Science policy in the USA

Sweeping changes to government science under the Bush administration may have caused long-term damage, scientists fear

George W. Bush famously said during his US presidential election campaign in 2000 "I'm a uniter, not a divider". But after nearly four years in office, his administration's policies have divided the USA more than ever, making this year's election a close race against democratic rival John F. Kerry. Although the result in November will undoubtedly hinge on foreign policy and domestic topics such as employment and the economy, science has—surprisingly—become an important topic as well, not just because of the much-publicized debate on federal limitations on stem-cell research. Many decisions and policies of the Bush administration have raised the ire of scientists who claim that science is increasingly being manipulated to serve a political and ideological agenda. "The Bush administration differs from previous administrations in its willingness to manipulate scientific findings to fit its own political and ideological views," Congressman Henry A. Waxman, a democratic representative from California, said.

...how have the changes implemented by the Bush administration affected US science?

This has prompted many US scientists to take the rather unusual step of openly criticizing their government. Peter Agre, after accepting the 2003 Nobel Prize for chemistry, announced that he might use some of his prize money to help defend academic freedom against restrictions imposed in the wake of the war against terrorism. Earlier this year, 48 Nobel

laureates signed an open letter that urged voters to support John F. Kerry in the November election. A more detailed criticism came in February 2004, when the Union of Concerned Scientists (UCS)—an independent non-profit alliance of citizens and scientists based in Cambridge, MA, USA—released a report that cited the Bush administration's widespread misuse of science (UCS, 2004). Backed by more than 60 prominent scientists, including many Nobel laureates, they described cases in which government agencies or the White House disregarded, censored, distorted or manipulated scientific evidence, and applied "political litmus tests" to candidates for scientific advisory committee positions. Many of these examples—in areas as divergent as global warming and climate control, air and

water pollution, and reproductive health—were also detailed in a similar 2003 report by Waxman, who, as ranking minority member of the Government Reform Committee, has the authority to investigate any federal programme or any matter that has federal policy implications (Waxman, 2003). In responding to the UCS document, the president's science advisor, John H. Marburger, wrote "...the accusations are wrong and misleading [...] and certainly do not justify the sweeping conclusions of either the document or the accompanying statement" and called the allegation over litmus tests "preposterous" (Marburger, 2004). Even in the face of his detailed rebuttal, the debate now points to a larger question: how have the changes implemented by the Bush administration affected US science?

One area in which things have changed significantly is in federal agencies such as the National Institutes of Health (NIH; Bethesda, MD), part of the Department of Health and Human Services (HHS). Soon after HHS Secretary Tommy Thompson was appointed in 2001, the new Assistant Secretary for Administration and Management, Ed Sontag, began releasing a series of directives aimed at making sweeping changes across the department. The most controversial reforms included streamlining the federal hiring process by privatizing as many jobs as possible, and consolidating personnel offices from 40 in 2001 to 4 in 2004—an ambitious goal given that the NIH alone has more than 18,000 employees. According to Sontag, the restructuring was to increase efficiency, but NIH officials in particular have complained about the effort and cost associated with implementing the changes (Marshall, 2003). At the same time, some scientists are suspicious of the motivation behind the decisions, and the impact they may have on science within the HHS agencies, which also include the Food and Drug Administration (FDA; Rockville, MD) and the Centers for Disease Control and Prevention (Atlanta, GA). “If you have centralized personnel, you now have exerted a level of control over who might be considered for a particular position,” said Gerald Keusch, former Director of the John E. Fogarty International Center (FIC; Bethesda, MD, USA), a branch of the NIH that supports global health programmes.

...any government employee who wants to visit the Pan American Health Organization headquarters—based in Washington, DC—should now file a notification of foreign travel

At the same time, the HHS has proposed reforms to the way federally-funded science is reviewed. As part of the 2002 Information Quality Act, the HHS Office of Management and Budget (OMB) was given the power to develop guidelines for peer review within the department; in September 2003, the OMB released a proposed rule change that was sharply criticized by several members of the US

House of Representatives. It called for agencies to develop a process for the peer review of “significant regulatory information”, a vague term that could encompass almost all scientific information produced by any HHS agency. It further required that peer review committee members must be independent of the agency, but could have ties to industry—so someone with a financial stake in the material being reviewed could be included, whereas an expert who has received agency funding could not. However, in April of this year, after seeking additional public comment, the OMB released a revised bulletin that addressed most of the shortcomings of the first document, such as allowing federally funded scientists to serve as peer-reviewers. Nevertheless, “the basic premise of the regulations remains the same, that a policy office—the OMB—will control the review of government scientific information,” said Ed Markey, a Democratic representative from Massachusetts who opposes the proposed regulations.

