

Errors in Celia Farber's March 2006 article in Harper's Magazine

Final version: Released 22 March 2006

Authors (in alphabetical order by surname):

Robert Gallo MD¹, Nathan Geffen², Gregg Gonsalves³, Richard Jefferys⁴, Daniel R. Kuritzkes, MD⁵, Bruce Mirken⁶, John P. Moore PhD⁷, Jeffrey T. Safrit PhD⁸

1. Director Institute of Human Virology, University of Maryland Baltimore
2. Policy, Communications and Research Co-ordinator, Treatment Action Campaign, South Africa
3. Gay Men's Health Crisis
4. Basic Science, Prevention & Vaccines Project, Treatment Action Group
5. Director of AIDS Research, Brigham and Women's Hospital, Associate Professor of Medicine, Harvard Medical School
6. Director of Communications, Marijuana Policy Project (previously a health journalist who covered HIV/AIDS for AIDS Treatment News, Men's Health and other publications)
7. Professor of Microbiology and Immunology, Weill Medical College of Cornell University, New York
8. Senior Programs Officer, Elizabeth Glaser Pediatric AIDS Foundation; Visiting Assistant Professor, Department of Pediatrics David Geffen School of Medicine, University of California, Los Angeles

Please send correspondence to Nathan Geffen at nathan@tac.org.za

This document describes the errors in Celia Farber's March 2006 article in Harper's Magazine, titled *Out of Control: AIDS and the Corruption of Medical Science*.

Our primary concern is with rebutting Farber's misconceptions about HIV/AIDS and antiretrovirals (ARVs). We have not focused our attention on misleading or biased reporting that relate to the NIH; none of us is an NIH employee. We have also ignored the sections on Peter Duesberg's career problems, his rejected funding proposals, and how he is (or is not) regarded by other cancer researchers nowadays; we have no interest in Duesberg, other than to note that he is not an AIDS researcher and has no practical experience in studying HIV.

Using a plethora of false, misleading, biased and unfair statements, Farber attempts to cast scientific institutions and scientists as dishonest. But intellectual dishonesty is the norm for Farber and other AIDS denialists including David Rasnick, Peter Duesberg, Kary Mullis and Harvey Bialy – all people she mentions favourably in her article. David Rasnick works for a vitamin entrepreneur, Matthias Rath. They have conducted unauthorised experiments on people with HIV in South Africa, convincing their subjects to take Rath's vitamin products in dangerously high doses, instead of scientifically recognised treatments for AIDS. It has been alleged that some of their subjects have died due to this experiment.¹ Farber implies financial motives permeate scientific research. Why does Farber not make similar allegations against the AIDS denialists, many of whom are involved in the marketing of unproven alternative medicines?

HIV has been shown to be the cause of AIDS in numerous studies. ARVs have been shown to reduce death and

illness in people with HIV. They have also been shown to reduce mother-to-child transmission (MTCT) of HIV. They often cause side-effects. On rare occasions these can be fatal, but death from HIV/AIDS is a far greater risk. The evidence shows beyond doubt that the benefits of ARVs far outweigh their risks.

We present two tables below. The first is a list of errors in Celia Farber's article in the March 2006 issue of Harper's. The list is possibly incomplete. All of these errors should have been found in the fact-checking process. The second table contains some relevant points about the authorities Farber cites in support of her views.

Guide to the First Table

Page and Column Number

The first column contains the page and column number of the error in Farber's article. If only one number is given, it is the page.

Error Type Key

MISLEADING: Farber implies a false fact without stating it directly. There are 16 such errors.

FALSE: Farber states a false fact. There are 25 such errors.

FAIRNESS: This denotes statements by Farber which are unfair, e.g. implying sinister motives with the flimsiest of evidence. There are ten such errors.

BIAS: Farber neglects key facts which negate her theories. There are five such errors.

There are 56 errors noted in the table.

Topic Key

TESTING: Related to HIV testing
ARVs: Related to antiretrovirals

MTCT: Related to mother-to-child transmission prevention

TRIALS: Related to clinical trials

HIV: Related to HIV as the cause of AIDS

Description

The comments of Farber that are referred to are described in italics. Then a description is given why Farber is wrong.

TABLE 1.

Ref (page, col)	Error Type	Topic	Description
37; 1	MISLEADING	TESTING	<p><i>Farber states that pregnancy itself can cause a false positive result. She supplies no supporting reference.</i></p> <p>A properly conducted HIV-test protocol (which involves at least two HIV tests) has a very small chance of giving a false positive, irrespective of pregnancy status. Farber alleges that Hafford's HIV-test was carried out incorrectly. If this was the case, medical negligence is a different matter to whether HIV tests carried out according to protocol are accurate in pregnant women. HIV tests were highly accurate from the time they were developed in 1984² and have become much more accurate over time as the underlying technology has evolved. HIV tests are amongst the most accurate available in medical science. For more on testing see Mirken (2001).³ For a more technical discussion see Coon (2000).⁴</p> <p>Incidentally, the testing protocol of the PACTG 1022 trial, to which Farber refers, required multiple HIV tests and regular viral load counts. Farber states that Hafford was only tested once. Assuming Farber is right, then Hafford's doctor did not follow the protocol. We, however, are not privy to Hafford's medical records and therefore cannot know if Farber's allegation of Hafford having only one test is correct. Was Harper's privy to this? Consequently, was the allegation fact-checked?</p>
37; 3	MISLEADING	ARVs	<p><i>Farber states that PACTG 1022 probed the "outer limits of bearable toxicity."</i></p> <p>PACTG 1022 compared ARVs, that had already been found to be safe and effective for treatment in the absence of pregnancy, in pregnant women. All drugs used in the trial had been shown in previous trials to benefit people with HIV. This is why the FDA has registered them. The PACTG 1022 trial happened to find higher than expected toxicity of nevirapine in very specific circumstances. Even here, toxicity was sufficiently rare as to be outweighed by the likely benefits of nevirapine use. The FDA revised its nevirapine recommendations on the basis of this trial. Nevirapine remains an important antiretroviral medicine whose benefits outweigh its risks.</p> <p>Nevirapine (or a drug, efavirenz, used instead of it) has been shown in an analysis of clinical trials to slow disease progression, particularly in patients with low CD4 counts.⁵</p> <p>Safety trials are obviously associated with a calculated risk, but they are permitted when the expected benefits are considered to outweigh this risk. Would Farber suggest that no clinical trials be conducted whatsoever?</p>

Ref (page, col)	Error Type	Topic	Description
38; 3	MISLEADING	ARVs	<p><i>Farber describes the death of one patient and implies this is relevant to the science of HIV.</i></p> <p>To try to get readers to conclude that an ARV related death can be generalised to conclude that the risks of ARVs outweigh their benefits is misleading and unscientific. HIV is a life-threatening condition. The drugs used to treat it are imperfect but have been shown beyond reasonable doubt in numerous clinical trials and analyses of large numbers of patients in real-world settings (operational cohorts) to reduce the risk of illness and death. They are associated with side-effects.</p> <p>The same scenario applies to chemotherapy for cancer; patients take drugs that cause nausea, vomiting, hair-loss etc, because to do so is preferable to dying from cancer.</p> <p>Clinical trials, or meta-analyses of clinical trials, have demonstrated direct clinical benefits, i.e. fewer AIDS-related illnesses or deaths, for a number of ARVs, including AZT,⁶ lamivudine,⁷ didanosine,⁸ stavudine,⁹ nevirapine,¹⁰ efavirenz,¹¹ and others.</p> <p>As ARVs began prolonging the lives and reducing the illnesses of people with HIV, it became the standard of care. In recent clinical trials the control group has to be given this standard of care for ethical reasons. Consequently progression to AIDS or death is unusual in recent clinical trials. Therefore scientists use what are called surrogate markers, CD4 and viral load counts, to determine drug efficacy. These surrogate markers are highly correlated with disease progression.¹²</p> <p>A meta-analysis of ARV trials has demonstrated that they have a profound effect on reducing progression to AIDS or death.¹³</p> <p>Furthermore, in practice, ARVs have been shown to reduce illness and deaths in industrialised and developing countries around the world irrespective of race, gender, sexual orientation, age and recreational drug use. We have included a sample of these in the endnotes.^{14,15,16,17,18,19,20,21,22,23}</p>

Ref (page, col)	Error Type	Topic	Description
39; 1	FALSE	TESTING	<p><i>Farber states that all "babies born to HIV-positive mother are born positive but most become negative within 18 months."</i></p> <p>Farber is clearly confused by the passing on of the mother's antibodies to the child, a natural mechanism that protects the child from infectious disease as its own immune system develops. These passively transferred antibodies are eliminated from the child's system within 18 months at most, usually rather sooner. If a child is infected with HIV, it produces its own antibodies, which persist. After 18 months, if the child still tests HIV-antibody positive, it is almost definitely its own antibodies that are producing the result.</p> <p>Furthermore, a PCR test for the presence of the virus itself can accurately determine a child's HIV status by about six weeks after birth.</p>
39; 1	FALSE	TESTING	<p><i>In footnote one, Farber makes various false statements about HIV tests. She comments that HIV tests are not even required for an AIDS diagnosis in Africa. She also claims most HIV tests come back indeterminate or negative when redone. She supplies no references.</i></p> <p>Most people in the industrialised world, as well as many developing countries, have at least two different HIV antibody tests to confirm they are HIV-positive, as part of the HIV testing protocol. HIV tests are highly accurate. It is false that when most people are retested they test indeterminate or negative. Even the risk of a single HIV ELISA test giving a false positive is less than 1% with today's tests.</p> <p>HIV tests are required for an AIDS diagnosis in South Africa. They are also standard in Botswana, Kenya, Uganda and many other clinics throughout Africa. An AIDS diagnosis cannot be considered definitive without an HIV test. Farber's comment about hopping on a plane from Uganda to Australia to change HIV diagnosis is simply silly hyperbole.</p>
39; 3	MISLEADING	MTCT	<p><i>Farber switches from a discussion of PACTG 1022 to HIVNET 012 and omits to explain a critical distinction.</i></p> <p>Here Farber misleads in a way that is repeated throughout the remainder of the article. She confuses the short-course nevirapine-only regimen used to reduce MTCT with chronic treatment using nevirapine as one component of a combination of ARVs.</p> <p>Not a single life-threatening event related to short-course nevirapine has been recorded in mother or child in tens of thousands of such uses around the world. The nevirapine toxicity found in PACTG 1022 was in chronic treatment.</p>

