

Coroner/Medical Examiner Services in Pennsylvania

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August 2022

This project was sponsored by a grant from the Center for Rural Pennsylvania, a legislative agency of the Pennsylvania General Assembly. The Center for Rural Pennsylvania is a bipartisan, bicameral legislative agency that serves as a resource for rural policy within the Pennsylvania General Assembly. It was created in 1987 under Act 16, the Rural Revitalization Act, to promote and sustain the vitality of Pennsylvania's rural and small communities. Information contained in this report does not necessarily reflect the views of individual board members or the Center for Rural Pennsylvania. For more information, contact the Center for Rural Pennsylvania, 625 Forster St., Room 902, Harrisburg, PA 17120, (717) 787-9555, www.rural.pa.gov.

EXECUTIVE SUMMARY

This research analyzed existing data and collected primary data via an online survey and interviews to provide information about coroner/medical examiners (C/MEs) and their offices in Pennsylvania. The analysis examined office caseloads, funding, facilities, forensic capacity, vehicles and equipment, and staffing and training resources. It also assessed how two simultaneous crises – the opioid epidemic and the COVID-19 pandemic – affected county C/ME offices.

Key Findings

- There is a lack of standardization of training, education, policies, and resources among C/ME offices in Pennsylvania, resulting in the inequitable application of death investigations statewide.
- Only a small number of C/ME offices are accredited by the International Association of Coroners and Medical Examiners (IACME). The multiple and complex county processes and standards make standardization of death investigation and performance impossible.
- Most rural and urban coroners reported neutral or inadequate support from county officials who control almost all of coroner funding.
- Most C/ME offices are operating below minimum annual funding requirements.
- Pennsylvania, like the rest of the U.S., has a severe shortage of forensic pathologists who can serve as medical examiners or perform autopsies.
- Forensic pathology trainees need to be recruited and retained through efforts such as increasing funding for pathologists' salaries and forensic pathology fellowships, supporting

an increase in the number of accredited forensic pathology fellowship programs, and forgiving medical school loans.

- Eleven of Pennsylvania's 19 urban counties (58 percent) and 10 of its 48 rural counties (21 percent) had at least one person certified by the American Board of Medicolegal Death Investigators (ABMDI). Five counties have a nationally accredited C/ME office.
- Insufficient financial resources, lack of time for education and training, and the part-time nature of their position pose barriers to coroner certification or data collection and communication for many rural death investigators.
- The opioid crisis and the COVID-19 pandemic have had a significant impact on C/ME office operations and caseloads.
- Most C/ME offices lack expertise or funding for data management, analysis, or communication.
- The majority of C/MEs support investment in regional centers for autopsy/forensic pathology services as this would not be a significant change to their usual practice.
- Clear and efficient communication between C/ME offices and other agencies (law enforcement, health care facilities, public health departments) are critical for collaboration and information sharing, however cross-disciplinary education and training are needed.

Key Policy Considerations

1. Standardize or centralize operations and training through the following measures to help improve the quality and equitability of the current system:

- Amend the County Code (Coroner statutes) to require every C/ME office to have written standard operating procedures.
- Amend applicable state statutes to include more stringent coroner qualifications, certification, and training requirements (see below for specific recommendations)
- Establish a state panel to explore whether a centralized state medical examiner system would better serve the future needs of Pennsylvania.

2. Consider the following measures to increase the number of forensic pathologists in Pennsylvania:

- Provide higher salaries for public sector forensic pathologists that are commensurate with those in the private sector.
- Provide medical school loan forgiveness for forensic pathologists working in the public sector for a minimum number of years (state funding).
- Implement a state grant program similar to the federal grant program (\$100,000 for one-year fellowship).
- J-1 visa sponsorship to recruit forensic pathologists.

3. Inadequate and unequal funding contributes to inequitable death investigations across the state. The following actions could be considered:

- Standardize coroner salaries, as in Ohio, a state of similar size that also has a county-based death investigation system.

- Increase Act 122 funding (Vital Statistics statutes) by increasing the proportion of death certificate fees going to C/MEs from \$1 to \$5 per certificate.
- Increase cremation authorization permit fees from \$50 to \$100.
- Require counties to fund C/ME offices at no less than 80 percent of the 2013 national per capita benchmark, adjusted for inflation.

4. Consider the following to address the qualifications, training, and certification of coroners:

- Emulate legislation in other states requiring some level of medical expertise in county/coroner offices.
- Require the coroner, lead investigator, and the majority of death investigators (deputy coroners) to be nationally certified by the American Board of Medicolegal Death Investigators.
- Increase the Pennsylvania Coroners' Education Board (PCEB) annual continuing education hours from eight to at least 12.
- Expand PCEB services to deliver regional training programs.

5. Consider the following to address inadequate facilities, which are a major obstacle to national accreditation of C/ME offices:

- Implement periodic Pennsylvania Department of Labor and Industry inspection of all morgue and autopsy facilities where publicly funded forensic services are conducted.
- Require hospitals, nursing homes, and counties to have a minimum number of refrigerated morgue spaces for their occupancy or population.

- Fund construction or modernization of county or regional forensic pathology facilities (minimum catchment area of 500,000) with American Rescue Plan or federal infrastructure grants.

6. Consider the following to improve the quality and communication of data from C/ME offices:

- Increase grant payments directly to C/ME offices for fulfilling Pennsylvania Department of Health data requests and require the department to make coroner-sourced aggregate data publicly available.
- Counties with populations of 500,000 or more should employ at least one full-time data professional in the C/ME office to analyze and communicate data.
- Perform a state audit of death certificates by physician and coroner certifiers.
- Ensure C/ME offices have access to secure computer networks with robust case management systems.
- Require C/ME offices to post annual reports that meet IACME or National Association of Medical Examiners (NAME) accreditation standards.
- Require statistical summaries of C/ME death investigations to be posted monthly on office or county websites.
- Require the PCEB to include training in communication strategies and technology to enhance the quality and efficiency of C/ME offices.

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INTRODUCTION

Death investigation in the United States is governed by a patchwork of laws and practices, with wide variability across states. Pennsylvania is one of 14 states with a county-based mixed coroner and medical examiner death investigation system. Figure 1 shows Pennsylvania rural and urban counties.

All but five counties in the state have elected coroners in charge of medicolegal death investigation. Two counties, Luzerne and Northampton, appoint coroners and three counties (Allegheny, Delaware, and Philadelphia) appoint medical examiners.

This report provides information on the current state of medicolegal death investigation across Pennsylvania, the impact of the COVID-19 pandemic and the opioid crisis, and the implications for public policy.

