CADTH Health Technology Review

Canadian Medical Imaging Inventory 2022–2023: PET-CT and PET-MRI

CMII Report

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Abbreviations

AI	artificial intelligence
CDST	clinical decision support tool
CIHI	Canadian Institute for Health Information
CMII	Canadian Medical Imaging Inventory
FTE	full-time equivalent
MRT	medical radiation technologist
OECD	Organisation for Economic Co-operation and Development
PACS	picture archiving and communication system
PSMA	prostate-specific membrane antigen

Key Messages

PET–CT Imaging

- PET-CT is an advanced imaging technique that combines PET with CT to measure metabolic or biochemical activity in the human body.
- Sixty PET-CT units in 9 provinces were identified by the Canadian Medical Imaging Inventory (CMII) in its 2022–2023 national survey. All units are located in urban centres.
- Canada has 1.5 PET-CT units per million people. The greatest density of units per million people is in Quebec, New Brunswick, and Newfoundland and Labrador.
- Approximately 156,320 publicly funded PET-CT examinations were performed in the 2022–2023 fiscal year. This represents a national average of 3.9 exams per 1,000 people, an increase of 18.2% since 2019–2020.
- PET-CT was reported to have the largest demand in oncology (66.1%), followed by cardiology (13.2%) and neurology (10.1%). Applications for PET-CT continue to expand to new clinical indications and therapeutic areas.
- The upfront capital and ongoing operational costs of PET-CT units, as well as the costs of radiopharmaceutical products and equipment, may act as barriers to the rapid adoption of this technology.
- Canada is positioned in the bottom 25% of Organisation for Economic Co-operation and Development (OECD) countries in units per million population and the bottom 50% of OECD countries for average volume of publicly funded PET-CT exams per 1,000 population.
- The average age of PET-CT equipment in Canada is 7.2 years; 51.5% of PET-CT units are 5 years old or newer, 21.2% are 6 to 10 years old, and 27.3% are more than 10 years old.
- Radiotracers are essential in PET imaging.[1] The most commonly used PET-CT radiotracers are for oncology: 91% of sites reported using fluorodeoxyglucose F18 and 31.8% of sites reported using gallium-68 DOTA-TATE.
- The production of most radiotracers requires the use of a cyclotron.[1] Overall, 21.7% of PET-CT sites reported local proximity to a cyclotron, reflecting a disparity in the access to and growing demand for radiotracer supply.

PET–MRI Imaging

PET-MRI is a technique that combines PET with MRI to produce highly detailed imaging of soft tissues in the human body.

PET-MRI is almost exclusively used for research purposes in Canada; therefore, data are limited for this modality.

- Six PET-MRI units were identified in Canada across 3 provinces, representing a national average of 0.2 units per million people.

- The average age of PET-MRI equipment in Canada is 6.7 years; 2 units are 6 to 10 years old, and 1 unit is 5 years old.

What Is the Context?

PET is the most specific and sensitive technique for imaging metabolic or biochemical activity in the human body.[2] PET scans combine the use of radiopharmaceuticals with sensitive imaging cameras to detect areas of atypical activity within a particular organ or tissue (Appendix 1).[3,4] PET is recognized as a unique imaging modality with proven value in the field of oncology to detect, stage, and monitor cancers, and is also used in other fields, such as neurology and cardiology.[2,5,6]

Single-modality PET has largely been superseded in clinical practice by the hybrid modality of PET-CT.[4] PET-CT combines the imaging capabilities of PET and CT into a single piece of equipment, allowing for high-resolution 3D imaging that supports more accurate diagnosis and treatment.[7] More recently, a hybrid of PET and MRI has been developed, which exposes patients to less iodizing radiation than PET-CT. Combining the strengths of both imaging modalities enables PET-MRI to provide finer visualization of certain soft tissues and reduces radiation exposure.[8,9] PET-MRI is still largely used for research purposes in Canada.

Evidence shows that PET-CT can more accurately inform the staging of cancers and influence treatment and management strategies compared to other imaging modalities, possibly leading to improved quality of care for patients and better utilization of medical resources.[1]

While it is known that PET-CT can lead to cost-savings by avoiding unnecessary imaging tests, biopsies, and treatments,[1] the adoption and ongoing use of PET-CT remains challenged by the upfront capital and ongoing operation costs of equipment.[16] With increased wait times for PET-CT services, there are concerns about whether Canada's inventory of PET-CT units can accommodate current demand. As demand increases, there are also concerns about future capacity, due to factors such as an aging population, growing incidence of cancer and other diseases, and technological advancements that expand the uses of PET-CT.[1,10]

Human resource capacity, geography, and availability of and access to radiopharmaceutical products further challenge the adoption of PET services. Radiopharmaceuticals have a short half-life and therefore production and reliable transportation are expensive, and access is limited by proximity to urban settings.[10-12]

As PET-CT and PET-MRI imaging modalities advance, decision-makers and clinicians face complex procurement and implementation decisions within the context of a finite health care budget and limited availability of clinical and technical expertise.

To better understand the medical imaging landscape in Canada, the CMII was created in 2015 to track, compare, and map trends over time related to the availability, distribution, technical specifications, and use of advanced imaging equipment (i.e., CT, MRI, PET-CT, PET-MRI, SPECT, and SPECT-CT) in Canada. The CMII collects data through a survey conducted approximately once every 2 years and details the use of strategies for improving appropriate imaging, enhancing system efficiencies, reducing wait lists, and addressing other systemic challenges. Through this work, the CMII provides health care decision-makers with information on

the imaging landscape in Canada that may be used to identify and address service and medical equipment gaps and inform strategic planning.

This report summarizes the PET-CT and PET-MRI related findings of the 2022–2023 national CMII survey.

What Did We Do?

The purpose of this CMII report is to document current practices and developments in the supply, distribution, technical operations, and general clinical use of PET-CT and PET-MRI across jurisdictions. This report is 1 component of a series of publications produced as part of the CMII national survey that also includes CT, MRI, SPECT, and SPECT-CT.

This is the fourth iteration of the CMII since CADTH resumed the collection of these data in 2015.[13-15] Previously, the Canadian Institute for Health Information (CIHI) collected data on medical imaging technologies in Canada, from 2003 to 2012.[16-19]

Why Did We Do This?

We maintain the CMII to provide information on the medical imaging landscape across Canada to help support health care decision-making. Robust data are required to ensure health systems can deliver the imaging required to provide timely, safe, patient-centred care; improve health outcomes; and deliver health care efficiencies. Further details on the purpose of the CMII are provided in the *Canadian Medical Imaging Inventory 2022–2023: Provincial and Territorial Overview* report, located on the [CMII webpage](#).

Methods Overview

Data were primarily collected on 6 imaging modalities, including PET-CT and PET-MRI, using a web-based self-report survey (refer to the *Canadian Medical Imaging Inventory 2022–2023: Methods* document). Data were supplemented with information from provincial and territorial validators who are senior medical imaging–related health care decision-makers. In addition, data from peer reviewers, literature searches, and CIHI, as well as previous iterations of CMII data, were incorporated into the report. Both English and French versions of the survey were provided.

The CMII survey collected the following data:

- number and location of imaging equipment
- volume of exams
- hours of equipment operation
- age of imaging equipment
- technical specifications of machines

- adoption of new and emerging supportive tools and technologies
- imaging storing and communication services.

The survey opened on May 5, 2023, and primary data collection and validator responses were collected until October 31, 2023. The full data collection and analysis strategy, including survey development, respondent identification, sources of data used, and data validation procedures can be found in the *Canadian Medical Imaging Inventory 2022−2023: Methods* document on the [CMII webpage](#).

The CMII also presents data from both the survey and other sources relating to human resources, funding structures, ordering and referral practices, and the adoption of tools that may support appropriate imaging, system efficiencies, and wait-list reductions.

Comparisons between Canadian data and data from other OECD countries are reported, as are trends and projections on imaging capacity.

Response Rate for the 2022−2023 National Survey

A total of 504 sites were invited to participate in the survey. A 100% participation rate was received from publicly funded facilities (i.e., hospitals) in 9 provinces and territories. The participation rate for the remaining provinces ranged from 51% to 93% for publicly funded facilities.

A complete response rate was received for unit counts and exam volumes by provincial and territorial validators for 467 sites (92.7%), while the response rate varied for other survey questions. A total of 308 sites provided updated or new information (72%), reflecting an increased response rate of 34% since the CMII 2019−2020 survey.

While the overall survey participation rate was high, in some instances, not all survey questions were answered. This may lead to a nonresponse bias, which may result in the overgeneralization of some findings. To enable readers to assess the representativeness of each data point, the number of sites that responded to each question are included alongside the reported data in this report.

Provincial and territorial validators provided high-level information for nonresponding publicly funded health facilities. Data obtained from the previous survey iteration and from other sources (e.g., personal communications, websites of health care facilities) were used to inform the status of the remaining sites. Data from free-standing sites with private imaging capacity supplemented data for public capacity; detailed information for private imaging facilities is limited due to the low number of survey responses.

The survey questions and full data collection and analysis strategy, including survey development, respondent identification, sources of data used, and data validation procedures can be found in the *Canadian Medical Imaging Inventory 2022−2023: Methods* document. Definitions of the types of facilities included in the survey are provided in [Appendix 2](#).

PET–CT and PET–MRI Imaging Facility Overview

Characteristics of Facilities With PET–CT or PET–MRI Equipment

A summary of the geographic distribution, type, location, and funding source of facilities in Canada with PET-CT or PET-MRI equipment that responded to the 2022−2023 survey is as follows.

- **Sixty PET-CT units** were distributed across **52 sites** in **9 provinces** ([Figure 1](#)).
- **Six PET-MRI units** were distributed across **6 sites** in **3 provinces** ([Figure 1](#)).

Figure 1: Geographic Distribution of PET–CT and PET–MRI Units in Canada, 2022 to 2023
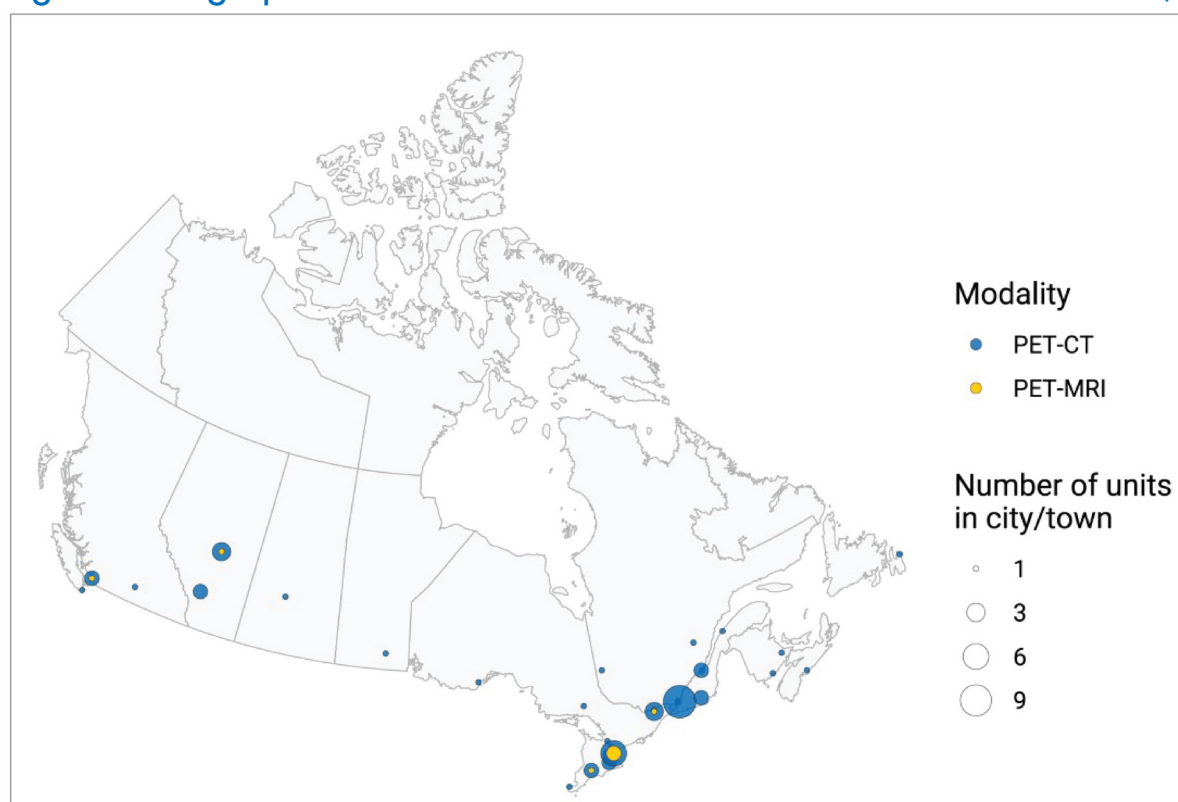
Notes: Location information was available for all units across all jurisdictions with PET-CT and PET-MRI capacity. Location was derived from the survey and validator data. Mobile units appear as 1 unit at each of the sites served.

Location and Facility Characteristics of PET–CT Units

- All PET-CT units were in urban areas across 9 provinces ([Appendix 3](#), [Table 8](#)). Prince Edward Island, the Northwest Territories, Nunavut, and Yukon all reported that they did not operate PET-CT equipment.
- Overall, 62.7% of sites with PET-CT units reported that they were hospitals, 23.5% reported that they were tertiary care centres, and 13.7% identified as private facilities ([Figure 2](#) and [Appendix 3](#), [Table 9](#)).

Data came from 51 sites with responses to this survey question. Definitions for the type of facility included in the survey are provided in Appendix 2.

- In total, 84% of sites reported being publicly funded, 10% reported private funding, and 6% reported receiving funds from both public and private sources (Figure 3 and Appendix 3, Table 10). Data came from 50 sites that responded to this survey question.

Figure 2: Types of PET–CT Imaging Facilities in Canada, 2022 to 2023
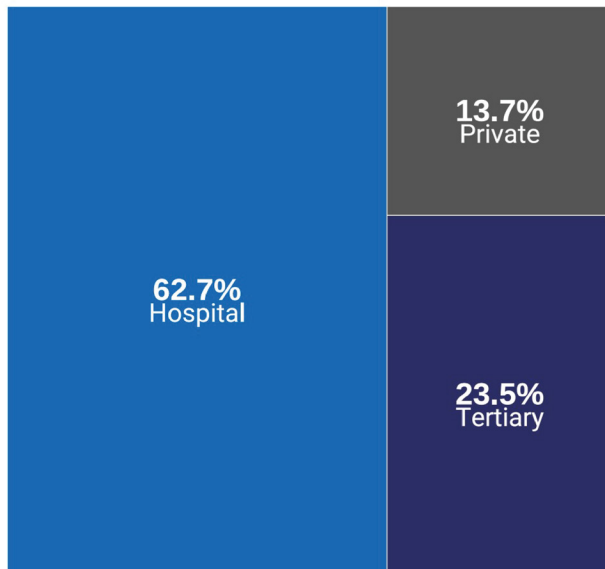
Notes: Survey response data were available for 51 out of 52 sites across all jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "What type of facility is this?"

Survey responses for facility type from private sites were limited due to a low response rate.

Data summaries by province and territory are available in Appendix 3, Table 9.

Figure 2 presents the number of sites as proportions according to facility type of all reported sites.

Definitions for each type of facility are provided in Appendix 2.

Location and Facility Characteristics of PET-MRI Units

- All PET-MRI units operate in urban areas across 3 provinces: Alberta, British Columbia, and Ontario.
- Overall, 66.7% of sites with PET-MRI units reported that they were hospitals, and 33.3% reported that they were tertiary care centres. Data came from 4 sites that responded to this survey question.
- Among the 3 sites in Alberta, British Columbia, and Ontario that reported the sources of funding, all sites reported receiving public funding.

Figure 3: Sources of Funding for PET-CT Imaging Facilities, 2022 to 2023
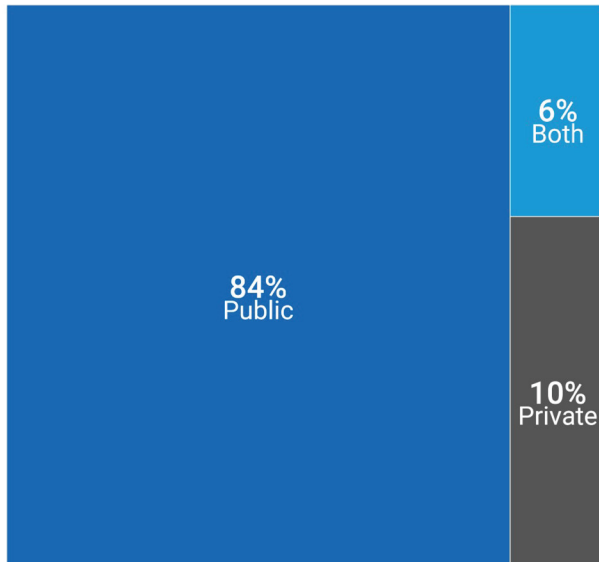
Notes: Survey response data were available for 50 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for Nova Scotia.

Data were derived from the following survey question: "How is this facility funded?"

Survey responses for facility funding source for private sites were limited due to a low response rate.

Data summaries by province and territory are available in Appendix 3, Table 10.

Figure 3 presents the number of sites as proportions according to the funding source of all reported sites.

Inventory of PET-CT and PET-MRI Imaging Equipment

PET-CT Units and Exams in 2022−2023

Total Number of PET-CT Units in 2022−2023

A total of **60 PET-CT units** were reported for 2022−2023, increasing from 57 units reported in 2019−2020.[14]

- The provinces with the highest number of PET-CT units are Quebec and Ontario, with 24 and 20 units, respectively. No PET-CT units operate in Prince Edward Island or the territories (Table 1 and Figure 4).

- Canada has **1.5 PET-CT units per million** population. The jurisdictions with the greatest density of PET-CT units per million are Quebec (2.7), New Brunswick (2.4), and Newfoundland and Labrador (1.9) (Figure 4). This does not reflect accessibility, particularly in provinces with large rural and remote areas, where travel to urban centres is required.

- Two sites in Ontario, 1 public and 1 private, reported the operation of mobile PET-CT units that are used as fixed units.

- Six PET-CT units operate in 6 private sites in Ontario, Quebec, and British Columbia.