Ref (page, col)	Error Type	Topic	Description
40; 1	FAIRNESS	ARVs	<p><i>Farber reports on the publication of PACTG 1022 as if it is something sinister.</i></p> <p>In fact, its publication was standard scientific procedure. Furthermore, that nevirapine toxicity was reported in the paper is an indication of honestly conducted science that is inconsistent with Farber's implications of some sort of cover-up.</p> <p>There is no logical comparison with the Schiavo case; Farber's analogy is bizarre and hard to understand.</p>
40; 2	MISLEADING	MTCT	<p><i>Farber repeats her mistake on p. 39 col. 3.</i></p> <p>Farber fails to inform her readers that she is switching back and forth between a discussion of chronic nevirapine use for treatment with short-course nevirapine for MTCT reduction.</p>
40; 2	FAIRNESS	MTCT	<p><i>Farber points out that Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) has taken money from Boehringer Ingelheim and implies this disqualifies them from commenting on the safety of short-course nevirapine.</i></p> <p>It is the function of the EGPAF, a registered charity, to prevent MTCT. The fact that the EGPAF has taken money from Boehringer Ingelheim does not disqualify it from commenting on the safety of nevirapine. The EGPAF is not selling nevirapine on behalf of Boehringer, but distributing it free of charge to those without access to it.</p> <p>Farber only mentions the EGPAF with respect to affirming the safety and efficacy nevirapine and links this to their Boehringer grant. But many organisations affirmed the safety and efficacy of single-dose nevirapine, including ones without financial connections to the pharmaceutical industry such as the World Health Organisation, the Nobel peace prize-winning organisation, Medecins Sans Frontieres, and the Treatment Action Campaign.</p>
40; 3	FALSE	HIV	<p><i>Footnote 4 states that AIDS is defined differently in Africa.</i></p> <p>It is true that as more was learned about AIDS, the definition of the disease changed. There is nothing unusual in this; AIDS was only discovered in 1981. It is a testimony to scientific methodology that it only took a few years to discover its cause. An accurate diagnosis of AIDS, throughout the world, does require an HIV-positive test. While there are facilities in Africa which do not even have HIV tests (one of the cheapest components of the medical response to HIV), our knowledge of HIV in Africa is based on studies that have used HIV tests. (Incidentally, facilities that cannot offer HIV testing do not offer ARVs either.)</p>

We show later that numerous studies conducted in Africa have demonstrated that people with HIV have much higher morbidity and mortality than people without HIV. Also see Nicoll and Killewo (2000).²⁴

Ref (page, col)	Error Type	Topic	Description
-----------------	------------	-------	-------------

40; 3	MISLEADING	HIV	<i>Footnote 4 also states that AIDS happens to have the same symptoms as "chronic malnutrition, malaria, parasitic infections and other common African illnesses."</i>
-------	------------	-----	---

HIV, not poverty, predicts progression to AIDS in Africa. Of course, living in poverty increases the risk of acquiring HIV infection, because poor people have less access to information about how HIV is spread and how to avoid contracting this infection. Also, poor people, especially poor women, frequently have less power to negotiate the use of condoms. HIV-infected people living in resource-poor environments can progress more rapidly to AIDS and death because of their reduced access to health care and their diminished state of general health compared to individuals who reside in more affluent settings.

As NIAID (2003) explains, the *"diseases that have come to be associated with AIDS in Africa - such as wasting syndrome, diarrheal diseases and TB - have long been severe burdens there. However, high rates of mortality from these diseases, formerly confined to the elderly and malnourished, are now common among HIV-infected young and middle-aged people, including well-educated members of the middle class."*²⁵

Sewankambo, Net al. [AIDS. 2000 Oct 20;14\(15\):2391-400](#) is a study of nearly 20,000 people, both HIV-positive and HIV-negative in a Ugandan district. People with HIV were much more likely to get sick or die. Furthermore death rates in civil servants and the better-educated (i.e. not the poor) were higher than the general population. This was associated with HIV infection.²⁶

Statistics South Africa (2005) counted South African death certificates between 1997 and 2002 and found a 57% increase in mortality (only a small portion can be accounted for by improved death registration and population growth). Critically, most of this increase is accounted for in young adults, with the highest proportion of adult deaths in 2002 being 30-39 year olds. Child mortality has also risen dramatically. This is incompatible with poverty as the cause of AIDS, especially in a country where living standards improved to some degree (or at worst stayed the same) during the period studied.²⁷

Furthermore, some AIDS-related diseases, e.g. cryptococcal meningitis, are very rare in people without HIV, but very common in Africa in people with HIV.

We provide further detail in the endnotes.²⁸

40; 3 MISLEADING TESTING

Footnote 4 further states that HIV tests are prohibitively expensive in Africa.

HIV tests are widely available across Africa. They are not prohibitively expensive for large numbers of people.

Ref (page, col)	Error Type	Topic	Description
-----------------	------------	-------	-------------

40; 3 MISLEADING TESTING

Footnote 4 further states "many diseases that are endemic to Africa, such as malaria and TB, are known to give false positives." Farber fails to supply a reference.

The risk of a false positive HIV test in Africa, as elsewhere, is very small if the correct protocol is followed. Some HIV antibody tests have been tested in Africa and found to be very accurate. These are the ones generally used. For example, the *Abbott Determine* rapid test used widely in South Africa has a specificity of at least 98% (and in some studies has achieved close to 100%). When this test is combined with a second rapid test or an ELISA test to determine HIV status, the risk of a false positive is negligible. The contribution of TB and malaria to false positives on today's tests is also negligible.

For examples of trials of HIV tests used in Africa and Brazil, see Sauer *et al.* (2000),²⁹ Phili *et al.* (2002),³⁰ Ferreira *et al.* (2005),³¹ Koblavi-Dème *et al.* (2001),³² and Foglia *et al.* (2004)³³.

40; 3 FALSE TESTING

Footnote 4 states "The statistical picture of AIDS in Africa, consequently, is a communal projection based on very rough estimates of HIV positives culled from select and small samples, which are extrapolated across the continent using computer models and highly questionable assumptions."

(1) Statistical estimates are not extrapolated across the continent, but on a per country basis.

(2) Large samples of people with HIV have been taken in a number of countries including Kenya, Botswana, Uganda and South Africa.

(3) South Africa's HIV/AIDS surveillance is arguably better than most industrialised countries, let alone developing countries. It comes from annual antenatal surveys, two countrywide household surveys, numerous small community surveys and death certificates. The most widely used computer model used to determine the size of South Africa's epidemic closely matches the prevalence calculated in the latest countrywide household survey. See ASSA (2005)³⁴ and Shisana *et al.* (2005).³⁵

(4) It is true that estimates of AIDS in most African countries are imprecise, but there is evidence showing beyond reasonable doubt that the African HIV epidemic is massive. For a detailed rebuttal of the claim that HIV is not a serious epidemic in Africa see Geffen (2004).³⁶

Ref (page, col)	Error Type	Topic	Description
41; 1	BIAS	TRIALS	<p><i>Farber complains about the growth of clinical trials and claims that everyone profits except the subjects. She also implies that only the poor and disadvantaged are used as subjects.</i></p> <p>No reference is supplied to support the view that subjects on the whole are not benefiting from clinical trials. Many well-off people participate in clinical trials. The claim that most subjects of clinical trials are put at greater risk than benefit is astonishing, and it certainly contradicts common sense. Not every clinical trial is conducted perfectly, particularly from the perspective of record-keeping. Some are poorly conducted, but the vast majority conform to strict, internationally accepted ethical guidelines and benefit the study subjects.</p>
41; 2	FAIRNESS	TRIALS	<p><i>Farber uses innuendo and rumours, from the perspective of Jonathan Fishbein, to cast aspersions on HIVNET 012, particularly on the honesty of its investigators. No concrete evidence is supplied. Surely this is not acceptable journalism in a magazine of Harpers' quality.</i></p> <p>In actual fact, problems with HIVNET 012 were identified and made public by NIAID long before Fishbein made an issue of them³⁷. The NIAID took steps to address these problems. The problems turned out to have no bearing on the scientific findings of HIVNET 012.</p> <p>Bookkeeping errors should not be automatically equated with a lack of ethics or any problems of a more serious and significant nature. To maintain clinical records in some developing countries (especially very poor ones such as Uganda) is not as simple as doing so in a leading industrialised country clinical research centre for a variety of reasons including financial ones and the shortage of fully trained clinical staff. This does not mean that clinical trials should not be conducted in developing countries or that trials in such countries are necessarily flawed, but there does need to be some understanding of the circumstances that can apply.</p>
41; 3	MISLEADING	ARVs	<p><i>Farber states that Canada rejected nevirapine twice on the grounds that it did not show efficacy with respect to surrogate markers. She says that the FDA nevertheless registered it.</i></p> <p>Nevirapine has been shown to be effective using surrogate markers of CD4 and viral load count. (See the FDA package insert for details.) Also see the meta-analysis of nevirapine and efavirenz referred to above.³⁸</p>

Ref (page, col)	Error Type	Topic	Description
42; 1	FALSE	MTCT	<p>Footnote 6 states there was no lowering of maternal viral load in the HIVNET 006 safety study.</p> <p>The study states that <i>"The antiviral activity of nevirapine appeared to be quite strong, resulting in a relatively consistent median 1.3 log reduction in maternal plasma HIV RNA at 1 week after a single 200mg dose in all mothers."</i> ³⁹</p>
42; 1	BIAS	MTCT	<p>Footnote 6 states in relation to HIVNET 006 "Of twenty-two infants born, four died. There were twelve serious adverse events' reported." Farber's implication is that the adverse events and deaths were due to nevirapine.</p> <p>The investigators of this Ugandan study studied drug toxicity in detail. They report <i>"There were no serious adverse events or grade 3 or 4 clinical or laboratory toxicities thought by investigators to be related to nevirapine among the mothers of either cohort. There were five serious adverse events including two deaths in the infants in cohort 1. Only one of the five serious adverse events was thought by the investigators to be possibly, but not likely, study drug related. This infant developed respiratory distress at birth and seizures after a difficult and prolonged labor requiring the use of forceps. In cohort 2 there were seven serious adverse events, including two infant deaths, although none were related to the study drug."</i> ⁴⁰</p>
42; 2	BIAS	MTCT	<p>Farber describes how the HIVNET 012 protocol was changed implying this rendered its quality sub-optimal.</p> <p>There is nothing unusual or inappropriate about changing a study protocol if logistics or new scientific developments require it. If the study protocol became unacceptable, it would be rejected for publication. The results of HIVNET 012 were published in <i>The Lancet</i>, a leading medical journal. ⁴¹</p>
42; 2	FALSE	MTCT	<p>Farber claims that HIVNET 012 was supposed to be a phase III trial but wound up being a phase II trial.</p> <p>Farber appears not to know the difference between a phase II and phase III trial, because HIVNET 012 was a randomized phase III trial. It was not double-blind, because the drug administration procedures were so different in each of the two arms. While phase III trials are ideally double-blind, this is not an indispensable requirement. Frequently drugs are tested using an "open-label" procedure.</p>

