JANUARY 2025

FIXING THE HEALTH CARE BOTTLENECK

A Report on Medical Imaging and Radiation Therapy in BC

Published by Health Sciences Association of British Columbia
January 2025

The Health Sciences Association of BC (HSA) is a democratic union that represents more than 20,000 health science and social service professionals in over 250 acute and community settings across BC including hospitals, long-term care homes, child development centres, mental health programs, and community social service agencies.

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Acknowledgements: Thank you to the individuals who were interviewed for this report, and to all the HSA members working across medical imaging and radiation therapy disciplines who are critical to the delivery of public health care. HSA also thanks Sarah Erdelyi of Canadian Association of Medical Radiation Technologists.

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HSA would like to acknowledge that our office is located on the unceded homelands of the Qayqayt First Nation (pronounced keekite) on whose territories we live and thrive on. Our union works and has members in unceded territories across the province. Unceded means that Aboriginal title to this land has never been surrendered or relinquished.

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Introduction

Medical imaging and radiation therapy professionals perform a variety of procedures and therapies in the diagnosis and treatment of injury and disease. Among these professionals, there are distinct medical imaging and radiation therapy disciplines with specialized post-secondary education and training who are necessary for health care delivery and patient treatment.

Shortages of these specialized professionals – who perform nearly all diagnostic procedures and deliver the radiation therapy critical to cancer treatment – contribute to bottlenecks and longer patient wait times. In some cases, severe shortages and understaffing have forced the BC government to send patients to the United States for diagnosis and treatment. Years of inadequate workforce planning, an aging population, and acute public sector shortages and burnout have contributed to the dire situation we face today.

This research report provides an in-depth look at the important, often unseen, and too-often undervalued work performed by medical imaging and radiation therapy professionals in BC. Specifically, this report examines the critical role of diagnostic medical sonographers and medical radiation technologists (MRTs), including x-ray, computed tomography (CT), fluoroscopy, magnetic resonance imaging, mammography, nuclear medicine, positron emission tomography (PET), and radiation therapists.[1]

Despite significant and welcome investments in these professions by the provincial government, this report finds that the medical imaging workforce is facing worsening shortages. This report offers policy solutions to address the understaffing and shortages that contribute to a significant bottleneck in health care access and longer wait times.

Methods

This report documents workforce challenges facing medical imaging and radiation therapy that contribute to staffing shortages and health care wait times in BC. This research uses statistical analysis from the Canadian Institute from Health Information (CIHI), health authorities (obtained by Freedom of Information), and Health Canada.

The analysis presented from the statistical data are validated by eight key informant interviews conducted in 2023 and 2024. Together, these interviewees bring frontline knowledge and experience from health authorities across BC, urban and rural communities, as well as from the post-secondary education and clinical training settings. Finally, this report draws on academic and policy literatures.

1 Radiation therapists are key members of the cancer care team. Although the profession is distinct from medical imaging disciplines, radiation therapists are part of the MRT family.

The medical imaging and radiation therapy disciplines

Diagnostic procedures, including medical imaging, are estimated to drive over 60 per cent of medical decisions. The highly-trained professionals who perform medical imaging tests and procedures are critical to a functioning health care system and timely access to the diagnosis and treatment patients need.

Medical radiation technologists (MRTs) "operate radiographic and radiation therapy equipment to administer radiation treatment and produce images of body structures for the diagnosis and treatment of injury and disease."[2] MRTs encompass professionals trained in the use of x-ray, computed tomography (CT), fluoroscopy, magnetic resonance imaging (MRI), mammography, nuclear medicine, positron emission tomography (PET), and radiation therapy.

Distinct from disciplines within the MRT family, diagnostic medical sonographers use high-frequency sound waves (ultrasound) to develop images which are used to assess organs, tissues, and blood flow inside the body.

The history of medical imaging dates to Wilhelm Roentgen's discovery of x-rays in 1895, which led to a great deal of scientific experimentation and ability for physicians to visualize structures inside the human body.[3] Marie Curie popularized the use of x-rays during World War I to allow doctors to see bullets, shrapnel, and broken bones. This led to the use of medical radiology by the French military and Red Cross. After the war, the use of x-rays and radiography became widespread in hospitals, especially in the fight against tuberculosis. Key developments in the field of medical imaging are noted in the table below.

Medical imaging disciplines have become an indispensable part of health care and biomedical advancement. Modern medicine and life expectancies would look nothing like what they are today without advances in medical imaging and radiation therapy.

2 Government of Canada, 32121 Medical radiation technologists, National Occupational Classification (NOC) 2021 Version 1.0.

3 Myuri Manogaran, Brenda Gamble, and Mark Given, Medical radiation technologists, chapter 11 in Ivy Bourgeault (ed.), *Introduction to the Health Workforce in Canada*, 2021.

Table 1: Key developments in medical imaging and radiation therapy

1895	Discovery of x-rays
1920s	Earliest professional societies for x-ray technologists established
1930s	Development and use of contrasting enhancing products and the x-ray sphere
1945	First Canadian national professional designation and exam
1951	Commercial availability of angiography
1956	Creation of the radiation therapy discipline
1961	Introduction of ultrasound technology
1966	Recognition of nuclear medicine as its own discipline
1973	Development of computed tomography (CT)
1982	Introduction of magnetic resonance imaging (MRI) in Canada
2002	First PET-CT scanner in Canada
2012	First PET-MRI scanner

Source: Myuri Manogaran, Brenda Gamble, and Mark Given, Medical radiation technologists, chapter 11 in Ivy Bourgeault (ed.), *Introduction to the Health Workforce in Canada*, 2021, p. 3.

Policy and funding context

Diagnostic medical imaging expanded through scientific advances and the creation of public health insurance in Canada. It has become an essential part of medical diagnosis and treatment.

Imaging modalities (Table 2) are funded by the provincial government either through health authorities as part of global hospital funding or billed to the Medical Services Plan (MSP). The Canada Health Act prohibits patients being privately charged for medically necessary medical imaging and radiation therapy.[4] The federal government claws back federal health funding to provinces if provinces allow unlawful patient charges (extra-billing) for these services.

4 Health Canada, Backgrounder: New Canada Health Act Initiatives (August 2018), January 31, 2019.

Table 2: Description of medical imaging modalities and radiation therapy

Modality	Description and selected discipline-specific uses	Public funding source
Computerized Tomography (CT)	CT technologists use x-rays and computer analysis to create quick, cross-sectional images Administer contrast for many CT scans, such as cardiac and CT angiography Perform CT-guided interventional procedures, such as biopsies	Health authority
Diagnostic Radiology (x-ray)	Radiological technologists use equipment that emits x-rays to produce images of body parts or systems, to be interpreted by radiologists Taking x-rays of chest, abdomen, bones, joints or spine using conventional radiography (or similar) Detect breast cancer in earliest stages through mammography Examine the heart, blood vessels, and blood flow through angiography Use fluoroscopy to produce real-time images showing the function of systems such as gastrointestinal or urinary, and to guide interventional procedures such as line placements and joint injections Use mobile radiography and fluoroscopy units at patient's bedside or in operating room	Medical Services Plan
Diagnostic Ultrasound	Diagnostic ultrasound is the use of high frequency sound waves (ultrasound) with a transducer (probe) to develop images which are used to assess organs, tissues, and blood flow inside the body View the uterus during pregnancy and monitor the developing baby's health Diagnose genital and prostate problems Examine a breast lump	Medical Services Plan
Magnetic Resonance Imaging (MRI)	MRI technologists produce images using equipment that generates radio waves and a strong magnetic field, and administer contrast Examine tissue of the joints, muscles, ligaments, and tendons Provide detailed studies of major organs View the workings of the heart and vascular system	Health authority

Nuclear Medicine	Nuclear medicine technologists carry out imaging and some treatment procedures including administration of radiopharmaceuticals. The images help identify the nature of the disease and how it affects the body. Evaluate coronary disease Study how the brain, heart, lungs, kidneys, and other organs are functioning Monitor the progression of cancer and the results of cancer treatments	Medical Services Plan
Positron Emission Tomography (PET)	Using a radioactive liquid called a tracer, the PET scan is an imaging test that can help show the metabolic function of tissues and organs Diagnosis of some conditions, including cancer to see whether and where cancer has spread	Health authority
Radiation therapy	Radiation therapists use focused beams of radiation to destroy tumours while minimizing harm to healthy tissues, and counselling patients on the possible side effects of radiation	Health authority

Source: Adapted from Manogaran et al., Medical radiation technologists, 2021; CADTH, *The Canadian Medical Imaging Inventory: 2022-2023*, December 2023; BC Ministry of Health, Diagnostic Services, last updated Dec. 12, 2023.

In 2018, the BC government announced its surgical and diagnostic strategy, with a focus on performing more surgeries and diagnostic imaging and reducing wait times. A key element of this strategy was the recognized need to significantly increase public sector MRI capacity – in an effort to reduce wait times and eliminate unlawful patient charges for medically necessary imaging.