US scientists have faced travel constraints for years, but the HHS has now tightened the travel restrictions for its employees—well-publicized cases include the refusal to let many researchers travel to this year’s annual International AIDS Conference in Bangkok, Thailand. “By restricting these international collaborations, the administration is placing politics and ideology ahead of scientific progress,” Waxman said. More importantly, “when the USA hordes expertise or politicizes international consultations, knowledge about important public health issues may suffer.” Recently, even heavier regulations have been imposed on internal travel: for example, any government employee who wants to visit the Pan American Health Organization headquarters—based in Washington, DC—should now file a notification of foreign travel. These rules were in place before the Bush administration came into office, but are only now being strictly enforced. Money is not the reason, but rather a “total lack of understanding of how science works,” according to Keusch.

Restrictions have also been extended to federal scientists’ collaborations and scientific interactions. Earlier this year, William Steiger from the HHS Office of International Affairs wrote to Denis G. Aitkin, Assistant Director-General of the

World Health Organization (WHO), to explain a recent change to HHS policy. Instead of allowing the WHO to contact government scientists directly, as they always have, the HHS now requires that any requests be made through the department, who will then identify an ‘appropriate expert’ to serve as a government representative (Steiger, 2004). “I think this is unprecedented,” said Keusch. “What US government scientists have done at WHO for decades is to come as individuals in their own capacity and give their scientific views as consultants and experts on committees, independent of US government policy. Now the department is saying that nobody can speak outside of an official capacity, which requires them to always adhere to government policy. [...] The objective to me is quite clear, and this has been [the case] in a lot of things this administration and this Secretary has done, which is to exert control over expression.” Waxman agreed, calling the decision a component “of a disturbing pattern of political interference in global health issues.”

This interference may have extended to advisory committees, which serve as the backbone of governmental decision-making. Critics point to a growing trend of removing panellists with ‘incorrect’ views, or positioning people with ‘suitable’ views, regardless of the relevance of their expertise. In February, the expulsion of biochemist Elizabeth Blackburn and medical ethicist William Kay from the President’s Council on Bioethics (www.bioethics.gov) prompted an outcry among fellow scientists and the press, although Chairman Leon Kass denied that membership of the council had been influenced by politics or ideology, and wrote that “these membership changes were met with unfounded and false charges of political ‘stacking’ of the council” (Kass, 2004). HHS committees have also been affected: in December 2003, Keusch resigned from the FIC after growing tired of Thompson’s interference with the centre’s advisory board nominations. Keusch, who joined the FIC in 1998, said that after the administration changed in 2001, “the change in the way the advisory board was being dealt with was like night and day.” While his nominations were rejected or delayed, he was repeatedly sent CVs by the Secretary,

presumably as suggestions for alternate nominations. "A couple of them were actually right on target, they had the scientific credentials and they had developing country experience which was what I needed for my board, but most of the others were irrelevant scientifically or absolute scientific midgets," he said. This made it "progressively and increasingly more difficult to be effective."

...by restricting foreign travel and collaborations with outsiders, the USA may be in danger of isolating itself from the international scientific community...

But even if advisory boards remain independent, there are other examples where politics may be interfering with science. When the FDA's advisory committees on non-prescription drugs and reproductive health drugs met in December 2003 to discuss switching levonorgestrel emergency contraception (commonly known as 'Plan B') from prescription to non-prescription, panel members voted overwhelmingly to allow over-the-counter access to the drug to prevent unwanted pregnancies. The committees unanimously agreed that there were no data to suggest a threat to the health or safety of teenagers, or to suggest that the drug would be used as a substitute for regular use of other contraceptives. Despite this vote of scientific confidence—from a carefully selected panel of experts in pharmacology, public health and family medicine—the FDA decided in May 2004 to reject non-prescription sales of Plan B, for reasons that many believe are linked to the Bush administration's pro-life and religious views, which instead promote abstinence to prevent teenage pregnancies.

