Ontario

Ontario Forensic Pathology Service annual report - April 1, 2019 - March 31, 2020

Remembering what we stand for: integrity, responsiveness, excellence, accountability and diversity

Chief Forensic Pathologist's report

In March 2020, the province, country and world were thrown into a state of emergency due to the COVID-19 pandemic. Since then, the way we work together and practise forensic pathology has had to pivot and adapt to the evolving crisis. While this report covers the period of April 2019 to March 2020, I would like to take this opportunity to reflect on our response to COVID-19, as well as the leadership role of our team.

During the early phase of COVID-19, the Ontario Forensic Pathology Service (OFPS) focused on maintaining 'essential' medicolegal autopsies for public death investigations. The paramount consideration was the protection of frontline staff through social distancing, the procurement and conservation of personal protective equipment and the promotion of wellness. Where an autopsy was required to answer medicolegal questions, procedures were modified to limit the possibility of viral particles in the air. The application of forensic imaging at the Provincial Forensic Pathology Unit (PFPU) in Toronto has allowed us to target procedures and dissections. The OFPS' modified guidelines were shared widely to inform best practices, and we have worked closely with the Canadian and Ontario Associations of Pathologists and international partners to translate timely knowledge.

Initially, because COVID-19 deaths were natural and, therefore, not reportable under the Coroners Act, very few autopsies were conducted. However, in some cases where medicolegal issues necessitated investigation by a coroner, autopsies were conducted. I performed the first COVID-19 positive autopsy on March 17, 2020 at the PFPU. The first cases were referred for autopsy for various reasons, including to support death investigations in long-term care facilities. By June 2021, more than 160 COVID-19 cases have been examined at the PFPU.

The OFPS, through its autopsy practice, is well positioned to gain first-hand insight into COVID-19. The PFPU has partnered with coroners and public health to support viral testing and contribute to public health.

Autopsies play an important role in understanding the pathological spectrum of COVID-19 and its effects on the human body. The OFPS is assisting with pre-clinical research by microbiologists and immunologists at the University of Toronto to contribute to vaccine development. Based on this work, Health Canada approved a phase one clinical trial that commenced in January 2021 for a new vaccine that has been developed by a Canadian biotech company in Toronto. The OFPS is in a unique position to collaborate on this vaccine project because of our direct experience with the effects of the SARS-CoV-2 virus. This project shows how the OFPS' expertise can safeguard public health in a way beyond its traditional role of providing medical expertise to the criminal justice system.

This activity is happening at a time of an unprecedented high sustained autopsy caseload across Ontario, including a surge in opioid related deaths. Since the beginning of the pandemic, the PFPU is performing an average 120 medicolegal autopsies per week. Other Forensic Pathology Units across the province have also seen increased caseloads. Despite challenging operational pressures, including managing an increased number of bodies, the OFPS remains committed to a knowledge-based approach to COVID-19.

During this uncertainty, it is important to pause and remember what we stand for: Integrity, Responsiveness, Excellence, Accountability and Diversity. I believe that our team has exemplified these core values in their herculean efforts to provide critical and evidence-based answers to families and to our death investigation, criminal justice and public health partners. I am very proud and thankful to work with such a great team of professionals.

Michael S. Pollanen, MD PhD FRCPath DMJ (Path) FRCPC Founder, forensic pathology
Chief Forensic Pathologist of Ontario and Deputy Chief Coroner
Professor, Department of Laboratory Medicine & Pathobiology, University of Toronto
June 2021

What we do

The Ontario Forensic Pathology Service (OFPS) provides forensic pathology services under the Coroners Act. The OFPS works closely with the Office of the Chief Coroner (OCC) to ensure a coordinated and collaborative approach to death investigation in the public interest. Together, the chief forensic pathologist (CFP) and chief coroner provide collaborative leadership for Ontario's death investigation system.

Our vision

Deliver a high-quality death investigation system for a safer and healthier Ontario.

Our mission

Support the administration of justice, prevention of premature death and be responsive to Ontario's diverse needs.

Our values

- Integrity
- Responsiveness
- Excellence
- Accountability
- Diversity

The OFPS applies these core values by embracing an independent and evidence-based approach that emphasizes the importance of thinking objectively in pursuit of the truth. The OFPS is committed to service, research and teaching

Our legislation

The *Coroners Act* defines the roles and responsibilities of pathologists and coroners in death investigation and enhances the quality, organization and accountability of forensic pathology services. The *Coroners Act*:

- defines the Ontario Forensic Pathology Service as the unified system under which pathologists provide forensic pathology services, including autopsies
- defines the position of the chief forensic pathologist as overseer of forensic pathology services
- defines the positions of the deputy chief forensic pathologist and pathologist

- requires a registry of pathologists accredited to perform medicolegal autopsies
- requires the chief forensic pathologist to communicate with the College of Physicians and Surgeons of Ontario on any adverse findings related to competency and professionalism of a registered pathologist

Registered pathologists have legal authority under the Coroners Act to attend scenes and order ancillary tests as required, pursuant to their duties.

Our governance

The Ontario Forensic Pathology Service (OFPS) and the Office of the Chief Coroner (OCC) are part of the Ministry of the Solicitor General and are accountable to the minister of the Solicitor General. The deputy minister of the Solicitor General provides direction on administrative matters.

The Death Investigation Oversight Council (DIOC) ensures that death investigation services are effective and accountable. As an independent advisory agency, the DIOC provides oversight of the OFPS and OCC, administers a public complaints process, and provides advice and recommendations to the chief coroner and chief forensic pathologist.

Our structure

Ontario Forensic Pathology Service (OFPS)

Under the Coroners Act, the chief forensic pathologist administers and operates the OFPS. Specifically, the chief forensic pathologist:

- supervises and directs pathologists in the provision of services
- conducts programs for the instruction of pathologists
- prepares, publishes and distributes a code of ethics
- maintains a register of pathologists authorized to provide services

Two deputy chief forensic pathologists have all the powers and authorities of the chief forensic pathologist in the event the chief forensic pathologist is absent or unable to act, or if the chief forensic pathologist's position becomes vacant. The deputy chief forensic pathologists also support the chief forensic pathologist in the administration, oversight and quality management of the OFPS.

Provincial Forensic Pathology Unit (PFPU)

The forensic pathologists of the PFPU perform approximately 4200 autopsies per year, mainly from the Greater Toronto Area. The PFPU is affiliated with the University of Toronto and is the central referral facility for many complex autopsies from across the province, including homicides, skeletal remains and suspicious infant and child deaths.

In June 2019, two Medical Manager positions, Autopsy Services and Postmortem Imaging, were created at the Provincial Forensic Pathology Unit to increase the Unit's capacity for oversight and quality management. These two positions assist the Deputy Chief Forensic Pathologists in leading and directing medicolegal autopsies and the postmortem imaging program at the PFPU.

The individuals in these new positions are:

- **Dr. Maggie Bellis**, Medical Manager of Autopsy Services
- **Dr. Michael Pickup**, Medical Manager of Postmortem Imaging.

The operation of the PFPU includes professional and technical roles in addition to forensic pathologists. These include forensic anthropologists, pathologist assistants, technologists and imaging specialists, as well as administrative and management personnel.

New role at the Provincial Forensic Pathology Unit – Physician (Assistants) Extenders

The PFPU has been exploring ways to augment our capacity by using non-physician professionals. While other options were considered, the PFPU concluded that using physician assistants had several advantages.

Physician (assistants) extenders (PEs) are highly trained and regulated professionals utilized in the Ontario health care system to improve access to care. Under the supervision of a licenced physician, PEs perform a range of clinical tasks up to diagnosing and treating illnesses, prescribing medications and assisting in surgeries. Similar to how PEs work under the supervision of a licenced physician in clinical settings, the PEs are also able to work under a licenced forensic pathologist to assist with medicolegal examinations. The Ontario Forensic Pathology Service (OFPS) is the most recent medical subspecialty to integrate the PEs as clinical providers. As a member of the death investigation team, the PE works with forensic pathologists to triage cases, completes an external and internal examination of the body, communicates preliminary autopsy results to coroners and police, consults subject matter experts, and liaises directly with families and coroners to obtain paperwork for organ retentions. The PE has the authority to order ancillary testing and assesses and reviews confidential investigative and medical records. The PE is responsible for review of all the postmortem and ancillary testing findings and report results and opinions in a postmortem examination report for signing by a forensic pathologist. PEs are also responsible for participating in programs to upgrade and maintain the quality assurance of medicolegal autopsies, teach medical and non-medical learners and contribute to research.

