

Viewpoint

The High Cost of Not Doing Neurological Research

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This article is based on a lecture delivered by Dr. Gibson at the Montreal Neurological Institute in 1986.

It is easy to imagine a new bumper sticker with the following message:

"If you think medical research is expensive, try disease."

Specifically in today's context, it might well read:

"If you think *neurological research* is expensive, try the diseases of the nervous system."

That is precisely what we are doing as a country - "trying disease"! Canada spends \$36 billion per year on health care, or \$700 million per month. Every hour Canada spends \$4 million on "health care" and only \$16,000 on medical research.

Let me tell you what my home province, British Columbia, experienced last year. We have approximately 10 percent of Canada's population, and in that year hospitalized, for diseases of the nervous system alone, 15,894 patients for a total of 342,498 hospital days. Translated into figures for the whole of Canada, this would approximate 160,000 patients with diseases of the nervous system, using a total of 3 1/2 million hospital days.

Some leaders have been far ahead of their time in recognizing that research should be looked upon as an investment which can lead to great returns in diseases cured or prevented. Such a forerunner was Sir Edward Beatty, McGill's Chancellor and president of the Canadian Pacific Railway. It was a well-kept secret that he was one of the first Canadians to give personal financial support to research into the causes of nervous diseases. Too few have followed his example to enable us to strike effectively at the cause of these diseases.

You will ask: "What are the diseases of the nervous system whose causes are unknown at present?" In short they are these: in young to middle-age groups - epilepsy, brain tumors, post-traumatic changes, multiple sclerosis and, in developing countries, infectious and parasitic diseases. Let it be said immediate-

ly that *one* disease which has been dramatically removed from the list is *poliomyelitis*. The total cost of the research which went into the development of the vaccine against "polio" was \$41 million. It has been calculated that, in the United States *alone*, the *savings* which have resulted from this research amount to one billion dollars *per year* in hospital and medical care costs no longer incurred, and in countless days of labor no longer lost to society. The savings in lives, money and human suffering world-wide are truly astronomical.

Lest we take this all for granted let us recall to readers that short years ago discussion centred around the question:

"Should we try to develop a vaccine against the "polio" virus or, should we accept Lord Nuffield's offer to build, in his Oxford automobile plant, one respirator for every hospital in the Commonwealth?"

The nightmare of poliomyelitis, repeated over and over since recorded history began, was brought to a halt by a dedicated group of researchers in the United States, struggling uphill against ignorance, but determined to combat fatal infections with vaccines - by applying the scientific principles employed against smallpox by Edward Jenner in England in 1798. The application of Jenner's vaccine to the world-wide problem of smallpox finally rid the world of this scourge, in 1979, thanks to the zeal of the World Health Organization, inspired by its first head, the Canadian Dr. Brock Chisholm. The World Health Organization ten-year program's *total* cost was \$100 million. The annual savings, in perpetuity will be in the billions of dollars.

Also in the class of "billions-per-year-saved" we should remember the immunization program against measles which, in the U.S.A. alone, prevented 7,900 cases of mental retardation, 78 million days of school lost, 12 million visits by physicians, as well as 1,352,000 days of hospitalization.

In the field of ALS - amyotrophic lateral sclerosis or Lou Gehrig's disease - in middle-aged to older people, let us recognize the research of our McGill graduate, King Engel and of his constant supporters, the Muscular Dystrophy Association of America.

By contrast, the diseases of later life are the toughest of all, for they concern that most sensitive organ of the body - the brain. The social and financial costs of Alzheimer's disease, and of Parkinsonism are becoming clear, but *not* their causes. The progress which basic and clinical researchers have made against the "paralysis agitans" described in 1817 by Dr. James Parkinson has been spectacular, given the toughness of the

problem. The work of the late Dr. André Barbeau in Montreal has been a shining example of dedication. His colleagues Sourkes and Poirier, along with the Doctors McGeer in Vancouver, form an important part of that bank of pioneers worldwide, whose research saves \$1.2 billion per year. Historians will be interested in Leonardo da Vinci's description of what was called by Parkinson "the shaking palsy". Leonardo wrote: "This appears clearly in paralytics ... who move their trembling limbs, such as the hands or the head, without permission of the soul, which soul, with all its power, cannot prevent these limbs from trembling."

The still tougher problem of Alzheimer's disease has attracted too few groups of researchers around the globe. It is amazing to any reader of Professor Alzheimer's two brief papers of 1906 and 1907 to see that at the meetings to which they were read there was "no discussion". Today, suddenly, the world is aware of Alzheimer's disease, but ignorant of its cause. Our colleagues at the Brain Research Institute in Los Angeles estimate this disease costs the American people \$12 billion annually.

