detectors to setting up decontamination systems—has proved difficult.

"There is no central coordination, and there is enormous redundancy and waste," says Tucker. "There is no integrated system," agrees Ernest Moniz, an MIT physicist and former chief scientist at the Department of Energy. "To get one, you have to break a lot of china": interagency jealousies and congressional oversight by a bewildering number of committees.

Better coordination and more resources, however, are not a magic bullet, warn some scientists. "I don't see a shortage of money; I see a shortage of ideas," says Harvard's Meselson. "And we're already spending gigantic amounts to cure cancer and AIDS, so let's not exaggerate what more money would do."

He and others say R&D to halt or cope with attacks is no substitute for diplomacy to prevent them. That means stopping the spread of the materials and expertise needed to develop such weapons. "It is time that this trade was exposed, disrupted, and stamped out," said British Prime Minister Tony Blair on 14 September. His foreign secretary, Robin Cook, added that "we must redouble our efforts to stop the proliferation and availability of such weapons."

But until now, the Bush Administration has not made proliferation a high priority. It has opposed new rules for monitoring compliance with the 1972 Biological Weapons Convention, arguing that they are unworkable, and proposed cutting funds for nuclear nonproliferation programs in 2002—including an effort to conduct an inventory of Russia's plutonium stockpile. "This doesn't make any sense," says Hoehn.

The U.S. government may reevaluate those policies in the light of last week's attacks. "If anything good has come from this, it is that complacency has been shattered," says Peter Jahrling, a biologist at the U.S. Army Medical Research Institute at Fort Detrick, Maryland. "What was unimaginable to most is now regarded as a vulnerability." The debate comes too late for the victims of the 11 September tragedies, but perhaps not for millions who could be targets of future attacks.

–ANDREW LAWLER

With reporting by Richard Stone.

RISING R&D FUNDING TO COMBAT TERRORISM

Category	(in millions of dollars) FY 1998	FY 1999	FY 2000	FY 2001*
Total U.S. spending on antiterrorism	$6500	$8760	$8400	$9300
Total R&D	403	527	728	813
R&D for weapons of mass destruction†	240	369	537	590
Basic research	71	31	48	92
Detection and diagnostics	18	59	78	97
Modeling and simulation	4	11	17	17
Personal and collection protection	12	10	30	28
Personal and environmental decontamination	2	9	21	24
Therapeutics and treatment	0	16	21	27
Vaccines	3	36	88	99
Other	131	197	240	205

* Requested amount.
† Weapons of mass destruction include biological, chemical, and nuclear weapons.

Spread thin. The government's spending on research to combat terrorism covers many activities across a half-dozen agencies.

SOURCE: MONTEREY INSTITUTE OF INTERNATIONAL STUDIES

ScienceScope

The terrorist attacks of 11 September jarred the scientific community in many ways. A few dispatches from* Science *reporters:

Emergency Response After the World Trade Center collapse, emergency medical care specialists in New York City for a 2-day review of "public access to defibrillation" funded by the National Heart, Lung, and Blood Institute sprang into action. "There were about 50 of us" from around the country, says Lynne Richardson, chair of emergency medicine at the city's Mount Sinai School of Medicine. "We tried to help" by setting up clinics in two hotel ballrooms and recruiting supplies from a nearby pharmacy. They treated a few hundred people for minor injuries but were "frustrated that we couldn't do more," Richardson says.

Words of Support At the U.S. National Academy of Sciences in Washington, D.C., messages of condolence and support poured in from sister science, medicine, and engineering academies around the world. "To those of us who, through our work in national academies, stand for values of reason and enlightenment and who see ourselves as part of a global family, such a horrendous crime is particularly repugnant," wrote Paul Callaghan, president of the Royal Society of New Zealand.

No Go Thousands of scientists cancelled travel plans after organizers called off scores of meetings. Among the cancellations: "Assembling the Tree of Life," a major evolution and taxonomy summit scheduled for 20 to 22 September at the American Museum of Natural History in New York City (*Science*, 14 September, p. 1979). "We intended for this symposium to be a celebration of Life on Earth," read a cancellation e-mail from the organizers.

On Alert At the Department of Energy's national laboratories, security was stepped up. The Livermore National Laboratory in California, for instance, closed public areas, moved security checkpoints to outer fences, and began searching all delivery vehicles. Nonessential staff were asked to stay home on the day of the attacks. Researchers with the lab's National Atmospheric Advisory Release Center were put on alert, ready if needed to monitor and forecast the movement of the smoke plumes created by the fires at the World Trade Center and the Pentagon.

Valangiman Subramanian Ramamurthy, a nuclear physicist and secretary of the Department of Science and Technology, says that what's needed is a system of laboratory accreditation "so that a fair system of checks and balances is in place." Currently, scientists planning experiments need only inform the ministry of their plans and gain approval from either institutional ethics boards or the government. Ramamurthy says that his department would be more than willing to help set up such an accreditation board. In the meantime, he says, "the country has a 100% need to upgrade its animal facilities."

