

## America's got talent—can it keep it?

**To remain competitive in biotech, policymakers should pay more attention to retaining skilled foreign workers than to fixating on illegal immigration.**

A survey published on p. 289 provides data that one of America's greatest strengths is the contribution of foreign nationals to the intellectual property underpinning entrepreneurial efforts in the life sciences. The study is the first to examine systematically the involvement of immigrants in patented biotech inventions. It finds that nearly 31% of lead inventors in biotech are foreign-born. This is a disproportionate contribution considering that only ~11% of the general US population and ~22% of the college-educated US workforce are foreign-born. The study analyzes a sample of >1,900 US-based inventors with patents not only granted in the United States, but also filed in Japan and Europe from 2000 to 2003.

This result aligns with a study published last March (*Issues Sci. Technol.* 45–52, 2009), showing that foreign nationals residing in the United States were inventors or co-inventors in one-quarter of all World Intellectual Property Organization patent applications filed in 2006 emanating from the United States. The apparent overrepresentation of immigrant talent is also reflected in entrepreneurial data; over a quarter of US companies in all industrial sectors have foreign nationals as founders. For biotech startups, the number is 20%—somewhat lower, but still disproportionately high compared with the proportion of immigrants in the US population as a whole.

This kind of data has been fueling the recent debate on the consequences of US immigration policy for innovation. With rising unemployment and a stuttering economy, some US politicians have called for a more restrictive stance on immigration: not quite 'American jobs for Americans', but perhaps headed in that direction. Critics of that policy direction point out that measures such as the Grassley-Sanders amendment in the 2009 American Recovery and Reinvestment Act restricts any firm receiving stimulus money from hiring immigrants on H-1B visas for one year. They also claim that the visa application process for foreign nationals coming to work in the United States is particularly dysfunctional, arbitrary and overly complex, forcing some applicants to wait up to a year for visa approval.

Such measures, critics say, threaten US competitiveness by cutting off the very lifeblood of innovation, especially when other countries are becoming more attractive to mobile skilled workers. The UK, for instance, has introduced a points system that allows entry to some workers, even before they get a job. And, starting in May 2009, the European Union's blue card program not only admits skilled workers but also allows them to bring their families and enables their spouses to work. India and China, of course, now increasingly offer much better commercial and research opportunities to would-be returnees, who might have remained in the United States in earlier decades.

So, has US immigration policy in recent years impaired the ability of the country's biotech sector to recruit and retain skilled immigrants? The answer, surprisingly perhaps, is no.

The reality is that it will take much more than recent administrative adjustments to immigration procedures to dissuade skilled researchers

from coming to the United States for professional or educational development. There is actually very little evidence that US immigration policy has harmed the country's innovation capacity at all. Indeed, the specter of the 'reverse brain drain' appears to be based largely on myths.

The first of these myths is that technologically skilled immigrants contribute disproportionately more to reinventing the US economy than the US-born. Yes, it is striking that 20% of CEOs of US biotech firms are foreign-born (25% in non-biotech startups) and that 31% of important patents filed from the United States have a foreign-born first inventor. Nevertheless, the immigrant supergeek is largely a phantom created by misperception. As the study we publish shows, foreign-born researchers are no more likely to invent than their US-born colleagues. The percentage of inventions originating from foreign-born researchers is higher because the percentage of US immigrants educated to the PhD level is much higher than the percentage of PhDs in the US population as a whole.

The National Science Foundation (NSF) publishes a regular survey of PhD recipients in the United States. Its most recent study, published last year (<http://www.nsf.gov/statistics/srvydoctorates/>), shows that in 2008, 33% of all doctoral recipients in the United States were foreigners, a figure that rose to 48% in the physical sciences and 60% in engineering. In the life sciences, the proportion of foreign doctoral recipients was 29%. And the number of foreign-born PhDs is probably higher than even these figures because in the NSF survey, green-card holders were categorized as US citizens.

When at least 29% of the US-trained life science PhDs are foreign-born, it is somehow less surprising that 31% of biotech inventors are foreign-born.

The second myth underlying fears about the 'reverse brain drain' is that recent US policy has discouraged the influx and retention of technologically skilled immigrants. Here again, the NSF data on doctoral recipients shows that over the George W. Bush years, the number of foreigners receiving a US life sciences PhD increased from 2,158 (25% of the total) in 1998 to 3,246 (29%) in 2008—and the proportion of foreigners receiving US PhDs in all disciplines increased from 33% to 42%.

What this means is that skilled immigrants in the biotech sector do make a significant contribution to US economic prosperity, but not a disproportionate one. Until now, America has been able to supplement homegrown talent with foreign talent lured by a business-supportive environment and competitive investment in R&D. But that does not justify complacency going forward. As competition for skilled labor increases around the world, it would be wise to streamline visa processing times and encourage foreign researchers to stay by offering more permanent resident visas (green cards) to newly minted PhDs from US universities.

The problem for knowledge-based economies is not too many immigrants—it is retaining too few skilled ones. The sooner policy makers recognize that, the better.