

concentrating the minds of universities on ways to improve the lot of staff on fixed-term contracts.

The legislation complements a move started in 1996 to improve conditions for contract research staff. Known as the Concordat, this is moving very slowly towards its goals: bringing terms and conditions in line with those of established staff; providing training and career guidance for contract research staff; and obtaining greater continuity of funding and employment when the research justifies it.

The Concordat was agreed by the UK research councils, the British Academy, the Royal Society, the Committee of Vice-Chancellors and Principals, the Standing Conference of Principals, and the Committee of Scottish Higher Education Principals. Progress towards its goals is monitored by the Research Careers Initiative, which published its most recent review in May. Sir Gareth Roberts, vice-chancellor of the University of Sheffield and chairman of the steering committee of the Research Careers Initiative, wrote in a preface to the review: "It is clear that the scale of change needs to be increased, and its pace accelerated."

The review found, for example, that compared with three years ago, more con-

tract research staff (53 per cent as opposed to 51 per cent) thought they were not on an equal footing with established staff when it came to university and departmental decisions. This perception persists despite seeming improvements in other aspects of the Concordat's aims, such as an increase in the number of staff that receive annual appraisals.

Bob Price, director of the Human and Corporate Resources Group of the Biotechnology and Biological Science Research Council, agrees that the universities need to ensure that the aims of the Concordat are met, but he does not think the new legislation covering fixed-term contracts will help. "All it will do is push up the bill for redundancy," he says. "Only a change in the way science is done so that an institution gets guaranteed funding for a longer time period, say ten years instead of the current three, would make a difference," he says.

H.G.

Further information

Research Careers Initiative

▶ <http://www.CVCP.ac.uk>

NATFHE

▶ <http://www.NATFHE.org>

The Concordat

▶ http://www.royalsoc.ac.uk/funding/fell_concord.htm

among minorities than the general population. Because of this, the National Institutes of Health (NIH) has been seeking ways to encourage minority participation in trials for more than 20 years.

Encouraging noises

But the problems clearly persist. Ruth Kirschtstein, acting NIH director, has made fighting health disparity a primary goal of her year in the post. She hopes to find ways to encourage more research in diseases that disproportionately affect minorities, enrol more minorities in clinical trials, and encourage more minorities to go into research.

It is important to have minority practitioners to treat members of subpopulations and to enrol them in clinical trials, says Clifton Poodry, director of the Minority Opportunities in Research Division at the National Institute of General Medical Sciences. "Changing unhealthy patterns is harder if you don't look or talk like the people you're trying to help," he says. Outsiders can undermine their own best efforts through ignorance of local custom.

The need for balanced representation is even greater at the senior career level, where policy and funding decisions about minority health initiatives are made, but the scientist can arrive at this level only by progressing through graduate education and the lab. Sadly, the farther along the career trajectory, the thinner the representation of minority scientists.

How can more minority students be inspired to take up science studies that lead to science careers? Nurturing scientific potential in young people from non-mainstream backgrounds is a delicate challenge, says Poodry, who belongs to the Seneca Indian tribe of upstate New York.

Education in grammar and high school must be improved in the United States. "A student coming from a school that has a curriculum that's 40 years out of date may be lost when he gets to the modern research lab," says Poodry.

The old idea was that getting minority children into research labs would inspire them to become scientists, but exposure to research must come earlier, he continues.

US minorities stake their claim in science and engineering

In the North America, Blacks, Hispanics and Native Americans participate in the science and engineering labour force at a rate only one quarter that of the aggregate population. Hispanics account for more than a tenth of the total population, but hold only half a per cent of science and engineering PhDs (see diagram overleaf). Minority scientists and engineers have higher unemployment levels, are less likely to be tenured, have fewer publications, and get fewer federal grants and contracts than the majority white population.

