Economic Footprint of Health Care Services in Canada

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Canadian Medical Association

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EXECUTIVE SUMMARY

Gauging the role of health in the economy almost always focuses on the share such spending is of total expenditures in the economy. This proportion surpassed 10 per cent in 2003, and having increased in most years of the last generation has led many to question whether this is "sustainable". In this report, we report on health from the supply side, and more specifically, focus on industries that supply health services - hospitals, residential and nursing care, and the diverse "ambulatory" sector (physicians, other health professionals, community care).

Their share of Gross Domestic Product (GDP)[1] in recent years has been slightly more than 5 per cent. They account for 8 per cent of employment and an equivalent amount of total income paid as wages and unincorporated income. Approximately one-fifth of the total current costs of delivering health services are supplied by other industries. These are equivalent to one per cent of GDP, adding another dimension to the sector's economic footprint.[2] Investment in the health services industries also extends the impact of the sector, but it is relatively modest, accounting for 3 per cent of all non-residential investment undertaken by business and governments. Returns to capital in health services are typically less than 2 per cent of those for all sectors (leaving aside imputed rent accruing to homeowners). Indirect taxes and subsidies paid by and received by health services are a small proportion of industry total costs, and in this sense, are undistinguished from most other industries.

Except during periods when a business cycle downturn slows growth of the business sector, the share of health service industries in total output of the economy has changed little over the last quarter century. "Down sizing" of health delivery was particularly severe over 1992-98, but subsequently significant growth has been restored. Notwithstanding the recent recovery, growth of the population weighted by age and sex for health expenditures (a rough approximation of the underlying demographic determinants for growth of patient numbers) suggests that "patient" numbers have grown 5 per cent more rapidly in 1992-2004 than has real service delivery (or more exactly, the real human, capital and other inputs needed to deliver service).

Increased spending on drugs accounts for some part of this gap between the expenditure and service delivery changes, but it also reflects the fact that spending on public health, general administration of the health system, research and other expenditures delivered outside of health services - principally by pharmaceutical industries, private health insurance administration, public officials, and universities - have accounted for more

[1] at Basic Prices, which is a smaller (about 10 per cent) amount than Gross Domestic Product at Market Prices, the measure used in reporting focused on spending.

[2] Most suppliers are service industries with little direct import content indicated, but for a few – pharmaceuticals and medical devices – import content is significant. These are particularly important suppliers to hospitals.

than two-fifths of all health expenditure increases since 1991. It raises the question of whether additions to spending in these areas are more likely than delivery of health services to produce improved health outcomes, and whether management of health is better served when there is such an increasing proportion of health spending being delivered outside of health system.

Changes over time indicate that the "major adjustments" to the structure of service delivery were made in 1992-98, but since that time the "new" system that had evolved by 1998 is being expanded with little change. Hospitals took the brunt of the reduction in service delivery over 1992-98, and within this sector, occupational data suggest that this was achieved mainly by reducing spending for 1) "catering" services (e.g., cleaning, preparation of food) as beds were closed, out-patient care, and shorter stays were implemented, and 2) for nurses and health assisting occupations (orderlies, nurse assistants, etc.) . Ambulatory care increased its role in service delivery, but within this "industry" (and within the hospital system itself), the role of physicians was reduced while that of other health professionals (e.g., therapists, chiropractors, etc.) was increased.

Changes in the 1990s have shifted delivery somewhat from larger to small scale delivery systems. Moreover, health services are among the least specialized of all sectors in the economy in the sense that resources managed within the industry dominate total costs. In part, this reflects the labour intensity of the industry, but other industries with highly qualified labour inputs (e.g., professional, scientific, technical services, broadcasting, publishing and data processing, mining services), purchase from 35-50 per cent of their inputs from other industries.[3]

In the 1980s, data on compensation and the GDP Deflator (a weighted measure of the unit costs of labour, capital and other inputs) suggests that "prices" of health service delivery were growing more rapidly than prices generally in the economy. But data for the 1990s and opening years of this decade suggest that these prices have been growing roughly in line with, or only a little more quickly, than prices in the economy as a whole. Given the labour-intensive nature of the sector, one should expect some upward bias in the longer run.[4]

There were some adjustments to health service investment spending in the 1992-98 period and growth of the capital stock available to the industry (mainly building structures) slowed, but from 1999 forward, high levels of investment and a rapidly expanding capital stock have been recorded. Not surprisingly, growth of investment in

[3] Changes in 1992-98 in the form of reduced delivery of accommodation and food services within the health care system might be seen as a move toward specialization, but this was more likely an offloading of the service to households and other financial systems (e.g., social insurance) since there is no indication that resources for delivery of the service were being increasingly sourced from outside health services.
[4] Employment downsizing in the early to late 1980s was especially severe among occupations with the lowest compensation rates, a which feature would exaggerate the upward bias.

information technologies has led the way (and was strong from the mid-1990s). But measured labour productivity in recent years (since 2000) has been falling.

It is a common feature of discussion about the sustainability of health care to see the issue as one in which (government) spending for health care occurs at the expense of other expenditures. This leaves aside possible positive effects on economic activity (and government revenues) of any consequent improvement in the health of the workforce, positive implications for participation rates, and reduced health spending because of reduced morbidity. We leave measurement of such effects to others focussed on health outcomes.

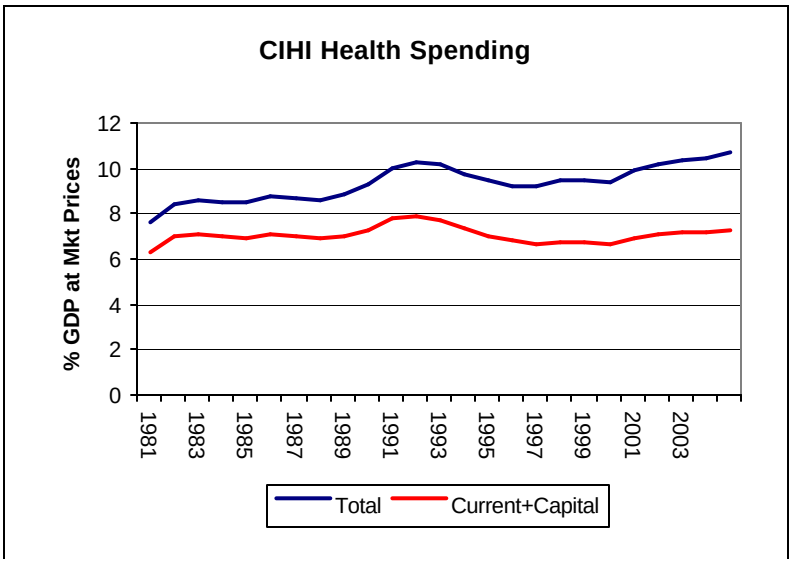
As well, however, it should be noted that there are measurable consequences for incomes that follow from increased spending on health services. Put otherwise, spending on health care provides government revenue and other income offsets to any increased spending to mitigate the sustainability argument that is based on direct spending arithmetic. Given a "traditional" view of a 70/30 (public/private) split in new spending, which we have directed to health service suppliers, we estimate that two-thirds of initial government spending would be recovered through increased revenues and modest reductions in Employment Insurance and other transfer payments, while household disposable income would be increased by twice the amount of any increased spending on health services. Argument about the specific magnitude of such impacts is reasonable, but we conclude on review of the channel of the impacts that "significant" offsets to the initial spending are very likely.

An annotated bibliography is included in the report. From this, we conclude that this focus on the supply side is a first such review effort, and should be understood to be an exploration of facts, conclusions and issues.

1 Background and Purpose of the Report

Data released by the Canadian Institute for Health Information (CIHI) that is focused on Health Expenditures records a secular increase in the share of health expenditures in total expenditures that define demands on economic activity (Gross Domestic Product at Market Prices), with this proportion recently exceeding 10 per cent.

Figure 1 Significance of Health Spending



Broadly speaking, this accounts for spending underpinning the current operations of health service providers and their capital formation, but also spending on drugs, and for public health, administration, and "other"[5].**This report is focused the industries that deliver health services and the extent to which these account directly or indirectly for measured economic activity. Attributes of the industry are also reviewed.** Drugs are an intermediate input to the operation of health service delivery, as are some elements of public health, administration and "other" spending, but for the most part these goods and services are delivered by other industries – pharmaceutical manufacturers, private insurance, the three levels of government, universities, and elements of the professional, scientific, and technical services industries. Spending on capital by health service industries is delivered by the construction and several manufacturing industries (e.g., producers of medical devices, electronic equipment).

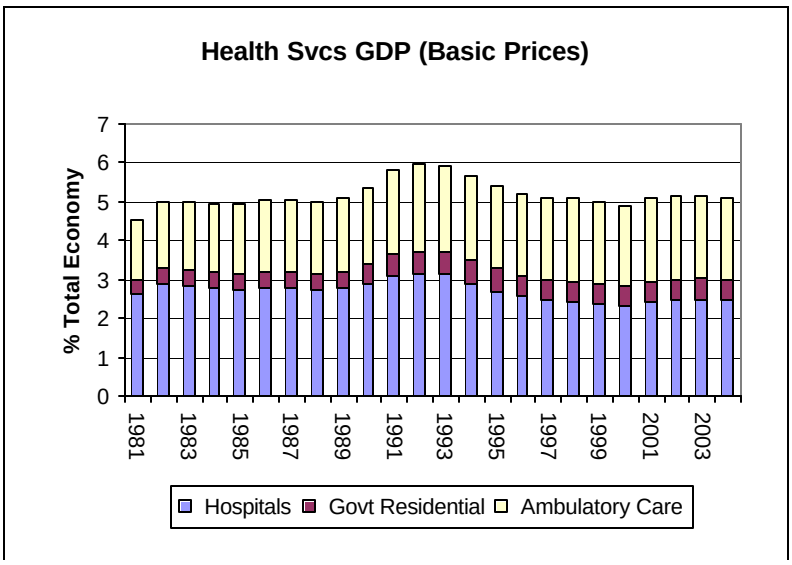
The notably sharp rise in the proportion of health care spending as a share of GDP in 1990-91 was accounted for by slow real growth of the general economy (while health services continued to expand in real terms), and a relatively rapid growth of unit costs of labour in health services. Subsequent to 1991, two features stand out:

[5] Public health covers government expenditures for items such as food and drug safety, health inspections, health promotion activities, community mental health programs, public health nursing, measures to prevent the spread of communicable disease, and occupational health to promote and enhance health and safety at the workplace. Administration covers expenditures related to the cost of providing health insurance programs by the government and private health insurance companies and all costs for the infrastructure to operate health departments. Other health spending covers, at the aggregate level, expenditures on home care, medical transportation (ambulances), hearing aids, other appliances and prostheses, health research and miscellaneous health care. For more detail, see "National Health Expenditure Trends 1975-2005", pp. 62-63.

- an emphasis on reducing government deficits and debt led to a period (1992-98) of little change to the level of health service industry real GDP and employment; since 1999, there has been a recovery in the growth of real spending and service GDP, and

- since 1991, there has been a major shift in emphasis toward spending on drugs, public health, administration and other spending. Combined, these accounted for 22.6 per cent of total health spending in 1991, with this rising (steadily) to 32.4 per cent by 2004. Put otherwise, more than two-fifths of the increase in spending from 1991 through 2004 has been accounted for by spending on goods and services produced by industries primarily outside of health services. As a first approximation, and as is illustrated in Figure 1, spending on the traditional forms of health service delivery as a share of GDP, although increased in recent years, is small. Indeed, the proportion in 2004 (6.5 per cent) is essentially the same as the average recorded in the economic growth years of 1983-89.

Figure 2 Significance of Health Service Production



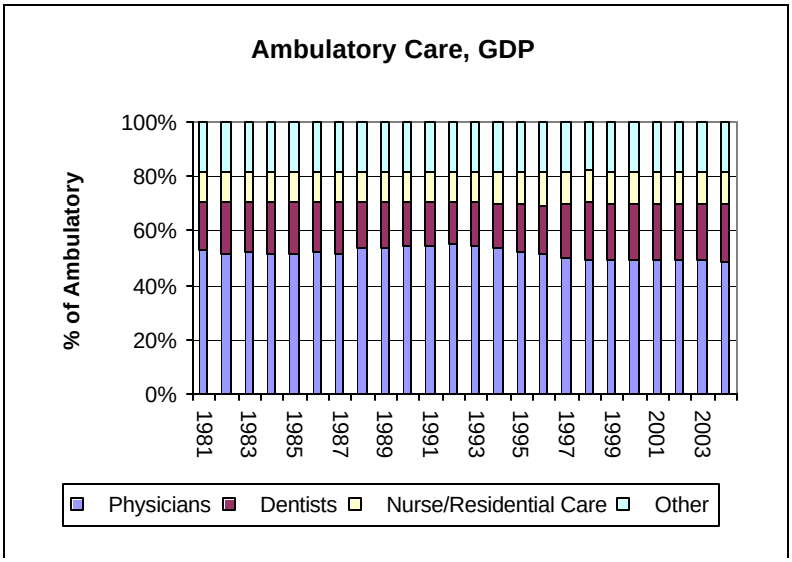
This characteristic of the period since the early 1990s is mirrored in the data that describe the supply of health services. Within this grouping, the notable changes include:

- a steady erosion over the past 25 years (accelerated in 1992-98) in the proportion of services delivered by hospitals,

- an increase since 1991 in the importance of "ambulatory care" services. Where GDP of hospitals in 1991 accounted for 53 per cent of health service delivery, it had shrunk to less than 48 per cent by 2004. Over the same period, the proportion of ambulatory services rose from 37.5 per cent to 41.5 per cent, and

- a notable rise in the share of government nursing and residential care in the first half of the 1990s with little change since. The surge in the first half of the 1990s followed a decade when the proportion changed little..

Figure 3 Components of Ambulatory Care



Among ambulatory care services,

- the proportion accounted for by physician services has eroded since the early 1990s, and at slightly more than 48 per cent in 2004, is notably less than the almost 54 per cent in 1991, and below the average of the 1980s – 51 per cent,

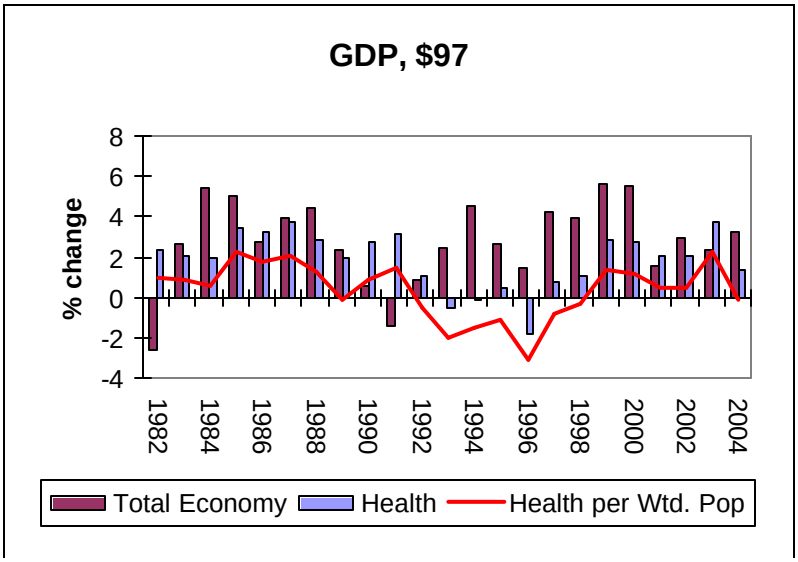
- the share accounted for by dental services has increased notably since 1991 – from 16 per cent to almost 21 per cent, while

- the shares accounted for by non-government nursing and residential services, and a broad array of other services (see below) have changed little over the past 25 years. Combined with an unchanged proportion of health services supplied by government and residential care facilities, this suggests little impact of stated intentions to move patients from hospitals to chronic care.

Other presenters at the workshop, for which this report provides support, focus on whether the real resources being employed to deliver health care are "productive" in terms of health outcomes. Here we use conventional economic measures to indicate how much real resources used to deliver health services have been changed over the last quarter century, and compare this to an indicative measure of changes in "patient demand". [6]

[6] We recognize that measuring patient numbers is a complex measurement issue. Here we have weighted population by ten-year age groups, and by sex using health expenditures in 2000 to capture the implication of increasing costs of health care as the population ages. More precise measures would alter detail but almost certainly would not alter the major trends noted here.

Figure 4 Real Health Services in Context



Following a reduction in real GDP in the recession years that opened the 1980s, real inputs (GDP) in health services grew at a rate that was typically higher than population weighted for health care spending through the 1980s. From 1992 through 1998, real inputs used to deliver health services changed little, and in 1998, were only slightly higher than in 1991. On an indicated per-patient basis, this implies a reduction of almost 10 per cent in health service inputs in 1998 compared to those of 1991. Beginning in 1999, real service delivery has increased, and typically by more than the change in the indicated growth of patient numbers. Notwithstanding this recent increase, real GDP per health-weighted population in 2004 was still 5 per cent less than in 1991. Preliminary, monthly data for 2005 suggests an annual increase of 1.5 per cent in such services, approximately matching the increase in the health-weighted population. In short, and notwithstanding the major increase in federal transfers to provinces in FY2005-06, there appears to have been little change to the state of affairs last year.

In the first section of this report we draw on the Business Register, to detail services that are reported in more aggregate economic terms in the following section, and to provide indications of the extent the detailed components of the sector are important or not, and indications of their scale. In the following section, we focus on costs of delivering services from the sector, decomposing this into labour and other inputs managed by the industry, and inputs purchased from other sectors of the economy. Included is a section on sector capital formation. Given the review of what changes in the structure of the sector and availability of capital have occurred, we conclude this section with a measure of the extent to which sector output per employee has changed.

2 Structure of Health Service Delivery Production

In this report, the Health Service Delivery (HSD) sector is defined on the basis of the North American Industrial Classification System (NAICS) as an aggregate of three sub-sectors:

1. Ambulatory, nursing and residential health care services;
2. Hospitals; and
3. Government residential facilities.

The first sub-sector - Ambulatory, nursing and residential health care services (NAICS 621, 6231, 6233), constitutes services provided by:

- Offices of Dentists
- Offices of Chiropractors
- Offices of Optometrists
- Offices of Mental Health Practitioners (except Physicians)
- Offices of Physical, Occupational, and Speech Therapists and Audiologists
- Offices of All Other Health Practitioners
- Family Planning Centres
- Out-Patient Mental Health and Substance Abuse Centres
- Community Health Centres
- All Other Out-Patient Care Centres
- Medical and Diagnostic Laboratories
- Home Health Care Services
- Ambulance (except Air Ambulance) Services
- Air Ambulance Services
- All Other Ambulatory Health Care Services
- Nursing Care Facilities
- Community Care Facilities for the Elderly

Hospitals (NAICS 622) includes four types of hospitals:

- General (except Paediatric) Hospitals
- Paediatric Hospitals
- Psychiatric and Substance Abuse Hospitals
- Specialty (except Psychiatric and Substance Abuse) Hospitals

Government residential care facilities (NAICS 6232,6239) are comprised of:

- Residential Developmental Handicap Facilities
- Residential Substance Abuse Facilities
- Homes for the Psychiatrically Disabled
- Transition Homes for Women
- Homes for Emotionally Disturbed Children
- Homes for the Physically Handicapped or Disabled
- All Other Residential Care Facilities

To understand the scale of the HSD sector in Canada, we employ basic indicators of the industrial size: number of establishments, employment[7], and Gross Domestic Product. According to the latest release of the Statistics Canada Business Register (BR), there were 75,615 health service delivery establishments in Canada in 2003, employing about 1.3 million people (Table 1).

