

# Frontline Workers in the Backrooms of COVID-19

## Caring for the Living and the Dead

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### ABSTRACT

**Objectives:** To review the response to the coronavirus disease 2019 (COVID-19) pandemic in a forensics center that integrates an academic department of pathology with multiple regional county medical examiners' offices.

**Methods:** Faculty and staff were asked to volunteer stories, data, and photographs describing their activities from March through May 2020. The information was assembled into a narrative summary.

**Results:** Increased deaths challenged capacity limits in a hospital morgue and a large urban medical examiner's office (MEO) successfully managed by forensic teams and monitored by an institutional command center. Autopsies of suspected and proven cases of COVID-19 were performed in both facilities. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing of decedents was performed in a MEO serving a large urban area. Scene investigators worked directly with families to meet needs unique to a pandemic. Artful photographs of decedent's hands and/or tattoos were offered to those unable to have in-person viewings. Pathologists and social workers were available to families of the deceased and created novel solutions to facilitate the grieving process.

**Conclusions:** Forensic pathology is important to successfully navigating emerging diseases like the COVID-19 pandemic. Direct conversations with families are common in forensic pathology and serve as a model for patient- and family-centered care.

### Key Points

- Investment in a cross-functional, interdisciplinary forensics center that combines an academic medical center and regional medical examiners' office is important for navigating a pandemic.
- Forensic pathology is an essential public health service for recognizing emerging diseases, defining novel diseases, and providing objective data to inform responses to current and future pandemics.
- Through interdisciplinary support of families, including direct communications with pathologists and laboratory scientists, forensic pathology is a model for patient- and family-centered care.

In the midst of a pandemic unprecedented in modern times, the story of forensic pathology—its pivotal role in our collective response, including direct interactions with the families of those who perished—has rarely been told. When we think of forensic pathology, we often think of crime shows and pathologists determining the cause of death. What those outside the field may miss is that forensic pathologists are strong patient advocates, especially with the families of the deceased with whom they have impactful conversations that help them understand and more effectively process their loss.<sup>1</sup>

The first case of coronavirus disease 2019 (COVID-19), the illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was reported in the United States in late January 2020. In the nearly 5 months that have passed at the time of this writing, the United States has seen 1.7 million confirmed cases and over 101,000 deaths, 5,372 of them in Michigan.<sup>2</sup> We've seen pictures and read stories of health care workers, such as first responders, nurses, emergency department and critical care physicians, respiratory therapists, and others, who are justly celebrated as medicine's frontline in our war with a novel coronavirus. Laboratories have also been

in the news, their importance suddenly brought to the forefront. They were celebrated as essential for protecting public health while simultaneously vilified for being slow to respond to the demand for the diagnostic testing that underpins medical decision making, and the serologic testing considered essential by many as we transition to recovery. Pathologists and laboratory professionals understood the challenges and supply chain barriers but their explanations could not be heard amidst the maelstrom of public perception and the political turbulence swirling in the wake of divided national, state, and local leaders. Through all of this, the forensics teams—pathologists, investigators, laboratory professionals, photographers, social workers, autopsy and pathologist assistants, and administrative staff—have been at the frontline of pathology's largest COVID-19 front, contributing to the public welfare and the science of SARS-CoV-2 while caring for the dead and the living with a measure of compassion and kindness that few understand or know. Our purpose is to tell a piece of that story as it occurred in southeast Michigan.

## Forensic Pathology as a Public Health Service

In 2008 a unique forensics center was created at Michigan Medicine to integrate a hospital autopsy service with a federation of regional county medical examiners' offices. Facilities include the morgue at University Hospital in Ann Arbor, which functions as the medical examiner's office for Washtenaw and Livingston Counties, and the Wayne County Medical Examiner's Office (WCMEO) in Detroit, which also functions as the medical examiner office for Monroe County. All participating staff and faculty are employees of Michigan Medicine and all faculty are appointed in the University of Michigan Medical School **Image 1** and **Image 2**. As government-funded offices they serve the public health needs of their jurisdictions. As a critical section in an academic department they fully participate in all missions and have access to the infrastructure of a large academic medical center and a public research university.

