

FOCUS

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HIV, AIDS, and the Distortion of Science

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In the past year, there has been a noisy resurgence of claims that HIV does not cause AIDS and that AIDS is not contagious. Proponents of this view insist that AIDS is caused by personal behavior, notably drug abuse, or by the drugs used to treat AIDS. This view was first stated back in 1987 by Peter Duesberg, a professor of molecular biology at the University of California, Berkeley, who today is viewed as the leader of the "HIV denialist" movement.* Duesberg's claims have been debated and refuted repeatedly in scientific journals and even by a special panel assembled by the National Academy of Sciences.

Over the years, there have been dozens of new discoveries that further strengthen the evidence that HIV causes AIDS, including most recently, the success of combination HIV antiviral treatment. Today, nearly every physician treating HIV-infected people has seen how suppressing levels of HIV causes the clinical symptoms of disease to disappear. Though there are debates about the optimum time to start treatment, and while its effects may not be permanent and may come at the cost of side effects, the reduction in the death toll has been dramatic, leaving little room to doubt that HIV is the driving factor in AIDS.

Today, a new generation of people, some who themselves have HIV, some who are afraid of getting it, and some with unspoken political agendas, are hearing the denialist story for the first time and finding it attractive. For many, it provides relief from the anxiety induced by a diagnosis of HIV infection or the fear of contracting it. For others, it reinforces the belief that life

is full of conspiracies and that "mainstream" views are always wrong. For still others, it supports political and religious beliefs that allow them to condemn people's behaviors, most notably, injection drug use and sex between men. For the politically inclined, it provides a rational-sounding excuse to reject spending public money on the problem. This mix of personal and political needs constitutes fertile ground for keeping the denialist view alive, no matter what the science actually says. But AIDS is not simply a matter of politics or belief. It is a real disease that has already killed vast numbers of people and threatens millions more in the near future.

Nothing would be better than to discover that HIV is harmless and that the nightmare of AIDS has disappeared. But wishing will not make it so. The denialist view—based as it is on the distortion of science—is fundamentally dangerous, since it sets the stage for another wave of transmission and death.

It would take a book to refute all of the denialists' arguments word by word, but it is not difficult to reduce them to a short list of statements they repeat over and over. The denialists' articles and books sound convincing only if the reader is not familiar with the science of AIDS, the natural history of the disease, or the history of the epidemic. Complete, documented responses to denialist arguments are available through the National Institutes of Health.¹ Simpler answers to the core claims follow below.

Claim #1: Widespread Scientific Support

The denialists say that there is an "exponentially growing" group of international AIDS experts who do not believe that HIV causes AIDS. This simply is not true. There are only a few active scientists associated with this view, none better known than Peter Duesberg. Very few are physicians, and fewer still treat people with AIDS.

**Editor's note: While this issue of FOCUS does not include an article by an "HIV denialist," the Clearinghouse on pages 4 and 5 does include a list of articles and organizations representing both sides of the issue.*

Editorial: Sense and Credibility

Robert Marks, Editor

As the first epidemic since microbiology triumphed over diseases like polio and smallpox, AIDS has held our imaginations captive since it sprung upon us in 1981, a powerful indication that our complacency about infectious disease was unwarranted. In response, AIDS has inspired creativity among everyone from people with HIV trying to rebuild their lives to researchers trying to comprehend an elusive organism.

From this fertile stew of wonder and wariness has arisen the debate about whether HIV indeed causes AIDS. The vast majority of scientists believe this to be true, and we at the AIDS Health Project agree.

But it is not surprising that there are those who doubt. Personally, I welcome skeptics; questioning even the obvious forces me to think in different ways about "reality," and at a time when "spin" is high art, it may be wisest to doubt first and reconsider later. Yet, not every uncomfortable assertion is automatically true; and not every accepted belief is the result of a conspiracy. In this issue of *FOCUS*, Martin Delaney identifies not only the holes in the arguments of "AIDS denialism," but also the defects in the process of denialists.

