1985
- Received clotting factor injection for hemophilia or another chronic coagulation disorder, and date of birth is after March 1985
- Received transplant of tissue/organs or artificial insemination
- Worked in a health care or clinical laboratory setting with possible exposure to human blood or other body fluids
- Women whose only sexual contact has been with another woman
- Other exposure to human blood or body fluids including but not limited to the following:
 - Household or other 'casual' contact
 - Patient exposure in a health care setting
 - Physical interaction where blood or body fluids were exchanged
 - Occupational exposure other than in the health care industry
 - Tattoo, piercing, other cosmetic exposures
 - Intentional self-inoculation or intentional inoculation by another person
 - Human bite
 - Other unusual circumstance (not previously identified as a risk factor)

B. Pediatric Risk Factors

Risk factors for pediatric cases that must be investigated regardless of whether the reported person has another risk factor include:

- Sexual contact with a male
- Sexual contact with a female
- Injected illicit or non-prescribed drugs
- Mother was known seronegative after the child's birth

C. HIV-2 and Variant Strain Surveillance

Cases that are infected with unusual strains of HIV, including those that are not typically transmitted in the United States, or cases that are not identified through standard testing:

- Idiopathic CD4 lymphocytopenia
- HIV antibody negative or other laboratory test inconsistent with the clinical picture
- HIV-2
- Unusual strains including Group O

D. Unusual Manifestations

Unusual manifestations of clinical, laboratory, and geographic clusters of public health importance that relate to the HIV epidemic.

E. Investigation and Follow-up of COPHI Cases

Investigation and follow-up of COPHI cases are a CDC priority. If one of the aforementioned risk factors is identified for a case, this case will be flagged in eHARS as a potential COPHI case. All potential COPHI cases will be investigated to confirm the reported exposure. For all flagged COPHI cases the following steps will be taken.

1. The COPHI coordinator at Central Office will review all flagged cases at the time of report and contact each site regarding any potential COPHI case.
2. If the flagged case is determined not to be a potential COPHI case, then the risk factor will be corrected in eHARS and no further action will be taken. If the flagged case is determined to be a potential COPHI case, an investigation of the case will be initiated within 3 months of the date of initial case report or at the time of notification from the patient or provider, if not sooner. The CDC COPHI Coordinator will be contacted at this time.
3. The surveillance site will follow Protocol 776 (*Appendix A: Cases of Public Health Importance (COPHI) and Protocol 776*) for case investigation. As part of the investigation the case will need to be interviewed if detailed risk factor information was not obtained through discussion with health care providers or review of medical records.
 - a. If the surveillance staff assigned are trained to conduct interviews, they will perform the interview. If not, the interview will be assigned to a local DIS or a qualified Central Office staff member.
 - b. Standard worksheets/questionnaires for COPHI are completed by the surveillance staff and sent to Central Office for review. Once patient identifiers have been removed, these forms will be sent to the CDC COPHI coordinator.
4. After completion of the investigation, if the risk factor is confirmed in consultation with the CDC, the case will be closed in eHARS with a final disposition. Cases will be closed after one year if no risk factor information becomes available. However, the case will be reopened if risk factors are able to be confirmed at a later date.

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Risk Factors

Risk factors for adults/adolescents:

Currently, the introduction to the patient history section of the adult case report form (CDC 50.42A) states "After 1977 and preceding the first positive HIV antibody test or AIDS diagnosis, this patient had..." *Technical Guidance for HIV/AIDS Surveillance Programs* changes the introductory statement to "Before the earliest known positive HIV test or AIDS diagnosis, this patient had..." If the person was exposed to HIV infection by any of the following routes before his/her first positive HIV test or AIDS diagnosis, then it is considered a CDC-defined risk factor for HIV infection:

1. Male who had sex with another male: This wording is intended to avoid the issue of sexual orientation or identity (whether the man considered himself homosexual, bisexual, "gay," "on the down-low," or basically heterosexual but occasionally having sex with other men). The important consideration here is not how this male perceives himself, but simply whether he had sex with another man. In this context, "having sex" or "sexual contact" means penis-to-mouth, penis-to-anus, or mouth-to-anus contact (but not mouth-to-mouth contact) regardless of which role (insertive or receptive) is played by the male in question. It does not include contact only with skin (not a body orifice). However, if explicit information on whether the man had sex with another man is unavailable, the man may be assumed to have done so if he stated that he was "homosexual" or "bisexual" or described himself with a similar term that implies that he had sex with another man. In addition, male-to-male sex may be inferred if he was diagnosed with any rectal STI (e.g., gonorrhea) before or at the time of HIV diagnosis.

2. Injected illicit or non-prescribed drug(s): This means receiving an injection, either self-administered or given by another person, of a drug that was not prescribed by a physician for this person. It generally includes illicit drugs used for producing euphoria, but it may also include prescription drugs that were not prescribed (e.g., estrogen, testosterone, anabolic steroids, or human growth hormone). It does not include injection of prescribed drugs (e.g., insulin for treating diabetes). The drug itself is not the source of the HIV infection, but the context of it being taken illicitly (i.e., without a prescription) is likely to be associated with sharing of injection equipment (e.g., syringes, needles, cookers), which can result in transmission of blood borne pathogens, such as HIV. The case report form does not include a separate question asking if injection equipment was shared.

3. Heterosexual contact with MSM and/or IDU [had sex (male or female) with someone of the opposite sex who had either of the two risk factors listed previously in items 1 or 2 (MSM and/or IDU)]: In this context, "having sex" or "sexual contact" means contact of one person's penis or mouth with the vagina or anus or penis of another person. It does not include mouth-to-mouth contact or contact of the penis or mouth with skin (not a body opening). Because the prevalence of HIV infection is higher among men who have had sex with men than among heterosexual non-IDU populations, such sex partners will be presumed to have HIV infection.

4. Heterosexual contact with person with hemophilia/coagulation disorder, transfusion recipient, or transplant recipient with documented HIV infection [Had sex (male or female) with someone of the opposite sex who has been diagnosed with HIV infection after having any risk factor for HIV infection listed below in items 6 (receipt of clotting factor for coagulation disorder), 7 (receipt of blood transfusion), or 8 (receipt of transplant or artificial

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insemination)]: Having sex is defined as previously in item 3. Because HIV infection has an extremely low prevalence among recipients of clotting factors who were born in March 1985 or after, recipients of blood transfusions, and recipients of transplants or artificial insemination, such sex partners will not automatically be presumed to have HIV infection. Instead, their HIV infection must be documented (e.g., by the history given by the person being reported as a case to his/her health care provider), but it does not require confirmation by a special investigation. For the sex partner's HIV infection to be attributed to any of these risk factors (e.g., receipt of clotting factor, transfusion, or transplant), the sex partner's diagnosis of HIV infection should have occurred after the sex partner's exposure to these risk factors (the exposure must not have occurred only after the diagnosis). If the time relationship between the sex partner's HIV infection diagnosis and the point in time that the sex partner engaged in the risk factor behavior cannot be ascertained, the risk factor may be assumed to have preceded the sex partner's diagnosis.

5. Heterosexual contact with person with documented HIV infection, risk not specified [Had sex (male or female) with someone of the opposite sex who was diagnosed with HIV infection but was not known to have had any of the risk factors of sex partners described above in items 3 and 4]: Having sex is defined as previously in item 3. The sex partner's HIV infection must be documented (e.g., by the history given by the person being reported as a case), but it does not require confirmation by a special investigation.

6. Received clotting factor injection for hemophilia or another coagulation disorder: This mainly involves Factor VIII and Factor IX. In the United States, screening of blood donors for antibody to HIV began in March 1985, which reduced the likelihood that clotting factor obtained after that month would be contaminated with HIV. In addition, clotting factor blood products for hemophilia began to be more effectively heat-treated around that time. More recently, clotting factors have been synthesized without using donated blood. Therefore, it would be unexpected for persons with hemophilia born in or after March 1985 to acquire HIV infection by this route, and such an occurrence must be confirmed by an investigation under the protocol for cases of public health importance (COPHI).