Ambulatory care is populated with 71,574 firms and around 700 thousand professionals and other staff. Most would appear to operate as private businesses. Among these, 93.6 per cent appear to provide mainly short-term care, with the rest in the private and community nursing and residential facilities. There were 1,432 hospitals in Canada in 2003 employing around 534 thousand people. General hospitals form the largest group of hospital establishments (945), followed by specialty hospitals (375), psychiatric and substance abuse hospitals (97), and the smallest group of paediatric hospitals (only 15). Government residential care facilities accounted for 2,609 establishments in 2003 with about 73 thousand employees. One-fifth of these facilities is devoted to the psychiatrically disabled, and one-tenth to residential, developmental handicap facilities, representing the largest groups of establishments in this sub-sector.

The scale of the organizations varies substantially across the HSD establishments that can be grouped by employment size as following:

1. Micro[8] and Small HSD establishments are those with 0 to 99 employees.
2. Medium HSD sector establishments employ between 100 and 500 employees.
3. Large HSD establishments have more than 500 employees.

In terms of industrial scale, a majority or 97.2 per cent of HSD sector organizations fall into the category of micro and small establishments with an average size of 17 employees per establishment.

The largely private ambulatory services sub-sector has the highest share of the micro and small firms - 98.3 per cent, and the lowest average number of employees per establishment (10) in the sector. However, the average establishment size is below 10 employees for doctors' offices, and higher than 10 for other ambulatory health care groups. The private nursing and residential care facilities depart significantly from the average firm size in this sub-sector: 66 employees per nursing facility and 28 employees per community care facility for the elderly.

[7] Informetrica Limited provides estimates of employment based on Business Register (STC) size groups. See Appendix 1 "Business Register Employment Size Map" for the assumptions used in calculations.

[8] According to STC and Industry Canada, micro establishments are defined as those that have 0-4 employees, which include self-employed and paid employees. Small businesses are defined as those that have fewer than 100 employees, medium firms are those with 100-499 employees, and large organizations have more than 500 employees.

Table 1. Health Service Delivery Sector: 2003 Snapshot of Industrial Organization Statistics

Industry Description	Number of establish.	Number of employees	Employees per establ.	% of Establishments		
				Micro & Small	Medium	Large
Ambulatory, Nursing and Residential Health Care Services	**71,574**	**694,053**	**10**	**98.3**	**1.7**	**0.1**
Offices of Physicians	30,120	142,040	5	99.8	0.2	0.0
Offices of Dentists	13,644	93,911	7	99.9	0.1	-
Misc. ambulatory health care services						
Offices of Chiropractors	3,615	10,070	3	99.9	0.1	-
Offices of Optometrists	2,140	9,839	5	100.0	0.0	-
Offices of Mental Health Practitioners (except Physicians)	1,201	3,523	3	99.8	0.2	-
Offices of Physical, Occupational, and Speech Therapists and Audiologists	2,840	18,598	7	99.5	0.5	-
Offices of All Other Health Practitioners	3,868	25,092	6	99.1	0.8	0.1
Family Planning Centres	384	2,620	7	99.7	0.3	-
Out-Patient Mental Health and Substance Abuse Centres	568	11,523	20	96.3	3.0	0.7
Community Health Centres	1,220	57,608	47	85.3	14.0	0.7
All Other Out-Patient Care Centres	2,374	6,648	3	99.7	0.3	-
Medical and Diagnostic Laboratories	1,788	19,870	11	98.4	1.4	0.2
Home Health Care Services	2,068	46,960	23	94.2	5.4	0.4
Ambulance (except Air Ambulance) Services	538	10,680	20	96.8	3.2	-
Air Ambulance Services	17	274	16	100.0	-	-
All Other Ambulatory Health Care Services	219	5,937	27	91.8	7.3	0.9
Nursing and residential care services						
Nursing Care Facilities	2,369	156,995	66	77.1	21.9	1.0
Community Care Facilities for the Elderly	2,601	71,865	28	92.4	7.2	0.4
Hospitals	**1,432**	**533,880**	**373**	**50.6**	**29.1**	**20.3**
General (except Paediatric) Hospitals	945	467,055	494	38.0	36.0	26.0
Paediatric Hospitals	15	14,938	996	20.0	26.7	53.3
Psychiatric and Substance Abuse Hospitals	97	15,651	161	71.1	14.4	14.4
Specialty (except Psychiatric and Substance Abuse) Hospitals	375	36,236	97	78.4	15.5	6.1
Government Residential Care Facilities	**2,609**	**73,322**	**28**	**93.9**	**5.6**	**0.5**
Residential Developmental Handicap Facilities	310	12,312	40	86.8	12.9	0.3
Residential Substance Abuse Facilities	211	4,701	22	97.2	2.4	0.5
Homes for the Psychiatrically Disabled	689	19,798	29	92.6	7.0	0.4
Transition Homes for Women	261	3,522	13	100.0	-	-
Homes for Emotionally Disturbed Children	109	10,332	95	81.7	14.7	3.7
Homes for the Physically Handicapped or Disabled	292	9,743	33	92.5	6.5	1.0
All Other Residential Care Facilities	737	12,914	18	97.4	2.3	0.3
Total Health Service Delivery Sector	**75,615**	**1,301,255**	**17**	**97.2**	**2.3**	**0.5**

Source: Business Register (STC) and TIM (Informetrica Limited)

Hospitals (public entities) are the largest organizations in the HSD sector with an average number of employees per establishment of 373. Half of hospitals are classified as micro and small group organizations (likely reflecting the varying sizes of communities served), three-fifths are positioned in the medium scale group, and two-fifths are large organizations. Interestingly, paediatric hospitals concentrate around 1,000 specialists and support staff in one organization on average, the highest level among hospitals. General hospitals are the second largest in terms of employment concentration (around 500 people).

The average government residential care facility is a small HSD unit employing on average 28 people. This is widespread among the organizations in this sub-sector: 93.9 per cent are micro and small establishments, 5.6 per cent are medium and only 0.5 per cent are large. As in the case with hospitals, facilities taking care of children - homes for emotionally disturbed children - have the largest average number of employees in this sub-sector (95). Facilities taking care of developmental, physically and psychiatrically handicapped or disabled have an above-average concentration of staff per establishment.

In 2003 the HSD sector generated close to $60 billion in GDP, of which ambulatory health services generated two-fifths, hospitals half, and government residential care facilities one-fifth (Table 2). On average, each HSD unit produces $756 thousand and each employee - around $44 thousand.

The most productive (or, largest scale) establishments in terms of GDP per establishment are hospitals ($19.3 million). The average government residential care facility generates $2.3 million annually, and the private nursing and residential care facility, about $0.6 million. All other HSD establishments have an annual level of GDP per establishment of less than half a million.

Table 2 Health Service Delivery Sector:2003 Snapshot of Key Industrial Organization Indicators

Industry description	Nominal GDP, $mn	Number of establ.	Number of employees	Employment per establ.	GDP per establ., $000	GDP per employee, $000
Total Health Service Delivery Sector	**57,188**	**75,615**	**1,301,255**	**17**	**756**	**43.9**
Offices of physicians	11,598	30,120	142,040	5	385	81.7
Offices of dentists	4,912	13,644	93,911	7	360	52.3
Misc. ambulatory health care services	4,272	22,840	229,242	10	187	18.6
Nursing and residential care services	2,837	4,970	228,860	46	571	12.4
Hospitals	27,537	1,432	533,880	373	19,230	51.6
Government residential care facilities	6,032	2,609	73,322	28	2,312	82.3

Source: Business Register (STC) and TIM (Informetrica Limited)

Government residential care facilities report the highest level of GDP per employee within the HSD sector ($82,300), followed by the offices of physicians ($81,700) and offices of dentists ($52,300).

Table 3 Health Service Delivery Sector: Cross-Industry Comparison of Industrial Organization Indicators, 2003 Snapshot

Industries	Nominal GDP, $mn	Number of establ.	Number of employees	Employees per establ.	GDP per establ., $000	GDP per employee, $000	% Establishments		
							Micro& Small	Medium	Large
Health Service Delivery Sector	**57,188**	**75,615**	**1,301,255**	**17**	**756**	**43.9**	**97.2**	**2.3**	**0.5**
Total service industries	**763,390**	**1,723,875**	**13,198,863**	**8**	**443**	**57.8**	**99.0**	**0.9**	**0.1**
Public admin	67,130	7,939	814,893	103	8,456	82.4	86.8	9.1	4.0
Information & culture industries	37,245	32,053	338,162	11	1,162	110.1	98.2	1.6	0.2
FIRE	212,317	367,008	1,637,053	4	579	129.7	99.5	0.4	0.1
Administrative & support, waste management & remediation services	25,763	107,303	761,588	7	240	33.8	98.9	1.0	0.1
Accommodation & food services	25,327	115,296	1,272,534	11	220	19.9	98.6	1.3	0.1
Arts, entertainment, recreation	11,136	42,340	289,062	7	263	38.5	99.0	0.9	0.1
Educational services	52,331	21,417	994,171	46	2,443	52.6	95.8	2.2	2.0
Health care & social assistance	85,491	95,755	1,539,937	16	893	55.5	97.5	2.1	0.4
Professional, scientific & technical services	49,804	309,702	1,198,039	4	161	41.6	99.6	0.4	0.0
Other services	28,614	168,243	755,322	4	170	37.9	99.7	0.3	0.0
Wholesale & retail trade	115,810	345,866	2,864,223	8	335	40.4	98.8	1.2	0.0
Transport & warehousing	52,421	110,953	733,879	7	472	71.4	99.1	0.7	0.1
All industries	**1,129,069**	**2,304,397**	**17,223,754**	**7**	**490**	**65.6**	**99.0**	**0.9**	**0.1**

Source: Business Register (STC) and TIM (Informetrica Limited)

Note: International and other extra-territorial public administration excluded from the establishment counts and estimates of employment

In comparison to the rest of the economy, the Business Register indicates that the HSD sector produces about 5 per cent of GDP, operates 3.3 per cent of establishments and provides 7.8 per cent of jobs (Table 3). As a component of the services economy, its share in GDP is 7.5 per cent, in the number of organizations - 4.4 per cent, and in employment - almost 10 per cent. The HSD sector ranks fifth among service industries in its contribution to total economy GDP. In terms of GDP indicators, the sector belongs to a group of industries with medium performance: its GDP per employee is lower than the economy average, but GDP per establishment is higher.

The industrial organization of the aggregate HSD sector by the size of establishments (micro and small, medium and large) is similar to the average organizational scale in other major service sectors in the economy (Table 3). It has a slightly lower proportion of micro and small units and higher shares of medium and large services organizations as a whole. HSD's establishment scale patterns are comparable to those of educational services, social assistance and public administration industries, while other service industries have a higher proportion of micro and small organizations, and even smaller shares of large firms. This is also reflected in HSD's higher than the economy average size of establishment: 17 employees in comparison to 7.

3 Cost of Health Service Delivery

3.1 Overview of Costs

This section of the report presents the 1991-2002 patterns of the nominal input costs of the aggregate HSD sector and three sub-sectors using five standard measures of the L-Level Input-Output Tables of the System of National Accounts:

- Labour;
- Unincorporated income;
- Corporate surplus;
- Indirect taxes and subsidies on production;
- Costs of purchased intermediate inputs (materials and services).

Put in secular terms, this exhausts the total cost of delivering a service. Labour costs include wages, salaries and supplementary labour income. The income of unincorporated business is defined as the sum of accrued net income, including rent. Corporate surplus (returns to capital) is essentially comprised of the profits of corporate and government business enterprises before taxes, interest and miscellaneous investment income, capital consumption allowances and inventory valuation adjustment. Indirect taxes and subsidies on production are comprised of the taxes on property and labour, and subsidies for labour costs. The first four inputs are the components of Gross Domestic Product at basic prices. The sum of GDP and the intermediate inputs constitutes the industry Gross Output measure.

Table 4 reports the structure of input costs in ambulatory health care. Although there are year to year variations, of total costs of delivery, payments for labour inputs (here, wages plus unincorporated income) are in the range of almost 70 per cent in recent years. (Typically the proportion was a couple of percentage points higher in the 1980s and early 1990s). Corporate surplus accounts for 8-9 per cent of costs, reflecting the fact that a high proportion of establishments are unincorporated, the labour-intensive nature of the industry, and recourse to leasing of space and equipment rather than ownership of real capital. Property and contributory taxes on employment are typical of all industries, and with small subsidies as an offset, net indirect taxes are less than one per cent of costs. Purchases from other industries range from a low of 20 per cent of total costs to as much as one-quarter. (Section 2.1.2 provides detail on the supplying industries.)

All components of the input costs of ambulatory care have been growing by an average of almost 5 per cent per year from 1991 through 2002 with the pace accelerating from about 4 per cent in 1992-98 to a more recent pace of almost 6 per cent. The significant acceleration has been concentrated in the wage bill and unincorporated income, offset by slower growth in corporate returns, and notably, a sharp deceleration in the growth of costs of purchased inputs.

Table 4 Structure of Input Costs: Ambulatory Care and Social Assistance Sub-Sector[9]

Indicators	1991	1998	2002	% Change in 1998	% Change in 2002
Contribution to Gross Output, %					
Labour costs	30.5	32.1	33.9		
Unincorporated income	40.1	33.5	35.1		
Corporate surplus	6.6	9.2	8.7		
Indirect taxes and subsidies	0.7	0.5	0.6		
Materials & services costs	22.2	24.7	21.7		
GDP, $mn, nominal	**16,284**	**20,897**	**27,280**	**28.3**	**30.5**
Labour costs, $mn, nominal	6,373	8,904	11,799	39.7	32.5
Wages and salaries	5,991	8,063	10,739	34.6	33.2
Supplementary labour income	382	841	1,060	120.2	26.0
Unincorporated income, $mn, nominal	8,395	9,298	12,245	10.8	31.7
Corporate surplus, $mn, nominal	1,377	2,545	3,023	84.8	18.8
Indirect taxes and subsidies, $mn, nominal	139	150	213	7.9	42.0
Taxes on production	161	196	298	21.7	52.0
Subsidies	(22)	(46)	(85)	109.1	84.8
Materials & services costs, $mn, nominal	4,636	6,873	7,565	48.3	10.1
Gross output, $mn, nominal	**20,920**	**27,770**	**34,845**	**32.7**	**25.5**

Source: I-O TIM and database (Informetrica Limited)

Table 5 reports the structure of input costs in hospitals. Again, labour is the dominant source of overall inputs, accounting recently for 65 per cent or less of the total.[10] The reduction in the proportion since the 1980s of more than 5 percentage points has been more pronounced than in ambulatory care. Corporate surplus typically accounts for 6 per cent of costs, with net indirect taxes and subsidies small – one per cent. Requirements for goods and services supplied by other industries have recently been in the range of 30 per cent or slightly more. This share has grown in line with the decline in the proportion paid to labour suggesting a notable substitution of purchased inputs for sector labour in the last decade.

The input costs of hospitals grew by an average of less than 4 per cent per year from 1991 through 2002, or less than that of the ambulatory health care services. An acceleration of costs is more pronounced in this sector, however, with the pace rising from a little more than 1 per cent in 1992-98 to almost 8 per cent since. The recent acceleration is widespread across all cost components, but notably, for hospitals where annual growth of purchased inputs has accelerated

[9] Note: We draw on input-output information incorporated in the The Informetrica Model (TIM). Ambulatory care includes private and community-based nursing and residential care but also includes social assistance due to the limitations of the Input-Output Industry L096 composition. For purposes of decomposing nominal measures of Gross Output this makes it impossible to separate social assistance for the purposes of this report. However, this component – individual and family services, community food, emergency and other relief services, vocational rehabilitation and child day care services - constitutes only about one-tenth to one-sixth of GDP and Gross Output respectively.

[10] Reflecting the "public" nature of establishments, no unincorporated income is reported.

to an annual pace of 11 per cent, growth of purchased inputs in the ambulatory sector has slowed (to 2 per cent).

Table 5 Structure of Input Costs: Hospitals Sub-Sector

Indicators	1991	1998	2002	% Change in 1998	% Change in 2002
Contribution to Gross Output, %					
Labour costs	71.0	66.1	62.7		
Unincorporated income	-	-	-		
Corporate surplus	4.8	5.3	5.0		
Indirect taxes and subsidies	1.0	1.1	1.0		
Materials & services costs	23.2	27.6	31.2		
GDP, $mn, nominal	**19,589**	**20,428**	**26,224**	**4.3**	**28.4**
Labour costs, $mn, nominal	18,111	18,637	23,919	2.9	28.3
Wages and salaries	16,004	15,957	20,411	(0.3)	27.9
Supplementary labour income	2,107	2,680	3,508	27.2	30.9
Unincorporated income, $mn, nominal	-	-	-	-	-
Corporate surplus, $mn, nominal	1,219	1,486	1,914	21.9	28.8
Indirect taxes and subsidies, $mn, nominal	259	305	391	17.8	28.2
Taxes on production	259	305	391	17.8	28.2
Subsidies	-	-	-	-	-
Materials & services costs, $mn, nominal	5,927	7,781	11,900	31.3	52.9
Gross output, $mn, nominal	**25,516**	**28,209**	**38,124**	**10.6**	**35.1**

Source: I-O TIM and database (Informetrica Limited)

Table 6 reports the structure of input costs in government residential care facilities during 1991-2002. This is the most labour-intensive of the three health care sectors, with labour costs typically accounting for 70-75 per cent of all costs. Again, reflecting the "public" nature of the sector, there are no payments to unincorporated income. Returns to cover capital service are small – in the range of 3 per cent, and as is common, indirect taxes are a small component of costs – a little more than one per cent. (As is the case with hospitals, government residential care facilities do not receive recorded subsidies.) Purchased inputs are typically in the range of 20 per cent. In contrast to the hospital system, where purchased inputs have been replacing labour costs, in this sector there have been no significant changes to cost shares.

Overall costs have grown by an average of a little more than 4 per cent since 1991, or just slightly less than in hospitals. And while cost growth has also accelerated in this sector, the difference in pace between 1992-98 and for later years is less pronounced (than in the hospital sector) – from annual increases of 3 per cent to more than 6.5 per cent.

Table 6 Structure of Input Costs: Government Residential Care Facilities Sub-Sector

Indicators	1991	1998	2002	% Change in 1998	% Change in 2002
Contribution to Gross Output, %					
Labour costs	73.0	75.8	73.5		
Unincorporated income	-	-	-		
Corporate surplus	2.4	3.1	3.8		
Indirect taxes and subsidies	0.7	1.3	1.3		
Materials & services costs	23.8	19.8	21.4		
GDP, $mn, nominal	**3,465**	**4,507**	**5,708**	**30.1**	**26.6**
Labour costs, $mn, nominal	3,320	4,259	5,341	28.3	25.4
Wages and salaries	2,893	3,721	4,664	28.6	25.3
Supplementary labour income	427	538	677	26.0	25.8
Unincorporated income, $mn, nominal	-	-	-	-	-
Corporate surplus, $mn, nominal	111	174	276	56.8	58.6
Indirect taxes and subsidies, $mn, nominal	34	74	91	117.6	23.0
Taxes on production	34	74	91	117.6	23.0
Subsidies	-	-	-	-	-
Materials & services costs, $mn, nominal	1,085	1,113	1,555	2.6	39.7
Gross output, $mn, nominal	**4,550**	**5,620**	**7,263**	**23.5**	**29.2**

Source: I-O TIM and database (Informetrica Limited)

The input cost patterns during 1991-2002 are summarized in Table 7. In the last reported year, the total gross output (or measure of total costs of service delivery) of the HSD sector was reported as $80.2 billion, of which $59.2 billion was GDP and $21 billion - intermediate industry requirements.