Ironically, the most reasonable criticism made by the denialists is also the one that most resoundingly contradicts their claims. The drug development process in a "free market" is fraught with conflicts of interest. Drug companies operate with the same speculative calculus that any business uses: R&D is an investment, profit is the goal. I am certain that most scientists, even executives, at drug companies seek to cure and treat disease or symptoms, but the enterprise as a whole is naturally fueled by the simple imperative to make money.

Drug companies depend on the academic system—researchers at universities—to corroborate their claims of safety and efficacy and on the government to certify these findings. As part of this process, drug companies do fund research. It is crucial that there be watchdogs—organizations like Project Inform and ACT-UP, and newsletters like *AIDS Treatment News*, as well as the FDA—to police this process.

For most people, understanding AIDS is about accepting the interpretations of "experts." Whether HIV is the cause of AIDS depends on which information source we find most credible. The question

is essentially a scientific one, but the answer is founded on trust. I know society can marginalize truth tellers when their assertions are unpopular or alien, but I cannot believe that the truths of most AIDS researchers and activists—and the work of organizations like Project Inform—has been poisoned by drug company cash. I believe that people like Martin Delaney, John James, Paul Volberding, and Jay Levy care more about saving lives than lining their pockets with lies. I just do not buy the central contention of the denialists that we are all pawns of the drug companies.

But perhaps the most convincing indicator that HIV is the cause of AIDS has nothing to do with what I write here or the more compelling remarks of Martin Delaney and hundreds of other commentators; it is personal experience—an experience that people who did not live in time before HIV treatment may not share. People I know got sick and died even when they took no HIV treatments or recreational drugs. People I know stopped dying when they took combination treatments. Their lives have not become easy or painless, and no one I know believes that AIDS has been conquered. But because they are treating the virus, my friends are living, and their lives are immeasurably better than they were.

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None, including Duesberg, have conducted any original AIDS research, either in the lab or in patients. Many, perhaps most, work in unrelated scientific fields such as physics, history, or literature. Some who are still claimed by the denialists as supporters long ago changed their views, and others have, themselves, died of HIV disease. There is no evidence whatever of a groundswell of scientific opinion moving toward the denialist viewpoint.

In contrast, there is a body of thousands of scientists worldwide who strongly support the belief that HIV causes AIDS. They have the appropriate credentials in virology, immunology, infectious disease, epidemiology, and often have a great deal of direct experience treating people with HIV disease. Their views and experiments regarding HIV

and AIDS have met the test of peer review that guides the scientific process.

Claim #2: An Old Disease with a New Name

The denialists say that AIDS is not a new disease, simply a collection of old ones grouped under a new name. It is true that people with HIV disease do not succumb directly to HIV infection, but to a well-known list of opportunistic pathogens such as *Pneumocystis carinii*, cytomegalovirus (CMV), and *Mycobacterium avium* complex (MAC). "Acquired Immune Deficiency Syndrome" refers to an illness that causes the collapse of the immune system, which in turn renders the body vulnerable to a series of potentially deadly infections that the body would otherwise have little trouble handling. HIV, the human immuno-

deficiency virus, is the cause of the collapse of the immune system.

AIDS is new and different because it affects specific populations of people who have no other reason for being severely immune compromised. AIDS first came to the attention of physicians when large numbers of healthy, young, gay men began coming down with *Pneumocystis carinii* pneumonia (PCP), an extremely rare pneumonia previously seen only in people with severely suppressed immune systems. As

more men came down with PCP and then other rare diseases, it also became clear that the disease was clustered in particular cities, in specific neighborhoods, and even within groups of people who knew each other. Most of these infections were not themselves contagious, but they were suddenly appearing in ways that looked like the outbreak of a contagious disease. Doctors realized that there must be a new, underlying disease destroying the immune systems of these people.

Today, AIDS is far more widespread. But even in Africa, where people have long suffered from malnutrition, poor sanitation, and parasitic illnesses, doctors had not seen such widespread severely compromised immunity until HIV emerged. Moreover, AIDS is also common in urban

areas, where malnutrition does not play as large a role as it does in rural Africa.