Table 1: Inventory of PET–CT for Public and Private Facilities in Canada, 2022 to 2023

Province or territory	Number of sites (private sites)[a,b]	Total units (private)[c]	Units per million population (private)	Population[d]
Alberta	4 (0)	5 (0)	1.1 (0)	4,703,772
British Columbia	4 (1)	5 (1)	0.9 (0.2)	5,437,722
Manitoba	1 (0)	1 (0)	0.7 (0)	1,444,190
New Brunswick	2 (0)	2 (0)	2.4 (0)	831,618
Newfoundland and Labrador	1 (0)	1 (0)	1.9 (0)	533,710
Northwest Territories	–	–	–	45,668
Nova Scotia	1 (0)	1 (0)	1 (0)	1,047,232
Nunavut	–	–	–	40,715
Ontario	18 (2)	20[e,f] (2)[g]	1.3 (0.1)	15,500,632
Prince Edward Island	–	–	–	176,113
Quebec	20 (3)	24 (3)	2.7 (0.3)	8,831,257
Saskatchewan	1 (0)	1 (0)	0.8 (0)	1,221,439
Yukon	–	–	–	44,412
Canada	**52 (6)**	**60 (6)**	**1.5 (0.2)**	**39,858,480**

Notes: For the 2022–2023 survey, complete unit count data were available for 52 sites with PET-CT capacity out of 467 participating sites with advanced imaging capacity (i.e., SPECT-CT, SPECT, CT, MRI, PET-CT, or PET-MRI).

Data were derived from the following survey question: "Do you have the following fixed, mobile, or portable units at the site?" Options included: CT, MRI, PET-CT, PET-MRI, SPECT-CT, and SPECT.

British Columbia has 1 PET unit without CT or MRI capabilities, which is used exclusively for research purposes and is not included in this report.

[a]Per-jurisdiction unit availability according to the validator if the validator provided lists of sites with availability; where these were unavailable, the data were from the survey and from private sites.

[b]A private site is a unit located in a health care facility that operates privately but is either privately or publicly funded.

[c]Per-jurisdiction unit counts according to the validator if the validator provided lists of units; where these were unavailable, the data were from the survey and responses from private sites.

[d]Estimated population as of the first quarter of 2023.[20]

[e]Includes 1 PET unit that was not hybrid (i.e., without CT or MRI capabilities).

[f]Incudes 2 PET-CT units used for research purposes at a publicly funded facility (i.e., not patient-pay or private-pay).

[g]Includes 1 or more mobile PET-CT unit.

Figure 4: Units and Units per Million Population for PET–CT, 2022 to 2023
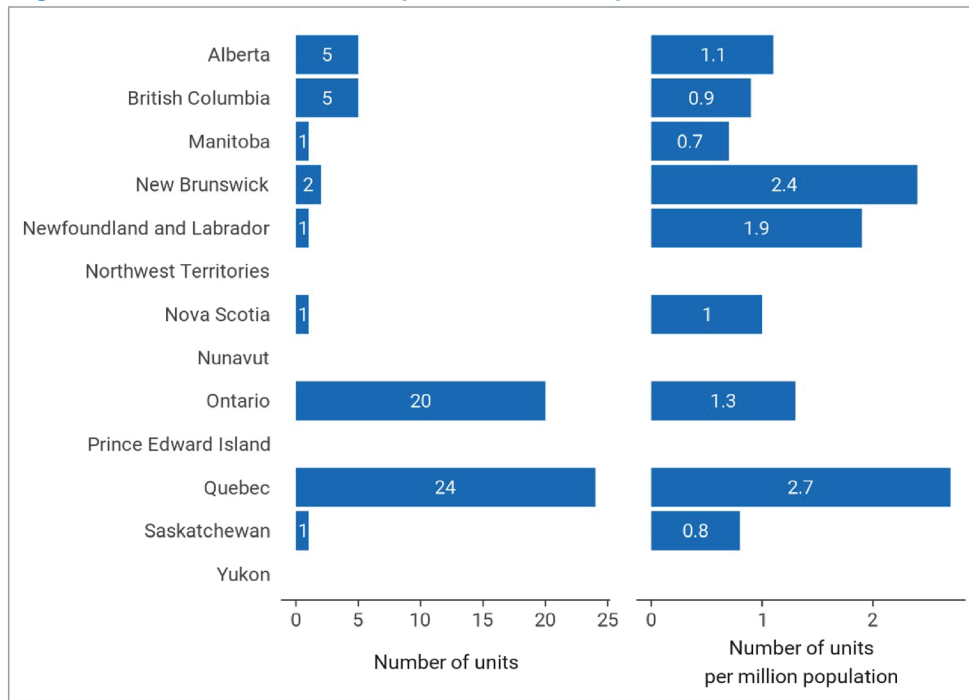
Notes: For the 2022–2023 survey, complete unit count data were available for 52 sites with PET-CT capacity out of 467 participating sites with advanced imaging capacity (i.e., SPECT-CT, SPECT, CT, MRI, PET-CT, PET-MRI).

Data were derived from the following survey question: "Do you have the following fixed, mobile, or portable units at the site?" Options included: CT, MRI, PET-CT, PET-MRI, SPECT-CT, and SPECT.

Total Volume of PET–CT Exams in Canada, 2022 to 2023

The total number of overall examinations and the total per capita (per 1,000 population) are reported for PET-CT for the most recent fiscal (or calendar) year and are presented in Table 2 and Figure 5.

- **A total of 156,320 PET-CT exams** were performed, representing a national average of **3.9 exams per 1,000 population**, ranging from 1.7 to 9 across all jurisdictions with capacity.

- An average of 2,605 exams per PET-CT unit were conducted across Canada in 2022–2023.

- **Quebec, Ontario, and British Columbia** had the **highest volume of PET-CT exams** of reporting jurisdictions with capacity in Canada, at 79,299 exams, 31,626 exams, and 15,898 exams, respectively.

- **Quebec, Newfoundland and Labrador, Alberta, and Nova Scotia** had the **highest density** of PET-CT exams of reporting jurisdictions in Canada, at 9.0 exams, 4.2 exams, 3.3. exams, and 3.3 exams per 1,000 people, respectively.

- The volume of exams conducted per unit is variable and may be impacted by several factors, such as the number of PET-CT units per capita, geographic location of equipment, facility type (i.e., specialized or tertiary care centres), and scope of clinical indications.

Figure 5: PET-CT Exams per 1,000 Population for the Latest Fiscal (or Calendar) Year With Data Availability Across Canada in Public Facilities, 2022 to 2023

Notes: Complete exam volume data for public facilities were reported by validators for all jurisdictions with PET-CT capacity.
Data were derived from the following survey question: "For all units, how many examinations on average were conducted in the last fiscal/calendar year?"

Table 2: Total Exams for the Latest Fiscal (Or Calendar) Year With Data Availability for PET-CT Across Canada for Public Facilities, 2022 to 2023

Province or territory	Population[a]	Total exams	Average exams per unit	Exams per 1,000 population
Alberta	4,703,772	15,695	3,139	3.3
British Columbia	5,437,722	15,898	3,179.6	2.9
Manitoba	1,444,190	2,443	2,443	1.7
New Brunswick	831,618	2,392	1,196	2.9
Newfoundland and Labrador	533,710	2,262	2,262	4.2
Northwest Territories	45,668	—	—	—
Nova Scotia	1,047,232	3,465	3,465	3.3
Nunavut	40,715	—	—	—

Province or territory	Populationᵃ	Total exams	Average exams per unit	Exams per 1,000 population
Ontario	15,500,632	31,626ᵇ	1,581.3	2
Prince Edward Island	176,113	—	—	—
Quebec	8,831,257	79,299	3,304.12	9.0
Saskatchewan	1,221,439	3,240	3,240	2.7
Yukon	44,412	—	—	—
Canada	**39,858,480**	**156,320**	**2,605.33**	**3.9**

Notes: Complete exam volume data for public facilities were reported by validators for all jurisdictions with PET-CT capacity.

Data were derived from the number of units with reported exam data and from the following survey question: "For all units, how many examinations on average were conducted in the last fiscal/calendar year?"

ᵃEstimated population as of the first quarter of 2023.[20]

ᵇFunding through PET centres.

PET–MRI Units and Exams in 2022−2023

Six PET-MRI units were reported for 2022−2023, distributed across 3 provinces, up from 5 in 2019−2020[14] (Table 3 and Figure 6).

- The province with the highest number of PET-MRI units was Ontario, with 4 units. One site in Alberta and 1 site in British Columbia had 1 PET-MRI unit each.
- Canada has **0.2 units per million** population. This does not reflect overall accessibility, particularly in provinces with large rural and remote areas where travel to urban centres is required.
- Approximately 1,200 exams were performed among sites with available data, representing a national average of **0.03 exams per 1,000 population.**
- Currently, PET-MRI is almost exclusively used for research purposes in Canada.

Table 3: Inventory of PET–MRI in Canada, 2022 to 2023

Province or territory	Number of sitesᵃ	Total unitsᵇ (private)	Units per million population	Total exams	Exams per 1,000 population	Populationᶜ
Alberta	1	1 (0)	0.2	0	0	4,703,772
British Columbia	1	1 (0)	0.2	0	0	5,437,722
Manitoba	—	—	—	—	—	1,444,190
New Brunswick	—	—	—	—	—	831,618
Newfoundland and Labrador	—	—	—	—	—	533,710
Northwest Territories	—	—	—	—	—	45,668
Nova Scotia	—	—	—	—	—	1,047,232
Nunavut	—	—	—	—	—	40,715
Ontario	4	4 (0)	0.3	1,200ᵈ	0.1	15,500,632

Province or territory	Number of sites[a]	Total units[b] (private)	Units per million population	Total exams	Exams per 1,000 population	Population[c]
Prince Edward Island	—	—	—	—	—	176,113
Quebec	—	—	—	—	—	8,831,257
Saskatchewan	—	—	—	—	—	1,221,439
Yukon	—	—	—	—	—	44,412
Canada	**6**	**6 (0)**	**0.2**	**1,200**	**0.03**	**39,858,480**

Notes: For the 2022–2023 survey, complete unit count data were available for 6 sites with PET-MRI capacity out of 467 participating sites with advanced imaging capacity (i.e., SPECT-CT, SPECT, CT, MRI, PET-CT, PET-MRI).

Data were derived from the following survey question: "Do you have the following fixed, mobile, or portable units at the site?" Options included: CT, MRI, PET-CT, PET-MRI, SPECT-CT, and SPECT.

[a]Per-jurisdiction unit availability according to the validator if the validator provided lists of sites with availability; where these were unavailable, the data were from the survey.

[b]Per-jurisdiction unit counts according to the validator and responses from private sites.

[c]Estimated population as of the first quarter of 2023.[20]

[d]Data from 2019–2020.[14]

Figure 6: Units and Units per Million Population for PET–MRI, 2022 to 2023
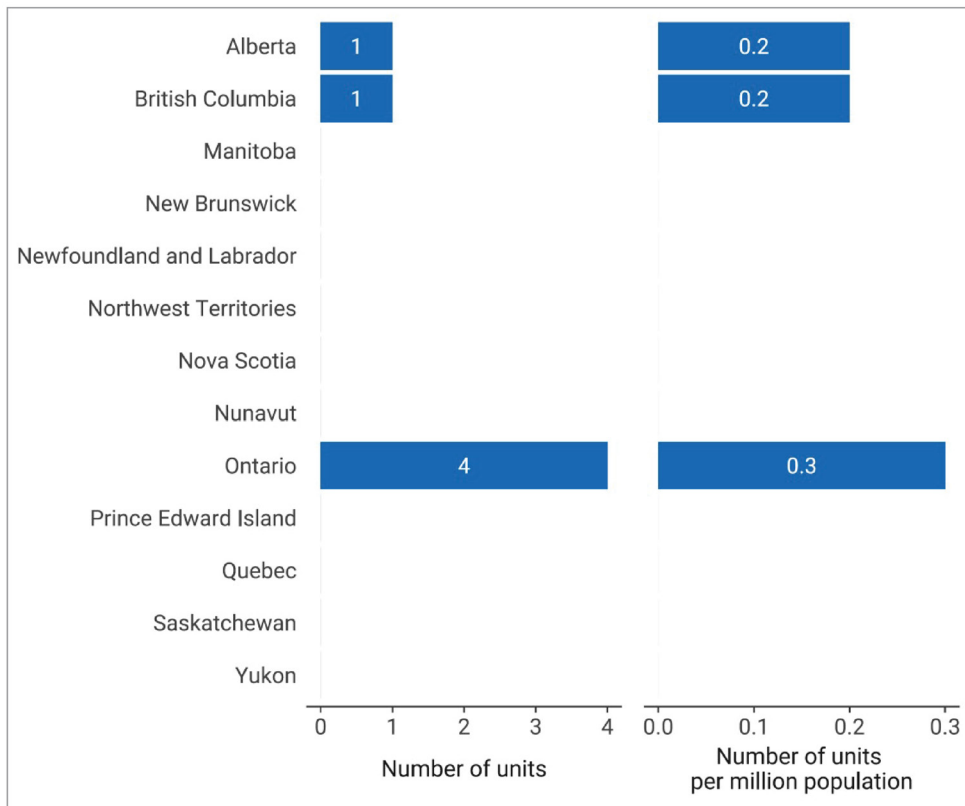
Notes: For the 2022–2023 survey, complete unit count data were available for 6 sites with PET-MRI capacity out of 467 participating sites with advanced imaging capacity (i.e., SPECT-CT, SPECT, CT, MRI, PET-CT, PET-MRI).
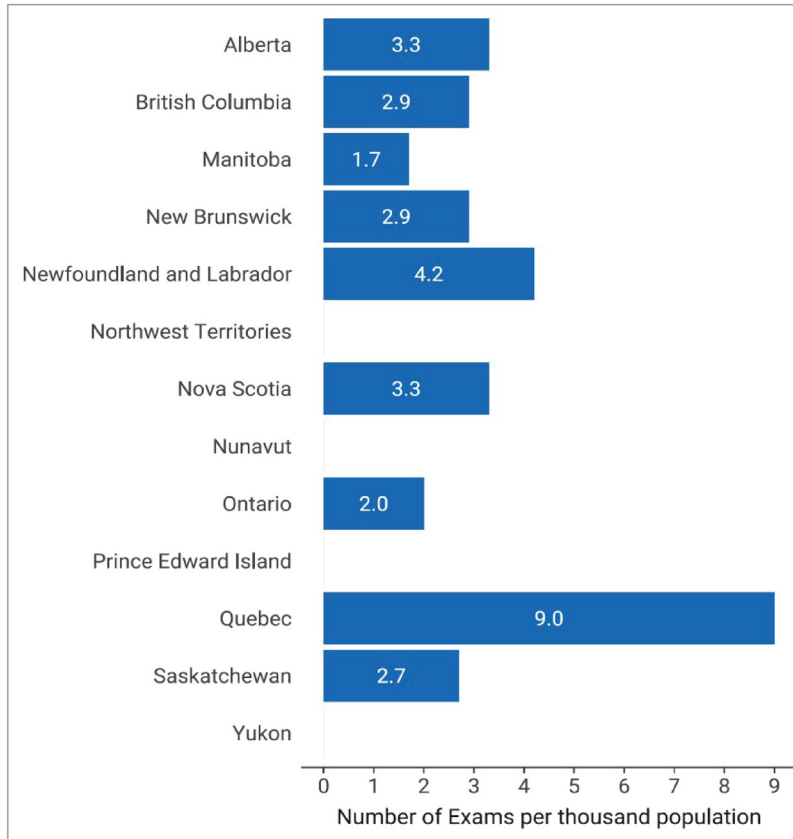
Data were derived from the following survey question: "Do you have the following fixed, mobile, or portable units at the site?" Options included: CT, MRI, PET-CT, PET-MRI, SPECT-CT, and SPECT.

Change in PET-CT Units and Exams Since 2015

Trends in Number of Units and Units per Million People, 2015 to 2022–2023

Information on the number of PET-CT units and units per million people between 2015 and 2022–2023 are presented in Appendix 3, Table 11.[13-15]

- Since 2015, the **number of PET-CT units** in Canada has **increased by 27.7%,** from 47 to 60 units.
- Between 2015 and 2022–2023, the number of **units per million people increased** by **15.4%,** from 1.3 to 1.5 units per million population. During this time, Quebec, New Brunswick, and Newfoundland and Labrador maintained the highest number of units per capita among jurisdictions with PET-CT capacity.
- Since 2019–2020, **Alberta** has experienced the **highest increase** in number of **units per million** people of all jurisdictions with PET-CT capacity, with an increase from 0.9 to 1.1 units per million population.

Trends in Exam Volume and Exams per 1,000 People, 2015 to 2022–2023

Information on the number of PET-CT exams and exams per 1,000 people between 2015 and 2022–2023 is presented in Appendix 3, Table 12:[13-15]

- Since 2015, the **volume of PET-CT exams** in Canada has **increased** by **103.5%,** from 76,824 to 156,320 exams.
- Between 2015 and 2022–2023, the number of **exams per 1,000 people increased** by **95%,** from 2.0 to 3.9 exams per 1,000 population. During this time, Quebec maintained the highest number of exams per capita among jurisdictions with PET-CT capacity.
- Since 2019–2020, **Saskatchewan** has experienced the highest **increase** in the volume of **exams per capita** among jurisdictions with PET-CT capacity, increasing by **58.8%,** from 1.7 to 2.7.

Operation of PET-CT and PET-MRI Imaging Equipment

Hours of Operation for PET-CT Equipment

Hours per Day and 24-Hour Use for PET-CT Units

- **PET-CT** units operate an **average of 9.4 hours per day** in Canada, ranging from 7 to 14 hours across all jurisdictions with capacity (Appendix 3, Table 13). Table 28 (Appendix 4) presents the average daily hours of operation reported for only publicly funded sites with capacity.
- New Brunswick and Nova Scotia reported the highest average hours of use per day across all jurisdictions with capacity, at 10 hours.
- **76% of sites** with **PET-CT** capacity in Canada reported use **between 8 and 12 hours per day**, **16%** reported use for **more than 12 hours per day**, and **8%** reported use for **less than 8 hours per day** (Figure 7). Data came from 25 sites that responded to this survey question.
- No sites with capacity reported PET-CT operation 24 hours per day. Operating times of PET-CT units are closely tied to radiopharmaceutical supply, whether onsite or offsite.