Figure 1. Pennsylvania Rural and Urban Counties

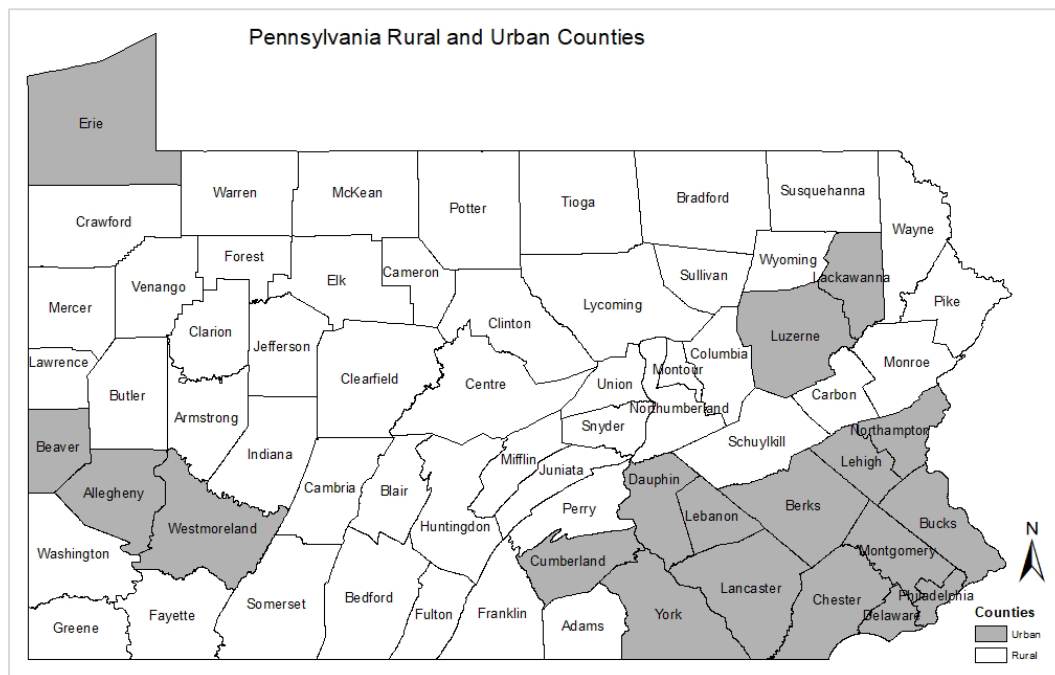
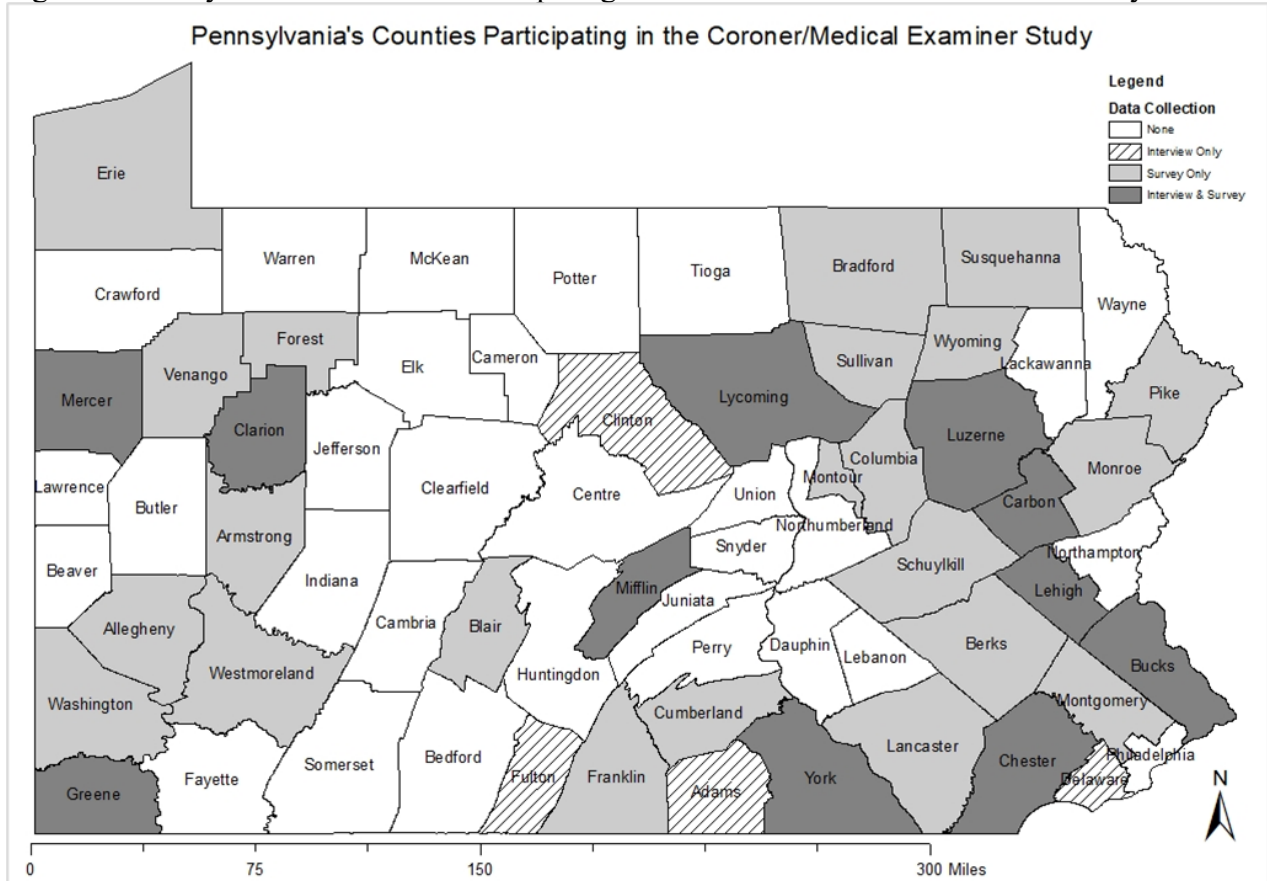


Figure 2 illustrates the counties that participated in this study; some counties participated only in the survey, others only in the indepth interviews, while others accepted the invitation to participate in both data collection efforts.

Figure 2. Pennsylvania’s Counties Participating in the Coroner/ Medical Examiner Study



Pennsylvania’s Medicolegal Death Investigation System

A section of the Pennsylvania County Code (Act 154 of 2018, Article XII-B – Coroner) outlines the jurisdiction, responsibilities, and powers of the coroner, including the types of deaths to be investigated. The legislation was originally enacted in 1953 with the most recent amendments enacted in 2018. There is no centralized coordination or oversight of coroner functions.

Coroner Qualifications and Training

To run for or be appointed coroner in Pennsylvania, a person must be at least 18 years old, a citizen of the U.S., and a resident of the county for one year preceding his or her election (16 P.S. § 413).

Elected coroners complete one week of training prior to taking office, and thereafter must complete eight hours of continuing education annually (37 Pa. Code § 199.41). The Pennsylvania Coroners' Education Board, administered by the Pennsylvania Office of Attorney General, oversees this education and training. Pennsylvania does not require coroner staff certification or accreditation of the coroner or medical examiner office by an independent outside entity (37 Pa. Code § 199.21).

Pathologists serving as coroners or medical examiners (currently the case in three counties) are not required to take the coroner training since their professional training and continuing education exceed the coroner requirements. Pathologists are physicians who have completed several years of specialized training after medical school and internship; forensic pathologists have an additional year of forensic training. In the 64 counties with non-pathologist coroners, pathologists (usually forensic pathologists) are employed or contracted by the coroner's office to perform autopsies.

Coroner Staff Certification and Office Accreditation

Pennsylvania does not require coroner staff certification or accreditation of the coroner or medical examiner office by an independent outside entity (37 Pa. Code § 199.21). Currently a minority of coroners and investigational staff are certified by the American Board of Medicolegal Death Investigation (ABMDI) and only six C/ME offices in Pennsylvania are accredited by either the International Association of Coroners and Medical Examiners (IACME)

or the National Association of Medical Examiners (NAME). The five coroner offices accredited by IACME in Pennsylvania are in Lehigh, Lancaster, Cambria, Adams, and Washington counties (IACME, n.d.). The only medical examiner office accredited by NAME is in Allegheny County (NAME, n.d.).

Although operating under the same state statutes, each C/ME office is an independent agency. This is true of other states with a large rural component, such as Ohio, and leads to a lack of operational uniformity (Robinson, 2017).

Investigations and Autopsies

Pennsylvania Statute 16 §1218-B “Coroner’s Investigation,” lists 11 categories of deaths coroners have a duty to investigate. These include but are not limited to sudden unexplained deaths, violent or traumatic deaths, drug overdose deaths, certain contagious disease deaths, in-custody deaths, stillbirths, and deaths of persons who are to be cremated. In 2018, the statute was amended to include specific requirements, including autopsy, for investigations of sudden unexplained deaths of children not more than three years of age (2018 Act 154).

Upon receiving a death report, the C/ME office determines whether or not to take jurisdiction (“accept a case”). If the case is accepted, investigation can range from review of medical records up to autopsy. Decisions on which cases are accepted and which of those are autopsied or have toxicology or other tests done are at the discretion of each coroner or medical examiner.

Stillbirths (16 weeks or greater gestation) and cremations in Pennsylvania are reported to a C/ME office for the coroner to determine if the death requires further investigation.

Funding for C/ME Offices

The budget for Pennsylvania county coroner offices comes almost entirely from county general funds (taxpayer based). All expenditures, regardless of source, are controlled by local officials (usually county commissioners). County salary boards set salaries for all C/ME staff, including elected coroners; other C/ME office funding is limited and primarily consists of fees (for reports and cremation permits) and Act 122 funds.

PA Act 122 of 2004 amended the 1953 Vital Statistics Law and allowed for the state to distribute a proportion of every death certificate issued in their county to the C/ME office of that county (PA Act 122 Section 206, 2004). The C/ME offices can use the funds received for designated purposes, including laboratory or necropsy room modernization, laboratory facility improvement, or the modernization of equipment used for forensic investigation.

Initially C/MEs received \$1 of every \$6 charged for a death certificate. The fee for death certificates was increased to \$20 in 2016 but coroners still receive only \$1 per certificate. The higher cost has decreased purchases of death certificates. As a result, the only state source of coroner funding has decreased.