During the COVID-19 pandemic, the forensic pathology program at the University of Michigan proved critical to supporting the counties they serve and families of the COVID-19 patients and others who died at home and in hospitals. The pandemic had a profound impact on hospital-based morgues and medical examiner offices in hot spots across the country. Some hospitals, including facilities that had retreated from providing autopsy services, struggled to house, manage, and release the decedents entrusted to their care. As a consequence, bodies

were sometimes warehoused in makeshift morgues in institutions that were unable to provide the security, cooling, and privacy expected by those who loved and cared for them in life. In Michigan, the April 2020 caseload at the WCMEO was 50% higher than April 2019 (Carl Schmidt, personal communication); in Washtenaw County cases increased by over 200% from April 1 to April 27 (Allecia Wilson, personal communication) compared to the average caseload for the same period of time in the preceding 3 years. Morgue census and the rate at which bodies were being released at each of Michigan Medicine's facilities became a standing metric for the command center overseeing COVID-19-related operations. Despite substantial increases in the number of bodies being managed in Michigan's facilities, all decedents were treated with respect and dignity by experienced and dedicated autopsy personnel whose volunteerism mirrored the dedication and commitment of other frontline health care workers.



**Image 1** Drs Jeffrey Jentzen, Allecia Wilson, and Carl Schmidt photographed in the morgue at University Hospital at Michigan Medicine. Dr Jentzen (left) was appointed as the inaugural director of autopsy and forensic services in 2008, the earliest days of Michigan's forensic center of excellence, which is administratively housed in the department of pathology. At that time only the Washtenaw County Medical Examiner's Office was included in the model. Dr Wilson (center) succeeded Dr Jentzen as director of autopsy and forensic services in January 2020 and was also appointed chief medical officer for Washtenaw and Livingston Counties. Dr Carl Schmidt (right), professor of pathology at Michigan Medicine, is chief medical officer for Wayne and Monroe Counties at the Wayne County Medical Examiner's Office.



**Image 2** A large team at the Wayne County Medical Examiner's Office in Detroit is responsible for autopsies each day and comprises a combination of Michigan Medicine staff (including pathologists' assistants), trainees, and a faculty member who functions as officer of the day. Other faculty participate as demand requires. The team is pictured here in May 2020.

Forensic pathology plays an essential role in public health as a first-line defense in recognizing emerging disease, defining the pathology and pathophysiology of novel diseases, and providing objective data that inform current and future responses. This goes beyond simply managing morgue inventory and includes autopsies as unique learning opportunities for a disease that was unknown to us until it arrived early in 2020. Dr Stephen Geller, emeritus chair of pathology at Cedars-Sinai Medical Center, commented in a COVID-19 autopsy listserv on March 22, 2020, that "The pathobiology of COVID-19 and its effects in the body above and beyond pulmonary system involvement remains to be understood. Every autopsy performed expands the opportunity to learn more." Michigan Medicine's director of autopsy and forensic services and chief medical examiner for Washtenaw and Livingston Counties, Dr Allecia Wilson, stated, "This embodies the essence of why we perform autopsies and why we are called in on issues that pose a public health threat. It's the one thing we do better than anyone else."

Michigan Medicine's autopsy and forensic services developed procedures and protocols that ensured use of PPE appropriate to the threat level **Image 3**, and implemented other measures, such as limiting the number of people in attendance for COVID-19 or suspected COVID-19 autopsies, to mitigate the risk to pathologists and staff **Image 4**. Autopsy cases from Michigan and elsewhere are yielding insights and observations



**Image 3** Photograph of autopsy teams at the Wayne County Medical Examiner's Office in Detroit working on cases with powered air-purifying respirators in May 2020.

that are expanding our understanding of the pathology and pathophysiology of COVID-19, including the features that it holds in common with other respiratory viruses and the unique findings that set it apart. Large-scale testing of nonhospitalized decedents underway at WCMEO **Image 5** is likely to yield information about the prevalence of this virus in populations who die of other causes, information that may prove critical to better understanding the potential value of large-scale testing in communities and organizations as we anticipate a return to whatever becomes our new normal.

