



4. Delivery arrangements 1: Infrastructure

Michael G. Wilson, Cristina A. Mattison and John N. Lavis

Infrastructure – Places where care is provided	126
Infrastructure – Supports for care	150
Capacity planning	164
Capital spending	165
Conclusion	167

Copyright © 2016 McMaster University. All rights reserved.

McMaster University is making this book chapter freely available to advance the public interest. However, the University does not give permission for this chapter to be posted on websites other than the website of the McMaster Health Forum, or to be circulated electronically. The full book is available for purchase on Amazon and other online stores.

This book chapter and the information contained herein are for informative, public interest purposes only, are provided on an as-is basis (without warranty, express or implied), and are not meant to substitute for medical, financial or legal advice. McMaster University, the editor, the chapter authors and the publisher assume no responsibility or liability for loss or damage caused or allegedly caused, directly or indirectly, by the use of information contained in this book chapter, and they specifically disclaim any liability incurred from its use.

The McMaster Health Forum welcomes corrections, updates and feedback, as well as suggestions for conditions, treatments and populations that are not covered in the book, so that they can be considered for incorporation in a future eBook and in future print editions of the book. Any corrections, updates, feedback and suggestions provided do not certify authorship. Please send your comments to mhf@mcmaster.ca.

The appropriate citation for this book chapter is: Wilson MG, Mattison CA, Lavis JN. Delivery arrangements 1: Infrastructure. In Lavis JN (editor), Ontario's health system: Key insights for engaged citizens, professionals and policymakers. Hamilton: McMaster Health Forum; 2016, p. 123-74.

ISBN 978-1-927565-12-4 (Online)
ISBN 978-1-927565-11-7 (Print)

Key messages for citizens

- The health system's infrastructure includes both the places where care is delivered (e.g., hospitals) and the supports for that care (e.g., electronic health records and platforms for data analysis, evidence synthesis, and guideline development).
- Some of this infrastructure is planned for and financially supported by government (e.g., Community Care Access Centres, private not-for-profit hospitals, and local public health agencies) whereas other parts are not, or are indirectly supported with government funds (e.g., community support service agencies, most primary-care practices, and Independent Health Facilities).
- Technology is used to support the delivery of care through a teletriage system called Telehealth Ontario (to assess a health problem and provide advice, but not diagnose or prescribe treatment) and through telemedicine (videoconferencing to provide clinical care at a distance through the Ontario Telemedicine Network), as well as through an increasing number of patient portals that provide patients with access to their personal health information.
- Charitable donations support some infrastructure (e.g., hospitals or technology), but often not its ongoing operating costs.

Key messages for health professionals

- Most health professionals work in one of three types of settings outside a citizen's home – 1) offices, clinics, pharmacies and laboratories in the community; 2) hospitals; and 3) long-term care homes – most of which are located in independently owned or leased space.
- Facilities such as hospitals and long-term care homes, and the professionals who provide care within them, are typically operating with very little reserve capacity.
- Ontario has the third highest percentage of physicians who are using electronic medical records in Canada (83% compared to 87% in Alberta and 85% in British Columbia), but 72% of the physicians in Ontario who are not yet using electronic medical records report that they do not intend to do so in the next two years.

Key messages for policymakers

- Many services traditionally provided in capital-intensive hospitals are now being provided in community-based speciality clinics (e.g., low-risk diagnostic and therapeutic procedures in Independent Health Facilities).
- Ontario is among a relatively small number of jurisdictions globally that hosts a high number of centres and initiatives that can support improvements to the care provided to Ontarians based on the best available data, evidence and guidelines.
- The Ministry of Health and Long-Term Care, Local Health Integration Networks and Cancer Care Ontario carry out capacity planning for select types of infrastructure (e.g., hospitals and regional cancer centres), but there is no formal approach used in many parts of the health system.
- Approximately 80% of capital spending is publicly financed, and the amount allocated to health-system infrastructure in Ontario's 2016-17 provincial budget is \$1.45 billion, much of which (87%) goes to hospitals.

...

In this third of four chapters focused on the building blocks of the health system, we focus on three areas: 1) infrastructure, which includes the places where care is delivered and the supports for that care; 2) capacity planning (i.e., determining what infrastructure is needed in future); and 3) capital spending (i.e., making investments to develop needed infrastructure). For the places where care is delivered, we focus primarily on the infrastructure used in the six sectors that we describe in more detail in Chapter 6, namely home and community care, primary care, specialty care, rehabilitation care, long-term care, and public health. For the supports for care, we focus on:

- 1) information and communication technology that support those who receive care (e.g., a teletriage system called Telehealth Ontario for providing advice, telemedicine for providing clinical services remotely, and patient portals for giving access to personal health information and supports for self-management) and those who provide care (e.g., electronic medical records or EMRs); and
- 2) platforms for data analysis, evidence synthesis and guideline develop-

ment to support improvements to the care provided to Ontarians.

Most of the chapter is dedicated to highlighting the key features of, and observations about, the health system's infrastructure, with less detail provided about capacity planning and capital spending given the limited amount of information available about these activities. In describing the available infrastructure, we include both data about the amount of infrastructure (e.g., number of hospitals) and data about how much the infrastructure is used (e.g., number of emergency department visits). Details about the governance and financial arrangements within which infrastructure is used, and about the health workforce that uses it (i.e., the other three building blocks of the health system) are covered in Chapters 2, 3 and 5. Additional details about infrastructure use are also addressed for each sector (Chapter 6), for select conditions (Chapter 7) and treatments (Chapter 8), and for Indigenous peoples (Chapter 9).

Infrastructure – Places where care is provided

In Table 4.1 we give an overview of where care is provided in Ontario by sector, and a brief description of each sector below. We focus on care included in the 'basket of services' that receives full or partial public (i.e., government) funding. We provide information about other types of care that typically do not receive public funding (e.g., dentistry and complementary and alternative therapy) in Chapter 8.

Table 4.1: Infrastructure as of 2014, by sector

Type of infrastructure	Number
Home and community care	
Community Care Access Centres	14
Community support service agencies	>800
Mental health and addiction organizations	>300
Diabetes education centres	245
Primary care	
Clinic models	
Family Health Organizations	475
Comprehensive Care Model practices	379
Family Health Groups	237
Family Health Teams	184
Community Health Centres ¹	105
Nursing stations ²	72
Nurse Practitioner-led Clinics	26
Family Health Networks	21

Continued on next page

Type of infrastructure	Number
Primary care – continued	
Targeted models	
Pharmacies	4,012
Midwifery clinics	103
Aboriginal Health Access Centres ¹	10
Birthing centres	3
Specialty care	
Hospitals	
Private not-for-profit hospitals ³	151
Private for-profit hospitals	6
Condition-specific care facilities	
Regional cancer centres	14
Specialty psychiatric hospitals	4
Other sources of specialty care	
Independent Health Facilities	934
Private laboratories	325
Out of Hospital Premises	273
Rehabilitation care	
Community Physiotherapy Centres ⁴	>300
Hospitals for which rehabilitation is a significant focus	173
Children's Treatment Centres	21
Long-term care	
Long-term care homes	636
Hospital-based continuing care facilities	117
Public health	
Local public health agency satellite offices	105
Local public health agencies	36
Public health laboratories	11
Cross-sectoral	
Health Links ⁵	82

Sources: 4; 103-115

Notes:

¹New capital projects announced in April of 2014 include 12 Community Health Centres and four Aboriginal Health Access Centres.

²The 72 nursing stations include 43 nursing stations in small and rural communities funded by Local Health Integration Networks (LHINs), with funds from the Ministry of Health and Long-Term Care, as well as 29 federal government-funded nursing stations in First Nations communities (four community operated and 25 run by Health Canada nurses).

³The legislation officially refers to these as public hospitals, however they are private not-for-profit hospitals.

⁴Community Physiotherapy Centres provide publicly covered services for seniors and other eligible patients. We were not able to identify the total number of physiotherapy clinics in Ontario, which would include those that receive public payment (e.g., Community Physiotherapy Centres), as well as those that exclusively provide services paid for privately.

⁵Health Links are in the process of being implemented and the total number is anticipated to be 100.

Home and community care

The 14 Community Care Access Centres (CCACs) – one for each Local Health Integration Network (LHIN) – currently have responsibility for determining need for home and community care, and then funding that care up to the limit set for that level of need. As we outline in Table 4.2, the number of Ontarians accessing home and community care through

CCACs has increased 18% from 2010-11 to 2014-15, with the majority of clients being 65 years of age or older.(1) Moreover, Table 4.2 points to the wide range of services provided, including nursing, rehabilitation and personal support and homemaking services, all of which have seen total service provision increase over the same time frame. The increases in rehabilitation services are exclusively driven by large increases in physiotherapy visits. However, as we describe in Chapter 10, the *Patients First Act, 2016* amended 20 existing acts. Key changes will include an expansion of the role of the LHINs for planning and integrating home and community care and primary care, with CCAC functions being absorbed into the

LHINs.(2) As a result, this component of infrastructure will likely change significantly in the near future.

While the CCACs coordinate access to and fund home and community care, services are delivered through many points of contact. The largest source of home and community care is through the more than 800 private not-for-profit and private for-profit community support service agencies that provide professional, personal support and homemaking services to more than 800,000 community-dwelling Ontarians (including older adults and people with physical disabilities).(3)

Table 4.2: Profile of Community Care Access Centre clients, employees and services, 2010-11 to 2014-15

Indicators	Numbers (and % of total)			Four-year percentage change ²
	2010-11	2013-14	2014-15 ¹	
Profile of clients served				
Clients served	616,952	699,020	713,493	18%
Age 65+	345,493 (56%)	405,432 (58%)	—	24%
Age 19-64	172,747 (28%)	223,686 (32%)	—	24%
Age 0-18	98,712 (16%)	69,902 (10%)	—	-28%
Clients placed to a funded long-term care home	25,761	26,374	~27,000	<1%
Full-time employees (approximately)	5,701	6,627	6,684	19%
Profile of services provided				
Service units	29,821,293	37,991,053	38,687,656	32%
Personal support/homemaking hours	20,965,448	27,719,897	28,529,882	40%
Nursing	7,606,320	7,980,381	8,344,089	8%
Nursing visits	5,799,127	5,713,359	5,932,298	-0.5%
Shift nursing hours	1,807,193	2,267,022	2,411,791	39%
Rehabilitation	1,249,525	1,623,478	1,782,933	31%
Occupational therapy visits	482,051	553,209	414,416	-18%
Physiotherapy visits	426,690	705,052	778,482	61%
Speech-language therapy visits	242,998	263,571	59,247	-76%
Dietitian service visits	45,384	49,014	48,067	-9%
Social work visits	52,402	52,542	54,519	-22%

Source: Adapted from: 1

Notes:

1 Data not available for the specific reference period are denoted by —.

2 Percentage changes were calculated based on the number of clients served, not the change in the proportion of the total.

Other targeted services complement those provided through community support service agencies and are focused on providing services to specific populations. For example, more than 300 community mental health and addiction organizations provide community mental health services (e.g., intensive case management, assertive community treatment, crisis intervention, and early psychosis intervention), drug and alcohol addiction support and treatment, as well as supports for problem gambling.(4) Also, 245 diabetes education centres provide education and support for adults and their families, individual and group counselling for patients and family members, and life plans to minimize diabetes-related symptoms.(5)

Primary care

Primary care can be accessed by Ontarians through clinic-based models and targeted models (i.e., for specific populations, locations or products and services). Most clinic-based primary care is provided by family physicians working in fee-for-service models (what the Ministry of Health and Long-Term Care calls Comprehensive Care Model practices and Family Health Groups) or in blended capitation models for groups of physicians (who may not necessarily be located in the same office) that the Ministry of Health and Long-Term Care calls Family Health Networks and Family Health Organizations (see Chapter 6 for details about these models).(6)

Team-based care currently reaches 25% of the population through both clinic-based and targeted models of primary care.(7) Team-based care delivered through clinic-based models include:

- 184 Family Health Teams that include a team consisting of family physicians, nurses (including nurse practitioners) and other health

professionals (e.g., social workers and dietitians), with some working in the same location (e.g., for smaller teams) and others working across multiple locations (e.g., for larger teams that serve a city or region);

- 105 Community Health Centres, which consist of interprofessional teams that serve hard-to-service communities and populations that may otherwise have trouble accessing health services; and
- 26 Nurse Practitioner-led Clinics that provide primary-care services that can be delivered within the scope of practice for nurse practitioners.

For targeted team-based primary-care models, 10 Aboriginal Health Access Centres provide community-led primary healthcare, including many services related to chronic-disease prevention and management, as well as a combination of traditional healing, primary care, cultural programs, health-promotion programs, community-development initiatives, and social-support services to First Nations, Métis and Inuit communities.(8)

Access to primary-care providers working within this infrastructure varies within the province with, at the low end, 87% of those living in the North West LHIN and 88% of those living in the North East LHIN reporting having a primary-care provider that they see regularly, as compared to 97% in the South East LHIN.(9) Those in need of primary care but who lack access to a primary-care provider who they see regularly, typically turn to less-than-optimal settings for primary care, such as walk-in clinics, urgent care centres or emergency departments (or forgo seeking care altogether).

Other targeted models of primary care in the province include:

- 4,012 pharmacies, which are increasingly providers of drug-related primary-care services (e.g., by filling prescriptions, providing medication counselling, providing additional services such as counselling to support smoking cessation and diabetes management, and providing flu shots);(10)
- 103 midwifery clinics, which provide primary care to low-risk pregnant women throughout pregnancy, labour and up to six-weeks postpartum; and
- three midwifery-led birthing centres, which provide out-of-hospital births for midwifery clients in Ottawa, Six Nations of the Grand River (near Hamilton), and Toronto.