Ref (page, col)	Error Type	Topic	Description
42; 2	BIAS	MTCT	<p><i>Farber claims HIVNET 012 was not placebo-controlled.</i></p> <p>This statement is true, but Farber fails to explain critical facts that would allow readers to understand that the trial design was appropriate and that the results are meaningful. A short-course AZT regimen had been found in the PACTG 076 trial to be effective at reducing MTCT. The AZT regimen used in HIVNET 012 was a subset of the PACTG 076 regimen and therefore at least as good as placebo (but probably not as good as the regimen used in PACTG 076). In the nevirapine arm the rate of MTCT was reduced by 47% over that in the AZT arm by the end of the of the study. It would have been unethical to compare nevirapine directly to placebo when it was known that AZT could reduce MTCT.</p> <p>Therefore simple logic shows this: (1) HIVNET 012 AZT regimen is better than or equal to placebo. (2) HIVNET 012 nevirapine regimen is better than HIVNET 012 AZT regimen. Therefore HIVNET 012 nevirapine regimen is better than placebo.</p> <p>For more details, see the Cochrane review of antiretroviral regimens for reducing MTCT.⁴² Note that four AZT regimens have been shown to be effective at reducing MTCT.</p>
42; 3	MISLEADING	MTCT	<p><i>Farber quotes Hopkins Medical News stating that nevirapine is more effective than AZT at reducing MTCT.</i></p> <p>This is not the full story. Short-course nevirapine is better than at least one short course AZT regimen that has been tested (i.e. the one tested in HIVNET 012). There are AZT regimens that are more effective than short-course nevirapine. It should be noted that single-dose nevirapine is a sub-optimal regimen for reducing MTCT, in respect of its efficacy. Its advantage lies in its relative affordability and the simplicity of its use, compared to more complex and expensive regimens. It is considered no more than a starting point for resource-poor health facilities or as one measure that can be used for HIV-positive women whose status is determined too late for other antiretroviral regimens (poor or well-off setting).⁴³</p>
43	BIAS	MTCT	<p><i>This page contains a highly biased account of the analysis of HIVNET 012. So as not to labour each of</i></p> <p>Farber's misrepresentations and omissions, the following should be noted:</p> <p>In all the innuendo and accusations made by Farber and other AIDS denialists, as well as by Fishbein, no evidence has been put forward about the conduct of HIVNET 012 that calls into question its scientific findings.</p>

HIVNET 012 was imperfect. The NIH has been honest about this. They state:

"NIAID and NIH initiated several reviews and re-reviews of HIVNET 012. These reviews identified procedural flaws in the study that led NIAID to implement improvements in the conduct of clinical research it supports both in the United States and abroad. We understand that certain previously recognized criticisms of the conduct of HIVNET 012 have re-emerged, **but stress strongly that throughout multiple reviews, the overall conclusions regarding the safety and efficacy of single-dose nevirapine in this setting have remained intact.**" (our emphasis) They further state:

"The statement in the Associated Press article of December 13, 2004, that there may have been thousands of underreported serious adverse events in the HIVNET 012 study implies that those were due to the drug nevirapine. This implication is absolutely false. Remonitoring reports of HIVNET 012 found no additional serious adverse reactions related to nevirapine. The original published study and the multiple subsequent reviews of the HIVNET 012 trial that have carefully scrutinized its data have found only a very small number of serious adverse reactions that potentially might be due to nevirapine."
[44](#)

See also NIAID (2004).[45](#)

The Institute of Medicine is part of the National Academy of Sciences. One of the purposes of the academy is to act as an independent reviewer of scientific issues. One could view it as the arbiter of scientific disputes of this nature, analogous to the way in which the US Supreme Court rules on matters of jurisprudence. In contrast to Farber or any of the AIDS denialists as well as the Associated Press journalist Farber refers to, the IOM extensively examined the documentation of HIVNET 012, including patient records. It concluded:

"Based on its review, the committee finds no reason to retract the publications or alter the conclusions of the HIVNET 012 study. The committee concludes that data and findings reported in *Guay et al.* (1999) and *Jackson et al.* (2003) are sound, presented in a balanced manner, and can be relied upon for scientific and policy-making purposes."
[46](#)

Short-course nevirapine has been tested in the South African Intrapartum Nevirapine Trial, a much bigger trial than HIVNET 012. Not a single life-threatening event due to nevirapine was found. The trial used double the dose of HIVNET 012 on mothers. It confirmed short-course nevirapine's efficacy too.
[47](#)

Short-course nevirapine has been added to an AZT regimen in a Thai trial and found to further reduce MTCT. The authors of this study state "No serious adverse effects were associated with nevirapine therapy."
[48](#)

Short-course nevirapine has been used extensively in operational settings, e.g. Ayouba *et al.* (2003).⁴⁹ From a safety perspective, not a single life-threatening event has been recorded due to short-course nevirapine. From an efficacy perspective, results have been mixed; some cohorts have done well, others less well than expected. There is no cohort however that has reported worse results than would be expected with placebo including the Ghent study referred to by Farber. In the absence of any intervention, The rate of MTCT varies but is seldom less than 25% after a few months in a breast-feeding population,⁵⁰ or even predominantly non breast-feeding populations.⁵¹

In many cases in the developing world the benefit of ARVs for reducing MTCT at the time of delivery is undone by the later transmission of HIV through breast-milk. Resolving this additional mode of transmission is a complex scientific, operational and social undertaking. However, in wealthy countries, paediatric epidemics have been virtually eliminated through a combination of long-course ARV treatments, caesarian sections and formula-feeding. There are also success stories in the developing world, including the Cameroon study cited above, an MSF site in Cape Town, South Africa, a hospital in Johannesburg, South Africa (which found a 9% transmission rate in an operational setting, much lower than would be achieved with placebo) and the Ugandan site where HIVNET 012 was conducted.

Ref (page, col)	Error Type	Topic	Description
44; 3	FALSE	VIT A	<p><i>Farber states that the fact that some of the HIVNET 012 participants were on a vitamin A trial negates data associated with them.</i></p> <p>If vitamin A supplements were actually effective at reducing MTCT, Farber's statement would be true. However several studies of whether vitamin A supplements reduces MTCT have been conducted. They all found that vitamin A supplementation does not differ from placebo.</p> <p>See the Cochrane review (2006)⁵² on this. It is possible that vitamin A supplementation confers other benefits, but even this is unclear as a recent Zimbabwean study demonstrates.⁵³</p>
46; 2	FAIRNESS	MTCT	<p><i>Farber says that the terms of the IOM study were skewed from the start because the IOM would not look at issues of misconduct.</i></p>

Investigating misconduct is not the role of the IOM and it was not asked to do so in this case either. The IOM was asked to examine scientific issues. It concluded that the science underlying the HIVNET 012 was sound. It also found that the trial largely conformed to internationally accepted ethical standards. Issues of misconduct are investigated by the NIH's Office of Research Integrity and/or by the Department of Health and Human Services' Office of the Inspector General, if they are justified. We are not aware that any such investigations have been initiated.

46; 2 FAIRNESS MTCT

Farber points out that six of the nine IOM members were NIH grantees. The innuendo is therefore they covered up for the NIH.

This is an astounding implied accusation that the magazine should not have permitted without evidence. In effect, Farber impugns the reputation of the six IOM members without offering any evidence that their findings were incorrect or that the implied bias was in any way real. It would be hard to find nine distinguished US scientists in the field of HIV research who do not receive NIH grants, given the role of the NIH as a funding agency. Furthermore, does Farber wish to suggest that the three non-NIH funded IOM members colluded in this suggested cover-up?

46; 3 FALSE MTCT

Farber states that the " 'multiple studies' line is a familiar tactic designed to deflect from the study that is actually being addressed, and that is HIVNET 012."

On the contrary, the fact that short-course nevirapine has been demonstrated to be effective in other clinical studies as well as in operational settings is relevant.

46; 3 MISLEADING MTCT

Farber quotes Valendar Turner's letter which makes the same misrepresentation about nevirapine not being tested against placebo discussed above.

As explained above nevirapine clearly performed better than placebo, despite Turner's allegations. Of note is that Turner is a prominent AIDS denialist in his own right, so is scarcely an objective reviewer of the trial data.

47; 1 FAIRNESS MTCT

Farber quotes Turner referring to a study of 561 people.

We are not sure what the 561 person study is that Turner refers to. No reference is supplied by Farber. We have given references above demonstrating that transmission is generally in the 25% region after a few months.

47; 1 MISLEADING VIT A

Farber's reference to women with higher levels of vitamin A having lower HIV transmission rates implies that HIV MTCT transmission can be resolved with vitamin A supplementation.

47; 2	FALSE	ARVs	<p>See above for evidence that vitamin A supplementation is not effective at reducing MTCT. Farber fails to consider that the general ill-health caused by advanced HIV disease is likely to reduce vitamin levels in the body.</p> <p><i>Farber describes the AZT study that resulted in FDA approval as a phase II study but that was actually presented as a double-blind, placebo controlled study.</i></p> <p>The AZT study referred to was a double-blind placebo controlled phase III study, known as BW 002.⁵⁴</p> <p>Incidentally, it was for the treatment of HIV, not for the prevention of MTCT. Farber does not make this clear. Other studies demonstrated AZT's efficacy at reducing MTCT transmission.</p>
-------	-------	------	--

Ref (page, col)	Error Type	Topic	Description
-----------------	------------	-------	-------------

47; 3	MISLEADING	ARVs	<p><i>Farber states that the "AZT study was unblinded almost immediately because of the severe toxicity of the drug. Members of the control group began to acquire AZT independently or from other study participants."</i></p> <p>Farber cannot have it both ways. If the BW 002 study became unblinded because of AZT's toxicity, then control group members would surely not have wished to acquire AZT. If the study became unblinded because AZT tasted differently to placebo, then perhaps control group members might have tried to acquire it.</p> <p>But here again, Farber makes a series of old AIDS denialist allegations that the results of BW 002 are invalid because of irregularities in the trial. In effect, Farber asks readers to take the side of a journalist who does not believe that HIV causes AIDS, John Lauritsen, against the considerably more expert opinion of the FDA panel that approved AZT. A number of points need to be made about this:</p> <p>(1) All the trial participants were symptomatic of AIDS or what was called AIDS Related Complex at the time. One out of 145 AZT recipients died on the trial. Nineteen out of 137 placebo recipients died. Furthermore the AZT recipients had fewer opportunistic infections and scored higher on quality of life measurements. This cannot be explained by chance and demonstrated the efficacy of AZT. Hence the FDA registered it.</p>
-------	------------	------	--

(2) If as is alleged by the AIDS denialists some subjects became unblinded with the consequence that placebo subjects took AZT, then the results of the trial actually underestimate the efficacy of AZT and the AIDS denialist case is hoisted by its own petard. This is because if AZT was more dangerous than placebo, then there should have been more than just one death on the AZT arm. If the allegation of unblinding is true, then the only logical conclusion is that the number of placebo deaths was fewer than should have been the case, because some of the placebo subjects were given extra life-expectancy by taking AZT. There is simply no logical way for AIDS denialists to explain the massive difference in life-expectancy between the two arms.

