

# What *is* AIDS?



Photo: How Christie

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There are many serious debates underway relating to HIV/AIDS, including the question of whether HIV has really been isolated and whether it really causes AIDS.

My purpose here, specifically and narrowly, is to review the issues surrounding the definition of AIDS itself. The dominant theme in the debates has been the character of HIV, while little attention has been given to exploring the meaning of AIDS. Some people talk about HIV as if it were a disease, while for others it is a hypothesized cause of disease. The premise of this essay is that there is little point in debating the causes of something if there is no clear and agreed specification of what that thing is.

The history of AIDS definitions varying over time is well documented elsewhere (e.g., Duesberg; Giraldo; Koliadin; Root-Bernstein; Shenton). Changes over time can be expected as science advances. Here, I want to focus on the definitions that are in use as we come into the new millennium. What is the current definition of AIDS? Presumably that definition must be clear before we can sensibly explore the possible linkages between HIV and AIDS. The discussion here is not about empirical questions that can be addressed through the tools of science. Rather, we are talking here about a precursor of good science: the formulation of good definitions and good questions.

Individuals hold many different views of what AIDS 'really' is. The approach adopted here is to go to the highest official sources to find their official, technical specifications of what constitutes AIDS.

### Global definitions

The website of UNAIDS, the Joint United Nations Programme on HIV/AIDS, offers no definition of AIDS, and does not suggest any source of a definition. The World Health Organization, a member of UNAIDS, takes the lead in setting out the global definition, and it is the WHO definition that guides UNAIDS data collection efforts.

The World Health Organization's official definition of AIDS

is presented in its WHO Recommended Surveillance Standards of 1997. Although AIDS is called a syndrome (Acquired Immune Deficiency Syndrome), WHO lists it under the category of diseases rather than syndromes, and says 'AIDS is a disease (WHO 1997, p. 21).' WHO's *Recommended Case Definition* is presented here in Table 1 (next page). The numbers in parentheses are links to journal references; they are omitted from the table. Items 1 and 2 in the table draw heavily from the CDC's definition, discussed in the following section. Item 2 in WHO's definition ends with a colon, as shown in Table 1. The text above these two numbered items acknowledges that a variety of other definitions of AIDS are used as well, especially in countries with limited laboratory facilities.

### Centers for Disease Control, United States

The dominant definition currently is that developed by the Centers for Disease Control in the United States. It offers the following summary definition (at [http://www.cdc.gov/nchstp/hiv\\_aids/pubs/faq/faq2.htm](http://www.cdc.gov/nchstp/hiv_aids/pubs/faq/faq2.htm)):

***AIDS stands for acquired immunodeficiency syndrome. An HIV-infected person receives a diagnosis of AIDS after developing one of the CDC-defined AIDS indicator illnesses. An HIV-positive person who has not had any serious illnesses also can receive an AIDS diagnosis on the basis of certain blood tests (CD4+ counts).***

***A positive HIV test result does not mean that a person has AIDS. A diagnosis of AIDS is made by a physician using certain clinical criteria (e.g., AIDS indicator illnesses).***

This summary definition is an attempt to make the technical definition comprehensible. The full technical definition effective January 1, 1993, is as follows:

***CDC has expanded the acquired immunodeficiency syndrome (AIDS) surveillance case definition to include all human immunodeficiency virus (HIV)-infected adolescents and adults aged greater than or equal to 13 years who have either a) less than 200 CD4+ T-lymphocytes/uL; b) a CD4+ T-lymphocyte percentage of total lymphocytes of less than 14%; or***



## WHO'S RECOMMENDED CASE DEFINITION FOR AIDS

Different case definitions are used in different countries, depending on population factors (children, adults, relative occurrence of opportunistic infection) and on the laboratory infrastructure and training available. Current most used case definitions include for countries with . . .

more sophisticated laboratory facilities

CDC 1987 (1)

CDC/CD4 (2)

European (3)

limited laboratory facilities

Abidjan/WHO (4)

Bangui/WHO (clinical) (5)

Caracas/PAHO (6) revised Caracas/PAHO (7)

### 1. 1987 CENTERS FOR DISEASE CONTROL AND PREVENTION SURVEILLANCE DEFINITION FOR AIDS

Without laboratory evidence of HIV infection (in the absence of other causes of immune suppression)