Also, Rural and Northern Physician Group Agreements support one to seven physicians per location to serve rural and northern communities with a nurse-staffed, after-hours Telephone Health Advisory Service for enrolled

patients seeking care for a range of issues, including chronic diseases.(6)

In terms of pharmacies specifically, there is a fair degree of consolidation, with half of locations being run by: 1) franchises such as Shoppers Drug Mart or banner retailers like Guardian (1,051, 26%); 2) large chains (872, 22%) that have more than 15 stores (e.g., Rexall); and 3) small chains (122, 3%) that have three to 15 stores.(11) However, the number of locations is not an ideal indicator of market share given some franchises and chains likely have higher volumes of sales than independent locations. Unfortunately, Ontario-level market-share data are not publicly available, but Canadian data indicate that nearly two thirds of national market share is held by three companies: 1) Shoppers Drug Mart (35%); 2) Katz Group Pharmacies Inc. (18%), which includes retailers such as Rexall that itself recently purchased Pharmaplus; and 3) Jean Coutu Group PJC Inc. (8%), although the latter's national data are of limited value given that in Ontario it serves only a small area in the east of the province (8.3%).(12)

Specialty care

Specialty care in the province is provided in hospitals, using emergency-service infrastructure, in condition-specific (e.g., cancer or mental health and addictions) facilities, and in a mix of other facilities (e.g., Independent Health Facilities, Out of Hospital Premises, and private laboratories), and with a variety of types of technology (e.g., diagnostic technology). Also, as highlighted in Chapter 3, hospitals are increasingly supported by shared-service organizations that seek to achieve supply chain and operational efficiencies.(13)

Hospitals

There are 151 private not-for-profit hospital corporations with 224 hospital sites in Ontario. The Ministry of Health and Long-Term Care classifies these hospitals as general hospitals, hospitals providing cancer care, convalescent hospitals, hospitals for chronic patients, active treatment teaching psychiatric hospitals, active treatment hospitals for alcoholism and drug addiction, and regional rehabilitation hospitals.(14) The most visible hospitals in many communities are general/teaching hospitals (what the Ministry of Health and Long-Term Care calls 'group A' hospitals), general hospitals with more than 100 beds (group B), and hospitals providing

cancer care (group D, which are a subset of group A) (Table 4.3). A list of general hospitals with fewer than 100 beds (group C) is available through the Ministry of Health Long-Term Care website.(14) Another measure of

Table 4.3: List of general/teaching hospitals, hospitals providing cancer care, and general hospitals with more than 100 beds

City (corporation name where different from name of main hospital site) ¹	Number of sites ¹	Name of sites ²	Hospital group ¹		
			General/ teaching (group A)	Cancer care (group D)	General >100 beds (group B)
Barrie	1	Royal Victoria Regional Health Centre			✓
Belleville (Quinte Healthcare Corporation)	4	Bancroft North Hastings Hospital; Belleville General Hospital; Prince Edward County Memorial Hospital; Trenton Memorial Hospital			✓
Brampton (William Osler Health System)	2	Brampton Civic Hospital; Etobicoke General Hospital			✓
Brantford (Brant Community Healthcare)	2	Brantford General Hospital; The Willet Hospital			✓
Brockville	2	Brockville General Hospital; Brockville General Hospital – Garden Street (formerly St Vincent de Paul Hospital)			✓
Burlington	1	Joseph Brant Hospital			✓
Cambridge	1	Cambridge Memorial Hospital			✓
Chatham (Chatham-Kent Health Alliance)	2	Chatham Public General Hospital; St. Joseph's Hospital			✓
Cobourg	2	Northumberland Hills Hospital; Cobourg District General			✓
Cornwall	1	Cornwall Community Hospital			✓
Guelph	1	Guelph General Hospital			✓

Continued on next page

City (corporation name where different from name of main hospital site) ¹	Number of sites ¹	Name of sites ²	Hospital group ¹		
			General/ teaching (group A)	Cancer care (group D)	General >100 beds (group B)
Hamilton (Hamilton Health Sciences)	6	Chedoke Hospital; Hamilton General Hospital; Juravinski Hospital; Cancer Centre; McMaster University Medical Centre; St. Peter's Hospital; West Lincoln Memorial Hospital	✓	✓	
Hamilton (St. Joseph's Hospital Site)	2	St. Joseph's Hospital; St. Joseph's Hospital – West 5th	✓	✓	
Kingston	1	Kingston General Hospital	✓	✓	
Kingston	1	Hotel Dieu Hospital	✓		
Kitchener	1	St. Mary's General Hospital			✓
Kitchener	2	Grand River Hospital; Kitchener Freeport Hospital			✓
Lindsay	1	Ross Memorial Hospital			✓
London (London Health Sciences Centre)	2	University Hospital; Victoria Hospital	✓	✓	
London (St. Joseph's Health Care)	3	Parkwood Institute; St. Joseph's Hospital; South West Centre for Forensic Mental Health Care	✓		
Markham	2	Markham-Stouffville Hospital; Uxbridge Cottage Hospital			✓
Mississauga (Trillium Health Partners)	2	Credit Valley Hospital; Mississauga Hospital			✓
Newmarket	1	Southlake Regional Health Centre			✓
North Bay	1	North Bay Regional Health Centre			✓
Oakville (Halton Healthcare Services Corporation)	1	Oakville Trafalgar Memorial Hospital			✓

Continued on next page

City (corporation name where different from name of main hospital site) ¹	Number of sites ¹	Name of sites ²	Hospital group ¹		
			General/ teaching (group A)	Cancer care (group D)	General >100 beds (group B)
Orangeville	3	Headwater Health Care Centre; Orangeville Dufferin Area Hospital; Shelburne District Hospital			✓
Orillia	1	Orillia Soldiers' Memorial Hospital			✓
Oshawa (Lakeridge Health)	3	Lakeridge Health Oshawa; Lakeridge Health Port Perry; Lakeridge Health Whitby			✓
Ottawa	1	Children's Hospital of Eastern Ontario	✓		
Ottawa	1	Hôpital Montfort	✓		
Ottawa (The Ottawa Hospital)	4	Ottawa Civic Hospital; Ottawa General Hospital; Ottawa Riverside Hospital; The Ottawa Hospital Rehabilitation Centre	✓	✓	
Ottawa	1	Queensway-Carleton Hospital			✓
Owen Sound (Grey Bruce Health Services)	5	Lion's Head Hospital; Markdale Hospital; Owen Sound Hospital; Southampton Hospital; Wiarton Hospital			✓
Pembroke	1	Pembroke Regional Hospital			✓
Peterborough	1	Peterborough Regional Health Centre			✓
Richmond Hill (Mackenzie Health)	1	Mackenzie Richmond Hill Hospital			✓
Sarnia (Bluewater Health)	2	Bluewater Health Hospital; Petrolia Charlotte Eleanor Englehart Hospital			✓
Sault Ste. Marie (Sault Area Hospital)	3	Sault Area General Hospital; Sault Area Hospital - Richards Landing; Sault Area Hospital - Thessalon			✓

Continued on next page

City (corporation name where different from name of main hospital site) ¹	Number of sites ¹	Name of sites ²	Hospital group ¹		
			General/ teaching (group A)	Cancer care (group D)	General >100 beds (group B)
Simcoe	1	Norfolk General Hospital			✓
St Catharines (Niagara Health System)	6	Fort Erie-Douglas Memorial Hospital; Greater Niagara General Hospital; Niagara-on-the-Lake Hospital; Port Colborne General Hospital; St. Catharines Hospital; Welland County General Hospital			✓
Stratford	1	Stratford General Hospital			✓
Sudbury	1	Health Sciences North	✓	✓	
Thunder Bay	1	Thunder Bay Regional Health Sciences Centre	✓	✓	
Timmins	1	Timmins and District General Hospital			✓
Toronto	1	The Hospital for Sick Children (SickKids)	✓		
Toronto	2	Humber River Hospital - Finch; Humber River Hospital - Wilson			✓
Toronto	2	North York General Hospital; Branson Ambulatory Care Centre			✓
Toronto	2	Rouge Valley Ajax and Pickering; Rouge Valley Centenary			✓
Toronto	2	The Scarborough General Hospital; The Scarborough Hospital - Birchmount			✓
Toronto (Sinai Health System)	1	Mount Sinai Hospital	✓		
Toronto	1	St. Joseph's Health Centre			✓
Toronto	1	St. Michael's Hospital	✓		
Toronto	2	Sunnybrook Health Sciences; Sunnybrook Health Sciences - Orthopaedic and Arthritic	✓	✓	

Continued on next page

City (corporation name where different from name of main hospital site) ¹	Number of sites ¹	Name of sites ²	Hospital group ¹		
			General/ teaching (group A)	Cancer care (group D)	General >100 beds (group B)
Toronto (Toronto East Health Network)	1	Michael Garron Hospital			✓
Toronto (University Hospital Network)	3	Princess Margaret Hospital/ Ontario Cancer Institute; Toronto General Hospital; Toronto Western Hospital	✓	✓	
Toronto	1	Women's College Hospital	✓		
Windsor	4	Windsor Regional Hospital; Windsor Metropolitan General Hospital; Windsor Regional Hospital – Ouellette; Windsor Regional Cancer Centre		✓	✓
Windsor	1	Hotel Dieu Grace General Hospital			✓
Woodstock	1	Woodstock General Hospital			✓

Source: 14

Note:

¹ Data is based on 2009 publicly available lists from the Ministry of Health and Long-Term Care.

² Where possible, an effort has been made to update site names using publicly available information from hospital websites.

scale is the number of acute-care beds per 1,000 people, and as of 2012, Ontario has fewer than either Canada as a whole or countries that are members of the Organisation of Economic Cooperation and Development (OECD), with 1.4 acute-care beds per 1,000 people in Ontario compared to 1.7 in Canada and 3.3 in OECD countries.(15)

A sense of the scale of the hospital infrastructure can also be captured through the volume of care they provide. Volume of care includes ambulatory-care visits (e.g., hospital visits for diagnosis, observation, consultation, outpatient treatment, and rehabilitation services), day/night care visits (e.g., hospital visits for surgical procedures that do not require inpatient care), emergency room visits, and inpatient care (Table 4.4). Ontario has a low average length-of-stay in hospital (6.6 days compared to 7.6 in Canada and across OECD countries), which means that more patients can be admitted and discharged for the same scale of infrastructure.(15)

Table 4.4: Number (in thousands) of ambulatory care visits, day/night care visits, emergency visits, inpatient admissions and inpatient days, 2000-01, 2010-11 and 2013-14

Indicators	Ontario ¹				Canada
	2000-01	2010-11	2013-14	13-year percentage change	2013-14
Ambulatory care service visits	14,889	18,126	18,944	27%	35,686
General	14,141	16,607	17,519	24%	31,690
Specialty - psychiatric	90	770	787	780%	907
Specialty - pediatric	381	439	460	21%	983
Specialty - other	170	—	—	—	766
Rehabilitation	105	10	8	-92%	126
Extended care/chronic	155	299	170	9%	1,214
Day/night care visits	1,859	3,479	3,472	87%	6,493
General	1,786	3,324	3,344	87%	5,627
Specialty - psychiatric	8	74	55	618%	96
Specialty - pediatric	22	39	45	110%	135
Specialty - other	4	—	—	—	379
Rehabilitation	8	—	—	—	37
Extended care/chronic	32	42	28	-14%	219
Emergency visits	5,245	5,689	6,002	14%	13,423
General	5,135	5,448	5,755	12%	12,339
Specialty - psychiatric	7	99	90	1190%	94
Specialty - pediatric	103	118	136	32%	268
Specialty - other	—	—	—	—	64
Rehabilitation	—	—	—	—	10
Extended care/chronic	—	24	22	—	649
Inpatient admissions	1,148	1,168	1,217	6%	2,466
General	1,095	1,100	1,165	6%	2,286
Specialty - psychiatric	15	25	15	-1%	22
Specialty - pediatric	19	21	22	15%	46
Specialty - other	11	7	6	-45%	35
Rehabilitation	3	3	0.2	-93%	3
Extended care/chronic	6	12	9	69%	74
Inpatient days	8,454	10,204	9,254	9%	20,278
General	7,343	7,912	7,875	7%	17,312
Specialty - psychiatric	561	1,121	794	74%	1,274
Specialty - pediatric	130	145	148	14%	282
Specialty - other	50	29	27	-45%	176
Rehabilitation	162	66	14	-92%	173
Extended care/chronic	209	931	397	90%	1,063

Source: 116

Note:

¹ Data not available for the specific reference period are denoted by —.

While all types of visits have increased between 2000-01 and 2013-14, day/night care visits (e.g., for surgeries that now only require a day visit instead of inpatient admission) have increased the most overall (87%) (Table 4.4). The most striking increases are for psychiatric care, whether that care was provided through ambulatory-care service visits (780%), day/night care visits (618%) or emergency visits (1,190%).

Acute inpatient hospitalizations over the last decade and a half (from 1995-96 to 2011-12), on the other hand, have decreased by 33% (slightly more than the Canadian average of 31% over the same time period) (Table 4.5). As well, the average length of acute inpatient hospital stay has decreased by 7% (almost double the average decrease in Canada of 4%).

Table 4.5: Age- and sex-standardized inpatient hospital utilization, 1995-96 and 2011-12

	Ontario		Canada	Ontario	Canada
	1995-96	2011-12	2011-12	16-year percentage change ¹	16-year percentage change ¹
Acute inpatient hospitalization rate per 100,000 ¹	10,466	7,038	7,672	-33%	-31%
Average length of acute inpatient hospital stay (in days) ²	6.9	6.4	7.2	-7%	-4%

Source: 117

Notes:

¹ Percentage change is from 1995-96 to 2011-12.

² Age- and sex-standardized based on the 2001-02 post-censal Canadian population

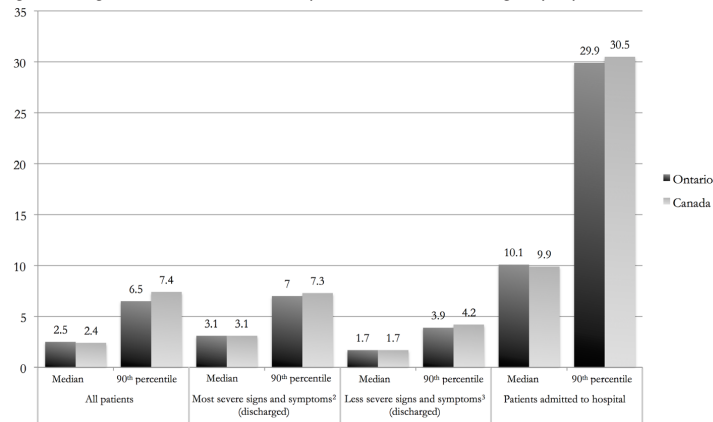
In addition to these private not-for-profit hospitals, there are also six private for-profit hospitals (Beachwood Private Hospital, Bellwood Health Services, Don Mills Surgical Unit, Shouldice Hospital, St. Joseph's Infirmary and Private Hospital, and Woodstock Private Hospital), which were grandfathered under the *Ontario Private Hospitals Act, 1990* when hospital insurance was introduced in Ontario.(16) All of these are small facilities, although Shouldice (89 beds) is larger than the other hospitals, which have 12 to 35 beds. Three of the hospitals provide care to chronically ill patients with a focus on complex continuing long-term care (St. Joseph's and Woodstock) and palliative care (Beachwood). The other hospitals provide alcohol-addiction treatment (Bellwood Health Services), general surgical procedures (Don Mills Surgical Unit), and abdominal wall and hernia surgery (Shouldice).