Figure 7: Percentage of Average Hours of Operation per 24-Hour Day of PET–CT Use by Category, 2022 to 2023
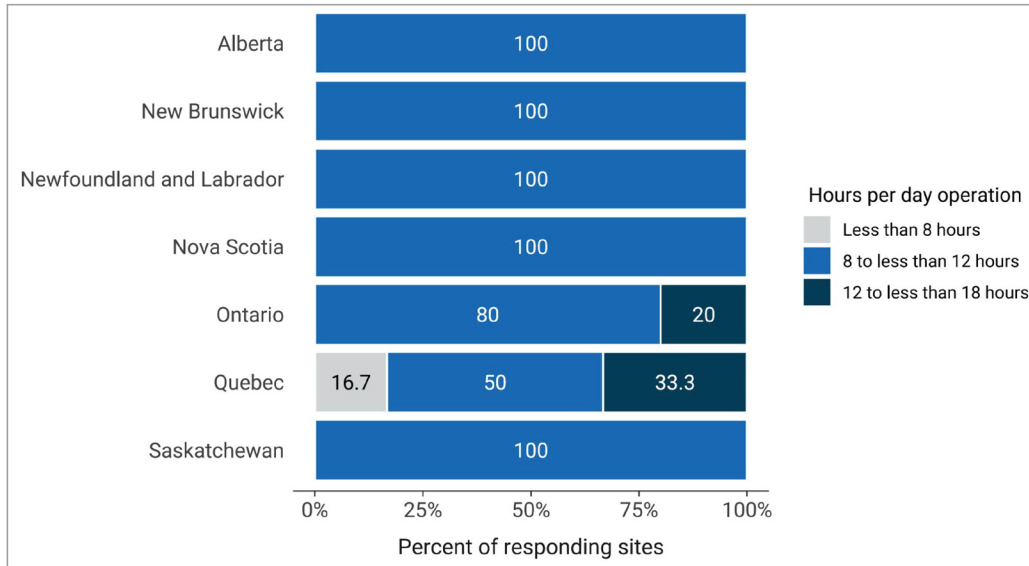
Notes: Survey response data were available for 25 out of 52 sites in 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia.

Data were derived from the following survey question: "In an average 24-hour day, how many hours are the units staffed through regular scheduled service capacity (do not include hours where staff are only on call)."

Hours Per Week and Weekend Use for PET–CT Units

- **PET-CT** units operate an **average of 44.2 hours per week** in Canada, ranging from 10 to 78 hours across jurisdictions with capacity (Appendix 3, Table 14). Table 29 (Appendix 4) presents the average weekly hours of operation reported for only publicly funded sites with capacity.

- Newfoundland and Labrador and Nova Scotia reported the highest average hours of use per week of all jurisdictions with capacity, at 56 and 50 hours, respectively.

- About **20%** of PET-CT units in Canada were used less than **40 hours per week**, **64%** were used **between 40 and 60 hours**, and **16% exceeded 60 hours** of use per week (Figure 8).

- Two sites in Ontario (7% of 26 sites in Canada) reported the operation of 1 PET-CT unit on weekends. We received anecdotal information that an additional 4 PET-CT units in Ontario are used on weekends.

- Hours of operation at the site level may change rapidly depending on demand and other factors.

Figure 8: Percentage of Average Hours of Operation per Week of PET-CT Use by Category, 2022 to 2023
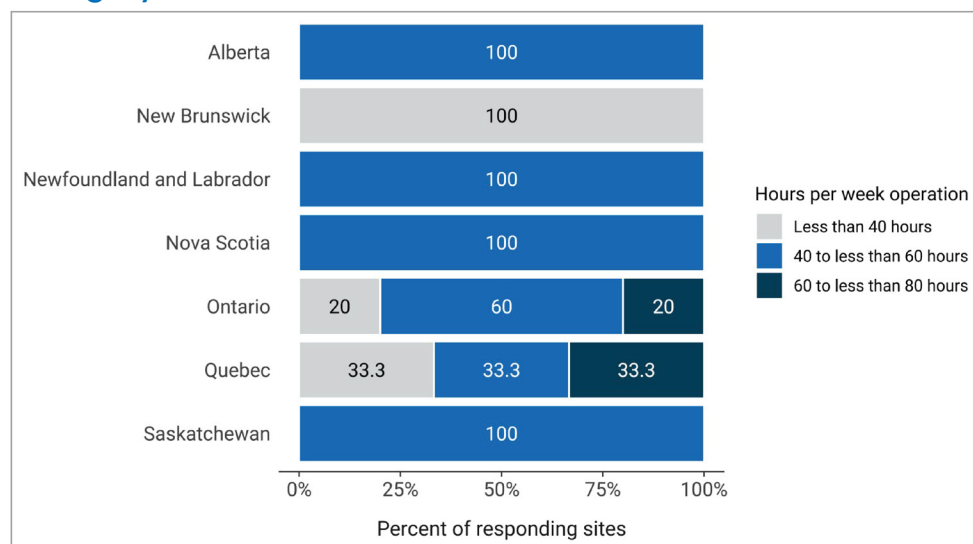
Notes: Survey response data were available for 25 out of 52 sites in 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia.

Data were derived from the following survey question: "In an average 168-hour week, how many hours are the [modality] units staffed through regular scheduled service capacity (do not include hours where staff are only on call)?"

Hours of Operation for PET-MRI Equipment

Hours Per Day and 24-Hour Use for PET-MRI Units
- One site provided data for the average number of hours per day of use. The PET-MRI unit was used for an average of 8 hours per day.
- No sites reported the use of a PET-MRI unit 24 hours per day.

Hours Per Week and Weekend Use for PET-MRI Units
- One site in Ontario provided data for the average number of hours per week of use. The PET-MRI unit was used for an average of 40 hours per week.
- The same site reported the use of a PET-MRI unit on weekends.

Annual Planned and Unplanned Downtime for PET-CT and PET-MRI Units

PET-CT Annual Downtime
- The average **planned downtime** for **PET-CT** units was **37.8 hours per year**, ranging from 2 to 240 hours (Figure 9 and Appendix 3, Table 15).
- The average **unplanned downtime** was **61.9 hours per year**, ranging from 0 hours to 480 hours.
- Some commonly reported reasons for unplanned downtime for PET-CT units include equipment and system failure, cyclotron breakdown, and lack of radiotracer supply.

PET-MRI Annual Downtime

- One site with **PET-MRI** capacity reported downtime information. This site reported **90 hours** of **planned downtime** and **75 hours of unplanned downtime** for their PET-MRI unit.

Figure 9: Average Downtime at Sites With PET-CT Units by Reporting Jurisdictions With Capacity, 2022 to 2023
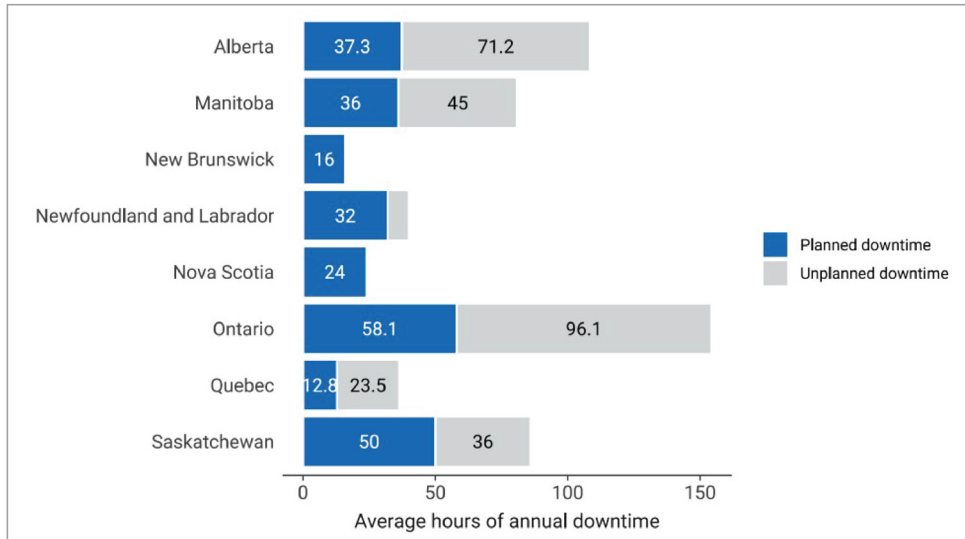
Notes: Survey response data for planned downtime were available for 23 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia. Survey response data for unplanned downtime were available for 20 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia and New Brunswick.

Data were derived from the following survey questions: "How much planned downtime is anticipated for scheduled maintenance for all units in a given year? (expressed in hours)" and "How much unplanned downtime is experienced for all units in a given year? (expressed in hours)".

Equipment Servicing at Sites With PET-CT and PET-MRI Imaging

The routine maintenance, inspection, and calibration of imaging equipment is usually managed though different types of equipment service agreements. Equipment servicing is part of health technology management and is intended to optimize the use of imaging equipment across its life cycle. Survey participants were asked to report on methods of servicing imaging equipment. The servicing methods included à la carte, full vendor, insurance, managed service contracts, shared service, third party, under warranty, and others. Definitions for types of servicing methods are available in Appendix 2.

Survey participants were asked to report these data at the modality level rather than the unit level. We received feedback indicating that, at sites where there was more than 1 PET-CT unit, in some instances, different servicing agreements may be used for different units.

- For PET-CT, the most commonly used **equipment servicing method** was **full vendor service**, with 64% of sites, followed by shared service (36%) (Table 4).

Table 4: Imaging Equipment Servicing Methods at Sites With PET–CT Units by Reporting Jurisdictions With Capacity, 2022 to 2023

| Province or territory	Full vendor	Managed service contracts	Shared service
Number of sites (%)			
Alberta	4 (100)	—	—
British Columbia	NR	NR	NR
Manitoba	1 (50)[a]	—	1 (50)[a]
New Brunswick	1 (100)	—	—
Newfoundland and Labrador	1 (100)	—	—
Northwest Territories	—	—	—
Nova Scotia	1 (100)	—	—
Nunavut	—	—	—
Ontario	5 (50)	1 (10)	4 (40)
Prince Edward Island	—	—	—
Quebec	2 (33.3)	—	4 (66.7)
Saskatchewan	1 (100)	—	—
Yukon	—	—	—
Canada	**16 (64.0)**	**1 (4.2)**	**9 (36.0)**

NR = not reported.

Notes: Survey response data were available for 25 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia.

Data were derived from the following survey question: "How is imaging equipment serviced?"

[a]Site reported the use of 2 different servicing methods.

Imaging Equipment Servicing at Sites With PET–MRI Units
- One site with PET-MRI capacity reported information about equipment servicing. This PET-MRI unit in Ontario uses a full vendor service agreement.

Full-Time Equivalent Medical Radiation Technologists for PET–CT and PET–MRI Units

Sites were asked to provide information on the number of full-time equivalent (FTE) trained medical radiation technologists (MRTs) assigned at the site level. An FTE position for an MRT was defined as an 8-hour workday, 5 days per week. The reported number of FTE trained MRTs may not reflect the total number of filled FTE trained MRTs in jurisdictions with PET-CT capacity, but rather the total number of budgeted positions.

- For **PET-CT**, an average of **4 FTE trained MRTs** were assigned **per site,** ranging between 1 to 9 (Table 5).
- For **PET-MRI, 2 FTE trained MRTs** were assigned to the 1 site that reported FTE information.

Table 5: Numbers of FTE Trained MRTs for PET–CT, 2022 to 2023

Province or territory	Number of reporting sites	Total FTE trained MRTs	Average FTE trained MRTs per site (minimum to maximum)	FTE trained MRTs per million population[a]	Total PET-CT units[b]
Alberta	4	16	4 (3 to 5)	3.4	5
British Columbia	NR	NR	NR	NR	5
Manitoba	1	3	3 (3 to 3)	2.1	1
New Brunswick	1	2	2 (2 to 2)	2.4	2
Newfoundland and Labrador	1	3	3 (3 to 3)	5.6	1
Northwest Territories	—	—	—	—	—
Nova Scotia	1	4	4 (4 to 4)	3.8	1
Nunavut	—	—	—	—	—
Ontario	10	36	3.6 (1 to 7)	2.3	20[c]
Prince Edward Island	—	—	—	—	—
Quebec	6	22	3.7 (2 to 9)	2.5	24
Saskatchewan	1	8	8 (8 to 8)	6.5	1
Yukon	—	—	—	—	—
Canada	**25**	**94**	**3.8 (1 to 9)**	**2.4**	**60**

FTE = full-time equivalent; MRT = medical radiation technologist; NR = not reported.

Notes: Survey response data were available for 25 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia.

Data were derived from the following survey question: "How many full-time equivalent (FTE) technologists are assigned to all units (collective number of FTEs for all units)?"

[a]Estimated population as of the first quarter of 2023.[20]

[b]Unit counts included all sites that participated in the national survey that reported information for number of units.

[c]Includes 1 PET unit that was not hybrid (i.e., without CT or MRI capabilities).

Age of PET–CT and PET–MRI Imaging Equipment

Average Age of PET–CT

- The average **age of PET-CT equipment in Canada is 7.2 years**, ranging between 0 and 30 years (Appendix 3, Table 16). In total, 73% of PET-CT units were operational within the past 10 years, and about half (52%) began operation within the past 5 years (Figure 10 and Appendix 3, Table 17). Table 30 (Appendix 4) presents the average age of equipment for publicly funded sites with capacity.

- Ontario installed 2 new PET-CT units in 2022–2023. Alberta and Quebec each installed a new PET-CT in 2022–2023.

Figure 10: Percentage of Average Years of PET-CT Operation by Province and Territory, 2022 to 2023
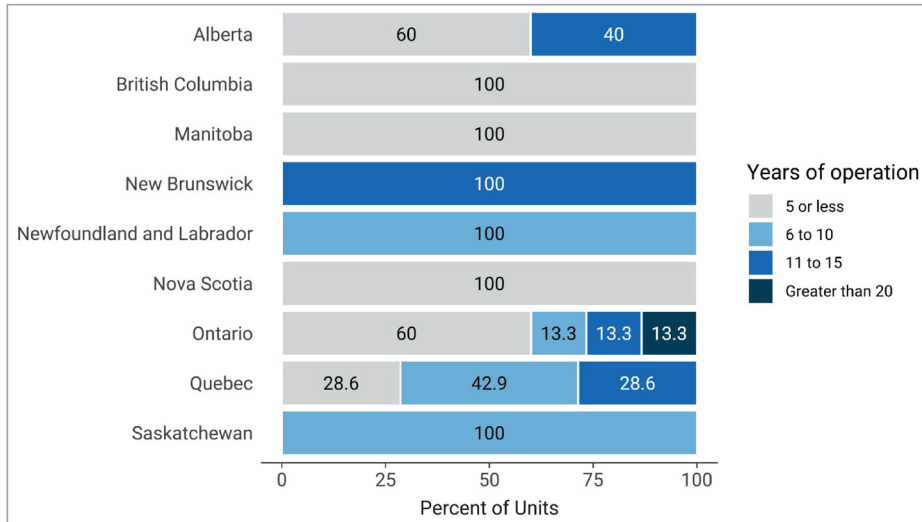
Notes: Survey response data were available for 33 of 60 PET-CT units across all jurisdictions with capacity.

Age for each unit was calculated from the following survey question: "What year did (or will) the [modality] unit become operational?" subtracted from 2023.

Average Age of PET-MRI

- The average **age of PET-MRI equipment in Canada is 6.7 years**, ranging between 5 and 8 years for 2 units operational in Ontario and 1 in Alberta. Dates for first year of operation for the other PET-MRI units were not available.

- Among the 3 sites with available data, the most recently installed PET-MRI unit was installed in 2018 and is located in Alberta.

Patterns of Use of PET-CT and PET-MRI Imaging Equipment

Purpose and Indication for PET-CT and PET-MRI Units

Purpose of PET-CT Use

- For all sites that provided exam use data, on average, **PET-CT exams were most often indicated for oncology,** at **66.1%** (use at individual sites ranged from 10% to 100%), followed by cardiology at 13.2% (range, 1% to 100%), and neurology at 10.1% (range, 2% to 100%) ([Figure 11](#) and [Appendix 3](#), [Table 18](#)).

- For all sites that provided use data, on average, **PET-CT was most often used for diagnostic noncardiac purposes** (80.4%), followed by diagnostic cardiac purposes (12.2%), and research purposes (4.5%) ([Figure 12](#) and [Appendix 3](#), [Table 19](#)).

Purpose of PET–MRI Use

- One PET-MRI unit in Ontario reported **97% use for neurologic indications**, 2% musculoskeletal, and 1% cardiac; **98%** of all use was for **research** purposes.

Figure 11: PET–CT Use by Clinical Specialty, 2022 to 2023
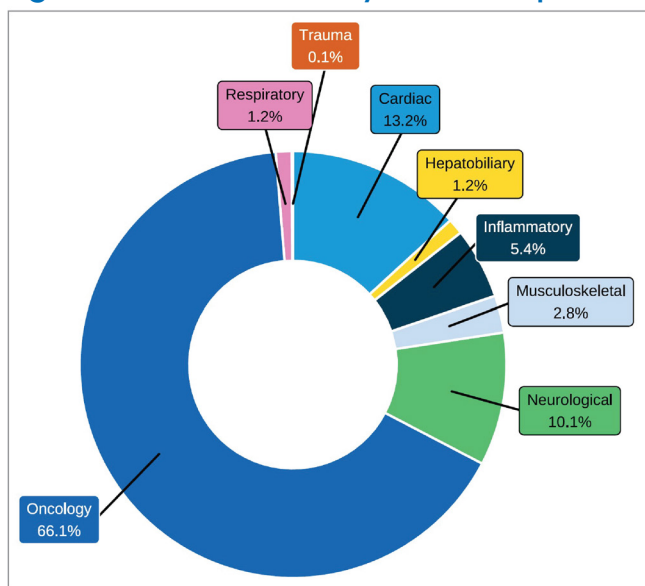
Notes: Survey response data on the average percentage of PET-CT use by discipline were available for 16 out of 52 sites across 4 of the 9 jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "On average, what percentage of these exams fall into the following categories? The total percentage, expressed as a number, must add up to 100." The following categories were offered: oncology, respiratory, hepatobiliary, musculoskeletal, inflammatory or infectious disease, neurological, cardiac, trauma, and other.

Integration of Use of Artificial Intelligence in PET–CT and PET–MRI Imaging

Artificial intelligence (AI) is a branch of computer science concerned with the development of systems that can perform problem-solving, reasoning, and recognition tasks.[21,22]

The current focus of AI in medical imaging departments in Canada includes, but is not limited to, assisting imaging professionals in lowering radiation dose, reading and interpreting images, image reconstruction, planning treatment, predicting outcomes, and carrying out administrative tasks.[21,22]

Survey participants were asked to report on the use of AI for PET-CT and PET-MRI in the clinical and/ or research setting. Most sites either did not respond to the questions on AI use, or answered with "no," indicating that it was not used.

