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Symbols

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.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
p	preliminary
r	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
E	use with caution
F	too unreliable to be published

Table of contents

Highlights

Research and development in the health field 1989 to 2006 (preliminary)

- Spending on research and development on health last year accounted for nearly one-quarter of total spending on R&D in Canada, according to preliminary data (table 1-1).
- Total spending on research and development in the field sector hit an estimated $6.6 billion in 2006, up 6.8% over the previous year. This represented just over 23% of total spending on R&D, up from 17% in 1996 (table 1-1).
- The higher education sector performed 63% of all R&D in the health field, the largest share. In 2006, this sector, which includes universities and teaching hospitals, performed an estimated $4.1 billion worth of health R&D, a 10.0% increase from the previous year (table 1-2).
- Business enterprises, a distant second to the higher education sector, performed an estimated $2.1 billion in health R&D, up 2.5%. Business enterprises accounted for about a third of the total (table 1-2).
- In terms of funding, universities overtook business enterprises as the largest funder of health R&D, spending just over $1.8 billion in 2006. Business enterprises spent $1.7 billion, and the federal government $1.2 billion (table 1-2).
- Private non-profit organizations more than doubled their funding for health R&D from $242 million in 1999 to $533 million in 2006 (table 1-2).
- On a regional basis, universities and teaching hospitals in Ontario and Quebec performed 73% of total R&D spending on health in 2004, the most recent year for which regional information is available. The higher education sector in the Atlantic provinces collectively accounted for 4.3% (table 1-3).

Analysis

Estimates of total spending on research and development (R&D) in the health field in Canada, 1989 to 2006

Expenditure on R&D in the health field in 2006 is projected to reach $6.6 billion in 2006, up by $422 million (6.8%) over the figures for the previous year (table 1-1).

Indicative of the increasing importance of health R&D, the ratio of expenditure on health R&D to the gross domestic expenditure on research and development (GERD) was recorded at 23.3% in 2006 (up from 22.7% in 2005) (table 1-1).

Health expenditure R&D per capita also increased from $191 in 2005 to $202 in 2006 (table 1-1).

Importantly, after a slight decline of 0.7% in 2003 (from $4.7 billion to $4.6 billion), health R&D expenditure in 1997 constant dollars bounced back in 2004 and recorded an impressive growth of 10.1% (to reach $5.1 billion). However, in 2005, the increase in health R&D expenditure (in 1997 constant dollars) experienced a rather sluggish growth of only 1.5% (table 1-1).

The higher education sector continues to perform the largest share of health R&D in Canada, spending slightly over $4.1 billion in 2006 (or 63% of total health R&D expenditure). This represents an increase of $377 million (10%) over the amount spent in 2005 ($3.8 billion) on health R&D. Business enterprises came in a distant second, accounting for slightly above $2.1 billion (or 32% of total health R&D expenditure) in 2006 (table 1-2).

Universities and teaching hospitals also emerged as the largest funder of health R&D in 2006, spending $1.8 billion dollars (or 28%) of total funding for health R&D. Business enterprises and the federal government placed second and third with funding outlays of $1.7 billion and $1.2 billion respectively (table 1-2).

Importantly, funding of health R&D by private non-profit firms has more than doubled from $242 million in 1999 to $533 million in 2006 (table 1-2).

In a pattern that closely mimics the overall pattern of R&D performance in Canada, educational institutions in Ontario and Quebec performed 73% ($2.6 billion) of health R&D in Canada in 2004 (the year that the latest information on regional health R&D data is available). On the other hand, higher education institutions in the Atlantic provinces collectively accounted for a meager 4.3% ($155 million) of total health R&D expenditure in the same year (table 1-3).

