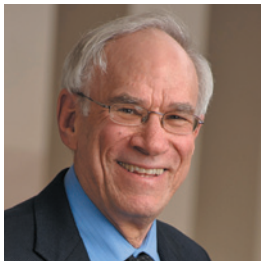

UT SOUTHWESTERN

It is time to update US biomedical funding

The effects of federal budget cuts provide an opportunity to revisit the funding structure of the National Institutes of Health, says **Frederick Grinnell**.

As the 30 September deadline looms for US lawmakers to complete budget appropriations for the fiscal year 2014 with no realistic prospect of success, drastic cuts to public spending on science seem likely to continue. The effect has been severe: many grant-renewal applications at the US National Institutes of Health (NIH), which were easily fundable a few years ago, are not even close to being funded this year. Things are tough, as reflected by an outpouring of comment and opinion in the media about the potential decline of US science.

We have been here before. Around 1970, US spending on science was cut to help pay for the Vietnam War. Faculty positions were scarce and winning a research grant became much more difficult. But the research community survived and thrived. I believe that we will survive the current cuts, but because of their depth and arbitrary nature, their effects will take years to overcome.

We should take this opportunity to examine and debate the NIH funding structure for biomedical research, and focus on how it could be made stronger, more resilient and more diverse in the future. To begin, here are four suggestions.

First, we should revisit the relationship between how NIH grants are assessed and funded. Grant applications are evaluated on a relative scale, but are funded in absolute terms: all or nothing. This is illogical. Applications that fall on either side of the funding cut-off, or payline, are more or less of equal quality. As overall success rates decline, this practice becomes more difficult to justify. A better approach would be to link funding levels with the percentile scores used to rank applications. NIH institutes should agree on the total number of grants to be funded, then give full funding to applications with the best scores and partial funding to those with slightly lower scores.

If the total available funds declined, then the curve of percentage funding versus percentile score would become steeper — perhaps down to 50% of the approved budget for grants with percentile scores just within the payline. If funds increased, then the curve would flatten out. In times of severe budget constraint, this would allow more laboratories to stay open — albeit on a smaller scale — preserving research infrastructure and lab continuity. Many will argue that this would produce labs that are unable to achieve their proposed specific aims, but investigators could always drop an aim.

Second, we should look closer at research productivity and the size of grants. Some data on the scientific output of researchers funded by the US National Institute of General Medical Sciences (NIGMS) suggest that productivity (measured by number of publications or average journal impact factor) peaks when principal investigators have annual funding levels of roughly US$750,000. When the productivity metrics were normalized to grant dollars, however, smaller labs were more productive per dollar.

THE NIH FUNDING STRUCTURE COULD BE STRONGER, MORE RESILIENT AND MORE DIVERSE.

The NIGMS findings are preliminary. Moreover, some types of research are much more expensive than others. However, if NIH scientific-review groups evaluating grant-renewal applications paid more attention to normalized rather than total productivity, then principal investigators with smaller labs might become more competitive for funding, resulting in a wider distribution of research dollars.

At present, when a scientist wins an NIH grant, a percentage of the funding is often used for his or her salary. In my view, that percentage is too high when faculty members are asked by their institutions to raise most or all of their own salaries through grant awards. Doing so creates both potential conflicts of commitment and challenges to research integrity. Faculty members with NIH funding bring benefits beyond the successful completion of research projects. They boost student education and the development of intellectual property and technology transfer. My third suggestion is that universities should chip in more to pay these academics, freeing up federal money for the research itself.

My final suggestion is to consider the broader impact of research grants. As pressure on public funds intensifies, scientists are increasingly being asked to articulate the economic benefits of their discoveries. Yet the economic impact of biomedical research goes beyond its ability to improve human health. It includes education of the scientific workforce, expansion of institutional and community resources, and development of regional technology centres.

Funding for academic research and technology development tends to be concentrated in a relatively small number of institutions. If 'scientific merit' remains the singular basis for decision-making on grants, then historically underfunded institutions are at a disadvantage — and the wider economic benefits cannot be shared. Yet incremental increases in funding would have a bigger relative impact for such institutions than for those already receiving the most research dollars. Perhaps grant applications from underfunded institutions should be funded at a different payline. That would be controversial but there is precedent: the NIH has already modified the payline to increase funding for new investigators, another underfunded group.

These are important points to debate, and some will be unpopular. The last consultation effort with the broad US biomedical community was in 1992, when I and many others served on the NIH Strategic Plan Task Force. That failed because the process was too top-down. We should try again. ■

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