The combined effects of these new policies and practices are slowly being felt in the scientific community. Keusch joined the FIC on two conditions: that he could be effective in what he was doing, and that he enjoyed it. "Towards the end, neither condition was satisfied," he said, which prompted his resignation. New restrictions, particularly those invoked by the USA PATRIOT Act, passed

in response to the September 11 terrorist attacks, have also exerted their influence across both government and academic science. Already, US dominance in the sciences is decreasing, as measured by patents, papers and prizes (Broad, 2004). This may be due in part to improvements in foreign science, but new stringent visa procedures also discourage foreign scientists from working in the USA. Robert M. Gates, the president of Texas A&M University (College Station, TX, USA), noted that international student applications to his university fell by 38% in 2004 and by at least 25% across research institutes (Gates, 2004). Furthermore, by restricting foreign travel and collaborations with outsiders, the USA may be in danger of isolating itself from the international science community, something that can only hurt its global reputation and leave the country in a more vulnerable position (May, 2004). An editorial in the 20 May 2004 issue of *Nature* also complained that it does not help to convey a positive impression of US science when foreigners working in federally funded laboratories are subjected to heavy-handed and apparently discriminatory security procedures.

Some critics therefore fear that the current changes may create lasting effects that could damage US science in the long run

According to Keusch, if the situation continues, "the scientific establishment in the United States will degrade, seriously and significantly," as foreigners stay away, and Americans leave to join industry or academia, or take up foreign positions. He said, "The NIH had a loyalty among its staff, and a love of the mission. Both of those are being undermined, and that is to me the most serious part because it takes so much longer to rebuild the quality than it does to tear it down." An essay posted on Waxman's website describes the low morale within the NIH as a result of HHS management directives and governmental interference. In 'I am the NIH...and I Need Your Help', an anonymous NIH senior scientist wrote, "My experience indicates that when workers are treated like second-class citizens, they

soon begin to feel like second-class citizens" (www.house.gov/reform/min/politicsandscience/inside_nih.htm).

This sentiment is by no means restricted to employees of HHS agencies. Morale has been reported to be similarly low at the Environmental Protection Agency (EPA)—in December 2003, a survey from Public Employees for Environmental Responsibility (PEER) revealed that EPA staff faced "unprecedented political pressure" and believed that "science is becoming secondary to servicing industry" (PEER, 2003). "EPA agents are sometimes portrayed as eco-cops, but they function more like overworked and financially strapped prosecutors," wrote Bruce Barcott in a *New York Times* article on the agency employees' increasing frustration with industrial polluters (Barcott, 2004). Because the EPA regulates air and water quality across the United States, it regularly comes up against some of the Republican party's biggest supporters: the chemical and energy industries. In the war over pollution and emission controls, industry—with a helping hand from the government—has won many recent battles, leaving EPA employees feeling tired and frustrated (Barcott, 2004).

Even scientists at the National Aeronautics and Space Administration (NASA) are facing difficult times. After President Bush announced in January an ambitious new plan to return to the Moon by 2020, and then reach Mars, funding for unrelated programmes at the agency was cut. Although scientists working in fields related to the new mission will benefit, many other areas of research, such as solar studies, materials science and astrophysics, will suffer, critics claim. One immediate victim is the Hubble Space Telescope, which will be retired early to make way for Moon- and Mars-related research. This decision has made NASA scientists, who consider Hubble as one of their biggest scientific successes so far, understandably upset.

Undoubtedly, the USA is still at the forefront of science, and will remain so for some time. Nevertheless, "the current administration is in a league of its own in its commitment to trumping the scientific consensus with political influence whenever the two collide," Markey said. Some critics therefore fear that the current changes may create

lasting effects that could damage US science in the long run. Even if Bush's presidency is limited to one term, and Kerry is elected to office later this year, US science may not immediately recover, Waxman fears. "Some of the effects will reverse themselves once the administration changes," he said, "but I am concerned that many will be long term. The scientific integrity of federal agencies is at stake. If expert scientists are driven from public service, it will be more difficult to craft the best policies to protect the health and well-being of the American people."