Indicator disease diagnosed definitively

Candidiasis of the oesophagus, trachea, bronchi, or lungs

Cryptococcosis, extrapulmonary

Cryptosporidiosis with diarrhoea persisting > 1 month

Cytomegalovirus diseases of an organ other than liver spleen, or

lymph nodes in a patient >1 month of age

Herpes simplex virus infection causing a mucocutaneous ulcer

persisting > 1 month; or bronchitis, pneumonitis, or

oesophagitis for any duration in a patient > 1 month of age

Kaposi's sarcoma in a patient < 60 years of age

Lymphoma of the brain(primary) affecting a patient < 60 years of age

Mycobacterium avium complex or M. kansasii disease, disseminated

(at a site other than or in addition to

lungs, skin, or cervical or hilar lymph nodes)

Pneumocystis carinii pneumonia

Progressive multifocal leukoencephalopathy

Toxoplasmosis of the brain in a patient > 1 month of age

With laboratory evidence of HIV infection

Indicator diseases diagnosed definitively

Coccidiomycosis, disseminated (at a site other than or in addition to

lungs or cervical or hilar lymph nodes)

HIV encephalopathy

Histoplasmosis, disseminated(at a site other than or in addition to

lungs or cervical or hilar lymph nodes)

Isosporiasis with diarrhoea persisting > 1 month

Kaposi's sarcoma at any age

Lymphoma of the brain (primary) at any age

Non-Hodgkin's lymphoma

Any mycobacterial disease caused by mycobacteria other than M.

tuberculosis, disseminated

Disease caused by M. tuberculosis, extrapulmonary

Salmonella (non-typhoid) septicaemia, recurrent

HIV wasting syndrome

Indicator diseases diagnosed presumptively

Candidiasis of the oesophagus

Cytomegalovirus retinitis with loss of vision

Kaposi's sarcoma

Mycobacterial disease, disseminated

Pneumocystis carinii pneumonia

Toxoplasmosis of the brain in a patient > 1 month of age

### 2. CONDITIONS\* ADDED TO THE CENTERS FOR DISEASE CONTROL AND PREVENTION 1993 SURVEILLANCE DEFINITION FOR AIDS (WITH LABORATORY EVIDENCE OF HIV INFECTION in addition to those in the 1987 surveillance definition:

Source: WHO Recommended Surveillance Standards. (Geneva: World Health Organization, WHO/EMC/DIS/97.1, 1997). See <http://www.who.int/emc>

c) any of the following three clinical conditions: pulmonary tuberculosis, recurrent pneumonia, or invasive cervical cancer.

The expanded definition retains the 23 clinical conditions in the AIDS surveillance case definition published in 1987. (See publication (1) in Publications List in this section for complete information referring to this case definition.)

The AIDS surveillance case definition for children aged less than 13 years has not changed and retains the clinical conditions listed in the AIDS surveillance case definition published in 1987. However, definitions for HIV encephalopathy, HIV wasting syndrome, and HIV infection in children have been revised and the 1987 definition has been updated. (See Publication (2) in Publications List for complete information pertaining to this case definition.)

Publication 1 is the 1993 revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults, published in the *Morbidity and Mortality Weekly Report*, 1992 Dec 18;41(RR-17):1-19. The following abstract can be obtained through a search on <http://www.aegis.com>

**Abstract:** CDC has revised the classification system for HIV infection to emphasize the clinical importance of the CD4+ T-lymphocyte count in the categorization of HIV-related clinical conditions. This classification system replaces the system published by CDC in 1986 (1) and is primarily intended for use in public health practice. Consistent with the 1993 revised classification system, CDC has also expanded the AIDS surveillance case definition to include all HIV-infected persons who have < 200 CD4+ T-lymphocytes/microL, or a CD4+ T-lymphocyte percentage of total lymphocytes of < 14. This expansion includes the addition of three clinical conditions--pulmonary tuberculosis, recurrent pneumonia, and invasive cervical cancer--and retains the 23 clinical conditions in the AIDS surveillance case definition published in 1987 (2); it is to be used by all states for AIDS case reporting effective January 1, 1993.

At the same website one can find technical explanations by searching for the title, *Questions and Answers on 1993 Revised Classification System for HIV Infection and Expanded Surveillance Case Definition for AIDS*.

Publication 2, mentioned in CDC's definition of AIDS, 1994 *Revised Classification System for Human Immunodeficiency Virus Infection in Children less than 13 years of age* was published in *Morbidity and Mortality Weekly Report*, 1994; 43 (No. RR-12). One of the major functions of this study is to classify infected children into mutually exclusive categories according to three parameters: infection status, clinical status, and immunologic status. This study offers no clear explanation of the relationship between HIV and AIDS, and at several points it appears to treat the two terms as synonymous.