Emergency services infrastructure

Emergency services, which consist of land and air ambulance services and care in emergency departments, are often the entry point into hospital-based care. Land and air emergency medical services provide emergency pre-hospital care. Land ambulance services are coordinated and provided through 53 certified land ambulance operators (which are a mix of private not-for-profit hospitals, private for-profit companies, municipal governments, First Nations bands, and volunteer providers), 19 Central Ambulance Communication Centres, three Ambulance Communications Services, and seven regional land ambulance base hospitals.(17) Air ambulance services across Ontario are provided by Ornge (a not-for-profit corporation) to approximately 18,000 patients per year through its fleet that consists of 10 helicopters and 10 airplanes, with its services coordinated by the Operations Control Centre.(18; 19) In addition, Ornge provides land paramedic services for critically ill patients in the greater Toronto area, Ottawa and Peterborough regions.(20)

For in-hospital emergency care, hospitals managed 5.8 million emergency department visits in 2014, which accounted for 57% of all emergency department visits across Canada that year.(21) The majority of visits are handled in large (40%) and medium (23%) community hospitals with the remaining patients coming to teaching hospitals (21%) and small community hospitals (16%). As displayed in Figure 4.1, the median time (in hours) spent in emergency departments in Ontario is 2.5, which is approximately the same as the Canadian median of 2.4 hours. However, the time spent by Ontarians whose emergency department wait times are among the longest (the 90th percentile) is 6.5 hours, which is less than the Canadian average of 7.4 hours (Figure 4.1). Also, the time spent by patients who are admitted to hospital and whose emergency department wait times are among the longest (again the 90th percentile) is substantially longer (29.9 hours) than those who are discharged.

Figure 4.1: Age-standardized¹ total time spent (in hours) in an emergency department, 2014-15



Source: 118

Notes:

¹ Standardized based on the 2014-15 National Ambulatory Care Reporting System emergency department population. Also, the Canadian Institute for Health Information report, from which these data are drawn, indicates that the data are representative of only the facilities that submitted to the National Ambulatory Care Reporting System in 2014-2015, as not all facilities in these jurisdictions are captured in the National Ambulatory Care Reporting System database. Given this, the Canadian Institute for Health Information report notes that comparisons involving these jurisdictions should be made with caution.

² Those with the most severe signs and symptoms include categories I (resuscitation), II (emergent) and III (urgent) on the Canadian Triage and Acuity Scale.

³ Those with less severe signs and symptoms include categories IV (less urgent – semi-urgent) and V (non urgent).

Condition-specific facilities

Ontario also has facilities designed specifically for people with cancer and mental illness or addiction (see Chapter 7 for more details). For cancer, there are 14 regional cancer centres (hosted within a hospital in each of the 14 LHINs), which are overseen and funded by Cancer Care Ontario.⁽²²⁾ The centres are responsible for responding to local cancer issues, as well as coordinating cancer care across local and regional healthcare providers.⁽²³⁾ For people living with mental illness or addiction, in addition to the hospitals in the province that are equipped to provide varying levels of care for such challenges, there are also four ‘psychiatric hospitals’ with eight sites in the province that provide specialty mental health and addictions care.⁽²⁴⁾

Other facilities providing specialty care

There are 934 Independent Health Facilities, and they are independently owned and operated, with almost all (98%) of them being for-profit corporations. These facilities can take several forms including being part

of an existing health facility (a hospital, Community Health Centre or a physician’s office), being located within a multi-office complex, being free-standing facilities, or being provided on a mobile basis when specific approval has been provided.⁽²⁵⁾ These facilities receive a facility fee for the publicly insured diagnostic and therapeutic procedures they provide (Table 4.6). For the facilities providing diagnostic procedures/services, most of the services provided include ultrasound and radiology (e.g., X-rays), but services such as nuclear medicine and medical resonance imaging/computed tomography (MRI/CT) scans, as well as those used as part of sleep and pulmonary function studies, are also provided. Among the facilities providing therapeutic procedures, the most commonly provided procedures (in terms of total facility fees paid) are dialysis, abortion and ophthalmologic procedures, with other services provided including plastic and vascular surgeries, and laser therapy.⁽²⁵⁻²⁹⁾

Table 4.6: Facility fees paid and number of services performed by 934 Independent Health Facilities

Types of services provided	Facility fees paid (\$ millions)		Number of services performed ¹
	2006-07	2010-11	
Diagnostic procedures/services			
Ultrasound	129.9	173.0	4,267,000
Radiology (includes X-rays)	116.1	111.0	3,878,000
Nuclear medicine	39.5	40.8	432,000
Sleep studies	29.3	39.6	106,000
Computed tomography/magnetic resonance imaging	5.7	10.0	—
Pulmonary function studies	2.1	2.4	152,000
Subtotal	322.6	376.8	8,835,000
Therapeutic procedures			
Dialysis	9.9	15.2	—
Abortion	6.4	7.1	—
Ophthalmology	6.4	6.4	—
Plastic surgery	1.0	1.1	—
Vascular surgery	0.9	0.8	—
Laser therapy	0.4	0.4	—
Subtotal	25.0	31.0	—
Total	347.6	407.8	—

Sources: 25-29

Notes:

¹ Data not available for the specific reference period are denoted by —.

In addition, there are 273 Out of Hospital Premises that provide services that would once have been provided in hospitals (cosmetic surgery, endoscopy and interventional pain management under the administration of a variety of types of anesthesia).(29) While the Out of Hospital Premises receive professional fees for these services, unlike Independent Health Facilities they do not receive a facility fee from the government for these services (but they are accountable to the College of Physicians and Surgeons of Ontario for the safety and quality of care they provide).(30; 31)

More generally, the Government of Ontario has signalled its intention to move more care from hospitals to community-based specialty clinics that can provide high volumes of low-risk diagnostic and surgical procedures that do not require overnight stays (e.g., colonoscopies and cataract procedures). Just as would have been the case had the procedures been performed in hospital, the medically necessary procedures provided in community-based specialty clinics are free at the point of use. These clinics can take many forms, including a private not-for-profit hospital (e.g., Hotel Dieu Hospital in Kingston), a satellite site or ambulatory-care centre operated by a not-for-profit hospital (e.g., the Queensway Health Centre’s Surgicentre, which is the largest free-standing ambulatory centre in North America and provides peri-operative services to 13,000 patients each year in eight operating rooms), and an Independent Health Facility (e.g., Kensington Eye Institute for cataract procedures).

Lastly, most laboratory tests (60%) ordered by clinicians (e.g., including routine laboratory tests, as well as more specialized tests such as for detecting cancer) are analyzed by the 325 private laboratories in the province, with the rest being analyzed by hospitals or public health laboratories.(32) There is a significant degree of consolidation in private laboratories, with 90% run by Lifelabs (which provides approximately two thirds of laboratory testing) and Gamma-Dynacare.(33)

While hospitals and some of the other infrastructure for speciality care have had dedicated quality monitoring and improvement mechanisms in place for some time, other parts of the specialty-care infrastructure have only recently been given attention. For example, the Quality Management Partnership is a collaboration between the College of Physicians and Surgeons of Ontario and Cancer Care Ontario that is focused on implementing provincial quality-management programs in three key areas.(34) These include: 1)

colonoscopy (through ColonCancer Check, Gastrointestinal Endoscopy Quality-Based Procedure, and the Out of Hospital Premises Inspection Program); 2) mammography (through the Ontario Breast Cancer Screening Program, Independent Health Facilities program, diagnostic imaging peer review program, and other safety and quality processes); and 3) pathology (through the Pathology and Laboratory Medicine Program, Path2Quality, Peer Assessment Program and the Institute for Quality Management in Healthcare).(35)

Technology used in specialty care

A wide array of technologies (other than information and communication technology, which we cover later as part of the section about supports for care) are used in the provision of specialty care. These can range from commonly used technologies such as ultrasound, X-ray and laboratory-based technology to more specialized (and often very expensive) technologies for diagnosis (e.g., imaging devices and equipment for auditory deficit testing) and treatment (e.g., radiation treatment for cancer and eye surgeries). However, data about the technology available is focused on imaging devices – computed tomography (CT), magnetic resonance imaging (MRI), positron emission tomography (PET), and nuclear medicine cameras – the first three of which we present data about in Table 4.7.

Table 4.7: Number of devices, number of devices per million people and number of exams per 1,000 people, 2015

Imaging device	Number available		Number available per million people		Number of exams per 1,000 people
	Ontario	Percentage of total in Canada	Ontario	Canada	Ontario
Computed tomography (CT)	186	35%	13	15	136
Magnetic resonance imaging (MRI)	125	37%	9	9	71
Single-photon emission CT (SPECT)	99	38%	7	7	12
Single-photon emission CT – CT (SPECT – CT)	38	18%	3	6	6
Positron emission tomography (PET) – CT (PET – CT)	15	32%	1	1	0.7

Source: 119

Data regarding the use of these devices is limited to CT and MRI scans, and show a significant increase (165%) in the number of MRI exams from 2003-04 to 2014-15, as well as an increase in CT exams (83%) over the same time period (Table 4.8).^(36; 37) For technology related to treatment, the most recent capital-investment strategy report from Cancer Care Ontario (April 2012) indicates that there were 103 approved and funded radiation treatment machines. However, the same report indicated that the treatment-utilization rate of these machines (i.e., the proportion of people with cancer who receive at least one course of radiation therapy in their lifetime) is 38%,⁽³⁸⁾ which was below the international average of 50-55% and Cancer Care Ontario's target of 48%.⁽³⁹⁾

Table 4.8: Number of computed tomography and magnetic resonance imaging exams in Ontario and Canada, 2003-04, 2010-11 and 2014-15

Types of exams	2003-04 (thousands)		2010-11 (thousands)		2014-15 (thousands)		11-year percentage change	
	Ontario	Canada	Ontario	Canada	Ontario	Canada	Ontario	Canada
Computed tomography (CT) exams	1,017	2,767	1,538	4,326	1,871	5,278	83%	91%
Magnetic resonance imaging (MRI) exams	367	768	728	1,594	974	1,952	165%	154%

Source: 120, 121

Turning to wait times for CT and MRI scans, data from April to September 2015 indicate that as compared to the other five provinces for which data are available, Ontario has:

- the lowest median wait time for CT scans (n=7 days with the others ranging from 17 to 30 days);
- the second-lowest CT scan wait time for those whose waits are among the longest (i.e., those in the 90th percentile of wait times) for CT scans (n=37 days with the lowest being 28 days and the rest ranging from 50 to 74 days);
- the second-lowest median wait time for MRIs (n=36 days with the lowest being 30 days and the rest ranging from 55 to 99 days); and
- the lowest MRI wait time for those in the 90th percentile (n=91 days with the others ranging from 149 to 202 days).⁽⁴⁰⁾

Rehabilitation care

As outlined in more detail in Chapter 6 (care by sector), rehabilitation care is different from other sectors in how it is more an element of other sectors than a sector in its own right, it does not have a single key player involved as the central point of contact (e.g., CCACs, primary-care teams or family physicians, hospitals, and long-term care homes), much of the focus is outside of what is sometimes considered to be the health system (e.g., children and youth with physical, communication or developmental disabilities), and it has been extensively 'privatized' as compared to other sectors. In this case privatization has meant both shifting from public payment to private payment (i.e., paid for out-of-pocket or with private insurance) and shifting from private not-for-profit delivery to more private for-profit delivery.

As such, the infrastructure in the province for providing rehabilitation care is comprised of multiple points of access that depend on the nature of care needed, among other factors. This includes rehabilitation care (physiotherapy, occupational therapy and speech-language therapy) delivered in:

- a patient's own home or a long-term care home;
- more than 300 Community Physiotherapy Centres, which provide a mix of government-funded rehabilitation care (i.e., Ontario Health Insurance Plan-funded) and privately funded rehabilitation care (i.e., paid for through out-of-pocket payments or through private insurance);
- 21 Children's Treatment Centres for children and youth with physical, communication and/or development challenges;⁽⁴¹⁾ and
- hospitals, including:
 - 55 general rehabilitation hospitals (labelled 'group E' hospitals under the *Public Hospitals Act, 1990*) that provide general rehabilitation services (e.g., dedicated 'rehabilitation beds' in acute-care hospitals where physiatrists focus specifically on physical medicine and rehabilitation, as well as inpatient or outpatient rehabilitation care from health professionals such as occupational therapists);⁽⁴²⁾
 - 10 special rehabilitation hospitals (group J) that provide specialty rehabilitation services;⁽⁴³⁾
 - three 'continuing care centres' (group R) that provide 'low intensity, long duration' rehabilitation; and
 - 108 chronic-care hospitals (groups F and G) that provide rehabilitation care for some of their 'complex continuing care' patients.

These numbers do not add to the 173 hospitals listed in Table 4.1 because

some hospitals can appear in more than one group. With no defined ‘basket’ of rehabilitation services, each hospital (sometimes in collaboration with its LHIN) decides on the inpatient and outpatient rehabilitation care that will be provided (if any).(44)

Long-term care

While not considered part of the long-term care sector, it is important to distinguish licensed retirement homes (of which there are 716) from the long-term care homes with which they are sometimes confused. Most retirement homes are private for-profit facilities, which can accommodate between six and 250 residents who require little to no support, and which do not provide access to 24-hour nursing care.(45; 46) More than 55,000 older adults in Ontario live in retirement homes, eligibility for them is determined by one’s ability to pay, and there is no requirement to provide proof of one’s health status or the amount of support needed (although retirement homes may assess an individual’s needs to determine whether it can provide the supports they require).(45; 46)

Turning to long-term care homes, as of 2013 more than half of them are private for-profit (51%), almost one quarter are private not-for-profit (22%) and the rest are owned by municipal governments or others (27%) (Table 4.9). The picture changes slightly based on data from 2015,

Table 4.9: Characteristics of select long-term care homes, 2013

Characteristics of select homes ¹	Ontario	Canada
Homes ²	598	1,334
Size		
4–99 beds	239	720
>100 beds	359	614
Type of care ³		
Type II	344	650
Type III or higher	254	669
Type of ownership ⁴		
Private for-profit	306	499
Private not-for-profit	129	410
Public	163	425
Occupancy rate ⁵	97%	97%
Beds staffed and in operation	78,427	147,926

Continued on next page

Characteristics of select homes ¹	Ontario	Canada
Age and sex of residents		
Females		
<45	0.3%	0.4%
45–64	4%	4%
65–74	10%	9%
75–84	28%	28%
>85	58%	58%
Males		
<45	1%	1%
45–64	9%	9%
65–74	15%	15%
75–84	34%	34%
>85	41%	41%

Sources: 52; 122; 123

Notes:

¹ The Long-Term Care Facilities Survey includes only long-term care homes that provide residents with a minimum of professional nursing care and/or medical supervision. For the purpose of the survey, long-term care homes were defined as non-hospital facilities that have more than four beds and are approved and licensed by the Ministry of Health and Long-Term Care. Cells were sometimes combined to prevent disclosure of long-term care homes when few homes had a specific characteristic.

² The most recent data indicate that the total number of long-term care homes is 636, but the data do not include the additional variables that we summarize in this table. Given this, we present the earlier data in this table, but in Table 4.1 we provide the most up-to-date number of long-term care homes.

³ The available data from the Canadian Institute for Health Information only consider those providing type II care or higher. Type II care includes people with chronic disease or functional disability, who are relatively stabilized. Personal care is required for a total of 1.5–2.5 hours per day and medical supervision is provided to meet psychosocial needs. Type III care includes people who are chronically ill and/or have a functional disability and may not be in stable condition. A range of therapeutic services, medical management and nursing care are provided (a minimum of 2.5 hours per day of therapeutic or medical care is required in a day). A higher type of care includes people who need a significant amount of nursing and/or medical care. Care above type III is most commonly provided in hospital settings.