Gradually we are coming to realize that as our population lives longer the nervous system may become subject to more and more pathological insults, superimposed upon the normal process of aging. The financial and social burden of this new tidal wave can be overcome only by investing in research. The cost of senile dementia alone will cripple Canada's economy. Half the children being born today are expected to live to 81 years of age. One in five of them will develop severe dementia before dying.

Hiding from the facts merely postpones the evil day. The solution lies in supporting research into the underlying causes. No other investment will pay such handsome dividends in the saving of useful life.

To yield results, the investment must not be halting. It is unrealistic, not to say childish, to imagine that serious and well-trained researchers will attack such massive problems on the basis of year-by-year funding - an unpredictable trickle of funds from a narrow tap connected to a shallow reservoir.

No other human endeavour of which I know is so haphazardly financed. It all suggests that in an age of political opportunism we are blinded by the painful misconception that, in some way, research is *not* the public's business. I can think of nothing more public than illness and its cost today. No industrial enterprise would dream of paying out \$36 billion per year for damages or costs of unknown origin. Yet this silent haemorrhage of taxpayers' money goes on in Canada.

Just to round out the picture of the financial burden which illness will create for us in Canada by the year 2001 - only 15 years from now - let me give you the projections made by Woods Gordon economists.

In 1981 - Canada had approximately 10% of its population over the age of 65. Fifteen years from now that proportion will have doubled.

In the 20-year period, 1981 to 2001, the utilization of our health services in Canada will have increased by 49% by inpatients, in general and allied special hospitals. In the case of long-term care facilities the demand will have increased by 68%!

This reflects what is happening to our population. In the same two decades Canadians 65 to 74 years old will have

increased by 39%. and those 75 or older will have increased by 95%.

If we look at the cost of constructing hospital accommodation for this aging population we find that by the year 2001 - only 15 years away - we shall need 44% more beds in general and allied hospitals than we had in 1981. If we project the requirements for construction to the year 2021 we are faced with these horrendous figures - 118,000 *new* acute hospital beds required, and 276,000 *new* long-term beds needed to keep up with the demand! The *annual* operating costs of these *new* beds only - and I stress *annual* - will be 11.4 billion dollars!

There is but one defence against this shocking burden - and that defence is medical research into the causes of the diseases which will otherwise relegate our citizens to these beds.

In brief, we can "dig ourselves out" of this hole only by taking action now. As a nation we need to clear the decks of a lot of annual "pot-boiling" projects and plan a strategy of financial support which will meet the real needs I have outlined. We must reject the 19th century's "hobby-type" research outright, and get down to the necessary ingredients for a campaign of "internal defence" - as important as the external defence of our country. After 20 years of happy connection with our Air Force and Defence Research Board I see the need for both forms of "defence".

We have to give up the infantile notion that we can battle disease through a handful of one-year fellowships to be held as "prizes" by our graduates. We need "careerships" to support our best and most curious minds on a continuing life-time basis, and with the dignity of university appointments. Either we help the universities of this country to accept the challenge or we shall pay dearly in the currency of disease. Some elected leaders in public life have "nothing but praise" for medical research - literally "nothing". Business and industrial leaders have a much more healthy regard for research - for it determines their corporate future. A recent survey in the United States has shown that 75% of corporate executives believe that corporations should increase their donations to universities for basic research! Health organizations with 17 million volunteers in the U.S. have led the way, but their annual campaigns can only scratch the surface of the long-range problem. It seems strange to me that elected representatives are so far behind their electors.

The cost of diseases affecting the brain and its appendages will overwhelm our society and our financial future unless we can draft our most imaginative and best-trained scientists to prosecute the investigations necessary. We are *not* being overtaken by a vast array of *new* diseases affecting the nervous system, but by the too-long neglected neurological diseases on whose research we, as a country, have bestowed a pittance, in a desultory fashion, unlikely to answer the tough questions. Our fretful financing of research is losing us our best-prepared minds. Canada's Medical Research Council needs far more money for careerships. They need it now.

The troops are available for this "internal defence" but there is a pitiful supply of ammunition, and no future yet for those who would happily serve. Surely there can be no more patriotic service which a scientist can render to his country than to bring his native grey matter, his training and his dedication to bear on the unsolved problems of medicine today and into the future. It is my fervent hope that careerships in neurological research will

be founded in institutes dedicated to fundamental investigation.

In summary then, we have, or had, the researchers with the grey matter required for the sustained attack on neurological diseases, which, as I have shown, presently exact such a toll on our national and provincial treasury and in stark human terms; the next ingredient required is an annual research budget of ten

percent of this financial drain, leaving nine times that amount for the treatment of neurological illnesses until we get to the source of these calamities; and overall, we need renewed faith in the ability of our universities to overcome the demonic powers of causal agents unknown, for in our universities resides the prospect of success.