(3) BW 002 was not the only placebo-controlled study that demonstrated AZT's efficacy. A placebo controlled trial known as ACTG 016 showed that symptomatic patients with CD4 counts between 200 and 500 were less likely to progress to AIDS. No difference in disease progression was seen in patients with CD4 counts greater than 500.⁵⁵

(4) Fifteen AZT versus placebo studies have been conducted. Not one shows any evidence to support AIDS denialist arguments that AZT causes AIDS or that its risks outweigh its benefits.⁵⁶


(5) Several uncontrolled studies have shown that AZT increases life-expectancy in symptomatic HIV patients.⁵⁷

(6) The BW 002 trial that Farber refers to in the main text involved AZT use as monotherapy. As is now well understood, HIV mutates rapidly resulting in selection for strains of the virus that are resistant to a single drug. Indeed, if AZT was not effective, HIV would not need to mutate to escape it. The short-term benefits demonstrated in the first, placebo-controlled AZT study led to the demand that subsequent trials of potential antiretroviral drugs in patients who had progressed to AIDS did not use a placebo control, but rather employed AZT. Consequently, subsequent studies demonstrated improved survival in individuals receiving dual drug therapy compared to AZT.

(7) Farber makes no mention of the fact that numerous ARV trials have demonstrated that they reduce morbidity and mortality. A meta-analysis of ARV clinical trials found the following:

One ARV reduces progression to AIDS or death by 30% against placebo.

Two ARVs reduce progression to AIDS or death by 40% against one ARV.

Three ARVs reduce progression to AIDS or death by 40% against two ARVs. (Jordan et al. [BMJ. 2002 Mar 30;324\(7340\):757](#). [ [Full-Text](#)])

If the risks of ARVs outweigh their benefits, why does using more of them result in less mortality and morbidity?

(8) A recent ARV study by the NIH, the largest ever conducted, found that the continuous use of ARVs resulted in half the rate of disease progression and death than occurred when treatment was interrupted.⁵⁸

If the risks of ARVs outweigh their benefits, why does taking them continuously result in less mortality and morbidity than taking them occasionally?

(9) As cited above (see note regarding page 38 column 3), numerous cohort analyses from around the world, both in developing and wealthy countries, demonstrate that ARVs are prolonging and improving life substantially. More examples of the efficacy of ARVs from different cohorts are being published regularly.

There is much more but the above should be sufficient to demonstrate that Farber's arguments are without merit. None of this should imply that ARVs are not associated with side-effects, which in rare circumstances are fatal. But the evidence is beyond doubt that their benefits outweigh their risks.

Ref (page, col)	Error Type	Topic	Description
47; 3	FAIRNESS	ARVs	<p><i>Farber states that the BW 002 trial was aborted. Her tone implies this was sinister. She fails to explain the legitimate reasons for terminating the trial.</i></p> <p>The trial was terminated because an interim analysis revealed that AZT was much better than placebo. Continuing to keep patients on placebo would have therefore been unethical. This is standard practice in clinical trials. Anything else would endanger the lives of patients.</p>
48; 2	FALSE	ARVs	<p><i>Farber states that the FDA approved ddl without even the pretense of a clinical trial in 1991. She creates the impression that ddl is an untested medicine.</i></p> <p>First, ddl was, of course, tested in a clinical trial prior to its approval by the FDA. The results of the trial were published after the drug was approved.⁵⁹ This is neither unusual nor sinister, and the results of the trial were available to the FDA during the approval process.</p> <p>She also fails to point out that ddl has been tested in a number of clinical trials. A Cochrane meta-analysis found that ddl added to AZT regimens reduced death and morbidity.⁶⁰</p>

Ref (page, col)	Error Type	Topic	Description
48; 2	FAIRNESS	ARVs	<p><i>Farber states in relation to clinical trials "This pattern of jettisoning standard experimental controls has continued up to the present"</i></p> <p>On the contrary, clinical trials are more closely scrutinised than before and, as a result, their scientific and ethical qualities are ever-improving. More needs to be done to improve the separation of clinical trials from those with a financial interest in their outcome, but this does not mean that clinical trials are a cesspit of corrupted science.</p>
48; 2	FALSE	ARVs	<p><i>Footnote 11 states that AZT is a DNA chain terminator and kills all dividing cells indiscriminately. Farber further states "AZT prevents the replication of HIV by killing infected T-cells." Apparently GlaxoSmithKline was asked to comment on this. If Harper's had an appropriate fact-checking process for scientific issues, it would have been realised that this should have been fact-checked with expert researchers, not the manufacturer of the drug.</i></p> <p>AZT does not kill cells indiscriminately. At concentrations below those that are toxic to human cells, AZT interferes directly with HIV replication within the living, infected cell, by inhibiting the conversion of the viral RNA into DNA.⁶² A more detailed description of how AZT works is given in an endnote.⁶³</p> <p>AIDS researchers and clinicians do not claim that AZT is a perfect drug; undoubtedly it can and does cause side effects. As with most drugs used to treat, say, cancer, the therapeutic index for AZT is less than ideal, but the dangers of not treating HIV infection strongly outweigh the risks of doing so. AZT therefore remains a highly useful drug for HIV therapy. This has been shown in clinical trials and cohort analyses as demonstrated by several references in our endnotes.</p>
49; 1	FALSE	HIV	<p><i>Farber appears to agree with Duesberg's view that HIV is incapable of causing a single disease.</i></p> <p>HIV causes a progressive decline of the immune system by depleting CD4+ T-cells. Eventually the immune system becomes dysfunctional and incapable of fighting off diseases that it normally would. People with advanced HIV-disease are more susceptible than the general HIV-negative population to about 30 different diseases, many of them with high mortality rates.⁶⁴</p>
49; 2	FALSE	HIV	<p><i>Farber cites Duesberg that HIV has not fulfilled Koch's postulates. No argument or references are provided to back this up.</i></p> <p>HIV as the cause of AIDS meets all four of Koch's postulates.⁶⁵</p>

(Postulate one) Studies have found HIV in almost every case where a person has been diagnosed with AIDS. Obviously there will be occasional misdiagnoses, as with any disease. (See our explanation of Farber's next error as well.)

(Postulate two) HIV can be isolated from AIDS patients and grown in laboratories. PCR tests can count the amount of HIV in blood. The virus is easily, and has been on numerous occasions, photographed using electron microscopes.

(Postulate three) Most people with HIV experience immune system decline, eventually leading to AIDS.⁶⁶ Postulate three does not require every, or even most, hosts to reproduce the disease. But in the case of HIV, the vast majority of people progress to AIDS. Furthermore, there are well-documented cases of workers developing AIDS after being infected with HIV in their laboratories. Likewise a case of a US dentist who infected six of his patients with HIV has been documented. Three died of AIDS. One developed AIDS. Five of the patients had no other proposed risk factors for AIDS. In both these examples, tests were done which confirmed the origins of their infections. These two examples not only meet postulate three but all four postulates.

(Postulate four) PCR tests show the presence of HIV in infected people.

That HIV is the cause of AIDS has arguably been demonstrated more thoroughly than is the norm for any disease with a viral causation.

49; 2

FALSE

HIV

Farber cites Duesberg that there are 4,000 AIDS cases in which HIV was absent.

This is false. The actual situation in the US is described accurately as follows *"A survey of 230,179 AIDS patients in the United States revealed only 299 HIV-seronegative individuals. An evaluation of 172 of these 299 patients found 131 actually to be seropositive; an additional 34 died before their serostatus could be confirmed (Smith et al. [N Engl J Med. 1993 Feb 11;328\(6\):373-9](#)).*⁶⁷

Of note is that, in extremely rare cases, HIV-infected people die of AIDS so quickly that they do not develop antibodies to the virus, but nevertheless their virus can be isolated.⁶⁸

If Duesberg has made this astonishing finding, he should be able to publish it in a credible peer-reviewed scientific journal. Of course this has not been done.

As explained previously and in more detail later, numerous studies from around the world, including Africa, the epicentre of the epidemic, demonstrate that mortality and morbidity is much higher in people with HIV.

Ref (page, col)	Error Type	Topic	Description
49; 3	FALSE	HIV	<p><i>Farber writes: "In fact, most AIDS patients have no active HIV in their systems, because the virus has been neutralized by antibodies."</i></p> <p>PCR tests demonstrate that HIV is active in people with HIV antibodies.</p> <p>Most of the HIV in the body is located within solid lymphoid tissues, where it is transmitted by cell-to-cell spread. Antibodies are unable to interfere efficiently with this process. Furthermore, whenever effective neutralizing antibodies are generated within the body, HIV responds by mutating to generate resistant variants that are unaffected by these antibodies.⁶⁹</p>
49; 3	FALSE	HIV	<p><i>Farber states "HIV can be isolated only by 'reactivating' latent copies of the virus, and then only with extraordinary difficulty." She supplies no reference.</i></p> <p>This is false. Virus isolates are routinely made in clinical and basic research laboratories. It is true that more virus is produced by reactivating latent cells, but this is not what Farber is saying.</p>
49; 3	FALSE	HIV	<p><i>Farber states "With all other viral diseases, by the way, the presence of antibodies signals immunity from the disease. Why this is not the case with HIV has never been demonstrated."</i></p> <p>The presence of antibodies all too often does not signify immunity from disease (e.g. herpes zoster, herpes simplex, hepatitis C, hepatitis B, dengue - all of these viruses can cause disease in the presence of virus-specific antibodies). HIV is a retrovirus and as such it integrates upon infection. Antibodies specific to a retrovirus almost always means the patient is infected and the levels of antibody usually correlate to some extent with the level of virus replication. We present more detail in an endnote.⁷⁰</p>
49; 3	FALSE	HIV	<p><i>Farber writes "Viral load, one of the clinical markers for HIV, is not a measurement of actual, live virus in the body, but the amplified fragments of DNA left over from an infection that has been suppressed by antibodies."</i></p> <p>This is nonsense. First, viral load assays do not measure DNA, they measure HIV's content of RNA genomes (HIV is an RNA-containing, not a DNA-containing virus). Second, there is ample evidence that the signals from plasma viral load assays are proportional to the infectious virus content of plasma.</p> <p>In numerous studies monitoring cohorts of HIV patients, viral load increases with time.⁷¹ How is this possible if all that is left over are the "fragments ... from an infection that has been suppressed"?</p>