7. Received transfusion of blood or blood components (e.g., platelets): Because screening of blood donors in the United States for antibody to HIV began in March 1985, it would be unexpected for persons who received a transfusion in or after March 1985 to acquire HIV infection by this route. Therefore, such an occurrence must be confirmed by an investigation under the protocol for cases of public health importance (COPHI).

8. Received a transplant of tissue or organ or artificial insemination: Because of its rarity and public health implications, any acquisition of HIV by this route must be confirmed by an investigation under the protocol for cases of public health importance (COPHI).

9. Worked in a health care or clinical laboratory setting with possible exposure to human blood or other body fluids: This has been reworded to clarify that it includes work that involves physical contact with patients, blood, or body fluids. For example, it does not include work as a clerk, secretary, or administrator who does not have physical contact with patients. It may include a custodian, however, who could be exposed to contaminated materials that have been discarded. Because of its rarity and public health implications, any acquisition of HIV by this route must be

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confirmed by an investigation under the protocol for special cases of public health importance (COPHI).

10. Other exposure to human blood or body fluids: This could include other forms of occupational exposure, such as that experienced by a police officer or fire fighter, or non-occupational exposures, such as contact with another person's blood or an open wound as a result of providing informal health care to another person or as a result of a fight. Additionally, any alleged HIV transmission in medical settings attributed to breach of infection control procedures (such as dialysis –related transmission or exposure to contaminated medical instruments (e.g. endoscopy of colonoscopy equipment)) should be confirmed by an investigation under the protocol for special cases of public health importance (COPHI).

Risk factors for children:

1. Perinatal (mother-to-child) exposure with specified maternal risk factors: The child's mother had any of the risk factors described previously in items 2–5 or 7, or 8 in adult risk factors before her first positive HIV test or AIDS diagnosis, and the mother was not known to be uninfected after the child's birth:

- Maternal injection drug use
- Maternal sexual contact with a man known to have had HIV infection or who
- was at high risk because he
 - was an injection drug user, or
 - was a man who had sex with other men, or
 - had HIV infection after having received clotting factor blood products, a transfusion, or a transplant
- Maternal receipt of a transfusion (and mother known to have had HIV infection)
- Maternal receipt of a transplant (and mother known to have had HIV infection)
- Maternal receipt of clotting factors (item 6 of adult risk factors) is not included among these possible maternal risk factors because hemophilia tends to be an X-linked hereditary disorder that does not occur among females. If the mother's experience of one of these risk factors is known to have occurred only after her diagnosis of HIV infection or AIDS, then it should not be accepted as the route by which she became infected.
- Maternal perinatal exposure

2. Perinatal (mother-to-child) exposure without specified maternal risk factors: The child's mother has or had (if deceased) HIV infection or AIDS, but she was not known to have any of the risk factors described previously in items 2–5 or 7, or 8 of adult risk factors before her first positive HIV test or AIDS diagnosis, and she was not known to have been uninfected after the child's birth.

3. Risk factors for children, other than the mother's HIV infection: These all require confirmation under the protocol for special cases of public health importance (COPHI).

- **Received clotting factor injection for hemophilia or another coagulation disorder:** This is defined as previously in adult risk factor item 6.
- **Received transfusion of blood or blood components (e.g., platelets):** This is defined as previously in adult risk factor item 7.
- **Received a transplant of tissue or organ or artificial insemination:** This is defined as previously in adult risk factor item 8.

