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News & Views

Cancer research funding in USA

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Despite the current stability of overall cancer incidence in the USA, for the past 2 years cancer-related deaths have fallen. This gratifying trend, laid out in the American Cancer Society's Annual Report to the Nation (Howe et al., 2006), has left cancer researchers with the rosy feeling that their hard work is starting to pay off on a grand scale. And, with such obvious evidence of the benefits of

investment to show to federal decision-makers, cancer researchers rightly presumed that funding for their work would increase in line with the predicted increase in cancer burden – expected to overtake heart disease as the leading cause of death by 2010. Unfortunately, the high-level commitment to cancer research exemplified by Richard Nixon's War on Cancer, launched in 1971, seems to have vanished over the past few years. Instead, the National Cancer Institute (NCI), the USA's main cancer research funding body, has been struggling to cope with stagnating appropriations from Congress, which equate to actual funding cuts – and the future is not looking any better.

Last year, the NCI received around US\$4.8 billion dollars from federal funds, an increase of less than 0.5% over the previous year's income and a continuation of the trend for below-inflation rises begun in 2003. With costs of doing research growing by at least 3% a year, these miniscule increases are putting real pressure on the NCI and its associated structures to cut back on large projects, eliminate smaller ones, and reduce the scale of their investment. According to Dr Richard Schilsky, President Elect of the American Society of Clinical Oncology, and a Professor of Medicine and Associate Dean at the University of Chicago Medical Center, these cuts could not have come at a worse time. "We have more drugs in pipeline than ever before and a better understanding of cancer. In many ways, this is intellectually the most exciting time in cancer research. But, paradoxically, it is a time when young people are questioning whether they can have a viable career," he said.

Even the head of the NCI, Dr John Niederhuber, has spoken out over the current levels of funding, stating that he believes the single biggest challenge facing the NCI is the uncertainty surrounding its annual budget. Blaming federal deficits resulting from the events following the terrorist attacks on September 11th, 2001, Dr Niederhuber said: "We are entering one of the most difficult times in the history of the National Institutes of Health (NIH)."

1. Testing times

The insecurity engendered by the current cuts is made more pronounced by its arrival after a few years of relative plenty. During the years 1997–2003, the budget for the NIH (of which the NCI is part) effectively doubled, although the NCI portion of this money went up around 80% during this time. According to Professor Geoffrey Wahl, past President of the American Association for Cancer Research and a Professor in the gene expression laboratory of the Salk Institute for Biological Sciences, CA, USA, this funding boost was about getting investment in US research up to the right level and did not take into account future demands. "The doubling of the NCI budget was to get us within the competitive arena, not for the future. There was an estimate in 1997 that we needed \$17 billion a year. We get \$4.8 billion now and they are thinking of decreasing it. You have to weigh that [amount] against the money spent by tobacco companies on advertising their products – around 15 billion. When you think about it in those terms [the amount NCI gets] becomes worrisome and humbling," he said (Tables 1 and 2).

According to Dr Schilsky, talk of the massive increases in money that accompanied the so-called doubling period must be seen in context of the NCI's already thrifty operations. "It is important to realise the scale of the under-resourcing," he said. The total funding for the nine cooperative groups financed by NCI to do treatment trials, for example, amounts to about \$150 million a year. With that money, these groups

run about 500 trials that enrol 28,000 patients a year, explains Dr Schilsky. “If you talked to most pharmaceutical companies about what they spend on one clinical trial that enrolls 1000 patients, they would say they spend around \$100 million. We are operating at several orders of magnitude less than industry. So no matter how efficient we might become, we are never going to be efficient enough to make up for the lack of resources,” he said. “The only other solution is a drastic cut back in programmes.”

Professor Wahl adds that looking at the grant applications funded by NIH during the last few years shows that money is definitely more difficult to come by than in the past. He says that NIH funds approximately 10% of grants submitted first time round, meaning the organisation is only picking up half of the best ideas in science. Delays in the application process mean that scientists can be left hanging on for 18 months waiting to hear if they will get some money. And even the grants that get funded get cut administratively by 30%. “The amount I get now, with the 30% cut, has brought me back to the level of 10 years ago – and I am doing more expensive science,” Professor Wahl said.

2. Broad implications

Funding cuts are slowing progress precisely at a time of great opportunity. With less money around, researchers will be unable to capitalise on the great technological and knowledge advances of the past few years. Furthermore, the lack of commitment to cancer research means that while the USA has been a world leader in the past, it may lose this position in future. “There are many other countries that are seeing that now not only is science socially responsible but economically good,” says Professor Wahl. “You have the US losing its competitive edge because it is not able to fund all the science that needs it. So some researchers are choosing to go elsewhere where they get money.”