Coroner/Medical Examiner's Role in Public Health

In the public health and safety arena, the demands of complex child, maternal, and elder deaths, drug overdose deaths, infectious disease outbreaks (like COVID-19), and requests for "molecular autopsies" (genetic testing) are increasing the need for medical expertise in Pennsylvania's death investigation system. One example is the detailed requirements enacted in Pennsylvania in 2018 for investigation of deaths of children three years or younger (16 P.S. 1220-B). Another is Governor Wolf's 2018 establishment of the Maternal Mortality Review

Committee. This came with a mandate for C/MEs to provide detailed information on such cases (without additional funding) (Act 24 of 2018).

Timely and accurate communication of C/ME data is key to local, state, and national public health systems. These data are primarily conveyed through death certificates, which include the cause and manner of death as well as demographic data. The opioid crisis and the COVID-19 pandemic have greatly increased demands for rapid and accurate transmission of C/ME death data. Reporting of COVID-19 deaths in Pennsylvania became a public source of disagreement between coroners and the Pennsylvania Department of Health in 2020.

Opioid Crisis

All drug overdose death information in the U.S. comes from C/MEs. In Pennsylvania, as in the rest of the U.S., C/ME offices are responsible by law for investigating drug overdose deaths because they are not due to natural causes and often involve illicit substances. The data collected, including toxicological test results, are provided directly to multiple agencies, including the Pennsylvania Department of Health, the U.S. Drug Enforcement Administration (DEA) via its collaboration with the University of Pittsburgh School of Pharmacy, and community organizations working to combat the epidemic (DEA, 2017). A 2017 study of death certificates found that Pennsylvania under-reported opioid deaths more than any other state (Ruhm, 2017).

Opioids are involved in drug overdose deaths in more than 70 percent of cases in Pennsylvania, which is why the increase in deaths in recent years is commonly known as the opioid crisis or opioid epidemic. The number of drug overdose deaths in Pennsylvania increased from 3,376 in 2015 to 5,172 in 2020 (DEA 2017; Centers for Disease Control and Prevention [CDC], 2021). Deaths per 100,000 population range widely from county to county. In 2018, for

example, the state overdose death rate was 35, but the range was from 0-99 deaths/100,000 population. The two counties with the highest drug overdose death rates that year were rural Montour (99) and urban Philadelphia (70) (DEA, 2018a and b).

Drug overdose deaths increased during the COVID-19 pandemic. The CDC predicted that after provisional data were finalized, total overdose deaths in the U.S. from June 2020 to June 2021 were 101,263, an 18.2 percent increase from the previous 12-month period. In Pennsylvania, there were 5,460 overdose deaths from June 2020 to June 2021, an 8.6 percent increase from the previous 12 months (Ahmad *et al*, 2022).

COVID-19 Pandemic

The first documented deaths due to COVID-19 in Pennsylvania occurred in March 1990. On April 8, 2020, the Pennsylvania Department of Health (Vital Statistics) issued a notice requiring all COVID-19 death certificates to be submitted online to an electronic database (EDRS) (Pennsylvania Department of Health, 2020).

When physicians are unable to certify these deaths, C/MEs medically certify them. Death certificates are required before a body can be cremated or buried; shortages of morgue space due to the large number of COVID-19 deaths have been a common problem during the pandemic (Hullinger, 2020). In 2020, 16,030 Pennsylvanians died of COVID-19. As of March 27, 2022, the cumulative death toll in the state had risen to 44,208 (Johns Hopkins University, 2022).

Any death due to the SARS-CoV-2 virus falls within the categories of deaths requiring investigation by a C/ME in Pennsylvania because it is “a death known or suspected to be due to a contagious disease and constituting a public hazard” (16 P.S. § 1218-B). C/MEs in the state are therefore responsible for taking reports of deaths due to COVID-19, that occurred in their county, regardless of the decedent's place of residence (16 P.S. § 1218-B).

Due to Pennsylvania's decentralized death investigation system and a difference in counting deaths between C/ME offices and the PA DOH, there is no centralized system for recording COVID-19 deaths according to the county where the death occurred. The PA DOH counts deaths according to a person's place of residence. Coroners and medical examiners count deaths according to the place of death. If a county has a regional referral hospital within its boundaries, for instance, any reportable death there will be referred to that county's coroner, not the coroner of the decedent's residence prior to hospitalization. In 2021, inconsistencies and discrepancies in COVID-19 death counts in Pennsylvania led to the introduction of new legislation requiring reporting of COVID-19 deaths to C/ME offices, although ultimately it was not enacted into law (Rushton, 2021).

Coroner/Medical Examiner's Role in the Justice System

The C/ME office is a focal point to bring together people, agencies, and information within the justice system (Gilson, 2018). Coroners and medical examiners play a key role in death scene investigation, forensic autopsy and toxicology, and other specialized testing (Department of Justice, 2019) ME/Cs also help scientifically identify decedents, which can be crucial for solving missing persons cases or identifying victims of fires or other violent deaths.

The cause and manner of death, as determined by the C/ME, often determine whether and what kind of criminal charges are filed. Drug overdose deaths are an example. Current national guidelines call for suspected drug deaths to be investigated with an in-person scene investigation, comprehensive toxicological testing, and autopsy (NAME, 2019). Results of C/ME office overdose death investigations provide evidence to district attorneys for prosecutions under Pennsylvania's "drug delivery resulting in death" law and to the DEA for surveillance and anti-drug dealing efforts (18 P.S. § 2506).

C/MEs have an increasingly visible role in the investigation of in-custody deaths, including prison deaths. The independence and expertise of the death investigator “is essential to determining whether police use of force contributed to a death in custody.” (Feldman and Bassett, 2021, Pg. S72). Coroners, medical examiners, and forensic pathologists are required to testify in criminal or civil cases, during which their education and training are subject to direct and cross examination. As noted above, educational background, training, certification, and accreditation vary widely among Pennsylvania C/ME offices.

The Role of the Forensic Pathologist

Forensic pathologists (FPs) are the linchpin of any medicolegal death investigation system. Forensic pathologists are physicians who have completed a minimum of four years of medical school, three to four years of medical specialty training in anatomical pathology or anatomical and clinical pathology, and an accredited fellowship year in forensic pathology (American Academy of Forensic Sciences [AAFS], 2021). Forensic pathology fellowships are critical to the workforce pipeline, as these fellowships provide specialized training in the work of medicolegal death investigation. Board-certification is achieved by passing a subspecialty examination in forensic pathology (American Board of Pathology [ABP], 2015b).

There is a national shortage of board-certified forensic pathologists (DOJ, 2019). Several reports estimate a current national workforce of only 400-500 full-time forensic pathologists, which is less than half of the total estimated need for the U.S. (DOJ, 2019). The number of forensic pathologists entering the field each year is not sufficient to keep pace with the number leaving the field due to retirement or death (DOJ, 2019). One reason is that only about half of the approved forensic pathology fellowship positions in the U.S. are filled in a given year (DOJ,

2019). The Allegheny County Medical Examiner's Office administers the only such fellowship program in Pennsylvania (NAME, 2021).

With the 2010 population of approximately 12.8 million, Pennsylvania should have approximately 50 forensic pathologists (Macrotrends, 2021; Scientific Working Group on Medical Death Investigation [SWGMDI], 2013). Instead, it is estimated that only about 20-25 board-certified FPs are currently actively practicing in Pennsylvania. (American Board of Pathology, 2021). Many are routinely performing more than 500 autopsies per year due to the shortage. Accreditation standards allow no more than 325 autopsies per year to be performed per forensic pathologist (NAME, 2021).

GOALS AND OBJECTIVES

Goal 1: To assess the capacity of rural and urban C/MEs to meet current caseloads.

The associated objectives were to:

- (1) Establish benchmarks by which to assess Pennsylvania C/ME office capacity by reviewing the professional and peer-reviewed literature, national standards, accreditation requirements, and Pennsylvania state regulations.
- (2) Use an online survey to inventory the 65 C/ME offices, which include 64 coroner offices and one medical examiner office (Delaware County). The questions were focused on current staffing, equipment, facilities, training, and forensic pathologist access to assess the degree to which each C/ME office were meeting benchmarks. A comparison between rural and urban counties was highlighted.
- (3) Conduct interviews of three board certified forensic pathologists from selected rural and urban regions. Salient themes and policy recommendations were informed by these indepth interviews.

Goal 2: To analyze the caseload trend over the past five years in rural and urban counties.

The associated objectives were to:

- (1) Use a standardized definition of a “case” to determine the total number of cases, the total number of jurisdictional cases, the total number of autopsies, and the total number of accidental drug overdose deaths in each of the past five years for the C/ME offices that participated in the study.
- (2) Assess the trend of required collection and reporting of data and reports to governmental and non-nongovernmental organizations by C/ME offices.