Ref (page, col)	Error Type	Topic	Description
50; 1	FALSE	HIV	<p><i>Farber claims that the latency period of HIV allows evasion of Koch's third and fourth postulates. She gives no reference.</i></p> <p>HIV as the cause of AIDS does meet all four of Koch's postulates as has been shown above.</p>
50; 1	FALSE	HIV	<p><i>Farber states that all infectious diseases spread randomly through the population, but HIV does not.</i></p> <p>HIV is primarily sexually transmitted and sexually transmitted infections do not spread randomly through the population. Sexually transmitted infections consistently target people who have more partners, use condoms less frequently, and visit sex workers.</p>
50; 1	MISLEADING	HIV	<p><i>Footnote 13 contains multiple scientific errors and perpetuates several misconceptions about HIV and AIDS that are commonly listed on AIDS denialist web sites.</i></p> <p>Farber writes "It has been claimed that HIV somehow causes cell death even when it is not present by remote programmed 'suicidal' mechanisms."</p> <p>It is difficult to discern what Farber is trying to say here, because as written, the sentence makes no scientific sense whatsoever. Perhaps the most plausible interpretation of Farber's train of thought is that she is alluding to the death of CD4+ T-cells by a mechanism known as apoptosis (sometimes called "programmed cell death") during HIV infection. The underlying science here is complex, and specialist reviews on viral pathogenesis should be consulted for a fuller picture.^{72 73 74} We provide a detailed explanation as an endnote.⁷⁵</p>
50; 1	FALSE	HIV	<p><i>Farber states in footnote 13 "Some researchers claim that HIV exploits special receptors on human T-cells that, due to a hypothetical genetic mutation, many 'Caucasian Europeans' lack, but many Africans have. What's interesting is that many gay men also seem to possess these mysterious receptors, as do intravenous drug users and transfusion recipients."</i></p> <p>Again, these sentences betray Farber's ignorance of a substantial body of scientific information. As we explain in a detailed endnote⁷⁶, a fraction of Caucasians have genetic predispositions which render them less likely to contract HIV (not immune) or more likely to progress slowly. However, the vast majority of Caucasians have no known genetic predisposition that makes them less likely to contract HIV or progress to AIDS. Many Caucasians do contract HIV and do progress to AIDS.</p>

Ref (page, col)	Error Type	Topic	Description
50; 1	FALSE	HIV	<p><i>Farber further states in footnote 13 "It is claimed that although HIV does not kill the laboratory T-cells used to manufacture AIDS tests, it does kill T-cells in the human body, even though it infects only a very small proportion of them, typically an average of 0.1 percent."</i></p> <p>There are three inaccuracies in this sentence. First, HIV does kill T-cells in the laboratory, as was recorded in the very earliest papers on the isolation of HIV dating from 1983-1984. Second, "laboratory T-cells" have not been used to "manufacture AIDS tests" for many years now (the technology has evolved well beyond the early methods of the mid-1980's which were based on the production of inactivated HIV particles in permanent T-cell lines that had been carefully selected for relative resistance to the cell-killing effects of HIV). Third, HIV does directly kill, or otherwise cause the death of a substantial fraction of the total CD4+ T-cell complement of the body.</p> <p>Farber is presumably alluding to measurements of the HIV infection status of CD4+ T-cells present in the bloodstream, which constitute only a small proportion of the total amount of these cells present in the body as a whole. Most CD4+ T-cells cells are, in fact, located in solid lymphoid tissues, particularly in the gut-associated lymphoid tissue. The loss of CD4+ T-cells from such tissues upon HIV infection is rapid in rate and substantial in extent.⁷⁷</p>
50; 1	FALSE	HIV	<p><i>Farber further states in footnote 13 that "HIV does not sicken or kill chimpanzees."</i></p> <p>It is true that HIV replicates inefficiently in chimpanzees, to a much lower level than it does in humans so it usually does not cause disease. However, there are recorded examples of HIV causing immunodeficiency in these animals.^{78, 79}</p> <p>Many agents which cause disease in man are unable to cause disease in a host of other species because they fail to infect, or infect poorly, or produce a different response. HIV has probably been in the chimpanzee population for a very long time. Therefore it is plausible that natural selection has rendered it less harmful.</p> <p>We note the presumably unintended irony in Farber's closing sentence in this footnote: "<i>Seldom do journalists insist on good hard evidence for these assertions.</i>" In fact, most professional science writers do exactly that. Perhaps Farber will take the trouble to do so in the future.</p>

Ref (page, col)	Error Type	Topic	Description
50; 2	FALSE	HIV	<p><i>Farber proceeds from column 2 to the end of column 3 to postulate other causes of AIDS and makes various statements about the demographics of AIDS. No sources are cited for her ponderings. This is a particularly poorly researched and fact-checked part of the article.</i></p> <p>Not a single credible peer-reviewed article published in a credible scientific journal since 1990 offers any support for what she says here. Instead of a complete point-by-point explanation, some critical comments are offered:</p> <p>(1) HIV does affect the heterosexual population in the US, not just gay men.⁸⁰ The US population in which HIV infection is now spreading most rapidly is African-American women. Poverty (where untreated sexually transmitted infections, lack of prevention knowledge, lack of power of women to negotiate condom use, increased frequency of transactional sex are more likely than in wealthier populations), unprotected anal sex (due to greater risk of abrasions), blood transfusions, intravenous needle reuse and exposure to multiple partners. All increase risk of HIV transmission and explain the demographic aspects of the disease with which Farber fumbles.</p> <p>(2) In contrast to Farber's implication that proposed causes of AIDS other than HIV have not been tested, they have – in great depth. These studies have found that in the absence of HIV none of recreational drug use, poverty, malnutrition and homosexuality can predict the onset of AIDS. Footnote 14 is consequently false too. There is no evidence that recreational drug use is the cause of AIDS. We quote an NIAID rebuttal to this myth:</p> <p><i>"[I]n a prospectively studied cohort in Vancouver, 715 homosexual men were followed for a median of 8.6 years. Among 365 HIV-positive individuals, 136 developed AIDS. No AIDS-defining illnesses occurred among 350 seronegative men despite the fact that these men reported appreciable use of inhalable nitrites ("poppers") and other recreational drugs, and frequent receptive anal intercourse (Schechter et al. Lancet. 1993 Mar 13;341(8846):658-9).</i></p> <p>Other studies show that among homosexual men and injection-drug users, the specific immune deficit that leads to AIDS - a progressive and sustained loss of CD4+ T cells - is extremely rare in the absence of other immunosuppressive conditions. For example, in the Multicenter AIDS Cohort Study, more than 22,000 T-cell determinations in 2,713 HIV-seronegative homosexual men revealed only one individual with a CD4+ T-cell count persistently lower than 300 cells/mm³ of blood, and this individual was receiving immunosuppressive therapy (Vermund et al. N Engl J Med. 1993 Feb 11;328(6):442).</p>

*In a survey of 229 HIV-seronegative injection-drug users in New York City, mean CD4+ T-cell counts of the group were consistently more than 1,000 cells/mm³ of blood. Only two individuals had two CD4+ T-cell measurements of less than 300/mm³ of blood, one of whom died with cardiac disease and non-Hodgkin's lymphoma listed as the cause of death (Des Jarlais et al. **J Acquir Immune Defic Syndr. 1993 Jul;6 (7):820-2**).⁸¹*

The use of some recreational drugs, such as metamphetamines, can place individuals at greater risk of acquiring HIV infection by lowering inhibitions and increasing the probability of engaging in, e.g., unsafe sexual practices. This does not mean that "drugs cause AIDS."

(3) Farber's claim that researchers have failed to demonstrate a higher incidence of AIDS in people with HIV is false. See the above studies. There are many more. Here is a further tiny sample of such studies, including some from Africa:

(i) The Multicenter AIDS Cohort Study (MACS) and the Women's Interagency HIV Study (WIHS) consisted of 8,000 participants in the US. It demonstrated that participants with HIV were approximately 1,100 times more likely than people without HIV to get a disease associated with AIDS.⁸²

(ii) A one-year South African study of 1,792 HIV-positive and 2,970 HIV-negative gold miners found that miners with HIV were nearly three times more likely to be hospitalised and nine times more likely to die than HIV-negative ones.⁸³

(iii) Researchers at Chris Hani Baragwanath Hospital in Johannesburg looked at deaths of HIV-positive and HIV-negative children between 1992 and 1996. They found that deaths increased among HIV-positive children but decreased among HIV-negative ones.⁸⁴

(iv) A study in Uganda of nearly 20,000 people found that HIV-positive people had a death rate more than twenty times higher than HIV-negative people.⁸⁵ Incidentally, in this study, educated people and civil servants were more likely to die, which is inconsistent with poverty being the cause of AIDS (though it certainly is an exacerbating factor).

(v) In Cote d'Ivoire, HIV-positive people with TB were 15 times more likely to die within six months than HIV-negative people with TB.⁸⁶

(vi) A study in Rwanda found that death was 21 times higher for HIV-positive children than for HIV-negative children.⁸⁷

(vii) A study of pregnant women at King Edward Hospital in Durban, South Africa found that those with HIV had a ten times higher rate of tuberculosis than those without.⁸⁸

(viii) A study of over 6,000 people with haemophilia in the United Kingdom found that those with HIV had a much higher death rate. The death rate amongst HIV-negative haemophiliacs stayed stable during the analysis period (1977 to 1991). The death rate amongst haemophiliacs who contracted HIV rose dramatically from 1984 to the end of the study period.⁸⁹ This disproves Farber's assertion that no studies have been carried out to determine if haemophiliacs infected with HIV die sooner than those not infected.

(ix) As explained by the NIH *"Similar data have emerged from the Multicenter Hemophilia Cohort Study. Among 1,028 hemophiliacs followed for a median of 10.3 years, HIV-infected individuals (n=321) were 11 times more likely to die than HIV-negative subjects (n=707), with the dose of Factor VIII having no effect on survival in either group* (Goedert. [Lancet. 1995 Nov 25;346\(8987\):1425-6](#)).⁹⁰ Factor VIII is Duesberg's proposal for higher mortality in haemophiliacs with HIV. This study debunked this notion. See Cohen (1994)⁹¹ for a more detailed discussion.

For further examples showing more illness and death among people with HIV, see NIAID (2003).²⁵ A diligent search on Medline will elicit even more examples.

(4) Farber provides no reference for her claim that HIV is a harmless passenger virus. The claim is false and disproven by the evidence presented in this document.

(5) Farber provides no reference for her claim that HIV is primarily spread from mother-to-child. The claim is false. Most HIV transmission is through heterosexual sex.

(6) In footnote 14 Farber claims that the majority of Kaposi's sarcoma patients are heavy users of nitrate inhalers. She gives no reference. Assuming she's right, if a sizeable minority are not, then nitrate inhalers cannot be the cause of Kaposi's sarcoma.

Once infected with HIV, recreational drug use and poverty are factors in the progression of HIV to AIDS, but HIV progresses to AIDS in sufficiently large numbers of well-off people who do not use recreational drugs to disprove that drugs or poverty are the cause of AIDS.

50; 3

FAIRNESS

HIV

Farber criticises those who compare AIDS denialism to Holocaust denialism.

Analogous to holocaust denialism, AIDS denialism is an insult to the memory of those who have died of AIDS, as well as to the dignity of their families, friends and survivors. As with Holocaust denialism, AIDS denialism is pseudo-scientific and contradicts an immense body of research.

But in contrast to Holocaust denialism, AIDS denialism directly threatens lives *today* by trying to fool laypeople at risk of HIV not to get tested for the virus or not to practice safer sex. It also tries to fool those who need ARVs not to take them.