Figure 5 Composition of HSD Input Costs in Gross Output, 2002

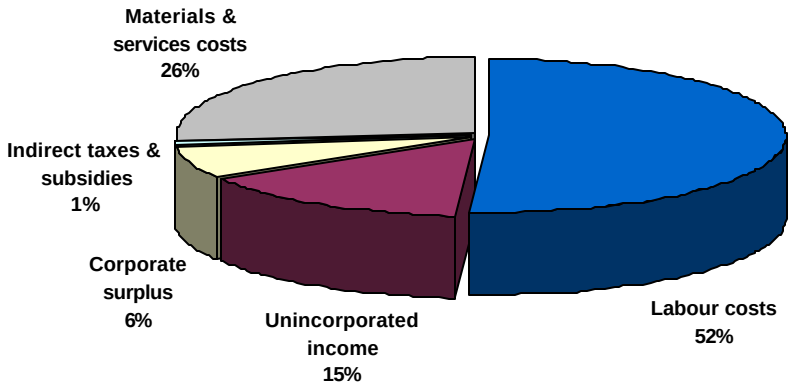


Table 7 Health Service Delivery Sector: Structure of Input Costs

Indicators	1991	1998	2002	% Change in 1998	% Change in 2002	2002 Share
GDP, $mn, nominal	**39,338**	**45,832**	**59,212**	**16.5**	**29.2**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	16,284	20,897	27,280	28.3	30.5	46.1
Hospitals	19,589	20,428	26,224	4.3	28.4	44.3
Government residential care facilities	3,465	4,507	5,708	30.1	26.6	9.6
Labour costs, $mn, nominal	**27,804**	**31,800**	**41,059**	**14.4**	**29.1**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	6,373	8,904	11,799	39.7	32.5	28.7
Hospitals	18,111	18,637	23,919	2.9	28.3	58.3
Government residential care facilities	3,320	4,259	5,341	28.3	25.4	13.0
Unincorporated income, $mn, nominal	**8,395**	**9,298**	**12,245**	**10.8**	**31.7**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	8,395	9,298	12,245	10.8	31.7	100.0
Hospitals	-	-	-	-	-	-
Government residential care facilities	-	-	-	-	-	-
Corporate surplus, $mn, nominal	**2,707**	**4,205**	**5,213**	**55.3**	**24.0**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	1,377	2,545	3,023	84.8	18.8	58.0
Hospitals	1,219	1,486	1,914	21.9	28.8	36.7
Government residential care facilities	111	174	276	56.8	58.6	5.3
Indirect taxes and subsidies, $mn, nominal	**432**	**529**	**695**	**22.5**	**31.4**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	139	150	213	7.9	42.0	30.6
Hospitals	259	305	391	17.8	28.2	56.3
Government residential care facilities	34	74	91	117.6	23.0	13.1
Materials & services costs, $mn, nominal	**11,648**	**15,767**	**21,020**	**35.4**	**33.3**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	4,636	6,873	7,565	48.3	10.1	36.0
Hospitals	5,927	7,781	11,900	31.3	52.9	56.6
Government residential care facilities	1,085	1,113	1,555	2.6	39.7	7.4
Gross output, $mn, nominal	**50,986**	**61,599**	**80,232**	**20.8**	**30.2**	**100.0**
Ambulatory health services, nursing & residential facilities, and social assistance	20,920	27,770	34,845	32.7	25.5	43.4
Hospitals	25,516	28,209	38,124	10.6	35.1	47.5
Government residential care facilities	4,550	5,620	7,263	23.5	29.2	9.1

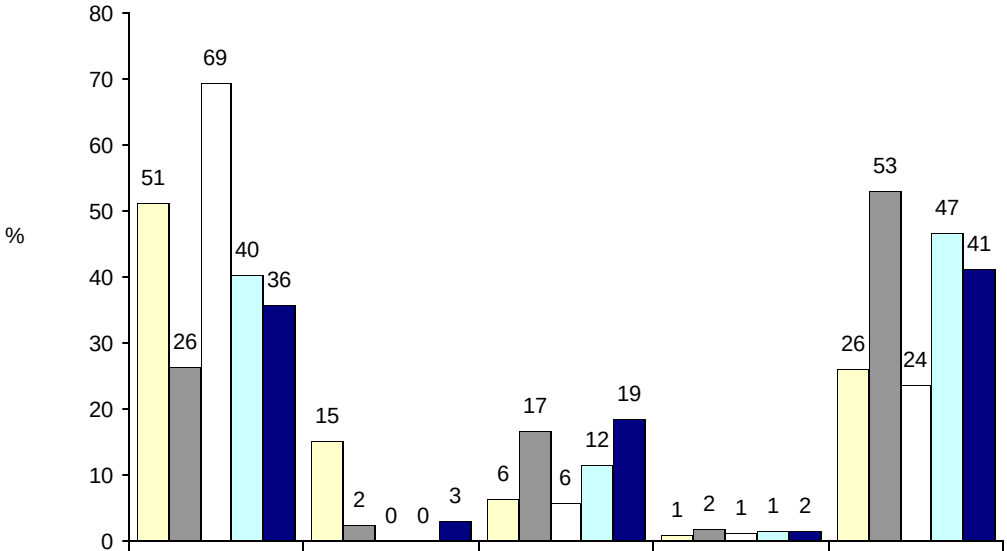
Source: I-O TIM and database (Informetrica Limited)

Across all HSD sectors compensation for labour inputs (including wages and unincorporated income) has been almost exactly two-thirds since the late 1990s, a modest reduction from earlier years. Compensating for this reduction over time has been an increase in the proportion of costs for purchased inputs, which recently have accounted for a little more than a quarter of costs. Returns, to provide for capital consumption and profits in the part of the private ambulatory

sector that is incorporated, have recently accounted for about 7 per cent of total costs, a one percentage point increase from the early 1990s.

Table 7 records the sub-sector significance for each cost component. Figure 6 compares the HSD to other sectors of the economy. The interesting comparisons in this are to major sectors either funded or operated as "public" organizations and for the most part made up of a relatively highly qualified labour force, and to a private-economy sector we have created where highly qualified labour inputs are a key characteristic. These knowledge based industries (KBI) are an aggregation of broadcasting and telecommunications, professional and scientific services, and publishing and data processing.

Figure 6 Health Service Delivery Sector: Comparison of Average Composition of Input Costs in Gross Output Between HSD and Other Sectors



	Labour costs	Unincorporated income	Corporate surplus	Indirect taxes and subsidies	Materials and services costs
HSD sector	51	15	6	1	26
All industries	26	2	17	2	53
Education services	69	0	6	1	24
Public administration	40	0	12	1	47
Private KBI	36	3	19	2	41

As this indicates,

- The HSD sector is among the most labour-intensive in the economy, matching the importance of payment to labour in education services if all (or a major proportion) of unincorporated income is regarded as a payment for labour services,

- Includes an especially large proportion of firms operating as unincorporated enterprises, which we have seen from the Business Register are predominantly micro and small firms,
- Appears not to be capital intensive, even by comparison to other service industries with highly qualified labour inputs, and
- Is among the least "specialized" sectors in the economy, in the sense that the proportion of costs derived from resources managed by the industry itself is high compared to almost all other industries in the economy.

3.2 Suppliers to Current Expenditures of Health Care Services

As the previous section has documented, only a modest proportion of health sector costs are supplied from other industries, although this has increased in recent years, largely because of changes in the hospital system. Here we indicate some of the detail of this demand, or which industries in the economy are affected by the procurement "footprint". We report this from the health industry's perspective, with figures in Table 9 representing the share of purchased inputs supplied to each health industry by those (most important) industries in the table rows. These account for 55-60 per cent of all purchased inputs.

Table 8 Health Service Delivery Sector: Composition of Top Supply Industries[11]

	Supply Industry Share in the Materials & Services Costs, %		
Industries	**Ambulatory, nursing & residential health care services**	**Hospitals**	**Government residential care facilities**
Lessors of Real Estate	11		4
Telecommunications	11		10
Operating Supplies (fictive industry)	7	4	6
Medical Equipment & Supplies	7		
Legal, Accounting, & Payroll Services	6		
Wholesale Trade	5	8	
Office Supplies (fictive industry)	4	5	
Travel & Entertainment (fictive industry)	4		
Electric Power Generation, Transmission & Distribution	4		
Offices of Physicians		10	
Pharmaceutical & Medicine		10	
Medical Equipment & Supplies		9	
Laboratory Supplies (fictive industry)		6	
Miscellaneous Ambulatory Health Care Services		4	
Cafeteria Supplies (fictive industry)			22
Other Non-Profit Institutions Serving Households			13
Postal Services & Couriers & Messengers			3
Social Assistance			3
Sub-total	**59**	**56**	**61**

Source: TIM (Informetrica Limited)

[11] Identified by the share in the intermediate industry demand (materials and services) on the basis of Input-Output Tables, System of National Accounts

Payments to lessors of real estate by ambulatory services reflects the small-business nature of this sector, and indicates that a relatively high proportion of space is leased/rented rather than owned by the proprietors. Requirements for operating and office supplies, legal, accounting and payroll services, and electric power are similar to those found in retail trade. When compared to inputs of other service industries, the requirement for telecommunications services is notably high. We surmise that this follows from high contact with patients, the need for communications between disciplines (specialist physicians and with diagnostic centres) and possibly the move to electronic records. Inputs for manufacturers of medical equipment and supplies represent requirements for current operating expenses, and would likely represent demands for maintenance of medical equipment and medical consumables used in the health care establishment. (Significant impacts on medical device manufacturers are as likely to be derived from capital formation.)

Hospitals require some standard operating inputs (office and operating supplies, wholesale trade), but are distinguished (from other sectors of health services) in their reliance on inputs from physicians, the pharmaceutical industry, laboratory supplies, and miscellaneous ambulatory services (e.g., ambulances). Combined, these inputs from other health service industries or related suppliers of medical goods and services account for two-fifths of all purchased inputs (about 12 per cent of total costs).

Government residential care facilities do not show any dependence on intra-industry (health) trade outside of a significant role played by social assistance establishments, and reaching further, non-profit institutions serving households. Their other distinguishing characteristic is the extent to which accommodation and general care information and support ("cafeteria" supplies) is needed. The relatively high proportion of costs allocated to telecommunications is notable, and high compared to other industries focussed on accommodating persons.

3.3 Employment and Labour Compensation

3.3.1 Employment – by Industry and Occupation

Health service industries are among the most labour intensive industries in the economy. Combining labour compensation (wages and supplementary payments) and unincorporated income as a share of Gross Output, only the elementary-secondary school system, urban transit, and a couple of non-profit sectors report a higher proportion of total costs as payment for labour services. This section describes the employment characteristics of health services, drawing mainly on occupational data included in the Labour Force Survey.

The proportion of total employment occupied in health services has varied within a narrow range since the mid-1980s. From a share of 7.5 per cent in 1987, the health service proportion rose to 8.2 per cent in the opening years of the 1990s as total employment fell in 1991-92 and growth of employment in health services surged in 1989-91. Recovering overall employment growth after 1993 and average growth of health services employment of only 0.1 per cent through 1998 reduced the proportion back to 7.5 per cent. Subsequent increases in public health spending have produced average annual growth in health services employment of 3.4 per cent, and restored the proportion of total employment to 8.1 per cent by 2004. We focus on the years since 1991.

Table 9 Employment in Health Services

Health Services Employment by Industry						
	2004			Growth (%)		
	000's	% of Health	% All-Economy	2004v91	1998v91	2004v98
Total Health Services	1297.4		8.1	23.4	0.9	22.2
Hospitals	580.9	44.8	3.6	3.3	-12.3	17.7
Ambulatory Services	407.0	31.4	2.6	56.1	17.4	33.0
Nursing & Residential Care	309.5	23.9	1.9	35.4	14.7	18.0
Health-wtd. Total Population				16.4	10.4	5.4
Health-wtd. Other Institutions				44.0	21.1	18.9

Source: Labour Force Survey

Since 1991, there has been a shift from employment in hospitals to ambulatory and nursing/residential care with most of this occurring in 1992-98 when hospital employment fell by 12 per cent. Subsequent to 1998, hospital employment has increased, roughly in line with overall health-service employment. Note, however, that while the cumulative effect of changes from 1991-2004 has been positive, growth has notably lagged population-based indications of an underlying growth in hospital-oriented patient demand.[12] Note also that while employment in other health services sectors in 1992-98 was increasing, the downsizing of hospital employment was so severe that overall health service employment essentially levelled off while the population indicator of demand for services grew by 10 per cent.

[12] As an approximation to this, population is weighted for health spending by age (ten year age groups) and sex for 2000, where expenditures were reported in **Health Expenditures by Age and Sex, 1980-81 to 2000-01**, Health Canada.

The shift away from hospital employment has been principally to ambulatory services as its share of health services employment has increased from slightly less than 25 per cent in 1991 to a current 31 per cent. Note too that while employment in nursing and residential care rose steadily over the years since 1991, its growth lags health-weighted indications of growth in the (mainly elderly) population that should underpin demand for such services.[13]

The reduction of health services employment in the 1990s and subsequent recovery in numbers has not been shared equally across occupations, and reflects the nature of adjustments that have been occurring in the institutions delivering health care. In the tabulation below, we summarize changes by aggregating the detailed occupations available from the Labour Force Survey.[14]

Table 10 Health Service Employment by Occupation

Health Services Employment by Occupation						
	2004			Growth (%)		
	000's	% of Health	% All-Economy	2004v91	1998v91	2004v98
Physicians, Dentists And Veterinarians	87.7	6.8	88.3	39.2	14.1	22.0
Other Professions	116.4	9.0	10.0	57.1	21.5	29.3
Nurse Supervisors & Registered Nurses	242.9	18.7	94.1	12.4	-2.9	15.8
Technical & Health Assisting	468	36.1	29.6	45.2	4.0	39.6
Clerical, Secretaries, Other Administrative	198.1	15.3	7.8	19.3	-1.4	21.1
Food, Cleaning & Other Services	107.7	8.3	6.5	-5.1	-17.6	15.2
Other	76.6	5.9	0.9	-20.7	0.9	-21.4
Managers	49.4	3.8	3.0	-5.7	2.9	-8.3
Miscellaneous	27.2	2.1	0.4	-38.5	-1.4	-37.6

Structural change in health care in the form of a move to more outpatient surgery and other services, shorter hospital stays and bed closures in the hospital system appear to have produced a sharp reduction in "catering" (food, cleaning, etc.) services and related employment and to have reduced the institutional requirements for administrative support occupations in 1992-98. More recently, and starting from reduced levels, as governments have increased spending, these occupations have grown. For nurses, technicians, and health assisting occupations (e.g., nurses aides, orderlies) the connection between the indicated view of "structural change" and either small reductions or very little growth over 1992-98 is less clear, and likely reflects at least partly the general move away from hospital to ambulatory and residential care. Employment of nurses, technical and assisting staff has recovered growth since 1998, with employment in "assisting" occupations and "technical" occupations (e.g., computer and information specialists) increased

[13] Through the 1990s, growth in demand was underpinned as the "baby boom" that followed World War I reached their mid-70s and older years of age. The "baby boom" that followed World War II will not reach these senior ages until the end of next decade. In the interim, lowered fertility rates and immigration during the Depression of the 1930s should slow underlying growth of demand moderately.

[14] "Other Professions" aggregates psychologists and social workers, therapy and assessment professionals, optometrists, chiropractors and other health diagnosing and treating professionals, pharmacists, dietitians and nutritionists, physical science and computer professionals, and writing, translating and public relations professionals. "Technical and Health Assisting" sums up employment in assisting occupations in support of health services, technical and related occupations in health, social service workers, technical occupations in computer and information systems, and creative designers and other technical occupations in arts and culture. Detailed definitions of the Standard Occupational Classification (1991) are available at: http://www.statcan.ca/english/Subjects/Standard/soc/1991/soc91-menu.htm.

most vigorously. Finally, we note a recent reduction of employment among "management" occupations.[15]

Growth of physicians, dentists, and veterinarians has been steady since the early 1990s, exceeding the indicated growth in the population weighted for health care spending. There has been a rapid growth of "other professions" since the early 1990s with increases in the number of psychologists, optometrists, chiropractors, therapists, social workers and assessment professionals especially vigorous. Also recording especially rapid growth are those employed in "administrative and regulatory occupations". Although CIHI spending accounts specify that expenditures for "administration" are additional to spending on physicians and hospitals, we speculate that this increase of administration in health services *may* be an indirect consequence as service providers add staff to respond to increased reporting and regulatory requirements.[16]

Downsizing of overall health services employment in nursing, technical and assisting, clerical and other administrative occupations and those in "catering" services over 1992-98 is largely a story of reductions in the hospital system.[17]

Table 11 Hospital Employment by Occupation

Hospital Employment by Occupation						
	2004			Growth (%)		
	000's	% Hospitals	% of Health	2004v91	1998v91	2004v98
Physicians, Dentists And Veterinarians	18.1	3.1	20.6	39.2	3.8	34.1
Other Professions	49.6	8.5	42.6	51.7	0.6	50.8
Nurse Supervisors & Registered Nurses	179.5	30.9	73.9	4.5	-8.1	13.8
Technical & Health Assisting	164.1	28.2	35.1	5.5	-14.5	23.3
Clerical, Secretaries, Other Administrative	84.7	14.6	42.8	6.0	-10.4	18.3
Food, Cleaning & Other Services	47.1	8.1	43.7	-24.9	-27.9	4.2

Hospital employment in nursing, technical, clerical and catering services in 1998 was reduced by 62,000 compared to 1991. For all health services, employment in these occupations was reduced by 16,000. Note, however, that there also was "restraint", although less severe, in the growth of physicians and other professions during that time frame. Subsequent to 1998, hospitals have been increasing employment (from the reduced levels of 1998) in almost all categories, except for "catering", indicating the "new" system of a shift to out-patient care, bed closures, shorter

[15] We have summed those of managers in health, education, social and community services, finance and insurance administration, specialist managers, service supervisors, and senior managers.

[16] Since CIHI indicates that such expenditures lie outside of those for hospitals, physicians and other forms of health service care, we infer that such spending is concentrated in the growth of regulatory, information and government services, and that increases of these occupations in the health delivery system are an indirect response to increased activity in government and regulatory agencies. Changes to employment in this and the "miscellaneous" category should be treated with caution as LFS appears to have reassigned relevant occupations to different industries in recent years. Further work in this area may be warranted, but note that the managerial and miscellaneous occupations account for a relatively small proportion of health services employment.

[17] Within the health services system, we have separately reviewed occupational data for hospitals, ambulatory care, and nursing/residential care. For most occupations, the sum of each occupation's employment for the three services is equal to an aggregate measure available from LFS data, but data are not consistent for "other" categories. Accordingly, we have omitted this from discussion on the three categories of service.

hospital stays has been made "permanent" or that any requirement to provide such services is being "outsourced".[18]

Compared to health services as a whole, employment of physicians, nurses and other professions in Nursing and Residential Care is a small proportion (one-sixth compared to one-third) of total sector employment indicating that the requirement for highly qualified "medical" inputs is less intense than in other sectors of health delivery. This noted, during the 1991-98 downsizing of the hospital system, the nursing and residential care institutions increased the number of nurses and other professions employed, thereby providing a very small offset to the reduction in nurses and other professions in hospitals.

Employment of technical and health assisting occupations (one-half of all employment) has grown steadily since the early 1990s, at or above the pace of growth of the populations weighted for expenditures relevant to these kinds of institutions.

Table 12 Nursing/Residential Care Employment by Occupation

Nursing and Residential Care Employment by Occupation						
	2004			Growth (%)		
	000's	% Resident.	% of Health	2004v91	1998v91	2004v98
Physicians, Dentists And Veterinarians	0	0.0	0.0			
Other Professions	17	5.5	14.6	27.8	23.3	3.7
Nurse Supervisors & Registered Nurses	35	11.3	14.4	24.6	9.3	14.0
Technical & Health Assisting	157.5	50.9	33.7	69.2	27.3	32.9
Clerical, Secretaries, Other Administrative	8.9	2.9	4.5	-21.9	12.3	-30.5
Food, Cleaning & Other Services	57.5	18.6	53.4	26.9	-9.1	39.6

If there is little opportunity to move to an out-patient delivery system or to bed closures (structural change indicates a move from hospitals to long-term care), then the reduction in employment of those providing catering services during 1991-98 is surprising. More recently, employment in these occupations has been rising rapidly. A recent reduction in clerical and other administrative staff is also notable, but is a small proportion of the sector's overall staff requirements.