In October 2019, the PFPU hired its first PE, David Clutterbuck, and hired a second, Brittini Santos, in January 2020.

The adoption of PEs by the PFPU is consistent with the 2019 Provincial Auditors Report that recommended that the OFPS and OCC evaluate staffing model alternatives to change the current workforce to be inclusive of non-physician professionals.

During the reporting period, the physician extenders completed 144 routine cases

Forensic Pathology Units (FPUs)

FPUs are located in university teaching hospitals in Kingston, London, Ottawa, Sault Ste. Marie and Sudbury. These units provide expertise in forensic pathology for approximately 7400 routine and complex autopsies annually, including homicides and pediatric cases. The Ministry of the Solicitor General, through the Ontario Forensic Pathology Service, provides funding to these units.

Complex forensic autopsies are performed by qualified forensic pathologists, most of whom work at a FPU or at the PFPU in Toronto. Some non-suspicious pediatric autopsies are performed at the Hospital for Sick Children in Toronto and the Children's Hospital of Eastern Ontario in Ottawa. Perinatal autopsies are also performed at Mount Sinai Hospital in Toronto. Occasionally, pediatric forensic cases from Northwestern Ontario are transferred to Winnipeg for autopsy by pathologists registered in Ontario.

Pathologists working in 15 community hospitals support the work of the Ontario Forensic Pathology Service by conducting routine medicolegal autopsies in their facilities on a fee-for-service basis.

Our partners and working relationships

In Ontario, our major partners are the Office of the Chief Coroner, municipal and provincial police agencies, the Office of the Fire Marshal and Emergency Management, the Special Investigations Unit, the Centre of Forensic Sciences as well as the province's criminal justice system.

The Ontario Forensic Pathology Service (OFPS) also collaborates with universities on research, education and training. Furthermore, the OFPS provides services to Canada's Department of National Defence.

Our services

Most deaths in Ontario are due to natural causes and do not require a medicolegal investigation. However, deaths that are sudden and unexpected require investigation by a coroner. These include deaths from accidents, suicides, homicides, and sudden deaths from previously undiagnosed diseases. Here is a list of services offered by the OFPS:

Pre-autopsy consultations

Forensic pathologists consult with regional supervising coroners to determine the appropriate location for an autopsy based on the complexity of a case and the skills of local pathologists.

Organ and tissue donations

In appropriate cases, forensic pathologists work with regional supervising coroners to facilitate organ and tissue donation through Trillium Gift of Life, in accordance with the wishes of the deceased and his or her family.

Scene visits

Pathologists attend scenes to gain necessary information as part of a complete autopsy. In most cases, photographs, video recordings and other imaging techniques are used to assess the scene instead of a physical scene visit.

Autopsies

Pathologists conduct autopsies and observe, document and interpret findings to help determine the cause of death. Autopsies are performed under the authority of an Ontario Coroner's Warrant for Postmortem Examination, a legal document that instructs a pathologist to perform the autopsy. In Ontario, coroner investigations are conducted in accordance with the provisions of the Coroners Act, and all autopsies must be authorized by a coroner's warrant. The Ontario Forensic Pathology Service (OFPS) also provides autopsy services to other jurisdictions, as well as to the Department of National Defence for military personnel who die outside of Canada.

There are five steps to a medicolegal autopsy:

1. Review of case history, scene and circumstances
2. External examination, including photographic documentation
3. Internal examination by dissection, including photographic documentation
4. Ancillary tests including, imaging, histology, cardiovascular, neuropathology, anthropology and odontology consultations, toxicology, metabolic screening and DNA testing
5. Opinion and report writing

Consultations and expert opinions

Our forensic pathologists and other consultants often participate in case conferences with other death investigation partners; assist in the identification of unidentified remains and missing persons and, provide expert opinion on complicated 'cold' cases in Ontario and other jurisdictions. They also provide occasional consultation and expert opinion on injuries to living individuals to assist with investigations.

Testimony in trials and other hearings

Forensic pathologists and other consultants testify as expert witnesses at coroner's inquests, all levels of court and public inquiries.

Collaboration with coroners

Forensic pathologists serve on QCC death review committees.

Special services

Special services are provided on request to other agencies including international groups and non-governmental organizations. In cases of multiple fatalities, these services may include disaster victim identification or human rights death investigations.

In memory of Dr. Fernandes – April 2019

In April 2019, we lost a dear colleague and friend, Dr. John Fernandes, after a brief illness.

A graduate of McGill medical school, John began his career as an OBGYN in the 1980s. In 2002, he completed his Forensic Pathology training and began a new career in Hamilton eventually becoming the Director of the Hamilton Forensic Pathology Unit and an original member of the Ontario Forensic Pathology Service. His vision, commitment and dedication to Forensic Pathology was steadfast and unwavering. John was a founder of the Forensic Pathology discipline as designated by the Royal College of Physicians and Surgeons of Canada. He played an integral role in growing the profession as director of the residency training program at McMaster University.

In addition, John was a valued and respected staff member of both Hamilton Health Sciences and St. Joseph's Healthcare Hamilton where he was the Chief of the Hamilton Regional Laboratory Medicine Program. He was also Professor of Pathology and Molecular Medicine, Faculty of Health Sciences at McMaster University.

John was a well-respected member of the medicolegal system and always a valued member of the death investigation team. His presence, generosity and compassion are missed by everyone who worked with him.

Retirement of Jeff Arnold

In November 2019, Jeff Arnold retired after 33 years of service from the Ontario Public Service (OPS). Jeff was hired in 1986 as a part-time pathologist's assistant. Throughout his career, he held many other roles within the Office of the Chief Coroner and the Ontario Forensic Pathology Service, which included managing the operations and staff of the Provincial Forensic Pathology Unit to project managing the design and construction of the state-of-the-art Forensic Services and Coroners Complex (FSCC).

Over the years, Jeff has published articles on designing forensic facilities and the efficacy of integrating dental data into investigations of missing and unidentified persons. He received an Accolade Award for his contribution to the RESOLVE Initiative to create a database and public website for Missing Persons and Unidentified Bodies in Ontario; an Amethyst Award for his contribution to the Swissair Flight 111 Crash Investigation; an Ovation Award for his contribution to the Goudge Inquiry Working Group and special recognition by former Deputy Minister Deborah Newman for his work on the FSCC.

2019 Value for Money Audit by the Office of the Auditor General of Ontario and the 2020 OFPS Workplan

From January-September of 2019, an audit of the Office of the Chief Coroner and the Ontario Forensic Pathology Service (OCC/OFPS) was conducted by the Auditor General's (AG) office in keeping with its mandate to evaluate the effectiveness of the Ontario Public Service. The completed audit report was released in December 2019. The report provided recommendations to the OCC/OFPS to enhance their service.

In January 2020, a project management team was assembled to implement the pathology-related recommendations of the AG's report as well from a few other external reviews. In total, there are 35 recommendations to adopt into OFPS practice that address the following themes:

- Quality Assurance
- Pathologist Register
- Scene Attendance
- Body Management
- Transfer Payment and Invoicing
- Policy and Training

The Public Inquiry into the Safety and Security of Residents in the Long-Term Care (LTC) Homes System

In July 2019, The Honourable Justice Eileen E. Gillese, Commissioner of the Public Inquiry into the Safety and Security of Residents in the Long-Term Care Homes System, released her final Report and Recommendations from the inquiry into the nurse Elizabeth Wettlaufer serial-killing conviction. The Report recommended broad systemic improvements, including a few directed to strengthening Ontario's death investigation system.

Specifically, the Report recommended that the Office of the Chief Coroner (OCC) and the Ontario Forensic Pathology Service (OFPS) develop a standardized protocol for autopsies performed on the elderly and that forensic pathologists be trained on this protocol.