A 2017 survey found that BC had the greatest number of for-profit MRI clinics of any province – 14 – and these were overtly accepting private payment contrary to provincial and federal legislation.[5] As part of the government's surgical and diagnostic strategy Fraser Health and Vancouver Coastal Health purchased three private MRI clinics in an effort in 2018 and 2021 to increase public sector MRI capacity and eliminate unlawful extra-billing

5 Ontario Health Coalition, *Private Clinics and the Threat to Public Medicare in Canada*, 2017, p. 10; Kathy Tomlinson, Some doctors charging both government and patients privately in illegal double-dipping practice, *The Globe and Mail*, June 10, 2017; Michael Mui, BC fined for medical extra-billing 16 years in a row, *StarMetro Vancouver*, April 12, 2018.

and queue-jumping.[6] The provincial government retains an ongoing focus on increasing medical imaging volumes and expanding public sector capacity.[7]

Recognizing the workforce shortages, especially in MRI, the BC government embarked on several post-secondary initiatives. In 2022, $2.5 million in one-time funding was provided to BC Institute for Technology (BCIT) for a bursary program to help current MRI technologist students who are also health authority employees complete their training. And, in January 2023, a direct-entry (first discipline) BCIT MRI technologist diploma accepted its first cohort.[8] While this initiative helped support more MRTs to become MRI technologists, it did not create net-new staff as they were already working in radiography or CT.

In December 2023, the Ministry of Health's Allied Health Policy Secretariat released the *Provincial Allied Health Strategic Plan* with 57 actions intended to support recruitment and retention of allied health professionals, including medical imaging professionals and radiation therapists.[9] This strategic plan builds on BC's health human resources strategy released in 2022.[10]

In May 2024, the Ministry of Health, in partnership with HSA, announced the first major investment of $93 million in the *Provincial Allied Health Strategic Plan*, which includes[11]:

- Expansion of the Provincial Rural Retention Incentive (PRRI) to 56 new communities (for a total of 74 communities across all health authorities). The PRRI provides up to $2,000 per quarter, pro-rated to productive hours, to health-care workers working in eligible rural and remote communities to a maximum of $8,000/year, from April 1, 2024 until March 31, 2025. All health care workers are eligible for those incentive, provided they are employed in regular positions by a health authority in eligible communities.

- Recruitment incentives (i.e., signing bonus) for eligible allied health professionals who join the GoHealth BC travel staffing service. GoHealth BC is a public alternative to the private, for-profit staffing agencies that have destabilized the public sector workforce. Eligible professionals who work between April 2024 and March 2025 can receive up

6 Cheryl Chan, Provincial government buys two Fraser Valley MRI clinics, *The Vancouver Sun*, September 25, 2018; Government of BC, More MRI scans coming for Vancouver Coastal Health patients, news release, July 23, 2021.

7 Government of BC, Medical Imaging 2021/22 Annual Progress Report, news release, June 2022.

8 Government of BC, British Columbia trains, recruits more allied health professionals, news release, July 19, 2022.

9 Government of BC, Province supports allied health workforce, improves patient care, news release, December 6, 2023.

10 Government of BC, New health workforce strategy improves access to health care, puts people first, news release, September 29, 2022.

11 Government of BC, New supports for allied health, clinical support workers will boost workforce, news release, May 1, 2024.

to $10,000 in signing bonuses for regular full- or part-time employment comprised of flexible, short-term deployments to rural and remote communities.

- Recruitment incentives (i.e., signing bonus) of up to $30,000 for professionals in priority occupations and designated communities when they agree to a two-year return of service agreement in the public health care sector. Eligible professionals who fill the identified rural/remote vacancy in priority occupations within Northern Health can receive up to $30,000 between April 2024 and March 2025 for two-year return of service agreement. Professionals filling eligible rural/remote vacancies outside Northern Health may be eligible for a $20,000 incentive payment also with a two-year return of service agreement.

- Difficult-to-fill vacancy recruitment incentives (i.e., signing bonus) in urban and metro communities of up to $15,000 for eligible professionals filling an identified vacancy with a two-year return of service agreement.

- $7.6 million to offer tuition credits for allied health students in identified high-demand programs, bursaries for licensing or certification exams, and development of employer-sponsored earn and learn programs beginning with combined lab and x-ray technologists and supporting kinesiology graduates to support them to complete the clinical exercise physiologist certification.

Cancer care system under severe strain

Medical radiation technologists are essential to the cancer care system. Radiation therapy wait times – currently longer than what is clinically recommended – have received considerable attention in BC. In May 2022, an investigation identified growing challenges at BC Cancer, including long wait times resulting from imaging technologist and radiation therapist shortages, and governance issues.[12] Later that year, radiologists also raised concerns about the effects of the increasingly severe shortage of imaging technologists on cancer diagnoses and treatment wait times.

In February 2023, the BC government launched a cancer care action plan intended to improve timely access to diagnosis and treatment.[13] The plan focused on recruitment and retention of oncologists and cancer care professionals, including $270 million over three years to expand cancer centre operating hours. During early 2023, HSA and the BC government engaged in discussions about the need to provide more competitive wages for members of the cancer care team, including radiation therapists, who have been long-recognized by the Ministry of Health as a profession in short supply. In March 2023, as a

12 Andrea Woo, Cancer care system in B.C. buckling as staff shortages lead to soaring wait times, *The Globe and Mail*, September 22, 2023.

13 Government of BC, BC launches action plan to better detect, treat, prevent cancers, news release, February 24, 2023.

result of HSA's efforts to seek pay improvements for a range of professions in shortage, the government agreed to increase wages for radiation therapists and radiation therapy service technologists.[14]

By May 2023, due to unacceptable wait times, the BC government took the unprecedented step of offering patients the option to receive faster access to radiation therapy in Bellingham, Washington.[15] For HSA and the Canadian Association for Medical Radiation Technologists (CAMRT-BC), this is not a long-term solution, and HSA joins CAMRT in raising concerns. As CAMRT-BC noted, "[t]hese conditions have been building over some time, with current shortages only the culmination of underinvestment in the field and workforce reaction to ever-building workload, stress and burnout."[16]

Shortage professions critical to the functioning of BC's cancer care system – including clinical counsellors, CT technologists, dietitians, medical laboratory technologists, MRI technologists, nuclear medicine technologists, PET technologists, pharmacists, radiological technologists, radiation therapists, and social workers – are included in the recruitment and retention investments announced in May 2024 and described above. Since most BC Cancer Agency medical radiation technologists and radiation therapists work in urban centres, it is anticipated that the difficult-to-fill vacancy recruitment incentive will be mobilized by the Ministry of Health and health authorities to support increased staffing levels and service delivery.

Provincial funding

Public medical imaging expenditures show that BC is making significant investments, but the challenges discussed in this report indicate that more must be done.

In 2021/22, BC spent $10.3 billion on public hospitals, with $474.2 million – or 4 per cent of total hospital expenditures – on hospital-based medical imaging (Figure 1).[17] The share of hospital spending dedicated to medical imaging has fallen from an average of 5 per cent of total hospital spending from the five-year period 2005/06 to 2009/10, to 4.5 per cent of total hospital spending from 2017/18 to 2021/22.[18] This comes even as there have been significant investments in medical imaging, notably MRI, particularly in 2019/20 and

14 HSPBA negotiates improved wages for cancer care specialists, HSABC, March 30, 2023.

15 Some B.C. cancer patients to be offered radiation treatments in Bellingham, Wash., *CBC News*, May 15, 2023; Government of BC, Cancer patients will have faster access to radiation treatment, news release, May 15, 2023.

16 Ian Holliday, BC radiation therapists weigh in province's plan to send patients to US for treatment, *CTV News Vancouver*, May 19, 2023.

17 Canadian Institute for Health Information [CIHI], *Trends in Hospital Spending, 2005-2006 to 2021-2022*, Series B: Hospital Spending by Service Area, Table B.10.1 and B.10.2.

18 CIHI, *Trends in Hospital Spending, 2005-2006 to 2021-2022*, Series B: Hospital Spending by Service Area, Table B.10.2.

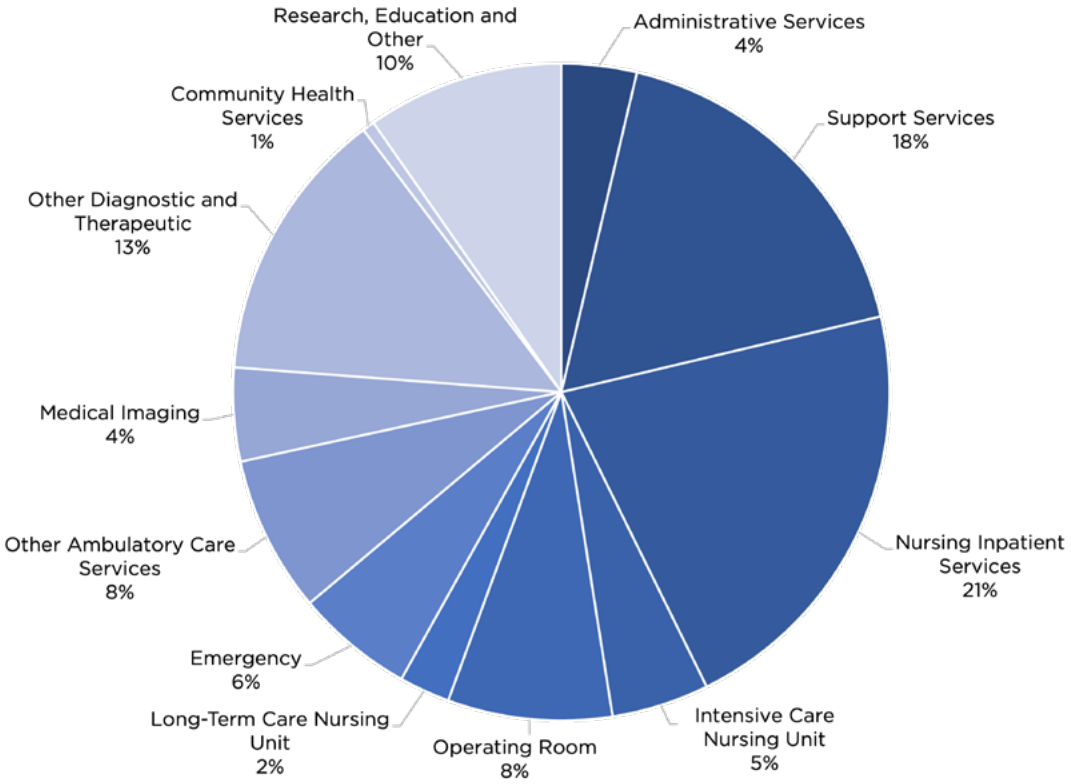
2020/21 as part of the provincial government's efforts to expand public sector MRI capacity.