Chart 1
Gross domestic expenditures on research and development in the health field

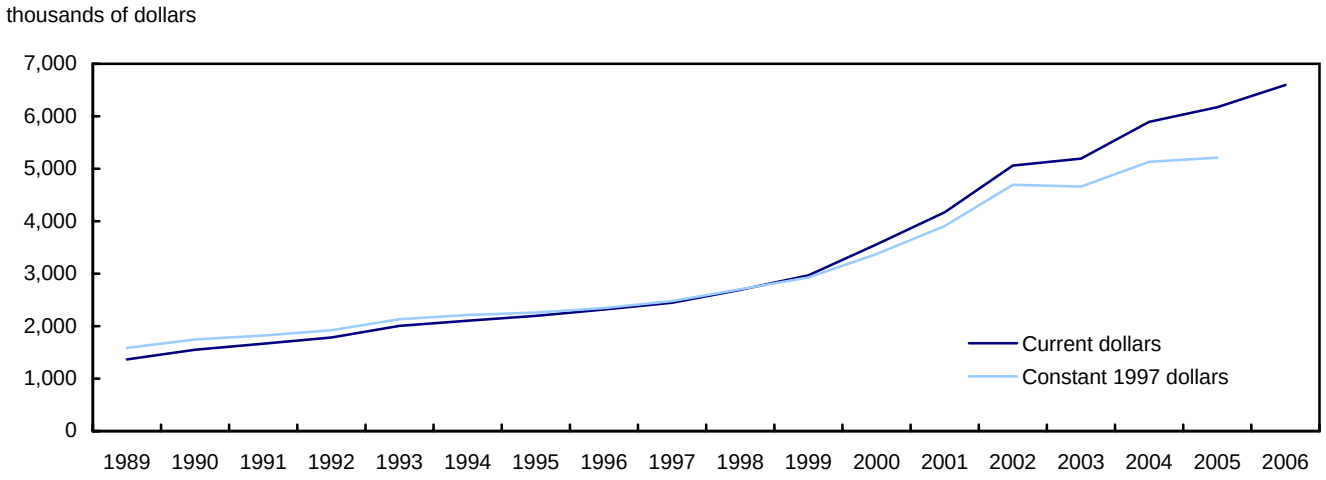
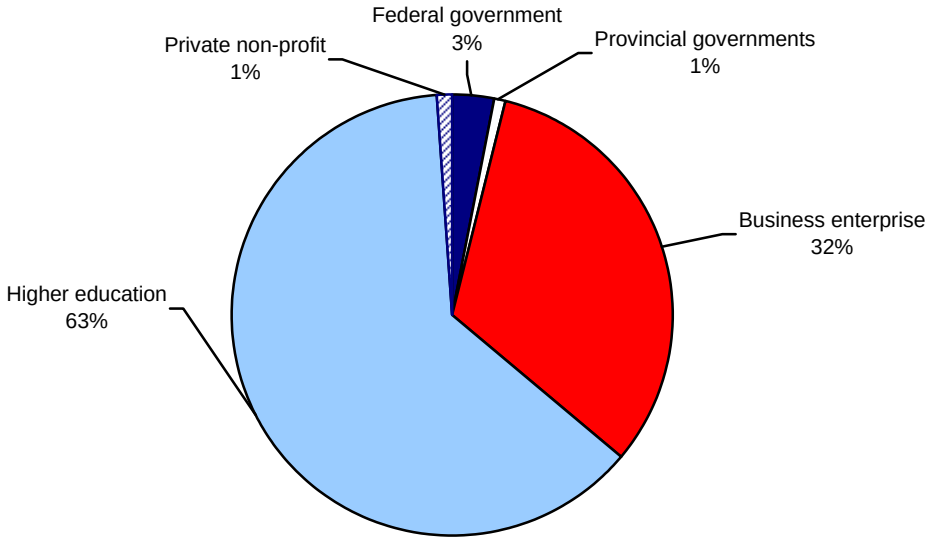


Chart 2
Gross domestic expenditures on R&D in the health field, by performer, 2006



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88F0017M2001011	Capacity to Innovate, Innovation and Impact: The Canadian Engineering Services Industry
88F0017M2001012	Patterns of Advanced Manufacturing Technology (AMT) Use in Canadian Manufacturing: 1998 AMT Survey Results

Selected CANSIM tables from Statistics Canada

358-0001	Gross domestic expenditures on research and development, by science type and by funder and performer sector, annual
358-0024	Business enterprise research and development (BERD) characteristics, by industry group based on the North American Industry Classification System (NAICS), annual
358-0026	Intellectual property management, by federal departments and agencies indicators, annual