Forensics programs are teaching us about the complex impact of pandemics on our communities. Much of the global focus is on the direct effects of SARS-CoV-2 infection, but the increased volume in large urban offices like WCMEO reflects the increase in potentially preventable deaths among those with urgent medical needs that are unrelated to COVID-19. Anecdotal estimates are that medical examiner offices have seen a 50% increase in non-COVID-19 related deaths, an increase driven primarily by adults dying at home (Leigh Hlavaty, personal communication). This reflects the experience reported in the United States and elsewhere that patients with medical emergencies are avoiding emergency departments and hospitals.<sup>3,4</sup> In California's San Joaquin County a drop in visits to the emergency department was counterbalanced by a 45% increase in cardiac arrests reported in the field by emergency medical services in March 2020.<sup>4</sup> All of these patients tested negative for COVID-19, and most were declared dead at the scene.

Individuals in Michigan Medicine's 4 county forensic services who died of conditions other than SARS-CoV-2





**Image 4** Photograph of Dr Allecia Wilson (left) and autopsy assistant, Monique Micallef, preparing to do a COVID-19 autopsy at Michigan Medicine's University Hospital in a negative pressure isolation room designed for this purpose. Only 2 individuals participated in each COVID-19 autopsy, with no access allowed to others during the case.

infection are a heterogeneous group with chronic and acute conditions for which care was either not sought or deferred out of fear that the risk of COVID-19 was worse. Many were older adults with chronic conditions such as cardiovascular disease. Others suffered from acute conditions for which mortality rates are generally low in populations with access to modern medical care. Some likely knew the gravity of their circumstances but did not seek care for fear of becoming infected. A few reached out to providers overburdened with COVID-19 related demands who either could not respond or triaged their care based on pandemic-driven paradigms. For example, a young mother suffering abdominal pain after a normal vaginal delivery was advised to first try home remedies given the risk of infection in acute care settings. She died from sepsis. In another case a young man was advised to manage his nausea and abdominal pain at home given what seemed a greater risk of COVID-19 infection were he to seek the care that might be standard in more normal times. He died following rupture of his appendix. A young inmate died in custody following a ruptured appendix after refusing care for abdominal pain for several days. According to a fellow inmate, she did not want to learn that she had COVID-19 only to be placed in isolation. Dr Milad Webb, assistant medical examiner at Wayne County and assistant professor of pathology, wrote of the experience: "In 2020, it's unthinkable that young people would be dying of such manageable conditions. But that is what the fear of COVID has done."



**Image 5** Nasopharyngeal swabs were routinely collected for SARS-CoV-2 testing on a large number of decedents at Wayne County Medical Examiner's Office including external inspections and autopsy cases.

Those with greater expertise in epidemiology and public health may rightly indicate that these are the inevitable costs to avoid far greater loss of life from curves not flattened and hospitals overwhelmed by a surge in viral infections. And yet as forensics teams across the country collect the data, it is impossible to shake the suspicion that these costs are disproportionately borne by those with less. This is consistent with evidence published by others that the pandemic disproportionately impacts minority groups, including African Americans, Asians, and Native Americans.<sup>5-7</sup> Race and income were the main factors that determined fatality rates for COVID-19 in those who perished in New York.<sup>6</sup> Forensic experiences like Michigan's may better inform battle plans that redirect a portion of the firepower brought to the COVID-19 war to the unrelated skirmishes and ambushes that many were left to fight on their own. From a more holistic point of view, COVID-19 may prove a trigger for redesigning a health care system that seeks to flatten all curves, including the disparities that separate so many of our citizens from a level of access and opportunity to which others have grown accustomed.