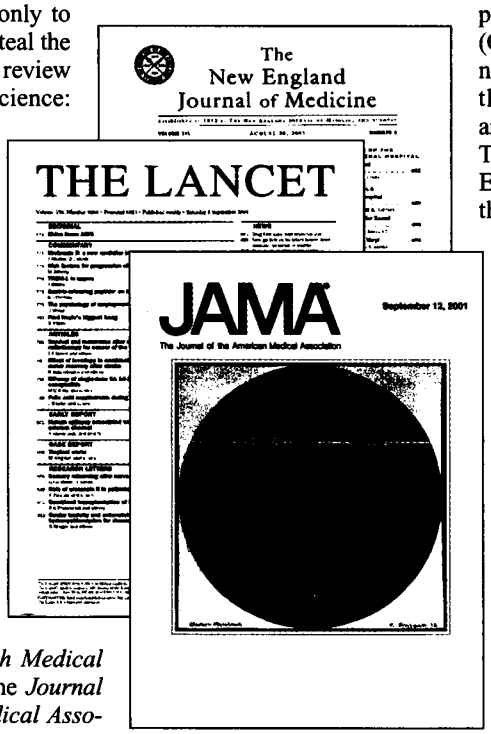
–PALLAVA BAGLA

SCIENTIFIC PUBLISHING

Peer Review and Quality: A Dubious Connection?

BARCELONA, SPAIN—Mention "peer review" and almost every scientist will regale you with stories about referees submitting nasty comments, sitting on a manuscript forever, or rejecting a paper only to repeat the study and steal the glory. Even so, peer review remains a pillar of science: Despite its flaws, letting scientists anonymously judge each other's work is widely considered the "least bad way" to weed out weak manuscripts or research proposals and improve promising ones.

But that common wisdom was questioned last weekend at a meeting* attended by hundreds of editors of medical journals and academics, organized by the *British Medical Journal* (*BMJ*) and the *Journal of the American Medical Association* (*JAMA*). In a meta-analysis that surprised many—and that some doubt—researchers found little evidence that peer review actually improves the quality of research papers. "It's a peculiar paradox," says Frank Davidoff, former editor of the *Annals of Internal Medicine*, about the study. "People cling to a system even though we don't know much about its value."



Under wraps. Critics are urging editors to lift the veil of secrecy surrounding peer review.

To rectify that situation, some speakers argued that more journals should study their own practices with the scientific rigor they demand of their authors—as should agencies that rely on peer review to dole out billions of dollars in research money.

Recently, many medical journals have become increasingly critical of their own procedures, in part because "they can be complicit in killing patients" by publishing bad or biased research, says Richard Horton, editor of *The Lancet*. [Just last week, for instance, a group of leading editors announced that they would no longer publish studies carried out in name by academic researchers but underwritten and run from behind the scenes by the pharmaceutical industry (*Science*, 14 September, p. 1969).] And some scientists and journal editors are putting peer review and other editorial processes to the test.

This emerging research enterprise has shed light on many individual steps of the editorial process, including very small ones; one study presented at the meeting examined whether it was best to prod tardy reviewers by phone, fax, or e-mail. (Conclusion: It makes no difference.) But the sobering meta-analysis, presented by Tom Jefferson and Elizabeth Wager of the Cochrane Centre in Oxford, U.K., showed that it has not answered the most burning question: Does peer review have a measurable effect on the quality of manuscripts?

The team scoured the literature for studies that had analyzed peer review as rigorously as new drugs are put to the test: in a trial in which two or more methods were compared and outcomes scored in some quantitative way. Those strict criteria yielded only 19 studies, but none of them really clinched the case for peer review. For instance, nine studies looked at the effects of blinding the reviewers to the authors or vice versa; they found it made little difference to the quality of the final paper. Two other studies found scant evidence that making peer reviewers use a standardized checklist led to better reviews, while two more revealed that training reviewers was

* Fourth International Congress on Peer Review in Biomedical Publication. Barcelona, Spain, 14–16 September.

ScienceScope

Science Budgets Uncertain With government spending plans in disarray due to major new outlays for recovery and military efforts, biomedical researchers fear that the move to double the National Institutes of Health's budget to $27 billion by 2003 is in jeopardy. Although a major increase for next year appears safe, future raises could be scaled back. But some areas—such as research on defenses against biological attack—could prosper.

Researchers funded by the military, meanwhile, may face feast or famine. Programs judged marginal may be cancelled to free up funds for military operations, observers say. Pentagon R&D projects considered critical—such as developing new security technologies—may be put on a fast track.

Congressional leaders this week were expected to decide whether to buy themselves some time by passing legislation that would freeze budgets at existing levels for up to 6 months into the new fiscal year, which begins 1 October, or try to finalize new spending numbers by the end of next month.

End of Discussion The battle over White House plans to develop a ballistic missile defense (BMD) system is finished, at least for this year. Opponents in the Senate and House this week said they have dropped efforts to cut funds from the president's $8-billion-plus BMD budget request and place restrictions on planned tests, which they fear will breach international arms control agreements (*Science*, 7 September, p. 1750).

Timely study Months before the attack, the National Academy of Engineering (NAE) in Washington, D.C, had already decided the time was right to mount a study of "homeland defense" against terrorism. Now, academy chief William Wulf says the effort will "move ahead smartly," with a report due "as soon as possible." He's already recruited a lead staffer—former Congressional Research Service terrorism expert Raphael Perl, and expects to announce panel members soon. "We hope to convey to the public in a nonalarming way what the threats are and what we might do to protect ourselves," he says. Wulf promises that the homeland defense study will be just the first of several efforts mounted by the U.S. National Academies to "mobilize our immense intellectual resources on this issue."

Contributors: Eliot Marshall, David Malakoff, Elizabeth Pennisi