RANDOM SAMPLES

edited by CONSTANCE HOLDEN

Population Control for Docs

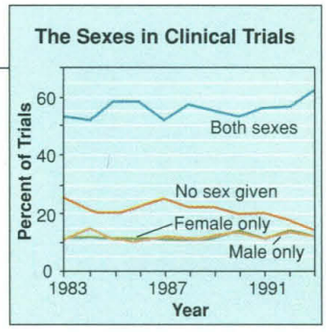
The U.S. government should move to rectify what threatens to be "a serious oversupply of physicians" by reducing the number of hospital residencies subsidized by the federal government and by no longer paying for the training of foreign nationals. So says a statement by six medical groups, including the American Medical Association and the Association of American Medical Colleges (AAMC). The recommendations are likely to be hashed over in congressional hearings on the budget of Medicare, which subsizes most residency training.

The "Consensus Statement on the Physician Work Force," issued on 28 February, notes that while medical schools have been turning out about 17,500 new doctors a year, first-year residencies now number 25,000 because of swelling numbers of international medical graduates. It says the country doesn't need all those doctors and can't afford to train them.

The doctors' statement proposes that the number of government-supported positions be cut from 25,000 to something closer to the number of yearly U.S. medical graduates. Foreign nationals, 3000 of whom start residencies each year in U.S. hospitals, would be particularly affected: They would have to pay for their training. Jordan Cohen, head of the AAMC, notes that this would make for fewer U.S. physicians because a third of foreign doctors—who normally are required to return home for 2 years after finishing their residencies—are obtaining waivers enabling them to stay.

Many doctors who came to the U.S. for their residencies are unhappy about the statement. Panos Fortounis, an internist at the Kingston Community Health Center in Kingston, N.C., argues that many like himself are serving in regions that U.S. graduates often avoid: "If it weren't for me and two others [with waivers on their visas], this clinic wouldn't exist," he says. He adds that "We're not training in high-competition specialties" but in lesser paying fields, such as family medicine. The physicians' manifesto downplays the contribution of foreign nationals to underserved regions, asserting that "a higher proportion of U.S. graduates than foreign graduates ends up in permanent practice in rural America."

Bruce Vladeck, head of the Health Care Financing Administration (HCFA), home of Medicare, sympathizes with foreign doctors' objections, saying, "I don't think it's appropriate to target reductions just on foreign nationals." However, he says there has been a "widely understood consensus" that training posts need trimming. In fact, HCFA has just launched a demonstration project in New York State teaching hospitals that offers them financial incentives to shift some of the functions usually done by residents to other health care professionals.



ADELE GILPIN/CURTIS MEINERT

Bias questioned. Analysis based on abstracts in the *Index Medicus* suggests that the sexes have gotten about equal treatment.

Women Not Shortchanged in Trials?

Four years ago, Congress, in response to pressure from women's groups and others, told the U.S. National Institutes of Health to take measures to assure that women and minorities are fully included in clinical trials. Amid some strong rhetoric—such as First Lady Hillary Clinton's reference to "the appalling degree" to which women were excluded from trials—NIH quickly set up an Office of Research on Women's Health. It also launched a giant study of postmenopausal women, the Women's Health Initiative.

But the idea that "women are second-class citizens in research" is "largely unsupported," contends Washington, D.C., psychiatrist Sally Satel. Critics have complained in particular about women being left out of two major heart studies completed in the last decade: the Physicians' Health Study and the Multiple Risk Factor Intervention Trial. But Satel, speaking at a conference last month on "Women's Health, Law, and the Junking of Science," said women were excluded for good scientific reasons: They get heart disease 10 to 20 years later than men, and older people are harder to study because of other health problems. "That's how new research legitimately works: You first study the group most at risk and least complicated."

Harvard medical professor Charles Hennekens agrees, saying, "My understanding of the

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Into the Air, Junior Robots

Flames engulf a chemical factory; workers are trapped inside. Then, to the rescue, comes a squadron of tiny aircraft agile enough to enter by a ventilation system and smart enough to find the victims and assess the danger. Such are the dreams of a group of aerospace engineers who met last month at the Georgia Institute of Technology in Atlanta to talk about "micro–aerial vehicles."