Goal 3: To assess education, training, certification, and accreditation for 65 C/ME offices and their investigative staff.

The associated objectives were to:

- (1) Assess the extent of engagement by the C/ME offices in investigative education, the extent of medical education, and the amount of continuing medicolegal death investigation training.
- (2) Identify the number of ABMDI certified staff, diplomates, or fellows for the 65 C/ME offices.
- (3) Determine each C/ME office status regarding accreditation (ex., accredited, seeking, failed, not seeking).

Goal 4: To assess the funding of C/MEs and their offices.

The associated objectives were to:

- (1) Identify and quantify all sources of funding, such as County General Funds, office fees, Act 122 funds, and other sources (ex., grants). Act 122 funding was confirmed by the state agency transmitting these funds and was a focus of in-person interviews.

- (2) Compare per capita funding for the C/ME who participated in the study to population-based recommended funding (dollars per capita) as determined by the Scientific Working Group for Medicolegal Death Investigation (SWMDI) (2013).
- (3) Obtain current year C/ME salaries for the C/ME who participated in the study to a) compare salaries to the median county income or cost of living and b) calculate per case compensation.
- (4) Compare funding and salaries for rural and urban county C/ME offices using per capita and/or per case dollars.

Goal 5: To identify policy implications of study findings and present considerations regarding the state’s medicolegal death investigation system.

The associated objectives were to:

- (1) Review current state legislation, regulation, and funding as they relate to the C/ME offices and their duties in Pennsylvania, with focus on the following: “County Code” (Title 16 P.S. Counties, Chapter 1) regulating coroners in Class 2-8 counties; 2004 Act 122, which amended the 1953 Vital Statistics Law and established distribution of a portion of death certificate fees to local coroners and medical examiners; and 1988 Act 22 (P. L. No. 1988—No. 22) (16 P. S. § 9525.1—9525.6), which established the Pennsylvania Coroners' Education Board under the Pennsylvania Office of Attorney General. Policy implications and considerations were based on this analysis.
- (2) Review the professional and industry literature regarding the organization and performance of medicolegal death investigation systems in Ohio and Virginia for lessons learned and best practices.
- (3) Provide policy considerations based on analyses of data from Goals 1-5.

DATA AND METHODS

This study combined both qualitative and quantitative methods and both primary and secondary data sources. Primary sources included information from open-ended structured interviews with C/MEs and forensic pathologists. Secondary data included publicly available data on COVID-19 deaths and county overdose fatalities. Deaths were gathered from the Johns Hopkins University Coronavirus Resource Center and county overdose fatalities from OverdoseFreePa.org, hosted by the University of Pittsburgh School of Pharmacy, Program Evaluation and Research Unit (PERU).

The unit of analysis in this study is the C/ME office for each Pennsylvania county. The indepth analysis was limited to 65 counties, not including Allegheny and Philadelphia counties. The research used the Center for Rural Pennsylvania's definition of rural, which is based on population density. According the definition, 48 of Pennsylvania's 67 counties are rural. (Center for Rural Pennsylvania, n.d.).

The research used both qualitative and quantitative methods to achieve additional explanatory power through Triangulation. The combination of multiple methods of data collection has many recognized benefits, most notably the additional assurance of validity and explanatory power.

Qualitative analysis: Interviews of Coroners, Medical Examiners, and Forensic Pathologists

In-person or telephone/video interviews were conducted with coroners and medical examiners in selected counties. Semi-structured interviews were also conducted with forensic pathologists to inform the themes expressed by C/MEs. The following approach was used to select counties to participate in the qualitative interviews: To ensure geographic diversity and

adequate representation of rural counties, approximately five to six counties in each of five regions of the state – southwest, northwest, central, northeast, and southeast – were invited to participate. These counties were selected to reflect the distribution of counties by Class (2A through 8). Since county class is determined by population, a range of rural and urban counties were invited to participate in the qualitative interviews.

Interviews were semi-structured with a mix of open-ended questions to gather illustrative personal experiences and elicit information on issues not considered elsewhere; see Appendix B and Appendix C for the questions used during the qualitative interviews. Interviews were conducted with the county coroner or medical examiner of the selected counties. If the C/ME did not wish to or was unable to personally participate, another county was selected. Only C/MEs or forensic pathologists were selected to participate in the study. In this report, county class and geographic region of each interview are identified, but individual interviewees and names of counties are not personally identified. Delaware County is the exception as it is the only Class 2A county with a medical examiner system. Interviews were not conducted with Philadelphia or Allegheny counties, as they are unique with regard to county class, population, system, and caseload.

The interviews ranged in time from approximately 30 minutes to one and a half hours and were completed via telephone or Zoom at a time convenient to each participant. The interviews were transcribed and the transcripts were analyzed by extracting, summarizing, and categorizing responses to the interview questions. The research team reviewed and color coded the salient themes from the interviews. They were then documented on a spreadsheet and confirmed among team members. The team members confirmed the accuracy of the theme definitions and their location in the text of the transcripts with other team members. Major themes of the interviews

were created to assess the influence of the opioid crisis and COVID-19 pandemic on the caseload and operations of C/MEs.

The researchers invited C/MEs in each of Pennsylvania's 67 counties to participate in the qualitative interviews via email and phone throughout 2021. Email addresses provided by the Pennsylvania State Coroners Association (PSCA) were used to invite C/MEs to participate in semi-structured interviews beginning in the spring of 2021. These email addresses were updated and a second round of requests was subsequently sent. The research team then attempted to contact C/MEs via the phone number published on the PSCA website. The team attempted to reach unresponsive C/MEs via phone four times throughout the spring, summer, and fall of 2021.

The response rate for semi-structured interviews was 22.4 percent. A total of 15 interviews were conducted with C/MEs, located in all regions of Pennsylvania, although relatively more were concentrated in the southeast and relatively less in the southwest. Four additional interviews were conducted with board-certified forensic pathologists practicing in Pennsylvania to provide additional explanatory power of the death investigation process and the unique issues experienced by forensic pathologists.

A thorough review of the peer-reviewed and industry literature was conducted to determine the lessons learned and best practices of Ohio and Virginia. The purpose of this effort was to assess alternative models of medicolegal death investigation systems adopted by comparable states. Searches were performed using appropriate key words with the goal of identifying mechanisms of the death investigation systems that would improve the quality and efficiency of the C/ME offices in Pennsylvania.

Quantitative Analysis: Online Survey for Coroners / Medical Examiners

The goal of the quantitative analysis was to have 65 C/ME offices provide data with the use of an online survey tool throughout the period of study from 2020 through 2021.

Quantitative Survey Tool

In collaboration with the Center for Survey Research (CSR) at the Pennsylvania State University, Harrisburg and the Center for Rural Pennsylvania, the researchers developed an online survey tool that examined the resources of C/MEs, including funding, facilities, forensic capacity, vehicles and equipment, and staffing and training. The survey tool included approximately 40 data points (unique pieces of information collected in the survey) and was administered to all 67 Pennsylvania county C/MEs. The researchers sent regular email reminders, each with its own unique survey link.

In April 2021, the quantitative survey tool was transitioned to a REDCap software system hosted by West Chester University of Pennsylvania (WCU). Regular email invitations and reminders were sent to C/ME offices throughout this period to the end of the study. The goal was to gather as much quantitative data as possible to inform the qualitative interview themes and data. The quantitative data from both phases of the effort were combined seamlessly into one IBM SPSS 26.0 dataset. The quantitative survey was a structured instrument (Appendix D).

As a supplement to the quantitative survey tool, the public website of each C/ME office was accessed and examined for statistical data or annual reports.

Assessment of Quantitative Data

Benchmarks to assess Pennsylvania C/ME office capacity were determined by reviewing the professional literature, national standards, accreditation requirements, and Pennsylvania state regulations. This review identified two relevant benchmarks for county C/ME offices. First, a

minimum annual funding requirement of \$3.75 per capita for death investigations (SWGMDI, 2013), unadjusted for inflation, was selected as a funding benchmark. Second, the National Commission on Forensic Science (NCFS) (2016) has recommended that all coroners and medicolegal death investigators obtain professional certification.

Current staffing, equipment, facilities, training, and forensic pathologist access were described, then the degree to which each C/ME office data compared with preestablished benchmarks was assessed. The data on rural and urban counties were contrasted and compared. The results from this analysis were used to assess the capacity of rural and urban C/MEs to meet current caseloads.