Table 13 Ambulatory Care Employment by Occupation

Ambulatory Care Employment by Occupation						
	2004			Growth (%)		
	000's	% Amb. Car	% of Health	2004v91	1998v91	2004v98
Physicians, Dentists And Veterinarians	69.6	17.1	79.4	40.9	15.6	21.9
Other Professions	43.1	10.6	37.0	96.8	64.8	19.4
Nurse Supervisors & Registered Nurses	28.3	7.0	11.7	74.7	31.5	32.9
Technical & Health Assisting	142.2	34.9	30.4	103.1	15.4	76.0
Clerical, Secretaries, Other Administrative	101.5	24.9	51.2	39.4	7.1	30.1
Food, Cleaning & Other Services	2.8	0.7	2.6	-48.1	-9.3	-42.9

Based on employment, close to two-thirds of ambulatory care services are provided through offices of physicians, dentists, optometrists and other health practitioners. One-sixth are out-

[18] A small increase in the share of intermediate inputs as a proportion of total costs of hospital delivery suggests the latter possibility, but would need to be confirmed by more detailed study than we can undertake for this report.

patient care centres focusing on a variety of specific support. Close to 10 per cent supply home health care and the balance (less than 10 per cent) supply diagnostic, ambulance, and miscellaneous services. This sector has seen the most rapid overall employment growth since the early 1990s, and it grew steadily during 1991-98 when the hospital system was being downsized.

Employment growth of those with highly qualified medical or other professional credentials has been steady since the early 1990s, with increases in those providing therapy and assessment the most rapid (more than doubled since 1991).[19] An even more rapid growth has occurred in technical and health assisting occupations, but as this growth appears to have occurred outside of physician offices, it is likely that growth in these occupations has been concentrated in out-patient and diagnostic laboratory services. Clerical and other administrative support appears to have grown in line with overall expansion of the sector. A reduction in catering occupations occurred, but is not traditionally related to services provided in the sector, and is in any case, an insignificant proportion of the sector's employment.[20]

[19] Review of data for physician offices indicates that employment of physicians (dentists, veterinarians) increased 56 per cent over 1992-2004. Given the industrial definition, one may reasonably suppose that these are all physicians. We note, however, that this portrays a distinctly different picture than is indicated by reports from the National Physician Database (CIHI). Comparing total numbers of fee-for-service physicians in the CIHI report for 2002-03 compared to those of 1996-97, yields an increase of 7.5 per cent, or average growth of one per cent. Over the same period, the LFS reports an increase in "physicians, dentists, and veterinarians" employed in the industry "Offices of Physicians" of 50 per cent or annual growth of almost 6 per cent. The Physician database counts physicians who have received payments from a provincial fee-for-service plan.

[20] With catering employment reduced in health services overall, and increases in residential care only partly compensating for the reductions in hospitals, it may be reasonably inferred that a consequence of structural change has been to shift much of the financial burden of such downsizing onto the incomes of households (and possibly government agencies outside of the health care system). If so, it is also reasonable to surmise that this form of spending (counted as "Health" expenditure if made inside the institutional system) is omitted from CIHI and other health expenditure accounts. If so, then in this sense the CIHI health expenditures understate the level of health expenditures.

3.3.2 Wages and other Compensation for Labour Inputs

Because physicians and other health professionals are compensated as unincorporated businesses, and this form of compensation is significant (equivalent to wage and other compensation payments in the ambulatory care system), we optionally included this as a compensation for labour services in the table below, recognizing that some element of this will also represent a "return" for fixed capital. As this indicates, payment for labour services in the health services sector as a whole currently accounts for almost 8 per cent of total economy compensation, or 7 per cent excluding payments as unincorporated income.

Relative to the economy as a whole, the proportion of compensation of all forms in the hospital system is the same as the sector's share of employment. The income proportion in the rest of health services is modestly smaller than its share of employment, indicating overall compensation rates that are below the total economy norm.

Table 14 Compensation for Health Services Labour

Compensation for Labour, 2004
Labour Income plus Unincorporated Income

		Share	
	($ Bns)	Total Economy	Health Income
Labour income + Unincorporated Income			
Total Health Care	57.1	7.8	
Hospitals	26.1	3.6	
Non-Hospital	31.0	4.2	
Ambulatory Care & Pvt. Residential	25.0	3.4	
Government Residential	6.0	0.8	
Wages & Supplementary			
Total Health Care	44.5	6.9	78.0
Hospitals	26.1	4.1	45.8
Non-Hospital	18.4	2.9	32.2
Ambulatory Care & Pvt. Residential	12.4	1.9	21.8
Government Residential	6.0	0.9	10.5
Unincorporated Income			
Total Health Care	12.6	15.0	22.0
Hospitals	0.0	0.0	0.0
Non-Hospital	12.6	15.0	22.0
Ambulatory Care & Pvt. Residential	12.6	15.0	22.0
Government Residential	0.0	0.0	0.0

Labour Income = Wages plus supplementary

Distinctions within the health care system follow from variations in the tenure structure of employment, which impacts the extent to which employees are covered by supplementary labour income payments or not, the extent to which sectors are unionized or not, other considerations – extent of overtime, etc. – and of course, the nature of occupations employed in the sector. The

table below provides a view of average wage payments[21] for component industries of health services, and related measures indicating the structure of employment.

Compared to the economy as a whole, weekly earnings are relatively high in hospitals, out-patient care centres, medical and diagnostic laboratories, and other ambulatory care (e.g., ambulance services).

- Relatively high earnings in the hospitals likely reflects more highly-qualified occupations (the proportion of employment accounted for by physicians, other professions and nursing staff is about 10 percentage points higher than in health services generally), a high proportion of union membership and close to the all-economy norm for the proportion of employment that is full time.

- Relatively high earnings in out-patient care centres (a small industry) likely reflects few employed in "catering" occupations, and an above-average share of union membership, but the proportion of full-time employees is below average.

Table 15 Wage Compensation and Employment Structure in Health Services

Health Care Services: Wage Rates and Employment Structure, 2003					
		% of employed			
	Avg. Weekly Earnings	Full Time	Part Time	Union Members	Self-Employed
All Industries	$663.48	81.2	18.8	25.6	15.3
Health Care	$643.63	73.3	26.7	53.0	9.5
Ambulatory Health Care Services	$573.05	70.0	30.1	14.0	27.4
Offices of Physicians	$474.67	72.3	27.6	2.0	40.9
Offices of Dentists	$582.56	72.2	27.9	2.9	19.9
Offices of Other Health Practitioners	$492.53	60.7	39.3	3.5	44.5
Out-Patient Care Centres	$771.90	70.4	29.8	41.1	19.0
Medical & Diagnostic Laboratories	$689.75	78.2	22.2	22.2	0.0
Home Health Care Serv.	$505.79	64.0	36.0	34.5	3.6
Other Ambulatory Health Care Serv.	$766.67	82.8	17.2	65.7	0.0
Hospitals	$755.93	77.6	22.4	78.6	0.0
Nursing & Residential Care Facilities (1)	$513.82	69.2	30.8	55.0	3.7

Pvt. & Government Residnetial Combined
Source: Labour Force Survey

- Relatively high earnings in medical and diagnostic laboratories likely follow from the high concentration of managers and medical technologists and technicians (two-thirds of total industry employment). The extent of full-time and unionized employment is close to economy-wide norms.

- Similarly, relatively high earnings in other ambulatory services probably reflect a high concentration of technical occupations (two-thirds of the total). The extent of unionization in the industry is also well above economy-wide norms.

[21] Supplementary income payments and unincorporated income would be excluded.

- Comparatively low wage earnings in the offices of physicians, dentists and other health practitioners, reflect a high proportion of the staff occupied in clerical and administrative occupations, and a relatively high proportion of part-time employment. (Recall that these are industries with a high degree of self employment and compensation in the form of unincorporated income, so that earnings are focussed in support for the lead professionals. Unionization is close to non-existent in these forms of health delivery.)

- Four-fifths of staff in home-care delivery is nursing and health assisting occupations, but a notably high proportion of employment is part-time. Although more unionized than the economy-wide norm, the proportion is lower than in health services as a whole. In any event, wage compensation is notably below the norm for health services as a whole.

- Relatively low levels of earnings in residential and nursing care may reflect the fact that three-fourths of the staff is in assisting and "catering" occupations. Although relatively highly unionized, part-time employment is also relatively high. We estimate from the Business Register that three-fourths of such facilities are non-governmental.

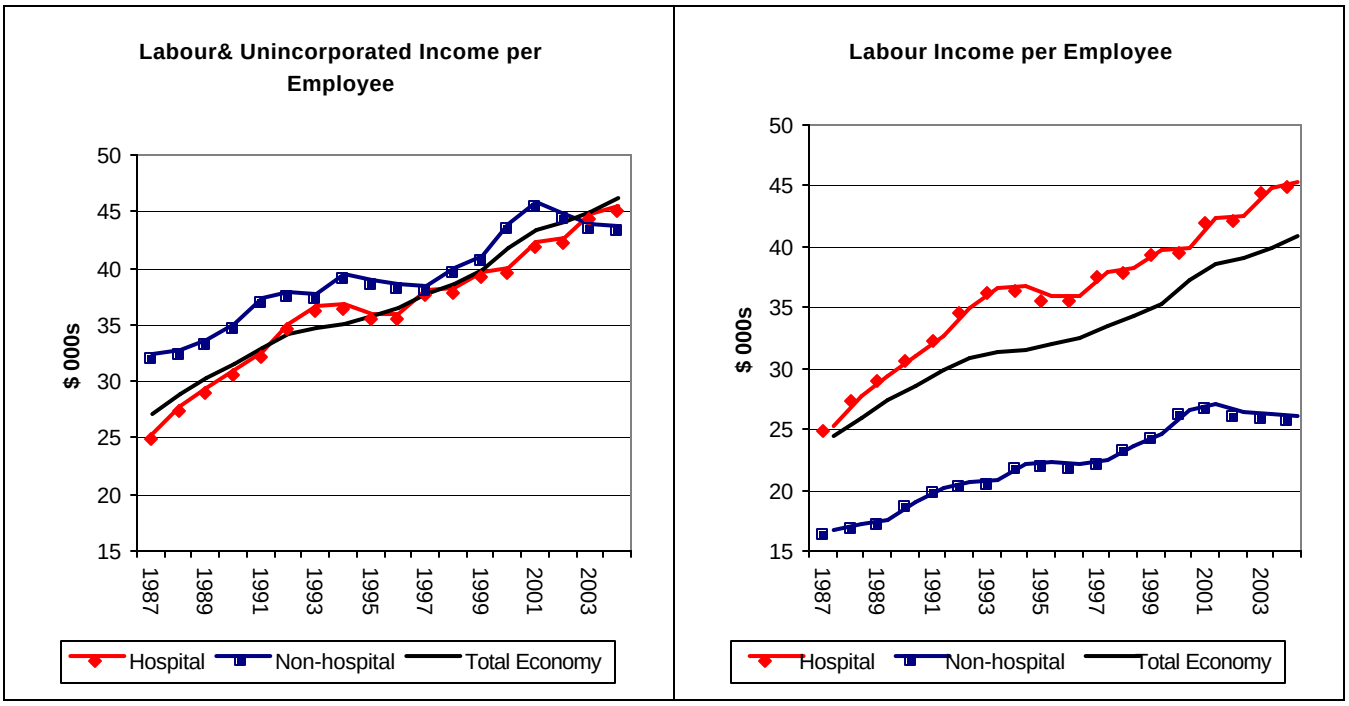
We cannot readily report changes in compensation over time at a detailed industry level, but report below changes for the hospitals and all other care combined. As this indicates, relative (to an economy-wide norm) compensation to labour inputs, including unincorporated income, has narrowed for the ambulatory care and residential sectors over the last, almost twenty years. The narrowing was most pronounced during the period of general restraint on health spending in 1992-98, and reflects both relatively slow growth of wage (and supplementary benefits) compensation, and indicated restraints in health services on growth of unincorporated income. (The proportion of total economy unincorporated income accounted for by ambulatory services was reduced from almost 22 per cent of the total in 1991 to 16 per cent by 1998.[22] There appears to have been little change to the proportion subsequently.) Compared to this measure of compensation, changes in the hospital system have essentially matched changes in the economy as a whole through almost all of the past two decades.

Data on compensation in the form of wages and supplementary benefits suggests that per employee payments in the hospital system have grown more rapidly than those of the economy as a whole since the mid-1980s, with a relatively strong rise at the opening of the 1990s likely reflecting more severe business-cycle effects on wages generally than in the hospital system. Following an adjustment in relative compensation at mid-decade (including reduced hospital compensation rates over 1994-96), compensation change in the sector has approximately matched that of the economy as a whole. Keep in mind that this is a period when the occupational data suggests the burden of employment downsizing was concentrated on employees with relatively low compensation *levels*. Other things equal, this should push the average sector measure of compensation rate up. This suggests that compensation rate increases were being restrained over

[22] The growth of physicians and other professional health services employment far exceeded that of total employment during this period. Combined with the sharp decline in the proportion of unincorporated income accounted for by the sector, this suggests the possibility of special restraint on net incomes of proprietors in health services. But we cannot conclude this authoritatively with the data available to us.

a wide range of occupations during the period of general downsizing of health spending. Since there is little evidence of a changing occupational mix in more recent years, growth of sector compensation at close to that of the economy as a whole indicates there are no special changes to occupational wage rates occurring.

Figure 7 Health Services Compensation for Labour Over Time



For the reasons reviewed above, wage rate compensation in the non-hospital system is low by comparison to the economy as a whole (and ranking it with other "low wage" sectors). Aggregate data suggest that there was some narrowing of the gap in the late 1990s, but official data for 2002, and Informetrica estimates of compensation in 2003-04, suggest a more recent retreat in relative compensation.

Although more detailed review of changes to occupational compensation for each of the health sectors that operate in distinct "markets", and of returns in the form of unincorporated income detailed by health profession would be required to provide authoritative answers, we conclude from this review of aggregate data that any future focus on reducing health care costs through programs that restrain compensation would be likely to yield very limited results. If so, then cost reduction would have to focus on what services are delivered by what sectors using what occupations. This "real" side focus is obviously far more complicated, especially when seen through the lens of health outcomes as a standard for measuring "productivity".

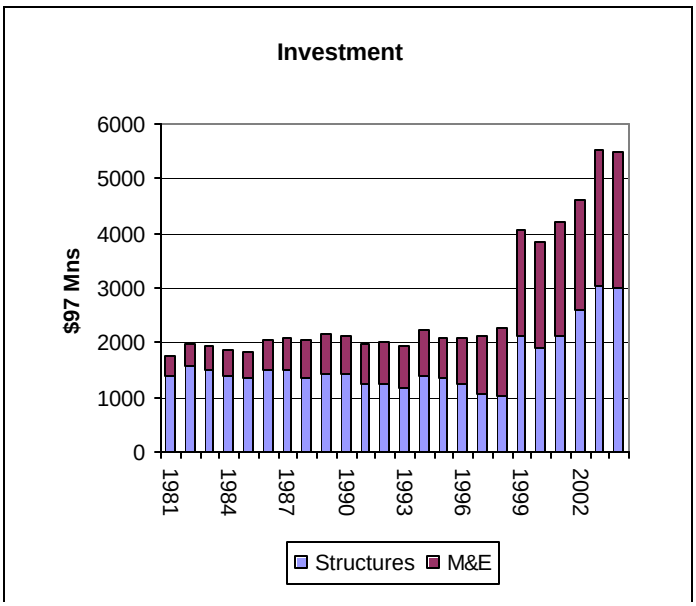
3.4 Capital Formation

The impact of health services on the economy as a whole extends beyond current operations through capital formation. Here we use data developed by Statistics Canada to detail investment and the capital stock available to health services.[23] At 3 per cent, as a share of total non-residential investment in the economy, industry investment is smaller than its proportion of output or employment. Spending impacts on supplying industries are generally small or modest, with demand on furniture manufacturers a notable exception.

Table 16 Capital in Health Care

Health Services: Investment and Capital Stock								
	Investment (Avg 99-04)		Growth ($K)					
		Share of	Investment			Net Stock		
	$C (Mns)	Economy	1992-04	1992-98	1999-04	1992-04	1992-98	1999-04
Total	4831	3.0	8.1	1.8	16.0	3.5	1.3	6.1
Structures	2796	4.0	7.0	-2.6	19.3	2.3	0.7	4.2
Commercial Buildings	53	0.4	12.2	6.8	18.7	3.4	2.9	3.9
Institutional Buildings	2744	34.1	6.9	-2.7	19.4	2.3	0.6	4.3
Machinery & Equipment	2035	2.2	9.8	7.3	12.6	9.1	5.2	13.8
Computers & Related Equipment	303	3.0	25.4	38.3	11.9	28.7	32.7	24.2
Furniture	260	6.5	4.7	-5.3	17.6	5.3	3.3	7.7
Software	245	1.8	12.9	13.8	11.7	14.4	13.1	16.0
Other	1167	1.8	6.8	2.8	11.6	7.2	2.9	12.5

Figure 8 Investment Over Time



The essentially unchanged levels of overall sector real investment in 1992-98 suggest that this period of general restraint affected capital formation as well as current spending. But the figure here indicates that this period of unchanged investment spending extended further back in time suggesting there was no particularly severe effect on capital spending in health services. Reduced levels of investment on buildings, and on spending for furniture and other machinery in the middle of the decade may represent an adverse consequence of the period of general restraint, but accelerated spending on information technologies from 1996 forward may reflect an initial positive

[23] Data used in this report includes capital formation and the capital stock covering Social Assistance as well as Health Services. Given the small size of the Social Insurance industry and the labour intensity of its components (e.g., Family Services, Relief Services, Vocational Rehabilitation and Child Day Care Services) we conclude that the data are representative of trends applicable to Health Services alone. Small annual differences between CIHI estimates of capital formation and data employed here suggests the same conclusion.

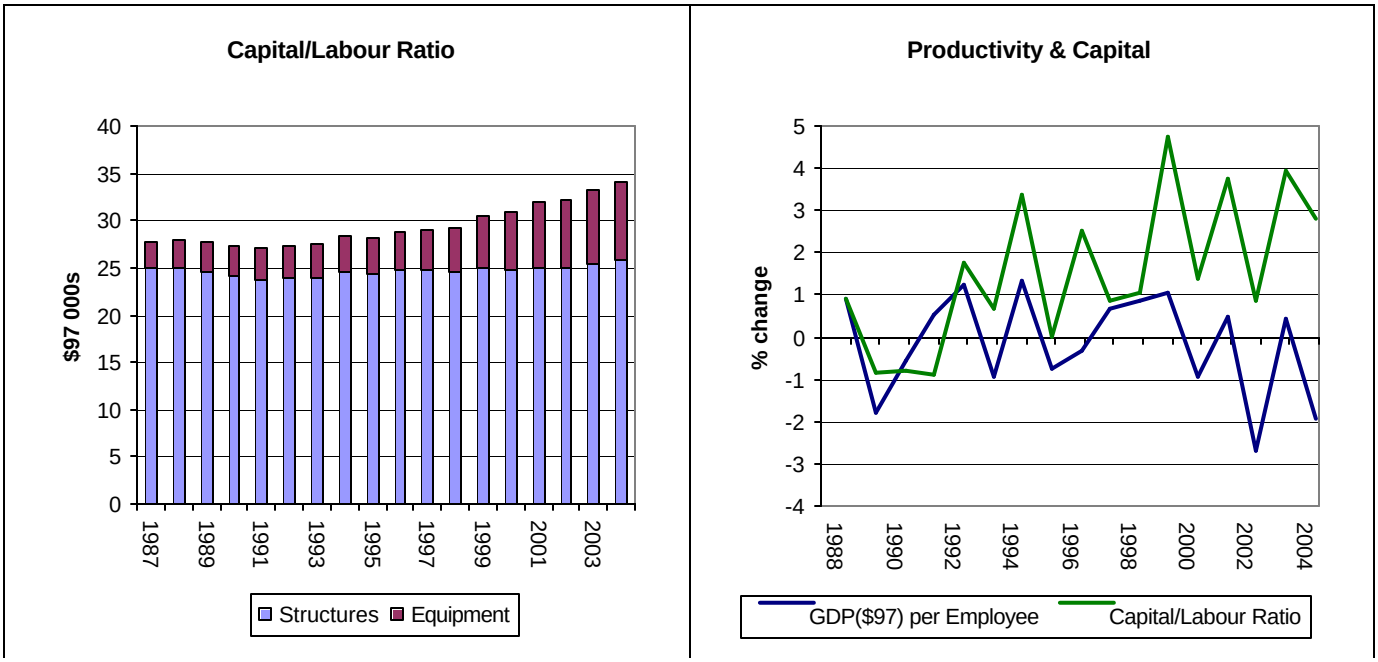
effect of "structural reform" as the sector moved to strengthen its information infrastructure.