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- **Sexual abuse by an HIV-infected person:** This is defined as sexual contact of the child with a man or woman who had HIV infection or AIDS. The case report form asks if the child had sexual contact with a male or a female, but does not ask if that sex partner had HIV infection, because it is expected that the infection status of the perpetrator of the sexual abuse may not be known when the form is initially completed. A “yes” answer to the question about sexual contact will then result in an investigation under the COPHI protocol, which should reveal the infection status of the sex partner. So far, no case of pediatric HIV infection or AIDS has been reported in which a child had sex with a female; so in practice, this risk factor is limited to sexual abuse by an HIV infected man.
- **Injected illicit or non-prescribed drug(s):** This is defined the same as previously in adult risk factor item 2, except that its rarity in children requires it not be accepted as such until it is confirmed by COPHI investigation.
- **Other exposure to human blood or body fluids:** This is similar to adult risk factor item 10. Such exposures among children may involve physical contact between children while playing or fighting, in which blood or serum from an injury of one child may come into contact with an open wound of the other child, or a child who received pre-masticated (pre-chewed) food from a person who is HIV positive.

Appendix C

Transmission Category

“Transmission category” is the term for classifying the patient history variable data collected on the HIV Confidential Case Report form by assigning mode of HIV transmission hierarchically.

Transmission categories are meant to convey the most likely way the person was infected based on a presumed hierarchical order of transmission developed in the early years of the AIDS epidemic, and based on what was known at the time about how HIV was transmitted. The hierarchy has not changed even though our understanding of the most efficient ways of HIV transmission has changed. The expanded transmission category variable has 5 categories of heterosexual contact (HC), which differ by the risk factor of the sex partner.

For cases in which there were multiple risk factors, the hierarchical nature of the transmission category classification may conceal some risk factors. For example, with a combination of IDU and HC, only the IDU would be selected and the HC would be hidden. An exception to the hierarchy is made only for the combination of MSM and IDU, in which one of those two risk factors is not selected over the other and both are presented in a combination category. The transmission category and expanded transmission category variables include some categories that come in pairs—one category for adults/adolescents and another for children—for 1) receipt of blood transfusion/transplant, 2) receipt of blood products for treatment of hemophilia, 3) “other” risk factors, and 4) absence of identified risk factors. The list of categories in the transmission category classification is shown in the following sample table using 2009 national data:

Table 1. Diagnoses of HIV infection, by transmission category, 2009-40 states with confidential name-based HIV infection reporting

Transmission category	No.	%
Male adult or adolescent		
Male-to-male sexual contact	15,488	57
Injection drug use	1,018	4
Male-to-male sexual contact and injection drug use	632	2
Heterosexual contact ^a	2,266	8
Other ^b	7,749	29
Subtotal	27,153	100
Female adult or adolescent		
Injection drug use	591	7
Heterosexual contact	6,639	78
Other ^b	1,301	15
Subtotal	8,531	100
Total	35,684	

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis.

^a Heterosexual contact with a person known to have, or to be at high risk for, HIV infection.

^b Includes hemophilia, blood transfusion, perinatal exposure, and risk factor not reported or not identified.

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Table 1: Distribution of US AIDS cases reported through 2003 by transmission category

Transmission Category	Frequency	Percent
MSM	373257	44.22
IDU	203226	24.08
MSM & IDU	49915	5.91
Adult Hemophiliac	4633	0.55
HTC	105616	12.51
Adult Transfusion*	8777	1.04
Adult Other	29	0.00
Adult Undetermined	88964	10.54
Pediatric Hemophiliac	563	0.07
Mother w/HIV	8353	0.99
Pediatric Transfusion*	415	0.05
Pediatric Other	20	0.00
Pediatric Undetermined	299	0.04
Total†	844067	100.00

* Receipt of a blood transfusion, donated organ or tissue, or artificial insemination.

† Excluding cases reported from more than one health department.