Selected surveys from Statistics Canada

4201	Research and Development in Canadian Industry
4204	Research and Development of Canadian Private Non-Profit Organizations
4208	Provincial Research Organizations (PRO)
4209	Provincial Government Activities in the Natural Sciences
4212	Federal Science Expenditures and Personnel, Activities in the Social Sciences and Natural Sciences

Selected summary tables from Statistics Canada

- *Research and development performed by the business enterprise sector*
- *Domestic spending on research and development (GERD), funding sector, by province*
- *Domestic spending on research and development (GERD), performing sector, by province*
- *Domestic spending on research and development (GERD)*

Statistical tables

Table 1-1

Gross domestic expenditures on research and development (GERD) in the health field — Compared to total GERD

	Health research and development (R&D)		Population [1]	Health research and development (R&D) per capita	Gross domestic expenditures on research and development (GERD) [2]		Health research and development (R&D) by gross domestic expenditures on research and development (GERD)
	millions of current dollars	millions of 1997 current dollars [3]	thousands	dollars	millions of current dollars	millions of 1997 constant dollars [3]	percent
1989	1,365	1,585	27,282	50	9,516	11,052	14.3
1990	1,551	1,747	27,698	56	10,260	11,554	15.1
1991	1,665	1,820	28,031	59	10,767	11,767	15.5
1992	1,783	1,923	28,367	63	11,338	12,231	15.7
1993	2,006	2,134	28,682	70	12,184	12,962	16.5
1994	2,105	2,213	28,999	73	13,342	14,029	15.8
1995	2,196	2,259	29,302	75	13,754	14,150	16.0
1996	2,317	2,345	29,611	78	13,817	13,985	16.8
1997	2,447	2,447	29,907	82	14,634	14,634	16.7
1998	2,692	2,703	30,157	89	16,088	16,153	16.7
1999	2,967	2,929	30,404	98	17,637	17,411	16.8
2000 r	3,560	3,374	30,689	116	20,580	19,507	17.3
2001 r	4,170	3,908	31,021	134	23,169	21,714	18.0
2002 r	5,061	4,695	31,373	161	23,539	21,836	21.5
2003 r	5,192	4,661	31,676	164	24,337	21,846	21.3
2004 r	5,892	5,132	31,989	184	26,003	22,651	22.7
2005 e	6,174	5,210	32,299	191	27,174	22,932	22.7
2006 e	6,596	..	32,623	202	28,357	..	23.3

1. CANSIM table 051-0005.
2. Estimates of Canadian Research and Development Expenditures (GERD), Canada 1995 to 2006 and by province 1995 to 2004, no. 88F0006XIE2006009, September 2006 on CANSIM table 358-0001.
3. CANSIM table 384-0036.

Table 1-2
Gross domestic expenditures on research and development (GERD) in the health field — Performing sector and funding sector

	Federal government	Provincial governments	Business enterprise	Higher education[1]	Private non-profit	Foreign	Total
	millions of dollars						
Performing sector							
1989	50	22	233	980	80	...	**1,365**
1990	64	26	321	1,049	91	...	**1,551**
1991	55	29	324	1,156	101	...	**1,665**
1992	56	33	405	1,229	60	...	**1,783**
1993	53	29	490	1,367	67	...	**2,006**
1994	57	31	561	1,382	74	...	**2,105**
1995	63	33	593	1,428	79	...	**2,196**
1996	76	32	702	1,430	77	...	**2,317**
1997	78	32	749	1,516	72	...	**2,447**
1998	87	36	874	1,628	67	...	**2,692**
1999	103	32	961	1,823	48	...	**2,967**
2000	116	42	1,254	2,104	44	...	**3,560**
2001 r	152	42	1,542	2,383	51	...	**4,170**
2002 r	186	42	1,828	2,956	49	...	**5,061**
2003 r	196	44	1,807	3,087	58	...	**5,192**
2004 r	203	42	2,022	3,565	60	...	**5,892**
2005 e	212	47	2,082	3,772	61	...	**6,174**
2006 e	205	46	2,134	4,149	62	...	**6,596**
Funding sector							
1989	282	129	251	532	143	28	**1,365**
1990	334	145	333	558	152	29	**1,551**
1991	322	147	367	616	173	40	**1,665**
1992	317	149	442	670	138	67	**1,783**
1993	351	146	533	713	178	85	**2,006**
1994	354	148	581	721	200	101	**2,105**
1995	373	153	578	753	206	133	**2,196**
1996	347	143	632	754	239	202	**2,317**
1997	353	168	703	786	245	192	**2,447**
1998	381	171	794	864	244	238	**2,692**
1999	477	195	837	907	242	309	**2,967**
2000	560	233	1,054	1,000	285	428	**3,560**
2001 r	733	277	1,235	1,023	333	569	**4,170**
2002 r	957	309	1,427	1,283	390	695	**5,061**
2003 r	1,033	362	1,393	1,301	394	709	**5,192**
2004 r	1,092	363	1,534	1,586	460	857	**5,892**
2005 e	1,153	386	1,588	1,678	486	883	**6,174**
2006 e	1,238	418	1,653	1,846	533	908	**6,596**