Claim #3: No Proof that HIV Causes AIDS

The denialists say that there is no proof that HIV causes AIDS and no single scientific paper that offers such proof. This myth has been repeated endlessly like a mantra since 1987. The denialists claim that one scientist, Robert Gallo at the National Cancer Institute, simply called a press conference one day and proclaimed that he had found the cause of AIDS, without having data or undergoing traditional scientific peer review. This is pure fiction.

In early 1983, French researchers isolated a previously unknown retrovirus from the lymph nodes of a person with early symptoms of AIDS, although they did not yet have enough data to prove the virus was the cause of AIDS. In the spring of 1984, Gallo and his team of U.S. researchers submitted a comprehensive series of four scientific

papers to the journal *Science*, papers that were fully peer reviewed (and later subject to one the most intensive review processes ever given to scientific articles).²⁻⁵ The four papers described how the virus was routinely found in people with various symptoms associated with AIDS and was absent in those who lacked either symptoms or AIDS-associated risk factors. The papers concluded to the satisfaction of most scientists that HIV was the cause of AIDS and went on to describe new methods for growing the virus in large quantities and for creating a blood test to detect the presence of antibodies to the virus.

A reporter learned of the impending publication of the *Science* articles and called the government press office, threatening to "break" the story. In response, the Department of Health and Human Services (DHHS) called a press conference in order to make sure the story was told accurately. Gallo was in France working with the French team on a statement they had planned to make together; DHHS ordered him back to the United States overnight to appear at the press conference. *Science* published the papers shortly afterwards.

Over the subsequent months, various French, British, and U.S. research teams published several more peer-reviewed papers, all of which further strengthened the link between HIV and AIDS. Today, the National Institutes of Health summary document on the relationship of HIV to AIDS cites approximately 500 scientific papers. While no "single" paper is viewed as complete proof that HIV is the cause of AIDS, there is the far more compelling foundation of proof built by more than 500 of them.

Claim #4: The Test Does Not Work

The denialists say that neither the HIV antibody test, used to detect HIV infection, nor viral load and CD4+ cell counts, which measure disease progression, mean anything. These claims are sometimes accompanied by stories of the personal experience of the author of one of the AIDS denialist books, *What if Everything You Thought You Knew about AIDS Was Wrong?*⁶ Christine Maggiore says she underwent a series of different HIV antibody tests and did not get consistent answers. Therefore, she concludes, the tests mean nothing.

It is true that people sometimes get what is called an "indeterminant" test result, often due to temporary changes in body chemistry affecting the antibody test. Because no laboratory test is ever perfect, most test centers never attempt to draw conclusions from a single test result.

While no "single" paper is viewed as complete proof that HIV is the cause of AIDS, there is the far more compelling foundation of proof built by more than 500 of them.

3. Gallo RC, Salahuddin SZ, Popovic M, et al. Frequent detection and isolation of cytopathic retroviruses (HTLV-III) from patients with AIDS and at risk for AIDS. *Science*. 1984; 224(4648): 500-503.

4. Schüpbach J, Popovic M, Gilden RV, et al. Serological analysis of a subgroup of human T-lymphotropic retroviruses (HTLV-III) associated with AIDS. *Science*. 1984; 224(4648): 503-505.

A more common claim is the circular argument that since many people who have died of AIDS took HIV antiviral drugs, the treatments themselves killed them.

Usually they begin with the enzyme-linked immunosorbent assay (ELISA), which is simple, quick, and cheap. The test's main problem is that it can give false positive results, although improved technology has greatly minimized this possibility to less than 1 percent. When a person gets a seropositive ELISA result, proper procedure calls for retesting with a more complex test called the Western Blot, which has a much lower rate of false positives. Rarely, even the Western Blot can produce an indeterminate result, and then, the whole procedure must be repeated. Maggiore's book seems to indicate that repeated testing in her case confirmed that she was not HIV-positive in the first place. The mistake that Maggiore and other denialists make is that they attempt to draw scientific conclusions based on their personal experiences or that of other single individuals.

Not all versions of the ELISA test are equally accurate, and this becomes particularly clear in other parts of the world. One of

the reasons the U.S. government patented the original HIV antibody test in the mid-1980s was to enforce strong quality controls and to ensure the most consistent results. Rather than applauding this effort, writers like Maggiore betray their bias by suggesting the patent was sought out of greed by the researchers. The researchers themselves had nothing to do with seeking the patent, and at the time it was filed, government researchers could not profit from patents issued in their names.