### Forensic Pathology and Patient- and Family-Centered Care: Partnering With Families and Providers to Care for the Living

Scene investigators from Michigan's forensics teams were often the first to enter the homes of those who died outside of an acute or chronic care facility. The families

of those who died in the course of the pandemic, whether from COVID-19 or unrelated illnesses, struggled with a complex emotional landscape that compounded the grief sparked by catastrophic loss. The families commonly expressed frustration, anger, guilt, regret, and feelings of abandonment by a system that prioritized public health and COVID-19 care above their own needs. Families were grateful that their loved ones were treated with dignity and respect by Michigan's forensics teams, especially on those occasions when other responders refused to enter their homes. For decedents received at WCMEO for whom there was no specific indication for autopsy (eg, suspected homicide), external exams, nasopharyngeal swabs for COVID-19 testing (Image 5), and toxicology were performed regardless of whether infection with SARS-CoV-2 was suspected. All decedents were treated the same. When families inquired about autopsies they were pleased to learn that their loved one had been examined with care and dignity, and that the examination included COVID-19 testing. Families repeatedly expressed gratitude for getting the testing that they could not get in life, and for turnaround times that rivaled those being advertised in acute care settings. When they called the Michigan's medical examiner's offices, they got to speak with a physician who took the time to answer their questions, often already armed with the test results in which they were interested. Michigan's faculty recount multiple conversations with family members who felt isolated from organized medicine until finally getting through to someone who took the time to listen and to respond, even if that occurred only after the loss of their loved one. And that someone was a pathologist.

Friends and families of those who died in hospitals and chronic care facilities with strict visitation policies wrestled with other frustrations and regrets at not being present for one of life's most heart-wrenching moments. The autopsy and forensics service at Michigan Medicine is tightly integrated with social work programs including the Office of Decedent Affairs (ODA), which is staffed by program managers for adult and medical examiner services and for children's and women's bereavement. Early on, ODA recognized how the pandemic and the response were impacting families experiencing deaths in the hospital and in the community. Providers already overwhelmed with COVID-19 care found themselves doing unfamiliar work addressing end-of-life needs of patients and families at an unprecedented scale. As a consequence, quality for postmortem paperwork suffered and families experienced additional distress as body disposition was delayed, making a tragic time more challenging. Incorrect autopsy-related documentation predates the pandemic but the impact of these operational gaps was magnified

by a surge in hospital deaths. In response, ODA staff created several novel communication vehicles that were intended to speak directly to the needs identified by families and providers. Key information from the postmortem policy was summarized in easy to read 1- to 2-page handouts. A single page summary of best practices for end-of-life and after-death care was crafted using a standardized Situation, Background, Assessment, Recommendation (SBAR) format and circulated to Michigan's COVID-19 command center. These proactive measures improved process with the hope of mitigating some small piece of the complex grieving process that surrounds loss of human life.

In-person viewings for hospital and medical examiner families at the Ann Arbor campus were suspended during the pandemic, which proved to be one of the greatest COVID-19 challenges imposed on our autopsy and forensic service. Viewings are typically supported by ODA and are especially important as the last opportunity to spend time with the deceased for families pursuing direct cremation. Families with limited means are overrepresented in this group. Many of these families expressed pain and guilt for not being able to say a final goodbye to their loved one when they could not afford to have the body embalmed. Grief therapists contend that often the first step to processing a loss is accepting the reality of the death. Viewings are a therapeutic intervention that promotes dealing with the reality. This can be especially effective when professionals are trained to clinically bear witness to another's pain while offering empathic support, psychological first aide, and important information for planning next steps. As part of our forensics teams, our social workers and ODA program managers are trained to sit with a person's pain while not talking them out of their feelings and experience.

Our autopsy and forensics team quickly substituted photographs for in-person viewings to comfort families grieving the loss of a loved one. Prior to the pandemic, Michigan's autopsy and forensics supervisor and biomedical photographer, Lisa Neal, understood the power of tasteful, professional photography in preserving a memory for those who are left behind. She initiated this service through collaboration with ODA and the medical examiner's office, and expanded the program during the pandemic when in-person viewings were suspended. Families identified by ODA and/or the medical examiner's office were given the opportunity to receive a subtly artful photograph of their loved one's hands or tattoo (Image 6). High-resolution photographs of fingerprints for memorial jewelry making and hand or footprint impressions were also available upon request. It is hard to measure the impact of this simple measure.