1. Includes teaching hospitals.

Table 1-3
Gross domestic expenditures on research and development (GERD) in the health field — Higher education sector by funding sector, 2004

	Federal government	Provincial governments	Business enterprise	Higher education[1]	Private non-profit	Foreign	Total
	millions of dollars						
Canada [2]	**875.0**	**311.7**	**325.9**	**1,585.1**	**428.1**	**38.3**	**3,564.1**
Newfoundland and Labrador	7.7	0.3	10.5	19.9	0.6	0.0	**39.0**
Prince Edward Island	1.8	0.1	0.0	1.8	0.0	0.0	**3.7**
Nova Scotia	23.8	2.4	15.9	43.7	17.1	0.0	**102.9**
New Brunswick	2.7	1.0	0.0	5.8	0.0	0.1	**9.6**
Quebec	278.2	95.4	63.4	364.2	92.0	7.5	**900.7**
Ontario	334.6	117.4	196.1	824.8	194.3	24.7	**1,692.0**
Manitoba	25.0	5.7	3.6	38.4	18.3	0.6	**91.6**
Saskatchewan	16.2	8.3	0.0	32.6	7.6	0.3	**64.8**
Alberta	76.2	69.5	27.6	142.4	33.2	2.2	**351.1**
British Columbia	108.7	11.6	8.8	111.5	65.1	3.2	**308.8**

1. Includes teaching hospitals.
2. Includes Yukon Territory, Northwest Territories and Nunavut.

Table 1-4
Gross domestic expenditures on research and development (GERD) in the health field — Higher education sector by provincial population, 2004

	Population [1]	Health research and development (R&D)	Health research and development (R&D) per capita
	thousands	millions of dollars	dollars
Canada [2]	**31,989**	**3,564**	**111**
Newfoundland and Labrador	517	39	75
Prince Edward Island	138	4	29
Nova Scotia	938	103	110
New Brunswick	752	9	12
Quebec	7,549	901	119
Ontario	12,417	1,692	136
Manitoba	1,170	91	78
Saskatchewan	995	65	65
Alberta	3,207	351	109
British Columbia	4,203	309	74

1. CANSIM table 051-0005.
2. Includes Yukon Territory, Northwest Territories and Nunavut.

Table 1-5
Gross domestic expenditures on research and development (GERD) in the health field — Historical