A group of three researchers from Perth, Australia are often cited by denialists as a source of information about flaws in the HIV tests, both the ELISA and the Western

Blot. Their basic contention is that the HIV test can cross-react. That is, a substance in the body, for example, mycobacteria or yeast, which is superficially similar to the chemistry of HIV antibody, is detected by the test, making the test's results meaningless. These views—primarily theoretical rather than research-based—are in conflict with those of regulatory agencies and scientists worldwide, who say such concerns are not borne out in the field. Although some body substances can cross-react with the HIV test, with few exceptions, these reactions lead only to "indeterminant" results and not to false positives or false negatives.

More importantly, several large cohort studies have shown a profound and consistent relationship between a positive HIV antibody test result and the eventual development of AIDS. People who lack a positive result almost never experience opportunistic diseases, AIDS-like disease, or a similar decline in CD4+ cells.^{7,8}

In common usage, HIV testing is still more accurate than most of the medical diagnostic tests used for other health problems. The Food and Drug Administration (FDA) and the Centers for Disease Control and Prevention (CDC) routinely monitor diagnostic laboratories and tests for quality. While it is true that HIV testing is not of uniform quality worldwide, and some countries do not routinely use confirmatory testing, there is no basis for condemning the value of all HIV tests.

Other denialists like Kary Mullis have raised similar questions about viral load tests, but these concerns are likewise misleading. Mullis, because he won a Nobel Prize for his early work in the development of polymerase chain reaction (PCR) testing, is probably the second most recognized denialist scientist after Duesberg. PCR is one of the mechanisms used to quantify viral load. While Mullis asserts that PCR was never meant to be used in the way it is to

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6. Maggiore C. What if Everything You Thought You Knew about AIDS Was Wrong? 4th ed. Studio City, Calif.: American Foundation for AIDS Alternatives, 2000.

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determine viral load, his theoretical concerns cannot contradict the empirical evidence from one of the largest and longest running AIDS studies: the Multicenter AIDS Cohort Study (MACS).^{9,10} Through the MACS, John Mellors and his colleagues have followed several thousand HIV-positive people over periods ranging from three to more than 10 years and found a profound and predictable relationship between viral load levels, CD4+ cell counts, and the risk of HIV disease progression or death.

Claim #5: Antibodies Conquer Infection

The denialists say that no infectious disease causes illness years after infection or after the development of antibodies, and that the very existence of antibodies means the infection is over. This often repeated assertion is the most easily refuted of all the denialist claims.

There are many conditions that can lead to severe illness years after initial infection by the causative agent, including hepatitis, herpes, and CMV. Most of these infections, very much like HIV disease, stimulate the body to make antibodies for years without signs of obvious clinical illness. This denialist declaration, perhaps more than any other, demonstrates the profound medical confusion of its proponents.

Claim #6: Drugs = AIDS

The denialists say that drug abuse and HIV antiviral medications are the real causes of AIDS. Canadian, European, and U.S. studies have repeatedly disproved this assertion.¹¹⁻¹³ Because drug use was common in the gay community, it was one of the very first factors suspected of causing AIDS. Over the years, researchers conducted studies comparing gay men who used drugs over long periods of time to groups of gay men who did not use drugs but had otherwise similar behaviors. They found that drug use was not a

predictor of AIDS, except in the sense that it increased the risk of HIV transmission. The only factor that differentiated those who developed AIDS from those who did not was the presence of HIV antibodies.

A more common claim in recent years is the circular argument that since many people who have died of AIDS took HIV antiviral drugs, the treatments themselves caused the illness. It is true that HIV antiviral drugs, like medications used for other serious illnesses, can have toxic side effects and, in some circumstances, cause death. But the data from clinical trials are abundantly clear: side effects do not appear in everyone; they are not always serious in nature; and most significant, when used properly, the drugs do far more good than harm.