There will be fewer clinical trials conducted over the next few years, and fewer patients enrolled in them, leading to issues of access to new therapies, says Dr Schilsky. He points out that to deal with budget cuts, some NCI cooperative groups have dropped sites from participating in their clinical

Table 2 – Where the money goes (dollars in millions; source: NCI 2005 Fact Book)

	2001	2002	2003	2004	2005
Total NCI (\$)	3753.7	4176.7	4592.3	4723.9	4794.8
Research project grants	1696.6	1893.2	2058.7	2161.4	2188.9
Intramural research	567.3	637.6	693.1	708.9	711.0
Cancer centers	192.1	208.0	235.8	245.7	255.3
Specialized centers	10.7	16.8	19.2	14.2	66.0
SPOREs	76.8	94.9	123.1	149.4	133.0
Clinical cooperative groups	154.3	163.8	158.7	154.3	142.8
Cancer prevention & control	459.5	501.2	533.2	530.0	531.6
R&D contracts	284.0	298.2	370.8	361.6	351.1
Other mechanisms	312.3	363.0	399.7	398.4	415.1

trials altogether. Small practices are usually first on the list to go because of the substantial regulatory and financial burden of monitoring their activities. But these centres are usually the most accessible to patients living in small communities, and it is these people who will lose out in future. The research areas likely to suffer most will be those concerning less common tumours, which are difficult to study because of their rareness and therefore require multicentre studies. “It is relatively easy to say ‘lets get out of that area because we have major public health issues like lung and breast cancer that we need to devote resources to’ and these rare tumours are not likely to be studied by the pharmaceutical industry because they are small markets,” says Dr Schilsky.

There are also consequences for the generations of scientists in the future, says Professor Wahl. The message given by poor funding is that the government does not value cancer research – and that will have implications for the next generation of researchers. “When people think about what route they are going to go into when they go to college, they will think about science, understand the funding problem – which is not only low, but inconsistent – and they can’t be sure that funding will be there. It gives the message that funding for cancer research is not a priority,” Professor Wahl explains. Also, if students doing PhDs see the people they revere spending all their time writing grants that later get rejected, rather than doing science or spending time with students, “they will think ‘do I want to spend my time on that?’” said Professor Wahl. “I hear that many students getting PhDs are going into marketing, hedge funds, banking, etc, areas that take advantage of scientific training. We are losing people who would make the next step of important observations and I think that unless we turn this around then we are going to be in a downward spiral.”

Dr Schilsky further warns that if the funding cuts persist it could spell the end for independent cancer research. Lower funding will force researchers to engage in more strategic initiatives funded by public-private collaborations, particularly with the pharmaceutical industry. “One of the advantages of having a publicly funded clinical trial system is that it can develop its own clinical research programme where the data is independently developed, reviewed and reported. The more we are forced to work with drug companies, the more that independence is jeopardised,” he says.

Table 1 – NCI budget increases over time (source: NCI financial management branch)

Financial year	Appropriations from Congress (\$)
1996	2,251,084,000
1997	2,382,532,000
1998	2,547,314,000
1999	2,927,187,000
2000	3,332,317,000
2001	3,757,242,000
2002	4,190,405,000
2003	4,622,394,000
2004	4,770,519,000
2005	4,825,258,000
2006	4,841,774,000

3. Lobbying for change

The potential damage to the cancer research base in the USA has aroused strong feelings among researchers and their supporters. But according to Dr Schilsky, lobbying efforts to target congressional decision-makers remain uncoordinated. ASCO is just rolling out a campaign about the need for funding of NIH at an acceptable level. “It is a multipronged approach taking the form of full page ads in newspapers, opinion pieces written by high profile people, using celebrities – and that is just beginning,” enthuses Dr Schilsky. AACR made the issue a focus for emphatic debate at its annual meeting in April this year. And patient advocacy groups are trying to create their own campaigns, but because there has not – so far at least – been a general public outcry about the funding cuts, efforts are scattered.

Professor Wahl believes the importance of cancer research to society as a whole should be the driving force for more vocal protests over the current situation. “One reason we are living longer is because of basic research. We now know there isn’t one kind of cancer there are as many cancers as there are individuals. We need to get better at it and we will through research, we can turn cancer into a four letter word GONE but it takes money to turn research into wisdom,” he says. What is more, he adds, it is an economically viable proposition. “If you look at the economic return on investment you can calculate the amount you spend on particular types of cancer each year, a permanent 1% decrease in cancer death rates would translate into a \$500 billion saving according to calculations (Murphy and Topel, 2006) done by two economists from the University of Chicago Graduate School of Business. “If you do the math that is a big return on your investment,” says Professor Wahl.

So not only is investing in cancer research a public good, it is also a policy that makes economic sense, and, adds Professor Wahl, this type of basic science work can produce unforeseen benefits in years to come. “You have one idea and you pursue it and then you find it has applications that you hadn’t considered,” he explains. One example is the class of drugs

known as the angiogenesis inhibitors. “Cancer requires vascularisation, so drugs that target this aspect of tumours – one such compound that has recently got through clinical trials is Genentech’s Avastin – can also be used to treat disorders caused by hypervascularisation, like age-related macular degeneration,” explains Professor Wahl. Since macular degeneration is the leading cause of age-related blindness, using cancer drugs to improve outcome are producing a much bigger return on the development investment than might have been expected.

But perhaps the most powerful argument for sustained and high-level cancer research funding is the threat this disease poses in the near future. Human beings are living longer thanks to substantial improvements in public health and the large contribution to life expectancy of the capability for prevention of heart disease by use of lipid-lowering statin drugs among other procedures and interventions. But with longer lives come higher risks that more people will develop diseases of ageing – and particularly cancer. “We are living longer, cancer is a disease of ageing, and the babyboomer generation are coming up to the point where they are at highest risk of cancer,” Professor Wahl points out. “We are going to see a big increase in cancer in that population. But, importantly, we have warning. Hundred years of cancer science have prepared us for it. We see the challenge, we need to meet the challenge, and we can – if we have the resources,” he says. “We know that cancer research is working, so we just have to persevere.”

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