Second, using a standardized definition of a “case,” data from the prior five years for the 65 C/ME offices were used to identify the total number of jurisdictional cases, the total number of autopsies, and the total number of accidental drug overdose deaths. Data from the online survey were used to identify the total number of cases, the total number of jurisdictional cases, and the total number of autopsies in each of the prior five years.

The reports on drug overdoses and COVID-19 death rates were based on publicly available data. Two data sources were used for 2015-2020 drug overdoses: first, deaths from drug overdose were downloaded from the Pennsylvania’s Open Data Portal (2022); because the portal only reports data that include 10 or more cases, the missing information was obtained from the University of Pittsburgh School of Pharmacy (www.overdosefreepa.pitt.edu), Program Evaluation and Research Unit (PERU). The website is hosted by the University of Pittsburgh and reports data obtained from Pennsylvania C/MEs on drug-related overdose deaths (ruled accidental or undetermined) that occurred in each county. Data were suppressed when only one

to five fatalities occurred within a given year. The COVID-19 data were downloaded from USAFacts.com (2022).

Data from the Pennsylvania Association of Pathologists were used to identify the number of forensic pathologists employed or contracted as of five years prior and in 2019, and the number of autopsies performed per forensic pathologist from 2015 through 2019. Analysis of these data sources against pre-established benchmarks enabled the researchers to analyze the caseload trend over the prior five years in the representative rural and urban counties.

The education, training, certification, and accreditation for the 65 C/ME offices and their investigative staff were assessed through the online survey and in-person interviews. The survey asked the C/MEs to identify the highest levels of investigative education for the C/ME and staff, the extent of medical education, and the amount of continuing medicolegal death investigation training. The survey gathered data regarding how many staff (C/ME and/or any deputies or investigators) are ABMDI-certified and how many hours of continuing education the C/ME completed in 2019.

The relevant data needed to assess the funding of C/MEs and their offices were gathered through in-person interviews with C/MEs and through the online survey. These data were confirmed through reviewing the annual reports for each county and C/ME office and other publicly available county data. The relative contribution to C/ME funding of different funding streams (tax-payer funded, fees, Act 122) was obtained from the online survey. Per capita funding comparison between urban and rural counties were assessed using county population data from the U.S. Census Bureau and converting the funding data into a per capita level.

The county C/ME salary data were accessed from publicly available county data and converted into a per case basis using the case data from the online survey. C/ME salaries were

compared with the median county income and a per case compensation basis to compare counties with one another. Finally, a rural/urban comparison was shown using the per capita and/or per case level. Overall, the purpose of this analysis was to assess all relevant funding sources for C/ME offices and assess its sufficiency and generate comparisons between counties and urban and rural regions.

Study Limitations

Despite making multiple attempts via phone and email to contact potential survey respondents to complete the quantitative survey or participate in an interview, the research team did not receive a completed survey from every C/ME. Because the answers from these non-respondents could be different from those who did participate, non-response bias exists. Further, it should be emphasized that the study was conducted during a time when two crises, the COVID-19 pandemic and the opioid crisis, were simultaneously affecting coroners and medical examiners.

RESULTS

Qualitative Analysis: Salient Themes from Semi-Structured Interviews

The following 15 counties (nine rural and six urban) agreed to participate in the indepth interviews, guided by a semi-structured instrument: Adams, Bucks, Carbon, Chester, Clarion, Clinton, Delaware, Fulton, Greene, Lehigh, Luzerne, Lycoming, Mercer, Mifflin, and York (See Coroner Interview Instrument -- Appendix A and Medical Examiner Interview Instrument -- Appendix B). Below is a summary of emergent themes from the 15 interviews. The themes emerged from the majority of C/MEs interviews, and unique comments were noted but not categorized in a theme. Any information that could be used to identify the C/ME office or its administrator(s) was removed. Interviews with four forensic pathologists were conducted using a

separate semi-structured interview instrument (Appendix B). Two interviewees were employed by government agencies and two by private for-profit entities. All provide autopsy services to C/ME offices in Pennsylvania.

Challenges

The following themes are a representative summary of the qualitative findings from the study. Where appropriate, context and sample quotes are given to illustrate the detail and nuance of the theme.

Theme 1: There is no uniformity across Pennsylvania counties regarding C/ME backgrounds, certification or accreditation status, training, staffing, or salaries.

Pennsylvania coroners who participated in the study had a wide variety of professional backgrounds, which may have included professional careers in health care, emergency preparedness, and mortuary services. Many coroners in rural counties had a full-time or part-time position in the mortuary profession, while most in the urban counties had a medical background and are full-time coroners. Participant coroners' medical backgrounds include paramedic, nurse, and physician. Some coroners have a background in law enforcement or the legal field. The length of time in office among the 15 interviewees ranged from two months to 25 years.

Coroners expressed a sincere desire and motivation to obtain additional training, however their primary limitation was the extra time to complete in-person seminars or online webinars. They all completed the required eight hours of continuing education in each calendar year. However, there was a wide range of additional trainings completed. Coroners indicated that the COVID-19 pandemic had limited their ability to complete additional training due to travel restrictions.

The majority of coroners said their salaries were the lowest among all county elected row officers. However, the time and dedication required to be on call 24/7 was significant when compared with other row offices. Coroners reported a great deal of frustration with the hourly pay rate for their deputy coroners. They indicated that the low hourly pay resulted in high turnover and burnout among staff. Many coroners also indicated frustration that they were only permitted to hire part-time deputies and how this increased turnover.

Pennsylvania does not require coroner or medical examiner offices to be accredited by a national accrediting agency. Accreditation is perceived as validation of best medicolegal death investigation practices but most counties do not meet the required standards. Five county coroner offices in Pennsylvania are accredited by the International Association of Coroners and Medical Examiners (IACME). Two are urban (Lehigh, and Lancaster) and three are rural (Cambria, Washington, and Adams). Accreditation is an arduous process that requires documentation of standard operating procedures, trained certified staff adequate for caseload, autopsy and laboratory facilities that meet minimum standards, and an application fee of several thousand dollars (varies with population) (IACME, 2022). One or more of these requirements is lacking in each of the 62 unaccredited counties. Most C/ME staff must be certified for the office to meet accreditation standards. Thirty-eight (79 percent) of Pennsylvania's 48 rural counties have no ABMDI-certified death investigator (ABMDI, 2021a). Inadequate administrative office space and refrigerated body storage are other obstacles to accreditation in many rural counties.

Lack of access to autopsy and laboratory space or forensic pathologists precludes accreditation in some urban counties as well. An example is an urban county with autopsy space that does not meet OSHA safety standards, has old, rusted equipment, and has autopsies done by contracted forensic pathologists whose caseloads exceed 325 autopsies per year.

Theme 2: Financial support from county officials for Coroner/Medical Examiners is insufficient to meet their needs or those of their offices.

Most rural and urban coroners expressed either neutral or inadequate support from their county officials. County officials control almost all funding of C/ME offices. Low financial support is reflected in the salaries of participating coroners and in C/ME offices' overall budgets for staffing and operations. The lack of salary equity with other row officers in their own county is a particular issue for many rural coroners, many of whom hold other full-time or part-time positions to support themselves and their families. *"It's assumed this is a part-time job,"* said a coroner whose salary in his Class 6 county is half that of the other county officials. Inadequate county support is a barrier for many coroners when pursuing upgrades to their facilities, purchasing equipment including vehicles, and pursuing certification or accreditation.

Interviewed C/MEs reported that the inadequate support stems from county officials' high levels of misunderstanding regarding the roles and responsibilities of coroners. *"We're a second thought for the most part,"* said another rural coroner. Although the coroner function is mandated by state law, its costs to a county exceed the revenue it generates, and therefore require taxpayer funding. Coroners with budgetary constraints indicate that they have attempted to educate their county officials, but very few have been successful in having their budgetary needs met. Expenses related to the opioid crisis and the COVID-19 pandemic have placed additional strain on C/ME budgets, including costs for autopsies, toxicological tests, transportation, personal protective equipment (PPE), and body storage. Autopsies performed in locations outside of the county incur transportation and salary costs, and decrease staff availability to respond to deaths in their home county.

Theme 3: Coroner/Medical Examiner offices experience challenges hiring and retaining deputy coroners due to low pay and irregular hours.

The most mentioned challenge identified by the participating coroners was the low pay (mostly hourly) for their deputies. This results in high turnover or unfilled positions. Coroners in some offices reported that deputy coroners are paid only if they are called to a death scene, but must remain on call throughout an extended period. A deputy coroner may be on call throughout the whole weekend, for example, and not receive any pay if there are no calls.