Analyzing provincial funding for medical imaging on a real per capita basis (i.e., inflation-adjusted, per-person basis) is a helpful way to determine whether funding is keeping pace with population growth and inflation. Since 2018/19, real per capita medical imaging has been trending upward (Figure 2). By 2021/22, BC funded medical imaging at $78 per person – the highest rate since data became available in 2005/06. Real per capita spending increased from $69 to $78 over the last five years of available data.

The amount BC spends on these services as a share of the economy (measured as GDP) has also increased over this period – from 0.12% to 0.14% of the provincial economy (Figure 2).

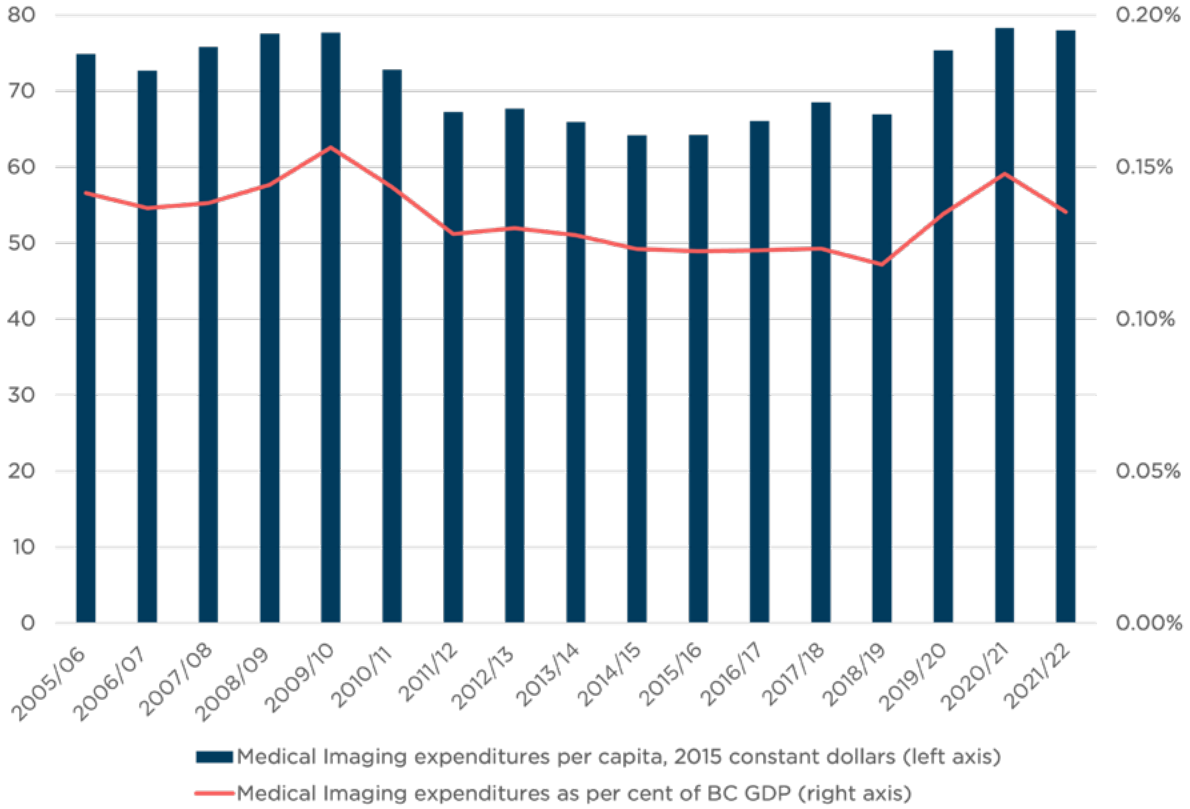
Increased funding for public medical imaging is a positive development and reflects the provincial government's commitment to increasing public sector capacity which deteriorated during the 2010s. However, much more investment is needed to address low baseline staffing levels, unmanageable workloads, and acute professional shortages across all disciplines.

Figure 1: Distribution of BC hospital expenditure by service area, 2021/22



Source: CIHI, *Trends in Hospital Spending, 2005-2006 to 2021-2022*, Series B: Hospital Spending by Service Area, Table B.10.2

Figure 2: BC hospital medical imaging expenditure, 2005/06 to 2021/22



Source: Author's calculations from CIHI, *Trends in Hospital Spending, 2005-2006 to 2021-2022*, Series B: Hospital Spending by Service Area, Table B.10.1; CIHI, *National Health Expenditure Trends 2023*, Appendix Tables A and D.

Key findings

Increasing wait times for radiation therapy, CT scans, and MRI scans

Wait times for medical imaging and radiation therapy are influenced by multiple factors, including funding, how services are organized and delivered, and importantly, staffing levels.

In Canada, wait time data are collected from provincial ministries of health and reported by the Canadian Institute for Health Information (CIHI). Currently, there are only pan-Canadian data for MRI, CT, and radiation therapy. The median wait times, compared below, reflect the how long patients in the 50th percentile wait.

- In BC, the median wait time for MRI was 72 days in 2023, a 67 per cent increase from 43 days in 2019 (Table 3). In 2023, BC median wait times ranked behind Ontario (38 days) and Alberta (60 days).

- Median wait times for CT scans in BC increased between 2019 and 2023 (Table 4). In 2023, the median wait was 28 days to receive a CT scan, more than Ontario (9 days),

but shorter than Alberta (30 days).

- In BC, the percentage of radiation therapy patients meeting the wait-time benchmark has declined from 91 per cent in 2019 to 72 per cent in 2023 (Table 5) – the largest percentage-point decline among the provinces. In 2023, BC had fewer patients meeting the benchmark than all other provinces reporting.

Despite significant new investments in medical imaging, particularly MRI, wait times continue to increase in BC. This is due to professional shortages in the public sector, as the next section explains.

Table 3: MRI median wait times in days, 2019-2023

	2019	2020	2021	2022	2023	% change, 2019-2023
BC	43	70	42	50	72	67%
AB	72	85	45	46	60	-17%
SK	48	31	30	49	37	-23%
MB	55	83	66	99	110	100%
ON	35	26	29	33	38	9%
NS	50	37	83	91	78	56%
PEI	45	35	34	41	30	-34%

Source: CIHI, Wait Times for Priority Procedures, 2024
Note: NB, NL, and QC data are unavailable.

Table 4: CT median wait times in days, 2019-2023

	2019	2020	2021	2022	2023	% change, 2019-2023
BC	20	21	21	23	28	40%
AB	24	31	13	17	30	25%
SK	25	20	27	31	23	-8%
MB	23	21	28	17	36	57%
ON	6	3	5	8	9	50%
NS	26	21	28	31	48	85%
PEI	27	15	27	24	21	-21%

Source: CIHI, Wait Times for Priority Procedures, 2024
Note: NB, NL, and QC data are unavailable.

Table 5: Radiation therapy percentage of patients meeting wait time benchmark (28 days), 2019-2023

	2019	2020	2021	2022	2023	Percentage point change, 2019-2023
BC	91	90	88	85	72	-19
AB	97	97	98	98	97	0
SK	97	97	98	98	98	1
MB	100	100	100	100	100	0
ON	98	98	98	98	99	0
NS	96	99	89	79	n/a	n/a
PEI	99	98	99	95	98	-1

Source: CIHI, Wait Times for Priority Procedures, 2024
Note: NB, NL, and QC data are unavailable.

Some improvements, but low staffing levels and shortages persist

Low staffing levels and shortages of medical imaging and radiation therapy professionals create health care bottlenecks and increase wait times for diagnosis and treatment. These shortages are evident in the form of unfilled vacancies and low baseline staffing levels that do not reflect the demand for services. This can cause moral distress, burnout, mental and physical illness for staff, and in turn, may lead to professionals reducing hours or exiting health care employment entirely.

Health authority data and key informant interviews show that low baseline staffing levels (understaffing) and shortages are concerns across the province and for most medical imaging disciplines and radiation therapy. The following data provide two indicators of staffing levels.