Figure 12: Purpose of PET-CT Use (by Category), 2022 to 2023
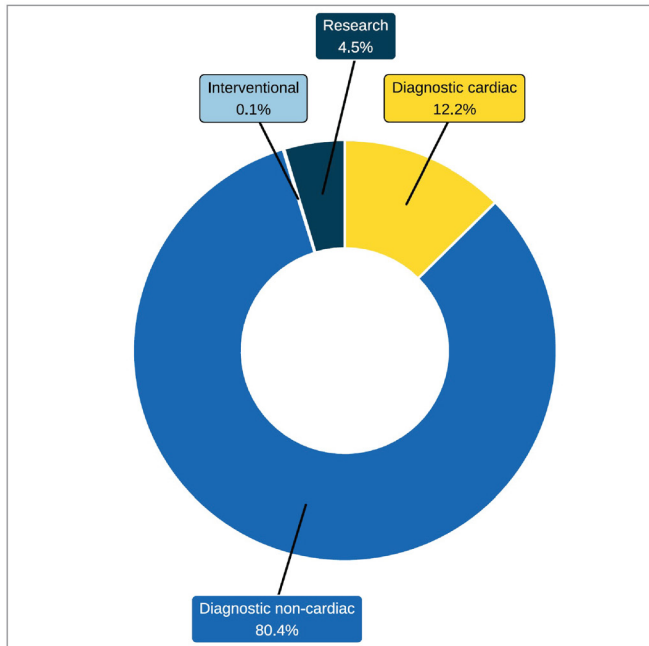
Notes: Survey response data on the average percentage of PET-CT use by discipline were available for 22 out of 52 sites across 5 of the 9 jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "Based on your practice in the last fiscal year, what percentage of time are all units used for? The total percentage, expressed as a number, must add up to 100." The following categories were offered: diagnostic purposes (cardiac only), diagnostic purposes (noncardiac), research, interventional, and other. Sections are labelled with the average percent of use in each category.

Use of AI for PET-CT

Data were available for 23 sites with PET-CT capacity; results are shown in Appendix 3, Table 20.

- Three sites located in New Brunswick, Ontario, and Quebec reported the use of AI with PET-CT in the **clinical setting** for **lowering radiation dose** and **image reconstruction**.
- One site in Ontario used **AI** with PET-CT in the **research setting** for **lowering radiation dose**, **image reconstruction**, and carrying out **administrative** tasks.

Use of AI for PET-MRI

- One site in Ontario reported the use of AI with **PET-MRI** in the **research setting** for all the tasks of interest: lowering radiation dose, reading and interpreting images, image reconstruction, planning treatment, predicting outcomes, and carrying out administrative tasks.

Ordering and Receiving Exams

Exam-Ordering Privileges at Sites With PET–CT Units

Jurisdictional validators were asked to provide details on the exam-ordering privileges of different types of health care professionals working in the public setting. Responses are summarized in Appendix 3, Table 21. The results showed the following:

- In all provinces that operate PET-CT units, clinical specialists are authorized to order PET-CT exams, although in British Columbia, PET-CT scans are primarily used for oncology indications with limited use for cardiology indications.

- Family doctors and general practitioners can order PET-CT scans in Alberta and Saskatchewan. While the Northwest Territories does not operate a PET-CT unit, clinical specialists, family physicians, and general practitioners can provide PET-CT exam referrals out of territory.

- Nurse practitioners in Saskatchewan have PET-CT ordering privileges.

- In Manitoba, Newfoundland and Labrador, and Ontario, all requests are reviewed for clinical appropriateness before being accepted. PET-CT orders will be accepted from family doctors after a nuclear medicine physician reviews the request to determine clinical appropriateness. In Newfoundland and Labrador, PET-CT orders are also accepted from nurse practitioners, following review by a nuclear medicine physician.

- In Quebec, there are specific conditions (not specified) under which family doctors and nurse practitioners can order PET-CT scans.

- In Nunavut, referrals for PET-CT scans are made for out of territory.

- For New Brunswick, the responses came from 1 of the 2 regional health authorities, the Horizon Health Network.

How Exam Requests Are Received at Sites With PET–CT and PET–MRI Imaging

Survey participants were asked to report their exam-ordering practices from the following options: requests by automated order entry, paper, fax, telephone, and centralized order entry for some, or all, exams.

- For **PET-CT** exam requests, the **most common** reported means were **paper form** (92%), **fax** (89%), and **centralized order entry** booking (68%), based on 27 sites with responses (Figure 13 and Appendix 3, Table 22).

- For **PET-MRI**, 1 site in Ontario reported **centralized order entry** for all exams.

Appropriateness and Quality Assurance Tools for PET–CT and PET–MRI Imaging

As imaging exam volumes continue to increase in Canada, so does the rate of low-value exam referrals that can impact exam wait times.[23] To help minimize low-value imaging, appropriateness processes, decision support tools, and peer-review programs may be implemented.

Use of Clinical Decision Support Tools in PET–CT and PET–MRI

A clinical decision support tool (CDST) is a tool that provides real-time guidance to physicians on the appropriateness of diagnostic imaging tests for a given patient during the ordering process.[14]

- One site (3.8%) reported that referring physicians use CDSTs for ordering PET-CT exams (Table 6).

- Data were available from 1 site in Ontario with a PET-MRI unit, which reported that CDSTs were not used to guide appropriateness.

Figure 13: Summary of PET–CT Exam-Ordering Practices at Sites That Reported a Process, 2022 to 2023
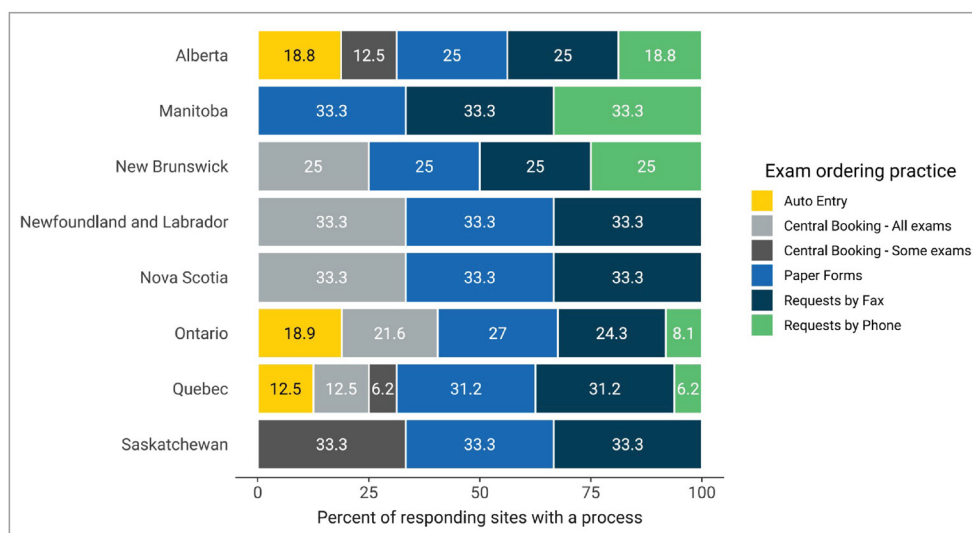
Notes: Survey response data were available for 27 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available from British Columbia.

Data were derived from the following survey questions: "Are automated order entry forms (exams request) used?"; "Are paper forms (exams requests) used?"; "Are requests received by fax?"; "Are requests received by phone?"; and "Is a centralized order entry (booking) system used? For all exams: Yes/no; For some exams: yes/no."

Use of Peer Learning in PET–CT and PET–MRI

Peer learning is a tool that is widely used in diagnostic imaging. Radiologists undertake peer review as part of the peer-learning workflow, often anonymously, in clinical practice to provide ongoing feedback to improve performance, reduce discrepancy and error, maintain standards, provide credibility, support learning, and identify gaps in education.[24]

- Eighteen sites (54.5%) with PET-CT used peer review of images for quality assurance (Table 6).

- Data were available from 1 site in Ontario with a PET-MRI unit, which reported that peer-review programs are not used to assist in quality assurance.

Table 6: Use of CDSTs and Peer Learning at Sites With PET-CT, 2022 to 2023

Province or territory	CDST		Peer review	
	Number of sites reporting "yes" (% of sites)	Number of reporting sites	Number of sites reporting "yes" (% of sites)	Number of reporting sites
Alberta	0 (0)	4	0 (0)	4
British Columbia	NR	NR	2 (100)	2
Manitoba	0 (0)	1	0 (0)	1
New Brunswick	0 (0)	1	1 (50)	2
Newfoundland and Labrador	0 (0)	1	0 (0)	1
Northwest Territories	—	—	—	—
Nova Scotia	0 (0)	1	1 (100)	1
Nunavut	—	—	—	—
Ontario	1 (9.1)	11	9 (75)	12
Prince Edward Island	—	—	—	—
Quebec	0 (0)	6	5 (55.6)	9
Saskatchewan	0 (0)	1	0 (0)	1
Yukon	—	—	—	—
Canada	**1 (3.8)**	**26**	**18 (54.5)**	**33**

CDST = clinical decision support tool; NR = not reported.

Notes: Survey response data about CDSTs were available for 26 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available from British Columbia. Survey response data about peer review were available for 33 out of 52 sites across all jurisdictions with PET-CT capacity.

CDST data were derived from the following survey question: "Is a clinical decision support tool used at the point of care by medical professionals referring patients to medical imaging? A clinical decision support tool provides real-time guidance to physicians on the appropriateness of diagnostic imaging tests for a given patient during the ordering process." Options were: "Yes," "No," and "Don't know." Additional data were supplemented from the following survey question: "Do you have a process for determining the appropriateness of orders that are received? If yes, which process is used?"

Peer-review data were derived from the following survey question: "Do radiologists at your facility participate in a peer-review program for image reading and interpretation for the purpose of quality assurance?" Options were: "Yes," "No," and "Don't know."

Picture Archiving and Communication Systems

A picture archiving and communications system (PACS) is an electronic system used to digitally manage images, including transmission, filing, storage, distribution, and retrieval of medical images. A detailed definition is provided in Appendix 2.

PET-CT and PACS

Sites with PET-CT capacity were asked whether medical images were stored on a PACS and accessible throughout the jurisdiction in which the site operates. Data were available for 22 sites with a PACS, noting that:

- **90.9%** of responding **sites** with **PET-CT** capacity reported **PACS access** throughout the **provincial** health care system without the need for manual retrieval (20 sites)
- **40.9%** of **sites** reported **local access** to a PACS (9 sites)

- **27.3%** of **sites** had **regional access** to a PACS (6 sites)
- **31.8%** of **sites** had **intraprovincial access** to a PACS (7 sites)
- **95.5%** of sites reported that **PACS images** were **accessible** to **referring physicians** located in areas of the hospital outside of diagnostic imaging (21 sites).

PET−MRI and PACS
- All 6 sites with PET-MRI capacity in Canada reported the use of a PACS.
- A total of **80%** of responding **sites** with **PET-MRI** capacity reported **PACS access** throughout the **provincial** health care system without need for manual retrieval (4 of 5 sites). One site indicated that their PACS was not connected to regional or provincial health care systems.
- Two sites reported regional access to a PACS, and 2 sites reported local and provincial access to PACS (4 of 6 sites).
- Overall, **83.3%** of responding **sites** reported that PACS images were **accessible** to **referring physicians** located in areas of the hospital outside of diagnostic imaging (5 of 6 sites).

Technical Characteristics of PET−CT Equipment

We collected data on the number of detector row slices, the imaging scope, and whether CT functionality was used independently to increase site CT capacity.

Technical Specifications of PET−CT Units

- The number of multidetector slices was reported for 27 PET-CT units (Figure 14 and Appendix 3, Table 23).
  - Overall, **64-slice** scanning was the **most common**, reported for 14 units (51.9%), followed by **128-slice** scanning for 4 units (14.8%), and **16-slice and 40-slice** scanning, which were both available in 3 units (11.1%).
- All **PET-CT units** with information on imaging **scope** were **near-whole body** or **full body**. One PET unit without CT capacity was used for head-only scans.
- The **CT component** was **used independently** to provide extra CT capacity in **16.7% of units** located in 4 provinces (4 of 24 units reported): 1 unit each in Alberta and New Brunswick, and 2 units in Ontario.

In recent years, the field of PET-CT has advanced with the introduction of digital PET-CT scanners. Compared to analogue PET-CT units, digital PET-CT scanners provide higher quality imaging, shorter scan times, and reduce patient radiation exposure.[25]

- A total of **69%** of PET-CT **units** were reported to be **digital PET-CT scanners**, located across 6 provinces: Alberta, British Columbia, Newfoundland and Labrador, Ontario, Quebec, and Saskatchewan (20 of 29 units reported).

Figure 14: Reported Proportion of Slices in PET–CT Units for Jurisdictions With Capacity, 2022 to 2023
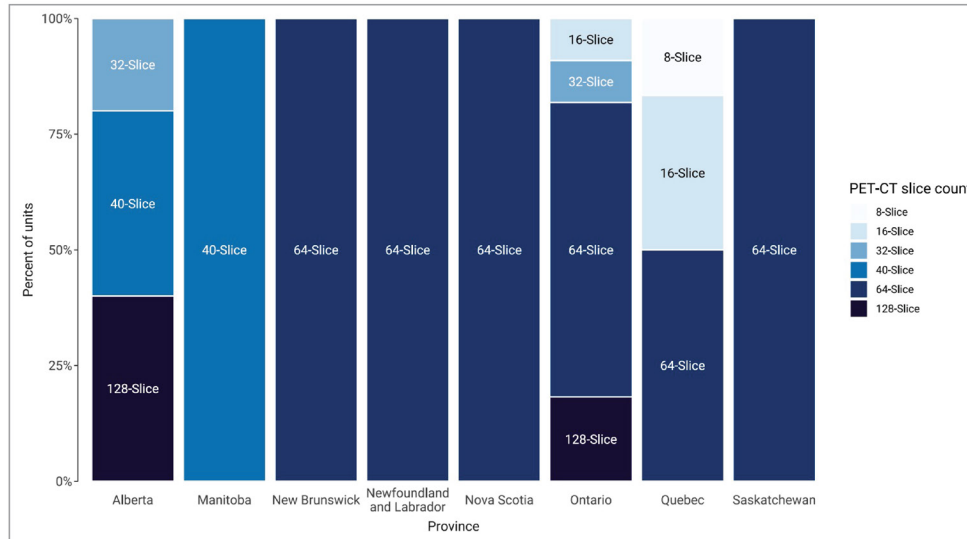
Notes: Survey response data were available for 27 out of 60 PET-CT units across 8 of the 9 jurisdictions with capacity. No data were available for British Columbia.

Data were derived from the following survey question: "How many multi-detectors does the CT unit have (how many slices)?"

Radiotracer Supply and Radiation Safety for PET–CT Units

Radiotracer Supply for PET–CT Units

A medical isotope emits radiation that is used to diagnose, stage, or treat disease.[26] Isotopes are processed in a cyclotron, generator, or reactor to create radiotracers that are required to produce PET-CT images. Radiotracers can be produced locally if a site has a cyclotron; otherwise, shipment from another centre is required. Sites that rely on receiving radiotracers from larger centres are limited by geographic proximity to the producing site and often order twice the amount of radiotracers required to account for the in-transit decay because of the short half-life, thereby intensifying the demand for radiotracers.[12] In some instances, radiotracers can be produced in generators that are delivered to sites.

The Canadian Nuclear Safety Commission website identified a total of 15 isotope producers and 23 research facilities in Canada.[26,27]

- Overall, **21.7%** of responding **sites** reported **local access** to a **cyclotron** (5 of 23 sites). Sites that reported access were located in Alberta, Ontario, and Quebec. The remaining sites that responded to the survey question indicated that radiotracers were sourced elsewhere.

There may be concerns about the capacity to supply the growing demand for radiotracers, given the significant increase in the volume of PET-CT exams since 2015 and the installation of new PET-CT units, particularly at sites that do not have access to a local cyclotron.

Radiotracer Use for PET–CT Units

Sites were asked to report on the different types of radiotracers used for oncology, cardiology, neurology, and other purposes, and to differentiate between clinical and research use (Figure 15 and Table 7). A total of 24 out of 52 sites with PET-CT capacity reported the use of radiotracers in 29 PET-CT units.

- Oncology was the most reported indication for PET-CT use. The most common radiotracers used for oncology were fluorodeoxyglucose F18 and gallium-68 DOTA-TATE.

- The use of certain radiotracers may be underrepresented due to the low response rate to these questions. For example, it is known that some jurisdictions support standardized provincial access via multisite Health Canada Clinical Trial Applications, which is not reflected in our survey results.

Figure 15: Average Percentage of PET–CT Radiotracer Use by Setting, 2022 to 2023
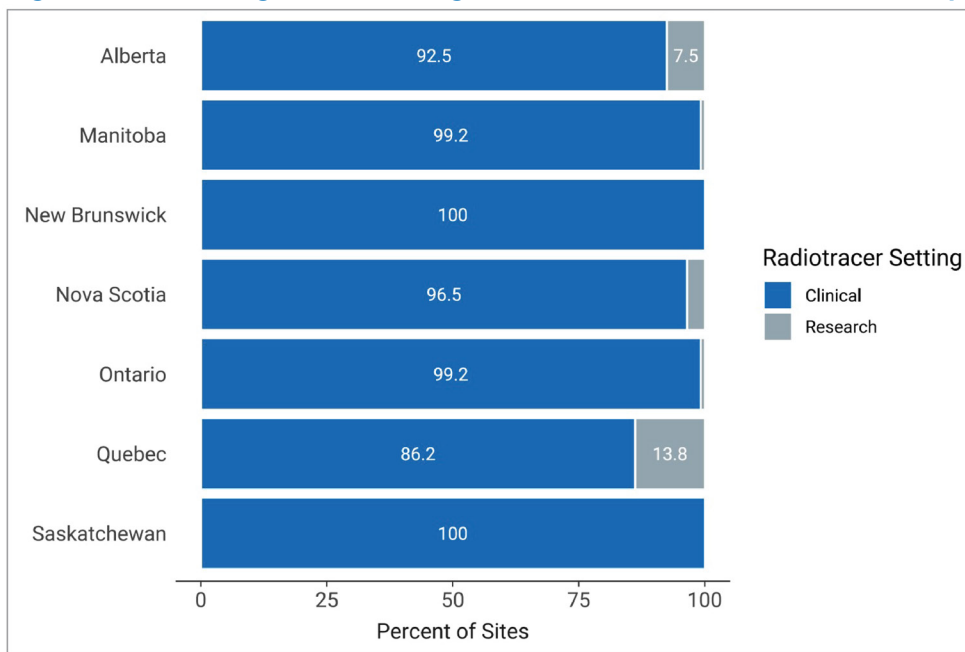
Notes: Survey response data for use by setting were available for 24 out of 52 sites across 7 of the 9 jurisdictions with PET-CT capacity. No data were available from British Columbia and Newfoundland and Labrador.

Data were derived from the following survey question: "What is your percentage of clinical use for each radiotracer you use? The total percentage, expressed as a number, must add up to 100."