Female Heterosexual Contact Category

Prior to 2010, hierarchical transmission categories required that a case of HIV infection reported for a female at birth (without history of IDU) with a history of sexual contact with a male be classified as heterosexual contact only if there was specific knowledge of the partner's HIV status or the partner's risk factor(s) for HIV infection. The requirement to have information regarding the male partner's HIV status/risk factor history resulted in an increase in the percentage of cases classified as NIR among females over time. In 2008, CDC assembled the Female Presumed Heterosexual Contact (FPHC) workgroup, comprised of state and local surveillance and CDC staff, to address the problem of increasing rates of NIR classification among females. Basing their work on the 2007 CSTE position statement "Heterosexual HIV Transmission Classification", the FPHC Workgroup proposed the following definition for classifying cases of HIV infection among females as "presumed due to" heterosexual contact: a female at birth, with a history of sexual contact with a male, and not classified as an IDU, should be classified as a heterosexual contact regardless of the reporting of HIV-status or risk history of her sexual partner(s). In 2010, the HIV Incidence and Case Surveillance Branch accepted this definition for the classification of cases among females when using either transmission or exposure categories to present surveillance data. Operationally, this means that the female heterosexual contact category includes a female at birth, that in the Patient History Section of the HIV Confidential Case Report Form has a 'Yes' checked for "sex with male" and the response to 'injected prescription drugs' is not 'Yes' (the field may be checked as "No," "Unknown," or can be missing).

The CSTE position statement "Heterosexual HIV Transmission Classification" can be found on the CSTE web site at <http://c.ymcdn.com/sites/www.cste.org/resource/resmgr/PS/07-ID-09.pdf>.

Exposure Category

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“Exposure category” is the term for classifying the patient history variable data (individual risk behaviors or events collected on the confidential HIV Case Report form) collected on the HIV Case Report Form by assigning individual variables into mutually exclusive categories. They are meant to convey all the known ways the person could have been exposed to HIV. The exposure category classification was developed as an alternative to the hierarchical transmission category classification. The assumption on which the current hierarchical classification (“transmission category”) is based—that sufficient information is collected to allow accurate selection of the most likely mode of transmission from among multiple possible routes of exposure—is probably not true, and the resulting concealment of routes of exposure lower in the hierarchy by those that are higher is therefore unjustified and misleading.

The exposure category still is hierarchical with respect to cases of public health importance (COPHI). Thus, if the COPHI investigation confirms that HIV transmission probably resulted from a documented occupational needle-stick or from a confirmed blood transfusion for example, then these rare routes of transmission will “trump” other more traditional modes even if the case gives a history of other risk behaviors. Unconfirmed COPHI cases will likely remain as NIR unless the case is classified into a transmission or exposure category based on additional history. (See Appendix 2 for COPHI Classification in Transmission and Exposure Categories)

Unlike transmission category, information regarding the female partner’s HIV status/risk factor(s) is not required in order to assign cases among males into the heterosexual contact exposure category. For females, as discussed in the “Female Heterosexual Contact” section, information regarding the male partner’s HIV status/risk factor(s) is not required in order to classify cases among females into transmission or exposure categories. The list of categories in the exposure category classification is shown in the following sample table using 2009 national data:

Table 2. Diagnoses of HIV infection, by exposure^a category, 2009-40 states with confidential name-based HIV infection reporting

Exposure category	No.	%
Male adult or adolescent		
Male-to-male sexual contact	14,785	54
Injection drug use	680	3
Heterosexual contact	6,076	22
Male-to-male sexual contact and injection drug use	530	2
Injection drug use and heterosexual contact	338	1
Male-to-male sexual contact and heterosexual contact	705	3
Male-to-male sexual contact, injection drug use, and heterosexual contact	102	0
Perinatal	12	0
Other ^b	3	0
No identified risk factor	3,922	14
Subtotal	27,153	100
Female adult or adolescent		
Injection drug use	284	3
Heterosexual contact	6,639	78

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Injection drug use and heterosexual contact	307	4
Perinatal	15	0
Other ^b	5	0
No identified risk factor	1,281	15
Subtotal	8,531	100
Total	35,684	

^aCategories used to classifying patient history variable data collected on the HIV Confidential Case Report Form by assigning individual variables into mutually exclusive categories. The categories are meant to convey all the known ways the person could have been exposed to HIV.

^bIncludes blood transfusions, blood products, transplant, artificial insemination, or occupational exposure.