The first indicator measures **staffing levels** on a full-time equivalent (FTE) basis. The second indicator shows **access rates** to medical imaging and radiation therapy, measured by FTE per 100k population. Access rates show to what extent staffing levels are increasing (or declining) in relation to population growth and expected increased service demand. It is important to note that the staffing levels and access rates rely on funded FTE, which is different from worked FTE. Therefore, the data reflect the staffing levels that health authorities are funded to provide and, therefore, exaggerates actual staffing levels (e.g., due to sick leaves and vacancies).[19]

In Fraser Health, Providence, and Vancouver Coastal Health from 2014-2023, analysis shows (Table 6):

19 For example, funded FTE includes paid leaves, including vacation and sick leave.

- Staffing levels increased for all disciplines: CT technologist (17 per cent), diagnostic medical sonographers (57 per cent), nuclear medicine technologists (7 per cent), and MRT (44 per cent).

- Access rates increased for diagnostic medical sonographers (36 per cent) and MRT (24 per cent), but remain unchanged or declined for CT technologists (1 per cent) and nuclear medicine technologists (-8 per cent).

In Interior Health from 2014-2023, analysis shows (Table 7):

- Staffing levels increased for all disciplines: diagnostic medical sonographers (53 per cent), nuclear medicine technologists (4 per cent), and MRT (31 per cent).

- Access rates increased for diagnostic medical sonographers (33 per cent) and MRT (14 per cent), but declined for nuclear medicine technologists (-10 per cent).

In Northern Health from 2014-2023, analysis shows (Table 8):

- Staffing levels increased for diagnostic medical sonographers (223 per cent) and nuclear medicine technologists (17 per cent), but from very low FTE to begin with, which means these increases should be interpreted with caution. Staffing levels for MRT declined by 6 per cent, and in absolute terms by 5.9 FTE.

- Access rates increased for diagnostic medical sonographers (210 per cent), but from a very low access rate to begin with, which means this increase should be interpreted with caution. Access rates did not change significantly for nuclear medicine technologists, and declined in absolute and percentage terms for MRT (-10 per cent).

On Vancouver Island from 2014-2023, analysis shows (Table 9):

- Staffing levels increased for diagnostic medical sonographers (33 per cent) and MRT (193 per cent), and remained relatively unchanged for nuclear medicine technologists (6 per cent).

- Access rates increased for diagnostic medical sonographers (16 per cent) and MRT (155 per cent), and declined for nuclear medicine technologists (-8 per cent).

For Provincial Health Services Authority – the health authority responsible for BC Cancer Agency and radiation therapy – between 2019 and 2023,[20] analysis shows (Table 10):

- Staffing levels increased for MRT (33 per cent) and nuclear medicine technologists (55 per cent), but both from very low levels to begin, and should be interpreted with caution. Staffing levels declined in absolute and percentage terms for radiation

20 Due to data quality concerns, data for years prior to 2019 are excluded.

therapists, with a reduction of 1.9 FTE or 1 per cent (Figure 4).

- Access rates increased for nuclear medicine technologists and MRT, but as stated, these increases should be interpreted with caution since rates were very low to begin. Radiation therapist access rates declined by 6 per cent from 5.5 FTE per 100k to 5.1 FTE per 100k (Figure 4).

The trends in staffing levels and access rates show that there have been staffing level improvements over the last decade, and primarily for diagnostic medical sonographers and MRT in most regions (Figure 3). Due to how health authorities code employment data, it is difficult to break out MRT disciplines by x-ray, CT, and MRI technologists in order to understand the distinct staffing challenges by discipline.

However, from key informant interviews we know that understaffing and shortages are particularly severe for radiological technologists, nuclear medicine and PET technologists, and radiation therapists. The unintended consequence of the government's focus on MRI has been that many x-ray technologists have moved into MRI for higher pay and tuition bursaries. These challenges may affect decisions for students to subspecialize in CT, interventional/fluoroscopy, and mammography, as well as x-ray.

As one frontline member explained, the understaffing and shortages in medical imaging are so severe that vacancies may go unfilled for years, and without a casual pool:

> *Our Victoria centre has had a posting out for casuals I think almost indefinitely since they've opened, and they opened like 5 years ago roughly. And they still to this day have zero casuals.*

A PET technologist explains the dire situation in cancer care resulting in the shortage of health science professionals:

> *Patients need their PET scan done prior to having chemo, radiation treatment, and surgery. We often use a scan to determine where doctors should biopsy or in a situation where a biopsy is not possible. PET technologists are used to determining mid treatment or end of treatment response and surveillance imaging amongst many other things. We are also now starting PET therapies and the demand for our therapies is increasing very quickly. I'm trying to understand how we are now also supposed to staff PET therapies when we don't currently have our clinic adequately staffed for patients' PET scans.*
>
> *Out of the six BC Cancer Agency centres in the province, all of which have radiation therapy departments, only three of the seven centres have PET. We do a large majority of the patients here in Vancouver, with 22 regular staff positions, a mix between full-time and part-time. A few of these 22 positions are currently unfilled. There's a massive and unrelenting provincewide demand for PET and yet there's only 31 of us for the entire province.*

> *The demand for PET is only going continue to increase in the coming years. We have absolutely no relief in sight, with the next two PET scanners (Surrey and Burnaby), being at least 10 years away. And even at that point, I can guarantee you now that there will not be staff to run those scanners. We currently can't staff our existing three PET centers and continue to struggle with staff retention.*
>
> *The only nuclear medicine program we have in BC is through BCIT and they accept a maximum of 16 students per year. However, every year, all of the nuclear medicine grad classes are finishing with substantially less than 16 grads. It's been like this for well over a decade now. These few grads are then dispersed out amongst the many nuclear medicine sites across our province and very few of them come to join us in PET.*
>
> *The demand for patients' PET scans weighs heavily on us and we feel helpless. How are we supposed to solve our staffing crisis and manage a constantly increasing demand for us while also mildly preserving our mental and physical health. There is no work-life balance anymore. We take this load home with us every day and it's no longer sustainable.*

As this PET technologist explains, the shortages are causing long delays for diagnosis and treatment, and the heavy workload is causing moral distress, burnout, mental health crises, and ultimately, loss of staff.

Frontline technologists welcome the investment in new equipment and infrastructure, but are deeply concerned that there has been little focus on increasing staffing so that the new services can be staffed:

> *Just mental health wise I think a lot of us are struggling. And we keep hearing of more PET scanners being announced, there's like two in Cloverdale, two in Burnaby, Nanaimo's getting one and it's just kind of alarming to hear all these centres and know that we can't staff the three small centres that we have now. And as much as we've been trying to raise the alarm, no one's really listening. So, it's also very frustrating.*

Table 6: Fraser, Providence, and Vancouver Coastal Health medical imaging funded staffing levels and access rates, 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	No. change, 2014-2023	% change, 2014-2023
Fraser Health, Providence, and Vancouver Coastal Health population	2,886,682	2,928,590	2,984,386	3,031,972	3,082,946	3,141,278	3,183,284	3,215,223	3,282,495	3,341,426	454,744	16%
Full-time equivalent (FTE)												
CT Technologist	80.5	82.8	81.0	86.2	85.7	85.7	88.7	100.6	93.1	94.3	13.8	17%
Diagnostic Medical Sonographer	193.4	202.9	214.1	218.9	239.0	248.5	203.8	263.7	277.1	303.5	110.1	57%
Nuclear Medicine Technologist	71.0	66.4	70.9	70.6	69.2	72.3	74.1	71.6	73.7	76.0	4.9	7%
Medical Radiation Technologist*	556.8	591.5	605.7	632.9	636.7	679.5	693.6	731.2	777.2	800.4	243.6	44%
FTE per 100k population												
CT Technologist	2.79	2.83	2.72	2.84	2.78	2.73	2.79	3.13	2.84	2.82	0.0	1%
Diagnostic Medical Sonographer	6.70	6.93	7.17	7.22	7.75	7.91	6.40	8.20	8.44	9.08	2.4	36%
Nuclear Medicine Technologist	2.46	2.27	2.38	2.33	2.24	2.30	2.33	2.23	2.24	2.27	-0.2	-8%
Medical Radiation Technologist*	19.29	20.20	20.30	20.87	20.65	21.63	21.79	22.74	23.68	23.95	4.7	24%

Source: Freedom of Information requests

*includes x-ray, combined lab/x-Ray, mammography, and MRI technologists

Table 7: Interior Health medical imaging funded staffing levels and access rates, 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	No. change, 2014-2023	% change, 2014-2023
Interior Health population	745,266	757,910	768,858	781,850	796,464	807,888	817,893	829,666	843,543	855,545	110,279	15%
Full-time equivalent (FTE)												
Combined Laboratory/X-Ray Technologist	4.92	4.96	4.22	4.22	4.22	4.32	7.49	8.49	6.85	7.98	3.1	62%
Diagnostic Medical Sonographer	45.05	45.05	45.05	45.05	45.05	62.37	66.36	68.59	68.41	68.79	23.7	53%
Nuclear Medicine Technologist	21.47	21.09	21.12	21.12	21.19	24.13	22.29	24.03	53.03	22.25	0.8	4%
Medical Radiation Technologist*	184.75	185.42	193.39	200.45	207.35	201.22	213.82	229.36	235.2	242.27	57.5	31%
FTE per 100k population												
Combined Laboratory/X-Ray Technologist	0.7	0.7	0.5	0.5	0.5	0.5	0.9	1.0	0.8	0.9	0.3	41%
Diagnostic Medical Sonographer	6.0	5.9	5.9	5.8	5.7	7.7	8.1	8.3	8.1	8.0	2.0	33%
Nuclear Medicine Technologist (NMT)	2.9	2.8	2.7	2.7	2.7	3.0	2.7	2.9	6.3	2.6	-0.3	-10%
Medical Radiation Technologist*	24.8	24.5	25.2	25.6	26.0	24.9	26.1	27.6	27.9	28.3	3.5	14%