**Image 6** Black-and-white photograph of a decedent's folded hands taken at the request of her family. This service predated the pandemic but proved especially impactful for those unable to do in-person viewings given COVID-19 related restrictions on visitation in Michigan Medicine's hospitals. Families were offered the opportunity to receive professional photographs of their loved one's hands or tattoo.

One grieving father replying to an email sent in response to his request for photographs said, "having these helps [me] considerably."

ODA developed a bereavement outreach program to add a layer of support for families impacted by hospital visiting restrictions, suspension of viewings, social distancing rules, and executive orders that limited funeral options. The goals were to expedite arrangements for disposition of decedents and to provide support to families who have experienced the death of a loved one. The program consists of 2 telephone calls to grieving families made by clinical social workers from throughout the health system who volunteered their time. The first call is made within 2 days of the death and is focused on acknowledging feelings, providing concrete information, encouraging expedited funeral arrangements, and helping to identify support systems. The second call is made 1 to 2 weeks after the death and is focused on providing empathic support, assessing coping, and providing referrals for additional community grief supports. If ODA staff is unable to reach the family by phone, a letter is sent to provide local grief support resources and connect them to the ODA.

Redesigning health care systems should involve structures to support and facilitate conversations between patients, their families, and pathologists. All patients deserve dignity and respect, whether alive or deceased;

when a patient dies that respect is due their families who serve as the custodians of their wishes and shepherds of their dignity. Direct conversations with pathologists empower patients and their families; it fosters a deeper sense of empathy and allows families to start processing their grief.<sup>1,8</sup> When processing loss, hearing about a loved one's death from the pathologist who determined the cause by examining them with compassion and dignity provides the framework for families to begin acceptance.<sup>1</sup> Conversations with members of a dedicated and well-trained forensics team allows the family to experience the mutual respect fundamental to patient- and family-centered care.

Pathologists and laboratory professionals have additional opportunities to expand their advocacy for patients and families as COVID-19 continues to percolate across our country. Diagnostic and serologic testing for SARS-CoV-2 has driven an unprecedented level of interest among not only patients and their families but also providers, public health experts, government officials, business leaders, universities, and health care executives regarding laboratory testing strategies for disease managing and safeguarding public health. Providing patients and families direct explanations of specific laboratory test results and why certain tests were performed over others is especially important given the complexities of COVID testing including the differences between nucleic acid testing for diagnosis and serologic testing for other purposes. In much the same way, when a patient dies—COVID related or not—findings and test results can be explained in ways important for more fully understanding the cause of death and the relative contribution of various factors in individuals with complex medical problems. Such information can be crucial in helping family members move forward.

The most important aspect of communication in the forensics context is empathy, which includes creating and holding the space for people to process their many emotions that accompany loss. Forensic pathology is an eloquent example of the bridging of science and emotional intelligence. It is with awareness of others and experience with responding to and managing their emotions that the skills and responsibilities unique to a cross-functional interdisciplinary forensic program empowers and provides support for families. The COVID-19 pandemic proved a pivotal moment for those who often work in the backrooms of health care to be present at the frontlines working directly with families to first understand and then respond to their unique needs. Forensic teams do this 365 days of the year, modeling for all of us the skills, experiences, and purpose essential to navigating patient advocacy in the midst of public health calamities like the COVID-19 pandemic of 2020.



## Conclusion

Working directly with families to understand and respond to their needs in a time of personal loss and national catastrophe is the unique province of an autopsy and forensics program. In southeast Michigan this is a collaborative initiative between a department of pathology in a cross-functional academic medical center, multiple county health departments, and a government-owned facility in a large urban center. Each contributes in unique ways to a robust interdisciplinary program that steps up to deliver on expectations for public health, education, and research, while also delivering compassionate care for those who are the direct or indirect casualties of a pandemic unlike anything most have experienced in their lifetimes. The effects of this pandemic will be with us always, and include a legacy that speaks in real terms to the importance of continuing our investments in the infrastructure fundamental to our public health and welfare. COVID-19 also showcased forensic pathology as an exemplar for what it means to be a patient- and family-centered discipline.

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