The high turnover among deputies results in delayed response time to crime and death scenes. It also increases costs and reduces the training levels and skill that come with experience. The lack of personnel is exacerbated whenever multiple deputies are required to transport a body to an autopsy site, which may be located hours away. Several C/MEs indicated that either they or their predecessors had experienced burnout in their position due to the long unpredictable hours and the stressful nature of the work. In the present economy (2021), high demand and higher pay in less stressful jobs are exacerbating turnover and loss of expertise in C/ME offices.

Theme 4: Coroner/Medical Examiner offices lack sufficient facility space for their caseload.

All of the rural and several of the urban county C/ME offices in the study indicated that they lack adequate and appropriate facilities for the storage of bodies and for conducting autopsies. The lack of such facilities is also a barrier for accreditation by the International Association of Coroners and Medical Examiners (IACME). Rural coroner offices and some urban offices reported borrowing or renting storage space for bodies at local hospitals and funeral homes. The lack of space was exacerbated during the opioid crisis and COVID-19 pandemic in those counties that experienced high death rates.

Rural coroners whose other job involved mortuary services reported using space either at their own funeral home or others to store bodies. Several rural coroners also indicated that their offices were located in spaces that they owned and they covered their own office costs.

The lack of facilities is linked to the high turnover rate among C/ME office staff. For instance, deputies working for low pay are also working in offices and facilities that are inadequate and depressing. These conditions further erode morale among staff and contribute to high turnover and difficulty recruiting staff.

Theme 5: Coroners and deputies in rural counties face greater challenges than urban offices in obtaining sufficient training and ABMDI certification.

Rural coroners reported completion of the state-mandated Basic Education Course given by the Pennsylvania State Coroners' Education Board when they were first elected or appointed. The course was not held in 2020 or the first half of 2021 due to COVID-19 concerns. The Board also authorizes courses as acceptable for fulfillment of the eight credit hours of continuing education required annually of all coroners and full-time deputies. However, C/MEs and staff experience barriers to training and certification beyond this mandatory level. In particular, rural coroners and their deputies lack the extra time and manpower to cover their absence whether attending continuing education in-person or online.

Coroners in most counties, but especially rural counties, rely heavily on part-time deputy coroners. An informal April 2021 survey, which had 79 percent participation (Pennsylvania State Coroners' Association, Personal Communication to C. VandePol), found that 185/288 (64 percent) of deputy coroners were part-time. There is no state requirement for part-time deputies to obtain any training. Coroners in rural counties reported that part-time deputies do not have time, financial support, or incentive for training. A Class 3 county coroner said of his part-time

deputies, *“They don’t really investigate. They just pick up the body and use this as an opportunity to steer business to their funeral home.”*

There is no state requirement in Pennsylvania for C/MEs or their investigative staff to attain national professional certification. Only 10 of the 48 rural counties and 11 of 19 urban counties have even one ABMDI-certified death investigator (ABMDI, 2021a).

The majority of interviewed rural coroners mentioned time constraints as a barrier to ABMDI certification. Most did not view certification as a priority or expressed a lack of familiarity with the requirements. Interviewed urban coroners without ABMDI-certified staff also mentioned time as a factor, but cost (at least \$400/person plus salary costs) also played a role. A rural and an urban coroner mentioned the need to have someone available to support certification applicants, since the ABMDI process requires in-person oversight and sign-off of applications by “a competent practitioner” (ABMDI, 2021b pg.17).

Theme 6: Both rural and urban coroners have faced challenges in addressing the ongoing opioid crisis while simultaneously managing the COVID-19 pandemic.

Coroners reported that the opioid crisis has had a significant impact on their offices due to additional resources required for autopsies, toxicology tests, storage, and overtime pay. Some coroners reported that their offices could not afford full autopsies and toxicology tests for all of the victims. They reported that their staff experienced apathy, burnout, and psychological trauma as the number of drug overdose deaths increased throughout the crisis.

Significant resources are required to transport suspected drug overdose cases to a forensic pathologist for autopsies and toxicology tests. Completed investigations are followed by extensive data entry and reporting to the PA DOH, law enforcement/district attorneys, or other stakeholders, such as OverdosefreePA. Coroners reported that 2020 was an especially difficult

year with continuing or increased drug overdose deaths amidst an ongoing pandemic. Coroners reported that 2020 and 2021 felt like they were going “backwards” in their efforts to reduce drug overdose deaths.

Theme 7: The COVID-19 pandemic has had a significant impact on most C/ME offices, requiring collaboration with other providers and funeral homes to manage their caseload.

The majority of coroners reported that the COVID-19 pandemic has had a significant impact on their office operations and their caseload. They reported that they experienced two surges, the first in April through May of 2020 and then again during December 2020 through January 2021. A third surge in COVID-19 cases and deaths began in late 2021.

Coroners had to rely on the assistance of hospitals, funeral homes, and other facilities with refrigerated storage to store bodies as deaths increased. Counties with high death rates had to borrow body bags and PPE from other counties or request them through emergency services offices. Coroners reported that one of the lessons learned throughout the pandemic was to maintain a close collaborative relationship with the hospital providers in their county. The working relationship facilitated the accurate reporting of COVID-19 deaths by health care providers and provided additional refrigerated storage space as deaths increased during periods of surge. Several coroners in rural counties with a low number of COVID-19 deaths reported that the pandemic did not have a significant impact on their caseload. They requested that the hospitals and nursing homes in their county report any deaths due to COVID-19, then tracked and reported them to the Pennsylvania DOH.

Theme 8: The shortage of forensic pathologists negatively impacts services provided by C/ME offices.

The interviewed forensic pathologists (FPs) reported that the FP shortage in Pennsylvania is resulting in fewer or delayed forensic autopsies in death investigations, long transport times to an autopsy facility, rapid escalation of costs for coroner and medical examiner offices, and increased caseloads for existing FPs.

Accrediting organizations will not accredit C/ME offices or forensic facilities where FPs perform more than 325 autopsies annually, although a maximum of 250 autopsies is considered the goal. Many FPs are routinely performing more than 500 autopsies per year due to the shortage. In Pennsylvania, it is common for a forensic pathologist to work full-time at one location and also perform autopsies on a contract/per diem basis for multiple other jurisdictions, organizations, or private individuals.

Interviews with practicing FPs in Pennsylvania indicate that the root causes of the growing FP shortage include poor funding and compensation, especially for government employees; lack of respect for the role of FPs in the criminal justice and public health systems; a lack of programs encouraging medical students to enter the field; and, a lack of forensic pathology fellowship programs.

The Association of State and Territorial Health Officials (ASTHO, 2019) issued a report on the shortage of board-certified forensic pathologists. The brief provided 11 recommendations for how states can address this shortage. These recommendations are congruent with the recommendations of the FPs interviewed for this report. Recommendations in the report include:

- Increase funding for forensic pathology salaries.
- Increase funding for forensic pathology fellowships.

- Increase access to accredited forensic pathology programs.
- Create more medical school loan repayment assistance programs.
- Collaborate with forensic operations by investing in instrumentation, including imaging technology.

Opportunities

Theme 9: Coroners support regional centers for autopsy/forensic pathology services located at strategic locations throughout Pennsylvania.

Rural coroners often transport decedents long distances to obtain autopsy services, using significant resources to do so. Transportation of a body typically takes at least one to two deputies to transport the body each way, although one county hires a commercial transport company for this purpose. The trip may last from 45 minutes to three hours one way. The coroners who currently transport bodies to Allentown (Forensic Pathology Associates of Lehigh Valley Health Network) or Erie (Erie County Coroner's Office) reported that they already consider these providers as a regional autopsy/forensic pathology service. Coroners further stated that their acceptable transportation time to a regional center would be from 45 minutes to three hours one way, though most expressed a preference for more convenient access.

Regional centers for autopsy/forensic pathology services located at strategic locations throughout the state would therefore not be a significant change to the usual practice of most rural and some urban coroners. Some urban coroners from larger counties indicated that their population and caseload already justified forensic pathology services being delivered through a standalone in-county facility. According to the Department of Justice National Institute of Justice (2019), a caseload of 250 or more forensic autopsies a year justifies a full autopsy facility.

Nevertheless, obtaining the support of county officials for such a facility or the forensic pathologists needed to perform the autopsies is viewed as a challenge.

Comparison of the States of Ohio and Virginia Death Investigation Systems

The death investigation models of Ohio and Virginia and their policies and practices are presented here to inform the themes presented by the semi-structured interview themes from coroner interviews. The goal of this analysis was to focus less on the name of the death investigation system than on how the system actually works and how it can inform and provide insights for the system in Pennsylvania. The analysis was not meant to advocate for one system type over the other, but to assess the training, funding, and staffing of the respective models.