While much of the talk and debate surrounding this presidential election is about domestic issues and the war in Iraq, it misses the important influence of American research enterprise on global policy and attitudes. As Democrats and Republicans debate the validity of criticisms aimed at the science policies of the Bush administration, scientists have more pressing concerns. Changes in science policy and the administration of federal research have also affected international health programmes for AIDS and women's health, which have suffered over the past four years from the Bush administration's reluctance to fund and support such efforts (Walgate, 2004; Germain, 2004). "My greatest concern is that we'll lose time because of this," said Keusch, who is now Dean and Provost for Global Health at Boston University (MA, USA). "And as I look at the crises of health in the developing world, there is no time to lose. We need to be acting now."

REFERENCES

- Barcott B (2004) Changing all the rules. *New York Times*, 4 Apr, S6, p38
- Broad WJ (2004) US is losing its dominance in the sciences. *New York Times*, 3 May, pA1
- Gates RM (2004) International relations 101. *New York Times*, 31 Mar, pA23
- Germain A (2004) Playing politics with women's lives. *Science* **305**: 17
- Kass L (2004) We don't play politics with science. *Washington Post*, 3 March
- Marburger JH (2004) Response to Congress on UCS document: Statement of the Honorable John H. Marburger, III, on Scientific Integrity in the Bush Administration. 2 April. www.ostp.gov/html/ucs.html
- Marshall E (2003) Management directives from 'downtown' again roil NIH. *Science* **301**: 148–149
- May T (2004) Isolation is not the answer. *Nature* **429**: 603

PEER (2003) Letter to Representative Henry A. Waxman on a Survey of US EPA Staff.

10 December. www.house.gov/reform/min/politicsandscience/

Steiger WR (2004) Letter to WHO Assistant Director-General, Denis G. Aitken. 15 Apr. www.house.gov/reform/min/politicsandscience/

UCS (2004) Scientific Integrity in Policy Making. 18 Feb. www.ucsusa.org

Walgate R (2004) Bush's AIDS plan criticised for emphasising abstinence and forbidding condoms. *BMJ* **329**: 192

Waxman HA (2003) Politics and Science in the Bush administration. Aug; updated 13 Nov. www.house.gov/reform/min/politicsandscience/

Caroline Hadley

doi:10.1038/sj.embor.7400267

Accession without concession

The ten new EU member states have an uphill battle to improve their science base, but would prefer not to play by different rules from the rest

On 1 May this year, the European Union celebrated its expansion to 25 member states, having welcomed 10 new countries, mainly from Eastern Europe, or to be geographically more accurate, central Europe (Fig 1). EU membership creates many opportunities for these countries, but with it come challenges, including the future of their life sciences research. The state of scientific knowledge, research and development in many of the new Eastern member states is the legacy of more than 50 years of misguided investment. Under Communism, an unhealthy bias towards strategically useful sciences—mathematics, physics and chemistry—came at the expense of biology, which for military purposes was of little interest. In Poland, for instance, as little as 20% of the entire research and development (R&D) budget is invested in the life sciences even today. What is lacking are certainly not brains and motivation, but rather the research infrastructure, which boils down to new laboratories, equipment and centres of excellence in certain disciplines.

While recognition and funding of scientists by external organizations, such as the Howard Hughes Medical Institute

and the European Molecular Biology Organization (EMBO), has certainly helped to lever more government funding in molecular biology, the degree to which recovery and convergence with the larger Western countries is possible differs widely. Among the so-called CC-10 countries one finds everything from large, slow-to-change countries, through smaller countries with excellent research in niche areas, to other small countries that have rapidly capitalized in the industry sector. Their current economic situation and investment in R&D vary considerably (Table 1). The disparities among the new member states themselves, and between them and the old EU members, have been debated hotly in European Commission (EC) circles. Proposals range from using some of the EU infrastructure funds to establish and maintain new research infrastructure in the East, to creating a two-tier system in the soon-to-be-established European Research Council (ERC) that would mainly benefit new members. However, scientists in the East have their own ideas on how to become competitive in the EU, despite acknowledging that their countries have to implement special measures to draw level with countries such as France, Finland, Germany or the UK in terms of research systems and performance. Most of the adjustments must be made at home, not on the international scene.

Most of the adjustments must be made at home, not on the international scene