Ref (page, col)	Error Type	Topic	Description
51; 1	MISLEADING	HIV	<p><i>Footnote 15 refers to the scientific consensus on scurvy being overturned when it was finally realised that it was due to a vitamin C deficiency. The implication is that this is similar to the case of HIV.</i></p> <p>Our present-day understanding of HIV and AIDS results from the efforts of thousands of scientists publishing tens of thousands of studies over 25 years. No other disease in history has been studied in this depth. It would require the exposure of an unprecedented conspiracy or duping for the scientific consensus on HIV as the cause of AIDS and the benefits of ARVs to be overturned. This is absurdly implausible. ARVs are probably more studied than any other class of drugs. Comparing HIV science to the history of scurvy is misleading and silly. Furthermore, the link between vitamin C and scurvy was definitively discovered in the 1930s, at the onset of the modern era of medical research. Scientific method in medicine has developed dramatically since then. Furthermore, Farber provides no reference for those proposing citrus fruit as a remedy for scurvy being dismissed as flat-earthers. Although scurvy was not properly understood until the 1930s, as early as the 17th century the surgeon general of the British East India Company suggested using fresh food including oranges, limes etc. as a preventative measure. This soon became standard practice in the British Royal Navy.⁹²</p> <p>But Farber is also highly selective. She fails to mention the successes of pharmaceutical products in medical science. These include the numerous infections treated by penicillin, treatments for diabetes, cardiovascular disease, cancer, etc. These treatments have had a substantial effect on improved life-expectancy since the 20th century.</p>
51; 3	FAIRNESS	HIV	<p><i>Footnote 16 refers to the reappraising petition with its approximate 2,300 signatories.</i></p> <p>It appears that Farber is referring to one of two petitions on the virusmyth website (we assume this because Farber, as usual, does not supply references). Farber is a signatory to one of these petitions a fact that indicates she had prejudged views before writing the Harper's piece. The petition texts are vague. They have been open for signing for years. It is not clear how to remove one's name from them if one wishes to do so. It is difficult to verify which of them are scientists or have conducted AIDS research.</p>

By contrast, the Durban Declaration was signed by approximately 5,000 scientists, most of them engaged in HIV/AIDS research, in a short space of time. It declared what was already obvious and accepted: that HIV is the cause of AIDS.

In any case, as the arguments here clearly show, there is no need to appeal to authority to demonstrate that HIV is the cause of AIDS, and that the benefits of ARVs outweigh their risks. The public domain research demonstrate these facts beyond reasonable doubt.

52 **FALSE** **ARVs** ***Farber states "Duesberg thinks that up to 75 percent of AIDS cases in the West can be attributed to drug toxicity. If toxic AIDS therapies were discontinued, he says, thousands of lives could be saved virtually overnight."***

This is merely Duesberg's opinion, for which there is not a shred of evidence. The evidence presented or referenced in this document demonstrates that Duesberg is wrong.

Does Farber, in fact, disagree with Duesberg? In a recent widely circulated email, she states that her Harper's article "does not, for example, say that all AIDS drugs are ghastly, or worthless. In each article (in the past) where I have addressed HAART I have included, clearly, the fact that the regimens have absolutely helped people who are very sick."

Or does she simply disagree with herself?

TABLE 2

Farber appeals to a number of authorities to confirm her views. It is worth noting the following:

Name	Description
David Rasnick	Rasnick is (or was until recently) on the payroll of Matthias Rath, a vitamin salesman who claims micronutrients treat HIV, heart disease, cancer, diabetes, asthma and many other serious diseases. Rath also claims that all pharmaceutical products are toxic and of no benefit in treating any of the aforementioned diseases.

Farber refers to a nutritional study being conducted by Rasnick in South Africa. Here are the facts on this disgraceful unethical debacle: Rath and Rasnick have recently conducted a clinical trial in South Africa. The trial received no regulatory approval, involves convincing ill HIV patients not to take ARVs and promises them that the mega doses of vitamins (far in excess of RDA) prescribed treat AIDS. Investigations into this trial have resulted in allegations that a number of deaths have occurred and consequently litigation is underway in South Africa to stop it (launched by the Treatment Action Campaign and South African Medical Association). Rath and Rasnick have the support of the South Africa Minister of Health. Herein lies a scandal that Harper's should really be running a story on. For more information on the deeds of Rasnick's employer, see TAC (2006).⁹³

Karry Mullis

Farber points out that Mullis discovered the PCR and is a Nobel laureate. What she fails to mention is that he has a wide range of odd beliefs. He does not believe in global warming, but does believe he might have been abducted by aliens and is partial to astrology. Entertaining perhaps, but if you're going to argue from authority this is not someone to quote.

Peter Duesberg

Farber fails to point out that Duesberg has almost no track record of published AIDS-related research in credible peer-reviewed journals.

Farber also fails to point out that his new cancer hypothesis is also considered pseudo-science by most cancer scientists. Farber is also wrong about Duesberg being the youngest member ever elected to the National Academy of Sciences.

There were many younger than 50, even at the time Duesberg was elected.

Farber further claims that the National Cancer Institute (NCI) "refuses" to fund Duesberg. The NCI relies on peer review groups that score grants. If his grants fared poorly in study sections, that's far from NCI's "refusal" to fund him. So the implication that the institution has blackballed him from funding is both false and misleading. He, like anyone else, can continue submitting grant applications, and if peers deem it worthy, he'll receive funding.

Harvey Bialy

Farber points out that Bialy is the founding scientific editor of Nature Biotechnology. He no longer holds any position with Nature.

Jonathan Fishbein

NIAID publicly revealed the problems with the HIVNET 012 study long before Fishbein was hired. His original complaint was about recertifying the study site, and it somehow mutated into concerns about efficacy and safety of the intervention itself. He nor anyone else has demonstrated any evidence that undermines HIVNET 012's scientific results (e.g. an unrecorded side effect or death likely due to nevirapine).

Fishbein, Farber writes, "supported Luzar in a sexual harassment claim against Kagan." Fishbein in fact filed it as a third party complaint.

Celia Farber

Celia Farber has been publishing articles for many years denying that HIV causes AIDS or that ARVs are effective.⁹⁴ Her views have been rebutted by the scientific community. She is not a scientist, yet clearly brings highly prejudiced views to this issue. She is obviously out of her depth trying to overturn the scientific consensus. Yet Harper's proceeded to publish her grossly inaccurate article without conducting proper fact-checking.

Correction History

3 March 2006: First public version. Sent to Harper's.

4 March 2006:

Modified (37;3) "Nevirapine remains an important antiretroviral medicine whose risks outweigh its benefits." to "Nevirapine remains an important antiretroviral medicine whose benefits outweigh its risks."







(b) Modified Bruce Mirken affiliation.

5-22 March: references standardised and typing errors corrected. Thank you to Sister Mary Elizabeth of [AEGIS](#) for assisting with these changes. This version is final.


References

- 1 TAC. (2005) *Analysis of deaths on Matthias Rath illegal clinical trial*. http://www.tac.org.za/Documents/ns02_11_2005.htm. Last accessed 2006/03/03.
- 2 Safai B. *et al*. Seroepidemiological studies of human T-lymphotropic retrovirus type III in acquired immunodeficiency syndrome. [Lancet. 1984 Jun 30;1\(8392\):1438-40.](#)
- 3 Mirken, B. (2001) *HIV Testing 101 (Part 1 of 2)*. [AIDS Treatment News, 2001 Nov 23;374\(5\)](#). Last accessed 2006/02/25.
- 4 Coon, M. (2000) *HIV, AIDS, and the Distortion of Science*. http://www.aegis.org/topics/hiv_exist.html. Last accessed 2006/03/01.
- 5 Torre *et al*. (2001) *Nevirapine or Efavirenz Combined with Two Nucleoside Reverse Transcriptase Inhibitors Compared to HAART: A Meta-Analysis of Randomized Clinical Trials*. [HIV Clin Trials. 2001 Mar-Apr;2\(2\):113-21.](#)
- 6 NIAID (1995) *AZT and AIDS*.<http://www.niaid.nih.gov/publications/hiv aids/23.htm>. Last accessed 2006/03/01
- 7 Phillips *et al*. (1997) *Correspondence between the effect of zidovudine plus lamivudine on plasma HIV level/ CD4 lymphocyte count and the incidence of clinical disease in infected individuals*. [AIDS. 1997 Feb;11\(2\):169-75.](#) [ [Full-Text](#)]
- 8 Kuritzkes *et al*. (1999) *A trial comparing nucleoside monotherapy with combination therapy in HIV-infected adults with CD4 cell counts from 200 to 500 per cubic millimeter. AIDS Clinical Trials Group Study 175 Study Team*. [AIDS. 1999 Apr 16;13\(6\):685-94.](#) [ [Full-Text](#)]

- 9** Spruance *et al.* (1997) *Clinical efficacy of monotherapy with stavudine compared with zidovudine in HIV-infected, zidovudine-experienced patients. A randomized, double-blind, controlled trial. Bristol-Myers Squibb Stavudine/019 Study Group.* [Ann Intern Med. 1997 Mar 1;126\(5\):355-6 \[Full-Text\].](#)
- 10** Torre *et al.*(2001), *supra* Note 5.
- 11** Ibid.
- 12** Mirken, B. *Answering the AIDS Denialists: CD4 (T-Cell) Counts, and Viral Load.* [AIDS Treatment News 2000 Apr 21;341.](#) Last accessed 2006/03/13
- 13** Jordan, R. *et al.* (2002) *Systematic review and meta-analysis of evidence for increasing numbers of drugs in antiretroviral combination therapy.* [BMJ. 2002 Mar 30;324\(7340\):757. \[Full-Text\].](#)
- 14** The CASCADE Collaboration. (2000) *Survival after introduction of HAART in people with known duration of HIV-1 infection. The CASCADE Collaboration. Concerted Action on SeroConversion to AIDS and Death in Europe.* [Lancet. 2000 Apr 1;355\(9210\):1158-9.](#)
- 15** Porter *et al.* (2003) *CASCADE Collaboration. Determinants of survival following HIV-1 seroconversion after the introduction of HAART.* [Lancet. 2003 Oct 18;362\(9392\):1267-74.](#)
- 16** Tassie JM *et al.* (2002) *Clinical Epidemiology Group from the French Hospital Database on HIV. Time to AIDS from 1992 to 1999 in HIV-1-infected subjects with known date of infection.* [J Acquir Immune Defic Syndr. 2002 May 1;30\(1\):81-7.](#)
- 17** Mocroft A *et al.* (2003) *EuroSIDA study group. Decline in the AIDS and death rates in the EuroSIDA study: an observational study.* [Lancet. 2003 Jul 5;362\(9377\):22-9.](#)
- 18** Badri, M. *et al.* (2004) *Initiating highly active antiretro viral therapy in sub-Saharan Africa: an assessment of the revised World Health Organizationscaling-up guidelines.* [AIDS. 2004 May 21;18\(8\):1159-68.](#)
- 19** Palella FJ Jr. *et al.* (1998) *Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. HIV Outpatient Study Investigators.* [N Engl J Med. 1998 Mar 26;338\(13\):853-60.](#)
- 20** Sinkala, M. *et al.* (2006) *Rapid Scale-up of Antiretro viral Services in Zambia: 1-year Clinical and Immunologic Outcomes.* [Conf Retrovir Opportunistic Infect 2005 Feb 5-8;13:abstract no. 64.](#) Last accessed 2006/03/13.
- 21** Wong KH. (2004) *Delayed Progression to Death and to AIDS in a Hong Kong Cohort of Patients with Advanced HIV Type 1 Disease During the Era of Highly Active Antiretro viral Therapy.* [Clin Infect Dis. 2004 Sep 15;39\(6\):853-60.](#)
- 22** Casseb J. (2003) *AIDS Incidence and Mortality in a Hospital-Based Cohort of HIV-1–Seropositive Patients Receiving Highly Active Antiretroviral Therapy in São Paulo, Brazil.* [AIDS Patient Care STDS. 2003 Sep;17\(9\):447-52.](#)
- 23** Sterne JAC. *et al.* *Long-term effectiveness of potent antiretro viral therapy in preventing AIDS and death: a prospective cohort study.* [Lancet. 2005 Jul 30-Aug 5;366\(9483\):378-84.](#)
- 24** Nicoll A. *et al.* (2000) *Science, sense, and nonsense about HIV in Africa.* [Commun Dis Public Health. 2000 Jun;3\(2\):78-9. \[Full-Text\].](#) Last accessed 2006/03/13.
- 25** NIAID. (2003) *The Evidence That HIV Causes AIDS.* <http://www.niaid.nih.gov/factsheets/evidhiv.htm>. Last accessed 2006/03/01.
- 27** Statistics South Africa. (2005) *Mortality and causes of death in South Africa, 1997–2003. Findings from death notification. P0309.3.Â*

