Unconventional thinkers or recklessly dangerous minds?

Aids denialism is estimated to have killed many thousands. Jon Cartwright asks if scientists should be held accountable, while overleaf Bruce Charlton defends his decision to publish the work of an Aids sceptic, which sparked a row that has led to his being sacked and his journal abandoning its *raison d'être*: presenting controversial ideas for scientific debate

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In late 1996, Robert C, a social worker living in New York, was diagnosed as HIV-positive. At first he followed his doctor's advice and collected his prescription anti-retrovirals, which stall the disease's progression. But he never took the drugs. Instead, encouraged by a series of articles in the US magazine *Spin*, he did nothing.

For a few years, everything was fine. Then in February 2003, Robert spotted what looked like a blood blister on the back of his calf. That, he would later discover, was Kaposi's sarcoma, a cancer known to be triggered by Aids. Soon thereafter, he noticed that his tongue was growing patches of white fur. That would turn out to be hairy leukoplakia, an infection also strongly linked with Aids. By May that year, he had contracted Aids-related pneumonia, forcing him to revisit a surgery. But the doctor unknowingly prescribed treatment for common pneumonia: Robert refused to admit that he had HIV.

Only in January 2004, having attempted suicide to escape a nervous breakdown, did Robert finally make it into hospital and receive the drugs that would save him from death. "I still have these moments when I have to remind myself that I'm not in that world any longer," he says now, clear of Aids for almost six years.

Robert is one of many who, in the wake of a traumatic diagnosis, have succumbed to the belief that HIV does not cause Aids. It is an idea circulated by so-called Aids denialists, who claim – contrary to the overwhelming scientific evidence – that HIV is harmless, or doesn't exist, and that the true causes of Aids are either certain "lifestyles" or antiretrovirals (ARVs) themselves. A recent survey of gay and bisexual men in four US cities found that 45 per cent think that HIV does not cause Aids, and more than 50 per cent believe that HIV drugs do more harm than good. In South Africa, policies stemming from Aids denialism led to an estimated 340,000 deaths. The shocking toll is prompting many scientists and activists to ask: who should be held accountable?

The origin of Aids denialism lies with one man. Peter Duesberg has spend the whole of his academic career at the University of California, Berkeley. In the 1970s he performed groundbreaking work that helped show how mutated genes cause cancer, an insight that earned him a well-deserved international reputation. Yet in the early 1980s, something changed. Duesberg attempted to refute his own theories, claiming that it was not mutated genes but rather environmental toxins that are cancer's true cause. He dismissed the studies of other researchers who had furthered his original work. Then, in 1987, he published a paper that extended his new train of thought to Aids.

By that time, scientists were already forming a clear idea of how HIV causes Aids. HIV enters into crucial cells in the immune system, integrates with the DNA and replicates itself. The process destroys the cells, gradually weakening the immune system to a point classified as Aids, when the body is left undefended against all manner of potentially fatal infections. In his paper, however, Duesberg claimed, as he did for cancer, that Aids is caused by environmental toxins, while HIV is a mere "passenger" virus.

Initially many scientists were open to Duesberg's ideas. But as evidence linking HIV to Aids mounted – crucially the observation that ARVs brought Aids sufferers who were on the brink of death back to life – the vast majority concluded that the debate was over. Nonetheless, Duesberg persisted with his arguments, and in doing so attracted a cabal of supporters, from Australia's Perth Group of denialists to those behind the website virusmyth.com. "On a daily basis people are listening to them because they are saying what people want to hear – that HIV doesn't cause Aids," says Seth Kalichman, a clinical psychologist at the University of Connecticut and editor of the journal *Aids and Behavior*.

In 1999, denialism secured its highest-profile advocate: Thabo Mbeki, who was then president of South Africa. Having studied denialist literature, Mbeki decided that the consensus on Aids sounded too much like a "biblical absolute truth" that couldn't be questioned. The following year he set up a panel of advisers, nearly half of whom were Aids denialists, including Duesberg. The resultant health policies cut funding for clinics distributing ARVs, withheld donor medication and blocked international aid grants. Meanwhile, Mbeki's health minister, Manto Tshabalala-Msimang, promoted the use of alternative Aids remedies, such as beetroot and garlic.