Dr. Rebekah Jacques, Forensic Pathologist, London Forensic Pathology Unit, has developed a professional interest in these issues and is leading this important work on behalf of the OFPS. Dr. Jacques has developed comprehensive guidelines for medicolegal autopsies of potential elder abuse and neglect cases.

Notable cases

May 2019	**Trout Lake First Nation fire – 1 adult and 4 children deceased:** Forensic Anthropologist flew to community to scientifically excavate, separate and remove the remains. Remains were flown to PFPU for autopsies and identification. Forensic Anthropologist spoke to council and family members who expressed their wishes. A forensic pathology fellow also attended scene.

August 2019	**Using CT imaging and innovative medical equipment:** Young man with chronic illnesses was found dead, possibly from natural death, trauma or choking. Family desired minimally invasive autopsy. Postmortem CT scan indicated presence of material in trachea. An endoscope was used to extract foreign object.
October 2019	Reinvestigations of Indigenous deaths in Thunder Bay: Together with the Chief Coroner, Chief of Thunder Bay Police Service, Grand Chief of Nishnawbe Aski Nation and The Honourable Stephen Goudge, the CFP is participating on the Governance Committee overseeing the multi-agency reinvestigations of the deaths of nine Indigenous people in Thunder Bay. The reinvestigations respond to the report of the Office of the Independent Police Review Director. Two OFPS forensic pathologists, Drs. Kona Williams and Linda Kocovski, are members of the Investigative Resource Committee.
November 2019	**Kingston Plane Crash – 7 decedents:** American-registered plane left Buttonville Municipal Airport in Markham, Ontario and was attempting to land in Kingston, Ontario. Seven decedents underwent autopsy at PFPU; all were identified. Required constant communication between Regional Supervising Coroner, families of victims, legal representation and Manager of Provincial Dispatch Unit.
January 2020	**UIA Flight PS752 – 176 decedents, mostly Canadian Citizens:** Commercial flight was shot down by Iranian Islamic Revolutionary Guards. Two families in Canada approached the OFPS to undertake autopsies and confirm identification. Each family received the remains of its deceased loved one.
February 2020	**Central African Republic:** At request of International Criminal Court, CFP participated with other experts in forensic investigation into discovery of bodies buried in a mass grave in Bangui.

2019-20 results

Register of pathologists

Under the Coroners Act, medicolegal autopsies may be performed only by pathologists who are appropriately credentialed and registered by the Ontario Forensic Pathology Service (OFPS). Based on their qualifications, registered pathologists may be approved by the Credentialing Subcommittee of the Forensic Pathology Advisory Committee (FPAC) to perform:

- all medicolegal autopsies including homicide, criminally suspicious and pediatric cases (Category A)
- routine cases only (Category B)
- non-suspicious pediatric cases only (Category C)

During the reporting period, 121 registered pathologists were active, including 40 Category A pathologists permitted to conduct all types of autopsies. These 40 pathologists are recognized as having additional experience, training and/or certification in forensic pathology.

The Credentialing Subcommittee of the Forensic Pathology Advisory Committee reviews applications and provides advice to the Chief Forensic Pathologist (CFP) regarding acceptance and renewal to the register.

Pathologists are registered for a five-year term after which their appointments are considered for renewal. The Quality Team assembles data for review by the Credentialing Subcommittee, including:

- case load, cumulative over five years and year-by-year

- turnaround time for postmortem examination reports
- peer review history
- complaints, incident reports and critical incidents, and remediation by the chief forensic pathologist and by the College of Physicians and Surgeons of Ontario (CPSO), where applicable

Performance management of registered pathologists related to the quality of medicolegal autopsies is the responsibility of the CFP. When there is professional misconduct or incompetence, the CFP is obligated by law to report the issue to the College of Physicians and Surgeons of Ontario.

The pathologist register process will be revamped in late 2021.

Chart 1: Register Composition by Pathologist Category, 2010-2020 (A/B/C)

- 2010-11: 24/142/5
- 2011-12 27/132/7
- 2012-13: 29/115/7
- 2013-14 31/99/7
- 2014-15: 31/97/7
- 2015-16: 34/66/6
- 2016-17: 39/65/7
- 2017-18: 40/66/7
- 2018-19: 41/70/9
- 2019-20: 40/73/8

The OFPS Register is available publicly through the ministry's website.

Supervision and direction of pathologists

To promote consistent and high-quality practices across Ontario and to assist registered pathologists in their work, the OFPS provides a practice manual and toolkit.

The practice manual includes the Code of Ethics, practice guidelines for medicolegal autopsies and explanations of the peer review system and Register. Together, these documents provide the professional and policy foundation for the OFPS.

The Code of Ethics was adapted from the Forensic Pathology Section of the Canadian Association of Pathologists.

Since a number of recommendations have come out of the Auditor General's Report and other Inquiries, the practice manual is expected to be updated by late 2021.

Pathology Information Management System (PIMS)

The OFPS uses the Pathology Information Management System (PIMS) to collect information about autopsies performed across Ontario. All registered pathologists contribute information to the system through the Postmortem Examination (PME) Record. This record, an electronic form used to capture high level data about autopsies, is completed and submitted to the OFPS directly after each autopsy. The record is reviewed daily by a senior forensic pathologist to ensure that autopsies are done according to guidelines. The collected information is also used to evaluate resources, as well as provide statistics about performance and quality. PIMS, in conjunction with the PME record, facilitates accountability and the oversight of autopsies by the CFP.

Caseload statistics

Caseload statistics are derived from Postmortem Examination Records submitted during the reporting period.

Each OFPS case begins with a coroner's request for an autopsy by warrant to a pathologist. All medicolegal autopsies, including homicide, criminally suspicious and pediatric cases, are performed in Forensic Pathology Units (FPUs) by appropriately qualified forensic pathologists. Routine cases are conducted at the FPUs and community hospitals. Some non-suspicious (medical type) pediatric cases are performed at pediatric sites. In 2019-20, approximately 84 percent of all autopsies were performed in FPUs and pediatric sites, and 16 percent in community hospitals. Chart 2 shows the distribution of autopsies captured in the system by FPUs and Community Hospitals from 2019-20.

Chart 2: Distribution of Autopsies by FPUs and Community Hospitals, 2019-20

- PFPU: 4169 (48.54%)
- Hamilton RFPU: 598 (6.98%)
- Community Hospitals: 1376 (16.06%)
- London RFPU: 640 (7.47%)
- Ottawa RFPU: 825 (9.63%)
- Sudbury RFPU: 485 (5.66%)
- Kingston RFPU: 358 (4.18%)
- Sault Area RFPU: 127 (1.48%)

Chart 3 shows the distribution of autopsies captured by the system for each year by FPUs and community hospitals.

Chart 3: Distribution of Autopsies by Year, 2010-20 (Total/FPUs/Community Hospitals)

- 2010-11: 5360/3534/1826
- 2011-12: 5568/3937/1631
- 2012-13: 5963/4417/1546
- 2013-14: 5728/4529/1199
- 2014-15: 6105/4990/1115
- 2015-16: 6419/5312/1107
- 2016-17: 7279/6206/1073
- 2017-18: 7797/6556/1241
- 2018-19: 8589/7345/1244
- 2019-20: 8568/7385/1183

Pediatric autopsies (for children 5 years of age or under) are often complex, requiring additional ancillary testing and/or consultation with other medical specialists. All pediatric autopsies of a criminally suspicious nature are performed in FPUs.

In 2019-20, there were a total of 186 pediatric cases completed across the province (Chart 4).

Chart 4: Pediatric Cases Involving Children under 5 Years by Locations, 2019-20

- PFPU: 81
- Community Hospitals: 38
- London FPU: 27
- Ottawa FPU: 26
- Sudbury FPU: 9

- Hamilton FPU: 4
- Sault Area FPU: 1

Chart 5 provides a breakdown of autopsies by case type for 2019-20. The category ‘sudden’ includes non-homicidal gunshot wounds, drug overdoses and other cases not specified in the captured categories.

Chart 5: Distribution of Autopsies by Case Type, 2019-20

- Sudden: 68.18%
- Hanging: 8.15%
- Collision: 6.90%
- Decomposed: 3.78%
- Homicide: 2.73%
- Water: 2.26%
- Fall: 2.16%
- External: 1.51%
- Other: 2.29%
- Suspicious: 1.10%
- Fire: 0.91%
- DND: 0.04%

In some cases, the decision is made to limit an autopsy to an external examination where sufficient information can be obtained from a limited examination. There were 765 such cases performed in PFPU in 2019-20.