⁴ Ownership is aggregated into the following groups: private for-profit, private not-for-profit, and public (e.g., municipal).

⁵ The occupancy rate is calculated by dividing resident days by the multiplied result of beds staffed and in operation × 365.

which indicate that 57% are private for-profit and 24% are private not-for-profit.(47) Also, this profile differs from the rest of Canada where 37% (499) are operating under private for-profit ownership and 31% (410) under private not-for-profit ownership.(52) Based on our own calculations using publicly available data, there has been some consolidation among licensed operators, with five operators owning the licenses for 20,633 (28%) of the 76,569 long-term beds in the province.(48) Relatively few operators outsource the management of their long-term care homes, but when they do it has been primarily to three companies. The occupancy rate of long-term care homes is consistently very high, and was 97% in 2013.

The availability of long-term care beds varies by region within the province, and detailed data about the number of beds available in each long-term care home, the number of people on the wait lists for those facilities, and the average number of beds that come available each month are provided for each CCAC through the Ontario Association of Community Care Access Centres’ website.(49) However, 2014 data from the Ontario

Long Term Care Association indicate that more than 23,000 older adults were on waiting lists for admission to a long-term care home, and that the median wait time is 108 days (with more specialized facilities having wait times of several years). Moreover, it has also been found that 52% of these long-term care homes are not compliant with most of the 2009 provincial design standards.(50; 51)

Using the more detailed data available from 2013, when there were fewer (598) long-term care homes than counted in the most recent 2015 data (636), Ontario had 45% of all such facilities in Canada that are available to adults aged 18 and older (but as shown in Table 4.9, residents are almost exclusively 65 years or older).(52) Based on these more detailed data, long-term care homes also vary in size, type of ownership and type of care provided. In terms of size, there are more large (>100 beds) long-term care homes (359, 60%) than small (4-99 beds) homes (239, 40%), which differs from the total numbers across Canada where there are more small long-term care homes (720, 54%) than large ones (614, 46%).(52) Lastly, 344 (58%) of the long-term care homes in Ontario provide type II care, which typically includes people with chronic disease or functional disability who are relatively stabilized, and who require approximately 1.5-2.5 hours of care per day along with medical supervision for psycho-social needs.(52) The remaining 254 (42%) provide type III care or higher, with the former including people who are chronically ill and/or with a functional disability, who may not be in stable condition and who require a minimum of 2.5 hours per day of a broader range of therapeutic services, medical management and nursing care.(52) The available data only cover those receiving type II care or higher.

Those requiring higher levels of care are typically accommodated in the 117 hospital-based continuing care facilities. These facilities provide care to Ontarians (regardless of age) who are in need of complex and specialized services that are not available through home care or long-term care homes (e.g., for those who have long-term illness or disabilities which need skilled and/or technology-based care).(53)

Public health

The 36 local public health agencies' geographic boundaries (which define the public health 'units' that they serve) are not aligned with the boundaries

of the LHINs and instead are typically linked to municipal governments. However, the *Patients First Act, 2016* seeks to strengthen relationships between the LHINs and local boards of health even though their boundaries do not fully align.(54) Local public health agencies provide a range of health-promotion and disease-prevention programs, including those that inform the public about healthy lifestyles, provide communicable disease control (e.g., education about sexually transmitted diseases and HIV/AIDS, immunizations, and food inspection), and support healthy growth and development (e.g., parenting education, health education for all age groups, and selected screening services).(55) In addition, 105 local public health agency satellite offices provide targeted services within the areas covered by the local public health agencies (e.g., when front-line services need to be delivered across a large geographical boundary served by the local public health agency). The services delivered are also supported by 11 public health laboratories, which provide clinical (e.g., HIV testing) and environmental testing (e.g., water and food-borne illness testing) related to public health services provided by the province.

Cross-sectoral models

To provide patient-centred care for those with complex health needs (the approximately 5% of the population that accounts for two thirds of healthcare costs), Ontario developed and is currently implementing Health Links. At present 82 Health Links (of approximately 100 planned Health Links) have been implemented, and the model continues to evolve.(56) In general, Health Links aim to support coordinated team-based approaches to care across the sectors outlined above. This includes providing patients with an individualized care plan; having care providers who are responsible for ensuring the plan is followed; providing support to ensure correct medications are taken; and ensuring access to a care provider who knows the patient and their situation to enable them to provide help when needed.(56) Recent data indicate that Health Links have led to a total of 18,926 complex patients having been provided with coordinated care plans, and 29,946 patients having been connected to regular and timely access to primary care.(57)

Infrastructure – Supports for care

Information and communication technology that support those who receive and provide care

The main information and communication technology used to support those who receive care (as distinct from the technology, like EMRs, used primarily by those who provide care, which we turn to below) are Telehealth Ontario (i.e., a teletriage system that assesses a health problem and provides advice, but that does not diagnose or prescribe treatment) and telemedicine (i.e., providing remote clinical services, including diagnosis and prescribing treatment), as well as a small number of newly developed patient portals. Telehealth Ontario provides 24/7 access to a registered nurse who can assess the caller's health problem (but not diagnose it) and provide advice about whether and where the caller should seek care. This advice could include helping a caller decide if they can manage their health problem on their own or should seek medical attention (e.g., by visiting a family physician, going to a primary-care team's clinic, contacting a CCAC or going to a hospital or emergency room).(58)

Telemedicine refers to the use of technology (e.g., videoconferencing) to provide clinical care at a distance in order to improve access to some types of care that are typically not available in rural, northern and remote regions.(59) The Ontario Telemedicine Network was originally designed for such regions, but now is available to meet the needs of all Ontarians and is one of the largest telemedicine networks in the world.(59) The network uses two-way videoconferencing to help address the difficulties faced by hard-to-serve residents from across large rural and northern geographical areas, and to prevent patients from having to travel long distances to be seen by a specialist (which can reduce costs for patients and reduce the carbon footprint associated with providing care in the north).(60) At present, 49% of care provided through the network is for northern Ontario. The network also supports the delivery of several specialized programs in this large geographic area, including the Northern Ontario Francophone Psychiatry Program and Telemedicine Critical Care pilots in Kenora and Thunder Bay, which allow those in critical condition to access life-saving care.(60)

Data from 2013-14 indicate that the network includes sites based in 516 health facilities, 327 community/shared facilities, and 877 clinical centres,

as well as 434 virtual (i.e., personal videoconferencing) sites.(61) In that fiscal year these sites delivered:

- 305,269 real-time clinical sessions, which is 74% of the 411,778 total sessions in Canada and a substantial increase (150%) from the 122,029 real-time clinical sessions in 2010;
- 22,371 education sessions (104 education sessions involving patients/families and 22,267 for healthcare providers), which was a 113% increase from 10,492 education sessions provided in 2010;
- 28,215 administrative meetings (a 125% increase from the 12,518 meetings supported in 2010); and
- 2,176 other sessions, such as legal assessments (a category that was not reported in earlier data).(61; 62)

The government agency eHealth Ontario also reports that more than 38,000 consultations for neurotrauma are made remotely each year as a result of stroke patients having 24/7 access to a neurological specialist.(63)

Complementing the Ontario Telemedicine Network, 10 of the 14 LHINs provide telehomecare services (i.e., remote patient monitoring) as part of efforts to reduce emergency room visits and hospital stays.(64) As of 2015, 5,800 patients had enrolled in telehomecare services over a two-year period. The Ontario Telemedicine Network conducted a survey of patient experience with telehomecare services and found positive findings, including 98% being generally satisfied with their care, 99% being satisfied with the quality of the healthcare, teaching and coaching they received, 86% indicating less need to visit an emergency department, and 79% indicating less need to visit a primary-care provider.(64)

While these are established resources in the province, the 2014 National Physician Survey revealed that only 24% of physicians in Ontario indicated that they have used telemedicine in their practice (e.g., to identify when patients have sought advice and then to follow up with them).(65) For those who have used these resources, 32% indicated using them 'live' to follow up with patients, and 22% indicated using them 'live' for patient treatment.(65)

There are now also some examples of patient health records and patient portals that allow patients to access and manage their health information. As an example of the former, MyOSCAR provides an online version of a patient's health record that is 'owned' by them and can only be accessed

by the patient and those to whom they grant permission (as opposed to a patient portal that allows patients to view the portions of their health information that are made available to them by others).(66) MyOSCAR allows patients to control the addition or modification of data and to change who can view or change their record. Also, the system provides users with access to health-management tools to help with tracking information, identifying trends in health indicators (e.g., blood sugar), and monitoring potential side-effects of medications.

As an example of a patient portal, Sunnybrook Health Sciences Centre in Toronto has implemented MyChart, which allows patients to use a secure website (www.mychart.ca, which employs the same type of encryption as the major banks in Canada) to view the portions of their health information that are made available to them.(67) Access to MyChart is provided to patients at participating hospitals, and access can also be granted to caregivers, clinicians in other hospitals, primary-care providers, CCACs, pharmacists, and other providers. The key features of MyChart include:

- access to clinical information from Sunnybrook's electronic patient record system (e.g., medical imaging, laboratory results and progress notes);
- ability to self-enter or upload personal health information;
- access to appointment information, ability to make appointment requests, and opportunity to receive appointment reminders;
- access to Psychiatry Release of Information module;
- access to communications (e.g., announcements, patient information and surveys); and
- access to customizable tools and resources (e.g., mood tracker, weight tracker, and blood pressure measurement).(67)

While MyChart is likely the most widely used patient portal in the province currently, some primary-care teams such as Group Health Centre in Sault Ste. Marie – using myCare (68) – and Wise Elephant Family Health Team – using miDash (69) – also give their patients online access to their personal health information as well as the opportunity to manage their appointments online. In addition, LifeLabs provides a patient portal called *my results*, which allows patients in Ontario (as well as in B.C.) to access their laboratory results online.(70) However, patient portals such as these and MyChart typically do not provide patients with access to the best available research evidence about how to manage their disease or condition.

Instead, patients (and their families and informal caregivers) can seek out this type of information from resources such as the McMaster Optimal Aging Portal (www.mcmasteroptimalaging.org).

The availability of these types of consumer-oriented digital health technologies that aim to improve the patient experience is likely to grow given strong demand from patients and their families. For example, consultations conducted by Canada Health Infoway about how such technology could be harnessed going forward included several consumer-focused technologies in the top-five priorities, including mobile patient monitoring, online access to personal health information, e-visits, and e-scheduling.(71)

While many of these resources also help those who provide care, the main information and technology support for providers is electronic medical record (EMR) systems, for which eHealth Ontario is responsible for supporting implementation (and reporting on implementation progress). An EMR refers to a computer-based medical record that is specific to and maintained by clinicians or the practice or organization in which they work (as opposed to interoperable electronic health record systems that integrate all medical information about a patient from all clinicians, practices and organizations in a system).(72) EMRs also typically include order sets (i.e., checklists or decision support for what tests to order or services to provide to specific patients based on information in their EMR), but there is no statutory requirement that they be based on the best available research evidence.(73)

The most recent (2014) National Physician Survey found that Ontario has the third highest percentage of EMR adoption by physicians in Canada (83%) as compared to Alberta (87%) and B.C. (85%).(74) The percentage of family physicians (86%) who either use a mix of paper charts and EMRs or exclusively use EMRs is slightly higher than specialists (81%) (Table 4.10).(65) These levels of EMR adoption in Ontario are substantially higher than those reported in the 2010 National Physician Survey, which found that 58% of family physicians and 55% of specialists were using EMRs (either exclusively or in combination with paper charts).(75) Moreover, eHealth Ontario reports that 75% of Ontarians receive care from physicians who use an EMR, 3,000 types of laboratory results can be accessed through physicians' EMRs, the medication history of all seniors in Ontario is accessible to providers in all hospitals and

Table 4.10: Electronic medical record use as reported in the 2010 and 2014 National Physician Surveys

Indicators	All physicians		Family physicians		Specialists	
	2010	2014	2010	2014	2010	2014
Mechanism used to capture patient-related information ¹						
Paper chart only	32%	17%	33%	14%	31%	19%
Paper chart and electronic medical record (EMR)	37%	48%	29%	34%	44%	62%
EMR only	20%	35%	29%	52%	11%	19%
Duration of EMR use in practice						
<1 year	—	8%	—	7%	—	8%
1-2 years	—	14%	—	14%	—	13%
3-4 years	—	22%	—	23%	—	21%
5-6 years	—	14%	—	16%	—	13%
> 6 years	—	42%	—	39%	—	44%
Not reported	—	<1%	—	1%	—	1%
Plans to use EMRs in next two years among those currently using paper records ²						
Yes	11%	27%	12%	32%	10%	22%
No	—	72%	—	67%	—	76%
Not reported	—	1%	—	1%	—	2%
Perceived access to EMRs						
Excellent	—	13%	—	16%	—	10%
Satisfactory	—	44%	—	42%	—	46%
Unsatisfactory	—	20%	—	18%	—	22%
Not available in jurisdiction	—	21%	—	22%	—	20%
Not reported	—	2%	—	2%	—	2%
Access points for EMRs						
Office/community clinic/Community Health Centre	54%	64%	72%	84%	38%	44%
Hospital	60%	59%	46%	38%	73%	80%
University/research unit	10%	6.3%	5%	3%	14%	9%
Long-term care home	4%	4.6%	8%	8%	1%	1%
Outside of a healthcare setting	—	41%	—	51%	—	32%
Other	14%	1%	20%	0.4%	9%	1%
Connection of records used across different settings of practice						
Yes	28%	79%	26%	81%	30%	76%
Some	24%	14%	23%	11%	24%	18%
None	19%	7%	23%	7%	15%	6%
Not reported	30%	<1%	28%	1%	31%	<1%
Use of EMRs to manage chronic conditions ³						
	37%	81%	—	87%	—	68%

Sources: 65; 75

Notes:

¹ The results from the 2010 survey for this question provided the percentage of respondents who selected 'not applicable – I do not provide patient care' (2.6% of family physicians and 4.9% of specialists) and for whom data were not reported (6.6% of family physicians and 9% of specialists), but these categories were not provided in the 2014 survey.

² The question about plans to use EMRs was different in the 2010 survey from that in 2014, with the former not phrasing it as a discrete 'yes' or 'no' question as in 2014, but as one option that could be selected among a much longer list of electronic resources respondents planned to use.