Source: Freedom of Information requests

*includes x-ray, combined lab/x-Ray, mammography, and MRI technologists

Table 8: Northern Health medical imaging funded staffing levels and access rates, 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	No. change, 2014-2023	% change, 2014-2023
Northern Health population	293,991	292,562	292,461	293,995	296,540	298,493	299,783	300,970	304,255	306,759	12,768	4%
Full-time equivalent (FTE)												
Combined Laboratory/X-Ray Technologist	9.2	8.7	9.9	10.8	7.7	8.7	5.6	4.8	8.6	9.7	0.4	4%
Diagnostic Medical Sonographer	13.2	12.4	14.1	17.8	26.1	29.0	32.9	34.5	36.8	42.6	29.4	223%
Nuclear Medicine Technologist	7.7	8.8	9.7	9.6	7.0	8.0	8.0	8.0	9.0	9.0	1.3	17%
Medical Radiation Technologist*	103.6	107.9	110.8	109.1	93.4	105.0	96.5	96.2	98.7	97.7	-5.9	-6%
FTE per 100k population												
Combined Laboratory/X-Ray Technologist	3.1	3.0	3.4	3.7	2.6	2.9	1.9	1.6	2.8	3.1	0.0	0%
Diagnostic Medical Sonographer	4.5	4.3	4.8	6.1	8.8	9.7	11.0	11.4	12.1	13.9	9.4	210%
Nuclear Medicine Technologist	2.6	3.0	3.3	3.3	2.4	2.7	2.7	2.7	3.0	2.9	0.3	12%
Medical Radiation Technologist*	35.3	36.9	37.9	37.1	31.5	35.2	32.2	32.0	32.4	31.9	-3.4	-10%

Source: Freedom of Information requests

*includes x-ray, combined lab/x-Ray, mammography, and MRI technologists

Table 9: Vancouver Island medical imaging funded staffing levels and access rates, 2014-2023

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	No. change, 2014-2023	% change, 2014-2023
Vancouver Island Health population	781,164	797,326	813,545	821,567	834,526	847,137	857,768	868,946	885,271	899,337	118,173	15%
Full-time equivalent (FTE)												
Combined Laboratory/X-Ray Technologist	4.0	4.0	3.0	3.0	4.0	4.0	4.0	3.8	3.4	3.4	-1	-15%
Diagnostic Medical Sonographer	65.0	66.0	64.0	74.0	85.0	69.4	68.8	76.5	78.8	86.6	22	33%
Nuclear Medicine Technologist	24.0	24.0	22.0	22.0	26.0	24.7	26.1	26.7	28.4	25.4	1	6%
Medical Radiation Technologist*	72.0	77.0	110.0	106.0	122.0	194.1	163.8	190.3	203.1	211.1	139	193%
FTE per 100k population												
Combined Laboratory/X-Ray Technologist	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.4	-0.1	-26%
Diagnostic Medical Sonographer	8.3	8.3	7.9	9.0	10.2	8.2	8.0	8.8	8.9	9.6	1.3	16%
Nuclear Medicine Technologist	3.1	3.0	2.7	2.7	3.1	2.9	3.0	3.1	3.2	2.8	-0.2	-8%
Medical Radiation Technologist*	9.2	9.7	13.5	12.9	14.6	22.9	19.1	21.9	22.9	23.5	14.3	155%

Source: Freedom of Information requests

*includes x-ray, combined lab/x-Ray, mammography, and MRI technologists

Table 10: Provincial Health Services Authority medical imaging and radiation therapy funded staffing levels and access rates, 2019-2023

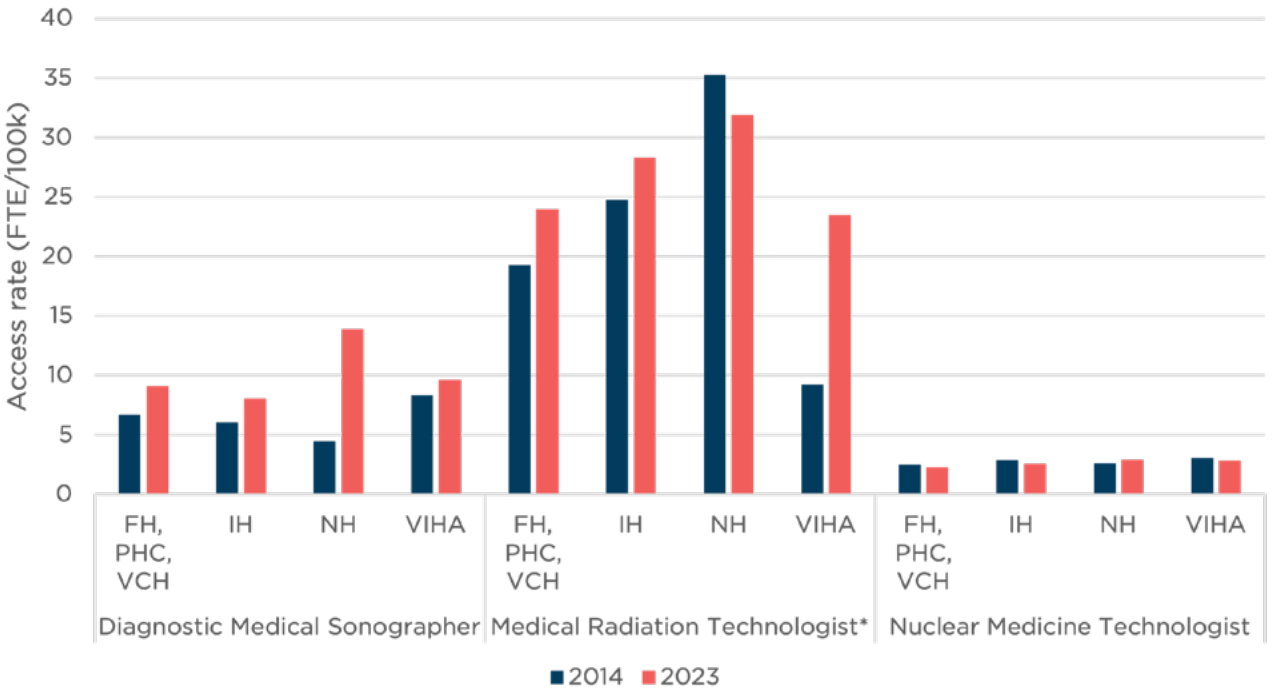
	2019	2020	2021	2022	2023	No. change, 2019-2023	% change, 2019-2023
BC population	5,094,796	5,158,728	5,214,805	5,315,564	5,403,067	308,271	6.1%
Full-time equivalent (FTE)							
Nuclear Medicine Technologist	16.6	21.3	25.1	27.0	25.6	9.1	54.6%
Radiation Therapist	280.1	265.8	272.2	284.8	278.2	-1.9	-0.7%
Medical Radiation Technologist*	18.0	17.9	16.2	23.9	24.0	6.0	33.3%
FTE per 100k population							
Nuclear Medicine Technologist	0.3	0.4	0.5	0.5	0.5	0.1	45.8%
Radiation Therapist	5.5	5.2	5.2	5.4	5.1	-0.3	-6.3%
Medical Radiation Technologist*	0.4	0.3	0.3	0.4	0.4	0.1	25.7%

Source: Freedom of Information requests

Note: Due to data quality concerns, data for years prior to 2019 are excluded.

*includes x-ray, combined lab/x-Ray, mammography, and MRI technologists

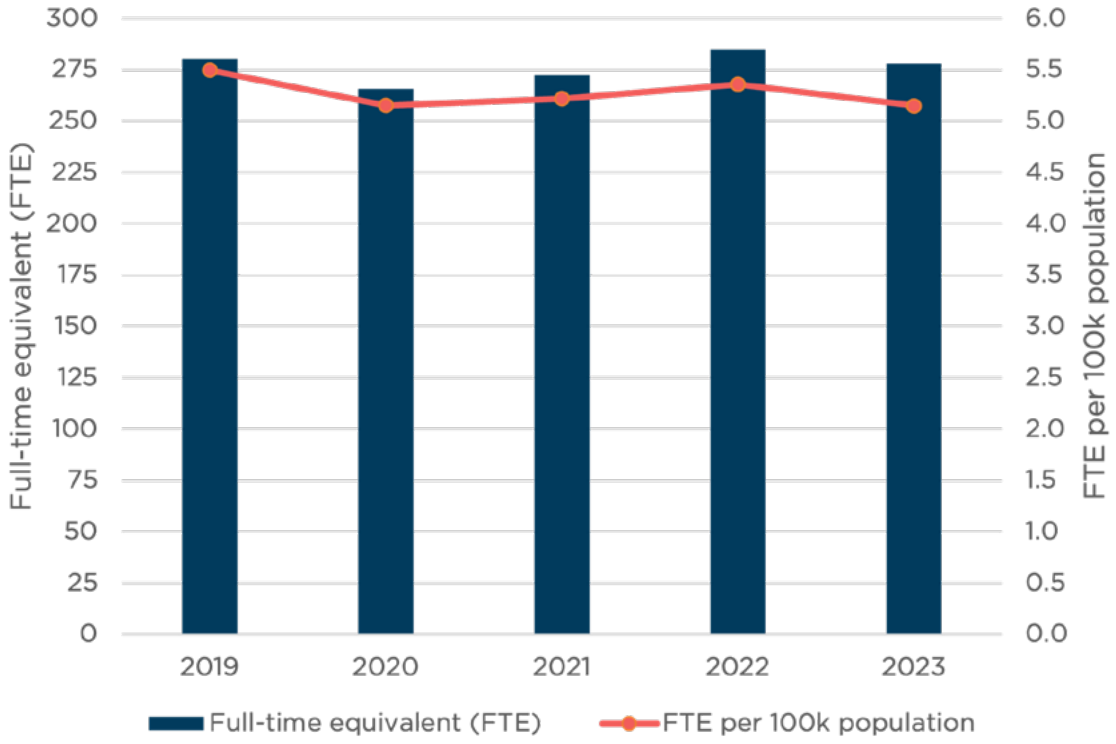
Figure 3: Medical imaging access rates by health region, 2014-2023