MIT LINCOLN LABORATORY

Tiny spy. Model of "micro–unmanned aerial vehicle" with camera.

Designing such critters offers a bundle of challenges, says Sam Blankenship, director of Georgia Tech's microflyer program. They can't support the bulky motors and hydraulics necessary for flaps and rudders, so other ways must be found to bend control surfaces. One idea is to add "smart" materials that twist in an electric field.

New, lightweight propulsion systems are being explored—Alan Epstein at the Massachusetts Institute of Technology, for example, has fabricated parts for a jet engine the size of a shirt button.

Aerodynamics is also problematic on this scale. At slow speeds, an aircraft with a 15-centimeter wingspan won't generate enough lift to stay aloft, so researchers have been experimenting with microfans to send air over the wings, says Georgia Tech engineer Robert Englar. His colleague Robert Michelson is trying another approach to the lift problem: He's building a prototype that flaps its wings.

Trickiest yet will be programming the flyers to make decisions, says Blankenship. Humans would have limited ability to command flyers designed to dart into crevices, for example, because their short antennae could pick up few signals.

Still, if all these obstacles can be surmounted, Blankenship sees an enormous payoff. Aircraft carrying tiny video cameras could transmit images from difficult-to-access locations. Onboard sensors could sniff out toxic chemicals in the above-mentioned burning factory.

The smallest autonomous flying vehicle today is "Sender," a battery-powered, 120-centimeter-wide surveillance plane built by the Naval Research Laboratory in Washington, D.C. But the Georgia Tech engineers predict that within a few years, the world will see the launching of a plane no bigger than a postcard.

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trail of knowledge is it's been logical and ordered." In the '50s and '60s, he says, the focus was on extending life expectancy for infants. Then it moved to the most vulnerable adults: middle-aged men. And today, "It's time to do randomized trials on women."

An analysis by Curtis Meinert at Johns Hopkins University in Baltimore suggests that overall, women were fairly well represented in trials held in the decade before the NIH women's health office was set up (see chart). But Vivian Pinn, its director, says past data are not complete enough to refute the gender-bias charge, and that detailed data have been available only since 1993—when her office started monitoring the situation. At any rate, all seem to agree that it's looking good now: The latest numbers show that in 1994, 52% of the million-plus subjects in NIH-sponsored clinical trials were female.

Burning up the citation logs. The Institute for Scientific Information (ISI) in Philadelphia has come out with its latest rankings of the world's "hottest" papers published over the last 2 years. Using a Hot Paper algorithm based on numbers of citations and the prestige of journals in which papers are published, ISI determined that the hottest researcher is Roger J. Davis, a Howard Hughes Medical Institute investigator at the University of Massachusetts, Worcester. "I was a bit surprised," says Davis. "When I got a call from them [ISI], I thought it was a joke." He and his colleagues have churned out 11 much-cited papers on signal transduction—specifically on a new type of pathway for chemical signals that tell cells to proliferate.

Mad cows are responsible for the number-one "red hot" research paper in 1996. Garnering 69 citations was "A new variant of Creutzfeldt-Jakob disease in the UK," published in *The Lancet* last April by R. G. Will and colleagues at Western General Hospital in Edinburgh, U.K.

THE HOTTEST RESEARCH OF 1996
(Scientists Ranked by Number of Hot Papers)