³ Data for this question on the 2010 survey are only available for all physicians and are not separated by family physicians and specialists.

emergency rooms, and all hospital sites in the province can digitally share diagnostic images and reports within their region.(63)

Key additional findings for Ontario from the most recent National Physician Survey (Table 4.10) include:

- two-thirds (67%) of family physicians and three quarters (76%) of specialists who indicated not using EMRs in 2014 also indicated that they do not intend to use EMRs in the next two years;
- more than half of physicians rated their perceived access to EMRs as excellent (16% of family physicians and 10% of specialists) or satisfactory (42% of family physicians and 46% of specialists);
- the percentage of physicians accessing EMRs in different settings (e.g., in offices, clinics, Community Health Centres, hospitals, university/research units, and long-term care homes) has been relatively constant since 2010 (but 41% of physicians now indicate that they access EMRs outside of a healthcare setting, which was not included in the 2010 data);
- substantially higher numbers of physicians reported that EMRs are connected across the different settings in which they work; and
- many more physicians reported using EMRs to manage patients' chronic conditions (81% of all physicians in 2014 as compared to 37% in 2010).(65; 75)

However, when compared internationally, Ontario's performance in EMR use is mixed. Specifically, results from the Commonwealth Fund 2015 International Health Policy Survey of Primary Care Physicians indicate that EMR use in Ontario has tripled in the past decade, however:

- the adoption of EMRs is below the 88% average among the countries that were included in the survey (Australia, Germany, Netherlands, New Zealand, Norway, Sweden, Switzerland, U.K., and U.S.);
- the use of EMR functionality is in some cases above average (e.g., for using at least functions related to population-health management), in others average (e.g., using at least two decision-support functions), and in still others below average (e.g., using at least two patient-management functions); and
- the use of EMRs for patient communication is low, with 12% of practices using EMRs for appointment or referral requests (compared to 11% nationally), 10% of practices using them for prescription-refill requests (compared to 7% nationally), and 13% allowing for test re-

sults to be viewed securely online (compared to 18% nationally).(76)

Among the 78% of physicians in Ontario reporting barriers to accessing EMRs in the 2014 National Physician Survey, the identified barriers included:

- technical difficulty/reliability (52%);
- compatibility with other electronic systems (46%);
- firewalls or security issues (25%);
- hardware availability (16%);
- lack of training (16%); and
- privacy (14%).(65)

Other examples of EMR expansion in Ontario include:

- the implementation of more than 5,100 ambulatory EMR seats (i.e., access points in hospital ambulatory settings that may be used by multiple health professionals) in 36 hospitals;
- enhanced connectedness of EMRs between sites with more than 5,000 community-based clinicians having access to hospital reports (e.g., discharge summaries) through their EMRs (which are sent through the Hospital Report Manager); and
- ongoing implementation of the Ontario Laboratory Information System, which currently houses 86% of laboratory results in the province, and is accessible to more than 9,000 community-based health professionals and more than 26,000 hospital-based health professionals.(64; 73)

Turning now to electronic health records (EHRs), meaning health record systems that integrate all medical information about a patient from all clinicians, practices and organizations, eHealth Ontario reports that more than 77,000 health professionals can now access EHRs, and that more than 1,970 health organizations are connected to the provincial EHR.(63) At the national level, Canada Health Infoway reports that approximately 139,000 health professionals (as of 2015) are active users of EHR systems, which they defined as regular consultation of two or more electronic systems (e.g., laboratory or drug information systems and diagnostic imaging repositories).(64) This suggests that Ontario is home to more than half of the health professional users of EHRs in Canada.

In addition to EMRs and EHRs, the Panorama public health surveillance

system is being implemented in Canada to digitally track immunizations, to manage vaccine inventories, and, in some cases, to monitor communicable disease outbreaks.(64) At present, all of Ontario's 36 local public health agencies are using Panorama to track immunizations, and the agencies that need to track vaccine supply are using the inventory module.(64)

Research infrastructure that supports clinical practice and health-system policymaking

As described in a recent evidence brief published by the McMaster Health Forum, Ontario shares with other provinces and countries the challenge of consistently improving care based on data, evidence and guidelines.(77) However, Ontario is among a relatively small number of jurisdictions globally that hosts a high number of centres of expertise and small-to-medium-scale initiatives that can support rigorously informed improvements to care. To illustrate this richness, we identified examples of centres and initiatives that are active in Ontario (Table 4.11, which is adapted from the evidence brief), many of which are widely seen as global leaders. While we have assigned each centre or initiative a single area of focus, several of them are active across multiple areas of focus (as we note in parentheses in the table, where applicable). In addition to these examples, efforts to support high-quality and safe clinical practice are supplemented by the efforts of a national accreditation agency (Accreditation Canada), more focused accreditation initiatives (e.g., through the Canadian Association of Radiologists), and a national safety agency (Canadian Patient Safety Institute). Such resources are important given the many challenges that professionals and policymakers face when trying to find and use unbiased, understandable and current knowledge about health and healthcare.(78)

Many of the initiatives and some of the centres that are highlighted as examples in Table 4.11 are particularly noteworthy for how they are:

- 1) organized as research projects (not as institutionalized programs within the health system);
- 2) funded on a one-off, time-limited basis by research-funding agencies or government (not as sustainable enterprises); and
- 3) geographically restricted (not system-wide endeavours and not positioned with a view to exporting the approach to other health systems, as the National Institute for Health and Care Excellence (NICE) has so successfully done with NICE International).

Table 4.11: Examples of centres and initiatives that support improvements to the care provided to Ontarians using data, evidence and guidelines

Ontario and Canadian centres and initiatives that support Ontario (and their principal contributions)
<p>Data analytics</p> <ul style="list-style-type: none"> Institute for Clinical Evaluative Sciences (performance, capacity and other types of data, which are available through atlases/reports and customizable data and analytical service requests) Canadian Institute for Health Information (performance, capacity and other types of data, which are available through reports, interactive online databases like Your Health System, and customizable data and analytical service requests) Statistics Canada (statistics about the health of the population, lifestyle and environmental factors affecting health, access to and use of healthcare services, and analyses about health-related topics)
<p>Evidence synthesis (best evidence on specific topics)</p> <ul style="list-style-type: none"> Cochrane Canada (production of, and capacity building for, systematic reviews of effects, with five of six review groups, including the one focused on optimizing practice, and all four of the methods groups, based in Ontario)
<p>Evidence 'refineries' (best evidence across a broad range of topics)</p> <ul style="list-style-type: none"> McMaster Optimal Aging Portal (database and customizable evidence service with evidence, website reviews and blogs targeted primarily to citizens, but also to clinicians, public health practitioners and policymakers) ACCESSSS (database and customizable evidence service for pre-appraised studies and reviews about clinical care) Tools for Practice (bi-weekly summary of evidence that can change primary-care practice) Health Evidence (database and customizable evidence service for pre-appraised reviews of effects about public health) Health Systems Evidence (database and customizable evidence service for pre-appraised reviews, as well as overviews of reviews, economic evaluations, and other types of evidence, about health-system arrangements and implementation strategies)
<p>Guideline methods development</p> <ul style="list-style-type: none"> AGREE II (tool to assess the quality and reporting of practice guidelines, the development of which was led by Ontario-based researchers) GRADE (tool to assess the quality of evidence and the strength of recommendations, the development of which was led in part by Ontario-based researchers and a co-chair who is an Ontario-based researcher) Guideline Implementability for Decision Excellence Model – GUIDE-M (tool to create optimally implementable guidelines and to support the better use of guidelines)
<p>Guideline production</p> <ul style="list-style-type: none"> MacGRADE Centre (methodological support for the use of GRADE to assess the quality of evidence and strength of recommendations in guidelines, as well as for the preparation of many World Health Organization and professional association guidelines) Registered Nurses' Association of Ontario's Best Practice Guidelines (clinical and healthy work place environment guidelines, as well as related order sets, quality indicators (through its NQuIRE program), implementation resources, and Best Practice Spotlight Organization designations) Cancer Care Ontario's Program in Evidence-Based Care (production of clinical practice guidelines on the full spectrum of cancer care) Canadian Agency for Drugs and Technologies in Health (evidence and guidelines about drugs and technologies) Canadian Task Force on Preventive Health Care (clinical practice guidelines that support primary-care providers in delivering preventive healthcare)

Continued on next page

Ontario and Canadian centres and initiatives that support Ontario (and their principal contributions)
<p>Evidence and guideline implementation</p> <ul style="list-style-type: none"> Centre for Effective Practice (guideline quality ratings, tool development, continuing professional development, and guideline implementation supports) Centre for Practice-Changing Research at the Ottawa Hospital Research Institute (evidence and guideline implementation supports, as well as patient decision aids and rapid reviews) National Collaborating Centre for Methods and Tools (supports for optimizing practice in public health) Initiatives such as Knowledge Translation Canada's consultation service (evidence and guideline implementation supports)
<p>Quality improvement</p> <ul style="list-style-type: none"> Health Quality Ontario (supporting continuous quality improvement, as well as public reporting about clinical practice, among other topics, and making – with the support of the Ontario Health Technology Advisory Committee – evidence-based recommendations about standards of care and funding of technologies) Initiatives such as: <ul style="list-style-type: none"> Adopting Research to Improve Care - ARTIC (evidence and guideline implementation supports through projects in Ontario academic hospitals) Building Bridges to Integrate Care – BRIDGE (supports for the evaluation of care-integration models in the greater Toronto area) Improving and Driving Excellence Across Sectors - IDEAS (capacity building for quality improvement, leadership and change management)
<p>Continuing professional development</p> <ul style="list-style-type: none"> Ontario's faculties of health sciences and health professions offer a broad range of continuing professional development opportunities that can support practice optimization (although these opportunities can vary dramatically in the extent to which they are based on data, evidence and guidelines) McMaster Health Forum's Health Systems Learning, which is an educational program designed to provide online and in-person training about how to reform, renew or strengthen health systems, and how to get cost-effective programs, services and drugs to those who need them.

Source: Adapted from: 77

In addition to these initiatives, there are 16 provincial and five national hosts of publicly reported performance indicators for the health system (Table 4.12). Performance indicators can be used to support patient choice about where to obtain care (e.g., based on the shortest wait time or the highest quality), to provide the basis for establishing 'external accountability' for the performance of providers and the system as a whole, to inform internal quality-improvement processes, and to conduct research. The second of these four purposes appears to dominate in Ontario. Indeed, a patient (or their family or informal caregiver) would be exceptionally hard pressed to find and make sense of this crowded landscape.

Table 4.12: Sources for public reporting about the health system

Host	Statement of purpose	Type of indicator(s) provided
Government		
Ontario Ministry of Health Long-Term Care	<p>"To help improve your access to care, this site provides the best available data on wait times for hospitals all across Ontario" (124)</p> <p>"The reports on LTC [long-term care] homes will help you find LTC homes within a desired area and see general information about the home.... You can also view ministry inspection reports and see if any orders have been issued to a particular home"</p>	<ul style="list-style-type: none"> • Home care wait times • Emergency room wait times • Surgery, magnetic resonance imaging and computed tomography wait times • Long-term care home incident reports
Government agency¹		
Cancer Care Ontario	<p>"The Cancer System Quality Index tracks Ontario's progress against cancer and points out where cancer service providers can make quality and performance improvements" (125)</p> <p>"As the provincial agency that steers and coordinates cancer services and prevention efforts in Ontario, one of Cancer Care Ontario's priorities is to improve access and wait times for cancer care" (126)</p>	<ul style="list-style-type: none"> • Quality and performance improvement (Cancer System Quality Index) • Wait times
Health Quality Ontario	"Transparent data drives accountability and improvement. That's why Health Quality Ontario has been monitoring and reporting on the province's health system performance since 2006" (127)	<ul style="list-style-type: none"> • Home care sector performance • Primary care sector performance • Hospital care sector performance • Long-term care sector performance
Local Health Integration Networks (LHINs)	"Provides an update on the milestones, achievements and progress of... LHIN initiatives" (128)	<ul style="list-style-type: none"> • Access to healthcare services • Integration and coordination of care • Quality and improved health outcomes
Ontario Renal Network (a division of Cancer Care Ontario)	"Responsible for establishing consistent standards and guidelines to support quality kidney care, and putting in place information systems to measure performance" (129)	• Ontario Renal Reporting System collects data on all re-dialysis, acute dialysis and chronic dialysis patients in Ontario
Public Health Ontario (PHO)	"Our Annual Reports reflect PHO's core activities and progress on key commitments including: our performance scorecard and targets, laboratory performance standards, financial statements and Board of Directors appointees" (130)	• Progress on priority initiatives by strategic direction

Continued on next page

Host	Statement of purpose	Type of indicator(s) provided
Government-funded organization		
BORN Ontario: Better Outcomes Registry & Network	"Collect, interpret, share and rigorously protect critical data about pregnancy, birth and childhood" (131)	• Pregnancy, maternal and child health outcomes
Cancer Quality Council of Ontario	"Provide an overall assessment for each dimension of quality in an effort to track Ontario's progress towards better outcomes in cancer care and highlight where cancer service providers can advance the quality and performance of care" (132)	<ul style="list-style-type: none"> • Cancer System Quality Index • Wait times
Cardiac Care Network of Ontario	"Using data and consensus-driven methods, we offer planning advice for the future of cardiac services and the provision of exemplary care in collaboration with the Ministry and others" (133)	<ul style="list-style-type: none"> • Cardiac procedure volumes by hospital • Patient characteristics • Cardiac wait times • Treatment of ST elevation of myocardial infarction by hospital • Market share analysis by LHIN
Institute for Clinical Evaluative Sciences (ICES)	"ICES researchers access a vast and secure array of Ontario's health-related data, including population-based health surveys, anonymous patient records, as well as clinical and administrative databases" (134)	<ul style="list-style-type: none"> • Health system performance • Drug safety and effectiveness • Primary care • Surgery and transplantation • Population health • Mental health and addictions • Chronic diseases
Provincial Council for Maternal and Child Health	"The 2015 Report represents the key initial step of an extensive redesign process motivated by our commitment to on-going quality improvement in providing relevant information to the maternal and child healthcare community" (135)	<ul style="list-style-type: none"> • Hospital profiles • Hospital level indicators • LHIN-level indicators
Association initiative		
Association of Family Health Teams of Ontario	"Supporting, measuring, and promoting the value of well-integrated interprofessional primary care, and advocating for its expansion so that more Ontarians can access this high-quality comprehensive care" (136)	• Family Health Team performance

Continued on next page

Host	Statement of purpose	Type of indicator(s) provided
Association initiative – continued		
Children's Mental Health Ontario	"The Report Card highlights the government's progress toward key policy commitments and identifies critical areas where we must work together to make important improvements" (137)	<ul style="list-style-type: none"> Mental healthcare for children and youth (e.g., wait times, coordination of treatment, emergency department visits, and hospitalizations)
Ontario Association of Community Care Access Centres	"To promote continuous improvement and share learning, CCACs [Community Care Access Centres] measure key metrics and issue annual quality reports" (138)	<ul style="list-style-type: none"> Home and community care (e.g., expenditures) Wait times (e.g., long-term care home placement) Complex health needs
Ontario Hospital Association (OHA)	<p>"The OHA is committed to providing members with current Human Resources (HR) metrics to support and inform leaders and managers in Ontario hospitals" (139)</p> <p>"To promote transparency and the advancement of integration through eHealth, the OHA makes available a searchable online registry of the clinical and administrative applications in use by Ontario's hospitals" (140)</p>	<ul style="list-style-type: none"> Health human resources eHealth Applications Registry Green Hospital Scorecard
Ontario Long Term Care Association	"We strive to lead the sector in innovation, quality care and services, building excellence in long-term care through leadership, analysis, advocacy and member services" (141)	<ul style="list-style-type: none"> Long-term care (e.g., number of homes, wait times, staffing, and health conditions of residents)
Federal or national body ¹		
Statistics Canada (federal government)	"Information on the health of the population, lifestyle and environmental factors affecting health, access to and use of health care services, and research into health topics" (142)	<ul style="list-style-type: none"> Population health Disability Disease and health conditions Life expectancy and death Lifestyle and environmental factors affecting health Mental health and well-being Pregnancy and births Healthcare services Prevention and detection of disease
Canada Health Info-way (federal government)	"Infoway, the provinces and territories, and our other partners have worked together to deploy core systems such as registries of patients and providers; drug, lab and diagnostic imaging systems; and clinical reports and immunizations" (143)	<ul style="list-style-type: none"> Use of digital health resources (electronic health records and electronic medical records)