#### Laboratory Centre for Disease Control, Health Canada

WHO's recommended case definition acknowledges that there are differences in the definition of AIDS in countries with limited laboratory facilities as compared with those with sophisticated laboratory facilities. However, there are many variations beyond that. Canada, for example, uses a definition different from that used in the United States (Health Canada). Indeed, the Canadians take the position that the U.S. definition distorts the data:

**The U.S. revised definition to include CD4<200 has limited the usefulness of AIDS surveillance to illustrate the trend of the HIV/AIDS epidemic. One effect is an abrupt increase in the growth in the number of cases diagnosed per calendar quarter beginning in early 1991, and a peak in incidence in the first quarter of 1993. This change of AIDS definition distorts the trend of AIDS incidence data (Health Canada, p. 38)**

The difference in definitions helps to account for the apparently higher per capita incidence of AIDS in the U.S. than in Canada. Through 1997, more than 28 % of the AIDS cases in the United States were based on CD4 counts (CDC 1997, p. 17). As indicated in the following table, AIDS diagnosed on the basis of CD4 counts has accounted for a steadily rising share of the cases in the United States, amounting to almost two-thirds in 1997.

PERIOD OF DIAGNOSIS	PROPORTION BASED ON SEVERE HIV-RELATED IMMUNOSUPPRESSION
Before 1994	14.8 %
1994	45.6 %
1995	53.2 %
1996	59.4 %
1997	64.9 %

Source: Centers for Disease Control. HIV/AIDS Surveillance Report. 1997:9 (No. 2), Table 11, p. 17.

Thus, this difference in definitions is not trivial.

Regardless of which definition is better, it is clear that the many variations in official definitions through time and across countries make the global aggregate data extremely difficult to interpret. What is being counted?

#### Unofficial definitions

There are other definitions as well. For example, at its website (<http://www.projinf.org/fs/dp-day1.html#HIV>), Project Inform, a private non-profit organization concerned with AIDS, says that HIV is itself a disease:

**HIV is a "spectrum" illness: all who are infected have the same disease, but there are many different stages to it. AIDS is the name given only to the most serious stage of HIV disease. In the least serious stage, people are HIV seropositive, meaning they have tested positive on the HIV antibody test but have no symptoms of illness.**

**If left untreated, most of those who are infected generally progress along the spectrum toward AIDS.**

The Aegis website offers what is supposed to be a simplified version of CDC's official definition at <http://www.aegis.com/topics/definition.html>. It says a person has AIDS if he or she has a T-cell count below 200 or has at least one of the 25 'defining illnesses'. Curiously, there is no mention of HIV at all, except that one of the defining illnesses is 'wasting syndrome due to HIV'. There is no mention that HIV must be present for any of the other 24 illness or for low T-cell counts as a necessary condition for an AIDS diagnosis.

The Aegis list shows 25 'defining illnesses', while elsewhere (as in CDC's technical definition), there are 26. Apparently there are variations in the ways in which the diseases are grouped.

The definitions offered by private groups are not the official definitions. They do not serve as the foundation for official diagnoses and data collection. Therefore the analysis here will focus on the CDC definition, the highest level technical definition of AIDS that is currently available.

#### HIV implies AIDS or AIDS implies HIV?

The CDC definition says one looks only at those who are already determined to be HIV-infected. It takes HIV infection to be a prerequisite for a diagnosis of AIDS. The definition does not say how that HIV status is to be determined.

Similarly, in their 1994 *Revised Guidelines for the Performance of CD4+ T-Cell Determinations in Persons with Human Immunodeficiency Virus (HIV) Infections*, the CDC did not say how one is to decide whether an individual is HIV infected. The first paragraph simply asserts that HIV infection causes the depletion of T-cells.

According to the CDC definition, one begins by looking only at people that are HIV infected. If they also have some additional characteristic (e.g., a specific result on a blood test, or any of a list of diseases), they have AIDS. If AIDS is identified by marker A plus marker B, it is hardly sensible to suggest that this (A+B) is caused by A. HIV can be linked to AIDS as a causal factor, to be confirmed empirically, or it can be linked as a matter of definition. It is illogical to try to do both simultaneously.

