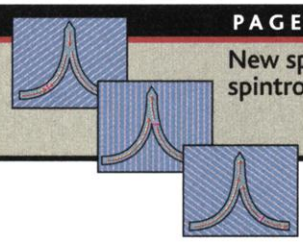


PAGE 1948
New spin on spintronics

1950
Restoring Afghanistan's heritage

NATIONAL SECURITY

Research Chiefs Hunt for Details In Proposal for New Department

President George W. Bush's proposed Cabinet-level department to combat terrorist threats would, on paper, include billions of dollars' worth of federally funded research and hundreds of government researchers. But the hurriedly assembled plan, released 6 June, is sorely lacking in details, leaving government research leaders scrambling to find out if, or how, their labs might be affected. The proposal must now work its way through Congress, where some lawmakers have already put their own ideas on the table.

The plan* was hatched by a small group of White House officials who met secretly for several weeks. Most Cabinet members, presidential science adviser John Marburger, and the institutes most affected by the change had no influence over the plan. "It was as much news to me as to the people in the Cabinet," says Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda, Maryland, who was informed the day of Bush's announcement by Health and Human Services (HHS) Secretary Tommy Thompson. NIAID would see $1.7 billion in bioterrorism funds in the president's 2003 budget request transferred to the new department.

Home team. President Bush explains proposed homeland security department with Tom Ridge (left) and Senator Joseph Lieberman (D–CT).

The same bewilderment was expressed by Bruce Tarter, outgoing director of Lawrence Livermore National Laboratory in California, a nuclear weapons facility listed as part of the new department. "Our lab has been cited in a number of media stories today relative to President Bush's proposal to create a new Homeland Security Cabinet-level agency," Tarter said in a statement issued a few hours before the president's evening television address to the nation. "We have not yet received any official details on this proposal."

The plan would pull together in a single new department, the $37 billion Department of Homeland Security, hundreds of programs now scattered across dozens of federal agencies. A 29-page overview of the proposal pays due homage to science and technology, noting that it provides the United States with a "key advantage" over its more low-tech adversaries. And research against chemical, biological, radiological, and nuclear threats is highlighted as one of the four arms of the proposed department. But apparent mistakes and inconsistencies in the plan left agency managers and researchers wondering exactly what the White House wants to do. "They didn't do their homework," says one government official.

For example, the report assumes that the new department would gobble up most of Livermore's $1.5 billion annual budget—but only 300 of its nearly 8000-strong workforce—to work on radiological and nuclear countermeasures. In fact, says Marburger, the majority of the lab's funding goes for work on the U.S. nuclear stockpile and won't be transferred to the new department. Still, in an interview on *ABC News This Week*, White House chief of staff Andrew Card suggested that some of the researchers not working on counterterrorism might be transferred to other weapons labs, such as Sandia National Laboratories, as Livermore becomes what one senior Administration official called "a center of excellence to help us deal with the development of technology" to combat terrorism.

Bioterrorism researchers were also unclear about the plan's impact. A total of $2 billion in research to develop drugs, vaccines, and diagnostics—both at NIAID and the Centers for Disease Control and Prevention (CDC) in Atlanta—would be transferred from HHS to the new department. But only 150 researchers of the thousands working in this area would be transferred. An HHS spokesperson says the new department "wants to be able to drive the research agenda," and the vast majority of scientists would work "on a contractual basis" without leaving their current institutes. But what role the new department would play in setting funding priorities for the National Institutes of Health and CDC remains unclear. "The details are currently being worked out," says Fauci.

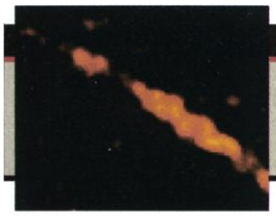
C. J. Peters, director of the Center for Biodefense at the University of Texas Medical Branch in Galveston, says he's opposed to the idea if it "separates bioterrorism from the best thinking in public health." Last year's anthrax attacks demonstrated that doctors, nurses, and health officials are crucial in detecting and responding to an attack, he says.

A proposal for the new department to take charge of the Plum Island Animal Disease Center, a lab off New York's Long Island that is run by the U.S. Department of Agriculture (USDA), has so far provoked less opposition. The transfer of the entire annual budget of $25 million would make sense, says Plum Island director David Huxsoll, because the lab's focus on foreign diseases such as foot-and-mouth disease and African swine fever would "fit in well" with the new department's overall mission of safeguarding the borders. Huxsoll noted that one of the two USDA departments that uses

At sea. Plum Island lab would be part of new department, but other details remain sketchy.

CREDITS: (TOP TO BOTTOM) RON EDMONDS/AP; ARS

* www.whitehouse.gov/homeland



1951
Smeared-out star cluster

LEAD STORY 1954
The Army's frontline biodefense lab

1957
Profile: TIGR's Claire Fraser

Plum Island, the Animal and Plant Health Inspection Service, is also being transferred.

Under the president's plan, the Department of Defense would not give up the nation's premier biodefense lab, the U.S. Army Medical Research Institute of Infectious Diseases in Fort Detrick, Maryland (see p. 1954). But it would apparently relinquish the proposed $420 million National Biowarfare Defense Analysis Center, requested in the current budget, to study the technology and tactics at bioterrorists' disposal.