All this might not have been so devastating had South Africa not been in the throes of an Aids epidemic. Among pregnant women attending clinics, positive tests for HIV rose from almost nothing in 1990 to about a quarter in 2000. South Africa's population needed help, but little came. In 2007, Nicoli Nattrass, an economist and director of the Aids and Society Research Unit at the University of Cape Town, estimated that, between 1999 and 2007, Mbeki's Aids denialist policies led to more than 340,000 premature deaths. Later, scientists Max Essex, Pride Chigwedere

and other colleagues at the Harvard School of Public Health arrived at a similar figure.

"I don't think it's hyperbole to say the [Mbkei regime's] Aids policies fall [just] short of a crime against humanity," says Kalichman. "The science behind these medications was irrefutable, and yet they chose to buy into pseudoscience and withhold life-prolonging, if not life-saving, medications from the population. I just don't think there's any question that it should be looked into and investigated."

Kalichman isn't the only one demanding accountability. Over the past few years, there have been escalating calls for an inquiry that will give justice to bereaved families and help prevent a similar catastrophe recurring. Chigwedere and Essex, for example, suggest that the case could be taken on by the International Criminal Court. Salim Abdool Karim, an Aids epidemiologist at Columbia University and a former member of Mbeki's Aids advisory panel, thinks South Africa needs a "truth commission" – similar to the one that

"There needs to be some accounting. Not a mass trial, just a public acknowledgement that this was wrong, and that these are the people who are responsible for it being wrong"

investigated perpetrators of apartheid. Others, such as Malegapuru Makgoba, who was head of South Africa's Medical Research Council during Mbeki's rule, have called the former leader's policies tantamount to genocide.

"There needs to be some sort of accounting," says Nathan Geffen, director of communications at the Treatment Action Campaign, which fights for the rights of HIV and Aids sufferers. "I'm not talking of some sort of mass trial and sending them all off to jail. I'm just talking about a public acknowledgement that this was wrong, and that these are the people who are responsible for it being wrong."

Most scientists and activists admit that the chances of a trial are low. And even if one were possible, there is concern that such public exposure of Aids denialists would give more publicity to their cause and, ultimately, lead to more deaths. This is the view taken by Nattrass, who also thinks Mbeki would fall back on the time-tested defence that he did what he believed was right.

In fairness, there was a reason to have faint doubts about HIV treatment in the early days of Mbeki's rule. In 2000, after Mbeki had formed his advisory panel and just days before an international Aids conference in Durban, more than 5,000 scientists and physicians signed the "Durban Declaration", affirming that HIV is "unequivocally" the cause of Aids. Although the declaration emphasised the general efficacy of ARVs, some individual cases had raised questions about their reliability on mass rollout. In 2002, for example, Sarah Hlalele, a South African HIV patient and activist from a settlement background, died from "lactic acidosis", a side-effect of her drugs combination. Today doctors know enough about mixing ARVs not to make the same mistake, but at the time her death terrified the medical community. Could it have somehow resulted from her poor background?

"We just didn't know," says Edwin Cameron, a justice of the South African Constitutional Court, who is openly HIV positive. Cameron believes that Mbeki played on cases such as Hlalele's to enforce his own "intellectual hubris"; indeed, he once compared the former president's Aids denialism to Holocaust denialism. Yet he thinks that any trial would be futile because of the uncertainties over ARVs that existed during Mbeki's tenure and the fact that others in Mbeki's government went along with his views (although they have since renounced them). "Mbeki was wrong, but propositions we had established then weren't as incontestably established as they are now… So I think these calls [for genocide charges or criminal trials] are misguided, and I think they're a sideshow, and I don't support them."

In need of help among pregnant women attending South African clinics, positive tests for HIV rose from almost nothing in 1990 to about a quarter in 2000

Regardless of the culpability of politicians, the question remains whether scientists themselves should be allowed to promote views that go wildly against the mainstream consensus. The history of science is littered with offbeat ideas that were ridiculed by the scientific communities of the time. Most of these ideas missed the textbooks and went straight into the waste-paper basket, but a few – continental drift, the germ basis of disease, or the Earth's orbit around the Sun, for instance – ultimately proved to be worth more than the paper they were written on. In science, many would argue, freedom of expression is too important to throw away.