One other feature of this period is notable. Reduced spending on institutional buildings while spending on commercial buildings grew robustly is roughly consistent with the shift of service delivery from the hospital to ambulatory care. Note, however, that such spending and the capital stock consequences of this as an indicator of capital available to ambulatory care is only a rough proxy. This is suggested by the fact that the single largest payment (11 per cent of the total) of the ambulatory care industry for intermediate industry inputs is made to "Lessors of Real Estate (NAICS 5311)". Generalizing, leasing of equipment is also likely significant in this small-business context. It may also apply to hospitals and both the public and private residential and nursing care sectors but we speculate that it may be less significant.

This caveat noted, measures of real net capital stock suggest that the capital available to health services grew during 1992-98, if very slowly in institutional buildings where moves to out-patient delivery and bed closures are at least consistent with this indicator. Beginning in 1998, investment was increased to a new, much higher level of spending, with this widespread among the types of assets being purchased. Growth of spending on information technology has been notably rapid. [24]

3.5 Output per Employee

Figure 9 Labour Productivity and the Capital-Labour Ratio



[24] A sharp spike in spending on computers and software in 1998 and 1999 occurred. While this might represent an increased emphasis on health-system information, it may well represent a response to "Year 2000" conversion problems as a "spike" in such spending was characteristic of such spending across the economy as a whole. A reduction to lower levels of spending by health services in 2000-02 is also consistent with this thesis.

Notwithstanding an apparent, increased capital intensification of health services in the last six years, conventional measures of real GDP per employee suggest that there has been erosion in the level of output per employee. There are important caveats to this view of change in sector productivity. Others at the workshop will focus more directly on the issue, likely moving the discussion to measures in terms of health outcomes.

Here we note difficulties that derive from the conventional measurement system.

- The employment measure we have used is from the Labour Force Survey. This does not weight total employment for part-time/full-time/over-time employment, nor do we use employment hours as a labour input measure. An alternative measure of employment is used by Statistics Canada to measure sector productivity. Levels of employment are distinct (higher) from those available from the LFS, but we note that changes over time between the two measures are similar.

- Deflation of Gross Domestic Product or Gross Output, likely a preferable indicator,[25] as the measure of output is a significant challenge, given the changing institutional mix of delivery, major shifts in occupations, and wide variance in compensation rates between occupations. This suggests that a high degree of sector dissaggregation will be important to developing improved measures.

[25] For Gross Output, given a debate about the extent to which pharmaceutical and other medical inputs affect outcomes

4 Health Service Prices over Time

Figure 10 Health Service Deflators

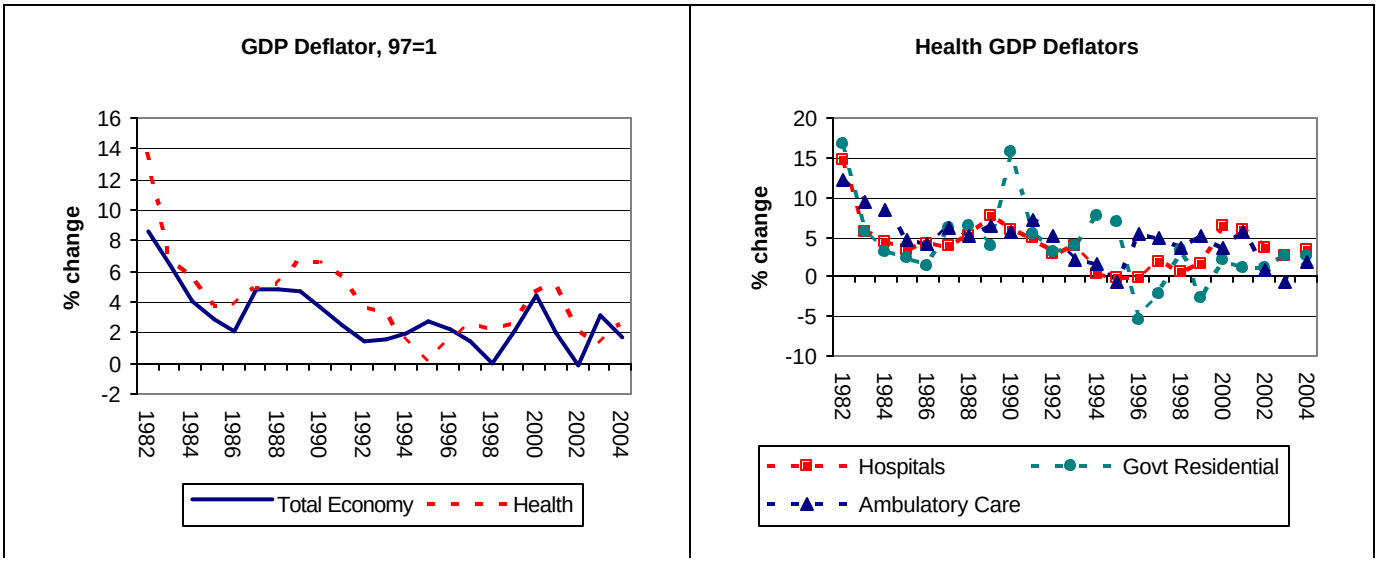


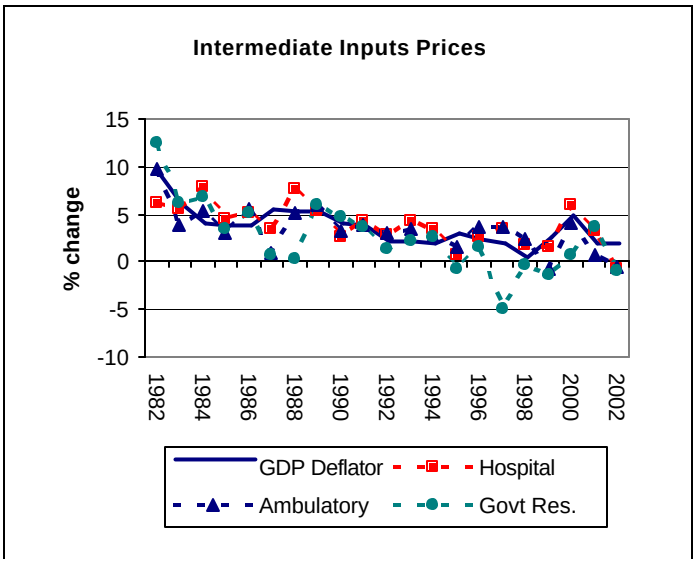
Figure 8 represents changes to GDP deflators (effectively, the sum of unit labour and capital costs of production) of the health sector overall, and the three institutional segments of the sector for which detailed components of GDP can be consistently identified. The following points stand out.

- The year-to-year pace of change in the health deflator decelerated slowly in the early 1990s to a generally slower pace since, as has been the case for price changes in the economy as a whole. This slowed growth in the 1990s is apparent in all major component industries of health services. The important message of this is that growth of prices in health care necessary to cover input costs over the longer terms are not an "island unto themselves". Although "special" considerations may apply to the supply of highly qualified professionals, and the nature of the capital required to deliver health care, sector changes in wage compensation and supplementary labour costs, returns to proprietors, and costs of capital are determined (probably rather more than less) by factor markets in the economy. Further, there have been no previous major and special impacts from changes in indirect taxes and subsidies that directly affect sector costs.

- The growth of the GDP deflator for health care services as a whole is typically more rapid than growth of prices generally. This was the case in the 1980s and through the 1990s, although the "premium" in health care has narrowed in the 1990s. Given the labour-intensive nature of production in health services, this should be expected since, in the long-run, growth of compensation for labour inputs should exceed that of prices generally so long as productivity change is positive – it usually is.

- Averaged for 1982-91, 1992-98, and 1999-2004, annual growth of the GDP deflator of ambulatory services has been from 0.8 to 1.8 percentage points more rapid that the general-economy GDP deflator. Detail suggests this durable, "premium" growth characteristic is true of its components – physician, dental, and other services. Price (more properly, unit cost) growth of government residential and nursing care is volatile (subject to periodic sharp acceleration and deceleration), and has recently been growing more slowly than general prices.[26] Growth of the hospital deflator during 1992-98 matched the pace of prices generally; more recently, there has been a "premium" – 2 percentage points.

Figure 11 Prices of Purchased Inputs



In the long run, the "price" required to cover costs of health service delivery will also reflect the approximately one-fifth of costs purchased from supplying industries. Here we have weighted (see Section 3.2) the domestic selling prices for each health-service industry to provide an estimate of price changes of purchased materials and services relevant to the health industry.[27] Again, note the general deceleration from the 1980s to 1990s, indicating again that costs and prices of health care are sensitive to conditions outside of the sector.

The key findings are:

- Prices for purchased inputs of hospitals typically rise more rapidly than those of the other two sectors (although in 1992-98 increases in ambulatory care were the same). This follows from the relatively high proportion (36 per cent) of inputs purchased from physician services, pharmaceuticals, medical equipment, and laboratory "supplies". Among the several industries that are significant suppliers to health service industries, selling prices of these industries have tended over the past twenty years to rise relatively fast. We note, specifically, prices of pharmaceuticals, which we estimate grew by an average of almost 5 per cent in 1999-02. (In this arithmetic, we do not distinguish by "type" of drug - over-the-counter or prescribed- and recognize that this would ignore "health outcome" implications for measures of price.)

- From average growth of 5 per cent in the 1980s, we estimate that annual increases in prices of purchased materials and services in the government residential sector have slowed to less than one per cent in the 1990s with this extended into the first years of this

[26] Estimates for 2003 and 2004 are subject to revision.
[27] We have shortened the time coverage to end in 2002, given the sensitivity at the underlying high level of detail to revisions in the data.

decade. This reflects the relatively high weight for this service of purchases from "cafeteria" supplies[28], non-profit agencies serving households, and telecommunications, where secular technological gains (and increased market competition) are producing falling absolute prices.

- We estimate that prices of purchased inputs in ambulatory care grew at an average pace of 4.6 per cent in 1982-91. This slowed to 2.9 per cent in 1992-98, and for 1999-02 was reduced sharply to less than one per cent. As outlined earlier, the sector's outputs are similar to those of retail trade. Estimates for recent years suggests declining prices for payments to "lessors of real estate" and for telecommunications. For the former, variations between provinces and communities are likely to be sharp.

5 Contribution of Sector to Government and Other Incomes

It is a common feature of discussion about the sustainability of health care to see the issue as one in which (government) spending for health care occurs at the expense of other expenditures. This leaves aside possible positive effects on economic activity (and government revenues) of any consequent improvement in the health of the workforce, positive implications for participation rates, and reduced health spending because of reduced morbidity. We leave measurement of such effects to others focussed on health outcomes, but here focus on measurable consequences for incomes that follow from increased spending on health services.[29]

To measure impact magnitudes and illustrate the channels of effect, we employ The Informetrica Model (TIM) of the economy. We have assumed that expenditures are increased by $1 billion in 2005, with this decomposed as a "traditional" 70/30 split between public and private spending. Specifically, we have assumed that provincial governments increase spending on health care by $700 million, almost all of which is channelled directly to hospitals, ambulatory care, and government residential and nursing homes. Increasing spending at the provincial level reflects the fact that the predominant share of government spending on health care is managed by the provinces, with federal spending on defence, and aboriginals and municipal spending on long-term care relatively small by comparison (about 7 per cent of public spending). Spending by social insurance funds (Workers Compensation Boards and the Quebec Drug Insurance Fund) are expenditures of provincial governments. Consumer spending on health care is increased by $300 million, with this directed to spending on medical care.[30] The impact on public sector balances is reported in Table 9.

[28] Cafeteria supplies are a "fictive" industry in the accounting framework that reflects a weighted combination of mainly food manufacturing industries.

[29] We assume here that there is "slack" in the economy. Arguably, if the economy is operating at full employment, then increased spending would simply impact nominal incomes (with distributional implications) but lead to no consequent increase in real incomes. As sustainability is a long-term issue, it may be noted, on the record, that on average there is slack in the economy.

[30] Consumer spending on drugs and for accident and health insurance is unchanged so that direct impacts of household spending are channelled solely to health services.

Table 17 Health Spending Increase: Impact on Public Sector Balances

Public Balances Impacts of $1 Billion Increase in Spending for Health Services in 2005 ($mns, Nominal)		
Federal Balance	**264**	
Revenues	206	60%- income taxes, 11%- contributions, 25%- indirect
Expenditures	-58	-$70 Mn Transfers to Persons (EI & GST Credit)
Provincial Balance	**-514**	
Revenues	181	28%- income taxes, 41%- indirect, 26%- federal transfers
Expenditures	695	$700 Mn "shock" offset partly by $35 Mn Reduced Welfare
Municipal Balance	**5**	
Revenues	7	
Expenditures	2	
CPP/QPP Balance	**19**	
Revenues	19	
Expenditures	0	No significant impact on CPI

The major points to note are the following.

- The federal government (and the two main public pension systems) are net beneficiaries of the spending undertaken by households and provincial governments. (We have assumed that provincial actions are "unilateral" in that there are no changes in federal transfers to provinces.) Positive effects are mainly from the revenue side, but there are also reduced expenditures from an improved state of labour markets. Municipal governments are also small net beneficiaries; we assume that provincial transfers to municipalities are not changed because of improved revenue conditions for municipalities or because of direct negative consequences of the health spending for provincial balances.

- Provincial balances are unfavourably affected, but by less than the original expenditure of $700 million. The major offset is from the revenue side, but we expect there would be some modest expenditure offsets – mainly from reduced welfare/relief payments.

- We estimate that taxes on production (e.g., employer contributions, property taxes, and GST/HST) accounted for by the three health service sectors would be a little less than $20 million. In addition, sector-related personal and corporate direct taxes should be noted. We do not account for these directly, but note that approximately two-thirds of the addition to personal income is centred in labour and unincorporated income paid in health services. Although a less precise indicator, positive impacts on sector corporate surplus are equivalent to one-sixth of the improvement in before-tax business saving.

Financial offsets for governments of the original spending follow from increased economic activity and strengthened private incomes. We estimate that real economic activity would be increased by the $1 billion spending by 0.9 per cent with employment increased by a similar proportion - 16,000 person years as a level impact. Table 10 details implications for sector incomes.

Table 18 Health Spending Increase: Impact on Sector Incomes

Major Domestic Sector Impacts of $1 Billion Increase in Spending for Health Services in 2005 ($mns, Nominal)		
Spending		
Households	300.0	
Provincial Government	700.0	
Incomes		
Households		
Personal Income	796.9	
Gross	901.5	80/20 split for wages and unincorporated income
less Transfers	-104.6	reduced EI and welfare
less Personal Taxes & Contribu	169.7	
Disposable Personal Income	627.2	
Government		
Revenues	415.3	
Spending	627.6	Spending on Health less reduced EI, welfare, GST Credits
Saving	-212.3	
Business		
Saving before Tax	418.1	
Corporate Income Tax	69.0	
Saving after Tax	349.1	

Household incomes (after tax) are increased by more than $600 million or by $300 million more than the additional spending for health care. Business saving is also notably increased, including on an after-tax basis.

Precise measures of the impact are open to question given the uncertain determinants of any model's multiplier properties. Including induced effects, the expenditure, impact multiplier in these results is 1.5. This magnitude may be questioned but given the relatively small direct and indirect import leakage that would be associated with spending directed to health services, a "relatively" large multiplier may be expected. Induced effects reflect a $100 million reduction in personal saving, and are sensitive to our assumption that interest rates and the exchange rate are unchanged from the Base Case. (The impact on aggregate prices is negligible.) We report an increase of $315 million in net foreign saving (reduction of the Current Account Balance). In addition to increased consumer spending ($300 million beyond the initial spending on health services), this reflects a notable increase in overall capital formation in the economy ($400 million) with presumably positive dynamic effects on productivity in subsequent years.

These caveats noted, we are confident that increased health care spending financed in "standard" proportions should (as an impact and regularly) increase the incomes of households and businesses beyond their initial spending, with some net loss to the incomes of governments. But for governments as a whole, our mix of health care spending suggests that close-to two-thirds of this would be offset by improved revenues and reductions in other (mainly transfer) spending. Impacts for jurisdictions vary or put another way, have implications for fiscal federalism. Benefits in the form of health outcomes with consequence for the economy are a "plus". Whether this form of spending initiative is more economically productive than others is another question

not addressed here. But these results and the answer to that question are central to the sustainability issue.

Annotated Bibliography

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- Statistics Canada
- Canadian Institute for Health Information (CIHI)
- Organization for Economic Cooperation and Development (OECD)
- World Health Organization (WHO)
- Brookings Institution
- Caledon Institute
- Social Sciences and Research Network
- US publications on local/regional impacts of the regional health care systems
- National Bureau for Economic Research (NBER)
- Institute for Work and Health
- Heritage Foundation
- Canadian labour unions publications (CAW, CLC) if necessary (regarding privatization)
- Council on Health Care Economics and Policy
- Conference Board of Canada
- Institute for Research on Public Policy
- Canadian Healthcare Association (CHA)
- Canadian Health Services Research Foundation (CHSRF)

Health Care System Productivity, Efficiency and Sustainability

John Baldwin, Director of Micro-Economic Analysis Division, Statistics Canada. "Status of the research on the productivity estimates for Health Care", a telephone discussion.

Estimation of health care productivity is a very difficult task since health care differs substantially from other sectors. At this point, Statistics Canada does not have publicly available estimates of health care productivity. Moreover, STC does not have a mandate to produce these estimates. Nevertheless, some work was conducted by George Kitchen, Health Canada, on the issues of cost-based weighted estimates of health care productivity; however, the data supporting his paper no longer exist. The major issue in the estimation of the health care sector productivity is the definition of the output measures for health care. Several approaches to defining health care productivity were proposed by health care analysts and researchers: 1) by quality (health status), and 2) by activity (such as patient-base, patient-hospital activities, etc.).

1. Cutler D., and Berndt E. "Medical Care Output and Productivity", National Bureau of Economics Research, Studies in Income and Wealth, Volume 62, edited by David D. Cutler and Ernst R. Berndt, The University of Chicago Press, London, 2001.

This book contains papers and discussions presented at the Conference on Research in Income and Wealth, held in Maryland in June of 1998. The book concentrates on such themes as conceptual issues in medical care prices and productivity, measurement of medicare outcomes (in price indexes, national health accounts), pricing of medical treatments and pharmaceuticals, and cost-benefit analysis of health care treatments and pharmaceutical innovations.