	Performing sector					
	Federal government	Provincial governments	Business enterprise	Higher education [1]	Private non-profit	Total [2]
	millions of dollars					
Funding sector						
2006 [e]						
Total [2]	**205**	**46**	**2,134**	**4,149**	**62**	**6,596**
Federal government	205	0	8	1,018	7	**1,238**
Provincial governments	0	46	1	363	8	**418**
Business enterprise	0	0	1,268	377	8	**1,653**
Higher education [1]	0	0	0	1,846	0	**1,846**
Private non-profit	0	0	1	501	31	**533**
Foreign	0	0	856	44	8	**908**
2005 [e]						
Total [2]	**212**	**47**	**2,082**	**3,772**	**61**	**6,174**
Federal government	212	0	8	926	7	**1,153**
Provincial governments	0	47	1	330	8	**386**
Business enterprise	0	0	1,237	343	8	**1,588**
Higher education [1]	0	0	0	1,678	0	**1,678**
Private non-profit	0	0	1	455	30	**486**
Foreign	0	0	835	40	8	**883**
2004 [r]						
Total [2]	**203**	**42**	**2,022**	**3,565**	**60**	**5,892**
Federal government	203	0	7	875	7	**1,092**
Provincial governments	0	42	1	312	8	**363**
Business enterprise	0	0	1,202	324	8	**1,534**
Higher education [1]	0	0	0	1,586	0	**1,586**
Private non-profit	0	0	1	430	29	**460**
Foreign	0	0	811	38	8	**857**
2003 [r]						
Total [2]	**196**	**44**	**1,807**	**3,087**	**58**	**5,192**
Federal government	196	0	14	814	9	**1,033**
Provincial governments	0	44	2	306	10	**362**
Business enterprise	0	0	1,117	267	9	**1,393**
Higher education [1]	0	0	0	1,301	0	**1,301**
Private non-profit	0	0	0	369	25	**394**
Foreign	0	0	674	30	5	**709**

See footnotes at the end of the table.

Table 1-5 – continued

Gross domestic expenditures on research and development (GERD) in the health field — Historical

Funding sector	Performing sector: Federal government	Provincial governments	Business enterprise	Higher education[1]	Private non-profit	Total[2]
	millions of dollars					
2002 [r]						
Total [2]	**186**	**42**	**1,828**	**2,956**	**49**	**5,061**
Federal government	186	0	15	752	4	**957**
Provincial governments	0	42	2	249	16	**309**
Business enterprise	0	0	1,157	261	9	**1,427**
Higher education [1]	0	0	0	1,283	0	**1,283**
Private non-profit	0	0	0	371	19	**390**
Foreign	0	0	654	40	1	**695**
2001 [r]						
Total [2]	**152**	**42**	**1,542**	**2,383**	**51**	**4,170**
Federal government	152	0	12	564	5	**733**
Provincial governments	0	42	5	214	16	**277**
Business enterprise	0	0	991	236	8	**1,235**
Higher education [1]	0	0	0	1,023	0	**1,023**
Private non-profit	0	0	0	312	21	**333**
Foreign	0	0	534	34	1	**569**
2000						
Total [2]	**116**	**42**	**1,254**	**2,104**	**44**	**3,560**
Federal government	116	0	8	433	3	**560**
Provincial governments	0	42	4	176	11	**233**
Business enterprise	0	0	835	211	8	**1,054**
Higher education [1]	0	0	0	1,000	0	**1,000**
Private non-profit	0	0	0	264	21	**285**
Foreign	0	0	407	20	1	**428**
1999						
Total [2]	**103**	**32**	**961**	**1,823**	**48**	**2,967**
Federal government	103	0	6	362	6	**477**
Provincial governments	0	32	6	145	12	**195**
Business enterprise	0	0	665	167	5	**837**
Higher education [1]	0	0	0	907	0	**907**
Private non-profit	0	0	0	219	23	**242**
Foreign	0	0	284	23	2	**309**

See footnotes at the end of the table.

Table 1-5 – continued

Gross domestic expenditures on research and development (GERD) in the health field — Historical