CDC's summary definition, presented above, says 'An HIV-infected person receives a diagnosis of AIDS after developing one of the CDC-defined AIDS indicator illnesses'. This implies that one must be diagnosed as having HIV before one can be diagnosed as having AIDS. Yet a recent CDC surveillance report says 'AIDS incidence increasingly represents persons who were not diagnosed with HIV infection until they developed AIDS . . . (CDC 1998, p. 3)'. This seems to say either (a) people who have AIDS can for that reason be assumed to have HIV, or (b) people who have AIDS may or may not have HIV; it is not a prerequisite, or (c) people who are diagnosed as having one of the 25 defining diseases may be described as having AIDS if they are then also shown to be HIV-infected. All three of these interpretations raise difficulties regarding the claim that HIV causes AIDS.

#### Disease or diseases?

A second major problem with CDC's definition is that it does not explain the commonality among the many different elements supposed to be involved in AIDS.

Parts (a) and (b) of the CDC's technical definition say that one has AIDS if one has a low T-cell count. Part (c) says that one has AIDS if one has any of an enumerated list of specific diseases, regardless of one's T-cell count. Thus, AIDS is not one thing, but several different things and, indeed, several different kinds of things. The linkages among them are not evident. What is there that warrants a common label?

Invasive cervical cancer is one of the three diseases mentioned in Part c of the CDC's technical definition of AIDS. It is remarkable that in three major overview studies of cervical cancer published in April 1999 in *The New England Journal of Medicine* (accessible via <http://www.nejm.org>), there is no mention of AIDS at all.

It appears that the only commonality in the diseases under study is that their incidence is presumably elevated in people who have compromised immune systems. The definition confounds the diseases that result from a weakened immune system, indicated by their distinctive symptoms, with the fact of a weakened immune system, indicated by low T-cell counts.

It is not clear whether HIV infection is to be regarded as a disease in itself, as a cause of disease, or as a predictor of disease.

It is not clear whether a low T-cell count is to be regarded as a disease in itself, as a cause of disease, or as a predictor of disease.

The relationship between HIV infection and low T-cell counts is not clear. Are they supposed to be definitionally linked or causally linked?

The CDC's surveillance reports are not very clear about the definitions and indicators used as the basis for surveil-



lance. They include 'Technical Notes' at the end referring to a series of back issues of the *Morbidity and Mortality Weekly Report*.

Although the purpose here is to explore the current meaning of AIDS, it may be useful to repeat the indicators for HIV specified in the mid-1998 surveillance report:

***For this report, persons greater than 18 months of age were considered HIV infected if they had at least one positive Western blot or positive detection test (culture, antigen, or other detection test) or had a diagnosis of HIV infection documented by a physician. Before October 1994, children less than 15 months of age were considered HIV infected if they met the definition stated in the 1987 pediatric classification system for HIV infection (MMWR 1987;36:225-30, 235). Beginning October 1994, children less than 18 months of age are considered HIV infected if they meet the definition stated in the 1994 pediatric classification system for HIV infection (MMWR 1994; 43[no. RR-12]:1-10). This report also includes children who were diagnosed by a physician as HIV infected (CDC 1998, p. 38).***

The tests explicitly named here have all been challenged. The specification "or other detection test" is so open-ended as to be meaningless. Under this definition it appears that HIV can be anything a physician says it is. There is no explanation in these technical notes of the definitional or clinical relationship between HIV and AIDS.

#### Accounting Practices

It has been argued that HIV infection has become the fourth leading cause of premature mortality in the United States (Selik 1997). Is there a new killer disease stalking the nation, or is this simply an artifact of accounting practices?

The argument leading to the conclusion that HIV is the fourth most important cause of death is based on the assumption that HIV causes AIDS. AIDS is, in essence, a collection of 26 previously known diseases. AIDS is not a disease, it is a collection of diseases. It may appear to be highly deadly because it counts together what previously had been counted separately. Is this an epidemic, or is this simply innovative accounting?

Consider an analogy. Acute respiratory infection is now listed as a leading killer of children worldwide. However, ARI is not a new highly dangerous disease. It is a collection of well-known diseases such as asthma, tuberculosis, and pneumonia. ARI is serious, but it is made to look more serious by the artifact of collecting together the mortality figures for several other diseases that previously had been viewed separately.

Several other accounting practices tend to make the numbers look more frightening. For example, the surveillance reports emphasize cumulative figures. The 1998 report (CDC 1998, p. 3) begins by saying that "Through June 1998, 665,357 persons with AIDS have been reported to the CDC", without making it clear that this is a cumulative count beginning at some time (unspecified) in the 1980s, or maybe even earlier. (The surveillance reports refer to 'retrospective diagnoses' to cases in 1981 and earlier.) Also, once a person is diagnosed as having AIDS, it is retained forever, even if the original basis for the diagnosis disappears. Since AIDS is claimed to have a very long latency period, deaths may be attributed to AIDS with no sound clinical justification.