Such an issue is engulfing the Elsevier journal *Medical Hypotheses*. Last year the journal, which is not peer reviewed, published a paper by Duesberg and others claiming that the South African Aids death-toll estimates were inflated, while reiterating the argument that there is "no proof that HIV causes Aids". That prompted several Aids scientists to complain to Elsevier, which responded by retracting the paper and asking the journal's editor, Bruce Charlton, to implement a system of peer review. Having refused to change the editorial policy, Charlton faces the sack (see right).

There are people who would like the journal to keep its current format and continue accepting controversial papers, but for Aids scientists, Duesberg's paper was a step too far. Although it was deleted from both the journal's website and the Medline database, its existence elsewhere on the internet drove Chigwedere and Essex to publish a peer-reviewed rebuttal earlier this year in *AIDS and Behavior*, lest any readers be "hoodwinked" into thinking there was genuine debate about the causes of Aids.

Duesberg believes he is being "censored", although he has found other outlets. In 1991, he helped form "The Group for the Scientific Reappraisal of the HIV/Aids Hypothesis" – now called Rethinking Aids, or simply The Group – to publicise denialist information. Backed by his Berkeley credentials, he regularly promotes his views in media articles and films. Meanwhile, his closest collaborator, David Rasnick, tells "anyone who asks" that "HIV drugs do more harm than good".

Robert C was one of those who asked. In 1997, shortly after he was diagnosed as HIV-positive, he wrote to Duesberg. In reply, he received from Rasnick a letter on Berkeley-letterhead paper reassuring him that "the extraordinarily harmless virus HIV does not cause Aids" and that "the vast majority of HIV-positive people…are perfectly healthy". It went on to say that HIV drugs "are probably doing nothing to improve health directly". Eight years later, after Robert had become seriously ill without taking medication, he wrote to Duesberg again. This time he received no response. Neither Rasnick nor Duesberg responded to questions from *Times Higher Education* about the potential consequences of promoting views that contradict the medical consensus.

"Is academic freedom such a precious concept that scientists can hide behind it while betraying the public so blatantly?" asked John Moore, an Aids scientist at Cornell University, on a South African health news website last year. Moore suggested that universities could put in place a "post-tenure review" system to ensure that their researchers act within accepted bounds of scientific practice. "When the facts are so solidly against views that kill people, there must be a price to pay," he added.

Now it seems Duesberg may have to pay that price since it emerged last month that his withdrawn paper has led to an investigation at Berkeley for misconduct. Yet for many in the field, chasing fellow scientists comes second to dealing with the Aids pandemic. Alan Whiteside, director of health economics and HIV/Aids research at the University of KwaZulu-Natal and another former member of Mbeki's advisory panel, says he would like to see denialist scientists, activists and governments held to account. But he also points to neighbouring Swaziland, which is widely reported to have the world's greatest HIV infection rate and a life expectancy of just 45 years. "I'm facing a crisis…I've got to deal with that," he says. "It's more a luxury to hold people accountable."

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Without prejudice

Bruce Charlton explains why he published a paper by 'perhaps the world's most hated scientist' and the importance of airing radical ideas

On 11 May, Elsevier, the multinational academic publisher, will sack me from my position as editor of *Medical Hypotheses*. This affair has attracted international coverage in major journals such as *Nature*, *Science* and the *British Medical Journal*.

How did it come to this? Last year I published two papers on Aids that led to a complaint sent to Elsevier.

This was not unexpected. *Medical Hypotheses* was established with the express intent of allowing ideas outside the mainstream to be aired so that they could be debated openly. Its policy had not changed since its founding more than three decades ago, and it remained unaltered under my editorship, which began in 2003.

Nevertheless, managers at Elsevier sided with those who made the complaints and against *Medical Hypotheses*. Glen P. Campbell, a senior vice-president at Elsevier, started a managerial process that immediately withdrew the two papers – without consulting me and without gaining editorial consent. After deliberating in private, the management at Elsevier informed me of plans to make *Medical Hypotheses* into an orthodox, peer-reviewed and censored journal. When I declined to implement the new policy, Elsevier gave notice to kick me out before my contract expired and without compensation.