Continued on next page

Host	Statement of purpose	Type of indicator(s) provided
Canadian Institute for Health Information (CIHI) (federal and provincial government-funded organization)	<p>CIHI site: "Deliver comparable and actionable information to accelerate improvements in health care, health system performance and population health across the continuum of care" (144)</p> <p>'Your Health System' site: "Explore indicators to better understand your health system and the health of Canadians. Search by hospital, long-term care organization, city, health region, province or territory" (144)</p>	<ul style="list-style-type: none"> Health statistics (e.g., health system performance, population health and health services)
Canadian Partnership Against Cancer (federal government organization)	"The Partnership engages in collaborative efforts with provincial and national partners to identify aspects of the cancer control system that need to be measured, define performance indicators, collect valid and comparable data and report findings" (145)	<ul style="list-style-type: none"> CAREX Canada – a multi-institution research project – provides national surveillance on occupational and environment carcinogen exposure Cancer system performance (prevention, screening, diagnosis, treatment, patient experience and end-of-life care, research and long-term outcomes)
Canadian Medical Association (CMA) (association initiative)	"The CMA's Physician Data Centre conducts research that promotes the appropriate supply, mix and distribution of physicians to meet Canada's needs" (146)	<ul style="list-style-type: none"> Canadian physician data (e.g., demographics and supply, migration, training, physician-to-population ratios, workload, and remuneration)

Note:

¹ Other sources that could be considered as being engaged in public reporting include eHealth Ontario (a government agency that supports the implementation of and reporting about the use of electronic medical records) and the Canadian Mental Health Association (a national organization that provides information about mental health services and the mental health workforce).

Two other mechanisms for public reporting are the Quality Improvement Plan that must be submitted annually to Health Quality Ontario (HQQ) by four types of health organizations (CCACs, interprofessional team-based primary-care organizations, hospitals, and long-term care homes), (79) and the long-term care home inspection reports that must be completed annually and that are posted on the Ministry of Health and Long-Term Care website.(80) Regarding the former, each plan describes how an organization will address quality issues and meet quality-improvement goals. Based on analyses of these plans, HQO creates and makes publicly available sector-specific reports.(81) On a related point, eight partners (Ministry of Health and Long-Term Care, LHINs, Cancer Care Ontario, HQO, Public Health Ontario, Cardiac Care Network, Canadian Institute for Health Information, and Institute for Clinical Evaluative Sciences) are engaging

in an effort to advance timely practice-level reporting and to explore new models to incentivize quality and timely care.(82)

There are also 21 universities, 17 hospitals, seven non-governmental organizations, two professional associations and five government agencies in Ontario that are eligible to conduct health-related research with funding from the Canadian Institutes of Health Research. Also, nine of the 26 Statistics Canada's Research Data Centres are hosted in Ontario. These are funded by the Canadian Research Data Centre Network, the Social Sciences and Humanities Research Council, Canadian Institutes of Health Research, the Canadian Foundation for Innovation, and Statistics Canada. Other sources for data and analyses that are often called upon include: 1) consulting firms hired to conduct analyses to support planning and/or policy or organizational decisions; 2) expert advisory groups that are periodically convened to address priorities, with recent examples of such groups focusing on home care and primary-care reform;(3; 83) and 3) hospital-based research institutes (although these often focus on investigator-driven research that advance scientific knowledge, and they may or may not directly inform organizational or policy priorities).

In addition to funding from the Canadian Institutes of Health Research, the Ministry of Health and Long-Term Care provides stable long-term funding to two specialized research centres (Institute for Clinical Evaluative Sciences, and Women's College Hospital: Women's Xchange), and has historically provided funding to support health-related research in Ontario. Most recently, the Ministry of Health and Long-Term Care provided program awards to 11 research groups from 2012-15, as well as 11 shorter and focused capacity awards to another 11 research groups through its Health System Research Fund. However, the funding through this program has been temporarily paused.

Capacity planning

Capacity planning generally refers to processes that are used for determining what infrastructure is needed in the future.(84) Central to this is examining the extent to which existing health-system infrastructure (and the resources invested in using it) is able to meet policy or organizational objectives, as well as determining whether the existing levels of capacity

are sustainable given available resources.(85) This could include assessing the impacts of changes in policies, demographics and budgeted resources on available health-system capacity.(85) Also, the focus of capacity planning varies depending on who and for what purpose it is being conducted. For example, capacity planning for hospitals would focus on planning for investments needed in facilities, technology (e.g., MRI scanners), and service delivery, as well as for human and financial resources. In contrast, capacity planning in the home and community care sector would focus on what is needed across a range of different access points (e.g., home care, community service agencies).

At present, capacity planning for select types of infrastructure is carried out by the Ministry of Health and Long-Term Care (e.g., for health workforce planning),(86) LHINs (e.g., for hospitals and long-term care homes), and Cancer Care Ontario (for regional cancer centres).(84) However, with the LHINs not having responsibility for planning across all sectors, they are not able to support an integrated planning approach across the health system.(87) This leaves many parts of the system with no formal approach to capacity planning, and various (often uncoordinated) capacity-planning activities carried out by a range of stakeholders in the system. For example, system-wide capacity planning has been conducted for ophthalmology services, with one of the resulting recommendations being that ophthalmology-service providers should engage in central purchasing to reduce costs.(88) Moreover, agencies (e.g., eHealth Ontario) (89) and associations of organizations (e.g., Home Care Ontario),(90) as well as intergovernmental agencies (e.g., Canadian Agency for Drugs and Technologies in Health and Canada Health Infoway) are often involved in sector-based capacity-planning activities.(91) These efforts are also supported by groups that provide data analytics such as the Institute of Clinical Evaluative Sciences and the Canadian Institute for Health Information.

Capital spending

Capital spending generally refers to processes used to make investments to develop needed infrastructure. Expenditures on capital can range in size (from thousands of dollars to hundreds of millions of dollars), as well as in the complexity of instruments used to support capital investments (e.g., from debt-based investments for a single facility to investments in multiple

institutions that involve public and private partners over long periods of time and across locations and financing structures).(92) In contrast to the funds that are used to operate health-system infrastructure such as hospitals, which draw almost exclusively on government resources, capital spending can come from a mix of government sources (e.g., budget allocations specifically for infrastructure funds), as well as from donations from individuals (e.g., through donations from a philanthropist or community fundraising initiatives), foundations (e.g., hospital foundations and government-sponsored foundations such as the Canadian Foundation for Innovation) or corporations.(92)

While capital spending comes from a range of sources, public finances accounted for 76% of capital spending in 2013, with the rest accounted for by private sources.(92-99) However, there has been a substantial decrease in capital spending in recent years in Ontario (Table 4.13), with a 22% decrease in total spending from 2010 to 2013, which was mostly accounted for by a 27% decrease in public financing. These decreases are much larger than the 13% decrease in capital spending across Canada, which were accounted for by a 7% decrease in public financing and 33% decrease in private sources.

Table 4.13: Total public and private health-system capital expenditures in Ontario and Canada, 2010 and 2013

Capital expenditures	Ontario			Canada		
	2010 (\$ millions)	2013 (\$ millions)	% change	2010 (\$ millions)	2013 (\$ millions)	% change
Total capital expenditure	\$4,195	\$3,269	-22%	\$10,101	\$8,828	-13%
Public capital expenditure (% of total capital expenditure)	\$3,407 (81%)	\$2,477 (76%)	-27%	\$8,044 (80%)	\$7,446 (84%)	-7%
Private capital expenditure (% of total capital expenditure)	\$788 (19%)	\$791 (24%)	<1%	\$2,057 (20%)	\$1,383 (16%)	-33%

Source: 93-99

Capital spending appears to be continuing to decline in Ontario. The total estimated publicly-financed capital expenses for health-system infrastructure in Ontario in the 2016-17 fiscal year is \$1.45 billion (Table 4.14), the majority (87%) of which is allocated to hospitals through major hospital projects (\$1.1 billion, 75%) and the Health Infrastructure Renewal Fund (\$175 million, 12%).(100) The Health Infrastructure Renewal Fund is a source of capital for hospitals that supplements existing capital

funds to address additional priorities. Under the Health Infrastructure Renewal Fund, each LHIN is allocated a portion of the fund using an activity-based distribution formula that has a minimum allocation per hospital site. There is also \$20 million allocated to a Small and Rural Hospital Transformation Fund.(101) The third largest health-system capital expense is for community-health infrastructure (\$81 million, 6%). These funds are designed to support the ongoing shift of care from hospitals to community settings, which include Community Health Centres, Aboriginal Health Access Centres, and community-based mental health and addictions agencies.(102) The province has also indicated that an additional Community Infrastructure Renewal Fund will be created, which would be directed to other community organizations such as Family Health Teams, Nurse Practitioner-led Clinics, and local public health agencies.(102)

Table 4.14: Estimated public capital expenses in the health system, 2016-17

Item	Amount	Percent of all capital expenses
Major hospital projects	\$1,084,805,000	75%
Health Infrastructure Renewal Fund	\$175,000,000	12%
Community health programs	\$80,865,500	6%
Small hospital projects	\$40,000,000	3%
Medical and Diagnostic Equipment Fund	\$34,500,000	2%
Public health laboratories	\$17,260,800	1%
Provincial psychiatric hospitals divestment	\$10,000,000	0.7%
Long-term care programs	\$4,812,000	0.3%
Facilities Condition Assessment Program	\$2,287,100	0.2%
Integrated health facility programs	\$1,317,400	0.1%
Total	\$1,450,847,800	100%

Source: 100

Conclusion

The health system's infrastructure includes both the places where care is delivered and the supports for that care. Providing a full picture of the available infrastructure requires not only using data to quantify the amount of infrastructure available (i.e., the capacity available), but also measuring the extent to which capacity in different parts of the system is being used. In developing this picture of infrastructure in the province, we have found that the places of care that tend to be tracked with the most detail (in terms of both the capacity available and its use) are where most government-provided

capital is invested in the system (hospitals and to a much lesser extent, community care) and where ‘beds’ are available (i.e., hospitals and long-term care). In contrast, data regarding the availability and use of supports for care are detailed on some topics (e.g., for telemedicine and EMRs), but in others are reliant on unconfirmed reports by small samples of physicians who may or may not be broadly representative (e.g., for EMRs in the National Physician Survey). In terms of conducting capacity planning to determine what infrastructure is needed in the future, there are formal processes for some of the most capital-intensive parts of health-system infrastructure (e.g., hospitals and regional cancer centres that operate within hospitals). However, many other parts of the system have no formal approach to capacity planning or have some form of capacity planning that is not part of an integrated approach across a region or the system. Perhaps as a result of, or a reason for this, the vast majority of capital expenses for health-system infrastructure in Ontario is directed to hospitals. That said, recent capital investments have been directed to the community sector, which aligns with the shift from having many services traditionally provided in capital-intensive hospitals now being provided in community settings.

References

1. Home Care Ontario. Facts & figures. Publicly funded home care. Toronto: Home Care Ontario; 2016. <http://www.homecareontario.ca/home-care-services/facts-figures/publiclyfundedhomecare> (accessed 24 August 2016).
2. Legislative Assembly of Ontario. Bill 41, Patients First Act, 2016. Toronto: Queen's Printer for Ontario; 2016. http://www.ontario.ca/web/bills/bills_detail.do?locale=en&Intranet=&BillID=4215 (accessed 7 October 2016).
3. Ministry of Health and Long-Term Care. Bringing care home. Report of the Expert Group on Home and Community Care. Toronto: Queen's Printer for Ontario; 2015.
4. ConnexOntario. Number of distinct programs in the ConnexOntario database funded by the Ministry of Health and Long-Term Care - Community Mental Health and Addictions Branch by type of program and Local Health Integration Network (LHIN). Toronto: ConnexOntario; 2015.
5. Government of Ontario. Diabetes education program. Toronto: Queen's Printer for Ontario; 2015. <https://www.ontario.ca/page/diabetes-education-program> (accessed 24 August 2016).
6. HealthForceOntario. Family practice models. Toronto: Queen's Printer for Ontario; 2013. http://www.healthforceontario.ca/en/Home/Physicians/Training_%7C_Practising_in_Ontario/Physician_Roles/Family_Practice_Models (accessed 24 August 2016).
7. Glazier RH, Hutchison B, Kopp A. Comparison of Family Health Teams to other Ontario primary care models, 2004/05 to 2011/12. Toronto: Institute for Clinical Evaluative Sciences; 2015.
8. Association of Ontario Health Centres. Aboriginal Health Access Centres. Toronto: Association of Ontario Health Centres; 2016. <https://www.aohc.org/aboriginal-health-access-centres> (accessed 24 August 2016).
9. Health Quality Ontario. Measuring up: HQO's 2015 yearly report. Toronto: Queen's Printer for Ontario; 2015. <http://www.hqo.ontario.ca/portals/0/Documents/pr/measuring-up-2015-en.pdf> (accessed 24 August 2016).
10. Government of Ontario. Pharmacies. Toronto: Queen's Printer for Ontario; 2015. <https://www.ontario.ca/page/pharmacies> (accessed 24 August 2016).
11. Ontario College of Pharmacists. 2015 annual report. Toronto: Ontario College of Pharmacists; 2016.
12. IBIS World. Pharmacies and drugstores in Canada: Major companies. <http://clients1.ibisworld.ca/reports/ca/industry/major-companies.aspx?entid=1054 - MP9164> (accessed 14 October 2016).
13. Ministry of Government and Consumer Services. Collaborative procurement in Ontario. Toronto: Queen's Printer for Ontario; 2016. <https://www.doingbusiness.mgs.gov.on.ca/mbs/psb/psb.nsf/EN/map-collaborative-procurement> (accessed 14 October 2016).
14. Ministry of Health and Long-Term Care. Public Hospitals Act / Loi sur les hôpitaux publics. Toronto: Queen's Printer for Ontario; 2015. <http://www.health.gov.on.ca/en/common/system/services/hosp/hospcode.aspx> (accessed 25 August 2016).
15. CIHI. OECD interactive tool: International comparisons, peer countries. Ottawa: Canadian Institute for Health Information; 2012. <https://www.cihi.ca/en/health-system-performance/performance-reporting/international/oecd-interactive-tool-peer-countries-on> (accessed 24 August 2016).
16. Ministry of Health and Long-Term Care. Hospitals. Toronto: Queen's Printer for Ontario; 2014. <http://www.health.gov.on.ca/en/common/system/services/hosp/faq.aspx> (accessed 25 August 2016).
17. Ministry of Health and Long-Term Care. Emergency health services branch. Toronto: Queen's Printer for Ontario; 2012. http://www.health.gov.on.ca/english/public/program/ehs/ehs_dt.html (accessed 25 August 2016).
18. Ornge. Operations control centre. Mississauga: Ornge; 2012. <http://www.ornge.ca/Programs/Pages/OperationsControlCentre.aspx> (accessed 24 August 2016).
19. Ornge. Air operations. Mississauga: Ornge; 2012. <http://www.ornge.ca/Programs/Pages/AirOperations.aspx> (accessed 24 August 2016).
20. Ornge. Critical care land program. Mississauga: Ornge; 2012. <http://www.ornge.ca/PROGRAMS/Pages/CriticalCareLandProgram.aspx> (accessed 24 August 2016).
21. CIHI. NACRS emergency department visits and length of stay by province/territory, 2014-2015. Table 5: Number of ED visits and length of stay (LOS) in ED by age group, participating provinces/territories, NACRS, 2014-2015 Ottawa: Canadian Institute for Health Information; 2015.
22. Cancer Care Ontario. Regional cancer program and regional cancer centre locations. Toronto: Cancer Care Ontario; 2015. <https://www.cancercare.on.ca/pcs/treatment/rchospitals/> (accessed 24 August 2016).
23. Cancer Care Ontario. Regional cancer programs. Toronto: Cancer Care Ontario; 2015. <https://www.cancercare.on.ca/ocs/rcp/> (accessed 24 August 2016).
24. Ministry of Health and Long-Term Care. Designated psychiatric facilities under the Mental Health Act. Toronto: Queen's Printer for Ontario; 2015. <http://www.health.gov.on.ca/en/common/system/services/psych/designated.aspx - six> (accessed 25 August 2016).
25. Ministry of Health and Long-Term Care. Independent Health Facilities fact sheet. Toronto: Queen's Printer for Ontario; 2014. http://www.health.gov.on.ca/en/public/programs/ihf/docs/ihf_fact.pdf (accessed 25 August 2016).
26. Ministry of Health and Long-Term Care. Independent Health Facilities report. Toronto: Queen's Printer for Ontario; 2015. http://www.health.gov.on.ca/en/public/programs/ihf/docs/ihf_assessment_report.pdf (accessed 25 August 2016).