Forensic pathologists at the PFPU rely on imaging technology (i.e. Computed Tomography (CT) Scans) to inform their decisions about targeted examinations. In 2019-20, 48.6 percent of cases were targeted examinations (Chart 6).

Chart 6: Distribution of Autopsies by Autopsy Type in PFPU, 2019-20

- Targeted: 51.3%
- Full: 30.3%
- External: 18.4%

Quality management

The OFPS has a robust quality assurance program comprised of the following:

- Pathologists’ Register
- Practice guidelines, including standardized reporting templates, forms and standard operating procedures
- Consultation in difficult or challenging cases
- Collection of standardized case information through the Postmortem Examination Record
- Peer review of all autopsy reports on homicide, criminally suspicious and Special Investigations Unit (SIU)The Special Investigations Unit civilian oversight agency responsible for investigating circumstances involving police that have resulted in a death, serious injury, or allegations of sexual assault of a civilian in Ontario. cases, and complex pediatric cases (deaths under five years of age) prior to report distribution
- Audit of autopsy reports on routine cases
- Peer review of courtroom testimony
- Detection and follow-up of significant quality issues and critical incidents
- Reporting of key performance indicators to clients and stakeholders
- Tracking of complaints to ensure timely resolution and corrective action

- Continuing medical education in forensic pathology to:
    - Maintain specialist competence as required by the Royal College of Physicians and Surgeons of Canada
    - Address performance concerns

Peer review of autopsy reports for homicide, criminally suspicious, pediatric and SIU cases

There were 342 autopsy reports peer reviewed in 2019-20. On average, about 10 reviews were completed by each reviewing forensic pathologist per year. The average turnaround time for peer review was 7.1 days in 2019-20. The OPFS standard for peer review is ten working days.

Peer review of courtroom testimony by forensic pathologists

Forensic pathologists who testify are required to submit one transcript of courtroom testimony each year for review by another forensic pathologist. Courtroom testimony is assessed for:

- accuracy and use of evidence to substantiate testimony
- professionalism and objectivity
- clear language
- presentation of limitations, uncertainties and alternate hypotheses

Twenty-one courtroom testimonies were reviewed in the reporting period.

Quality review of autopsy reports for routine cases

Autopsy reports for routine cases are reviewed for administrative and technical accuracy by directors of FPUs. Reports from community hospitals are reviewed by the CFP or designate.

The administrative review focuses on completeness and adherence to guidelines. All community hospital reports undergo administrative review and ten per cent of routine autopsy reports from FPUs undergo this type of review.

The technical review focuses on the content of the report to ensure that the approach, conclusions and opinions derived from the evidence are reasonable.

A technical review is done for all reports that fall into the following categories:

- cases with an undetermined cause of death
- non-traumatic and non-toxicologic deaths of individuals younger than 40 years old
- reports from pathologists performing fewer than 20 autopsies per year

Key performance indicators

Key Performance Indicators for autopsy reports such as submission compliance, completeness, turnaround time and validity are collected from the administrative and technical reviews and reported.

Table 1 shows the indicator, target outcome and overall performance for FPU and community hospital pathologists from 2019-20.

Table 1: Key Performance Indicators for Autopsy Reports, 2019-20
(Note: Turnaround time may be influenced by case complexity and availability of ancillary testing.)

Key Performance Indicators for Autopsy Reports	Target	Results
Submission Compliance (PMF Record)	100%	92.8% - Approaching compliance
Completeness	95%	98.5% - Good compliance
Consistency	95%	99.4% - Good compliance
Turnaround Time	90 days	Average = 104 days - Approaching compliance
Reports with Significant Issues (Forensic Pathology Units)	≤ 2%	0% = Good compliance
Reports with Significant Issues (Community Hospitals)	≤ 2%	0.6% (21 amended reports requested out of 1104 audits) - Good compliance
Critical Incidents	0	0 - Good compliance

Pathologists in community hospitals are expected to follow the best practices set out in the practice manual. Pathologists are provided feedback from routine quality reviews with the goal of improving report quality.

Note: Community hospitals may use their own institution's report templates if they include the required template fields.

Chart 7 illustrates consistency of the content and opinion of autopsy reports as assessed by the reviewing pathologist during the period, as shown by a technical review.

Chart 7: Consistency Measures as Shown by Technical Review, 2019-20

- Appropriate Ancillary Testing: FPUs 100.0%; Community Hospitals 100.0%
- COD Reasonable: FPUs 99.4%; Community Hospitals 96.9%
- Free of Language Errors: FPUs 99.4%; Community Hospitals 99.3%
- Independently Reviewable: FPUs 100.0%; Community Hospitals 100.0%
- Opinions are Reasonable: FPUs 99.4%; Community Hospitals 99.3%
- Satisfactory Descriptions: FPUs 100%; Community Hospitals 98.3%

Significant issues

Significant issues include substantial errors, omissions and other deficiencies.

A critical incident is a significant issue that contributes to a serious error in a death investigation. All critical incidents are analyzed to determine root cause and corrective action. There were no critical incidents for the reporting period.

If the reviewing forensic pathologist detects a significant issue during the technical review, feedback is provided to the case pathologist. For the given reporting period, there were no significant issues detected in routine case reports from FPUs or community hospitals.

The purpose of quality assurance is to improve the quality of autopsies and reports. When a significant issue is detected, the reviewing pathologist contacts the original pathologist directly to discuss and recommend changes to the report. Continual improvement of autopsy practice and report writing is supported with:

- continuing education events such as the annual education course for coroners and pathologists and special workshops on autopsy practice

- resources such as the practice manual for pathologists and toolkit, including synoptic reports, annotated autopsy report templates, and CFP's guidance with case examples.

Turnaround time

Timeliness of autopsy reports is a key performance indicator. Turnaround time is influenced by case complexity, return of ancillary test results, pathologist workload and staffing levels. The OFPS standard regarding turnaround time is:

- 90 percent of autopsy reports are to be completed within 90 days of the day of the postmortem examination
- cases involving homicides, pediatric deaths, deaths in custody and those in which the coroner has requested that the report be prioritized (due to requests from family or other parties) are to be expedited as a matter of routine
- no more than ten percent of cases should be greater than six months old without a justifiable reason for delay (e.g., delays caused by molecular autopsy for channelopathy)

Chart 8 depicts the turnaround time for community hospital pathologists and forensic pathologists in FPUs for the last ten years. The longer turnaround time for forensic pathologists may be explained by the more complex nature of the autopsies performed.

Chart 8: Average Turnaround Time, 2010-20

Average turnaround time by location and years:

- 2010-11: Community Hospitals 85; FPUs 165
- 2011-12: Community Hospitals 55; FPUs 91
- 2012-13: Community Hospitals 66; FPUs 121
- 2013-14: Community Hospitals 75; FPUs 121
- 2014-15: Community Hospitals 67; FPUs 99
- 2015-16: Community Hospitals 72; FPUs 101
- 2016-17: Community Hospitals 75; FPUs 115
- 2017-18: Community Hospitals 100; FPUs 112
- 2018-19: Community Hospitals 117; FPUs 100
- 2019-20: Community Hospitals 82; FPUs 107

Clinical forensic medicine

At present, qualified expert opinions and testimony by forensic specialists are usually available only in cases of violent death. However, cases of serious assault with a surviving victim can often benefit from the review and interpretation of injuries by a forensic expert, and the expert’s opinion can be useful to the criminal justice system. Forensic pathologists consult by reviewing medical records and digital photographs.

Forensic anthropology

Forensic anthropologists are experts in the study of skeletal remains in the medicolegal context. Forensic anthropologists make an important contribution to death investigations where the remains are skeletonized, burned, decomposed, mutilated or otherwise unrecognizable. Forensic anthropologists act as part of the death investigation team. They are the experts at determining whether found bones are human or non-human by examining digital photographs or the remains themselves. They help to plan for multiple fatality events and

manage identification when they occur. They are also the experts who determine whether found remains are of recent forensic interest or are archaeological or historical in nature.