Source: Freedom of Information requests

* includes CT, x-ray, mammography, and MRI technologists

Figure 4: BC respiratory therapy staffing levels and access rates (FTE per 100k), 2019-2023



Source: Freedom of Information requests

Overtime and private agency staffing are symptomatic of shortages and risk patient and worker safety

Research evidence demonstrates a relationship between the conditions of work and the conditions of care. High levels of overtime and a deterioration of working conditions correspond with higher risk of mental and physical occupational injury, and risks to patient safety.[21]

Reliance on overtime to manage staffing shortages is apparent from data obtained from BC health authorities. Overtime (OT) hours increased in three out of five health authorities

21 D.H. Hickam, S. Severance, A. Feldstein, et al., *The Effect of Health Care Working Conditions on Patient Safety*, Evidence Report/Technology Assessment No. 74 (Prepared by Oregon Health & Science University), Rockville, MD: Agency for Healthcare Research and Quality, 2003.

A. E. Rogers, W.-T. Hwang, L. D. Scott, L. H. Aiken, & D. F. Dinges (2004), The working hours of hospital staff nurses and patient safety, *Health Affairs 23*(4), 202-212.

A. W. Stimpfel, D. M. Sloane, & L. H. Aiken (2012), The longer the shifts for hospital nurses, the higher the levels of burnout and patient dissatisfaction, *Health Affairs 31*(11), 2501-2509.

between 2019 and 2022: Interior, Fraser, and Vancouver Coastal/Providence (Table 11). The two largest health authorities (referred to as the Lower Mainland Consolidation) had a 196 per cent increase in the number of OT hours pre-pandemic (2019) to 2022 – to nearly 100,000 hours. This reliance on high levels of OT demonstrates the severity of unfilled vacancies (positions posted but unfilled) and low baseline staffing levels (new positions needed).

When short staffing is so severe and overtime has been exhausted, health authority employers are increasingly contracting-in agency staff. Contracting-in is a form of health care privatization when a private, for-profit company is contracted to bring its own staff into a unionized workplace to do the work of unionized workers covered by a collective agreement.

In BC, contracting-in of medical imaging professionals is occurring across the province. This information is based on a province-wide service contract between Provincial Health Services Authority (on behalf of all regional health authorities) and a large private, for-profit health care staffing agency, recently acquired by a publicly traded Quebec corporation. This health care staffing corporation now has a national footprint.[22]

Non-union agency MRTs and sonographers earn $10-30 more per hour than regular unionized staff, and may receive signing bonuses and payment for accommodation and travel expenses. Health authority employers often bring in agency techs at sites with chronic unfilled vacancies where they have been unable to recruit for a variety of reasons and have chosen not to pursue more significant strategies to recruit temporary relief from other sites (discussed later in this report).

The increasing use of agency staff undermines workplace morale and contributes to the hollowing out of the public sector workforce, as public sector professionals are encouraged to work for agencies for higher payer, reduced workload, and better work-life balance. A frontline sonographer explains:

> *When I was working up there, an agency was called in to help with the volume in ultrasound so I would be sitting at the desk right next to someone that trained a year ahead of me in school, I know exactly how he's trained, we did the same program, and he was making literally double the wage I was making sitting right next to me and turning down the difficult cases because he didn't want to do them. So I mean he's doing easier work for double the money. And that was so frustrating. That's what actually led me to get involved in union work. Yeah I find it really objectionable that that's what's going on and that the health authorities – because there's a solution and the gaps are being filled – I feel like it stops the problems from being as loud and as visible so they aren't working as hard towards solving staffing problems as they would if the agency didn't do it for them.*

22 Premier Health signs purchase agreement to acquire British Columbia-based company Solutions Staffing Inc., news release, July 4, 2023.

Table 11: Health authority medical imaging overtime hours

	Overtime (OT) hours				% change in OT hours, 2019-2022	FTE required to avoid OT in 2022*
	2019	2020	2021	2022		
Island Health						
Combined Laboratory/X-Ray Technologist	1,723	1,385	1,571	559	-68%	0.29
Diagnostic Medical Sonographer	7,359	10,158	7,460	2,760	-62%	1.42
MRI Technologist	2,449	7,509	7,990	3,303	35%	1.69
Medical Radiation Technologist	30,922	29,221	31,774	14,893	-52%	7.64
Total	42,453	48,274	48,794	21,516	-49%	11.03
Interior Health						
Cardiac Sonographer	739	956	871	791	7%	0.41
Combined Laboratory/X-Ray Technologist	1,394	2,230	2,581	2,452	76%	1.26
Diagnostic Medical Sonographer	3,049	3,091	1,948	3,550	16%	1.82
MRI Technologist	-	1,236	1,993	2,660	-	1.36
Nuclear Medicine Technologist	171	242	218	186	9%	0.10
Medical Radiation Technologist	27,174	26,098	23,982	30,283	11%	15.53
Total	32,528	33,852	31,593	39,923	23%	20.47
Fraser, Providence, and Vancouver Coastal Health						
Combined Laboratory/X-Ray Technologist	1,050	1,578	1,347	1,329	27%	0.68
CT Technologist	4,689	4,262	8,395	13,280	183%	6.81
Diagnostic Medical Sonographer	4,264	4,488	10,461	11,913	179%	6.11
Medical Radiation Technologist	18,339	19,555	41,310	58,048	217%	29.77
Medical Radiation Technologist - Imaging Informatics	474	175	395	273	-43%	0.14
Medical Radiation Technologist - Pediatric Procedures	41	107	588	1,436	3421%	0.74
MRI Technologist	3,586	4,688	7,257	10,353	189%	5.31
Nuclear Medicine Technologist	808	620	924	1,813	124%	0.93
Total	33,251	35,473	70,678	98,444	196%	50.48
Provincial Health Services						
Combined Lab/X-Ray Technologist	-	14	43	4	-	0.00
Diagnostic Medical Sonographer	807	970	1098	309	-62%	0.16
Medical Radiation Technologist	2387	2291	2628	754	-68%	0.39
Total	3,194	3,274	3,770	1,067	-67%	0.55

Source: Freedom of Information requests
*Note: 1 FTE = 1,950 hours

The deleterious effects of public sector employers' use of agency staff has been widely documented, and is a serious concern for HSA.[23]

Alarming shortages to come – without urgent action

Current and future shortages of MRTs and diagnostic medical sonographers are forecast to get much worse over the next decade without urgent action. A comprehensive analysis by the BC Radiological Society projects that the existing shortages of MRTs and sonographers will get much worse. There is a current x-ray, CT, and MRI technologist shortage of 248 FTE and current diagnostic medical sonographer shortage of 87 FTE.[24]

The same organization forecasts an x-ray, CT, and MRI technologist shortage of 504 FTE by 2028, and a diagnostic medical sonographer shortage of 43 FTE by 2028. These are massive shortages, but remain conservative estimates based on optimistic attrition and retirement assumptions. The shortages could be even worse, leading to dangerous backlogs and delays for medically necessary care in BC.

The BC government's own labour market projections suggest there will be significant staffing shortages. According to the BC Labour Market Outlook, 1,370 job openings for MRTs are expected between 2023 and 2033. For sonographers, 470 job openings are expected.[25] MRTs and sonographers are identified by the BC Ministry of Post-Secondary Education and Future Skills as "high opportunity occupations" based on seven economic indicators, including the expected number of job openings and low unemployment rate.

Promising practices to avoid shortages and privatization

In the southern Okanagan, there has been an effort – lead by frontline members within the bargaining unit – to staff up diagnostic medical sonography by pursuing creative strategies that prevent the privatization (i.e., contracting in) of agency staff. Upon the recommendation of frontline members and supervisors within the union, the health authority overhired to prevent chronic short staffing and service closures due to illness or other absences.

Overhiring is an important strategy that allows an increase in baseline staffing levels that then prevent temporary service closures and staff burnout. The success of overhiring in the southern Okanagan demonstrates the need for increases in baseline staffing across medical imaging departments – one of the key recommendations of this report. The

23 Penny Daflos, BC's health-care crisis: First look at massive markups by 'parasitic' staffing industry, *CTV Vancouver*, September 12, 2023; Tu Thanh Ha, Kelly Grant, and Stephanie Chambers, How Canadian hospitals grew dependent on expensive out of town nurses, *The Globe and Mail*, February 16, 2024.

24 BC Radiological Society, Critical Shortage of Medical Imaging Technologists in BC: Urgent Recommendations, September 2023.