27. Office of the Auditor General of Ontario. 2012 annual report of the Office of the Auditor General of Ontario. Chapter 3, section 3.06: Independent Health Facilities. Toronto: Office of the Auditor General of Ontario; 2012.
28. Office of the Auditor General of Ontario. 2014 annual report of the Office of the Auditor General of Ontario. Chapter 4, section 4.06: Independent Health Facilities. Toronto: Office of the Auditor General of Ontario; 2014.
29. College of Physicians and Surgeons of Ontario. Submission. The regulation of facilities: Looking forward. Toronto: College of Physicians and Surgeons of Ontario; 2015.
30. College of Physicians and Surgeons of Ontario. Out-of-hospital premises inspection program: Quick facts. Toronto: College of Physicians and Surgeons of Ontario; 2011.
31. Ministry of Health and Long-Term Care. Independent Health Facilities Act. Toronto: Queen's Printer for Ontario; 2014.
32. Ontario Coalition for Lab Reform. Labs in Ontario. Toronto: Ontario Coalition for Lab Reform; 2015. <http://labreform.ca/labs-in-ontario/> (accessed 26 August 2016).
33. Ontario Coalition for Lab Reform. Medical laboratory testing in Ontario: A history. Toronto: Ontario Coalition for Lab Reform; 2015. <http://labreform.ca/medical-laboratory-testing-in-ontario-timeline> (accessed 26 August 2016).
34. Quality Management Partnership. About us. Toronto: Quality Management Partnership; 2016. <https://www.qmpontario.ca/> (accessed 14 October 2016).
35. Quality Management Partnership. Building on strong foundations: Inaugural report on quality in colonoscopy, mammography and pathology. Toronto: Quality Management Partnership; 2015.
36. CIHI. Supply, distribution and migration of Canadian physicians, 2013. Spending and health workforce. SMDB data tables, Canada profile. Ottawa: Canadian Institute for Health Information; 2013.
37. CIHI. Table 1: Number of devices and number of devices per million population (rate) of selected imaging technologies, by province/territory, Canada, January 1, 2012. National inventory of selected medical imaging equipment, 2012. Ottawa: Canadian Institute for Health Information; 2013.
38. Cancer Quality Council of Ontario. Access to radiation treatment. Toronto: Cancer Quality Council of Ontario; 2016. <http://www.csqi.on.ca/cms/One.aspx?portalId=351209&pageId=354808> (accessed 12 October 2016).
39. Cancer Care Ontario. Radiation treatment capital investment strategy April 2012. Toronto: Cancer Care Ontario; 2012. <http://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=155722> (accessed 24 August 2016).
40. CIHI. Wait times for priority procedures in Canada, 2016. Ottawa: Canadian Institute for Health Information; 2016.
41. Ontario Association of Children's Rehabilitation Services. The voice of children's rehabilitation centres. Toronto: OACRS; 2016. <http://www.oacrs.com/en/about> (accessed 24 August 2016).
42. Ministry of Health and Long-Term Care. Classification of hospitals. Group E hospitals: General rehabilitation. Toronto: Queen's Printer for Ontario; 2016. http://www.health.gov.on.ca/en/common/system/services/hosp/group_e.aspx (accessed 25 August 2016).
43. Ministry of Health and Long-Term Care. Classification of hospitals. Group J hospitals: Special rehabilitation. Toronto: Queen's Printer for Ontario; 2016. http://www.health.gov.on.ca/en/common/system/services/hosp/group_j.aspx (accessed 26 August 2016).
44. Office of the Auditor General of Ontario. 2013 annual report of the Office of the Auditor General of Ontario. Chapter 3, section 3.08: Rehabilitation services in hospitals. Toronto: Office of the Auditor General of Ontario; 2013.
45. Retirement Homes Regulatory Authority. Annual report 2014-2015. Toronto: Retirement Homes Regulatory Authority; 2015.
46. Government of Ontario. Find a retirement home. Toronto: Queen's Printer for Ontario; 2015. https://www.ontario.ca/page/find-retirement-home?_ga=1.205570707.1245738462.1439332164 (accessed 24 August 2016).
47. Ontario Long Term Care Association. About long-term care in Ontario: Facts and figures. Toronto: Ontario Long Term Care Association; 2016. [http://www.olca.com/olca/OLTCA/LongTermCare/OLTCA/Public/LongTermCare/FactsFigures.aspx?hkey=b4823fa8-b615-49e3-8097-e67fa4224d40 - Ontario%27%20long-term%20care%20homes%20\(2015\)](http://www.olca.com/olca/OLTCA/LongTermCare/OLTCA/Public/LongTermCare/FactsFigures.aspx?hkey=b4823fa8-b615-49e3-8097-e67fa4224d40 - Ontario%27%20long-term%20care%20homes%20(2015)) (accessed 18 October 2016).
48. Ministry of Health and Long-Term Care. Find long-term care homes in Ontario. Toronto: Queen's Printer for Ontario; 2016. <http://www.health.gov.on.ca/en/public/programs/lrc/home-finder.aspx> (accessed 25 October 2016).
49. Ontario Association of Community Care Access Centres. Long-term care wait times. Toronto: Ontario Association of Community Care Access Centres; 2016. <http://oaccac.com/Quality-And-Transparency/Provincial-Wait-Times/long-term-care-wait-times> (accessed 12 October 2016).
50. Chartier C. LTC and dementia: Challenges, opportunities and the road ahead. National Conference on Dementia Care; 11-12 June 2015; Toronto. Toronto: National Conference on Dementia Care; 2015.
51. Ontario Medical Association. Ontario physicians supporting patients with dementia: A call for an Ontario dementia strategy. Ontario Medical Review 2016; February: 11.
52. CIHI. Residential long-term care financial data tables. Table 1.1: Selected characteristics of selected residential long-term care facilities, by province and territories, 2012. Ottawa: Canadian Institute for Health Information; 2014.
53. Ministry of Health and Long-Term Care. Complex continuing care co-payment. Toronto: Queen's Printer for Ontario; 2015. <http://www.health.gov.on.ca/en/public/publications/chronic/chronic.aspx> (accessed 25 August 2016).
54. Ministry of Health and Long-Term Care. Patients first - Reporting back on the proposal to strengthen patient-centred health care in Ontario. Toronto: Queen's Printer for Ontario; 2016. http://www.health.gov.on.ca/en/news/bulletin/2016/docs/patients_first_report_back_20160602.pdf (accessed 25 August 2016).
55. Ministry of Health and Long-Term Care. Health services in your community: Public health units. Toronto: Queen's Printer for Ontario; 2014. <http://www.health.gov.on.ca/en/common/system/services/phu/> (accessed 25 August 2016).
56. Ministry of Health and Long-Term Care. Transforming Ontario's health care system. Toronto: Queen's Printer for Ontario; 2016. <http://www.health.gov.on.ca/en/pro/programs/transformation/community.aspx> (accessed 14 October 2016).
57. Health Quality Ontario. Health Links: Improving integrated care for patients with multiple conditions and complex needs. Toronto: Health Quality Ontario; 2016.
58. Government of Ontario. Get medical advice: Telehealth Ontario. Toronto: Queen's Printer for Ontario; 2016. <https://www.ontario.ca/page/get-medical-advice-telehealth-ontario> (accessed 24 August 2016).
59. Ontario Telemedicine Network. Connected care across Ontario. OTN; 2016. <https://otn.ca/> (accessed 24 August 2016).
60. Ministry of Health and Long-Term Care. Excellent care for all: Telemedicine - Improving access to care through technology. Toronto: Queen's Printer for Ontario; 2014. http://www.health.gov.on.ca/en/pro/programs/ecfa/action/primary/pri_telemedicine.aspx (accessed 25 August 2016).
61. COACH: Canada's Health Informatics Association. 2015 Canadian telehealth report. Toronto: COACH: Canada's Health Informatics Association; 2016.
62. COACH: Canada's Health Informatics Association. 2011 Canadian telehealth report. Toronto: COACH: Canada's Health Informatics Association; 2012.
63. eHealth Ontario. Progress report. It's working for you. Toronto: eHealth Ontario; 2016. <http://www.ehealthontario.on.ca/en/progress-report> (accessed 25 August 2016).
64. Canada Health Infoway. A conversation about digital health. Annual report 2015-2016. Toronto: Canada Health Infoway; 2016.
65. National Physician Survey. 2014 National Physician Survey. Mississauga: National Physician Survey; 2014. <http://nationalphysiciansurvey.ca/result/2014-results-ontario/> (accessed 26 August 2016).
66. MyOSCAR. MyOSCAR - Your connection to health. Hamilton: McMaster University; 2016. <http://myoscar.org/> (accessed 4 November 2016).
67. Sunnybrook Health Sciences Centre. MyChart. Toronto: Sunnybrook Health Sciences Centre; 2016. <http://sunnybrook.ca/content/page-mychartlogin-learnmore> (accessed 24 August 2016).
68. Group Health Centre. myCARE. Sault Ste. Marie: Group Health Centre; 2015. <https://www.ghc.on.ca/article.php?i=MfY> (accessed 12 October 2016).
69. MiDASH. MiDASH. 2016. <https://midash.ca/miDASHApp/Pages/miDASHHome.aspx> (accessed 12 October 2016).
70. LifeLabs. See my results. LifeLabs Medical Laboratories; 2016. <http://www.lifelabs.com/patients/Pages/Test-Results.aspx?Province=ON> (accessed 24 August 2016).
71. Zelmer J, Hagens S. Understanding the gap between desire for and use of consumer health solutions. Healthcare Papers 2014;13(4): 12.
72. Canada Health Infoway. Electronic Medical Record (EMR). Ottawa: Canada Health Infoway; 2016. <https://www.infoway-inforoute.ca/en/home/82-our-partners/vendors/certification-services/240-emr> (accessed 24 August 2016).
73. Larsen D. eNotifications: Faster followup for better patient outcomes. Ontario Medical Review 2016; January: 2.
74. Collier R. National physician survey: EMR use at 75%. Canadian Medical Association Journal 2015;187(1): E17-E18.
75. National Physician Survey. 2010 National Physician. Mississauga: National Physician Survey; 2010. <http://nationalphysiciansurvey.ca/result/2010-on/> (accessed 26 August 2016).
76. CIHI. How Canada compares: Results from the Commonwealth Fund 2015 international health policy survey of primary care physicians. Ottawa: Canadian Institute for Health Information; 2016.
77. Lavis JN, Wilson MG, Grimshaw JM. Evidence brief: Optimizing clinical practice in Ontario based on data, evidence and guidelines. Hamilton: McMaster Health Forum; 2015.
78. Gray JAM. How to practice population medicine. Oxford: Oxford Press; 2011.
79. Health Quality Ontario. Quality improvement plans. Toronto: Health Quality Ontario; 2016. <http://www.hqontario.ca/Quality-Improvement/Quality-Improvement-Plans> (accessed 14 October 2016).
80. Ministry of Health and Long-Term Care. Long-Term Care Home Quality Inspection Program (LQIP). Toronto: Queen's Printer for Ontario; 2015. http://www.health.gov.on.ca/en/public/programs/lrc/31_pr_inspection.aspx (accessed 14 October 2016).
81. Health Quality Ontario. Quality improvement plans reports. Toronto: Health Quality Ontario; 2016. <http://www.hqontario.ca/Quality-Improvement/Quality-Improvement-Plans/Quality-Improvement-Plans-Reports> (accessed 14 October 2016).
82. Health Quality Ontario. Measuring up: HQO's 2015 yearly report. Toronto: Queen's Printer for Ontario; 2015.
83. Price D, Baker E, Golden B, Hannam R. Patient care groups: A new model of population based primary health care for Ontario. A report on behalf of the Primary Health Care Expert Advisory Committee. Toronto: Ministry of Health and Long-Term Care; 2015.