One full-time forensic anthropologist works in the OFPS along with several fee-for-service consultants. During the reporting period, there were 439 anthropology cases managed at PFPU.

Other professional consultants

The OFPS relies on the expert contributions of other professionals, including cardiovascular pathologists, neuropathologists, forensic odontologists, radiologists and a forensic entomologist.

At the PFPU, there were 238 consultation cases completed. These included neuropathology, cardiac and dental consultations.

Histology

Histology is the preparation of microscope slides from tissues obtained at autopsies for examination by a pathologist. The number of slides prepared for each case varies with the type of case and the pathologist's preference.

Histology services are provided by laboratories at community hospitals and FPUs located in hospitals. At the PFPU, two full-time Histotechnologists are employed to process about 4000 tissue specimens each month in 2019-20.

Toxicology

Toxicological analysis of postmortem samples is performed by scientists at the Centre of Forensic Sciences (CFS). In many cases, pathologists rely on the results and interpretive notes provided by toxicologists in coming to an opinion about the cause of death.

During the reporting period, toxicological analysis was requested in 5,179 death investigations. The average time to issue a toxicology report by the CFS was 38.8 days. In cases where toxicology was required, 84.5 percent of the autopsy reports were issued within 90 days of receiving the toxicology reports.

"Quick Tox" pilot program

In March 2020, the CFS introduced a new type of toxicology testing available to Forensic Pathologists called Quick Tox. Quick Tox provides quick analytical results for select non-criminal cases. The preliminary results of this new program revealed that the average turnaround time for toxicology results was 12 days, with a range extending from eight to 21 days. The program allows routine cases to be signed out by the Forensic Pathologists in an expedited fashion as they no longer need to wait the average 38 days for their report.

Opioid-related deaths in Ontario

During the reporting period the number and percentage of opioid-related death investigations has increased. The OFPS links its data on drug-related autopsies with the OCC Opioid Investigative Aid database to provide an accurate indicator of confirmed cases of opioid-related deaths in the province. This data is also valuable to public health officials in their work on the crisis.

Molecular autopsy/cardiovascular pathology

Many natural disease processes are now recognized to have a genetic underpinning. For a number of these conditions, characterization of the genetic mutations involved is becoming the standard of care in hospitals for living patients and is part of the movement towards targeted therapy and personalized medicine. The first significant manifestation of such a disease may be sudden and unexpected death, which may be first recognized and diagnosed following the autopsy. Thus, particularly for young people, the identification of a genetic contribution to sudden death can have huge implications for the surviving family members as well as the health care system.

A large proportion of cases where genetic disease may have contributed to death involve the heart and blood vessels. The OFPS provides high quality cardiovascular pathology services to investigate sudden cardiac and vascular deaths in Ontario and occasionally by request from across Canada. In cases that may have an underlying genetic predisposition, DNA banking and genetic testing will also be performed (the molecular autopsy). With the results of the postmortem examination and clinical investigation, DNA analysis can help define the underlying disease that caused death, facilitate screening in surviving family members and sometimes contribute prognostic information for affected relatives.

High quality pathological diagnoses are essential. Through the OCC, we communicate with families to give them information about a potential genetic condition and their options for care in subspecialty hospital clinics. Next of Kin Clinics have also set up between the PFPU and the OCC to improve communication with family members. Families meet with coroners, forensic pathologists and the Family Liaison Coordinator at the FSCC in person, via video or through teleconferencing, to review the findings of a death investigation.

It is also being increasingly accepted that unrecognized genetic disease may play a role in deaths following interactions with correctional officers or police, or in the course of a criminal act. In these circumstances, a molecular autopsy can help provide answers in these challenging death investigations and contribute to coroner's inquests and the criminal justice system.

Child injury interpretation committee

In 2017, the OFPS formed a committee to provide enhanced peer review of criminally suspicious pediatric deaths. Membership includes forensic pathologists from across Ontario, particularly those with special interest in pediatric deaths, as well as pediatricians from the SickKids SCAN (Suspected Child Abuse and Neglect) team, neuropathologists, cardiovascular pathologists, and forensic pathologists from other provinces. The peer review takes place before the autopsy report is released to provide a broad spectrum of specialist opinions for each case to ensure the quality of these challenging death investigations.

During the reporting period, 11 cases were peer reviewed by this committee.

Forensic imaging

Forensic Pathologists at the PFPU incorporate advanced postmortem imaging (CT and MRI) findings into their case management decisions. Incorporation of these non-invasive techniques into forensic pathology practice has resulted in increased numbers of external and targeted examinations leading to efficiencies and benefits to families.

Senior residents from the University of Toronto's Diagnostic Radiology Residency Program spend one month at the PFPU where they are integrated into daily service work. As a rotation preparing them for practice, radiology residents learn about lethal injury and disease as well as changes in the body after death. They report

postmortem CT and MRI scans and are able to see pathologic lesions in the autopsy room in a way that is not possible in the clinical setting.

Tissue recovery for donation

The OFPS and OCC are committed to facilitating and increasing the availability of tissue for transplantation through the Trillium Gift of Life Network (TGLN). The Forensic Services and Coroner's Complex (FSCC) houses a dedicated Tissue Recovery Suite that is used exclusively for obtaining donor tissues, including corneas, heart valves, skin and bones. After consent by the family, tissues are recovered by trained staff from TGLN as well as the OCC and OFPS.

In 2019-2020, significant renovations were undertaken to upgrade the FSCC Tissue Surgical Suite to a state-of-the-art facility. The renovations served to reduce potential contamination rates of donors; improve ergonomics of the process; and improve case flow by decreasing case time. Changes were also made to the donor transport contract, allowing TGLN to transport more donors to the FSCC for multi-tissue recoveries, thus lessening reliance on hospitals. This reduced the time to complete multi-tissue recoveries by 10%, thus increasing the overall capacity.

TGLN performed 69 tissue recoveries using the FSCC Tissue Surgical Suite during the reporting period, including bones, skin and heart valves. The number of recoveries was temporarily impacted by the renovations.

Continuing education events

Annual education course for coroners and pathologists

This two-and-a-half-day course is offered jointly by the Office of the Chief Coroner (OCC) and Ontario Forensic Pathology Service (OFPS) each autumn. This meeting qualifies as continuing education for the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

The 2019 course was held from November 20 – 22 and was attended by 24 registered pathologists.

The topics covered included:

- modernization of the death investigation system using radiological imaging and photography
- court testimony and presenting medical evidence
- vulnerabilities in the older population
- cultural anthropology and socio-demographics

Department of Laboratory Medicine and Pathobiology, University of Toronto

The Department of Laboratory Medicine and Pathobiology (LMP) at the University of Toronto has a goal to advance teaching and research in forensic medicine. Many of the forensic pathologists working in the Ontario Forensic Pathology Service are faculty for the university's continuing educational programs.

LMP hosts continuing education events that bring national and international experts to University of Toronto to discuss topics in forensics. The courses are attended by academics, those working in forensic disciplines, other medical and legal professionals, and law enforcement practitioners. Since the last annual report, no courses were offered.

Dr. Frederick Jaffe Memorial Lectureship

A special lecture series was created in memory of Dr. Frederick Jaffe, one of the first forensic pathologists in Canada. Dr. Jaffe authored a textbook, *Guide to Pathological Evidence*, which was used for many years by attorneys and judges. He was also the first director of a province-wide forensic medical service.

The lecture in October 2019 was given by the Consultant Pathologist, Dr. Sylvester Onzivua, from the Mulago National Referral Hospital in Kampala, where he described the opportunities and challenges of identification in Uganda.

Training Canadian forensic pathologists

The Provincial Forensic Pathology Unit (PFPU), in partnership with the Forensic Pathology Residency Training Program at University of Toronto and with funding support from the Ministry of Health and Long-Term Care, has the first training program in Canada leading to certification in forensic pathology by the Royal College of Physicians and Surgeons of Canada (RCPSC). Since 2008, 19 pathologists have completed training, 16 of whom are now working within the Ontario Forensic Pathology Service. The PFPU has improved the RCPSC-accredited residency program and has implemented Competency by Design (CBD).