One of the papers, by Marco Ruggiero's group at the University of Florence, (doi:10.1016/j.mehy.2009.06.002) teased the Italian health ministry that its policies made it seem as if the department did not believe that HIV was the cause of Aids. The other paper, by Peter Duesberg's group at University of California, Berkeley

(doi:10.1016/j.mehy.2009.06.024), argued that HIV was not a sufficient cause of Aids.

The Ruggiero paper seems to have been an innocent bystander that was misunderstood both by those who made a complaint and by Elsevier. The real controversy focused on Duesberg's paper.

Why did I publish a paper by Duesberg – perhaps the world's most hated scientist?

Peter Duesberg is a brilliant and highly knowledgeable scientist with a track record of exceptional achievement that includes election to the US National Academy of Sciences. However, his unyielding opposition to the prevailing theory that HIV is a sufficient cause of Aids has made Duesberg an international hate figure, and his glittering career has been pretty much ruined.

I published Duesberg's paper because to do so was clearly in line with the long-term goals, practice and the explicitly stated scope and aims of *Medical Hypotheses*. We have published many, many such controversial and dissenting papers over the past 35 years. Duesberg is obviously a competent scientist, he is obviously the victim of an orchestrated campaign of intimidation and exclusion, and I interpret his sacrifice of status to principle as prima facie evidence of his sincerity. If I had rejected this paper for fear of the consequences, I would have been betraying the basic ethos of the journal.

Medical Hypotheses was founded 35 years ago by David Horrobin with the purpose of disseminating ideas, theories and hypotheses relating to biomedicine, and of doing so on the basis of editorial review instead of peer review. Horrobin argued that peer review intrinsically tended to exclude radical and revolutionary ideas, and that alternatives were needed. He chose me as his editorial successor because I shared these views.

Both Horrobin and I agreed that the only correct scientific way to deal with dissent was to publish it so that it could be debated, confirmed or refuted in an open and scientific forum. The alternative – suppressing scientific dissent by preventing publication using behind-the-scenes and anonymous procedures – we would both regard as extremely dangerous because it is wide open to serious abuse and manipulation by powerful interest groups.

Did I know that the Duesberg paper would be controversial?

Yes. I knew that Duesberg was being kept out of the mainstream scientific literature, and that breaching this conspiracy would annoy those who had succeeded in excluding him for so long.

Duesberg publishing his work, says Charlton, 'would annoy those who had succeeded in excluding him for so long'

When I published the Duesberg article, I envisaged it meeting one of two possible fates.

In the first scenario, the paper would be shunned or simply ignored – dropped down the memory hole. This is what has usually happened in the past when a famous scientist published ideas that their colleagues regarded as misguided or crazy. Linus Pauling (1901-94) was a Nobel prizewinner and one of the most important chemists in history. Yet his views on the medical benefits of vitamin C were regarded as wrong. He was allowed to publish them, but (rightly or wrongly) they were generally ignored in mainstream science.

In the other scenario, Duesberg's paper would attract robust criticism and (apparent) refutation. This happened with Fred Hoyle (1915-2001), a Fellow of the Royal Society whose work on the "steady state" theory of the Universe made him one of the most important cosmologists of the late 20th century. But his views on the origins of life on Earth and the *Archaeopteryx* fossil were generally regarded as eccentric. Hoyle's ideas were published, attracted much criticism, and were (probably) refuted.

> **"I expected that Duesberg's paper either would be ignored or would trigger letters and other papers countering its ideas and evidence. That is how real science is supposed to work"**

So I expected that Duesberg's paper either would be ignored or would trigger letters and other papers countering the ideas and evidence presented. *Medical Hypotheses* would have published these counter-arguments, then provided space for Duesberg to respond to the criticisms and later allowed critics to reply to Duesberg's defence. That is, after all, how real science is supposed to work.