84. Ontario Hospital Association. OHA position statement on funding and capacity planning for Ontario's health system and hospitals. Toronto: Ontario Hospital Association; 2011. [https://www.oha.com/Documents/OHA Position Statement on Funding and Capacity Planning for Ontario's Health System and Hospitals.pdf](https://www.oha.com/Documents/OHA%20Position%20Statement%20on%20Funding%20and%20Capacity%20Planning%20for%20Ontario%27s%20Health%20System%20and%20Hospitals.pdf) (accessed 24 August 2016).
85. Ministry of Health and Long-Term Care. Update on the stroke capacity planning project. Toronto: Queen's Printer for Ontario; 2015. http://ontariostroke.ca/wp-content/uploads/2015/01/Stroke-Capacity-Planning-Update-OSN-Conference-January-9-2015_Final.pdf (accessed 25 August 2016).
86. Ministry of Health and Long-Term Care. Shaping Ontario's physician workforce: Building Ontario's capacity to plan, educate, recruit and retain physicians to meet health needs. Report of the Expert Panel on Health Professional Human Resources. Executive summary. Toronto: Queen's Printer for Ontario; 2015. <http://www.health.gov.on.ca/en/common/ministry/publications/reports/workforce/workforce.aspx> (accessed 12 October 2016).
87. Women's College Hospital Institute for Health Systems Solutions and Virtual Care. Health system capacity planning: Strengthening health care for Ontario's future. Toronto: Women's College Hospital Institute for Health Systems Solutions and Virtual Care; 2015. http://www.womenscollegehospital.ca/assets/pdf/wihv/Strengthening_Health_Care_for_Ontario%27s_Future_Report_FINAL.PDF (accessed 26 August 2016).
88. Ministry of Health and Long-Term Care. A vision for Ontario. Strategic recommendations for ophthalmology in Ontario. Toronto: Queen's Printer for Ontario; 2013. <http://www.health.gov.on.ca/en/requests/namd.aspx> (accessed 25 August 2016).
89. eHealth Ontario. Introducing Ontario's eHealth blueprint. Toronto: eHealth Ontario; 2016. <http://www.ehealthblueprint.com/en/> (accessed 12 October 2016).
90. Home Care Ontario. Capacity planning: The home care perspective. Toronto: Home Care Ontario; 2016. <http://www.homecare-ontario.ca/docs/default-source/position-papers/capacity-planning-apr-8-16-public-home-care-ontario.pdf?sfvrsn=6> (accessed 12 October 2016).
91. Ertelt S, Nolte E, Thomson S, Mays N, International Healthcare Comparisons Network. Capacity planning in health care. A review of the international experience. Geneva: World Health Organization; 2008. http://www.euro.who.int/_data/assets/pdf_file/0003/108966/E91193.pdf?ua=1 (accessed 25 August 2016).
92. Klein DJ, Brown AD, Huynh TM, et al. Capital spending in healthcare: A missed opportunity for improvement? Ottawa: Canadian Foundation for Healthcare Improvement; 2013.
93. CIHI. National health expenditure trends, 1975 to 2015. Series A, table A.3.2.1, private sector health expenditure by use of funds, Canada, 1975 to 2015 - Current dollars. Ottawa: Canadian Institute for Health Information; 2015.
94. CIHI. National health expenditure trends, 1975 to 2015. Series A, table A.3.2.2, private sector health expenditure by use of funds, Canada, 1975 to 2015 - Current dollars. Ottawa: Canadian Institute for Health Information; 2015.
95. CIHI. National health expenditure trends, 1975 to 2015. Series A, table A.3.3.1, public sector health expenditure by use of funds, Canada, 1975 to 2015 - Current dollars. Ottawa: Canadian Institute for Health Information; 2015.
96. CIHI. National health expenditure trends, 1975 to 2015. Series D table D.2.6.1, private sector health expenditure, by use of funds, Ontario, 1975 to 2015 - Current dollars (\$' 000,000). Ottawa: Canadian Institute for Health Information; 2015.
97. CIHI. National health expenditure trends, 1975 to 2015. Series D table D.2.6.2, private sector health expenditure, by use of funds, Ontario, 1975 to 2015 - Current dollars (percentage distribution). Ottawa: Canadian Institute for Health Information; 2015.
98. CIHI. National health expenditure trends, 1975 to 2015. Series D table D.3.6.2, public sector health expenditure, by use of funds, Ontario, 1975 to 2015 - Current dollars (percentage distribution). Ottawa: Canadian Institute for Health Information; 2015.
99. CIHI. National health expenditure trends, 1975 to 2015. Series D table D.3.6.1, public sector health expenditure, by use of funds, Ontario, 1975 to 2015 - Current dollars (\$' 000,000). Ottawa: Canadian Institute for Health Information; 2015.
100. Government of Ontario. Expenditure estimates for the Ministry of Health and Long-Term Care (2016-17). Toronto: Queen's Printer for Ontario; 2016. <https://www.ontario.ca/page/expenditure-estimates-ministry-health-and-long-term-care-2016-17> - vote18 (accessed 24 August 2016).
101. Ministry of Health and Long-Term Care. Ontario making new \$345 million investment in hospitals. Toronto: Queen's Printer for Ontario; 2016. <https://news.ontario.ca/mohltc/en/2016/02/ontario-making-new-345-million-investment-in-hospitals.html> (accessed 14 October 2016).
102. Government of Ontario. Investing in community health infrastructure. Ontario ensuring access to health care services, creating jobs. Toronto: Queen's Printer for Ontario; 2014. <https://news.ontario.ca/mof/en/2014/04/investing-in-community-health-infrastructure.html> (accessed 24 August 2016).
103. Association of Ontario Health Centres. Annual report 2012-2013. Toronto: Association of Ontario Health Centres; 2013. http://issuu.com/aohc_aohc/docs/aohc_annual_report_2013?e=7738038/2899350 (accessed 26 August 2016).
104. Association of Ontario Midwives. Welcome to Ontario midwives. Toronto: Association of Ontario Midwives; 2014. <http://www.ontariomidwives.ca/> (accessed 24 August 2016).
105. Ministry of Health and Long-Term Care. Community health centres. Toronto: Queen's Printer for Ontario; 2014. <http://www.health.gov.on.ca/en/common/system/services/chc/> (accessed 25 August 2016).
106. Nurse Practitioners' Association of Ontario. Nurse Practitioner-Led Clinics. Toronto: Nurse Practitioners' Association of Ontario; 2014. <http://npao.org/nurse-practitioners/clinics/> .U7v8X7EXmo (accessed 26 August 2016).
107. Vakrilova G. Personal communication.
108. Ministry of Health and Long-Term Care. Public health units. Toronto: Queen's Printer for Ontario; 2014. <http://www.health.gov.on.ca/en/common/system/services/phu/default.aspx> (accessed 25 August 2016).
109. Public Health Ontario. Laboratory services. Toronto: Ontario Agency for Health Protection and Promotion; 2014. <http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/default.aspx> (accessed 24 August 2016).
110. Ministry of Health and Long-Term Care. Publicly-funded physiotherapy: Clinic locations. Toronto: Queen's Printer for Ontario; 2015. http://www.health.gov.on.ca/en/public/programs/physio/pub_clinics.aspx (accessed 25 August 2016).
111. Ontario College of Pharmacists. 2015 annual report. Toronto: Ontario College of Pharmacists; 2016. <http://www.ocpinfo.com/library/news/2015-annual-report/> (accessed 24 August 2016).
112. HealthForceOntario. Specialist practice models. Toronto: Queen's Printer for Ontario; 2014. http://www.healthforceontario.ca/en/Home/Physicians/Training_%7C_Practising_in_Ontario/Physician_Roles/Specialist_Practice_Models (accessed 24 August 2016).
113. Ministry of Health and Long-Term Care. Primary health care status report - Signed at June 1, 2016. Toronto: Queen's Printer for Ontario; 2016.
114. CIHI. Continuing Care Reporting System, 2014-2015, quick stats. Table 1: Number of facilities and residents in continuing care facilities submitting to CCRS by province/territory, 2014-2015. Ottawa: Canadian Institute for Health Information; 2015. https://www.cihi.ca/en/ccrs-quickstats_14_15_en.xlsx (accessed 27 October 2016).
115. Office of the Auditor General of Canada. 2015 spring reports of the Auditor General of Canada. Report 4. Access to health services for remote First Nations communities. Ottawa: Office of the Auditor General of Canada; 2015. http://www.oag-bvg.gc.ca/internet/English/parl_oag_201504_04_e_40350.html - ex1 (accessed 24 August 2016).
116. CIHI. Hospital MIS Statistics. CMDB number of hospital inpatient days, inpatient admissions, ambulatory care visits, emergency visits and day/night care visits, by province, territory and Canada, 1999-2000 to 2013-2014. QuickStats. Ottawa: CIHI; 2015.
117. CIHI. Highlights of 2011-2012 emergency department visits and inpatient hospitalizations. Ottawa: Canadian Institute for Health Information; 2013.
118. CIHI. NACRS emergency department visits and length of stay by province/territory, 2014-2015. Table 3: ED length of stay for Canadian Triage and Acuity Scale (CTAS) levels and admitted cases, participating provinces/territories, NACRS, 2014-2015. Ottawa: Canadian Institute for Health Information; 2015.
119. Canadian Agency for Drugs and Technologies in Health. The Canadian medical imaging inventory, 2015. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2016.
120. CIHI. Table 3: Number of magnetic resonance imaging (MRI) and computed tomography (CT) exams, by province/territory, Canada, 2003-2004 to 2011-2012. Ottawa: Canadian Institute for Health Information; 2013. https://www.cihi.ca/sites/default/files/document/stats_mit_2012_en.xlsx (accessed 24 August 2016).
121. Canadian Agency for Drugs and Technologies in Health. The Canadian medical imaging inventory, 2015. Ottawa: Canadian Agency for Drugs and Technologies in Health; 2016. <https://www.cadth.ca/canadian-medical-imaging-inventory-2015> (accessed 14 October 2016).
122. CIHI. Residential long-term care financial data tables. Table 2.1: Age and sex of residents in selected residential long-term care facilities, by province and territories, 2012. Ottawa: Canadian Institute for Health Information; 2014.
123. CIHI. Residential long-term care financial data tables. Table 3.1: Expenses (\$000) reported by selected residential long-term care facilities, by province and territories, 2012. Ottawa: Canadian Institute for Health Information; 2014.
124. Ministry of Health and Long-Term Care. Ontario wait times. Toronto: Queen's Printer for Ontario; 2016. <http://www.ehealthontario.on.ca/en/progress-report/> (accessed 25 August 2016).
125. Cancer Care Ontario. Cancer System Quality Index. Toronto: Cancer Care Ontario; 2016. <https://www.cancercare.on.ca/cms/One.aspx?portalId=1377&pageId=8813> (accessed 24 August 2016).
126. Cancer Care Ontario. Ontario's wait times strategy. Toronto: Cancer Care Ontario; 2016. <https://www.cancercare.on.ca/ocs/wait-times/> (accessed 24 August 2016).
127. Health Quality Ontario. System performance. Why and how we report on health system performance in Ontario. Toronto: Queen's Printer for Ontario; 2016. <http://www.hqontario.ca/System-Performance/Health-System-Performance> (accessed 24 August 2016).
128. Local Health Integration Network. Ontario's LHINs. Toronto: Local Health Integration Network; 2016. <http://www.lhins.on.ca/> (accessed 24 August 2016).
129. Ontario Renal Network. About Ontario Renal Network. Toronto: Ontario Renal Network; 2016. http://www.renalnetwork.on.ca/about_orn/ - .V32KSVfnKJU (accessed 24 August 2016).
130. Public Health Ontario. Corporate reporting. Toronto: Ontario Agency for Health Protection and Promotion; 2016. <https://www.publichealthontario.ca/en/About/Publications/Pages/default.aspx> (accessed 24 August 2016).
131. Better Outcomes Registry & Network. About BORN. Toronto: BORN; 2016. <https://www.bornontario.ca/en/about-born/> (accessed 24 August 2016).
132. Cancer Quality Council of Ontario. About CQCO. Toronto: Cancer Quality Council of Ontario; 2016. <http://www.cqco.ca/cms/One.aspx?portalId=896138&pageId=89831> (accessed 25 August 2016).
133. Cardiac Care Network About CCN. Toronto: CCN; 2016. http://www.ccn.on.ca/ccn_public/FormsAboutCCN/about.aspx (accessed 25 August 2016).
134. Institute for Clinical Evaluative Sciences. About ICES. Toronto: Institute for Clinical Evaluative Sciences; 2016. <http://www.ices.on.ca/About-ICES> (accessed 24 August 2016).

135. Provincial Council for Maternal and Child Health. 2015 Ontario maternal-child healthcare system report. Toronto: Provincial Council for Maternal and Child Health; 2015. <http://www.pcmch.on.ca/health-care-providers/maternity-care/performance-and-quality-improvement/2015report/> (accessed 24 August 2016).
136. Association of Family Health Teams of Ontario. Strategic direction and reports. Toronto: Association of Family Health Teams of Ontario; 2016. <http://www.afhto.ca/about/advocacy-and-issues/> (accessed 26 August 2016).
137. Children's Mental Health Ontario. 2016 report card: Child and youth mental health. Toronto: Children's Mental Health Ontario; 2016. http://www.kidsmentalhealth.ca/about_us/cmho-report-card-2016.php (accessed 24 August 2016).
138. Ontario Association of Community Care Access Centres. Quality and transparency. Toronto: Ontario Association of Community Care Access Centres; 2013. <http://oaccac.com/Quality-And-Transparency> (accessed 26 August 2016).
139. Ontario Hospital Association. Employee relations services. Toronto: Ontario Hospital Association; 2013. <http://www.oha.com/Services/EmployeeRelations/Pages/EmployeeRelations.aspx> (accessed 24 August 2016).
140. Ontario Hospital Association. OHA's eHealth Applications Registry. Toronto: Ontario Hospital Association; 2013. <http://www.oha.com/CurrentIssues/keyinitiatives/eHealth/Pages/eHealthApplicationsRegistry.aspx> (accessed 24 August 2016).
141. Ontario Long Term Care Association. Our mission. Toronto: Ontario Long Term Care Association; 2016. <http://www.olca.com/oltca/OLTCA/AboutUs/OurMission/OLTCA/Public/AboutUs/Mission.aspx?hkey=f78f9822-cc19-49ec-8eed-fa5328e8541a> (accessed 24 August 2016).
142. Statistics Canada. Health. Ottawa: Statistics Canada; 2016. <http://www5.statcan.gc.ca/subject-sujet/theme-theme?pid=2966&lang=eng&more=0> (accessed 24 August 2016).
143. Canada Health Infoway. Progress in Canada. Toronto: Canada Health Infoway; 2016. <https://www.infoway-inforoute.ca/en/what-we-do/progress-in-canada> (accessed 24 August 2016).
144. CIHI. Vision and mandate. Ottawa: Canadian Institute for Health Information; 2016. <https://www.cihi.ca/en/about-cihi/vision-and-mandate> (accessed 24 August 2016).
145. Canadian Partnership Against Cancer. System performance. Toronto: Canadian Partnership Against Cancer; 2016. <http://www.partnershipagaincancer.ca/what-we-do/system-performance> (accessed 24 August 2016).
146. Canadian Medical Association. Policies and research. Ottawa: Canadian Medical Association; 2016. <https://www.cma.ca/En/pages/policies-research.aspx> (accessed 24 August 2016).