In 2019, two new residents began training in forensic pathology in the University of Toronto program:

Dr. John Alex MacNeil completed a Master of Applied Science degree in Forensic Anthropology at Saint Mary's University before receiving his Doctor of Medicine from Dalhousie University in 2014. He completed his residency in Anatomical Pathology at Dalhousie University and passed the RCPSC examination in Anatomical Pathology in 2019.

Dr. Linnea Duke received a Master of Criminology and MSc in Statistics from Simon Fraser University before receiving her Doctor of Medicine at University of Calgary. She completed her residency in Anatomical Pathology at McGill University and passed the RCPSC examination in Anatomical Pathology in 2019.

Clinical fellows in forensic medicine

The Provincial Forensic Pathology Service and the University of Toronto are committed to developing global forensic medicine and have outreach activities and training collaborations with Jamaica, the Middle East, Sri Lanka, Chile and Zambia. Since 2007, 14 international fellows have trained in forensic pathology at the PFPU. Since 2016, clinical fellows are eligible to write the Royal College of Physician and Surgeons of Canada examination in Forensic Pathology, through the Subspecialty Examination Affiliate Program.

In 2019, one clinical fellow from South Africa trained at the PFPU:

Dr. Candice Hansmeyer received her Bachelor of Medicine and Surgery and Master in Medicine at the University of the Witwatersrand, South Africa, and her Diploma in Forensic Pathology in South Africa. She is currently working as a Specialist Forensic Pathologist in Johannesburg. Dr. Hansmeyer started her training at the PFPU in September 2019.

In 2019, one research fellow from India trained at the PFPU:

Dr. Jatin Bodwal received his Bachelor of Medicine and Bachelor of Surgery as well as his MD in Forensic Medicine from the Maulana Azad Medical College, University of Delhi in New Delhi, India. Dr. Bodwal is currently working as Assistant Professor and a Specialist in forensic medicine in New Delhi.

Some trainees benefit from the **G. Raymond Chang Forensic Pathology Fellowship** through the University of Toronto's Department of Laboratory Medicine and Pathobiology. This is the first fund in the world that enables

young physicians from the developing world to train and ultimately strengthen forensic capacity in their own countries. This fellowship provides financial support to trainees whose countries may not be able to fund a year of training in Canada, particularly those from the West Indies.

In keeping with the Chang Foundation's philanthropic vision, the partnership was enhanced in 2017 through the addition of a Catalyst Fund to broaden the strategy to focus on critical infrastructure development in Jamaica, training of West Indian non-physician learners, and extension to other global areas in need.

In 2019, one international Chang Foundation fellows trained at the PFPU:

Dr. Heather Emmanuel received her Bachelor of Medicine, Bachelor of Surgery (MBBS) from the University of Guyana in 2008 and completed a residency in Anatomical Pathology at the University of the West Indies Mona, Jamaica in 2015. She currently serves as the Deputy Laboratory Director and Head of Histology and Cytology at the Ezra Long Laboratory in Saint Lucia.

The Raymond Chang Foundation

The Raymond Chang Foundation is named after the late Toronto-based businessman and philanthropist who had a passion for adult education and was dedicated to improving opportunities where it was most needed. Born in Jamaica, Mr. Chang was a proud and active member of the Caribbean-Canadian community. He was appointed to the Order of Jamaica in 2011 and as an officer of the Order of Canada in 2014.

Raymond Chang understood the relevance of forensic pathology as a truth-seeking tool for justice. The fellowship is a legacy that lives on through the dedication of his children, Andrew Chang and Brigette Chang-Addorisio. Their generosity and shared vision have ensured a sustainable fellowship training program at the University of Toronto.

Recruitment of forensic pathologists

The capacity of the Ontario Forensic Pathology Service (OFPS) has been enhanced through the recent addition of talented new recruits:

Tyler Hickey MD PhD FRCPC (AP & FP) received his BSc. H degree from the University of Guelph, his PhD from the University of British Columbia (UBC) and then completed his MD and Anatomical Pathology Residency at UBC. In 2019, Dr. Hickey successfully completed the RCPSC-accredited Forensic Pathology training program administered through the Provincial Forensic Pathology Unit (PFPU) and the University of Toronto and joined the PFPU in July 2019.

Jennifer M. Dmetrichuk MBChB PhD FRCPC (GP) received her Bachelor of Medicine and Bachelor of Surgery from the University of Aberdeen, Scotland, and her PhD in Biological Sciences (Neurobiology and Physiology) at Brock University. She has been a General Pathology resident at McMaster University's Department of Pathology and Molecular Medicine. She completed her residency training in forensic pathology at McMaster University and Hamilton Forensic Pathology Unit. She joined the PFPU in July 2019.

Carolyne Lemieux MBBS MSc FRCPC D-ABP received her Doctor of Medicine from the University of Limerick (Ireland) in 2019. She completed her residency in Anatomical Pathology at McMaster University and passed the RCPSC and American Board of Pathology examination in Anatomical Pathology in 2018. She completed her fellowship in Forensic Pathology at the Travis County Medical Examiner's Office in Austin, Texas. She joined the PFPU in July 2019.

Linda Kocovski MBBS FRCPC received her Doctor of Medicine from the University of Sydney in 2010. She completed her residency training in General Pathology at McMaster University in 2016 followed by a fellowship

in Forensic Pathology at the Hamilton Forensic Pathology Unit. Linda has been working as a staff forensic pathologist at the Hamilton FPU since July 2017. She holds the title of Assistant Professor and is the program director for Forensic Pathology at McMaster University. She joined the PFPU in January 2020.

Forensic Pathology Units

Sault Ste. Marie Forensic Pathology Unit

The Sault Ste. Marie Forensic Pathology Unit is led by Medical Director, Dr. Michael D'Agostino. Approximately 130 autopsies were performed during the reporting period.

The unit teaches students from medical schools around the province, pathologist assistant students from Western University on an elective rotation, as well as police and staff from the Centre of Forensic Sciences.

The unit has offered stable regional forensic service with two pathologists, two pathologists' assistants and administrative staff to support their work.

Eastern Ontario Regional Forensic Pathology Unit (Ottawa)

When the Ontario Forensic Pathology Service was established in 2009 the Eastern Ontario Regional Forensic Pathology Unit had two full time forensic pathologists (Doctors Milroy and Parai). It is now staffed by four full time forensic pathologists: Dr. Milroy, the Medical Director, and Doctors Kepron, Parai and Walker. In addition, Dr. Hamilton works in both the unit and also in pediatric and adult neuropathology as she is qualified in neuropathology as well as forensic pathology. The workload has increased from under 600 cases annually to more than 820 medicolegal autopsies per year. As well as covering Eastern Ontario, the unit also provides medicolegal autopsy services for the eastern half of Nunavut.

As well as providing an autopsy service, all the pathologists hold academic positions at the University of Ottawa and teach undergraduate medical students as well as residents within the Anatomical Pathology residency training program. In addition, teaching is provided for the Canadian Police College, the Faculty of Law at the University of Ottawa, the Office of the Chief Coroner for Nunavut and the Office of the Chief Coroner for Ontario at the annual training course for new coroners. Dr. Parai chairs the Canadian Association of Pathologists forensic pathology section and, along with Dr. Milroy, has organized the forensic pathology seminars at the annual meeting. Dr. Walker provides teaching at the University of West Indies and all members of the unit have been active at the American Academy of Forensic Sciences and the National Association of Medical Examiners. In June of 2019, Drs. Walker and Kepron (together with two American colleagues) organized the very successful University of Ottawa 4th Annual Conference in Forensic and Pediatric Pathology that was held in Atlanta, Georgia.

Drs. Parai, Milroy and Kepron serve on the Forensic Pathology specialty committee of the Royal College of Physicians of Canada with Dr. Parai serving as chair and Dr. Kepron as chair-elect. Dr. Milroy serves as chair of the Royal College panel of examiners in forensic pathology with Drs. Parai and Kepron also being examiners. Dr. Hamilton also acts as an examiner in neuropathology.

All members of the unit have been active in publishing academic papers and book chapters as well as acting as referees for multiple journals over the last decade. Dr. Milroy currently edits the Academic Forensic Pathology journal.