What I did not expect was that editors and scientists would be bypassed altogether, and that the matter would be settled by the senior managers of a multinational publishing corporation in consultation with pressure-group activists. Certainly, that would never have happened 25 years ago, when I began research in science.

The success of Medical Hypotheses

Nor did I not expect that I would be sacked, the journal destroyed and plans made to replace it with an impostor of the same name. I did not expect this because I had been doing a good job and *Medical Hypotheses* was a successful journal.

Elsevier managers in the UK had frequently commended my work, I got a good salary for my work as editor, and I was twice awarded substantial performance-related pay rises. The journal was expanded in size by 50 per cent under my editorship, and a spin-off journal, *Bioscience Hypotheses* (edited by William Bains), was launched in 2008 on the same principles of editorial review and a radical agenda.

The success of *Medical Hypotheses* is evidenced by its impact factor (average citations per paper), which under my editorship rose from about 0.6 to 1.4 – an above-average figure for biomedical journals. Download usage was also exceptionally high with considerably more than 1,000 online readers per day (or about half a million papers downloaded per year). This level of internet usage is equivalent to that of a leading title such as *Journal of Theoretical Biology*.

But *Medical Hypotheses* was also famous for publishing some rather "eccentric" papers, which were chosen for their tendency to provoke thought, trigger discussion or amuse in a potentially stimulating way. Papers such as Georg Steinhauser's recent analysis of belly-button fluff have polarised opinion and also helped make *Medical Hypotheses* a cult favourite among people such as Marc Abrahams, the founder of the IgNobel Prizes. But they have also made it the subject of loathing and ridicule among those who demand that science and the bizarre be kept strictly demarcated (to prevent "misunderstanding").

> **"Medical Hypotheses was also famous for some rather 'eccentric' papers, chosen for their tendency to provoke thought, trigger discussion or amuse in a potentially stimulating way"**

It is hard to measure exactly the influence of a journal, but some recent papers stand out as having had an impact. A report by Lola Cuddy and Jacalyn Duffin discussed the fascinating implications of an old lady with severe Alzheimer's disease who could still recognise tunes such as *Oh, What a Beautiful Mornin'*. This paper, which was discussed by Oliver Sacks in his book *Musicophilia: Tales of Music and the Brain*, seems to have helped spark a renewed interest in music in relation to brain disease.

The paper "A tale of two cannabinoids" by E. Russo and G.W. Guy suggested that a combination of marijuana products tetrahydrocannabinol (THC) and cannabidiol (CBD) would be valuable painkillers. This idea has since been widely discussed in the scientific literature.

And in 2005, Eric Altschuler published in *Medical Hypotheses* a letter outlining his idea that survivors of the 1918 flu epidemic might even now retain immunity to the old virus. A few 1918 flu survivors were found who still had antibodies, and cells from those people were cloned to create an antiserum that protected experimental mice against the flu virus. The work was eventually published in *Nature* and received wide coverage in the US media.

What is my own position on the cause of Aids?

As an editor of a radical journal, my position was resolutely agnostic – in other words, I was not pursuing an agenda. I would publish papers presenting both sides of the debate. Most of the papers I published on Aids were orthodox ideas relating to HIV as the main cause. However, as well as Duesberg's article, I published some other papers challenging the HIV causal theory and proposing different mechanisms, such as work by Lawrence Broxmeyer arguing that some Aids patients actually have tuberculosis.

As for my personal opinions on the cause of Aids, these are irrelevant to real science because the subject is too far away from my core expertise and I do not work in that area. It is clear that Duesberg understands far more about HIV than I do, and more than at least 99 per cent of his critics do. Therefore, the opinions of most of Duesberg's critics, no matter how vehement, are just as irrelevant to real science as are mine.

But for me to collude with prohibiting Duesberg from publishing, I would have needed to be 100 per cent sure that Duesberg was 100 per cent wrong. Because even if he is mostly wrong, it is possible that someone of his ability may be seeing some kind of problem with the current consensus about Aids that other people of lesser ability (that is, most of us) are missing.

And if Duesberg may be even partially correct, it is extremely dangerous that the proper scientific process has been so ruthlessly distorted and subverted simply to exclude his ideas from the official scientific literature.

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