State of Ohio Coroner System

Qualifications for Coroner

Similar to Pennsylvania, the State of Ohio has a county-based coroner system with coroners elected for a four-year term. Two counties, Cuyahoga and Summit, have medical examiner offices. However, unlike Pennsylvania the elected coroner must be a licensed physician who has been in practice for at least two years and is in good standing with their profession. Ohio is one of two states that requires the coroner to be elected and to be a licensed physician (ORC 313.02).

Continuing Education

Before starting the first term as coroner, the physician must complete 16 hours of continuing education sponsored by the Ohio State Coroners Association (OSCA). During each four-year period that coroners hold office, they must complete 32 hours of continuing education sponsored by the OSCA (ORC 313.02).

Deputy Coroners

A coroner in Ohio has the authority to appoint deputy coroners (one of which may be the chief deputy coroner), pathologists to help with autopsies and medical tests (can also be called deputy coroners), and technicians (ORC 313.05).

Policy Implications of Ohio's Death Investigation System

The main difference between Pennsylvania and Ohio is that Ohio's statutes standardize salaries and medical qualifications for coroners. Like Pennsylvania, Ohio has a county-based coroner system and studies have shown that there are advantages to such a model. A county-based coroner system has the following advantages as indicated by the Institute of Medicine (2003) and Hanzlick and Fudenberg (2014):

- Autonomy in decision-making regarding death investigation. The county coroner is an official elected by county residents and has the ability to represent their will.
- Coroners derive their autonomy from the electorate, which empowers them to compete for county budget allocations.
- The system allows forensic pathologists to concentrate on autopsies and the medical areas of death investigation, and for coroners to focus on coordination and overall administration.
- Elected coroners may be able to make independent decisions answerable only to their constituents. Those coroners that are poor performers can be removed by the voters and those that meet the expectations of voters can be returned to office.
- Elected coroners in small rural communities understand their constituents and can create a link between the community and a medical examiner, forensic pathologist, and autopsy facilities.

Commonwealth of Virginia: Statewide Medical Examiner System

Qualifications for Chief Medical Examiner

The Commonwealth of Virginia has a centralized medical death investigation system that is administered through the Virginia Department of Health. The state has a chief medical examiner who is a forensic pathologist licensed in Virginia and who supervises the central and district offices (Code of Virginia § 32.1-278). The Office of the Chief Medical Examiner (OCME) is housed within the Department of Health. The chief medical examiner employs forensic pathologists to serve as assistant chief medical examiners in the central and district offices. A qualified pathologist, designated by the chief medical examiner, performs autopsies or such pathological studies and investigations as may be determined to be necessary or advisable by the chief medical examiner (Code of Virginia § 32.1-278).

Continuing Education

No continuing education requirements are mentioned in the Virginia Code, but ongoing education is required to be licensed as a forensic pathologist or physician in Virginia (Virginia Board of Medicine, 2022; American Board of Pathology, 2015a).

Local Medical Examiner

The chief medical examiner appoints one or more medical examiners for each county and city (Code of Virginia § 32.1-282). The minimum requirements to be a local medical examiner in Virginia include:

- A valid Virginia license as a doctor of medicine or osteopathy, nurse practitioner, or physician assistant.
- An appointment by Virginia's chief medical examiner.
- A valid U.S. driver's license.

The OCME receives the initial notification of death and determines if the death should come under the jurisdiction of the medical examiner (Code of Virginia § 32.1-283). Local medical examiners may examine and sign the certificate of death on medical examiner cases or, using professionally established guidelines, refer certain classes of cases for more intensive death investigation and medicolegal autopsy (Code of Virginia § 32.1-283).

Autopsy

When an autopsy is required, it is conducted in one of four district offices: Manassas, Norfolk, Richmond or Roanoke. Each district is staffed by board certified forensic pathologists, death investigators, clerical and morgue personnel (Code of Virginia § 32.1-283).

Policy Implications of a Statewide Medical Examiner System

The death investigation model used in Virginia illustrates several advantages of the Medical Examiner system. A statewide medical examiner system has the following advantages as indicated by the Institute of Medicine (2003) and Hanzlick and Fudenberg (2014):

- Enhanced quality of death investigations and forensic pathology services and their freedom from the influence of population size, county budget variation, and politics.
- Death certification and investigation is accomplished by medical professionals who can integrate autopsy findings with those from the crime scene and the laboratory.
- Uniformity of statutes and regulations in the following areas:
 - Credentialing, training, and continuing education of medical examiner and death investigators.
 - The appeals processes for the cause of death when disputed among different parties
 - Centralization of administration of case management and death investigation provides isolated areas with timely consultation and centralization of laboratory services.

- All death certificates are completed by physicians.
- Medical examiners are subject to performance review by an appointing authority who is typically a forensic pathologist.
- The medical examiner is already trained in the science of death investigation, so there is no need for additional training by the state.
- Medical examiners use their training as medical doctors to assess medical histories, medical records, and laboratory tests in the death investigation process.

The report by the Institute of Medicine (2003) and Hanzlick and Fudenberg (2014) also identified challenges for a centralized medical examiner model to be successful. Such a system is dependent on a single strong champion of medical investigation services (the chief medical examiner) and an adequate number of forensic pathologists to conduct investigations and autopsies. A lack of such staff has caused autopsy backlogs in some states with centralized systems, such as Maryland (NBC, 2022) and New Jersey (NJ.com, 2019). Establishing a centralized model requires high initial costs. State funding may need to be supported by federal grants and funding for the system to scale up to size.

Quantitative Analysis: Descriptive Statistics

Pennsylvania has 67 counties, 48 of which are classified as rural counties and 19 as urban; 33 counties (12 urban and 21 rural) or about 49.3 percent participated in the quantitative survey: Allegheny, Armstrong, Berks, Blair, Bradford, Bucks, Carbon, Chester, Clarion, Columbia, Cumberland, Erie, Forest, Franklin, Greene, Lancaster, Lehigh, Luzerne, Lycoming, Mercer, Mifflin, Monroe, Montgomery, Montour, Pike, Schuylkill, Sullivan, Susquehanna, Venango, Washington, Westmoreland, Wyoming, and York. The remaining 34 counties did not

participate in the survey data collection efforts associated with this study, in spite of laborious recruiting through repeated emails and phone calls.

Of the 33 participating counties, only 25 submitted the online survey as “complete” (25 out of 67 or 37.3 percent). Moreover, a close inspection of the responses revealed that about half of the 25 counties did not answer all questions asked. The other eight counties started the survey but they did not click the “submit” button, and thus it was recorded as incomplete. Given the missing information among the 25 submitted surveys, all 33 responses were included in this report. Thus, the overall response rate, which includes the partial responses, was 49.3 percent. The urban county response rate was 63.2 percent, and the rural county response rate was 43.75 percent. To avoid empty table rows, all counties with missing information were excluded from analyses of that information. The number and proportion of valid responses for each survey question are available in Appendix D.

As with any self-reported survey data, the accuracy of the reported information is difficult to evaluate. However, some numbers reported in the survey are different from the publicly available information; specifically, the annual reports of drug overdose cases, of jurisdictional cases, and of total cases (jurisdictional and non-jurisdictional). Moreover, two counties (Appendix E, Table E2) reported the same or very similar number of autopsies conducted during the study period. Because of these findings, readers should exercise caution on how they use these data in decision making.

Inventory of the C/ME offices in rural and urban Pennsylvania including facilities, forensic capacity, vehicles, and equipment.

Among the 33 counties participating in the survey, 32 provided information on their inventory: 11 (eight urban and three rural) reported having a centralized forensic facility, and 15 counties (eight urban and seven rural) have a county morgue (Table 1, Figure 3).

Sixteen of the 32 counties (eight urban and eight rural) reported having refrigerated morgue spaces; most urban (67 percent) counties had 10 or more refrigerated morgue spaces, while the norm among rural counties was six to 10 spaces. Additionally, six counties (five urban and one rural) reported the availability of separate storage for decomposed or hazardous bodies: 41.7 percent of urban counties reported separate storage for hazardous materials compared to 5 percent of the participating rural counties.