Three papers are of the most interest in this volume. In the paper "What's Different About Health: Human Repair and Car Repair in National Accounts and in National Health Accounts", Jack E. Triplett proposes to organize national health accounts on the principles of cost-of-disease accounting and the evaluation of the real contribution of medical resources in the improvement of health or health outcomes. In the paper "Theoretical Foundation of Medical Cost-Effective Analysis: Implication for the Measurement of Benefits and Costs of Medical Interventions", David Meltzer discusses the challenges in heath care outcome measurement. Two major approaches are considered: measurement of the quality of life on the basis of the individual heath status and cost-effectiveness analysis of the future applications of medical treatments.

In the article "Price Indexes for Medical Care Goods and Services: An Overview of Measurement Issues" by Berndt et al., NBER's methodology to price and productivity measurement in the United States is summarised. This relates to the issues in construction of the medical care consumer price indexes (MCPIs) and medical-related producer price indexes (MPPIs). The major theme in the book is that the increase in the share of health care in GDP up to 14% did not really provide a feeling of value for money for the developed nations. The question of measuring health care productivity in terms of its health outcomes in comparison to financing amounts is a difficult methodological issue. Major measurement problems are:

1. Measurement of the value of technological change and other health care innovations.
2. Measurement of the simultaneous increase in products and services (unit prices of medicare) that reduce mortality rates and promote additional health gains, and the problem of understating their positive impacts. This leads to the question of whether health care prices can be adjusted for quality (hedonic prices).

2. Ruggeri J. "Health Care Spending, Fiscal Sustainability, and Public Investment". Paper for CMA Conference, 13-14 November 2005, Ottawa.

This paper discusses two myths about the Canadian health care system: 1) health care costs associated with population aging will impose an unsustainable burden on the fiscal system; and 2) the nature of health care expenditures is the same as other government maintenance costs. The author has presented calculations showing that total health care spending as a ratio of GDP will increase by only 4% in the next 25 years, while the government revenues will increase by at least 8%. Another finding is that stronger spending pressures for health will be associated with weaker spending in other areas such as education. The conclusion is that the current fiscal structure in Canada is capable of increasing health care spending with the population aging without increasing tax rates. The paper also introduces the notion that the view of health care as a consumption factor should be changed to reflect recent research findings that health care spending is also an investment into the human and social capital.

3. Conference Board of Canada. "Understanding Health Care Cost Drivers and Escalators", Report, March 2003.

The report is a useful conceptual and statistical overview of the Canadian health care cost drivers (demographics, consumers and health providers expectations and chronic diseases), cost escalators (pharmaceuticals, home care, health HR, new technologies), and emerging cost escalators (access issues, patient safety and environmental issues). It also provides an assessment of the Canadian health system's performance in comparison to international benchmarks (23 OECD countries), in competition with other sectors for fiscal resources, and in competition for demands from other public and health care programs. Another useful chapter is a profile of the Canadian health care system in terms

of evolution of the system, acts and regulations, public administration, accountability, etc. The executive summary makes the following points:

- Cost drivers will require an additional public investment of $5 billion per year and the cost escalators add to the pressure. The challenge for the financing of the public system is to balance the priorities;
- Canada is a middle-of-the-pack performer among OECD countries, and is the 3rd highest total spender on health care, which means that an increase in spending does not guarantee improvement in health status. There is also a growing fiscal disparity between federal and provincial governments.
- Governments need to focus on the emerging health care cost escalators. Research on the productivity determinants showed that there is a need for investment in HR, MandE and education and training.
- Governments need to continue to restructure the systems in order to address the challenges of population aging and inflation, look for alternative cheaper solutions, and to focus on the development of the collective vision on health care in terms of the health care outcomes, and not on the process of delivery.

4. James G. Frank. "Viewpoint: Sustainability and the Paradoxes of the Romanow Report", Conference Board of Canada Report, Briefing Report, January 2003.

This article is interesting in its comparison of the Romanow and Kirby Reports. It provides a brief summary of the key proposals in both reports. The author views the Romanow report as a passionate defence of the *status quo*, a single-payer public health care system. The proposed changes to health care are aiming at sustainability, but do not take into account the key drivers of the health care reform - budget restrictions and private sector delivery. The author argues on the basis of 6 paradoxes that he identified:

- The introduction of the Canada Health Transfers from the federal government to provincial governments (25%) and an escalator clause (increase of federal spending at a rate of 1.25 times the annual growth in GDP).
- Banning of private sector delivery vs. proposal to add new diagnostic services.
- Change in terms of increased financing; creation of Health Council of Canada for the purpose of establishing benchmarking frameworks. Proposal to finance this out of the surplus (about 50% of it).
- Introduction of innovative approaches to health care services in remote areas.
- Primary health care reform with a focus on prevention and health promotion requiring increased funding. Will it lead to real structural change?

The Kirby Report, on the other hand, has four important differences that might solve the sustainability question:

- Allowance for the for-profit delivery of medically necessary services.
- Recognition of teaching hospitals as national resources and federal responsibility.

- Necessity to reform hospital funding on the basis of their functions rather than on the basis of global budgeting.
- Opposition to the revision of the Canada Health Act (Romanow report recommends adding a 6th principle on accountability and expanding services covered under it).

The author holds the view that the Romanow Report has only initiated the debate on health care sustainability.

5. Canadian Health Services Research Foundation. "Myth: The Aging Population Will Overwhelm the Healthcare System", 2001.

The Knowledge Transfer Staff at CHSRF argue "… healthcare costs don't go through the roof just because there are more seniors. The real issue is with changes in the number and nature of medical services for elderly patients". The point is that the health care use rates of the different age groups stay constant. The population ages gradually, and the rise in their costs will be offset by the low costs for other age groups. The real cost driver is not the number of elderly but the changes in their use of medicare.

6. Canadian Health Services Research Foundation. "Myth: For-Profit Ownership of Facilities Would Lead to a More Efficient Healthcare System", 2004.

The article provides an overview of the misconceptions of the private delivery of public health care services, some examination of evidence from the United States, and discussion on the inherent conflicts of interest. "Research demonstrates that waiting lists and costs aren't reduced with private for-profit contracts - and American literature indicates that patients who receive care in for-profit facilities are more likely to die than those in non-profit ones." The authors provide some evidence from the experience of the private clinics in Alberta and British Columbia that waiting lists increase in the parallel public clinics. "For-profit clinics exist to provide care, but the individuals who own and operate these ventures also need to make money. These goals can collide - and sometimes to the detriment of the patients. As Robert Evans, a health economist at UBC, says, "Profit motives are the same everywhere."

7. Arrow K. "Uncertainty and the Welfare Economics of Medical Care", The American Economic Review, No.5, December 1963.

This is a useful theoretical article that identifies major characteristics of health care from the point of view of industrial economics: nature of demand, expected behaviour of the provider, product uncertainty, supply conditions, and pricing policies. The author provides a comparison of these characteristics of medicare to the competitive industry model under uncertainty, and identifies significant departures of the medicare industry from generally accepted competitive behaviour. These departures are identified as follows: 1) Increasing returns; 2) Restrictions on entry to the field; 3) Price discrimination and collective monopoly; and 4) Moral hazard of insurance policies.

8. The Conference Board of Canada. "The Future Cost of Health Care in Canada, 2000 to 2020: Balancing Affordability and Sustainability", 2001.

The report provides an overview of health care policy, assumptions and models used to produce forecasts of health care expenditures in Canada on the provincial/territorial level. The projections of health care expenditures are reported for the following dimensions:

- Provincial and territorial government expenditures by total, by age cohort and gender
- Private real and nominal health expenditures by age cohort and gender
- Health expenditure by age cohort and gender
- Per capita health expenditures by age cohort and gender
- Provincial and territorial government per capita health expenditure by age cohort and gender
- Private per capita health expenditures by age cohort and gender

The conclusions are: 1) public health expenditures will rise to 42% as a share of total provincial and territorial government revenues; 2) the proportion of seniors will also rise to 3 per cent of the population in 2020; 3) public health care costs will grow at 5.2% per year during 2000-20; 4) private health care costs will increase by 5 per cent; 5) real public per capita spending will increase by almost 60 per cent, while public per capita spending on all other government services will increase by 17 per cent.

9. Enthoven A., Tollen L. "Competition in Health Care: It Takes Systems to Pursue Quality and Efficiency", Center for Health Policy/Center For Primary Care and Outcome Research, Stanford University, Health Affairs, September 2005.

In this journal article, authors discuss the problems of the current model of U.S. health care competition and provide their assessment of market failure. "Costs continue to rise at double-digit rates, and quality is far from optimal. One proposal for fixing health care markets is to eliminate provider networks and encourage informed, financially responsible consumers to choose the best provider for each condition. We argue that this

"solution" will lead our health care markets toward even greater fragmentation and lack of coordination in the delivery system. Instead, we need markets that encourage integrated delivery systems, with incentives for teams of professionals to provide coordinated, efficient, evidence-based care, supported by state-of-the-art information technology. "

10. Shapiro I., Shapiro M., Wilcox D. "Quality Improvement in Health Care: A Framework for Price and Output Measurement", NBER Working Paper No. 6971, American Economic Review Proceedings, Vol. 89 (May 1999): 333-337.

The durability of health care treatment, the substantial technical change in health care treatment, and the prevalence of third-party payment interact to create substantial difficulty in measuring the price and output of health care. This paper provides a framework for analyzing the demand for health care taking into account these difficulties. It then suggests how this framework might be used to improve measurement of health care prices and output.

11. Frech H.E., Miller R.D. "The Productivity of Health Care and Pharmaceuticals: An International Comparison", UCLA Research Program in Pharmaceutical Economics and Policy, 1996.

This is an econometric paper providing a good literature review on international studies of health production and productivity of pharmaceuticals, and an empirical investigation of the international evidence for the common determinants of health of nations on the basis of OECD countries. The health production equation is specified as a function of pharmaceutical consumption, other health care consumption, wealth (GDP), lifestyle (alcohol, smoking and richness of diet) and environmental factors. The result is that the pharmaceuticals and GDP have a positive and significant effect, while non-pharmaceutical health care consumption had mixed effects. Among the lifestyle variables, the richness of diet has the most effect.

12. Triplett J., and Berndt E. "New Developments in Measuring Medical Care", The Brookings Institution Press, February 1999.

A survey paper on the new significant empirical work on the measurement of medical outcomes and prices in the United States. "New methodologies and empirical estimates for selected medical care disease categories suggest that improvements in medical care are greater than the usual statistics suggest, and that medical care price inflation is lower."

13. Triplett J. "Integrating Cost-of-Disease Studies into Purchasing Power Parities (PPP), Brookings Institution Press, Paper for OECD Working Party on Social Policy Workshop "What is Best and at What Cost? OECD Studies on Cross-National Differences of Ageing-Related Diseases", June 2002.

The author considers that data on cost of disease treatments are appropriate for improving PPP measures for medical care and provides a discussion on how the OECD studies can be used for international comparisons. "In the health context, the costs for medical procedures provide the weights for computing a quantity index in national accounts. The same point can be made about PPP comparisons. One wants a PPP in the usual case in order to make a comparison for real consumption levels across countries. In the case of health, one wants a PPP for health services in order to make a comparison of the real consumption of health services across countries. Where health care is not a market commodity, price indexes or PPS are not really relevant. Instead, one can get at the underlying question - measuring differences in real health services internationally - by computing a quantity index of medical treatments. For constructing international quantity studies, the costs of medical treatments provide the weights. The PPP can be computed implicitly. Accordingly, the cost data collected in the RD study can be used to get at the underlying question."

14. Kenny N. P. "What "Good" Is Health Care? Reflections on the Canadian Experience",
Canadian Healthcare Association Press, Ottawa, ON , 2002.

Dr. Kenny asks Canadians to reflect on what value they place on health care and to look at health care from the market-value perspective. She discusses the medicalization of modern life, doctors' dilemmas today in delivering care and the myth of the market in health care.

15. Canadian Healthcare Association. "Towards Improved Accountability in the Health System: Getting from Here to There", CHA Press, Ottawa, ON, 2001.

Accountability means accepting responsibility for assigned tasks, duties or mandates. The Canadian health system faces considerable pressure from government, the public and the media for all players in the system to be accountable for the considerable dollars spent and the quality of care delivered. CHA looks at some of the common issues and suggests where "pan-Canadian" solutions could be developed.

16. Richardson H., Duschesne R., Einagel V., and Kennedy J. "Integrated Delivery Systems: Do They Hold the Answer to Accountability? ", Policy Briefing, Canadian Healthcare Association Press, Ottawa, ON, 1998.

We need to know if integrated systems deliver on their promise of a better balance sheet and a healthier community. The authors of this brief say they can but only under the right conditions and, in Canada, only when special funding requirements are met. The authors focus on vertical integration and offer a formula to ensure accountability in the system through a review of approaches used in the United States and Great Britain.

17. Canadian Institute for Health Information. "Health Care in Canada", CIHI Press, 2005
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_43_E&cw_topic=43.
This report provides up-to-date information on what we know and don't know about the performance of Canada's health care system. Topics covered in the report include the outcomes of care, health expenditures and Canada's health care professionals. Included with this report is a *Health Indicators* insert, providing new data on a range of health and health system-related indicators at both regional and provincial/territorial levels.

18. Canadian Public Health Association. "An Ounce on Prevention - Public Health and Productivity", Brief to the Standing Committee on Finance, October 24, 2005.

A position paper, advocating government investment in health care prevention programs as the most correlated with the economic productivity and sustainability of the health system. Provides a discussion on the systems that keep people healthy, relationship between public health and productivity, erosion of public funding of the health care system, and recommendations for investments into public health infrastructure and human resources. Additional recommendations are made on specific investments for CIHI to carry out a comprehensive review of public health expenditures, request to the Health Council of Canada to include public health system outcomes in its reporting to Canadians, long-term funding commitment for a national immunization program, funding for current chronic and infectious disease programs, funding for pandemic prevention planning, to strategic public health R&D development of the pan-Canadian public health research agenda, implementation of the policies for the voluntary sector, etc.

19. Dickson M., J.Hurst J., and Jacobzone S. "Survey of Pharmacoeconomic Assessment Activity in Eleven Countries", OECD Health Working Paper 4, 2003.

An international survey on the emerging practices of pharmacoeconomic assessment (health technology assessment for drugs) in selected OECD countries (Australia, Belgium, Canada, France, Italy, Japan, The Netherlands, Portugal, Sweden, Switzerland, UK) and its comparison to the practice in the United States. This practice refers to such types of pharmaceutical assessment as the cost-effectiveness analysis, cost-utility analysis, and cost-minimization analysis.

Systems of Health Accounts and Their Role in Health Care System Analysis and Policy Making

1. Organization for Economic Cooperation and Development. "A System of Health Accounts", Manual, 2000. http://www.oecdbookshop.org/oecd/

Health care now accounts for about 8 per cent of GDP, on average, in OECD countries. There have been impressive achievements in improved health status and coverage of populations in most OECD countries. However, there is still considerable concern regarding the adequacy of resource levels for health care and the way that those resources are used. The challenges of monitoring the impact of rapid technological change, observing the expanding private sector and providing care to ageing populations reinforce the appeal of further reform. Consequently, a growing number of policy-makers and researchers are seeking detailed information on health care expenditures. This OECD manual provides a standard framework for producing a set of comprehensive, consistent and internationally-comparable health accounts to meet the needs of public and private-sector health analysts and policy-makers. The SHA manual establishes a conceptual basis for statistical reporting rules that are compatible with other economic and social statistics. It proposes a newly-developed International Classification for Health Accounts (ICHA) which covers three dimensions of health care: functions of care, ICHA-HP Classification of Health Care Providers, and Sources of Funding. Moreover, the SHA manual provides basic concepts and definitions underlying the annual data collection of OECD Health Data as well as a standard set of tables for reporting on health resource flows.

2. Organization for Economic Cooperation and Development. "The State of Implementation of the OECD Manual: A System of Health Accounts (SHA) in OECD Member Countries", 2001. http://www.oecd.org/dataoecd/3/41/1896856.pdf

This paper provides an overview on the current state of SHA pilot implementations in OECD countries. It summarises the background of the new OECD manual A System of Health Accounts (SHA), and provides an overview of the latest developments in international co-operation of work on health accounts and the SHA, including a report for Canada. The SHA manual provides a conceptual framework and estimation rules for health accounting and proposes a three-dimensional International Classification for Health Accounts (ICHA) that provides breakdowns of health expenditure by functions of care, provider industries, and sources of funding. The SHA is intended for use as a model to set up national health accounts, for revising and amending existing national health accounts or as a model to map detailed national health accounts to SHA standard tables for the purpose of international comparisons. The main concepts of the SHA and of the ICHA are used in OECD Health Data, an annually updated database of health statistics in OECD countries.

3. Organization for Economic Cooperation and Development. "Towards High Performing Health Systems", The OECD Health Project, Summary Report, 2004. http://www.oecd.org/dataoecd/7/58/31785551.pdf

This publication offers a synthesis of findings from recent OECD studies undertaken as part of the three-year Health Project, an initiative geared towards answering many of the key questions facing today's health policy makers. It provides information and analysis on a wide variety of topics, such as new and emerging health-related technologies, long-term care, private health insurance, health care cost control, equity of access across income groups, health workforce planning and productivity, and waiting times for elective surgery. Building on international experience and grounded in new data on cross-country differences, this report offers an up-to-date map of the road to performance improvement. The report is based on the SHA data.

4. Bennett J.. "Investment in Population Health in Five OECD Countries", OECD Health Working Paper No.2, 2003.

Provides case studies of the investment and financing regimes in Australia, Canada, Korea, Sweden and Switzerland and a general overview of the evidence on the determinants of health in these countries.

5. Poullier J-P., Hernandez P., Kawabata K. "National Health Accounts: Concepts, Data Sources and Methodology", World Health Organization, 2002. http://www.who.int/nha/docs/en/NHA_concepts_datasources_methodology.pdf

A methodological paper summarizing conceptual frameworks behind the systems of National Health Accounts in countries, members of the World Health Organization. This paper also provides NHA estimates for 1998.

NHA has a central role to play in supporting stewardship and decision-making by both policy makers and stakeholders. There is, however, a lack of estimates in most countries of the world. By reporting on the basic elements of NHA, WHO has shown how such indicators can provide a useful policy reference even in cases when data gaps are large. This effort aims to encourage countries to develop and use NHA estimates to ensure a keener perception of resource use in health systems. The initial estimates have been developed through available off-the-shelf statistics with collaboration from national administrations and international networks and contacts. However, a wider knowledge of published material and a stepped-up effort to develop NHA in a hundred countries in the near future will lead to better understanding and use of the emerging NHA indicators. National accounting and national health accounting are evolving entities. Each newcomer must assess its specific monitoring requirements and create matrices or tables adapted to these requirements. It would be important to take advantage of, and use international experience and ready-made classifications as shortcuts and cost saving devices. Nevertheless, although sharing experiences has been found to facilitate the process, it

does not substitute for rigorous analysis, which covers the main attributes of NHA. Although SNA accounting rules are to be followed, country-specific conditions require adjustments to the still non-definitive methodology. WHO's efforts have consisted of borrowing existing statistics and accounting rules with value added. Accuracy will, however, only be reached through collaborative work and "national" NHA exercises.

6. Hjortsberg C. "National Health Accounts - Where Are We Today?", Health Division Document 2001:6, Swedish International Development Cooperation Agency, Stockholm, Sweden, 2001.
http://www.who.int/nha/docs/en/NHA_where_are_we_today.pdf

This is a background paper on the rationale behind creation of the National Health Accounts and a summary of the progress within the WHO systems. One chapter is devoted to the comparison of the various methods of health accounting (NHA Harvard, SHA, and SNA). Most countries use NHA Harvard methodology, while the OECD countries use SHA. The rest of the paper is focused on the description of the producers and users of NHA and their issues such as institutionalization, financing, networks, training and guidance, regional and national actors and recent developments.