	Performing sector					
	Federal government	Provincial governments	Business enterprise	Higher education[1]	Private non-profit	Total[2]
	millions of dollars					
Funding sector						
1998						
Total [2]	**87**	**36**	**874**	**1,628**	**67**	**2,692**
Federal government	87	0	9	275	10	**381**
Provincial governments	0	36	8	111	16	**171**
Business enterprise	0	0	641	145	8	**794**
Higher education [1]	0	0	0	864	0	**864**
Private non-profit	0	0	0	213	31	**244**
Foreign	0	0	216	20	2	**238**
1997						
Total [2]	**78**	**32**	**749**	**1,516**	**72**	**2,447**
Federal government	78	0	8	261	6	**353**
Provincial governments	0	32	7	111	18	**168**
Business enterprise	0	0	559	134	10	**703**
Higher education [1]	0	0	0	786	0	**786**
Private non-profit	0	0	0	208	37	**245**
Foreign	0	0	175	16	1	**192**
1996						
Total [2]	**76**	**32**	**702**	**1,430**	**77**	**2,317**
Federal government	76	0	10	255	6	**347**
Provincial governments	0	32	6	89	16	**143**
Business enterprise	0	0	505	118	9	**632**
Higher education [1]	0	0	0	754	0	**754**
Private non-profit	0	0	0	200	39	**239**
Foreign	0	0	181	14	7	**202**
1995						
Total [2]	**63**	**33**	**593**	**1,428**	**79**	**2,196**
Federal government	63	0	9	294	7	**373**
Provincial governments	0	33	8	97	15	**153**
Business enterprise	0	0	458	105	15	**578**
Higher education [1]	0	0	0	753	0	**753**
Private non-profit	0	0	0	169	37	**206**
Foreign	0	0	118	10	5	**133**

1. Includes teaching hospitals.
2. Statistics Canada's estimate (due to unavailability of data by specific "Health Field").

Estimates of total spending on R&D in the health field in Canada, 1989 to 2006

Research and development (R&D) is a measure of a country's economic prosperity. Recently, our readers have expressed interest in the health field. How much R&D is Canada performing in the health field and who is funding this research? A methodology has been devised in order to estimate how much of the gross domestic expenditures on research and development (GERD) are relevant to health R&D. This paper presents details of expenditures on health R&D performance and funding.

Definitions

Research and development (R&D)

R&D is defined as creative work undertaken on a systematic basis in order to increase the stock of scientific and technical knowledge and the use of this knowledge to devise new applications. Expenditures on R&D are an important indicator of the effort devoted to creative activity in science and technology.

Gross Domestic Expenditures on Research and Development (GERD)

GERD represent all R&D performed in a country's national territory during a given year. The GERD includes R&D performed within a country and funded from abroad but excludes payments sent abroad for R&D performed in other countries.

Methodology

Federal government sector: The health GERD figures include scientific activities aimed at protecting, promoting and restoring human health, broadly interpreted to include health aspects of nutrition and food hygiene. They range from preventative medicine, including all aspects of medical and surgical treatment, both for individuals and groups, and the provision of hospital and home care, to social medicine and paediatric and geriatric research.

Federal government R&D expenditures in the health field from 1989 until 2006[e] are derived from the survey of Federal Science Expenditures and Personnel. Data were collected from responses to a question on health as a socio-economic objective for Federal R&D spending. Federal government data are published in catalogue no. 88-204-X.

Provincial governments: R&D expenditures in the health field are based on values from provincial science surveys which identify their intramural R&D expenditures in the health socio-economic objective field.

Business enterprise sector: The pharmaceutical and medicine manufacturing industry *North American Industry Classification System* (NAICS) 325410 is the most significant source of health R&D in the business enterprise sector. Other NAICS industries which are prevalent in health R&D include: pharmaceuticals and pharmacy supplies wholesale - distributors (414510), testing laboratories (541380), research and development in the physical, engineering and life sciences (541710) and health care and social assistance (NAICS 62) industries. Data originate from the R&D in Canadian industry survey conducted by Statistics Canada.

The higher education sector: Health R&D statistics are derived from Statistics Canada's revised higher education R&D estimates (catalogue no. 88-001-X vol. 30, no. 5) which identify R&D performed in the health field. The revised estimates are based on the assumption that the total R&D expenditures are equal to the sum of: a) sponsored research expenditures (including all teaching hospitals); b) indirect expenditures on sponsored research; c) a value

for the fraction of faculty members' time assumed to be devoted to sponsored and non-sponsored research; and d) indirect expenditures related to faculty members' time on research. Statistics Canada uses Canadian Association of University Business Officers (CAUBO) and Centre for Education Statistics data in order to compile the estimates.

Due to the nature of the estimation system for higher education research and development (HERD) statistics, higher education is the only sector of performance where a regional breakdown of health R&D is available.

Private non-profit sector: Values used for estimating health R&D expenditures in the private non-profit (PNP) sector are those identified as health-related in survey responses.