Kingston Forensic Pathology Unit

The Kingston Regional Forensic Pathology Unit is based at Kingston General Hospital in the Department of Pathology and Molecular Medicine and is affiliated with Queen's University. Dr. Tanguay is a forensic pathologist and has been the Medical Director since 2018. During this reporting period there were 16 Category B pathologists also performing autopsies. The unit performed approximately 350 medicolegal autopsies and participated in the education of anatomical pathology residents and medical students. In addition, the unit welcomed an elective resident from Alberta for a month-long experience in Forensic Pathology. Dr. Tanguay is a member of the Royal College of Physicians and Surgeons of Canada Examiners Committee in Forensic Pathology.

London Forensic Pathology Unit

Over the years, the unit has been very successful in establishing and expanding its provision of high-quality forensic death investigation service to the Southwest Region of the province. Caseload demands continue to grow, as is the caseload throughout the province, partly attributable to the steady and persistent increase in opioid-related deaths. The unit performed over 640 medicolegal autopsies in 2019-20.

Over this reporting period, the London unit remained staffed by four forensic pathologists (E. Tweedie, R. Jacques, E. Tugaleva, M. Shkrum), with Dr. D. Ramsay providing forensic pathology assistance. Four “category B” pathologists also conduct some autopsies at the unit. A wide variety and steady increase of interesting cases are referred from throughout the Southwest Region. Teaching continues to be a priority, including the Western Pathologists’ Assistant Master’s program run by Dr. Tugaleva, pathology resident training, undergraduate courses taught by Dr. Jacques, and multiple teaching outreach activities.

Northeastern Regional Forensic Pathology Unit (Sudbury)

The Northeastern Regional Forensic Pathology Unit (NERFPU) of Health Sciences North in Sudbury is affiliated with Laurentian University and the Northern Ontario School of Medicine (NOSM) and performs about 470 medicolegal autopsies each year for Sudbury and the greater North Bay region. The Medical Director of the unit is Dr. Martin Queen.

In 2018, Dr. Kona Williams joined the regional unit as a Forensic Pathologist and Laboratory Medical Director. As such, there are two full time forensic pathologists and three Pathologist’s Assistants who manage the cases.

In addition, the Unit teaches NOSM medical students and each student is required to observe an autopsy as part of their graduation requirement.

Closure of Hamilton Forensic Pathology Unit

In July 2019, the Chief Forensic Pathologist and Chief Coroner for Ontario announced the stepwise decommissioning of the Hamilton Forensic Pathology Unit.

The operational decision to close the Hamilton Unit was made in 2018. Communities previously served by the Hamilton Unit continue to receive high-quality and timely medicolegal autopsies at the Provincial Forensic Pathology Unit (PFPU) in Toronto. These communities include the regions of Niagara, Halton and Waterloo, as well as the counties of Brant, Dufferin, Wellington and Haldimand-Norfolk.

This concentration of autopsy services ensures the optimal use of the state-of-the-art facility in Toronto where the Centre of Forensic Sciences, the Office of the Fire Marshal and Emergency Services Ontario are also located.

The decision to transfer operations shows how efficiencies can be achieved without compromising public safety. The OFPS is grateful for the service that the Hamilton Unit provided for so many years. Many of the

Unit's former trainees, staff and Forensic Pathologists are now working at the PFPU.

International assistance and capacity development

Ontario has a proud history of providing leadership and support to international Disaster Victim Identification missions. These humanitarian missions are assembled following natural or human-caused disasters where help is needed to identify victims. The Ontario Forensic Pathology Service has participated internationally with Interpol, the International Committee of the Red Cross (ICRC), the Federal Bureau of Investigation and other experts from the forensic community.

Some nations do not have a robust system of forensic medicine to support human rights and justice. Dr. Pollanen has worked to build forensic medicine capacity and support human rights investigations in geographic areas such as the Middle East, South Asia, Africa and the Caribbean. Some of this work has involved United Nations agencies and the International Criminal Court, as well as the ICRC.

In 2019-20, the Provincial Forensic Pathology Unit (PFPU) hosted a number of domestic and international guests and observers:

- Dr. Abdulhameed Abdulhamed, Egypt
- Dr. Paola Bonasoni, Italy
- Dr. Elsie Helena Burger, Australia
- Dr. Mariana Florancia L. Lambrisca, Argentina
- Dr. La Fleece Williams, St. Vincent
- Dr. Fabio Antonio Tironi, Brazil

The PFPU has a Memorandum of Understanding with the Institute for Forensic Science and Legal Medicine (IFSLM), Ministry of National Security, Jamaica to support professional development in forensics. Professional and technical staff of the PFPU have visited Jamaica to instruct forensic pathologists, pathologist assistants, administrators and others from IFSLM to promote best practices in forensic medicine. In 2018, with support from the Chang Foundation, two groups of pathologist assistants and a forensic pathologist travelled to Jamaica to teach morgue assistants the steps in a medicolegal autopsy. The groups were provided with lectures and hands-on learning experiences.

In 2019-20, Dr. Pollanen travelled to Uganda to continue ground-breaking research into the pathology and pathophysiology of Nodding Syndrome, a little-understood, endemic neurologic disorder of young people in East Africa. This is a multi-layered research program that is also aimed at developing capacity in research, pathology, and forensic pathology in Uganda.

At the request of the International Criminal Court, he participated in a multidisciplinary and multinational forensic mission to Bangui, Central African Republic. While there, he also met with operational and academic leaders to assess the need for future forensic medicine capacity development.

Professional activities and outreach

Registered pathologists and forensic consultants enrich the practice of forensic science and medicine by participating in provincial, national and international professional organizations such as the Ontario Association of Pathologists, Canadian Association of Pathologists, National Association of Medical Examiners, Canadian Society of Forensic Sciences, American Academy of Forensic Sciences, the IAFS and other organizations.

The Ontario Forensic Pathology Service (OFPS) forensic pathologists participate in activities of the Royal College of Physicians and Surgeons of Canada that focus on the promotion and accreditation of forensic pathology and

anatomical pathology in Canada.

OFPS pathologists lectured and delivered courses to audiences that included forensic pathologists and scientists, medical practitioners, the judiciary, lawyers, police, advocacy groups and others.

OFPS pathologists serve as members of editorial boards of international peer-reviewed forensic journals, and act as reviewers for other specialist journals.

In November 2019, Dr. Pollanen participated in the 1st International Conference on Humanitarian Forensic Action in Coimbra, Portugal. He presented on the OFPS' activities in Jamaica and his international missions to Iraq.

Scholarly activities

Teaching

Most forensic pathologists and forensic consultants hold academic appointments at their respective universities. They teach undergraduate and graduate forensic science students, medical students, pathologist assistant and physician assistant students, dentists, nurses, medical artists, law students, medical imaging residents, and pathology and forensic pathology residents. Forensic pathology units also host many medical students and pathology residents from Canadian universities and elsewhere.

The Provincial Forensic Pathology Unit (PFPU) participates in the University of Toronto's Department of Laboratory Medicine and Pathobiology's digital library by providing digital histological images of forensic interest for the educational purposes of pathology residents.

Forensic pathologists also act as visiting faculty to foreign universities.

The PFPU partners with the "LAWS" initiative of the Toronto District School Board, the University of Toronto Faculty of Law and Osgoode Hall Law School to offer an educational program for Grade 11 students to understand forensic pathology, its intersection with the law, and the different career options available in the field. Case-based sessions, for more than 100 students each, are offered at the Forensic Services and Coroner's Complex. The students are exposed to a wide range of forensic specialties involved in a case. The program was not offered during the reporting period due to the pandemic.

Research

Forensic pathologists contribute to and support research aimed at understanding causes of sudden death, Nodding's syndrome and improving public safety.

Academic Activity

Collins, K., & Jaques, R. (2020). Physical Abuse and Elder Homicide. In K. Collins & R. Byard (Eds.), Geriatric Forensic Medicine and Pathology (pp. 130-153). Cambridge: Cambridge University Press. doi:10.1017/9781316823040.009

Shkrum, Michael J., and David A. Ramsay. "Forensic Pathology Aspects of Sudden Unexpected Death in Infancy and Childhood." In Investigation of Sudden Infant Death Syndrome, edited by Marta C. Cohen, Irene B. Scheimberg, J. Bruce Beckwith, and Fern R. Hauck, 235-65. Diagnostic Pediatric Pathology. Cambridge: Cambridge University Press, 2019. doi:10.1017/9781108186001.036.

