



U.S. NATIONAL INSTITUTES OF HEALTH DRIVE THE WORLD'S RESEARCH AGENDA

BY DR LESLEY RUSSELL

The National Institutes of Health (NIH) is the principle United States federal agency that conducts and supports biomedical and behavioral research. NIH began as a one-room Laboratory of Hygiene in 1887 and today has grown into a complex and multi-disciplinary engine for discovery and innovation, with 27 different institutes and centres. The NIH has a budget of US\$32.2 billion, more than four-fifths of which is devoted to competitive grants that support more than 325,000 research personnel at more than 3,000 institutions located across the US and in 90 countries around the world, including Australia. More than 130 researchers funded by NIH have gone on to win Nobel Prizes.

Australia has always batted well above its weight in biomedical research, but too often that success has come in spite of, rather than because of, good funding support. The 2010-11 Budget provides for AU\$791 million in research funding, and around \$40 million in operational expenses. If Australia was to match the NIH on a population basis, that funding should be about four times higher. Perhaps that explains why Australia is consistently among the largest recipients of NIH awards.

The US Congress understands that investing in biomedical research, not only improves the health of America (and the world), but it propels the US economy. NIH-funded research has contributed to overall gains in average life expectancy from 1970 to 2000 worth an estimated \$95 trillion. It is estimated that every \$1 in NIH funding results in an additional \$2.11 in economic output in the US. That's why, even in difficult financial times, President Obama's FY 2011 Budget requests a \$1 billion increase in NIH funding, on top of the \$10.4 billion supplemental funding provided in the American Recovery and Reinvestment Act.

The 2008 report developed for the Australian Society for Medical Research highlights that the returns for Australia in this area may be even higher: The eight-year gain in life expectancy from 1960-1999 were worth \$5.4 trillion to Australians and the return on investment was \$5 for every \$1 spent on health research and development.

The new NIH Director, Francis Collins, has spent the time, since his appointment last year, scanning the landscape of biomedical research for areas ripe for major advances that could yield real health benefits. He has grouped these opportunities under five broad themes: taking greater advantage of high-throughput technologies; accelerating translational science; focusing more on global health; helping to reinvent health care; and reinvigorating the biomedical research community.

There are lessons here for Australia which is still struggling to provide sufficient priority and funding

for health services research and to ensure that research opportunities and salaries deliver real incentives that encourage the best young Australian minds to work in Australian laboratories. Moreover it is clear that the NIH recognises its global role.

For example:

- NIH has launched the Cancer Genome Atlas, and the data for this is being shared with the worldwide scientific community. Another ambitious effort will involve sequencing the complete genomes of 300 people with autism and their parents.
- The Therapeutics for Rare and Neglected Diseases (TRND) program is about finding cures and treatments for the 6,800 rare diseases. TRND will enable promising compounds to be taken through the time-consuming and high risk preclinical development phase that is so problematic for pharmaceutical companies focused on the bottom line.
- The Human Microbiome Project has published its analysis of the genomes of 178 types of microbes that live in or on the human body. Researchers have discovered novel genes in these microbes, adding a new level of understanding to what is known about how these micro-organisms affect human health and cause disease.

As this partial list highlights, genomics has become central to biomedical and disease-based research. The National Human Genome Research Institute at the NIH drives this. In 2003-06, U.S. spending on genomics research was round \$2.9 billion, 50 percent of this spent by NIH. The US government spent more than any other country on genomics research, corresponding to 35 percent of the overall worldwide funding. Australian public spending on genomics research in this time frame was \$277 million, just 0.9 percent of the total. Of 12 countries surveyed, only South Africa spent less, and on a per capita basis, Australia still ranked eleventh, just ahead of Spain.

The recently enacted health care reform law includes several provisions to boost NIH research efforts. In particular, it authorises the Cures Acceleration Network (CAN) program. Like TRND, the purpose of CAN is to translate promising discoveries into approved new therapies. However CAN's scope is broader than rare and neglected diseases and the focus is on supporting research to accelerate the development of 'high-need cures'. NIH will also play an integral role in the development and implementation of comparative effectiveness research.

We will all be beneficiaries of this work. ☘