Radiation Considerations for PET–CT

There is ongoing concern about potential health hazards associated with imaging exams that use radiation.[28] Hybrid imaging modalities that use CT contribute significantly to the radiation dose in individual patients, and strategies to monitor cumulative radiation dose are recommended.[29,30 31]

The survey asked about features intended to manage radiation safety (Appendix 3, Table 24). Of the sites that responded to the survey questions relating to radiation safety:

- **88%** of **PET-CT units recorded patient radiation dose** per exam (22 of 25 units with information)

- 77% of **PET-CT units had dose-management controls** (20 of 26 units with information)
- 3 sites planned to capture patient cumulative radiation tracking in the future.

Table 7: Radiotracers for Clinical and Research Use in PET–CT, 2022 to 2023

Radiotracers	Clinical use	Research use
Number of sites (% of responding sites)		
Oncology		
^{18}F-FDG	20 (90.9)	7 (31.8)
[18]F-Choline	0	1 (4.5)
^{68}Ga-DOTA-TATE	7 (31.8)	3 (13.6)
^{68}Ga-DOTA-NOC	0	1 (4.5)
^{18}F-PSMA-1007[a]	1 (4.5)	5 (22.7)
^{18}F-DCFPyL (BCCA, CPDC)[a]	0	2 (9.1)
^{68}Ga-PSMA-HBED-CC[b]	1 (4.5)	2 (9.1)
Cardiology		
[13]N-ammonia	1 (4.5)	2 (9.1)
[82]Rb-chloride	1 (4.5)	0
Neurology		
^{18}F-DOPA	0	1 (4.5)
[18]F-Florbetaben	2 (9.1)	1 (4.5)
[18]F-Flutemetamol	1 (4.5)	1 (4.5)
[18]F-Pittsburgh compound B	0	1 (4.5)
^{18}F-AV-45 (Florbetapir)	1 (4.5)	1 (4.5)
Infection and inflammation		
[18]F-Fluorodeoxysorbitol	1 (4.5)	0

^{18}F-AV-45 = Florbetapir; ^{18}F-Choline = fluorine-18−choline;[18]F-DCFPyL = fluorine F-18 piflufolastat; ^{18}F-DOPA = fluorine-18−fluoro-dihydroxyphenylalanine; ^{18}F-FDG = fluorine-18−fluorodeoxyglucose; ^{18}F-Florbetaben = fluorine-18−florbetaben; ^{18}F-Flutemetamol = fluorine-18−flutemetamol; ^{18}F-PSMA-1007[a] = fluorine-18−prostate-specific membrane antigen-1007; ^{68}Ga-DOTA-NOC = gallium-68−1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid-1-NaI3-octreotide; ^{68}Ga-DOTA-TATE = gallium-68−1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid-tyrosine-3-octreotate; ^{68}Ga-PSMA-HBED-CC = simultaneous gallium-68−prostate-specific membrane antigen; ^{13}N-ammonia = nitrogen-13−ammonia; [82]Rb-chloride = rubidium-82−chloride.

Notes: Survey response data were available for 22 out of 52 sites across 5 of the 9 jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "Which radiotracers do you use for PET imaging? Divide answer into research and clinical purposes, plan to use in next 12 months."

[a]There is not currently a commercially available product for these agents; all access is via the Health Canada Clinical Trials Application.

[b]This number is likely underrepresented, given the timing of the availability of commercial product compared to the data collection window for the national survey.

Trends in Technical Specifications of PET–CT

Trends Over Time in Number of Slices in PET–CT Units

- In 2012, **16-slice** was the **most common** scanning option used by PET-CT units. Since **2012**, the percentage of PET-CT units with **16-slice** scanning has **decreased**, from **75%** of units in 2012 **to 11.1%** of units in **2022–2023** ([Figure 16](#) and [Appendix 3](#), [Table 23](#)).

- Since **2012**, the percentage of PET-CT units with **64-slice** scanning has steadily **increased**, from **9.4%** of units in 2012 **to 51.9%** of units in **2022–2023**.

- In 2022–2023, **14.8%** of PET-CT units used **128-slice** scanning, in Alberta and Ontario (4 of 27 reported units).

Figure 16: Trends in Number of Slices in PET–CT Units, 2012 to 2022–2023
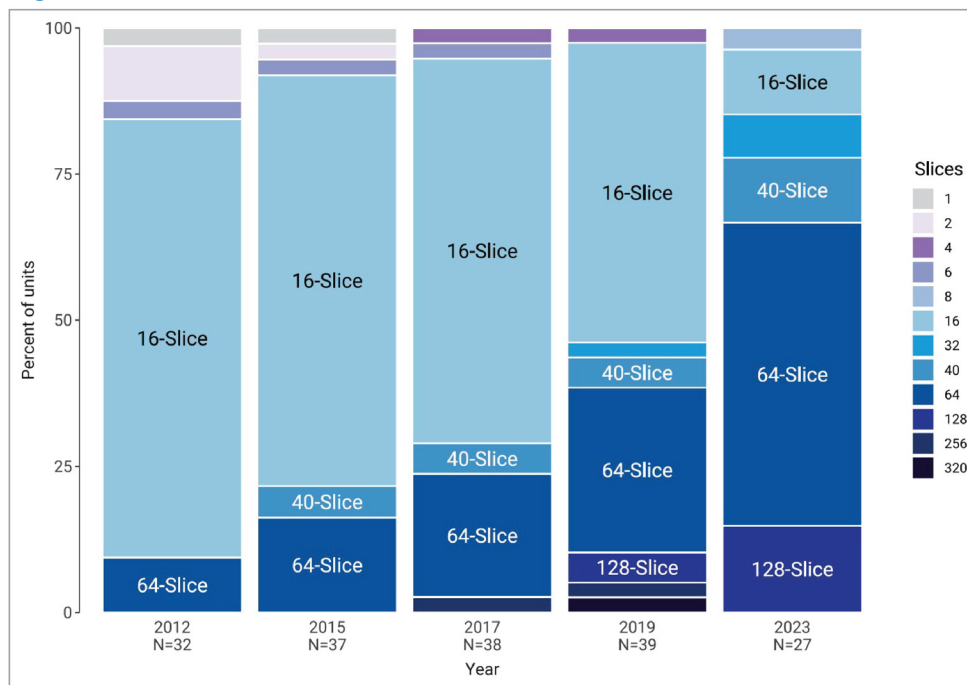
CIHI = Canadian Institute for Health Information; CMII = Canadian Medical Imaging Inventory.

Notes: Number of units with data available for each year is indicated with the year.

The 2023 data were derived from the following survey question: "How many multi-detectors does the CT unit have (how many slices)?"

Source: CIHI (2012)[17], the CIHI QuickStats dataset,[16] CMII (2015),[13] CMII (2017),[15] CMII (2020),[14] and CMII (2022–2023). The 2015 data were subject to additional data-cleaning before being uploaded for the 2017 survey, and this cleaned dataset was used.

Scope of PET–CT Units, 2015 to 2022–2023

- Data on the scope of imaging were collected for CMII surveys conducted between 2015 and 2022–2023. From 2015 to 2019–2020, **all PET-CT units** that reported data on scope were **identified as near-full body or full body**. In 2022–2023, all PET-CT units that reported data on scope were identified as near-full body or full body.

Availability and Use of Technologies for Control of Radiation Exposure, 2015 to 2022–2023

- Since 2015, Alberta, Ontario, Quebec, and Saskatchewan have reported the use of dose-management controls and dose recording in PET-CT. Table 24 (Appendix 3) shows the availability and use of technologies for control of radiation exposure in PET-CT units from CMII surveys conducted between 2015 and 2022–2023, for units with available information.

- The number of PET-CT units reported to have **dose-management controls increased** from **18.6% in 2015** to **33.3% in 2022–2023**.

International Comparisons

Canadian Data Compared With International Data

We compared Canadian PET-CT and PET unit counts and exam volume data with those of other Organisation for Economic Co-operation and Development (OECD) countries.[32] The comparison was made with the latest available year that data were available for each OECD country.

- Canada is **below the OECD average** of 2.6 units **per million** population at 1.5, positioned **24th** among 32 countries (Figure 17).

- Canada ranks **below the OECD average** of 5.0 exams **per 1,000** population at 3.9, positioned **15th** among 26 countries (Figure 18).

Figure 17: Comparison of Canadian and International Data for PET or PET-CT Scanners per Million Population, 2022 to 2023
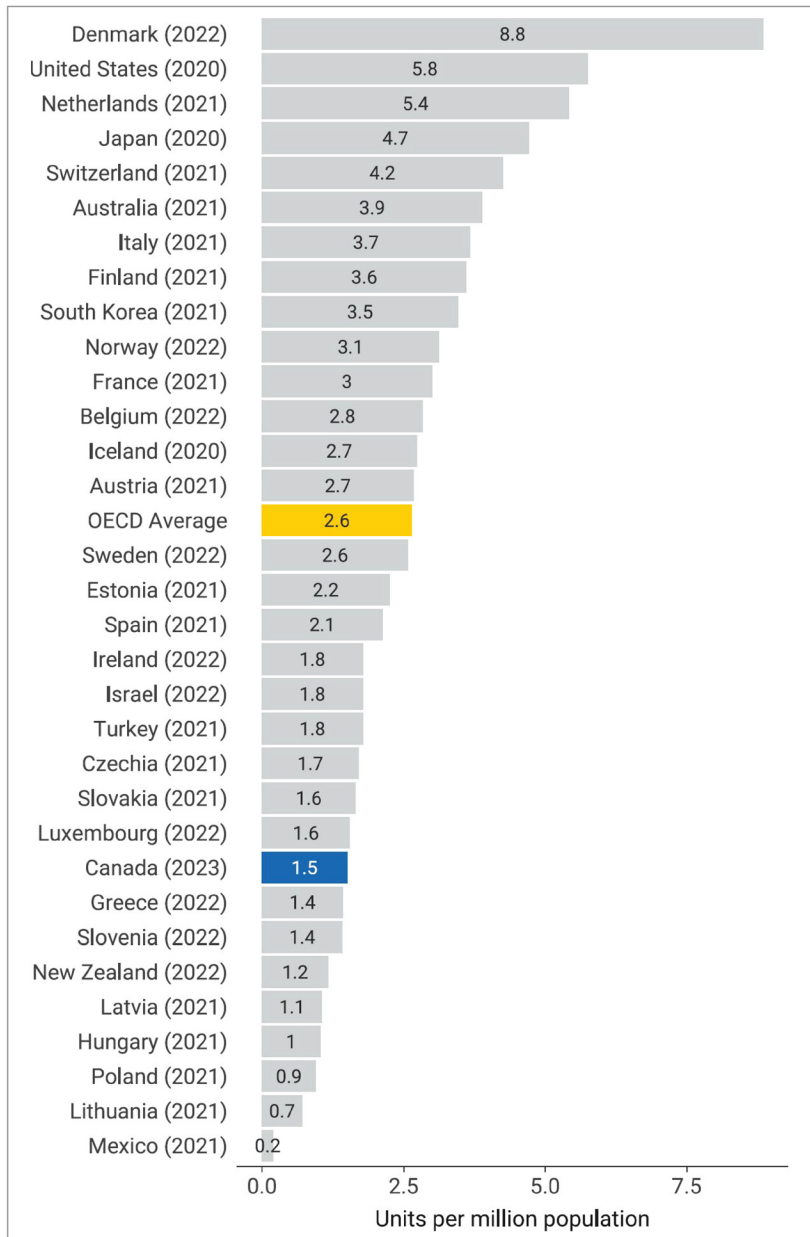
OECD = Organisation for Economic Co-operation and Development.

Note: The year is the last year with data available (refer to https://stats.oecd.org/ for details). OECD data retrieved on October 30, 2023.

Figure 18: Comparison of Canadian and OECD Data for PET or PET-CT Exams per 1,000 Population, 2022 to 2023
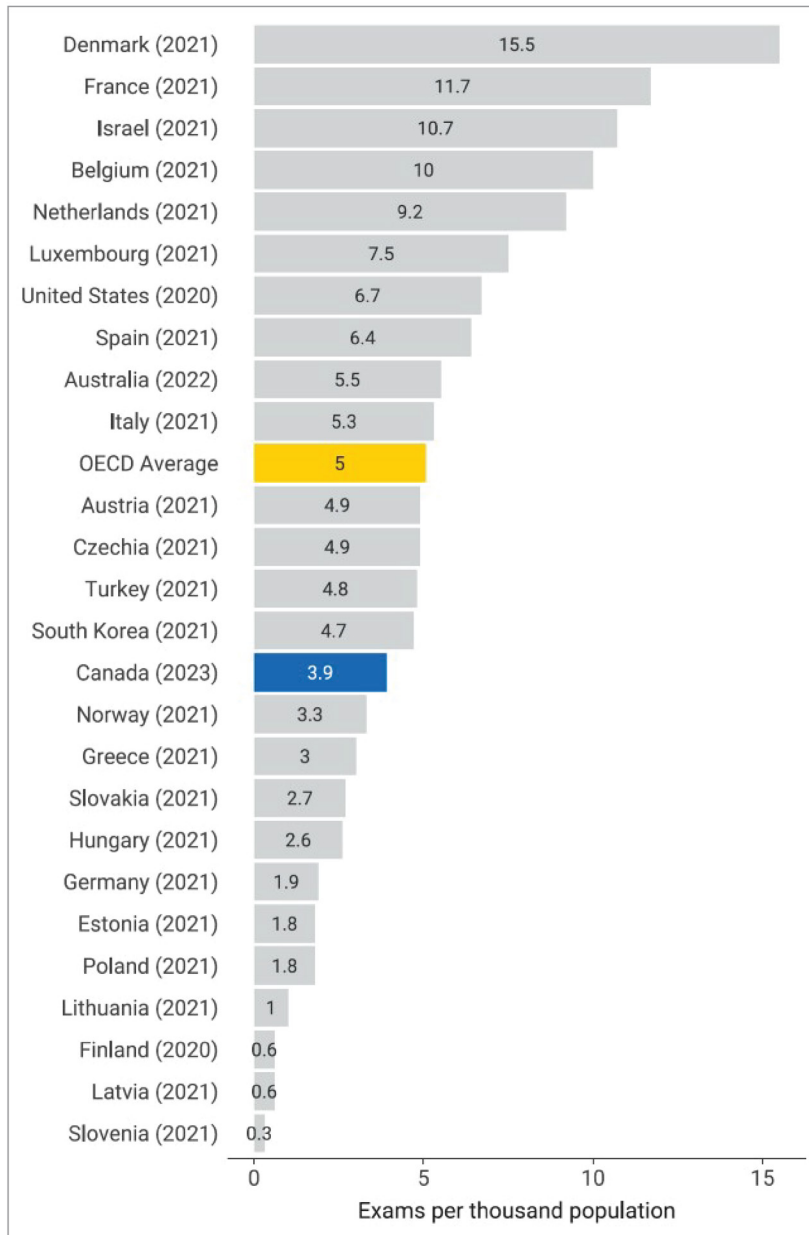
OECD = Organisation for Economic Co-operation and Development.

Note: The year is the last year with data available (refer to https://stats.oecd.org/ for details). OECD data retrieved on October 30, 2023.

Projections of the Number of PET–CT Units and Exams

The CMII forecasts the number of PET-CT units and the volume of exams needed to maintain current levels of service based on estimations of population growth in Canada for the following years: 2025, 2030, 2035, and 2040.

Our projections used a simple model based on 2022–2023 PET-CT imaging unit and exam findings, which were applied to estimated population projections from Statistics Canada. Three different population scenarios were envisioned for low, medium, and high projected growth and are presented in 5-year increments to 2040 (refer to Appendix 3, Table 25 for population projections). Projections use the current per capita number of units and exam volumes for 2022 to 2023, and are based on the assumption that population change is the only driver of growth over the forecasted period.

Projected Number of PET–CT Units for 2025, 2030, 2035, and 2040

Projections for the number of units for each province with existing PET-CT capacity are shown in Figure 19 and Appendix 3, Table 26. Assuming medium population growth:

- in Canada, the number of PET-CT units is **projected to increase by 18%, from 60 units** in 2022–2023 to **71 units** in **2040** (range, 66 to 78)
- the number of PET-CT **units** is **projected** to **increase** for **all provinces** with existing capacity, except for Newfoundland and Labrador
- 3 provinces are projected to have the **largest increase** in **units by 2040**: **Ontario,** from 20 to 24 units; **Quebec,** from 24 to 26 units; and **Alberta,** from 5 to 7 units.

When **low population growth** is assumed, the number of PET-CT units is projected to increase in **Ontario, Alberta, British Columbia, and Saskatchewan**. Quebec is projected to remain unchanged.

Newfoundland and Labrador is the only province that has a projected population decline across growth scenarios.

The Northwest Territories, Nunavut, Yukon, and Prince Edward Island do not currently have any PET-CT units; therefore, growth projections could not be calculated.

Figure 19: Projected Number of PET–CT Units for 2025, 2030, 2035, and 2040
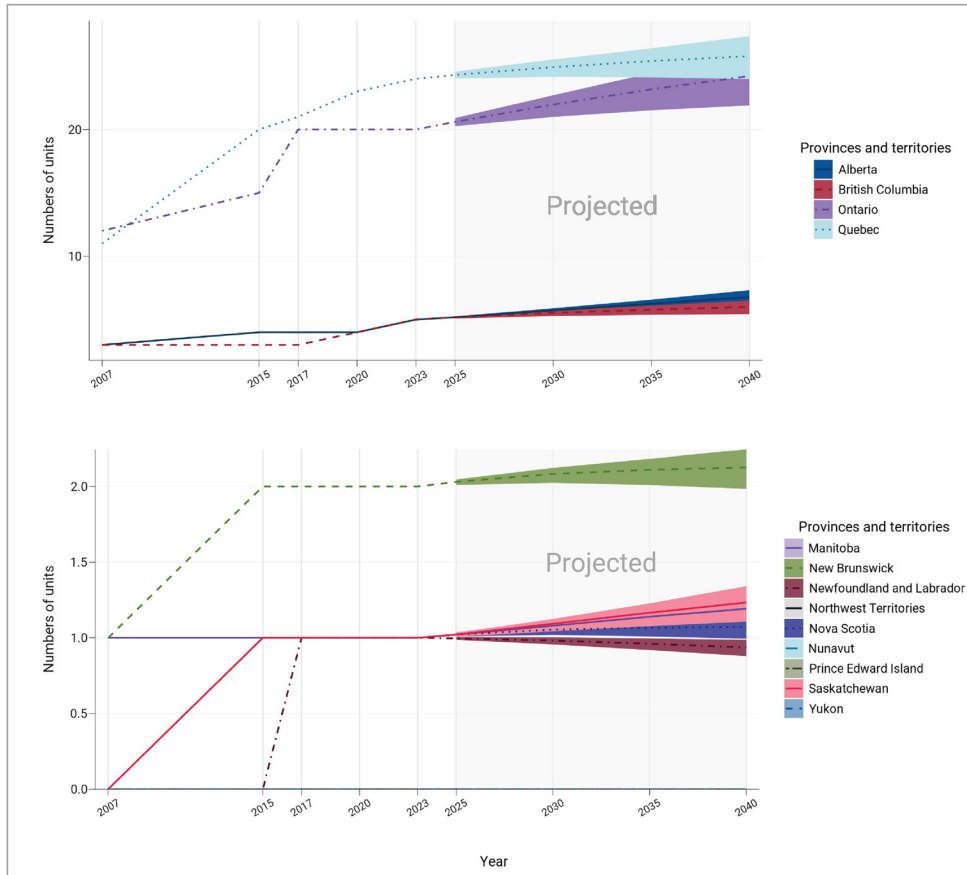
Notes: The projection was calculated from the products of the numbers of per capita units in 2022–2023 and the population projections in 2025, 2030, 2035, and 2040.
The numbers of imaging units or exams were provided by provincial or territorial validators in 2023.
The population projections were retrieved from the Statistics Canada website on January 18, 2024.[33]
The solid lines of projections were based on the population projection, assuming medium growth.
The upper and lower bounds were based on population projections, assuming high and low growth, respectively.
The data displayed in this figure are presented in greater detail in Appendix 3, Table 26.