25 Government of BC, *BC's Labour Market Outlook: 2023 Edition*, Appendix 6: High Opportunity Occupations, BC.

practice of overhiring also provides the additional benefit by providing additional capacity when needed for other hospitals in the region if they need help working down their waitlist.

In the southern Okanagan, they have also been successful in recruiting for their vacancies and retaining staff because they have explicitly focused on improving working conditions, scheduling, and work-life balance – a particularly important issue for younger workers who may have young children and caregiving responsibilities:

> *So I think wages, of course, would be one thing, but the other one too I guess for some areas would be is if they got more creative. I think we've got our applicants because of the four-day work week and the work-life balance that they have. With the senior leadership, too, I brought that up to them as well. Our director had asked, "what do you guys do here?" And so when I replied I said every applicant I've had has commented on, "it sounds like a really good work live balance as far as working full-time, having a four-day work week, and the call hours are only from 5:30 at night until 10:00. You're not getting interrupted and just overall it was a good working environment.*

In the southern Okanagan, they have also been successful recruiting temporary relief by bringing public sector technologists and sonographers from other hospitals by canvassing other departments directly and offering travel incentives and supports. This example illustrates the importance of senior leadership listening to frontline staff and their union about how to address shortages and recruitment and retention. It also provides a strong example of creative and practical ways to reduce the need for very expensive private staffing agencies that are much more costly and contribute to the hollowing out of the public sector workforce.

For-profit medical imaging sector contributes to public sector shortages

In BC, the growth of a large private, for-profit medical imaging sector has contributed to public medical imaging technologist shortages and unlawful patient charges against the Canada Health Act. Over the last two decades, the radiologist and investor-owned for-profit imaging sector became well-established for the following reasons:

- historic lack of public investment in hospital-based inpatient and outpatient medical imaging capacity;
- private clinics receiving public funding for MSP-billable and outsourced procedures; and,
- the lack of provincial legislation and enforcement to prohibit extra-billing (i.e., private-pay) by private clinics contrary to the Canada Health Act.[26]

26 Ontario Health Coalition, *Private Clinics and the Threat to Public Medicare in Canada: Results of Surveys with Private Clinics and Patients*, 8; Kathy Tomlinson, BC Doctors Warned That Charging Patients as Well as Public System Is Illegal, *The Globe and Mail*, June 16, 2017.

The growth of for-profit, private-pay medical imaging clinics pulls limited technologists from the public system, making it more difficult to staff existing operating hours, to say nothing of increasing evening and weekend imaging hours. A large body of evidence clearly demonstrates that neither private financing nor private delivery (or contracting out) of surgical and diagnostic services reduce public waiting times.[27]

In 2018 and in response to many of these problems, the BC government launched its surgical and diagnostic strategy. The plan included a large focus on increasing public sector MRI capacity, which had languished under the previous government and given rise to significant unlawful extra-billing. The increase in public MRI capacity – both staffing and equipment – means that BC hospitals have been able to provide diagnostic procedures for more patients even with population growth. In 2023, BC performed 18.4 scans per 1,000 population, which increased from 14.8 scans per 1,000 population in 2018 (Table 12). Despite this progress, BC still remains behind Ontario in its public MRI capacity, performing 25.7 scans per 1,000 in 2023. Ontario's greater hospital MRI capacity has enabled the province to maintain the shortest wait times in the country (Table 3).

Moving forward, the province's significant for-profit medical imaging sector remains a significant barrier to addressing public sector technologist shortages and reducing wait times. BC remains the only province without a legislative ban on extra-billing in diagnostic facilities. The provincial government had intended to bring into effect a legislative prohibition against extra-billing in diagnostic facilities (section 18.1 of the BC Medicare Protection Act) in 2018, but this was delayed due to the now-concluded *Cambie Surgeries Corporation v. British Columbia litigation*.

According to Health Canada, the BC government has not established a date when the province will come into compliance with the Canada Health Act.[28] The federal government's Diagnostic Services Policy took effect April 1, 2020, with deductions beginning in March 2023 for provinces with unlawful extra-billing occurring in diagnostic facilities. Under the Canada Health Act reimbursement policy, mandatory deductions may be reimbursed provided a province carries out a Reimbursement Action Plan to eliminate the patient charges and the circumstances that led to them.

The lack of a provincial ban on extra-billing in medical imaging facilities, in contravention of the Canada Health Act, continues to result in BC losing federal health care funding. In 2020/21, BC had the second-largest amount of unlawful extra-billing ($17.2 million) occurring in diagnostic facilities and federal funding deductions under the Diagnostic

27 Vanessa Brcic, Evidence is in: privately funded health care doesn't reduce wait times, Policy Note, 2015; Andrew Longhurst, Marcy Cohen, and Margaret McGregor, *Reducing Surgical Wait Times: The Case for Public Innovation and Provincial Leadership*, Vancouver: Canadian Centre for Policy Alternatives, 2016, pp. 17-22; Stephen Duckett, Commentary: The consequences of private involvement in health care – the Australian experience, *Healthcare Quarterly* 2020;15(4), pp. 21-25.

28 Health Canada, *Canada Health Act Annual Report 2021-2022*, p. 397.

Services Policy, after Quebec.[29]

By bringing legislation into effect to prohibit this practice, it will help free up the workforce for providing publicly funded procedures based on medical need and not ability to pay. As the inter-provincial wait time data demonstrate, Ontario maintains the shortest wait times for MRI and CT scans in the country (Tables 3-4). Ontario provides the vast majority of MRI and CT scans in hospitals (although this is anticipated to change with the Ontario government pursuing much greater outsourcing).

There are many benefits to coordinated and centralized hospital-based diagnostic delivery, including a workforce that isn't stretched between competing sectors, and operational efficiencies like centralized intake that are not possible with a multitude for-profit providers and fragmented service delivery.

Table 12: MRI cases (scans) per 1,000 population, BC and Ontario, 2019-2023

	BC			Ontario		
	Pop.	Cases	Cases per 1k	Pop.	Cases	Cases per 1k
2018	5,010,476	74,045	14.8	14,308,697	360,689	25.2
2019	5,094,796	83,988	16.5	14,544,701	356,584	24.5
2020	5,158,728	62,815	12.2	14,726,022	246,448	16.7
2021	5,214,805	96,679	18.5	14,809,257	358,935	24.2
2022	5,315,564	95,483	18.0	15,109,416	370,029	24.5
2023	5,371,789	98,877	18.4	15,287,781	392,356	25.7

Source: CIHI, Wait Times for Priority Procedures, 2024; National Health Expenditures, Appendix A

Note: Includes cases age 18 and older, all priority levels. Excludes emergency cases and routine follow-up scans and mammography and prenatal screening.

Limited post-secondary and clinical training capacity

There have not been significant increases for all medical imaging disciplines over the last decade. Despite recent large post-secondary training program increases for nursing professions (602 new seats announced in 2022), care aides (3,000 each year beginning in 2020), and physicians (40 undergraduate seats, 122 residency positions by 2028, and a new medical school by 2026), medical imaging has received little attention, even as upwards of 60 per cent of diagnoses require medical imaging.[30]

29 Health Canada, Canada Health Transfer Deductions and Reimbursements – March 2023, March 10, 2023. A reimbursement of $15.6 million to BC under the reimbursement policy has been made, which represents a partial reimbursement of its March 2021, March 2022, and March 2023 deductions.

30 See Government of BC: Hundreds of new nursing training seats coming provincewide, news

The largest program increases came in 2019 with the creation of the College of New Caledonia diagnostic medical sonography program, and in 2020 with diagnostic medical sonography at Camosun College. Smaller increases came to BCIT radiation therapy with an increase of eight seats in 2022, and a one-time two-seat increase at the College of New Caledonia in medical radiography (Table 14). For three disciplines – MRI, nuclear medicine, and radiation therapy – the only post-secondary programs in the province are located in the Lower Mainland, despite the need for these professionals across the province. Furthermore, there are no first-discipline (direct entry) MRT programs in the Interior.

In order to address the growing unmet health care needs in rural and remote BC, including health care access challenges facing many First Nations communities, research shows that students from rural communities or with rural practice exposure make them more likely to work rurally.[31]

Training new health care professionals not only requires the involvement of post-secondary institutions but also health authority employers who have the staffing capacity to provide hands-on clinical experience, called a practicums or clinical placements. Key informants are unanimous that we are not training enough medical imaging and radiation therapy professionals in the province, and that a significant expansion is needed of post-secondary programs and clinical capacity to train students.

High cost of living exacerbating shortages

Key informants from both urban and rural communities consistently commented on how high cost of living – including housing and child care – are exacerbating shortages and making recruitment and retention efforts more difficult. Over the last five years, many rural communities now face the same high housing costs as the Lower Mainland and south Island. In small rural communities, it is even more difficult to find suitable rental housing.

A frontline member articulates these challenges, and how they contribute to staffing shortages:

> *Our recruitment and retention challenges are very similar to most places where cost of living and wages are mismatched. The coast isn't cheaper than the city, you know. We pay a ferry premium for all our groceries, and all our goods here. And housing, and particularly rental housing is not cheaper than living in the city. So there's no attraction there in affordability, it makes it a downside if anything. […] I've lost count now, but the*

release, February 20, 2022; Province supports allied health workforce, improves patient care, news release, December 6, 2023; New health workforce strategy improves access to health care, puts people first, news release, September 29, 2022; Province expands health-care workforce and increases patient access, news release, December 5, 2023.