Rank	Name	Institution	Field	Hot Papers
1	Roger J. Davis	HHMI, U. of Massachusetts	Signal Transduction	11
2	Benoit Dérijard	HHMI, U. of Massachusetts	Signal Transduction	7
	Michael Karin	U. of California, San Diego	Signal Transduction	7
	Vishva M. Dixit	U. of Michigan	Signal Transduction	7
3	Edward Witten	Institute for Advanced Study	Theoretical Physics	6
	James N. Ihle	St. Jude Children's Res. Hosp.	Signal Transduction	6
	Barry J. Hoffe	U. of Colorado	Neuroscience	6
4	Carol J. Bult	Inst. for Genomic Research	Genomics	5
	Rebecca A. Clayton	Inst. for Genomic Research	Genomics	5
	Granger G. Sutton	Inst. for Genomic Research	Genomics	5
	Eric S. Lander	MIT/Whitehead Institute	Genomics	5
	Tony Hunter	Salk Institute	Signal Transduction	5
	Douglas R. Green	La Jolla Inst. Allergy & Immunol.	Molecular Biology	5

SOURCE: ISI'S HOT PAPERS DATABASE, NOV./DEC. 1994–NOV./DEC. 1997

DOE Plans Bay Area Gene Works

A "factory" that will sequence human DNA at a rate of more than 20 million base pairs a year is soon to be built in the San Francisco Bay area by the U.S. Department of Energy (DOE).

Ari Patrinos, director of health and environmental effects research at DOE, says the agency plans to spend $10 million this year to build a 4500-square-meter DNA data factory as part of DOE's new "virtual genome center," a managerial melding of three DOE labs. The idea is to merge sequencing projects at those labs—the Lawrence Berkeley, Lawrence Livermore, and Los Alamos national labs—into a state-of-the-art R&D center. Patrinos hopes to learn from Motorola Inc., which runs advanced manufacturing production lines for cellular phones, how to manage several modular assembly lines that function as a unified operation and serve as a test-bed for new technologies.

The factory will be directed by Mike Palazzolo, chief sequencer at the Lawrence Berkeley lab. Patrinos says DOE's 1998 budget calls for a rapid scale-up: The facility may have churned out as many as 20 million base pairs of DNA data by the end of 1998. That would put it on a par with the largest sequencing centers supported by the U.S. National Institutes of Health.

Shot in the Arm for AIDS Vaccine

The National Institute of Allergy and Infectious Diseases last week announced a program designed to inject new life into AIDS vaccine development by pouring $6 million into grants for pursuing novel, high-risk ideas.

The INNOVATION Grant Program for Approaches in HIV Vaccine Research, as it's called, is the creation of the AIDS Vaccine Research Committee. Headed by Nobel Prize–winner David Baltimore, of the Massachusetts Institute of Technology, the committee met for the first time on 17 February. The grants, each worth $150,000 over 2 years, will fund research in three areas: the surface protein of the AIDS virus, the development of better animal models, and strategies for maximizing the immune response to HIV. Proposals are due by 23 May.

Popeye the Miner

Like a miner in a collapsed shaft, the blind mole rat often finds itself digging in tunnels with scant oxygen. How does it compensate? The animal is extraefficient at getting oxygen to its muscles, scientists are finding.

Physiologist Ewald Weibel, of the University of Bern in Switzerland, and colleagues have been studying how species adapt to extreme environments, such as deserts or caves. They became intrigued by mole rats, which "have to work very hard to dig their burrows," Weibel says. "It's an extreme constraint."

Team members obtained several specimens from the dean of blind mole rat studies, Israeli comparative physiologist Eviatar Nevo. They ran the creatures on a treadmill and put them through a battery of tests to measure oxygen consumption and its diffusion to the muscles. It turned out that, compared to white rats, the mole rats had about a 30% greater capillary density in their muscles. And while mole rats have less muscle mass than white rats do, they have almost a 50% higher density of mitochondria, the oxygen-processing mechanisms in muscle cells. Moreover, Weibel says, the mole rats are built like miniature Popeyes, with most of their muscle mass up front. The animal uses its head, neck, and forearms "like a powerful shovel," says Weibel, who reports on the work in the 4 March *Proceedings of the National Academy of Sciences*.

E. WEIBEL

Great muscles. Blind mole rat.

Mole rat experts give Weibel's study thumbs up. "In my opinion, the work is interesting and novel," says Chris Faulkes of the Institute of Zoology in London. Faulkes, a specialist in African mole rats, cautions that findings from blind mole rats don't necessarily apply to other species.