- 28** The immunological perturbations associated with HIV infection are: persistent immune activation, naïve CD4 and CD8 T cell depletion and memory T cell dysfunction and depletion (Grossman Z, et al. *CD4+ T-cell depletion in HIV infection: are we closer to understanding the cause?* **Nat Med.** **2002 Apr;8(4):319-23** [ **Full-Text**]). There is also an accumulation of T cell responses, particularly CD8 T cell responses, that are demonstrably targeting HIV (Betts MR, et al. *Analysis of total human immunodeficiency virus (HIV)-specific CD4 (+) and CD8(+) T-cell responses: relationship to viral load in untreated HIV infection.* **J Virol.** **2001 Dec;75(24):11983-91** [ **Full-Text**]). These perturbations are not mirrored in chronic malnutrition, malaria, parasitic infections and other common African illnesses. The only condition associated with similar immunological perturbations is HIV-2 infection (Sousa AE, et al. *CD4 T cell depletion is linked directly to immune activation in the pathogenesis of HIV-1 and HIV-2 but only indirectly to the viral load.* **J Immunol.** **2002 Sep 15;169(6):3400-6** [ **Full-Text**]).
- 29** Sauer G *et al.*, *Evaluation of the abbot determine HIV-1/2 rapid assay using samples from the Western Cape region.* South Africa. *Int Conf AIDS* 2000 Jul 9-14; 13:(**abstract no. MoPeA2091**)
- 30** Phili R *et al.* (2002) *Evaluation of a rapid human immunodeficiency virus test at two community clinics in Kwazulu-Natal.* **S Afr Med J.** **2002 Oct;92(10):818-21**
- 31** Ferreira *et al.* (2005) *Evaluation of rapid tests for anti-HIV detection in Brazil.* **AIDS.** **2005 Oct;19 Suppl 4:S70-5**
- 32** Koblavi-Dème S. (2001) *Sensitivity and Specificity of Human Immunodeficiency Virus Rapid Serologic Assays and Testing Algorithms in an Antenatal Clinic in Abidjan, Ivory Coast.* **J Clin Microbiol.** **2001 May;39(5):1808-12** [ **Full-Text**]
- 33** Foglia *et al.* (2004) *Use of rapid and conventional testing technologies for human immunodeficiency virus type 1 serologic screening in a rural Kenyan reference laboratory.* **Clin Microbiol.** **2004 Aug;42(8):3850-2.** [ **Full-Text**]
- 34** ASSA. (2005) ASSA 2003. (The model's spreadsheets can be downloaded from www.assa.org.za.)
- 35** Shisana O. *et al.* (2005) *South African National HIV Prevalence, HIV Incidence, Behaviour and Communication Survey 2005.*
- 36** Geffen N. (2004) *Rian Malan Spreads Confusion about AIDS Statistics.* http://www.tac.org.za/newsletter/2004/ns20_01_2004.htm. Last accessed 2006/03/01.
- 37** NIAID (2002). *Review of HIVNET 012.* http://www3.niaid.nih.gov/news/newsreleases/2002/review_hivnet012.
- 38** Torre *et al.* (2001), *supra* Note 5.
- 39** Musoke P. *et al.* (1999) *A phase I/II study of the safety and pharmacokinetics of nevirapine in HIV-1-infected pregnant Ugandan women and their neonates (HIVNET 006).* **AIDS.** **1999 Mar 11;13(4):479-8.** [ **Full-Text**]
- 40** *Ibid.*
- 41** Guay LA. *et al.* (1999) *Intrapartum and neonatal single-dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomised trial.* **Lancet.** **1999 Sep 4;354(9181):795-802.**
- 42** Brocklehurst P. *et al.* (2006) *Antiretrovirals for reducing the risk of mother-to-child transmission of HIV infection.* The Cochrane Database of Systematic Reviews. <http://www.cochrane.org/reviews/en/ab003510.html>. Last accessed 2006/03/02.

- 43** Public Health Service Task Force. (2005) *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health and Interventions to Reduce Perinatal HIV-1 Transmission in the United States*. <http://aidsinfo.nih.gov/ContentFiles/PerinatalGL.pdf>. Last accessed 2006/03/01.
- 44** NIAID. (2005) *Questions and Answers: The HIVNET 012 Study and the Safety and Effectiveness of Nevirapine in Preventing Mother-to-Infant Transmission of HIV*. <http://www3.niaid.nih.gov/news/newsreleases/2005/hivnet012qa.htm>. Last accessed 2006/03/02.
- 45** NIAID. (2004) *The HIVNET 012 Study and the Safety and Effectiveness of Nevirapine in Preventing Mother-to-Infant Transmission of HIV*. <http://www3.niaid.nih.gov/news/newsreleases/2004/hivnet012.htm> Last accessed 2006/03/02.
- 46** IOM (2005) *Review of the HIVNET 012 Perinatal HIV Prevention Study*. <http://www.iom.edu/?id=26287&redirect=0>. Last accessed 2006/03/02.
- 47** Moodley D. et al. (2002) *A Multicenter Randomized Controlled Trial of Nevirapine Versus a Combination of Zidovudine and Lamivudine to Reduce Intrapartum and Early Postpartum Mother-to-Child Transmission of Human Immunodeficiency Virus Type 1*. **J Infect Dis.** 2003 Mar 1;187(5):725-35. [Full-Text]
- 48** Lallemand M. et al. (2004) *Single-dose perinatal nevirapine plus standard zidovudine to prevent mother-to-child transmission of HIV-1 in Thailand*. **N Engl J Med.** 2004 Jul 15;351(3):217-28. [ Full-Text]
- 49** Ayouba A et al. (2003) *Low rate of mother-to-child transmission of HIV-1 after nevirapine intervention in a pilot public health program in Yaounde, Cameroon*. **J Acquir Immune Defic Syndr.** 2003 Nov 1;34(3):274-80.
- 50** Wiktor SZ. et al. (1999) *Short-course oral zidovudine for prevention of mother-to-child transmission of HIV-1 in Abidjan, Cote d'Ivoire: a randomised trial*. **Lancet.** 1999 Mar 6;353(9155):781-5
- 51** Connor EM. et al. (1994) *Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. Pediatric AIDS Clinical Trials Group Protocol 076 Study Group*. **N Engl J Med.** 1994 Nov 3;331(18):1173-80.
- 52** Wiysonge CS (2006) *Vitamin A supplementation for reducing the risk of mother-to-child transmission of HIV infection*. The Cochrane Database of Systematic Reviews.
- 53** Humphrey JH. (2006) *Effects of a Single Large Dose of Vitamin A, Given during the Postpartum Period to HIV-Positive Women and Their Infants, on Child HIV Infection, HIV-Free Survival, and Mortality*. **J Infect Dis.** 2006 Mar 15;193(6):860-71.
- 54** Fischl MA. et al. (1987) *The efficacy of azidothymidine (AZT) in the treatment of patients with AIDS and AIDS-related complex. A double-blind, placebo-controlled trial*. **N Engl J Med.** 1987 Jul 23;317(4):185-91.
- 55** NIAID. (1995) *AZT and AIDS*. <http://www.niaid.nih.gov/publications/hiv aids/23.htm>. Last accessed 2006/03/01.
- 56** Some AIDS denialists have misrepresented the Concorde study to show that AZT is more dangerous than placebo. But the Concorde study did not show this. Ref: NIAID. (1995) *The relationship between the Human Immunodeficiency Virus and the Acquired Immune Syndrome*. <http://www.niaid.nih.gov/Publications/hiv aids/all.htm>. Last accessed 2006/03/02.
- 57** Ibid.
- 58** NIH (2006). *International HIV/AIDS Trial Finds Continuous Antiretroviral Therapy Superior to Episodic Therapy*. <http://www.nih.gov/news/pr/jan2006/niaid-18.htm>. Last accessed 2006/03/01.
- 59** Kahn JO. et al. (1992) *A controlled trial comparing continued zidovudine with didanosine in human immunodeficiency virus infection. The NIAID AIDS Clinical Trials Group*. **N Engl J Med.** 1992 Aug 27;327(9):581-7.

