



The federal government's CANARIE Telehealth Program allocates \$1 million per year for innovative R&D projects that will enhance the adoption of telehealth in Canada's health-care delivery system. Some of the most promising telehealth applications are telecardiology, telepathology, teleradiology, home telecare (including diagnostics and monitoring), medical imaging, consumer health information, health informatics and continuing professional education.

PHARMACEUTICALS

Over 350 new pharmaceutical products are under development in Canada. The pharmaceutical industry encompasses three key segments: subsidiaries of multinational brand-name drug producers, many with research and product mandates; Canadian-owned generic drug companies; and a dynamic and growing small and medium-sized biopharmaceutical industry. Contract research organizations, Canadian universities and academic centres also play a pivotal role in the sector's research activities.

Canada's capabilities in this area are based on a number of contributing elements, including:

- 143 firms producing or distributing a full range of pharmaceutical products;
- in 1997, 15 of Canada's top 50 R&D investors were pharmaceutical companies;
- shipments valued at \$5.3 billion in 1997;
- rapidly growing exports — \$1.446 billion in 1999 from \$800 million in 1996;
- R&D spending by brand-name manufacturers totalled \$900 million in 1998 and is expected to reach \$1 billion in 2000;
- a growing biopharmaceutical sector of over 100 SMEs;
- some 140 contract research organizations offering integrated services to pharmaceutical and biotechnology companies; and
- a solid health science research infrastructure with 16 medical schools, over 100 teaching hospitals and 30 000 medical researchers, government laboratories and Networks of Centres of Excellence.

BIOTECHNOLOGY

Canada is a world leader in biotechnology. In 1997, Canada had the second-largest industrial biotechnology community in the world, including dedicated biotechnology firms, established corporations with biotechnology divisions, university departments, research institutes, venture capital firms, regional associations, regulatory authorities and suppliers.

According to a 1998 Statistics Canada Biotechnology Firm Survey, the Canadian biotechnology industry consists of 282 dedicated firms, 25 percent of which are publicly traded, and employs close to 10 000 people. Industry Canada has identified 102 new biotechnology start-ups since then, the

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majority of which are in the biohealth sector. The Canadian industry is characterized by a mixture of dedicated biotechnology companies and companies that use biotechnology as a tool to develop other products and services.

Over 70 percent of these firms are still growing — employing fewer than 50 people — the greatest concentration being in the health-care sector, followed by agriculture and environment, respectively. Half of all Canadian firms are using DNA-based technologies, with the rest applying biochemistry or bioprocessing technologies. Sales of Canadian biotechnology products and services exceeded \$1 billion in 1997 — 40 percent from exports — the largest share being from health care, followed closely by the agriculture and food-processing industry.

The federal government recognizes the value of genomics research to the biotechnology industry. In the year 2000, \$160 million was committed to establish Genome Canada — a new not-for-profit corporation — and its five research centres across Canada. The establishment of the Canada Foundation for Innovation helps to ensure that Canadian researchers have the facilities and equipment they need to maintain their leading-edge research. The federal government promotes the commercialization of biotechnology through the Networks of Centres of Excellence (NCE) program, which links multi-disciplinary teams of academic researchers with industry researchers. Since 1994, six biotechnology NCEs have helped establish 33 new companies (which already employ over 400 people) to commercialize new technologies.

Canada also has one of the world's best biotechnology regulatory systems. With a strong emphasis on safety, human health and environmental protection, the system has the flexibility to deal with special cases. Many countries in Latin America and eastern Europe are looking at Canada's regulatory regime as a model.

Quality of knowledge is driving the new economy. By 2005, the federal government will have invested \$300 million to implement Canada Research Chairs, a permanent new program of 2000 research chairs at Canadian universities. This program is a key component of the strategy to ensure that Canada continues to produce a stable supply of well-educated knowledge workers in the years to come. Several Canadian cities already boast an enviable network of university and government researchers around which companies have been established. These include Toronto, Montreal and Vancouver (health care), Saskatoon and Guelph (agriculture), and east and west coast cities (aquaculture). The success of Canada's biotechnology industry is due in large part to an established educational system coupled with excellent post-secondary staff and facilities, which give Canada a distinct advantage, allowing it to develop a skilled biotechnology workforce.