CDC's surveillance reports provide tables on 'deaths of persons with AIDS'. Understandably, some readers might think this means 'deaths of persons resulting from AIDS', but that is not what it says. The reports do not indicate any reason for assuming a causal connection. People who have

been diagnosed as having AIDS do eventually die, like everyone else. This does not necessarily mean they died as a result of AIDS. In the mid-year and year-end surveillance reports for 1997, the tables on 'AIDS Cases, Case-Fatality Rates, and Deaths' acknowledged in a footnote that 'Reported deaths are not necessarily caused by HIV-related diseases'. There is no table with this title in the mid-1998 report. The other deaths tables that are provided in the mid-1998 report have no such acknowledgment.

Some deaths associated with AIDS are 'iatrogenic', resulting not from the disease itself but from the medical treatment for it. The data do not provide any means for distinguishing these deaths.

#### Conclusion

The *MMWR Technical Notes* make claims about the completeness of the reports, but not about their reliability or validity. The technical definition of AIDS is impossibly difficult. It is hard to believe that the thousands of health care workers who diagnose AIDS or who fill out death certificates have a well-developed and common understanding of what AIDS means. It appears there are no simple, explicit, consistent, and widely accepted indicators for AIDS. Studies should be undertaken to compare health care providers' working definition of AIDS with the official definitions.

What can be done to escape from the convoluted and ambiguous set of concepts surrounding HIV/AIDS?

Since it can take so many different forms, if AIDS is to be used as a technical term, it would be very useful if every diagnosis of it were accompanied with an account of the type of AIDS under consideration. Otherwise, we can hardly know what is meant when someone says, 'this person has AIDS'.

However, the conceptual mess is so great, it requires far more radical treatment. It might be wise to rethink what the core issues are, and to formulate an entirely new terminology to discuss them. The need to revise the language is already foreshadowed by the efforts in some quarters to speak of HIV disease, rather than AIDS. However, I think there is a need for a clean and decisive break from the old, cumbersome language and its incomprehensible definitions.

On the cover of the *HIV/AIDS Surveillance Report* covering cases through 1997 (CDC 1997), the CDC says:

***Acquired immunodeficiency syndrome (AIDS) is a specific group of diseases or conditions which are indicative of severe immunosuppression related to infection with the human immunodeficiency virus (HIV).***

It makes sense to say that AIDS is a group of diseases related to severe immunosuppression. But why does the CDC continue by saying it must be related to HIV? While many different kinds of diseases can result from severe immunosuppression, there is no apparent reason for making distinctions among those diseases depending on what caused the immunosuppression.

This insistence on a direct HIV-AIDS linkage has confused matters. It would be clearer if the CDC said something of this form:

***AIDS refers to those illnesses that result from severe immunosuppression. There may be many different factors causing or contributing to severe immunosuppression. Among these are x, y, and z.***

Since the term AIDS has now become so corrupted, it might be better to rewrite the first sentence simply as: 'There are many illnesses that can result from severe immunosuppression.'

Although I am not a physician, it appears to me that the

core issue in the HIV/AIDS discourse is the role of the immune system. The epidemiological data seem to show there has been a marked increase in the incidence of diseases resulting from severely compromised immune systems since the 1970s.

There could be multiple causes of this phenomenon. Immune systems may be weakened through their normal work of helping us to recover from disease, and they may also be vulnerable to various forms of stress or pathogens. The key thing we need to know, it seems, is what sort of insults to the immune system can bring it to the point of collapse so that it is no longer able to carry out its normal functions.

While we may have designated markers for measuring the degree of stress on immune systems, the crossover point, the threshold beyond which the immune system cannot recover, is likely to be different for different individuals. Thus, measuring the degree of stress on some standard scale (such as T-cell counts) may not help us to know when collapse is imminent. The strength of immune systems should somehow be assessed in terms of their distance from the collapse threshold for particular individuals. Collapse presumably would be defined as the condition in which the immune system can no longer carry out its normal functions, and is unable to recover on its own.

We need good scientific work to identify the likely causes, on one side, and the likely health consequences, on the other side, of immune system collapse. Presumably the strength or weakness of immune systems can be viewed as an intervening variable in the human biological system, mediating between inputs and outputs to that system, and serving as one among many useful indicators of health status.

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**I would like to thank Nick Bennett, Lodewijk Bos, David Crowe, Roberto Giraldo, Todd Miller, and Jason Nussbaum for their helpful advice on earlier drafts of this essay.**