- 60** Darbyshire J. *et al.* (2006) *Zidovudine (AZT) versus AZT plus didanosine (ddI) versus AZT plus zalcitabine (ddC) in HIV infected adults.* The The Cochrane Database of Systematic Reviews.
- 61** FDA. (1996) *FDA grants accelerated approval to third protease inhibitor to treat HIV.* <http://www.fda.gov/bbs/topics/NEWS/NEW00528.html>. Last accessed 2006/03/01.
- 62** Furman PA. *et al.* (1988) *Spectrum of antiviral activity and mechanism of action of zidovudine. An overview.* **Am J Med. 1988 Aug 29;85(2A):176-81.**
- 63** AZT stops the conversion of viral RNA to DNA by acting as an analog of the DNA-component, thymidine. Unlike thymidine, once AZT is added into a nascent DNA chain, that chain cannot be further lengthened, which is the basis for AZT's antiviral activity. The process of HIV reverse transcription is more sensitive to AZT than is the process of copying the cell's own DNA during cell division; the reason is that the HIV reverse transcriptase enzyme incorporates AZT with a 10-fold preference over thymidine, whereas the host cell DNA-copying enzymes preferentially incorporate thymidine by a comparable margin. The result is that AZT relatively selectively inhibits viral DNA synthesis. There is, therefore, a useful, albeit small, "Therapeutic Index" for AZT use, both in cell culture systems and in humans. Understanding the concept of the Therapeutic Index is important: It is the ratio between the concentration at which a drug has a beneficial effect and that at which it has a toxic effect. Ideally, this ratio should be as high as possible, allowing the greatest possible margin of safety. Every chemical can be toxic - water, salt, anything - if enough of it is administered to a human. The skill is to find the dose that is effective but safe enough to use.
- 64** NIAID. (2004) *How HIV causes AIDS.* <http://www.niaid.nih.gov/factsheets/howhiv.htm>. Last accessed 2006/03/01.
- 65** NIAID (1995) *Koch's Postulates Fulfilled: The Relationship Between the Human Immunodeficiency Virus and the Acquired Immunodeficiency Syndrome.* http://www.aegis.org/factsheets/niaid/1995/niaid95_fact_sheet_hivaids_12.html. Last accessed 2006/03/01.
- 66** Osmond, DH. (1998) *Epidemiology of Disease Progression in HIV.* HIV InSite Knowledge Base Chapter May 1998. <http://hivinsite.ucsf.edu/InSite?page=kb-03-01-04#S3X>. Last accessed 2006/03/01.
- 67** NIAID. (2003), *supra*, Note 25.
- 68** Montagnier L. (1997) *Human immunodeficiency virus infection and AIDS in a person with negative serology.* **J Infect Dis. 1997 Apr;175(4):955-9.**
- 69** Richman DD *et al.* (2003) *Rapid evolution of the neutralizing antibody response to HIV type 1 infection.* **Proc Natl Acad Sci U S A. 2003 Apr 1;100(7):4144-9.** [ [Full-Text](#)]
- 70** The reason why HIV antibodies do not confer immunity from disease has been demonstrated. Farber may be confusing binding and neutralizing antibodies. Many antibodies to viral proteins lack antiviral activity; they are raised against viral proteins, they often bind efficiently to dissociated viral proteins or fragments of these proteins (which is why they register in diagnostic assays), but they are unable to bind to intact virus particles and inhibit their replication. Virus-neutralizing antibodies, on the other hand, do possess antiviral activity, with the caveats noted in the text. Among the very many publications on these basic immunology topics are:
- Hangartner L *et al.* (2006) *Anti viral antibody responses: the two extremes of a wide spectrum.* **Nat Rev Immunol. 2006 Mar;6(3):231-43**
- Burton DR. (2002) *Antibodies, viruses and vaccines.* **Nat Rev Immunol. 2002 Sep;2(9):706-13**
- Parren PWHI. (2001) *The antiviral activity of antibodies in vitro and in vivo.* **Adv Immunol. 2001;77:195-262.**
- 71** NIAID (1995). *Course of HIV infection.* <http://www.niaid.nih.gov/publications/hivaids/9.htm>. Last accessed 2006/03/01.
- 72** Brenchley JM. *et al.* (2006) *HIV disease: fallout from a mucosal catastrophe?* **Nat Immunol. 2006 Mar;7(3):235-9.**

- 73** Haase AT. (2005) *Perils at mucosal front lines for HIV and SIV and their hosts.* [Nat Rev Immunol. 2005 Oct;5\(10\):783-92.](#)
- 74** Douek DC *et al.* (2003) *T cell dynamics in HIV-1 infection.* [Annu Rev Immunol. 2003;21:265-304](#)
- 75** The immune system responds to many viral infections, including HIV infection, by activating previously resting T-cells (CD4+ and CD8+) to fight the invading pathogen. Once activated, most T-cells later die, by a natural process ("apoptosis"), after their specific tasks have been accomplished. One of the manifestations of HIV infection is therefore a state of immune activation, accompanied by the death of the activated cells. Because HIV is not eliminated from the body by the immune response, the chronic and persistent immune activation over a multi-year period contributes substantially to the gradual erosion of the immune system that precedes the clinical manifestations of AIDS. Direct cell killing by HIV also contributes to the loss of CD4 T-cells during HIV infection, particularly in the acute phase (see below). Irrespective of which mechanism most applies in any particular circumstance, the death of CD4+ T cells is a direct consequence of the presence in the body of HIV, as the extent of immune activation and the degree of cell death both decline when HIV replication is inhibited by the use of antiretroviral therapy. It should be noted that the natural function of the CD4+ T-helper cell is to coordinate and regulate acquired immune responses to pathogens, including of course HIV itself. The loss of this critical component of the immune system seriously compromises the development and maintenance of efficient humoral (antibody-mediated) and cellular (cell-mediated) immune responses, and hence the infectious disease-fighting capacity of the body. The consequence is an increased susceptibility to opportunistic infections, and the onset of AIDS.
- 76** Like all viruses, HIV uses specific receptor molecules to bind to and then enter the cells it infects. The receptors used by HIV are CD4 and either CCR5 or CXCR4, proteins found on, *inter alia*, human CD4+ T-cells. The human CCR5 gene exists in several mutant forms (alleles), the most important of which is known as CCR5-delta32. This mutant allele encodes a defective protein that is not expressed on the cell surface. Individuals with one copy of the CCR5-delta32 gene (and one copy of the normal CCR5 gene) therefore have a reduced complement of CCR5 receptors for HIV; these individuals are heterozygous for the defective CCR5 allele. Individuals with two copies of the CCR5-delta32 gene have no functional CCR5 proteins on their cells; they are homozygous for the defective CCR5 allele. CCR5-delta32 homozygotes are strongly protected from acquiring HIV infection, because the most commonly transmitted variants of HIV require CCR5 to enter cells (and hence the human body). These individuals can, however, still be infected by the less commonly transmitted HIV variants that use, instead of CCR5, the CXCR4 receptor, so the protection conferred by the mutant CCR5-delta32 allele is not absolute. CCR5-delta32 heterozygotes are not protected from acquiring HIV infection, but they progress less rapidly to AIDS and death than individuals with two normal CCR5 alleles because the lower levels of CCR5 on their cells support the spread of HIV within the body less efficiently. The CCR5-delta32 mutant allele arose spontaneously in the human genome several thousand years ago, most probably in Northern Europe (hence the allusion to "European Caucasians"). Its frequency nowadays in European populations varies from country to country (higher in the north of the continent, less so in the south) but, on average, about 1% of contemporary Europeans are CCR5-delta32 homozygotes and about 15-20% are CCR5-delta32 heterozygotes. The mutant allele is also found in populations that have migrated from Europe during the past few thousand years (e.g., in North Americans of European origin) and in populations that have bred with Europeans. It is not found in populations of African or Asian origin. The distribution of the CCR5-delta32 allele is not affected by behavior, so "gay men, intravenous drug users and transfusion recipients" are as likely (or unlikely) to possess the mutant as any other members of the general population in which they reside. There is nothing "mysterious" about any of this; the facts are clearly established in the scientific literature, and even in popular science magazines, as shown by a small selection of the available reviews on the subject (Berger EA, Murphy PM, Farber JM. *Chemokine receptors as HIV-1 coreceptors: roles in viral entry, tropism, and disease.* [Annu Rev Immunol. 1999;17:657-700](#); Moore JP, Kitchen SG, Pugach P, Zack JA. *The CCR5 and CXCR4 coreceptors--central to understanding the transmission and pathogenesis of human immunodeficiency virus type 1 infection.* [AIDS Res Hum Retroviruses. 2004 Jan;20\(1\):111-26](#); O'Brien SJ, Moore JP. *The effect of genetic variation in chemokines and their receptors on HIV transmission and progression to AIDS.* [Immunol Rev. 2000 Oct;177:99-111](#); O'Brien SJ, Dean M. *In search of AIDS-resistance genes.* [Sci Am. 1997 Sep;277\(3\):44-51](#)).

- 77** Brenchley JM. et al. (2004) CD4+ T cell depletion during all stages of HIV disease occurs predominantly in the gastrointestinal tract. **J Exp Med.** **2004 Sep 20;200(6):749-59.** [ **Full-Text**]
- 78** Fultz PN. (1997) *HIV type 1 strains pathogenic for chimpanzees.* **AIDS Res Hum Retroviruses.** **1997 Oct 10;13(15):1261.**
- 79** Wei Q, Fultz PN. (1998) *Extensive diversification of human immunodeficiency virus type 1 subtype B strains during dual infection of a chimpanzee that progressed to AIDS.* **J Virol.** **1998 Apr;72(4):3005-17.** [ **Full-Text**]
- 80** CDC. (2005) Cases of HIV Infection and AIDS in the United States, 2004: HIV/AIDS Surveillance Report, Volume 16 <http://www.cdc.gov/hiv/topics/surveillance/resources/reports/2004report/default.htm>. Last accessed 2006/03/01.
- 81** NIAID. (2003), *supra*, Note 25.
- 82** *Ibid.*
- 83** Corbett EL. et al. (2002) *Morbidity and mortality in South African gold miners: impact of untreated disease due to human immunodeficiency virus.* **Clin Infect Dis.** **2002 May 1;34(9):1251-8.** [ **Full-Text**]
- 84** Zwi, K. et al. (2000) *HIV infection and in-hospital mortality at an academic hospital in South Africa.* **Arch Dis Child.** **2000 Sep;83(3):227-30** [**Full-Text**].
- 85** Sewankambo, N. et al., *Mortality associated with HIV infection in rural Rakai District, Uganda,* **AIDS.** **2000 Oct 20;14(15):2391-400.** [ **Full-Text**]
- 86** Ackah AN, et al. *Response to treatment, mortality, and CD4 lymphocyte counts in HIV-infected persons with tuberculosis in Abidjan, Cote d'Ivoire.* **Lancet.** **1995 Mar 11;345(8950):607-10.**
- 87** Spira R. (1999) *Natural History of Human Immunodeficiency Virus Type 1 Infection in Children: A Five-Year Prospective Study in Rwanda.* **Pediatrics.** **1999 Nov;104(5):e56** [ **Full-Text**].
- 88** Pillay T. et al. (2001) *The increasing burden of tuberculosis in pregnant women, newborns and infants under 6 months of age in Durban, KwaZulu-Natal.* **S Afr Med J.** **2001 Nov;91(11):983-7**
- 89** Darby SC. (1995) *Mortality before and after HIV infection in the complete UK population of haemophiliacs.* UK Haemophilia Centre Directors' Organisation. **Nature.** **1995 Sep 7;377(6544):79-8.**
- 90** NIAID. (2003), *supra*, Note 25.
- 91** Cohen J. (1994) *Duesberg and Critics Agree: Hemophilia is the Best Test.* [ **Science**, **1994 Dec 266 (9):1645-6.** Last accessed 2006/03/01.
- 92** Wikipedia. (2006) *Scurvy.* <http://en.wikipedia.org/wiki/Scurvy>. Last accessed 2006/03/03.
- 93** TAC. (2006) *Matthias Rath and TAC's efforts to stop his harmful activities.* <http://www.tac.org.za/Documents/Rath.htm>. Last accessed 2006/03/03.
- 94** Gay Men's Health Crisis. (2000) *Celia Farber and Denial in the Streets of San Francisco.* **Treatment Issues** **2000 Spring 14:3/4.**
-