The dismal portrait of minority participation in science painted by these figures — gathered from reports by the US National Science Foundation and Canadian National Research Council — signifies the waste of a huge pool of potential scientific talent. It also flouts the principle that science ought to be free of discrimination and open to everyone.

Obstacles to minority achievement in science block the way at every level from school to career. Deborah Jackson, an African American engineer at the Jet Propulsion Lab (JPL) in Pasadena, California, says the biggest problem minorities with science careers have is maintaining any gains they have made.

Since California's 1995 public law banning positive discrimination for minorities

in hiring and school admissions, the prospects for minority scientists in California have become increasingly bleak, Jackson says. "It's competitive at JPL for everyone, but if you're different, like me, it's even worse," she explains. "Early on I had lots of success, but right now I'm not feeling so great about where I've gone professionally."

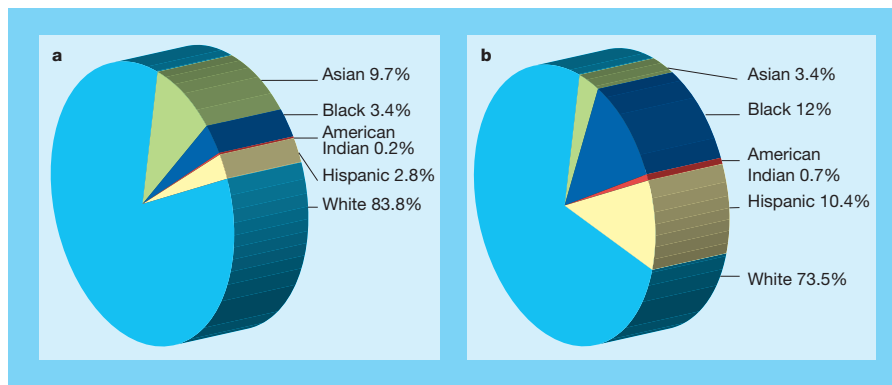
In the biomedical sciences, minority Americans are under-represented in clinical trials and are also scarce as investigators. Preventable and treatable diseases such as cardiovascular disease, asthma, diabetes, HIV/AIDS and lupus are more prevalent

Canadian aborigines get overlooked

Canada's roughly 1.2 million aboriginal people are ill-equipped for the future, says Merv Dewasha, president of the Canadian Aboriginal Science and Engineering Association, which is affiliated to Canada's National Research Council. In Canada, aboriginal people are 90 per cent under-represented in science and engineering professions.

Although the country is struggling with a skills shortage as it shifts from a commodity-based export economy to one based on technology, its aboriginal population is mostly overlooked. Seeing a long cycle of development ahead, Dewasha has focused on delivering this message to the Canadian government and to the tribal chiefs. The shortage of good maths and science teachers and the dispersion of tribal communities across the country's vast reaches present unusual difficulties, which distance learning, facilitated by CANARIE, Canada's high-speed Internet network, may mitigate.

P.W.



An uneven split. a, The proportion of scientists and engineers by race/ethnicity in 1995. b, The resident population of the United States by race/ethnicity in 1995.

Because research opportunities for undergraduates typically do not open up until the junior or senior year, populations such as the American Indian community, which have high early dropout rates, never get exposure to lab work in the first place.

Attempts to boost minority achievement in maths and science go back a generation. But the now largely dismantled programmes of the Affirmative Action era tended to have a built-in remedial bias that assumed the underperformance of non-whites.

Opinion today holds that a more productive approach is to push under-represented students rather than sequester them from the mainstream and feed them watered-down coursework. "High-school math programmes have been dumbed down for minorities, so students with talent are victimized by their teachers," says Manuel Berriozábal, who runs TexPREP, a maths and science enrichment programme for high-school students.

"If you push students to build communities based on a shared passion it's easier to help them make A's than to focus on their putative deficiencies," argues Uri Treisman, who started the Emerging Scholars Program at the University of Texas in 1988, based on his studies of minority achievement at Berkeley in the 1970s. The programme focuses on boosting students' grades in calculus.