7. Abt Associates. "Using NHA to Inform the Policy Process", The PHRPlus Projects, U.S. Agency for International Development, September 2002.

Provides an overview of the importance of the implementation of the System of National Health Accounts on a global scale. This includes a description of the linkages of the NHA statistics to policy analysis and development, evidence on how NHA helped to identify gaps in health policy, and advocacy for the development of regional NHA networks.

8. Musgrove P., Zeramdini R., and Carrin G. "Basic Patterns in National Health Expenditures", Bulletin of the World Health Organization, No. 80 (2). 2002,
http://www.who.int/nha/docs/en/Basic_patterns_in_national_health_expenditure.pdf

Analysed in this paper are national health accounts estimates for 191 WHO Member States for 1997, using simple comparisons and linear regressions to describe spending on health and how it is financed. The data cover all sources—out-of-pocket spending, social insurance contributions, financing from government general revenues and voluntary and employment-related private insurance — classified according to their completeness and reliability. Total health spending rises from around 2–3 per cent of gross domestic product (GDP) at low incomes (<US$ 1000 per capita) to typically 8–9 per cent at high incomes (>US$ 7000). Surprisingly, there is as much relative variation in the share for poor countries as for rich ones, and even more relative variation in amounts in US$. Poor countries and poor people that most need protection from financial catastrophe are the least protected by any form of prepayment or risk-sharing. At low incomes, out-of-pocket spending is high on average and varies from 20–80 per cent of the total; at high incomes that share drops sharply and the variation narrows. Absolute out-of pocket expenditure

nonetheless increases with income. Public financing increases faster, and as a share of GDP, and converges at high incomes. Health takes an increasing share of total public expenditure as income rises, from 5–6 per cent to around 10 per cent. This is arguably the opposite of the relation between total health needs and need for public spending, for any given combination of services. Within public spending, there is no convergence in the type of finance — general revenue versus social insurance. Private insurance is usually insignificant except in some rich countries.

9. De S., Dmytraczenko T., Brinkerhoff D., and Tien M. "Has Improved Availability of Health Expenditure Data Contributed to Evidence-Based Policymaking? Country Experiences with National Health Accounts", Abt Associates Inc., Partners for Health Reforms Plus Project, May 2003.

National Health Accounts (NHA) is a tool designed to inform the health policy process. It aims to do so by providing policymakers with valuable information on the distribution of health funds within the system. NHA was introduced and implemented in a number of middle - and low-income countries in the mid- to late 1990s. As sufficient time has passed for NHA findings to penetrate the policy processes in these countries, this study sets out to determine if NHA has actually met its principal goal of contributing to evidence-based policymaking. The paper examines the policy impact of NHA in 21 developing countries from the Latin America and the Caribbean region, East and Southern Africa, the Middle East and North Africa, and the Asia Pacific region. The study describes how policymakers have used NHA and assesses the various factors and influences that determine the extent to which NHA impacts the policy process. It is hoped that lessons learned from this study can help other countries as they move forward with efforts to inform health policymaking using health expenditure information.

10. United Nations, Statistics Division. "The System of National Accounts (SNA)", 1993.
http://unstats.un.org/unsd/sna1993/toctop.asp

A manual describing an international system of national accounts that consists of a coherent, consistent and integrated set of macroeconomic accounts, balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules. It provides a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making.

Health Care Human Resources Trends and Issues

1. Canadian Institute for Health Information. "Health Personnel Trends in Canada", 2002.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_21_E&cw_topic=21

This publication contains data on selected health personnel groups in Canada. Tables include counts of health professionals by registration status and, for some professions, the number of graduates. This report continues to focus on aggregate supply-based trend information by province or territory and year. It also includes information on the regulatory environment and examines the education and training required to enter the health workforce.

2. Canadian Institute for Health Information. Bringing the Future into Focus: Projecting RN Retirement in Canada.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1023_E&cw_topic=1023

This special analytical study estimates the number of registered nurses (RNs) aged 50 or older that could leave the Canadian nursing workforce by 2006. Using data from the Registered Nurses Database (RNDB) at CIHI, this study calculates the potential number of losses of registered nurses to retirement or death, and measures the impact upon different nursing employment sectors and regions of the country.

3. Canadian Institute for Health Information."Evolving Role of Canada's Family Physicians, 1992 - 2001".
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1171_E&cw_topic=1171

This new report, based on CIHI's National Physician Database, looks at how family doctors billing practices have changed over the 10-year period, 1992 - 2001. It also describes how the family practice environment has changed, including medical training trends, regulatory and policy developments as well as societal changes. The report provides national level results for a broadly-defined range of health care services, including office and hospital inpatient visits, mental health care, basic procedures (such as suturing and joint injection/aspiration), advanced procedures (like setting broken bones and intensive care/resuscitation), surgical services (such as appendectomies and tonsillectomies), anesthesia services, obstetrical care and assisting in the operating room. Data trends are examined across geographic (urban/rural) settings as well as for physician age and gender groups.

4. Canadian Institute for Health Information. "From Perceived Surplus to Perceived Shortage: What Happened to Canada's Physician Workforce in the 1990's?"
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_181_E&cw_topic=181

The report dissects the various trends (demographics, training programs, immigration and emigration, etc.) affecting the physician workforce in the 1990s and examines how policy decisions may have also had an impact on the physician supply levels in Canada.

5. Canadian Institute for Health Information. "Supply and Distribution of Registered Nurses in Rural and Small Towns, Canada", 2001.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_28_E&cw_topic=28

This analytical report is the first national comprehensive publication about registered nurses working in rural and small town Canada. Developed in partnership with the Nursing Practice in Rural and Remote Canada Study Group, this report uses data from the Registered Nurses Database at CIHI to establish a demographic, educational and employment profile of registered nurses in rural and small town Canada between 1994 and 2000.

6. Canadian Institute for Health Information. "Supply, Distribution and Migration of Canadian Physicians".
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_14_E&cw_topic=14

This report provides data tables on the number of physicians by province or territory, specialty, age group, sex, and place of and years since M.D. graduation. It also provides physician to population ratios by province or territory, sex and specialty. Data on migration of physicians between Canadian jurisdictions and international migration of physicians are included as well.

7. Canadian Institute for Health Information. "The Practicing Physician Community in Canada: Workforce and Workload", 1999.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_29_E&cw_topic=29

This report focuses on physicians who practice clinical medicine and bill fee-for-service. It does not provide a head count of physicians, regardless of their activities, who are licensed in Canada. It should, therefore, be relevant to the current dialogue addressing adequacy of physician availability for clinical service needs, timely access to required services, waiting periods, etc. The issue in the current physician workforce debate should revolve around the effective supply of physicians for clinical needs, not around hypothetical available supply since many physicians have responsibilities outside of clinical care areas in administration, teaching, research and in other business ventures. There are many factors that influence physician workload, workflow and output, such as gender, age, specialty, size of community, place of graduation, clinical demands, number of physicians, as well as personal considerations. It is important to understand how the sum of these factors yields an effective physician workforce.

8. Canadian Institute for Health Information."The Regulation and Supply of Nurse Practitioners in Canada".http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1263_E&cw_topic=1263

The first report to provide contextual information on the history, roles and regulation of the nurse practitioner (NP) profession in Canada with a statistical profile of the licensed NP workforce.

9. Canadian Institute for Health Information. "Workforce Trends of Licensed Practical Nurses in Canada", 2004. http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_365_E&cw_topic=365

This publication is a reference document, which can be used to support, licensed practical nursing research and planning. Data is derived from the first six months of each Provincial/Territorial Association's registration year. The publication presents summary and detailed tables reflecting licensed practical nurses in Canada. The tables include counts by various demographic and practice characteristics, such as age group and gender, education, year and province of graduation, employment status, full-time/part-time status, type of employer, primary area of responsibility and position of employment.

10. Canadian Institute for Health Information. "Workforce Trends of Registered Nurses in Canada", 2004. http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=PG_396_E&cw_topic=396&cw_rel=AR_20_E

This report builds on the Registered Nurses Management Data publication (catalogue no. 83F0005XPB) previously produced by Statistics Canada. In 2000, CIHI assumed responsibility for this publication.

Data is derived from the first six months of each provincial/territorial regulating authority's registration year. The publication presents summary and detailed tables reflecting registered nurses in Canada. The tables include counts by various demographic and practice characteristics, such as age and sex, basic and post-basic nursing education, year and province of graduation, post-basic education in other than nursing, employment status, full-time/part-time status, type of employer, primary area of responsibility and position of employment.

11. Canadian Institute for Health Information. Workforce Trends of Registered Psychiatric Nurses in Canada ", 2004. http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1046_E&cw_topic=1046

This publication is a reference document that can be used to support registered psychiatric nursing research and planning. Data are derived from the first six months of

each provincial association's registration year. The publication presents summary and detailed tables reflecting registered psychiatric nurses in Canada. The tables include counts by various demographic and practice characteristics, such as age group and gender, education, year and province of graduation, employment status, full-time/part-time status, type of employer, primary area of responsibility and position of employment.

12. Canadian Institute for Health Information. Workforce Trends of Regulated Nurses in Canada", 2004.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1173_E&cw_topic=1173

This product is a comprehensive reference to support nursing research and planning. Consisting of three separate reports - *Workforce Trends of Licensed Practical Nurses in Canada; Workforce Trends of Registered Nurses in Canada;* and *Workforce Trends of Registered Psychiatric Nurses in Canada* - this product provides analysis and statistics for the entire regulated nursing workforce in Canada. This is the first year for which CIHI has distributed paper copies of these reports as a single package.

Data for these reports are obtained by CIHI through agreements with provincial/territorial regulatory authorities. Each publication presents an analysis and summary tables of the most recent demographic, education and employment characteristics, such as age group, sex, initial education in nursing discipline, years since graduation, employment status, place of work, area of responsibility and position.

13. Canadian Institute for Health Information. "Geographic Distribution of Physicians in Canada: Beyond How Many and Where".
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1346_E&cw_topic=1346

This report looks at how physicians are distributed in Canada, using the latest available data from several sources. The spatial distribution of physicians is described in some detail. But the report seeks to go beyond presenting data on the distribution of physicians relative to the distribution of the Canadian population. It describes how physicians in communities of different sizes differ with respect to several demographic characteristics. As well, it discusses how much they do and what they do, and whether there are urban-rural differences. In particular, it documents urban-rural differences in the scope of practice of family physicians and discusses why such differences may have important implications.

14. Canadian Institute for Health Information. "Average Payment per Physician (APP) Report, Canada", 2004.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_82_E&cw_topic=82

This report contains average payment data. It provides tables by specialty and provinces/territories for the following categories: full-time equivalent fee-for-service physicians and physicians receiving payments in excess of $60,000 per year. For more

information on physician payments in Canada, including data source comparisons, data gaps and data limitations, please see CIHI's Physician Databases Analytical Bulletin.

15. Canadian Institute for Health Information. "Full-time Equivalent Physicians (FTE) Report, Canada', 2004.http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_17_E&cw_topic=17

This report provides detailed and summary tables on physician supply and workload in Canada. The Full-Time Equivalent (FTE) methodology was developed to provide a consistent basis for comparing physician supply across and within provinces and territories; to provide a consistent basis for measuring changes through time in physician supply; and to recognize workload differences among individual specialties. All figures are provided by province and specialty.

16. Canadian Institute for Health Information. "Canada's Health Care Providers: 2005 Chartbook". http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_35_E&cw_topic=35

This report presents a fact-based compilation of current research, historical trends and data, findings and analysis on what we know and don't know about Canada's health care providers as a foundation for understanding some of today's most critical and complex issues in health care. Produced with the help of the Institute for Work and Health, the report draws on data and analysis from CIHI, as well as research produced at local, regional, provincial/territorial, national and international levels.

17. McIntosh T., Torgerson R. "Setting Priorities and Getting Direction: Consultation Conference on Health Human Resource Planning", Research Report H/08, Canadian Policy Research Networks Inc., February 2006.

This paper summarizes the topics and issues discussed at the multi-stakeholder conference on Health HR planning in held on October 12-13, 2005 in Regina, Saskatchewan. The document is in the format of the strategic priorities and business plan, with short summaries of the multi-stakeholder consensus expressed at the consultation.

Health Outcomes and Health Care System Financing

1. Crichton A., Hsu D., and Tsang S. "Canada's Health Care System: Its Funding and Organization", Canadian Healthcare Association Press, Ottawa, ON, 1994

This introductory textbook provides an informative overview of the Canadian health care system. The focus is on investigating what makes Canada's system unique from other countries—how it pays for health services and how it organizes them. This is a good primer, offering charts, graphs, tables and lists to facilitate an understanding of the health care system.

2. Frank K., McIntyre J., O'Sullivan T. "Canada's Public Health Care System Through 2020: Challenging Provincial and Territorial Financial Capacity", The Conference Board of Canada Report, November 2003.

This study projects real provincial and territorial health expenditures through to 2020, showing how trends vary among seven components. The results call into question the financial sustainability of the Canadian health care system. The major conclusions are:

- As a share of government revenues, overall provincial and territorial spending on health will increase from 32 per cent in 2001 to 44 per cent in 2020.
- An important factor driving increases in real health spending will be changes in the volume of services required due to demographic trends (e.g. growth and ageing of the population).
- The ageing of the Canadian population will be a particular concern for the health system when the bulk of the baby boomers reach age 65, starting in 2012.
- Provincial and territorial health spending as a share of GDP will increase from 6.3 per cent in 2001 to 7.4 per cent in 2020.
- As a share of total provincial and territorial health expenditures, spending on hospitals, other institutions, physicians, and other professionals will fall, while spending on home care, prescription drugs, and other items will rise.

3. Canadian Healthcare Association. "Funding Canada's Healthcare System", Canadian Healthcare Association Press, Policy Brief, Ottawa, ON, 1999

First in the Policy Brief series, *Funding Canada's Healthcare System* is the foundation for CHA's stand on funding issues, beginning with hospital and medical services, and home and community care. This brief includes a detailed history of federal funding mechanisms and private-sector spending, as well as examining current funding mechanisms in practice today.

4. Steven R. Eastaugh. "Health Care Finance: Cost, Productivity, & Strategic Design", Jones and Bartlett Publishers, 1998.

This book is an exploration of what is happening in the rapidly changing health care marketplace. New payment incentives, which stimulate change in the marketplace, are analyzed. Tools for success include better financial planning productivity improvement, better scheduling systems, total quality management, cost effectiveness, and cost-benefit studies.

5. Canadian Healthcare Association. "The Private-Public Mix in the Funding and Delivery of Health Services in Canada: Challenges and Opportunities", CHA Press Ottawa, ON, 2001.

Drawing together the latest research and debate, this publication provides an in-depth look into the major issues involved in the best private-public mix for our health system. This comprehensive resource provides a critical analysis of the funding and delivery of health services and the current levels of public- and private-sector spending on health. It also examines the dangers associated with increased private funding and delivery, and the role of the private sector in a public-private partnership.

6. Health Canada. "Healthy Canadians: A Federal Report on Comparable Health Indicators 2004". http://www.hc-sc.gc.ca/hcs-sss/pubs/care-soins/2004-fed-comp-indicat/index_e.html

This report provides a summary of provincial and Canadian statistics on 18 comparable indicators during 1999-2003 in:

- 4 key dimensions: timely access, quality of health services, health status, and sustainability; and
- 6 Priority areas: Primary Health Care, Home Care, Catastrophic Drug Coverage and Pharmaceutical Management, Diagnostic and Medical Equipment , Health Human Resources, and Healthy Canadians.

The inter-jurisdictional trends are summarized and plans for the introduction of new indicators are discussed.

7. Colombo F., Tapay N. "Private Health Insurance in OECD Countries: The Benefits and Costs for Individuals and Health Systems", OECD Health Working Paper 6, 2004.

The publication provides an assessment of evidence on the effects of public health insurance (PHI) in different national contexts of OECD countries. The contribution of PHI to the performance of the national health care systems, specifically with respect to such indicators as access to care, financial protection, quality of care, costs and efficiency

is analyzed. This is followed by a discussion of the implications and future role of the intervention of regulators and policy makers into the PHI markets across OECD.

8. Canadian Institute for Health Information. "Exploring the 70/30 Split: How Canada's Health Care System is Financed", 2005.

Fewer services are channelled through physicians and hospitals, and both sectors account for decreasing percentages of total health expenditures. Total spending on health care has risen and private spending by individuals or insurers has been growing more quickly than public spending. Today, about 70 per cent of total Canadian health expenditures comes from the public purse. The remainder (about 30 per cent) comes from private sources. In this report, the authors look at trends in financing and at variations in this 70/30 split across provinces and territories.

Chapter 1 provides an overview of the health financing systems in Canada and the World, including historical facts and the current situation on the public/private mix of health care financing, and private health insurance. **Chapter 2** focuses on the description of the major historical points in Canadian Health Care Policy, the dynamics of the income of health professionals, and health care spending growth, a definition of Healthcare Sustainability, the distribution of public/private funding by the use of funds, analysis on the correlation between the quality and access to health care and geography, and a discussion on the composition of a Basket of Health Services. **Chapter 3** provides a primer on the cost of the Canadian Health Care System and shows dynamics for the following indicators: total health spending, health spending as per cent of GDP, international comparison total and per capita, detailed breakdown of health expenditures by public/private sources of funds, trends in private sector spending, and shifts in health spending. **Chapter 4** discusses hospital funding by source and use of funds.

Chapter 5 focuses on the finances of physician services, including the public/private mix, types of payment schemes, the amounts of compensation, differences in cost for specialists and family doctors. Of particular interest are the findings on the overhead costs (investment in office equipment, supplies, rent, professional fees and staff salaries). A 2002 CMA survey found that the medical specialists reported spending 27 per cent of their income on overhead costs, surgical specialists - 33 per cent, and family and general practitioners - 35 per cent.

Chapter 6 provides analysis of the retail drug sales in Canada, coverage for drugs and who pays for it, explanations for rising drug expenditures, and discussion of the international perspective. **Chapter 7** focuses on the funding for oral health care services and patterns of spending. **Chapter 8** analyses the funding and spending for eye care services. **Chapter 9** analyses spending and financing patterns for continuing care (residential care facilities and home care), including informal support trends (family and friends). **Chapter 10** focuses on the financing patterns for mental health services, and **Chapter 11** looks at complementary and alternative medicine.

9. Canadian Institute for Health Information. "Reciprocal Billing Report (RB),Canada", 2005
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_19_E&cw_topic=19

The Reciprocal Billing Agreement allows physicians to bill their own provincial and territorial medical care plans for services provided to residents of other jurisdictions. This data is reported to CIHI in the National Physician Database. The report includes summary and detailed tables. The summary tables indicate the total number of services provided and received by each province, the total dollar value of these services and cost per services. The detailed tables show utilization for each individual province by home province of the patient and host province of the provider. Both summary and detailed tables show breakdowns by physician specialty and type of service.

10. Canadian Institute for Health Information. "National Health Expenditure Trends", 2005.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_31_E&cw_topic=31

This publication includes updated expenditure data by source of funds (sector) and use of funds (category) at the provincial/territorial level and for Canada. It also contains an overview with discussion on the trends of health care spending in Canada. International comparisons such as health spending to GDP ratio are included, as well as a comprehensive set of data tables and technical notes.

11. Canadian Institute for Health Information. "Provincial and Territorial Government Health Expenditure by Age Group, Sex and Major Category: Recent and Future Growth Rates", 2004.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1219_E&cw_topic=1219

This report examines recent changes in provincial and territorial government health spending by age group, gender and major category of expenditure. It also assesses the demographic effects on future provincial and territorial government health spending.