31 Ian MacQueen et al., Recruiting rural healthcare providers today: A systematic review of training program success and determinants of geographic choices, *J Gen Intern Med* 2018;33(2), pp. 191-199.

two most recent postings that I awarded in CT, the top candidate that I awarded the jobs to, both times, one last summer and one just a few weeks ago, the top candidate accepted and said yes, and then looked at housing and turned around and declined. And so it is the single barrier that was blocking people who otherwise were very qualified.

Table 13: Medical radiation technology and sonography post-secondary programs in BC

Discipline	Program	Certification	First discpline	Institution	Location	Program length	Status	Annual intake
Diagnostic medical sonographer	Diagnostic medical sonography	Diploma	Yes	Camosun College	Victoria	24 months	Full-time	16
Diagnostic medical sonographer	Diagnostic medical sonography	Diploma	Yes	College of New Caledonia	Prince George	24 months	Full-time	16
Diagnostic medical sonographer	Diagnostic medical sonography - general option	Diploma	Yes	BCIT	Burnaby	22 months	Full-time	48
Radiological technologist	Medical radiography technology	Diploma	Yes	Anderson College	Surrey	18 months	Full-time	unknown
Radiological technologist	Medical radiography technology	Diploma	Yes	BCIT	Burnaby	24 months	Full-time	80
Radiological technologist	Medical radiography technology	Diploma	Yes	Camosun College	Victoria	24 months	Full-time	16
Radiological technologist	Medical radiography technology	Diploma	Yes	College of New Caledonia	Prince George	24 months	Full-time	18
MRI technologist	Medical resonance imaging	Advanced certificate	No	BCIT	Virtual	22 months	Part-time	80
MRI technologist	Medical resonance imaging (first discipline)	Diploma	Yes	BCIT	Burnaby	24 months	Full-time	14
Nuclear medicine technologist	Nuclear medicine technology	Diploma	Yes	BCIT	Burnaby	24 months	Full-time	16
Radiation therapist	Radiation therapy	BSc	Yes	BCIT	Burnaby	33 months	Full-time	20

Source: Compiled by the author as of May 2024

Historically, medical imaging and radiation therapy professionals in BC have been among the lowest paid in Canada, despite having the highest cost of living. The most recent Health Sciences Professionals Bargaining Association (HSPBA) collective agreement, and wage adjustments negotiated in cancer care, begin to address the damage caused by wage austerity.

While improved wages go a long way in addressing these challenges, there is also a need for government to be bold and creative with workforce housing and child care, especially in rural and remote communities. Government has identified the need for action in these areas as part of its 2022 health human resources strategy.

Conclusions and recommendations

Over the last decade, there have been some notable improvements in staffing levels, equipment and technology, and patient access to publicly funded and delivered medical imaging. Despite welcome investments, MRTs and sonographers are under severe strain due to staffing shortages, low baseline staffing levels, and chronic unfilled vacancies. These workforce challenges are reflected in stagnant or increasing wait times for medical imaging and radiation therapy.

Specifically, this report has found the following:

- Patient wait times increased for radiation therapy, CT scans, and MRI scans between 2019 and 2023. In 2023, BC wait times for CT, MRI, and radiation therapy were considerably longer than Ontario.
- Despite some recent improvements, understaffing and shortages persist across the province and especially in radiation therapy and medical imaging disciplines.
- Overtime and private agency staffing are symptomatic of shortages and risk patient and worker safety. As well, The large for-profit medical imaging sector contributes to public sector shortages.
- BC has inadequate and strained post-secondary and clinical training capacity.
- The high cost of living and historically uncompetitive wages with other provinces have contributed to the medical imaging and radiation therapy staffing crisis.

Focused attention and investment on the medical imaging workforce and cancer care system can help turn the situation around. The 2022 health human resources strategy and allied health professionals and cancer care strategies released in 2023 demonstrate the government's commitment to addressing wait times and workforce shortages. These strategies have been supported with the recent investment of $93 million in May 2024 for recruitment and retention incentives and post-secondary bursaries. Moving forward,

sustained investments and policy changes will be necessary to boost – and maintain – staffing levels in urban, rural, and remote BC.

Based on the key findings of this report, HSA recommends the following policy solutions to address understaffing and shortages, and to reduce patient wait times.

Immediately address medical imaging and radiation therapy shortages and increase baseline staffing levels

The Ministry of Health, Health Employers Association of BC (HEABC), and health authorities need to work with HSA and the Health Sciences Professionals Bargaining Association (HSPBA) to address worsening professional shortages in public medical imaging, including chronic unfilled vacancies and understaffing.

Building on commitments in the province's health human resources strategy, and in collaboration with HSPBA, HSA recommends a suite of complementary strategies that would improve working conditions by increasing staffing levels:

- **Fill existing vacancies:** Fill existing vacancies using targeted initiatives to support immediate recruitment into unfilled vacancies.

- **Increase baseline staffing levels** in order to reduce unmanageable workload causing burnout, and expand clinical leadership opportunities, all of which will help recruit more new graduates and encourage recruitment of new graduates and help the province retain its medical imaging and radiation therapy professionals. Increasing staffing levels will also improve working conditions and job quality and support retention.

- **Continue to build on the May 2024-announced recruitment and retention incentives for allied health professionals** in order to attract those not currently employed in the public sector and also encourage students to pursue post-secondary education. The May 2024 recruitment and retention incentives provide a solid foundation to build from, with additional investments to ease the high cost of living and relocation challenges with workforce housing and child care in communities with persistent shortages.

- **Stop contracting-in medical imaging and health science professionals**, which contributes to the hollowing out of the public sector workforce, as higher private-sector agency wages, bonuses, and other incentives encourages public sector professionals to work for private staffing agencies. Private staffing agencies should be prohibited from requiring that workers sign non-compete agreements that prohibit them from accepting permanent health authority employment for a certain period of time. The creation of GoHealth BC as a public sector travel staffing alternative that offers flexible, short-term assignments is a welcome movement to phase out costly private, for-profit staffing agencies that are destabilizing the public sector workforce.

Increase post-secondary and clinical training capacity

It is widely recognized that BC is training far too few medical imaging and radiation therapy professionals, and significant provincial investment is needed in public post-secondary programs and clinical training capacity (in health authorities).

There have been no significant increases for medical imaging disciplines and radiation therapy in the last decade. Despite large post-secondary training program increases for nursing professions (602 new seats announced in 2022), care aides (3,000 each year beginning in 2020), and physicians (40 undergraduate seats, 122 residency positions by 2028, and a new medical school by 2026), medical imaging and radiation therapy have received little attention, even as upwards of 60 per cent of diagnoses require medical imaging and growing demand for cancer treatment.

In the absence of provincial investments in public post-secondary medical imaging and radiation therapy programs, for-profit colleges are expanding in the province. Private, for-profit programs are much more expensive for students, and have been found to exploit international students by charging exorbitant tuition and other fees.

BC should double the number of training seats for all medical imaging disciplines and radiation therapy at public post-secondary institutions, with a focus on seat expansion outside the Lower Mainland. This will require the creation of new or satellite programs. The provincial government should convene an advisory group to discuss the potential need to start investing in new ways of training, such as teaching clinic models like the one implemented for sonography at Camosun College.

BC should also establish a process for regular post-secondary seat increases that considers geographical need and provides a commensurate increase in health authority clinical training capacity. Currently, BC does not have a consistent and geographical needs-based post-secondary and clinical training planning and expansion process.

Provide tuition bursaries and paid practicums

Post-secondary institutions and health authority employers, with the support of the Ministry of Health and HEABC, should offer tuition bursaries and paid practicums for medical imaging and radiation therapy professionals and other shortage health science professionals. This should include a return-of-service commitment to public-sector employment under the health science professionals collective agreement.

Tuition bursaries and paid practicums (sometimes called “earn-and-learn”) with return-of-service commitment for public sector employment are increasingly used for nurses and care aides, including the Health Career Access Program (HCAP). Tuition bursaries and paid practicums can help address under-enrolment of existing post-secondary training spaces. For the 2023 graduating class, there was low uptake for radiation therapy, nuclear medicine, and medical radiation technology (MRT) seats at BCIT. The MRT program has 80 seats,

and only expects to graduate 27 students from the 2023 cohort – less than half. Few of these nuclear medicine students become PET technologists, which is creating a bottleneck for timely cancer diagnosis and treatment. BCIT is the only nuclear medicine program in BC, and they accept a maximum of 16 students per year. However, over the last decade, the nuclear medicine graduating classes are finishing with substantially less than 16 new graduates.

Another example is the movement of radiological technologists to MRI. Now that BCIT offers a direct-entry certificate for MRI, many students who may have considered radiography are pursuing MRI for higher pay. Existing radiological techs are moving into MRI for better pay as well. The good news is that the 2024 cohorts were fully subscribed, but the programs need to be expanded and tuition bursaries and paid practicums used in order to encourage program interest and completion, similar to strategies employed for nurses and care aides.

In a welcome move, the BC government expanded tuition bursaries valued at $2,000 per year for students enrolled in select unsubscribed programs at public post-secondary institutions, including perfusion, medical laboratory science, medical radiography, MRI, nuclear medicine technology, radiation therapy, respiratory therapy, environmental health services, clinical counselling, and biomedical engineering.[32] Tuition support, as well as bursaries for licensing and certification exams, should be maintained and expanded moving forward.

32 Government of BC, New supports for allied health, clinical support workers will boost workforce, news release, May 1, 2024.

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