Schroeder, Peyton. The Effects of Child Restraint System Use and Motor Vehicle Collision Severity on Injury Patterns and Severity in Children 8 Years Old and Younger. MSc diss. Western University. 2018.

Journal Publications

Herath JC, Liu O. Sudden Natural Deaths in Ontario, Canada: A Retrospective Autopsy Analysis (2012–2016). J Forensic Sci Med 2020;6:18-26

Halari MM, Shkrum MJ. The Significance of a Knee Injury in the Investigation of an Unsuspected Motor Vehicle-Pedestrian Collision. Am J Forensic Med Pathol. 2020 Mar;41(1):52-55. doi: 10.1097/PAF.0000000000000518.

Hickey TBM, Dmetrichuk J, Morin J, Orde M. Deaths Associated With Community Donation Bins: A Ten-Year Retrospective Review Describing Five Cases in British Columbia and Ontario. Acad Forensic Pathol. 2020 Mar;10(1):47-55. doi: 10.1177/1925362120944738. Epub 2020 Sep 14.

Herath CJ and Park S. Healing myocarditis from a hypertrophied heart with multifocal fibrosis mimicking cardiomyopathy. Clinical Cardiol Cardiovascular Med. 2019; 3(1): 14-16. doi.org/10.33805/2639.6807.119

Bradley LM, Addas JAK, Herath JC. Maternal and fetal death at 22 weeks following uterine rupture at the site of the placenta percreta in a C-section scar. Forensic Sci Med Pathol. 2019 Dec;15(4):658-662. doi: 10.1007/s12024-019-00130-5. Epub 2019 Jun 21.

Dmetrichuk JM, Chiasson DA, Lu JQ. Neuronal inclusions and α-Synucleinopathy in a patient with 5p deletion syndrome. J Neurol Sci. 2019 Aug 15;403:56-58. doi: 10.1016/j.jns.2019.05.036. Epub 2019 Jun 3.

Decker SJ, Braileanu M, Dey C, Lenchik L, Pickup M, Powell J, Tucker M, Probyn L. Forensic Radiology: A Primer. Acad Radiol. 2019 Jun;26(6):820-830. doi: 10.1016/j.acra.2019.03.006. Epub 2019 Apr 17.

Khara M, Herath JC. Suicide Decapitation by a Detonating Cord: A Case Report. Am J Forensic Med Pathol. 2019 Jun;40(2):140-143. doi: 10.1097/PAF.0000000000000446.

Hickey TB, Honig A, Ostry AJ, Chew JB, Caldwell J, Seidman MA, Masoudi H, Maguire JA. Iatrogenic embolization following cardiac intervention: postmortem analysis of 110 cases. Cardiovasc Pathol. 2019 May-Jun;40:12-18. doi: 10.1016/j.carpath.2019.01.003. Epub 2019 Jan 19. PMID: 30769235.

Cecchini MJ, Shkrum MJ. A Self-Inflicted Gunshot Wound With an Unusual Hand Injury. Am J Forensic Med Pathol. 2019 Mar;40(1):47-48. doi: 10.1097/PAF.0000000000000427.

Smyk DS, Herath JC. Delayed rupture of a vertebral artery laceration: a case report and challenges for the forensic pathologist. Forensic Sci Med Pathol. 2018 Dec;14(4):536-540. doi: 10.1007/s12024-018-9999-1. Epub 2018 Jun 20.

Ball CG, Herath JC. Earth, Air, Water, and Fire: Histopathology of Environmental Death. Acad Forensic Pathol. 2018 Sep;8(3):641-652. doi: 10.1177/1925362118797739. Epub 2018 Aug 31.

Shi T, Shkrum MJ. A Case Report of Sudden Death From Intracardiac Leiomyomatosis. Am J Forensic Med Pathol. 2018 Jun;39(2):119-122. doi: 10.1097/PAF.0000000000000377.

von Both I, Bruni SG, Herath JC. Differentiation of antemortem pulmonary thromboembolism and postmortem clot with unenhanced MRI: a case report. Forensic Sci Med Pathol. 2018 Mar;14(1):95-101. doi: 10.1007/s12024-017-9940-z. Epub 2018 Jan 4.

Herath JC, Wali MA. Sudden death of an infant due to complex congenital cardiac abnormality including an interrupted aortic arch, abnormal pulmonary artery and a peri-membranous ventricular septal defect. J Clin Path Lab Med. 2017;1(2):6-8.

Yang E, Jacques RD, Herath J. 5-Year Retrospective Review of Diltiazem Associated Deaths. Research Article. J Hosp Clinical Pharm (RRJHCP). 2017 Dec; 3(3).

Rizvi SS, Herath JC. Non-natural Deaths of Children under the Age of 5 Years in Ontario, Canada: A Retrospective Autopsy Analysis of 10 Years (2006-2015). J Forensic Sci Med. 2017 Oct-Dec; 3(4): 197-202. doi: 10.4103/jfsm.jfsm_64_17

Herath JC, Pollanen MS. Clinical Examination and Reporting of a Victim of Torture. Acad Forensic Pathol. 2017 Sep;7(3):330-339. doi: 10.23907/2017.030. Epub 2017 Sep 1.

Peerani R, Berggren M, Herath JC. Sudden Death of a Young Man by Acute Hemorrhagic Leukoencephalitis. Acad Forensic Pathol. 2017 Sep;7(3):487-493. doi: 10.23907/2017.041. Epub 2017 Sep 1.

Bellis M, Herath J, Pollanen MS. Sudden Death Due to Acute Epiglottitis in Adults: A Retrospective Review of 11 Postmortem Cases. Am J Forensic Med Pathol. 2016 Dec;37(4):275-278. doi: 10.1097/PAF.0000000000000268.

Williams AS, Little DL, Herath J. Sudden unexpected death as a result of primary aortoduodenal fistula identified with postmortem computed tomography. Forensic Sci Med Pathol. 2015 Dec;11(4):596-600. doi: 10.1007/s12024-015-9719-z. Epub 2015 Oct 13.

Krizova A, Herath JC. Death of a Neonate With a Negative Autopsy and Ketoacidosis: A Case Report of Propionic Acidemia. Am J Forensic Med Pathol. 2015 Sep;36(3):193-5. doi: 10.1097/PAF.0000000000000156.

Herath JC, Kalikias S, Phillips SM, Del Bigio MR. Traumatic and other non-natural childhood deaths in Manitoba, Canada: a retrospective autopsy analysis (1989-2010). Can J Public Health. 2014 Apr 9;105(2):e103-8. doi: 10.17269/cjph.105.4156.

Pahlavan P, Herath J, Two rare cases of fatal intoxication from Metformin and literature review. Am J Clin Pathol 2012 Nov 1;138:A126. doi.org/10.1093/ajcp/138.suppl2.8

Hunt JC, Schneider C, Menticoglou S, Herath J, Del Bigio MR. Antenatal and postnatal diagnosis of coxsackie b4 infection: case series. AJP Rep. 2012 Nov;2(1):1-6. doi: 10.1055/s-0031-1296027. Epub 2011 Nov 25.

Committees

Forensic Pathology Advisory Committee

The Forensic Pathology Advisory Committee (FPAC) provides advice to the Chief Forensic Pathologist regarding professional medicolegal autopsy practices. This committee includes the directors of the Forensic Pathology Units and the President (or delegate) of the Ontario Association of Pathologists.

During the reporting period, the committee convened twice to discuss policy issues, including guidelines for autopsy requests on deaths in hospitals and the Ontario Forensic Pathology Service (OFPS) response to a number of external reviews including the 2019 Provincial Auditor General's report.

Forensic Services Advisory Committee

The Forensic Services Advisory Committee was created to strengthen the objectivity of the OFPS and to improve communication with key external stakeholders such as police, crown attorneys and defense counsel who are represented on the committee. The committee meets as required to provide advice to the Chief Forensic Pathologist on topics that advance the quality and independence of medicolegal autopsies.

The committee did not meet during the reporting period.