Projected Number of PET–CT Exams for 2025, 2030, 2035, and 2040

Projections for the number of exams for each province with existing PET-CT capacity are shown in Figure 20 and Appendix 3, Table 27. Assuming medium population growth:

- in Canada, the number of PET-CT **exams** is **projected to increase by 18.5%,** from 156,320 to 185,257, **by 2040** (range, 168,841 to 199,964)

- the number of PET-CT **exams** is **projected** to **increase** for **all provinces** with existing capacity, except for Newfoundland and Labrador

- **Alberta**, **Saskatchewan, and Ontario** are projected to have the **largest increase** in exams by **2040**, at 35%, 23%, and 21%, respectively, as they are projected to have the largest increase in medium population growth from 2022–2023 to 2040.

When **low population growth** is assumed, the number of PET-CT exams is projected to increase in **Alberta, British Columbia, Manitoba, Ontario, and Saskatchewan**. New Brunswick, Nova Scotia, and Quebec are projected to remain unchanged.

Figure 20: Projected Number of PET-CT Examinations (Times 1,000) for 2025, 2030, 2035, and 2040
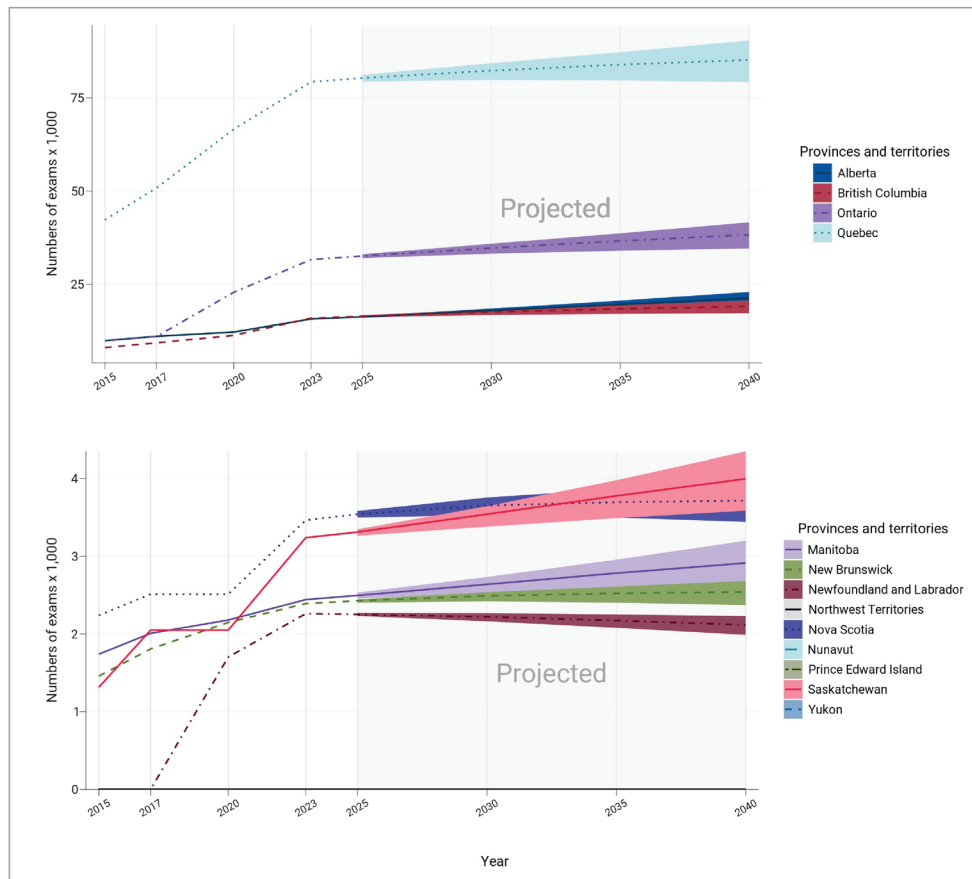
Notes: The projection was calculated from the products of the numbers of per capita exams in 2022–2023 and the population projections in 2025, 2030, 2035, and 2040.
The numbers of imaging units or exams were provided by provincial or territorial validators in 2023.
The population projections were retrieved from the Statistics Canada website on January 18, 2024.[33]
The solid lines of projections were based on the population projection, assuming medium growth.
The upper and lower bounds were based on population projections, assuming high and low growth, respectively.
The data displayed in this figure are presented in greater detail in Appendix 3, Table 27.

Projection Considerations and Limitations

Since 2015, the numbers of PET-CT units and exam volumes in Canada have increased by 27.7% and 103.5%, respectively. The rapid increase in exams over time, compared with the smaller increase in PET-CT units, suggests that demand for exams is outpacing the installation of units. Additionally, when considering the 2019–2020 CMII projections, the unit counts for 2025 and exam counts for 2040 have already been exceeded.[14]

Population growth is not the only factor that influences PET-CT projections. To assist with policy development and planning, many variables should be considered. These variables may include: changing health care priorities and policies, funding (with a set level of funding, there may be a limited number of exams that can be performed), an aging population, increasing disease prevalence, and the widening scope of clinical indications for which PET-CT can be used.

Limitations of Findings

- While complete data are available from provincial and territorial validators for units and exams in the public setting, there is no equivalent in the private imaging sector, and therefore data for unit and exam counts are less complete. Additionally, there were challenges identifying private facilities and contacts within these facilities, which also contributed to the low number of survey responses. Therefore, this may lead to underestimating the total number of units and exams, particularly in jurisdictions where privately run imaging facilities contribute to the overall use.

- For some survey questions, a low number of responses were received by participating sites, warranting caution when interpreting the data. For instance, while 6 sites reported PET-MRI capacity, only 1 site reported data for hours of operation, exam ordering and receiving practices, and patterns of use. Similarly, while the application of PET-CT outside the field of oncology continues to expand, which is reflected in our survey responses, the lower response rate to this survey question limits the generalizability of these findings. The number of sites that responded to each question are included alongside the reported data to enable readers to assess representativeness. Future work will be undertaken to identify patterns in missing data and how these may impact reporting bias.

- To document the age of equipment, dates were variably reported as the year of installation or first year of operation (depending on data availability). This frequently varied across datasets, leading to a 1-year or 2-year uncertainty in the age of individual units, and a corresponding uncertainty in the reported mean age of equipment.

- For specific survey questions, the accuracy of the data in this report relies in part on the survey participants' personal knowledge of their particular health care setting (e.g., hours of operation and hours of unplanned downtime). For these survey questions, recall bias cannot be avoided, as we were unable to assess whether all information was visually verified and based on real-time observations, or whether questions were answered from memory. As a result, the accuracy and completeness of reporting may be impacted.

- Since 2015, the CMII national survey forms have been prepopulated with responses from sites that participated in previous CMII national survey iterations. Invited survey respondents are asked to update their data to reflect the status at the time of responding to the survey. If the survey was not updated for this iteration, it was assumed that no changes had been made from the previous CMII survey response. While this method improved survey respondent engagement and reduced fatigue, in some instances, not all data may be up-to-date for some sites.

- While we asked about replacement of units, we did not ask about technical upgrades that improve the operation of existing units, which directly impact the age of equipment and need for replacement.

What Else Are We Doing?

This *Canadian Medical Imaging Inventory 2022–2023: PET-CT and PET-MRI* report is part of a series of publications that we have produced as part of the CMII national survey.

The following additional publications, which can be found on the CMII webpage, are available to provide jurisdiction-level information on medical imaging modalities and resources:

- *Canadian Medical Imaging Inventory 2022–2023: Provincial and Territorial Overview*
- *Canadian Medical Imaging Inventory 2022–2023: CT*
- *Canadian Medical Imaging Inventory 2022–2023: MRI*
- *Canadian Medical Imaging Inventory 2022–2023: SPECT and SPECT-CT*
- *Canadian Medical Imaging Inventory 2022–2023: The Medical Imaging Team*
- provincial and territorial summaries.

What Else Have We Done?

Other CMII-related reports that we have released in 2023–2024 in response to specific decision-maker needs are listed here and published on the CMII website:

- General Ultrasound Examination Volumes per Sonographer 8-Hour Workday
- Average Volume of MRI Exams Conducted per Hour Across Canada
- Implications of ChatGPT on Radiology Workflow
- Use of MRI and CT in Private Imaging Facilities in Canada: Service Report
- Optimizing the Use of Iodinated Contrast Media: Conservation Strategies Used Across Canada During the 2022 Shortage
- Imaging Implementation Advice Panel: Guidance for PSMA-PET Implementation
- Individuals' Access to Medical Imaging Results via Patient Portals
- Privately Operated Medical Imaging Facilities Across Canada
- Optimizing the Use of Iodinated Contrast Media for CT: Managing Shortages and Planning for a Sustainable and Secure Supply
- Wait List Strategies for CT and MRI *Scans*

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Appendix 1: Introduction to PET, PET–CT, and PET–MRI

Note that this appendix has not been copy-edited.

About PET and PET–CT

PET uses injection of a sugar or other metabolic tracer labelled with a positron-emitting radioisotope, sensitive radiation detector cameras, and powerful computers to detect and visualize areas of increased metabolism, such as tumours. It creates three-dimensional images of regions of interest, such as brain, bone, and heart.[3,34]

The main advantage of PET (and its successor PET-CT) imaging is the ability to precisely quantify metabolic processes (e.g., the rate of glucose metabolism) and, depending on the pathology, to more accurately localize abnormalities. PET-radiolabelled sugar (i.e.,[18]F-FDG) is the most common PET tracer currently used in Canada, but other tracers are becoming available, especially for cardiac and neurologic imaging. Another advantage of PET-CT imaging is that the whole body can be imaged, which is useful for assessing tumour spread or recurrence.

Medical specialties that commonly use PET imaging include oncology, neurology, psychiatry, cardiology, pediatrics, and infectious disease.

PET-CT combines the modalities of PET and CT, creating three-dimensional images of the body part of interest, such as brain, bone, and lung. Both scans are performed in sequence during a single session, and the images are computationally aligned.[7] PET-CT is commonly used in oncology to diagnose and stage various cancers, such as lung, gastrointestinal, colorectal, breast, and thyroid cancer. Additionally, PET-CT is commonly employed to diagnose neurologic, cardiovascular, infectious, and inflammatory pathologies, and the CT component is used to detect coronary artery calcification, a marker of coronary atheroscleosis.[35]

The main advantage of PET-CT is the ability to demonstrate metabolic information with the precise anatomic detail of multislice high-resolution CT images; as a result, PET-CT has replaced PET in Canada. Medical specialties that commonly use PET-CT imaging include oncology, neurology, cardiology, internal medicine, and orthopedics.

The challenges of PET-CT are those of the component modalities, both of which involve exposure to ionizing radiation.[35-37] The radioisotopes used in PET-CT have a half-life measured in hours, so imaging depends on availability of a cyclotron and transportation.

About PET–MRI

PET-MRI combines PET with MRI,[38] permitting high-sensitivity metabolic imaging with high resolution of soft-tissue detail, enabling visualization of anatomy and pathologies not commonly attainable with other modalities. The 2 scans are performed in tandem, and the images are then computationally aligned. PET-MRI

is the newest combination to reach clinical use and has applications in oncology, neurology, cardiology, internal medicine, and orthopedics.[39,40]

PET-MRI requires injection of radioisotope tracers and therefore requires the same risk-benefit assessment as other nuclear medicine imaging modalities for females of reproductive age and children.[41,42] Since the CT component is replaced by MRI, X-ray exposure is avoided; however, the hazards of magnetic fields remain.[41,42] The radioisotopes have a short half-life, requiring proximity to a cyclotron. The units and their infrastructure requirements are extremely expensive.

Appendix 2: Definitions in the CMII PET–CT and PET–MRI Report

Note that this appendix has not been copy-edited.

Type of Facility Operating Imaging Equipment

Hospital

An institution where patients are provided with continuing medical care and supporting diagnostic and therapeutic services. Hospitals are licensed or approved as hospitals by a provincial or territorial government or are operated by the Government of Canada. Included are those providing acute care.

Tertiary Care

A hospital that provides tertiary care, which is health care from specialists who investigate and treat patients in a large hospital after referral from primary care and secondary care facilities.

Private

A health care facility that operates privately but that is either privately or publicly funded, that ranges from specialized services by physicians, radiologists, dentists, chiropractors, or via mammography programs, to broad-based imaging centres offering a wide range of tests.

Community Hospital

A short-term (average length of stay with fewer than 30 days) hospital that provides acute care.

Picture Archiving and Communication Systems

PACS refers to an electronic system used to digitally manage images, including transmission, filing, storage, distribution, and retrieval of medical images. It is networked and frequently web-based. Combined with other web-based telehealth technologies, PACS allows timely access to medical images and specialists. PACS has replaced film and film library systems.

Access to images outside medical imaging departments by referring and consulting physicians is important for efficient patient care, particularly so in a country like Canada, with its large geographic size and dispersed population.

Type of Equipment Servicing Method Reported by Sites

À La Carte

Services and parts that are paid by the imaging facility on an as-needed basis, with the service provider charging for parts, labour, and travel.

Full Vendor Service Contracts

Full vendor contracts provide a wide range of services, such as corrective maintenance, operational maintenance, planned maintenance, and extended warranty, along with insurance maintenance programs for a set period.

Insurance

Insurance policy service contracts may vary, but most equipment insurance companies specialize in risk management, cost avoidance, or service billing audit functions.

Managed Equipment Service

This service package entails ownership, acquisition, installation and commissioning, user training, asset management, maintenance, and ongoing replacement of medical technology and equipment.

Shared Service

Organizations that have in-house expertise and resources may service their own imaging equipment and may use external service contracts for certain types of equipment.

Third Party

Third-party agreements may often be used for hardware support and to provide services offered through a company separate from the original equipment manufacturer.

Under Warranty

Equipment maintenance according to warranty service agreement. At the end of the warranty period, health care systems must select their service contract type.

Appendix 3: Supplementary Summary Tables for PET–CT and PET–MRI, the 2022–2023 CMII

Note that this appendix has not been copy-edited.

Table 8: Summary of Location of PET–CT Facilities Included in the CMII, 2022 to 2023

Province or territory	Urban	Rural	Remote
Number of sites (% in each jurisdiction)			
Alberta	4 (100)	0 (0)	0 (0)
British Columbia	4 (100)	0 (0)	0 (0)
Manitoba	1 (100)	0 (0)	0 (0)
New Brunswick	2 (100)	0 (0)	0 (0)
Newfoundland and Labrador	1 (100)	0 (0)	0 (0)
Northwest Territories	—	—	—
Nova Scotia	1 (100)	0 (0)	0 (0)
Nunavut	—	—	—
Ontario	18 (100)	0 (0)	0 (0)
Prince Edward Island	—	—	—
Quebec	20 (100)	0 (0)	0 (0)
Saskatchewan	1 (100)	0 (0)	0 (0)
Yukon	—	—	—
Canada	**52 (100)**	**0 (0)**	**0 (0)**

CMII = Canadian Medical Imaging Inventory.

Notes: Survey response data were available for 52 out of 52 sites across all jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "In which of the following settings are you located?"

Table 9: Summary of Type of PET–CT Facility Included in the CMII, 2022 to 2023

Province or territory	Hospital	Private	Community hospital	Tertiary care
Number of sites (% in each jurisdiction)			
Alberta	3 (75)	0 (0)	0 (0)	1 (25)
British Columbia	3 (75)	1 (25)	0 (0)	0 (0)
Manitoba	0 (0)	0 (0)	0 (0)	1 (100)
New Brunswick	1 (50)	0 (0)	0 (0)	1 (50)
Newfoundland and Labrador	1 (100)	0 (0)	0 (0)	0 (0)
Northwest Territories	—	—	—	—
Nova Scotia	0 (0)	0 (0)	0 (0)	1 (100)
Nunavut	—	—	—	—

Province or territory	Hospital	Private	Community hospital	Tertiary care
Ontario	11 (61.1)	3 (16.7)	0 (0)	4 (22.2)
Prince Edward Island	—	—	—	—
Quebec	13 (68.4)	3 (15.8)	0 (0)	3 (15.8)
Saskatchewan	0 (0)	0 (0)	0 (0)	1 (100)
Yukon	—	—	—	—
Canada	**32 (62.7)**	**7 (13.7)**	**0 (0)**	**12 (23.5)**

CMII = Canadian Medical Imaging Inventory.

Notes: Survey response data were available for 51 out of 52 sites across all jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "What type of facility is this?" The table includes only those facilities that responded to the survey question. In some instances, validator data, CMII data, and data from other publicly available sources supplemented survey responses. Definitions for the type of facility included in the survey are provided in Appendix 2.

Table 10: Summary of Source of Funding for PET–CT Sites Included in the CMII, 2022 to 2023

Province or territory	Public	Private	Both
Number of sites (% in each jurisdiction)			
Alberta	4 (100)	0 (0)	0 (0)
British Columbia	3 (75)	1 (25)	0 (0)
Manitoba	1 (100)	0 (0)	0 (0)
New Brunswick	2 (100)	0 (0)	0 (0)
Newfoundland and Labrador	1 (100)	0 (0)	0 (0)
Northwest Territories	—	—	—
Nova Scotia	NR	NR	NR
Nunavut	—	—	—
Ontario	15 (83.3)	0 (0)	3 (16.7)
Prince Edward Island	—	—	—
Quebec	15 (78.9)	4 (21.1)	0 (0)
Saskatchewan	1 (100)	0 (0)	0 (0)
Yukon	—	—	—
Canada	**42 (84)**	**5 (10)**	**3 (6)**

CMII = Canadian Medical Imaging Inventory; NR = not reported.