Denialists seem to be unaware that people were dying horrible deaths from AIDS before any HIV antiviral drugs were available. In a recent publication, Christine Maggiore conceded she had no idea why people died "of AIDS" before antiviral drugs were available. Denialists like to claim that HIV drugs have only been tested against laboratory markers, such as viral load, and not in terms of their effects on survival. Like many of their claims, this is simply false. The very first studies of zidovudine (ZDV; AZT) demonstrated a statistically significant (though not long-lasting) survival gain. Later studies of two-drug combinations showed up to 50 percent increases in time to progression to AIDS and in survival when compared to people receiving single-drug therapy. In more recent years, three-drug combination therapies have produced another 50 percent to 80 percent improvements in progression to AIDS and in survival when compared to two-drug regimens.^{14,15} As of today, tens of thousands of people have participated in clinical studies of HIV antiviral drugs, and no one with any memory of the earliest days of the epidemic can believe that the shortcomings

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of antiviral therapy outweigh the lives extended or saved by these medications.

Claim #7: Still Healthy without Medications

The denialists say that there are HIV-positive people (often pointing to themselves as examples) who do not take AIDS drugs and stay healthy for several years, and that this somehow proves that HIV is harmless. What's missing in this reasoning is any understanding of the natural, untreated history of HIV disease. The denialists confuse the question of whether HIV is the cause of AIDS with the question of whether HIV has yet caused AIDS in themselves.

On average, HIV-infected people who have access to health care and a reasonable diet, will take about 10 years to progress to AIDS. This means that 10 years after infection, about half will have progressed to AIDS and another half will have not. A small percentage progress rapidly to AIDS within two to three years, while some reach 15 years or longer without progressing, even without treatment. At 20 years after infection, the percentage who are still well without treatment becomes vanishingly small.^{16,17} There is nothing unusual about this. Many other diseases—such as cancer, heart disease, and multiple sclerosis—affect people differently over different periods of time.

Many factors—ranging from access to health care to diet and personal outlook—may contribute to the rapidity of progression. Researchers have also identified at least two different genes that inhibit or slow HIV disease progression, and one that may even make some people “uninfectable.” While many people, especially the denialists, like to think their good fortune is due to something they are personally doing (or not doing), it is likely that the genetic package they received from their parents deserves much of the credit.

Claim #8: Fewer Deaths Not Due to Treatment

The denialists say that recent reductions in the HIV death rates are not caused by the new antiviral treatment combinations, and they show misleading charts to prove this assertion. This claim boldly misstates or misrepresents actual CDC statistics.

Denialists state that the number of deaths had already begun to drop as early as 1993, and therefore claim that the reduced death rate we see today has nothing to do with the new treatments. On closer examination, it becomes clear that they are confusing either the rate of new infections or the number of people with AIDS with the number dying from the disease. CDC records show that the number of AIDS deaths in the United States

continued to increase yearly until 1996, at which time it began to fall dramatically. That was the year that three-drug combinations became widely used. The number of deaths dropped again in 1997 and in 1998; figures for 1999 are not yet available.¹⁸

Conclusion

The denialists almost never directly address or challenge the accumulated data that scientists use to determine that HIV is the cause of AIDS. Instead, they make reasonable sounding but tangential arguments, pointing out and often misunderstanding occasional anomalies, and dwelling on a few eccentric publications, while almost entirely overlooking the real body of data.

Every epidemic throughout history has had its “denialist.” Some epidemics have been blamed on rats, some on foreigners, Jews, or other disfavored local ethnic groups. Very often, epidemics have been blamed on the people who suffered from them, their illness being seen as some kind of moral failure. Sound familiar?

There is nothing wrong with holding unpopular or unconventional views, and it is often wise to challenge conventional wisdom. But it is also wise to know when to accept the value, as well as the limits, of accumulated knowledge. Unfortunately, in this case, denialist views result in public disregard for AIDS prevention efforts and undermine increasingly difficult efforts to fund AIDS support and care programs. And, especially today, they threaten the already mind-boggling challenge of coping with AIDS in developing nations.

The debate over whether HIV causes AIDS has been staged over and over again. The answer is not going to change, no matter how many new recruits can be attracted by the balm of denial. There are real problems to be faced in combating AIDS worldwide; the cause of AIDS is not one of them.