Marburger says researchers shouldn't expect too many details at this stage. "This was done in a way to dramatize the scope of this change and generate support for a bold initiative," he says. "It is still very much in the abstract and will be refined." Marburger denies that the timing of the announcement—it came the same day an FBI whistleblower delivered damning testimony before Congress about U.S. intelligence gathering—was meant to deflect growing criticism of how the Administration responded to numerous bits of intelligence obtained before the 11 September attacks. "This has been planned for at least a month," he insists.

Government researchers and managers, reluctant to criticize the White House, say they will wait and see what emerges from Congress, which by law must approve any plan of this magnitude. Several hearings are already in the works, some to explore proposals drafted before Bush unveiled his plan.

–MARTIN ENSERINK AND ANDREW LAWLER

AIR POLLUTION RISKS

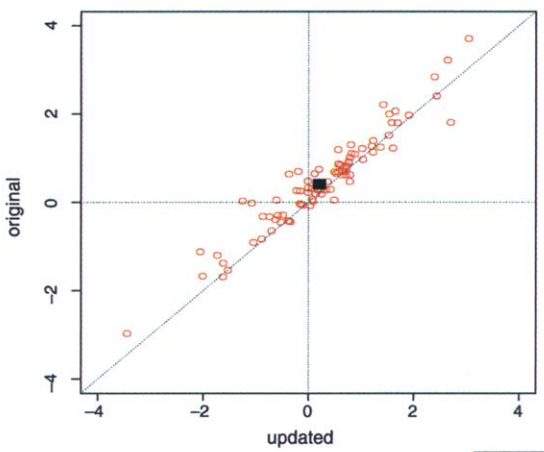
Software Glitch Threw Off Mortality Estimates

The authors of a landmark air pollution study have found a problem with their software application that means they overestimated the risks of fine particles, or soot. The overall conclusions of the group at Johns Hopkins University in Baltimore linking soot and death haven't changed, but the discovery is providing fresh ammunition to industry groups that have criticized the science behind federal air pollution rules issued 5 years ago. The Environmental Protection Agency (EPA) says it will examine whether the rules need to be modified to reflect the new results.

The experience also serves as a cautionary tale to scientists who use off-the-shelf statistics software without questioning what's inside. The Hopkins group "is very good and very careful," says Stanford University statistician Trevor Hastie, yet they used the program for 5 years before catching the problem.

The research, an ongoing project known as the National Morbidity, Mortality, and Air Pollution Study (NMMAPS), is led by Hopkins epidemiologist Jonathan Samet and biostatistician Scott Zeger and funded by the nonpartisan, nonprofit Health Effects Institute (HEI) in Cambridge, Massachusetts. Started in 1996, the project expands on earlier studies in several cities documenting that when daily levels of tiny soot particles rise, slightly more people die from heart and lung disease. These so-called "time series" studies helped persuade EPA to issue its first regulations limiting permissible levels of very fine particulate matter (PM), known as $PM_{2.5}$, in 1997.

In NMMAPS, the Hopkins scientists sought to determine whether the case against fine particles held up across a much larger number of cities—90 in all. Such time-series studies are tricky because they seek to disentangle the role of particles from other factors that can also boost death rates, such as heat waves. The team used a model, the Generalized Additive Model (GAM), that is part of S-plus, a widely used statistical software package. The software searches for a pollution effect and smooth functions of the confounding variables in an iteration that continues until the results don't change much.



Recalculating the risk. In this reanalysis of air pollution data, the vertical distance of dots from the diagonal line shows how much the estimated excess death rate was off for each of 90 cities. Black square represents updated (0.27% per 10 $\mu g/m^3$ of PM_{10}) and original (0.41%) pooled estimates. Diesel exhaust (*right*) is one source of fine particles at center of debate.

Since NMMAPS began, the Hopkins team has published more than a dozen papers linking fine particles and premature deaths (*Science*, 7 July 2000, p. 22). But about 10 weeks ago, says Zeger, "something struck me as funny about the way the software was working." Eventually, his team figured out that the trouble was an S-plus GAM default setting. The software was set to stop calculating when a certain result differed from the previous one by 0.001. But the Hopkins researchers realized that because they were looking at a tiny rise in daily death rates, they needed to keep going. When they changed the default from 10^{-3} to 10^{-15}, they got slightly different risks for most cities (see graph).

Their revised result for all 90 cities was a 0.27% rise in mortality per 10 micrograms per cubic meter ($\mu g/m^3$) of PM_{10} (a class of particles that includes $PM_{2.5}$) compared with 0.41% per 10 $\mu g/m^3$ in the original study. The NMMAPS group informed HEI and is notifying the journals that published its papers.

Industry groups are crowing. Allen Schaeffer, executive director of the Diesel Technology Forum, says the error suggests that more work should be done before the current regulations are fully implemented. "If the risks have been exaggerated, we have to understand the real risks," he says.

Industry complaints aside, both scientists and EPA officials say that the S-plus problem does not undermine the 1997 soot rule. "The underlying relationship is still solid," says John Bachmann of EPA's air office. Indeed, another type of study looking at how death rates vary in polluted cities over many years makes an even stronger case against fine PM than the daily studies, notes HEI president Dan Greenbaum. However, Bach-

CREDITS: (LEFT TO RIGHT) F. DOMINICI *ET AL.*, JOHNS HOPKINS BLOOMBERG SCHOOL OF PUBLIC HEALTH; TED SPIEGEL/CORBIS