Notes: Survey response data were available for 50 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for Nova Scotia.

Data were derived from the following survey question: "How is this facility funded?" The table includes only those facilities that responded to the survey question. In some instances, validator data, CMII data, and data from other publicly available sources supplemented survey responses.

Table 11: Number of PET-CT Units and Units per Capita, 2015 to 2022–2023

Province or territory	2015 Units	2015 Units per million population	2017 Units	2017 Units per million population	2019 to 2020 Units	2019 to 2020 Units per million population	2022 to 2023 Units	2022 to 2023 Units per million population
Alberta	4	1.0	4	0.9	4	0.9	5	1.1
British Columbia	3	0.6	3	0.6	4	0.8	5	0.9
Manitoba	1	0.8	1	0.8	1	0.7	1	0.7
New Brunswick	2	2.7	2	2.6	2	2.6	2	2.4
Newfoundland and Labrador	—	—	1	1.9	1	1.9	1	1.9
Northwest Territories	—	—	—	—	—	—	—	—
Nova Scotia	1	1.1	1	1.1	1	1.0	1	1.0
Nunavut	—	—	—	—	—	—	—	—
Ontario	15	1.1	17	1.2	20	1.4	20	1.3
Prince Edward Island	—	—	—	—	—	—	—	—
Quebec	20	2.4	21	2.5	23	2.7	24	2.7
Saskatchewan	1	0.9	1	0.9	1	0.8	1	0.8
Yukon	—	—	—	—	—	—	—	—
Canada	**47**	**1.3**	**51**	**1.4**	**57**	**1.5**	**60**	**1.5**

Notes: Complete unit count data were available for all public PET-CT units across all jurisdictions with capacity.

For the 2022 to 2023 survey, complete unit count data were available for 52 sites with PET-CT capacity out of 467 participating sites with advanced imaging capacity (i.e., SPECT-CT, SPECT, CT, MRI, PET-CT, PET-MRI). For 2019 to 2020, complete unit count data were available for 46 sites with PET-CT capacity out of 455 participating sites with advanced imaging capacity. For 2017, complete unit count data were available for 45 sites with PET-CT capacity out of 505 participating sites with advanced imaging capacity. For 2015, complete unit count data were available for sites with PET-CT capacity out of 392 participating sites with advanced imaging capacity.

Data were derived from the following survey question: "Do you have the following fixed, mobile, or portable units at the site?" Options included: CT, MRI, PET-CT, PET-MRI, SPECT-CT, and SPECT.

Sources: CADTH (2015),[13] CADTH (2017),[15] CADTH (2020),[14] CADTH (2024).

Table 12: Volume of PET-CT Exams and Exams per 1,000 People Across Canadian Public Facilities, 2015 to 2022–2023

Province or territory	2015		2017		2019 to 2020		2022 to 2023	
	Exams	Exams per 1,000	Exams	Exams per 1,000	Exams	Exams per 1,000	Exams	Exams per 1,000
Alberta	9,896	2.7	11,050	2.6	12,175	2.8	15,695	3.3
British Columbia	8,028	1.4	9,280	1.9	11,286	2.2	15,898	2.9
Manitoba	1,741	1.3	2,009	1.5	2,180	1.6	2,443	1.7
New Brunswick	1,458	1.9	1,808	2.4	2,149	2.8	2,392	2.9
Newfoundland and Labrador	—	—	0	0	1,704	3.3	2,262	4.2
Northwest Territories	—	—	—	—	—	—	—	—
Nova Scotia	2,241	2.4	2,512	2.6	2,512	2.6	3,465	3.3
Nunavut	—	—	—	—	—	—	—	—
Ontario	9,825	0.7	10,998	0.8	22,851	1.6	31,626	2.0
Prince Edward Island	—	—	—	—	—	—	—	—
Quebec	42,320	5.1	50,823	6.1	66,600	7.8	79,299	9.1
Saskatchewan	1,315	1.2	2,050	1.8	2,050	1.7	3,240	2.7
Yukon	—	—	—	—	—	—	—	—
Canada	**76,824**	**2.0**	**90,530**	**2.0**	**123,507**	**3.3**	**156,320**	**3.9**

Notes: 2022–2023 exam volume data for public facilities was reported by validators for all jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "For all units, how many examinations on average were conducted in the last fiscal/calendar year?"

Sources: CADTH (2015),[13] CADTH (2017),[15] CADTH (2020),[14] CADTH (2024).

Table 13: Summary of Average Hours per Day of PET-CT Use by Province and Territory, 2022 to 2023

Province or territory	Number of reporting sites	Mean hours	Median (minimum to maximum) hours
Alberta	4	9.8	9.5 (9 to 11)
British Columbia	NR	NR	NR
Manitoba	1	8	8 (8 to 8)
New Brunswick	1	10	10 (10 to 10)
Newfoundland and Labrador	1	8	8 (8 to 8)
Northwest Territories	—	—	—
Nova Scotia	1	10	10 (10 to 10)
Nunavut	—	—	—
Ontario	10	9.4	8 (8 to 14)
Prince Edward Island	—	—	—
Quebec	6	9.5	9 (7 to 12)
Saskatchewan	1	9	9 (9 to 9)
Yukon	—	—	—
Canada	**25**	**9.4**	**9 (7 to 14)**

NR = not reported.

Notes: Survey response data were available for 25 out of 52 sites in 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia.

Data derived from the survey question: "In an average 24-hour day, how many hours are the units staffed through regular scheduled service capacity (do not include hours where staff are only on call)".

Table 14: Average Hours per Week of PET-CT Use by Province and Territory, 2022 to 2023

Province or territory	Number of reporting sites	Mean hours	Median (minimum to maximum) hours
Alberta	4	48.5	47 (45 to 55)
British Columbia	NR	NR	NR
Manitoba	1	40	40 (40 to 40)
New Brunswick	1	26	26 (26 to 26)
Newfoundland and Labrador	1	56	56 (56 to 56)
Northwest Territories	—	—	—
Nova Scotia	1	50	50 (50 to 50)
Nunavut	—	—	—
Ontario	10	42.7	40 (10 to 78)
Prince Edward Island	—	—	—
Quebec	6	44.3	45 (21 to 60)
Saskatchewan	1	45	45 (45 to 45)
Yukon	—	—	—

Province or territory	Number of reporting sites	Mean hours	Median (minimum to maximum) hours
Canada	25	44.2	45 (10 to 78)

NR = not reported.

Notes: Survey response data were available for 25 out of 52 sites in 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia.

Data were derived from the following survey question: "In an average 168-hour week, how many hours are the [modality] units staffed through regular scheduled service capacity (do not include hours where staff are only on call)?"

Table 15: Planned and Unplanned Downtime at Sites With PET–CT Units, 2022 to 2023

Province or territory	Annual planned downtime		Annual unplanned downtime	
	Number of reporting sites	Mean hours (minimum to maximum)	Number of reporting sites	Mean hours (minimum to maximum)
Alberta	3	37.3 (32 to 48)	4	71.2 (32 to 131)
British Columbia	NR	NR	NR	NR
Manitoba	1	36 (32 to 40)	1	45 (40 to 50)
New Brunswick	1	16 (16 to 16)	NR	NR
Newfoundland and Labrador	1	32 (32 to 32)	1	8 (8 to 8)
Northwest Territories	—	—	—	—
Nova Scotia	1	24 (24 to 24)	0	0
Nunavut	—	—	—	—
Ontario	9	58.1 (12 to 240)	8	96.1 (8 to 480)
Prince Edward Island	—	—	—	—
Quebec	6	12.8 (2 to 21)	4	23.5 (7 to 60)
Saskatchewan	1	50 (50 to 50)	1	36 (36 to 36)
Yukon	—	—	—	—
Canada	23	37.8 (2 to 240)	20	61.9 (0 to 480)

NR = not reported.

Notes: Survey response data for planned downtime were available for 23 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia. Survey response data for unplanned downtime were available for 20 out of 52 sites across 7 of the 9 jurisdictions with PET-CT capacity. No data were available for British Columbia and New Brunswick.

Data were derived from the following survey question: "How much planned downtime is anticipated for scheduled maintenance for all units in a given year? (expressed in hours)" and "How much unplanned downtime is experienced for all units in a given year? (expressed in hours)."

Table 16: Average Age of PET–CT and PET–MRI Imaging Equipment, 2022 to 2023

Province or territory	Number of PET-CT units	Average age PET-CT (years, minimum to maximum)	Number of PET-MRI units	Average age PET-MRI (years, minimum to maximum)
Alberta	5	6 (1 to 11)	1	5 (5 to 5)
British Columbia	1	3 (3 to 3)	NR	NR
Manitoba	1	2 (2 to 2)	—	—
New Brunswick	1	11 (11 to 11)	—	—
Newfoundland and Labrador	1	6 (6 to 6)	—	—
Northwest Territories	0	—	—	—
Nova Scotia	1	3 (3 to 3)	—	—
Nunavut	0	—	—	—
Ontario	15	8 (0 to 30)	2	7.5 (7 to 8)
Prince Edward Island	0	—	—	—
Quebec	7	7.71 (1 to 15)	—	—
Saskatchewan	1	10 (10 to 10)	—	—
Yukon	0	—	—	—
Canada	**33**	**7.2 (0 to 30)**	**3**	**6.7 (5 to 8)**

NR = not reported.

Notes: Survey response data were available for 33 of 60 PET-CT units across all jurisdictions with capacity. Survey response data were available for 3 of 6 PET-MRI units across 2 of the 3 jurisdictions with capacity. No data were available for British Columbia.

Age for each unit was calculated from the following survey question: "What year did (or will) the [modality] unit become operational?" subtracted from 2023.

Table 17: Age of PET–CT and PET–MRI Imaging Units in Years, 2022 to 2023

Modality	Years				
	5 or less	6 to 10	11 to 15	16 to 20	Greater than 20
Number of units (% of age categories)					
PET-CT	17 (51.5)	7 (21.2)	7 (21.2)	0	2 (6.1)
PET-MRI	1 (33.3)	2 (66.7)	0	0	0

Notes: Survey response data were available for 33 of 60 PET-CT units across all jurisdictions with capacity. Survey response data were available for 3 of 6 PET-MRI units across 2 of the 3 jurisdictions with capacity. No data were available for British Columbia.

Age for each unit was calculated from the following survey question: "What year did (or will) the [modality] unit become operational?" subtracted from 2023.

Table 18: Summary of Type of Use by Clinical Specialty for PET–CT, 2022 to 2023

Use category	Average percent	Median (minimum to maximum) percent
Oncology	66.1	80 (0 to 100)
Cardiac	13.2	1.7 (0 to 100)
Neurologic	10.1	2 (0 to 100)
Inflammatory	5.4	0.5 (0 to 20)
Musculoskeletal	2.8	0 (0 to 24)
Hepatobiliary	1.2	0 (0 to 10)
Respiratory	1.2	0 (0 to 9)
Trauma	0.1	0 (0 to 1)
Other	0	0 (0 to 0)

Notes: Survey response data on the average percentage of PET-CT use by discipline were available for 16 out of 52 sites across 4 of the 9 jurisdictions with PET-CT capacity.

Data were derived from the following survey question: "On average, what percentage of these exams fall into the following categories? The total percentage, expressed as a number, must add up to 100." The following categories were asked: oncology, respiratory disease, hepatobiliary or gastrointestinal, musculoskeletal disorders, inflammatory or infectious diseases, cardiac, trauma, and other use.

Table 19: Summary of Type of Use by Medical Category for PET–CT Units, 2022 to 2023

Use category	Average percent	Median percent (minimum to maximum)
Diagnostic noncardiac	80.4	95 (0 to 100)
Diagnostic cardiac	12.2	1.4 (0 to 95)
Research	4.5	0 (0 to 40)
Interventional	0.1	0 (0 to 2.5)
Other	0.0	0 (0 to 0)

Notes: Survey response data on the average percentage of PET-CT use by discipline were available for 22 out of 52 sites across 5 of the 9 jurisdictions with PET-CT capacity.

Data derived from survey question: "Based on your experience in the last fiscal year, what is the average percentage of overall time PET-CT units are used for?" The following categories were asked: cardiac, noncardiac, research, interventional, and other use.

Table 20: Summary of Use of AI in PET–CT, 2022 to 2023

Use of AI in PET-CT	Number of responses	Number of sites – yes (%)	Number used for clinical or research purposes[a]	Provinces (number of sites)[b]
Lowering radiation dose	22	4 (18.2)	Clinical: 2, research: 1, NR: 1	NB (1), ON (2), QC (1)
Reading and interpreting images	23	0	Clinical: 0, research: 1	ON (1)
Image reconstruction	22	3 (13.6)	Clinical: 3, research: 1	NB (1), ON (2), QC (1)
Treatment planning	22	0	Clinical: 0, research: 1	ON (1)
Predicting outcomes	22	0	Clinical: 0, research: 1	ON (1)

Use of AI in PET-CT	Number of responses	Number of sites – yes (%)	Number used for clinical or research purposes[a]	Provinces (number of sites)[b]
Administrative tasks	22	1 (4.5)	Clinical: 0, research: 1, NR: 1	ON (1)

AI = artificial intelligence; NR = not reported; NB = New Brunswick; ON = Ontario; QC = Quebec.

Notes: Number of sites out of 52 sites with PET-CT capacity that provided survey response data are indicated in the "Number of responses" column.

Data derived from the following survey questions: "Is artificial intelligence used to support: The reading/interpretation of images? Predicting outcomes? Lower radiation dose? Image resolution/reconstruction enhancement? Treatment planning? Administrative tasks?"

[a]Includes sites that did not select "yes" for the use of AI, but provided responses for the setting of use (clinical/research).

[b]Includes provinces that did not respond "yes," but indicated setting of AI use.

Table 21: Types of Health Care Professionals That Have PET-CT Exam-Ordering Privileges, 2022 to 2023

Province or territory	Clinical specialists	Family physicians or general practitioners	Nurse practitioners
Alberta	Yes, all	Yes	NR
British Columbia	Yes, all	No	NA
	PET-CT are currently under the sole governance of the BC Cancer Agency and primarily for oncology indications with limited use for cardiac indications		
Manitoba	Yes, all	Requests will be accepted from family doctors, but a nuclear medicine physician will first review the request to ensure it is clinically appropriate before it is accepted	No
New Brunswick[a]	Yes, all	NR	NR
Newfoundland and Labrador	Yes, all	Requests will be accepted from family doctors, but a nuclear medicine physician will first review the request to ensure it is clinically appropriate before it is accepted	Requests will be accepted from nurse practitioners, but a nuclear medicine physician will first review the request to ensure it is clinically appropriate before it is accepted
	All requests are reviewed for clinical appropriateness before being accepted. Not all clinical indications are feasible (i.e., staging for breast cancer, all lymphoma related clinical indications, neurodegenerative diseases, and infection) due to limited capacity in the program. This is reviewed and re-evaluated on a routine basis with the clinical specialists.		
Northwest Territories	PET-CT are referred out of territory. No PET-CT units are available in the Northwest Territories.	Yes	Uncertain, may need physician co-signature
Nova Scotia	Yes	No	No
Nunavut	Uncertain. These are referrals out of territory and uncertain who has the capability to order.		
Ontario	Yes, all	Requests will be accepted from family doctors, but a nuclear medicine physician will first review the request to ensure it is clinically appropriate before it is accepted	No

Province or territory	Clinical specialists	Family physicians or general practitioners	Nurse practitioners
Prince Edward Island	–	–	–
Quebec	Yes, all	Under certain conditions, not specified	Under certain conditions, not specified
Saskatchewan	Yes, all	Yes	Yes
Yukon	–	–	–

BC = British Columbia; NR = not reported.

Notes: Survey response data were available from 11 out of 13 jurisdictions. No data were available for Prince Edward Island and Yukon.

Data were derived from the following question: "Which health care professionals can order imaging exams for PET-CT?"

[a]For New Brunswick, the responses came from 1 of the 2 regional health authorities, the Horizon Health Network.

Table 22: Exam-Ordering Practice at Sites With PET–CT Units, 2022 to 2023

Province or territory	Automated entry		Paper forms		Requests by fax		Requests by telephone		Central booking		
	Yes	No	Yes	No	Yes	No	Yes	No	All exams	Some exams	Not used
Number (%) of sites that use these exam-ordering practices											
Alberta	3 (75)	1 (25)	4 (100)	0 (0)	4 (100)	0 (0)	3 (75)	1 (25)	0 (0)	2 (50)	2 (50)
British Columbia	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Manitoba	0 (0)	1 (100)	1 (100)	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	0 (0)	1 (100)
New Brunswick	0 (0)	1 (100)	1 (100)	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)
Newfoundland and Labrador	0 (0)	1 (100)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	1 (100)	0 (0)	0 (0)
Northwest Territories	–	–	–	–	–	–	–	–	–	–	–
Nova Scotia	0 (0)	1 (100)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	1 (100)	0 (0)	0 (0)
Nunavut	–	–	–	–	–	–	–	–	–	–	–
Ontario	7 (63.6)	4 (36.4)	10 (90.9)	1 (9.1)	9 (81.8)	2 (18.2)	3 (30)	7 (70)	8 (80)	0 (0)	2 (20)
Prince Edward Island	–	–	–	–	–	–	–	–	–	–	–
Quebec	2 (33.3)	4 (66.7)	5 (83.3)	1 (16.7)	5 (83.3)	1 (16.7)	1 (16.7)	5 (83.3)	2 (33.3)	1 (16.7)	3 (50)
Saskatchewan	0 (0)	1 (100)	1 (100)	0 (0)	1 (100)	0 (0)	0 (0)	1 (100)	0 (0)	1 (100)	0 (0)
Yukon	–	–	–	–	–	–	–	–	–	–	–

Province or territory	Automated entry		Paper forms		Requests by fax		Requests by telephone		Central booking		
	Yes	No	Yes	No	Yes	No	Yes	No	All exams	Some exams	Not used
Canada	12 (46)	14 (54)	24 (92)	2 (8)	23 (88)	3 (12)	9 (36)	16 (64)	13 (52)	4 (16)	8 (32)

NR = not reported.

Notes: Survey response data were available for 27 out of 52 sites across 8 of the 9 jurisdictions with PET-CT capacity. No data were available from British Columbia and Manitoba.