Daunting numbers

Similar work needs to be done to help minorities settle into college. John Matsui runs the Biology Scholars Program at the University of California, Berkeley, which gives academic support to 400 mostly minority students. Part of the programme is Matsui's new course to help acclimatize transfer students from community colleges — an overlooked source of minority talent, he says — to university life. "I tell them about the culture of universities, how science is done and how it's funded, how courses are structured, why they may find assistant professors grumpy and hard to reach."

But for all the successes of such programmes, their graduates number only in the thousands, while the scope of the

problem must be counted in the millions. Antonio Flores is president of the Hispanic Association of Colleges and Universities, based in Texas, which represents 237 colleges and universities with high Hispanic student enrolments in North and Latin America. He cites studies that show Latino students lagging two years behind Whites in maths. Perhaps not surprisingly, a study last year by the Educational Testing Service shows that only 55 per cent of Latino eighth graders in the United States expect to go to college, compared with 64 per cent of African Americans and 72 per cent of Asians.

Much of the blame is attributable to below-par elementary and secondary schools in poorer districts. A current spate of lawsuits in California and other states, arguing that egregious deficiencies in academic programmes and physical facilities in poorer schools amount to a structural form of discrimination against minorities, aim to force state governments to guarantee basic resources in all schools. But with the inertia

of a generation of neglect, reform will come slowly.

Meanwhile, the shadows of an impending crisis grow longer. A recent report by President Bill Clinton's National Science and Technology Council predicts failing economic competitiveness and increasing social strains if present trends continue. And because the proportion of minority people in the United States will rise to 48 per cent over the next couple of generations, the disparity in representation will become even more pronounced unless something is done soon.

But the point might be made that minority under-representation and abysmal inner-city schools have been in place for at least a generation without harming the country's productivity and competitiveness. In the 1990s, the US economy roared past countries such as France and Japan, which have far better schools and early childhood education. So, leaving aside for a moment the question of social equality and limiting discussion to economic productivity, does science education really matter?

Of course it does. It is just that, as with many other essential resources, the United States imports it. Under the H1-B temporary visa plan for skilled workers, whose upper limit is likely soon to be increased to 200,000 a year, scientists and engineers flow into the United States from countries such as China, India, Taiwan and Canada.

"The quick fix is to go abroad and bring in those people to fill the jobs," says Antonio Flores. "But the strategic way of doing things would be to invest in the education of underprivileged young people here at home. It will improve not only our educational system, but our society as a whole."

Potter Wickware is a science writer in San Francisco.



Access to education provides a way out

The American Type Culture Collection (ATCC), a repository of bacterial and viral strains, cell culture lines and cDNA clones, has quite a diverse staff. About 32 per cent of its staff are from minority groups. But Yvonne Reid, who oversees cell culturing at the facility in Manassas, Virginia, worries that the number is not representative of minorities in science nationwide. Recently, Reid has noticed a decline in the number of African American scientists at meetings and academic labs at predominantly white institutions such as Harvard, Brown and Yale.

The sixth of seven siblings, Reid grew up in a rural district of Jamaica. Her father was a farmer and her mother stayed at home. "They could read and write, but were not educated people. It was my generation that broke that pattern," she says. During the 1950s and 1960s, when universal free education first became available in the country, the standardized curriculum meant that "the son or daughter of a labourer would have the same resources available in school as the son or daughter of a professor".

Reid earned a PhD in zoology from Howard University, Washington DC, in 1986. Her older sister has a doctorate in education from the Catholic University of America, Washington DC, another sister is a nurse, a cousin is a chemist with a degree from the University of the West Indies, and a nephew is doing a residency in surgery in New Jersey.

Reflecting on her own background, in which only education could lead the way out of poverty, Reid says: "The key to achievement, not only for minority persons but everyone, is high-quality, equal-opportunity education starting at an early age."

P. W.