13. Canadian Institute for Health Information. "Drug Expenditure in Canada", 2005, http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_80_E&cw_topic=80

Drugs continue to consume an increasing share of Canada's health care dollar, accounting for the second largest category of health expenditures next to hospital services. Drug Expenditure in Canada, updates trends in drug spending in Canada, primarily from retail establishments, in total, by public and private payers, and by type of drug (prescribed and non-prescribed). Provincial and territorial comparisons are included. International trends are updated based on data from the OECD.

14. Canadian Institute for Health Information. "Statistical Report on the Health of Canadians".
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=reports_statistical_e

This report provides detailed statistics on more than 80 health topics, contributing to a broad and current picture of Canadians' health. It was produced through a partnership of Health Canada , Statistics Canada and the Canadian Institute for Health Information, under the auspices of the Federal, Provincial and Territorial Advisory Committee on Population Health (ACPH).

15. Canadian Institute for Health Information. "Improving the Health of Canadians 2004."http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_322_E&cw_topic=322

Improving the Health of Canadians 2004 is a comprehensive policy-focused report on factors beyond the health care system that affect the health of Canadians. The report focuses on income, early childhood development, Aboriginal peoples' health and obesity. Improving the Health of Canadians 2004 is an important tool to engage decision-makers, researchers and Canadians in general in an informed discussion about factors outside of the health care system that influence health and what we know and don't know about options for addressing them.

16. Canadian Institute for Health Information. "Improving the Health of Canadians 2005-2006", Report Series.
http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=AR_1217_E&cw_topic=1217

Improving the Health of Canadians 2005-2006 is a report series focusing on population health. The first report in the series examines healthy transitions to adulthood. The second in the series will be a policy-focused report examining healthy weights. The third in the series will investigate health disparities as a result of location.

17. World Health Organization. "The World Health Report 2005".
http://www.who.int/whr/en/

Health Report, first published in 1995, is WHO's leading publication. Each year the report combines an expert assessment of global health, including statistics relating to all countries, with a focus on a specific subject and on the basis of the National Health Accounts (NHA). The World Health Report 2005 – Make Every Mother and Child Count, says that this year almost 11 million children under five years of age will die from causes that are largely preventable. Among them are 4 million babies who will not survive the first month of life. At the same time, more than half a million women will die in pregnancy, childbirth or soon after. The report says that reducing this toll in line with the Millennium Development Goals depends largely on every mother and every child having the right to access health care from pregnancy through childbirth, the neonatal

period and childhood. Statistical annexes and supporting online database contain the following statistics across all countries, members of WHO:

1. Per capita health expenditures 1998-2002 (Per capita total expenditure on health at average exchange rate (US$);
2. Per capita total expenditure on health at international dollar rate, Per capita government expenditure on health at average exchange rate (US$),
3. Per capita government expenditure on health at international dollar rate, health expenditure and financing indicators 1998-2002 (total expenditure on health as per cent of GDP; general government expenditure on health as per cent of total expenditure on health; private expenditure on health as per cent of total expenditure on health; general government expenditure on health as per cent of total government expenditure ; external resources for health as per cent of total expenditure on health; social security expenditure on health as per cent of general government expenditure on health; out-of-pocket expenditure as per cent of private expenditure on health; private prepaid plans as per cent of private expenditure on health, etc.)

1. Organization for Economic Cooperation and Development. "Health At a Glance- OECD Indicators 2005". http://www.oecd.org/

This publication provides the latest comparable data and trends on different aspects of the performance of health systems in OECD countries on the basis of the System of Health Accounts (SHA). It provides striking evidence of large variations across countries in indicators of health status and health risks, and in the costs, allocation of resources and outputs of health systems. Compared to the previous edition, it contains an expanded set of indicators related to health promotion and disease prevention, reflecting growing policy interest in striking a better balance between spending on prevention and care. Each indicator in the book is presented in a user-friendly format, consisting of charts illustrating variations across countries and over time, brief commentaries highlighting the key findings conveyed by the data, and a methodological box on the definition of the indicator. In addition, a statistical annex provides additional information for each indicator, often presenting long time series going as far back as 1960. This publication takes as its basis **OECD Health Data 2005**, the most comprehensive database on health and health systems across the 30 OECD member countries. In terms of data on expenditures and financing, it includes the following:

- National Expenditures on health
    - Total expenditures on health (current, investment on medical facilities, public/private expenditure on health, public/private investment on medical facilities);
    - Expenditures on personal health care (public/private)
    - Expenditures on collective health care (public/private)
    - Expenditures on prevention and public health (public/private)

    - Expenditures on health administration and insurance (public/private)
    - Expenditures on health R&D (public/private)
    - Price index for Canada and OECD (general government, social security, out-of-pocket, private insurance, all other)
- Expenditures on medical services by function of care
    - Expenditures by functions (in-patient care (public/private), ambulatory and out-patient care (public-private), home care, ancillary services to health care)
- Expenditures on medical goods to out-patients (total public/private, pharmaceuticals, therapeutic appliances)
- Expenditures on medical services by provider industry (hospital (public/private), nursing and residential care (public/private), ambulatory health care providers (public/private), retail sale and other providers of medical goods (public/private), public health organizations (public/private), health care administration (public/private), other)
- Expenditures on medical services by source of funding
- Health care financing
    - Health care financing by sources of funds (general government, social security, out-of-pocket payments, private insurance, all other)
- Health care coverage (total, in-patient acute care, out-patient medical care, pharmaceutical goods)

19. Zeynep Or. "Determinants of Health Outcomes in Industrialized Countries: A Pooled, Cross-Country, Time-Series Analysis", OECD Economic Studies, WP No.30, 2000.

An econometric paper, providing a theoretical framework for specification of a health production function. Issues on the measurement of the health status, impacts of the medical system and environmental factors are taken into consideration. Results of the regression are discussed. The conclusion is that there is a significant positive relationship between public health financing and health outcomes. However, results strongly suggest that environmental factors are more important than medical inputs in explaining variation in premature mortality, particularly the occupational status.

Health Care Markets, Pricing, Technological Innovation, and Evaluation

1. Triplett J. "Measuring the Prices of Medical Treatments", Brookings Institution Press, 1999.

How serious is medical care inflation in the United States? For many years, price indexes for medical care have outstripped the overall rate of inflation. For example, between 1986 and 1996, the medical care component of the Consumer Price Index (CPI) rose 6.5 per cent per year, roughly exceeding the annual increase in the overall CPI during this period by 75 per cent.

Many economists, however, believe that economic statistics on medical care do not accurately measure medical care price changes because it is especially difficult to construct accurate price indexes for medical markets. Some very recent research, reported in this volume, suggests that—contrary to the usual presumption of runaway medical inflation—prices for at least some medical care interventions are not rising rapidly and may even be falling.

Understanding medical care inflation is important for policy issues such as medical care cost containment. Medical care price indexes also affect other economic statistics on medical care, including national accounts and the national health accounts. Understanding economic trends in the medical care sector is vitally dependent on accurate medical care price measures.

This volume, the result of a conference cosponsored by the Brookings Institution and the American Enterprise Institute, brings together state-of-the-art methodological and empirical work on the measurement of medical outcomes and prices.

2. Michael Rachlis. "Prescription for Excellence: How Innovation Is Saving Canada's Health Care System", featured by Canadian Healthcare Association, Harper Collins Publishers Ltd., Toronto, ON

Michael Rachlis argues that the cure for Canada's health delivery system is not more money and not privatization; he says the answer can be found in the system itself. He describes various innovations and best practices across the health system that have improved health delivery and enhanced quality for the patients and health professionals. Using an evidence-based storytelling approach, Rachlis argues that innovation will be the key to success, along with maintaining our publicly-funded support for our hospitals and doctors.

3. Hjertqvist J. "Health Care Treatment Prices in Swedish Hospitals", Atlantic Institute for Market Studies Bulletin, December 2002.

A discussion on the positive effects of the reintroduction of prices for health care procedures in Swedish hospitals. The view is that among the important reforms to the medicare model in Stockholm, no single step has been of greater importance than the restoration of prices for health care procedures in hospitals. The acronym for the price tag per treatment is known as "Diagnostic Related Group". The DRG price mechanism, introduced in 1990, underpins the remarkable increases in productivity and efficiency in the delivery of publicly-funded Swedish health care. By attaching an official price tag to every hospital treatment, government budget makers enabled providers both to improve their performance and to shift the system's focus to the needs of health-care consumers.

4. Organization for Economic Cooperation and Development. "Health Technologies and Decision Making", 2005. http://www.oecd.org/document/55/0,2340,en_2649_34537_35589431_1_1_1_1,00.html

The introduction of new technologies has brought improvements over the past few decades to the health of the citizens of OECD member countries. There is, however, widespread variation in how such new, as well as existing, technologies are used across OECD countries, indicating that the most effective and efficient technologies may not always be the ones employed. Encouraging the uptake of the most efficient and effective health-care technologies remains a significant policy challenge in many OECD countries. The work described in this report, carried out with a group of experts drawn from OECD countries, examined how improvements could be made to integrate effective and efficient technologies into health-care systems. Analysis focused on the production of evidence, primarily in the form of health technology assessment (HTA), and the way that such evidence is subsequently used in decision making. The way decisions are made and implemented was also analyzed, including examining the range of policy tools used to put decisions into actual practice. The conclusions presented in this report drew on analysis of a survey of how health technologies are integrated into health systems, focusing on:

- How decisions at the national, regional and hospital levels are made.
- How evidence (particularly HTA-based evidence) is produced and used in decision making.
- How aspects of health-care systems facilitate or impede the implementation of decisions.

5. Doonan M. "The Economics of Prescription Drug Pricing", Council on Health Care Economics and Policy US), The National Press Club, Washington D.C. March 2001. http://sihp.brandeis.edu/council/pubs/DoonanRxPricing.pdf

A complex mix of government regulation and market competition characterizes the economics of prescription drug pricing. This paper provides background information necessary to understand this dynamic and evaluate potential change. It examines prescription drug price trends over time. Increasing growth is attributed to development and marketing of new products and the increasing volume of drugs prescribed. The growing number of people with prescription drug insurance coverage also increases demand and price as does growth in direct-to-consumer advertising. Drug price inflation is less of a factor. Pricing is strongly affected by patent law and the regulatory structure that partially determines the time and cost to bring a new drug to market. The industry pricing and cost structure is examined with a focus on how potential changes in pricing might impact future investment in research and development, and innovation. Next, the paper describes cost control strategies in certain organizations such as pharmacy benefit management organizations (PBMs), managed care organizations, the Medicaid program, and other government purchasers (VA, federal employees). A number of strategies are examined that have been tried or proposed to control costs including: increased cost sharing for consumers, formularies, discounts and rebates, reference pricing, the greater use of generics, and disease management. The final section examines international comparisons and re-importation strategies.

6. Lorenzi N., Ash J., Einbinder J., McPhee W. "Transforming Health Care Through Information", Springer Publishing, 2004.

This book draws upon the experience of the foremost experts in medical informatics to address the complex challenges faced when healthcare organizations implement technological changes. The case studies illustrate specific and practical solutions employed to overcome such challenges. Key topics include organizational structures; project planning and management; preparing for change; leadership; the role of healthcare providers in technological changes, and more.

7. Folland S., Goodman A., and Stano M. "Economics of Health and Health Care", Pearson Education, 2004.

A book on the economics of health and health care that develops and explains economic ideas and models to reflect the full spectrum of the most current health economics literature. It uses core economic themes as basic as supply and demand, as venerable as technology or labor issues, and as modern as the economics of information. Review of the basic economic tools, supply and demand, information and insurance markets, the organization of health insurance markets and managed care, description for the key players in the health care sector (NPOs, hospitals and long-term care, health care labour market and professional training, pharmaceutical industry), topics on government intervention in health care markets and such special topics as tool of economic evaluation.

8. Mooney G. "Economics of Medicine and Health Care", 3rd Edition, Pearson Education, 2003.

This textbook covers major topics in health economics such as market, nature of the commodity health care, issues on the health status and other outcome measurement, valuation of outputs, medical ethics, and economic evaluation.

9. Clewer A., and Perkins D. "Economics For Health Care Management", Pearson Education, 1997.

The authors have tackled the subject from the point of view of the profession rather than that of the economist. International concern about health care costs has resulted in widespread policy reforms, most notable has been the introduction of market mechanisms for the provision of public health care services.

The book summarized the fundamental questions in health care economics. Chapters are devoted to the discussion of the measurement and valuation in healthcare, the economic theory of demand, econometrics of demand and supply analysis, price determination, production and cost functions, short-run and long-run marginal analysis, theory of the health care organization, health care in the competitive frameworks and economic appraisal.

10. Michael F. Drummond, Mark J. Sculpher, George W. Torrance, Bernie J. O'Brien, and Greg L. "Standard Methods for the Economic Evaluation of Health Care Programmes", 3rd edition, Oxford University Press, 2005.

This book provides a summary of the methods of economic evaluation of health care programs. The methodological features of the basic forms of analysis are explained in great detail with special emphasis of the latest views on productivity costs, the characterisation of uncertainty and the concept of net benefit. It contains a discussion on

the methods of analysis of the patient-level data and decision-analytic modelling. There is also discussion of new methodological approaches, including cost effectiveness acceptability curves, net benefit regression, probabilistic sensitivity analysis and value of information analysis, use of economic evaluation, including the use of cost-effectiveness thresholds, equity considerations and the transferability of economic data.

Data Sources

1. Statistics Canada. "The Business Register (BR): Counts of Establishments". Statistics Canada, BR database, 2003.

The Business Register database is the product of the Business Register Division (BRD) of Statistics Canada. Business Register (BR) is the central repository of information on businesses in Canada. The BR provides comprehensive coverage of Canadian industries on the basis of the North America Industrial Classification System and a set of stratification variables such as industrial classification, gross business income, number of employees and total assets for all active businesses in Canada that have a corporate income tax (T2) account, are an employer or have a GST account with an annual gross business income of over $30,000. The businesses are classified according to 9 cohort groups by employment size. BR allows production of the estimates of the number of businesses and employment by industrial (NAICS) and standard geographic classifications. The most recent release of the Business Register was in 2005, containing data up to 2003.

2. Informetrica Limited. "Estimates of Employment for Business Register Size of Establishment Cohorts".

Informetrica produces estimates of employment for the BR's Size of Establishment Cohorts on the basis of corresponding counts and employment assumptions for each cohort. See employment assumptions in Appendix 1.

3. Statistics Canada. "Estimates of Employment and Earnings by Industry and Occupation", Labour Force Survey, 2003 and 2004.

Provided on special request by HRSDC.

4. The Informetrica Model (TIM) databases and simulations on the basis of System of National Accounts and Input-Output Model.

5. World Health Organization (WHO). National Health Accounts database.
http://www.who.int/nha/country/can/en/

WHO publishes key indicators of the National Health Accounts for all countries, members of WHO, including Canada, on an annual basis from 1998 forward. Available data are for the period 1998-2002 for the following:

- Total expenditure on health as per cent of Gross domestic product
- General government expenditure on health as per cent of Total expenditure on health
- Private sector expenditure on health as per cent of Total expenditure on health
- General government expenditure on health as per cent of General government expenditure
- Social Security funds as per cent of General government expenditure on health
- Prepaid and risk-pooling plans as per cent of Private sector expenditure on health
- Private households' out-of-pocket payment as per cent of Private sector expenditure on health
- External resources on health as per cent of Total expenditure on health
- Total expenditure on health per capita at exchange rate
- Total expenditure on health per capita at international dollar rate
- General government expenditure on health per capita at exchange rate
- General government expenditure on health per capita at international dollar rate

6. Organization for Cooperation and Economic Development. Health Data 2005: Statistics and Indicators for 30 Countries, CD-ROM.

Aside from the standard health indicators, this database also contains detailed economic data on:

- health care resources (employment, in-patient beds, employment-to-beds ratio, medical technology, education in health and care),
- health expenditures (total, public/private, personal, collective, prevention and public health, health administration and insurance, etc.),
- expenditures on medical services (by functions, in-patient care, out-patient care, home care, ancillary services)
- medical goods dispensed to out-patients (total, pharmaceuticals, other medical non-durables, therapeutic appliances)
- current health expenditures by provider
- price indexes
- health care financing (by source of funds, health care coverage, social expenditure)
- pharmaceutical market indicators (industry activity, consumption, sales,

The CD-ROM contains actual data up to 2003 and OECD estimates for 2004.

7. Canadian Institute for Health Information. Canadian Health Services Databases

CIHI is responsible for many databases and registries that capture information across the continuum of health care services in Canada. This information supports research and analysis for planning and policy making purposes.

- Canadian Joint Replacement Register (CJRR) - captures information on hip and knee joint replacements performed in Canada and follows joint replacement patients over time.
- Canadian Medication Incident Reporting and Prevention System (CMIRPS) - A new information system that captures data related to medication incidents in Canada
- Canadian Organ Replacement Register (CORR) - records information on the level of activity and outcomes of vital organ transplantation and renal dialysis activities in Canada.
- Continuing Care Reporting System (CCRS) - contains demographic, administrative and clinical data for residents in facility-based continuing care in Canada.
- Discharge Abstract Database (DAD) - contains demographic, administrative and clinical data for hospital discharges (inpatient acute, chronic, rehabilitation) and day surgeries in Canada.
- Home Care Reporting System (HCRS) - contains demographic, administrative and clinical data for clients receiving home care services in Canada.
- Hospital Mental Health Database (HMHDB) - contains demographic and medical diagnosis information for inpatient hospital stays for mental health disorders in Canada.
- Hospital Morbidity Database (HMDB) - contains a count of cases separated (discharge or death) from a hospital, by primary diagnoses, for all provinces and territories.
- National Ambulatory Care Reporting System (NACRS) - includes data for all hospital-based and community-based ambulatory care: day surgery, outpatient clinics and emergency departments. Currently contains Ontario emergency data only.
- National Rehabilitation Reporting System (NRS) - A national health information system for adult inpatient rehabilitation services.
- National Prescription Drug Utilization Information System (NPDUIS) - A pan-Canadian information system housing information related to Drug Benefit Formularies, drug claims, drug plans and population statistics.
- National Trauma Registry (NTR) - contains demographic, diagnostic and procedural information on all admissions to acute care hospitals in Canada due to injury.
- OECD Health Database (Canadian Segment) (OECD) - CIHI and Statistics Canada maintain the Canadian segment of the OECD Health Database, which

includes information on health care utilization among member countries of the Organisation for Economic Co-operation and Development (OECD).

- Ontario Mental Health Reporting System. Will contain demographic, administrative and clinical data for clients receiving inpatient mental health care in Ontario. (OMHRS)
- Ontario Trauma Registry (OTR) - contains demographic, diagnostic and procedural data on all admissions to acute care hospitals in Ontario due to injury, plus detailed data on major trauma, and data on all deaths in Ontario due to injury.
- Therapeutic Abortions Database (TADB) - contains basic demographic and medical information related to Canadian patients obtaining therapeutic abortions in Canada and some American states.
- Canadian Health Spending Databases
- In 2001, total health care spending in Canada was projected to have exceeded $100 billion (National Health Expenditure Trends, 1975-2001). CIHI's health spending databases track where the money comes from and how it is spent, at both the macro and selected micro levels.
- Macro-Level Health Spending
- National Health Expenditure Database (NHEX) contains information on all health expenditures in Canada, by spending category and source of finance.
- Hospital Spending
- Canadian MIS Database (CMDB) contains financial and statistical information on hospitals, plus limited data on regional health authorities, across Canada.
- Physician Services Spending
- National Physician Database contains data on fee-for-service physician payments in Canada.
- Drug Spending
- National Prescription Drug Utilization Information System (NPDUIS)—A pan-Canadian information system housing information related to drug benefit formularies, drug claims, drug plans and population statistics.
- Drug Expenditure—Drug expenditure data in this report are obtained from the National Health Expenditure Database (NHEX) maintained by the Canadian Institute for Health Information (CIHI). Drug expenditure data in NHEX are macro-level data and do not allow for decomposition of prescription costs or drug classes.