Data were derived from the following survey question: "Are automated order entry forms (exams request) used?"; "Are paper forms (exams requests) used?"; "Are requests received by fax?"; "Are requests received by phone?"; and "Is a centralized order entry (booking) system used? For all exams: Yes/no; For some exams: yes/no."

Table 23: Trends in Reported Slices for PET-CT Units, 2012 to 2022–2023

Slices	2012	2015	2017	2019–2020	2022–2023
Number of units (% of total responses per survey year)					
1	1 (3.1)	1 (2.7)	0	0	0
2	3 (9.4)	1 (2.7)	0	0	0
4	0	0	1 (2.6)	1 (2.6)	0
6	1 (3.1)	1 (2.7)	1 (2.6)	0	0
8	0	0	0	0	1 (3.7)
16	24 (75)	26 (70.3)	25 (65.8)	20 (51.3)	3 (11.1)
32	0	0	0	1 (2.6)	2 (7.4)
40	0	2 (5.4)	2 (5.3)	2 (5.1)	3 (11.1)
64	3 (9.4)	6 (16.2)	8 (21.1)	11 (28.2)	14 (51.9)
128	0	0	0	2 (5.1)	4 (14.8)
256	0	0	1 (2.6)	1 (2.6)	0
320	0	0	0	1 (2.6)	0

Notes: 2022 to 2023 survey response data were available for 27 out of 60 PET-CT units across 8 of the 9 jurisdictions with capacity. No data were available for British Columbia.

Data derived from the survey question: "How many multi-detectors does the CT unit have (how many slices)?"

Table 24: Availability and Use of Technologies for Control of Radiation Exposure for PET-CT, 2015 to 2022–2023

Response	2015 n (%)	2017 n (%)	2019 to 2020 n (%)	2022 to 2023 n (%)
Does the PET-CT unit have dose-management controls?				
Yes	8 (18.6)	22 (40.7)	28 (51.9)	20 (33.3)
No	1 (2.3)	3 (5.6)	3 (5.6)	3 (5.0)
Don't know	0	1 (1.9)	4 (7.4)	3 (5.0)
Missing	34 (79.1)	28 (51.9)	19 (35.2)	34 (56.7)
If yes, are the dose-management controls used?				
Yes	NA	14 (25.9)	20 (37)	NA
No	NA	8 (14.8)	8 (14.8)	NA
Don't know	NA	3 (5.6)	7 (13)	NA
Missing	NA	29 (53.7)	19 (35.2)	NA
Does the PET-CT unit incorporate image reconstruction techniques for dose reduction?				
Yes	8 (18.6)	19 (35.2)	24 (44.4)	NA
No	2 (4.7)	2 (3.7)	4 (7.4)	NA
Don't know	0	0	1 (1.9)	NA
Missing	33 (76.7)	33 (61.1)	25 (46.3)	NA
Does the PET-CT unit record patient radiation dose by exam (e.g., as a save screen on PACS)?				
Yes	8 (18.6)	18 (33.3)	26 (48.1)	22 (36.7)
No	2 (4.7)	5 (9.3)	4 (7.4)	1 (1.7)
Don't know	0	3 (5.6)	5 (9.3)	2 (3.3)
Missing	33 (76.7)	28 (51.9)	19 (35.2)	35 (58.3)

NA = not applicable; PACS = picture archiving and communication system.

Notes: For NA, question not asked during survey time point.

The 2022–2023 survey response data were available for 26 of the 60 PET-CT units across 6 of the 9 jurisdictions with capacity.

Data were derived from the following survey questions: "Does the PET-CT unit have dose management controls?", "Does the modality make regularly use of dose management controls?"; "Does the PET-CT unit incorporate image reconstruction techniques for dose reduction?"; "Does the PET-CT unit record patient CT radiation dose (e.g., as a save screen on PACS)?"; "Do you capture patient cumulative radiation dose tracking?"; and "If no, do you plan to capture patient cumulative radiation tracking in the future?."

Table 25: Population Estimates and Projections for Canada by Province and Territory, 2007 to 2040

Province or territory	2007	2015	2017	2020	2023	2025 (low- to high-growth projections)	2030 (low- to high-growth projections)	2035 (low- to high-growth projections)	2040 (low- to high-growth projections)
Number of people									
Alberta	3,533,414	4,163,048	4,253,530	4,412,013	4,591,100	4,761,500 (4,696,600 to 4,816,400)	5,254,600 (5,040,300 to 5,411,900)	5,739,800 (5,356,300 to 6,033,800)	6,212,900 (5,654,900 to 6,714,200)
British Columbia	4,312,048	4,795,547	4,962,706	5,173,896	5,451,700	5,642,800 (5,541,600 to 5,729,700)	6,027,500 (5,752,300 to 6,238,900)	6,306,700 (5,855,000 to 6,653,900)	6,541,200 (5,917,400 to 7,085,800)
Manitoba	1,191,684	1,298,120	1,340,426	1,381,809	1,414,400	1,445,300 (1,422,700 to 1,467,000)	1,527,900 (1,460,300 to 1,582,600)	1,611,300 (1,493,300 to 1,711,800)	1,686,700 (1,520,100 to 1,852,900)
New Brunswick	746,136	759,971	768,029	783,814	804,300	816,400 (808,200 to 822,800)	837,700 (813,900 to 853,700)	848,700 (808,100 to 877,500)	854,700 (798,100 to 902,100)
Newfoundland and Labrador	510,256	528,843	530,153	526,046	519,500	517,500 (512,500 to 522,000)	510,100 (496,900 to 521,200)	499,300 (477,700 to 517,200)	486,300 (456,900 to 512,600)
Northwest Territories	43,286	44,443	44,825	44,395	46,300	47,100 (46,500 to 47,600)	48,600 (46,900 to 49,900)	49,500 (46,600 to 51,800)	50,100 (46,100 to 54,000)
Nova Scotia	935,433	938,914	956,074	989,154	1,023,500	1,046,100 (1,032,900 to 1,058,600)	1,079,200 (1,043,800 to 1,109,400)	1,091,800 (1,033,100 to 1,142,000)	1,097,600 (1,016,900 to 1,175,100)
Nunavut	31,560	36,602	37,829	39,581	40,200	41,000 (40,700 to 41,300)	43,000 (42,100 to 43,700)	45,300 (43,600 to 46,500)	47,700 (45,200 to 49,700)
Ontario	12,807,497	13,759,762	14,610,084	14,757,582	15,372,100	15,837,800 (15,573,200 to 16,067,500)	16,883,800 (16,134,300 to 17,446,900)	17,807,200 (16,534,000 to 18,795,500)	18,615,400 (16,830,000 to 20,232,300)

Province or territory	2007	2015	2017	2020	2023	2025 (low- to high-growth projections)	2030 (low- to high-growth projections)	2035 (low- to high-growth projections)	2040 (low- to high-growth projections)
Prince Edward Island	138,020	144,949	150,595	159,179	171,800	177,400 (174,300 to 179,900)	187,700 (179,200 to 193,600)	196,600 (182,200 to 207,200)	204,400 (184,400 to 222,000)
Quebec	7,712,616	8,190,074	8,326,075	8,551,865	8,746,600	8,859,200 (8,757,800 to 8,953,600)	9,080,500 (8,802,700 to 9,298,900)	9,256,500 (8,788,300 to 9,621,900)	9,396,500 (8,739,100 to 9,970,200)
Saskatchewan	1,007,305	1,125,588	1,151,044	1,165,963	1,199,500	1,226,100 (1,208,100 to 1,239,500)	1,311,100 (1,251,800 to 1,349,100)	1,398,300 (1,292,400 to 1,472,700)	1,479,800 (1,327,800 to 1,608,600)
Yukon	32,663	37,730	39,705	42,109	45,000	46,500 (45,900 to 47,000)	48,900 (47,600 to 50,200)	50,100 (47,500 to 52,300)	50,900 (47,200 to 54,300)
Canada	33,001,918	35,823,491	36,722,075	38,027,406	39,426,000	40,647,000 (39,861,100 to 40,992,800)	42,840,800 (41,111,900 to 44,150,000)	44,901,100 (41,958,100 to 47,184,200)	46,724,200 (42,584,000 to 50,433,700)

Note: Data retrieved from the Statistics Canada website.[33]

Table 26: Reported and Projected Numbers of PET–CT Units by Province and Territory, 2007 to 2040

Province or territory	2007	2015	2017	2020	2023	2025 (low- to high-growth projections)	2030 (low- to high-growth projections)	2035 (low- to high-growth projections)	2040 (low- to high-growth projections)
Alberta	3.0	4.0	4.0	4.0	5.0	5.2 (5.1 to 5.2)	5.7 (5.5 to 5.9)	6.3 (5.8 to 6.6)	6.8 (6.2 to 7.3)
British Columbia	3.0	3.0	3.0	4.0	5.0	5.2 (5.1 to 5.3)	5.5 (5.3 to 5.7)	5.8 (5.4 to 6.1)	6.0 (5.4 to 6.5)
Manitoba	1.0	1.0	1.0	1.0	1.0[a]	1.0 (1.0 to 1.1)	1.1 (1.0 to 1.1)	1.1 (1.1 to 1.2)	1.2 (1.1 to 1.3)
New Brunswick	1.0	2.0	2.0	2.0	2.0	2.0 (2.0 to 2.0)	2.1 (2.0 to 2.1)	2.1 (2.0 to 2.2)	2.1 (2.0 to 2.2)
Newfoundland and Labrador	0.0	0.0	1.0	1.0	1.0	1.0 (1.0 to 1.0)	1.0 (1.0 to 1.0)	1.0 (0.9 to 1.0)	0.9 (0.9 to 1.0)
Northwest Territories	0.0	0.0	0.0	0.0	0.0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Nova Scotia	0.0	1.0	1.0	1.0	1.0	1.0 (1.0 to 1.0)	1.1 (1.0 to 1.1)[b]	1.1 (1.0 to 1.1)	1.1 (1.0 to 1.1)
Nunavut	0.0	0.0	0.0	0.0	0.0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Ontario	12.0	15.0	20.0	20.0	20.0	20.6 (20.3 to 20.9)	22.0 (21.0 to 22.7)	23.1 (21.5 to 24.5)	24.2 (21.9 to 26.3)
Prince Edward Island	0.0	0.0	0.0	0.0	0.0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Quebec	11.0	20.0	21.0	23.0	24.0	24.3 (24.0 to 24.6)	24.9 (24.2 to 25.5)	25.4 (24.1 to 26.4)	25.8 (24.0 to 27.4)
Saskatchewan	0.0	1.0	1.0	1.0	1.0	1.0 (1.0 to 1.0)	1.1 (1.0 to 1.1)	1.2 (1.1 to 1.2)	1.2 (1.1 to 1.3)
Yukon	0.0	0.0	0.0	0.0	0.0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Canada	31.0	47.0	54.0	57.0	60.0	61.6 (60.7 to 62.4)	65.2 (62.6 to 67.2)	68.3 (63.9 to 71.8)	71.1 (64.8 to 76.8)

Note: The projection was calculated as the product of the numbers of per capita units in 2022 to 2023 and the population projections in 2025, 2030, 2035, and 2040. The numbers of imaging units were provided by provincial or territorial validators in 2023. The population projections were retrieved from Statistics Canada website on January 18, 2024.[33] The population projection assumed medium, low, and high growth.

[a]One new PET-CT scanner was installed midyear 2023; anticipated exam volume was not included in the projected unit counts.

[b]Projected unit count does not include 1 additional unit anticipated for installation by 2030.

Table 27: Reported and Projected Numbers of PET-CT Exams by Province and Territory, 2007 to 2040

Province or territory	2007	2015	2017	2020	2023	2025 (low- to high-growth projections)	2030 (low- to high-growth projections)	2035 (low- to high-growth projections)	2040 (low- to high-growth projections)
Alberta	–	9,826	11,050	12,175	15,695	16,277.5 (16,055.7 to 16,465.2)	17,963.2 (17,230.6 to 18,501.0)	19,621.9 (18,130.9 to 20,627.0)	21,239.2 (19,331.7 to 22,953.0)
British Columbia	–	8,028	9,280	11,286	15,898	16,455.3 (16,160.2 to 16,708.7)	17,577.1 (16,774.6 to 18,193.6)	18,391.3 (17,074.1 to 19,403.8)	19,075.2 (17,256.1 to 20,663.3)
Manitoba	–	1,741	2,009	2,180	2,443[a]	2,496.4 (2,457.3 to 2,533.9)	2,639.0 (2,522.3 to 2,733.5)	2,783.1 (2,579.3 to 2,956.7)	2,913.3 (2,625.6 to 3,200.4)
New Brunswick	–	1,458	1,808	2,149	2,392	2,428.0 (2,403.6 to 2,447.0)	2,491.3 (2,420.6 to 2,538.9)	2,524.0 (2,403.3 to 2,609.7)	2,541.9 (2,373.6 to 2,682.9)
Newfoundland and Labrador	–	0	0	1,704	2,262	2,253.3 (2,231.5 to 2,272.9)	2,221.1 (2,163.6 to 2,269.4)	2,174.0 (2,080.0 to 2,252.0)	2,117.4 (1,989.4 to 2,232.0)
Northwest Territories	–	0	0	0	0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Nova Scotia	–	2,241	2,512	2,512	3,465	3,541.5 (3,496.8 to 3,583.8)	3,653.6 (3,533.7 to 3,755.8)	3,696.2 (3,497.5 to 3,866.2)	3,715.9 (3,442.7 to 3,978.2)
Nunavut	–	0	0	0	0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Ontario	–	9,825	10,998	22,851	31,626	32,584.1 (32,039.7 to 33,056.7)	34,736.1 (33,194.1 to 35,894.6)	36,635.9 (34,016.5 to 38,669.2)	38,298.7 (34,625.4 to 41,625.2)
Prince Edward Island	–	0	0	0	0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)
Quebec	–	42,230	50,823	66,600	79,299	80,319 (79,400.5 to 81,175.7)	82,326.2 (79,807.6 to 84,306.3)	83,921.9 (79,677.1 to 87,234.7)	85,191.2 (79,321.0 to 90,392.5)
Saskatchewan	–	1,315	2,050	2,050	3,240	3,311.9 (3,263.2 to 3,348.0)	3,541.4 (3,381.3 to 3,644.1)	3,777.0 (3,490.9 to 3,977.9)	3,997.1 (3,586.6 to 4,345.0)
Yukon	–	0	0	0	0	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)

Province or territory	2007	2015	2017	2020	2023	2025 (low- to high-growth projections)	2030 (low- to high-growth projections)	2035 (low- to high-growth projections)	2040 (low- to high-growth projections)
Canada	–	76,824	90,530	123,507	156,320	160,438.3 (158,045.1 to 162,532.2)	169,859.3 (163,004.4 to 175,050.2)	178,028.2 (166,359.5 to 187,080.5)	185,256.6 (168,841.1 to 199,964.4)

Note: The projection was calculated as the product of the numbers of per capita exams in 2022 to 2023 and the population projections in 2025, 2030, 2035, and 2040. The numbers of imaging exams were provided by provincial or territorial validators in 2023. The population projections were retrieved from Statistics Canada website on January 18, 2024.[33] The population projection assumed medium, low, and high growth.

aA new PET-CT scanner was installed midyear 2023, which is not included in the projected exam counts.

Appendix 4: Supplementary Summary Tables for Publicly Funded Sites With PET–CT Units, 2022–2023

Note that this appendix has not been copy-edited.

Table 28: Average Hours per Day of PET-CT Use at Publicly Funded Sites by Province and Territory, 2022 to 2023

Province or territory	Number of reporting sites	Mean hours	Median (minimum to maximum) hours
Alberta	4	9.8	9.5 (9 to 11)
British Columbia	NR	NR	NR
Manitoba	1	8	8 (8 to 8)
New Brunswick	1	10	10 (10 to 10)
Newfoundland and Labrador	1	8	8 (8 to 8)
Northwest Territories	—	—	—
Nova Scotia	1	10	10 (10 to 10)
Nunavut	—	—	—
Ontario	10	9.4	8 (8 to 14)
Prince Edward Island	—	—	—
Quebec	6	9.5	9 (7 to 12)
Saskatchewan	1	9	9 (9 to 9)
Yukon	—	—	—
Canada	**25**	**9.4**	**9 (7 to 14)**

NR = not reported.

Notes: Overall, 25 out of 25 sites that reported information for PET-CT daily operation identified as public facilities.

Data were derived from the following survey question: "In an average 24-hour day, how many hours are the units staffed through regular scheduled service capacity (do not include hours where staff are only on call)".

Table 29: Average Hours per Week of PET-CT Use at Publicly Funded Sites by Province and Territory, 2022 to 2023

Province or territory	Number of reporting sites	Mean hours	Median (minimum to maximum) hours
Alberta	4	48.5	47 (45 to 55)
British Columbia	NR	NR	NR
Manitoba	1	40	40 (40 to 40)
New Brunswick	1	26	26 (26 to 26)
Newfoundland and Labrador	1	56	56 (56 to 56)
Northwest Territories		—	—

Province or territory	Number of reporting sites	Mean hours	Median (minimum to maximum) hours
Nova Scotia	1	50	50 (50 to 50)
Nunavut	—	—	—
Ontario	10	42.7	40 (10 to 78)
Prince Edward Island	—	—	—
Quebec	6	44.3	45 (21 to 60)
Saskatchewan	1	45	45 (45 to 45)
Yukon	—	—	—
Canada	**25**	**44.2**	**45 (10 to 78)**

NR = not reported.

Notes: Overall, 25 out of 25 sites that reported information for PET-CT weekly operation identified as public facilities.

Data were derived from the following survey question: "In an average 168-hour week, how many hours are the [modality] units staffed through regular scheduled service capacity (do not include hours where staff are only on call)?"

Table 30: Average Age of Publicly Funded PET-CT Imaging Equipment, 2022 to 2023

Province or territory	Number of PET-CT units	Average age PET-CT (years, minimum to maximum)
Alberta	5	6 (1 to 11)
British Columbia	1	3 (3 to 3)
Manitoba	1	2 (2 to 2)
New Brunswick	1	11 (11 to 11)
Newfoundland and Labrador	1	6 (6 to 6)
Northwest Territories	0	—
Nova Scotia	1	3 (3 to 3)
Nunavut	0	—
Ontario	14	7.6 (0 to 30)
Prince Edward Island	0	—
Quebec	7	7.7 (1 to 15)
Saskatchewan	1	10 (10 to 10)
Yukon	0	—
Canada	**32**	**7.1 (0 to 30)**

Notes: Overall, 32 out of 33 PET-CT units with information reported for operational age were located at public facilities.

Age for each unit was calculated from the following survey question: "What year did (or will) the [modality] unit become operational?" subtracted from 2023.