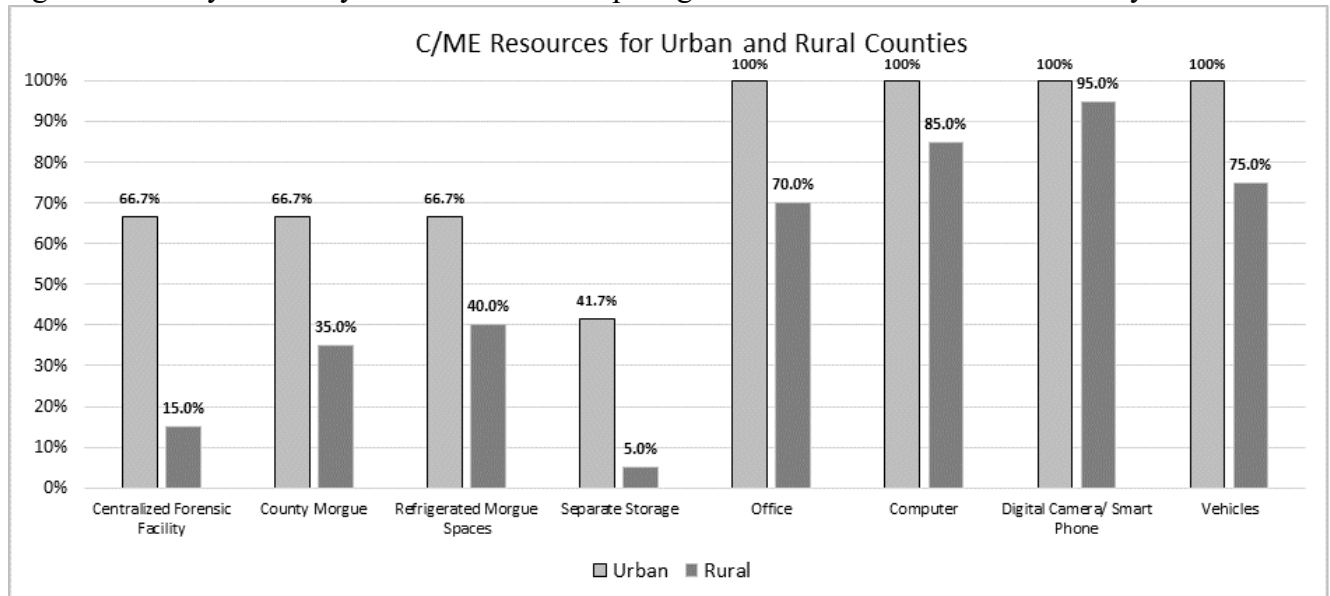
All urban and most rural counties have an assigned office and a computer. However, about one third of the rural counties did not have an assigned office and at least two of these rural counties did not have a computer either. Thus, all 12 participant urban counties had a C/ME county-provided office, computer, and camera or smart phone for taking pictures, and all but one (Erie County) had three or more county-owned vehicles. However, only 14 of the 20 rural counties had a county office, 17 had a county-provided computer, 19 had access to a device capable of taking pictures, and 15 had access to a county-owned vehicle. One rural county (Franklin) reported availability of three or more vehicles, and one (Washington) had access to two vehicles; the other 13 had access to only one vehicle.

Table 1. Inventory of forensic capacity, vehicles, and equipment in the C/ME offices of rural and urban Pennsylvania

	Centralized Forensic Facility	County Morgue	Refrigerated Morgue Spaces	Separate Storage	Office	Computer	Digital Camera/ Smart Phone	#Vehicles (0, 1, 2, 3+)
URBAN								
Allegheny	✓				✓	✓	✓	3
Berks					✓	✓	✓	3
Bucks	✓	✓	>10	✓	✓	✓	✓	3
Chester					✓	✓	✓	3
Cumberland		✓	6-10	✓	✓	✓	✓	3
Erie	✓	✓	1-5		✓	✓	✓	1
Lancaster	✓	✓	>10	✓	✓	✓	✓	3
Lehigh	✓	✓	>10		✓	✓	✓	3
Luzerne	✓	✓	>10		✓	✓	✓	3
Montgomery	✓	✓	>10	✓	✓	✓	✓	3
Westmoreland	✓	✓	>10	✓	✓	✓	✓	3
York					✓	✓	✓	3
Total Urban (N=12)	8 (66.7%)	8 (66.7%)	8 (66.7%)	5 (41.7%)	12 (100%)	12 (100%)	12 (100%)	34+ (100%)
RURAL								
Armstrong					✓	✓	✓	1
Blair					✓	✓	✓	1
Bradford		✓	6-10		✓	✓	✓	1
Carbon						✓	✓	0
Clarion	✓	✓	1-5		✓	✓	✓	1
Columbia							✓	0
Forest						✓	✓	0
Franklin	✓	✓	>10		✓	✓	✓	3
Greene					✓	✓	✓	1
Mercer							✓	0
Mifflin		✓	6-10		✓	✓	✓	1
Monroe					✓	✓	✓	1
Montour			>10			✓	✓	1
Pike					✓	✓	✓	1
Schuylkill	✓	✓	>10		✓	✓	✓	1
Sullivan					✓	✓	✓	0
Susquehanna		✓	6-10	✓	✓	✓	✓	1
Venango		✓	6-10		✓	✓		1
Washington					✓	✓	✓	2
Wyoming							✓	1
Total Rural (N=20)	3 (15%)	7 (35%)	8 (40%)	1 (5%)	14 (70%)	17 (85%)	19 (95%)	18+ (75%)
Total (N=32)	11	15	16	6	26	29	33	52+

Figure 3 provides the proportional distribution of county-owned resources, illustrating a consistently lower availability of resources in rural counties as compared to urban counties.

Figure 3. County Inventory Available to Participating C/MEs in Urban and Rural Pennsylvania



Inventory of the C/ME offices in rural and urban Pennsylvania including staffing and training resources and other relevant factors.

Figure 4 displays the personnel by type of employment, full-time (FTE) or part-time (PTE), overall and for urban and rural areas represented in the survey. The data indicate that rural counties tend to have more part-time rather than full-time personnel as compared to the urban counties.

As of December 31, 2021, the ABMDI website (<https://abmdi.org/>) listed 123 certified medicolegal death investigation professionals in Pennsylvania. A total of 11 urban counties (57.8 percent) and 10 rural counties (20.8 percent) had at least one person listed as ABMDI-certified. Of the 26 C/MEs who responded to the continuing education item, eight urban coroners completed an average of 44 hours each and 18 rural coroners completed an average of 20 hours each. Three urban coroners either failed to respond to this item or entered 0; these were not

included in the calculation of total or average hours of continuing education. (Appendix E, Table E2)

Figure 4. Personnel by Type of Employment for Urban and Rural Counties

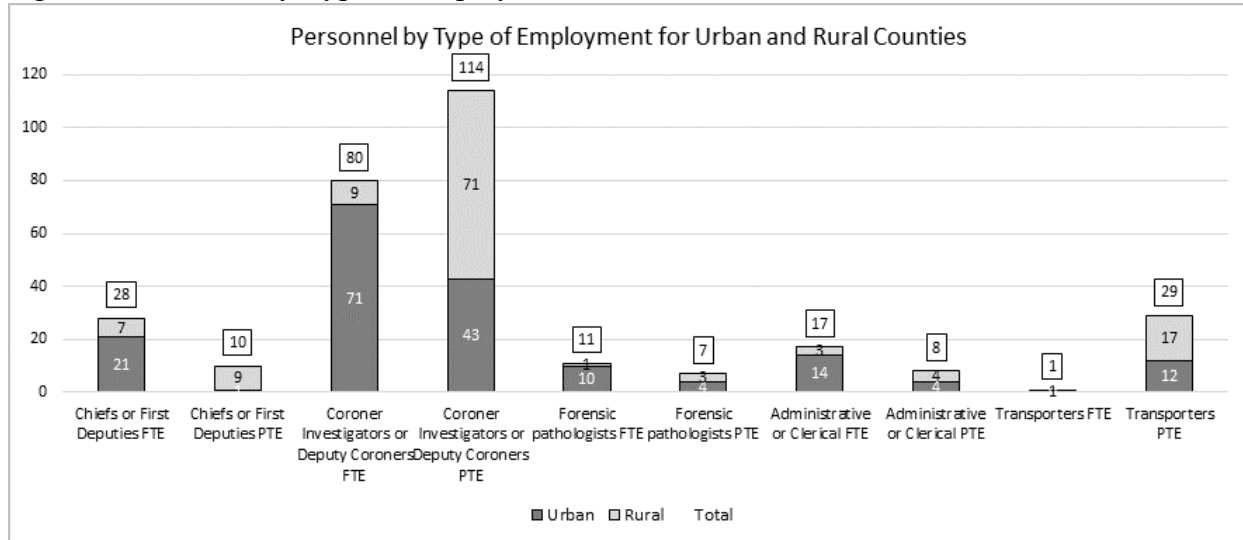


Figure 5. Distribution of Accreditation Status

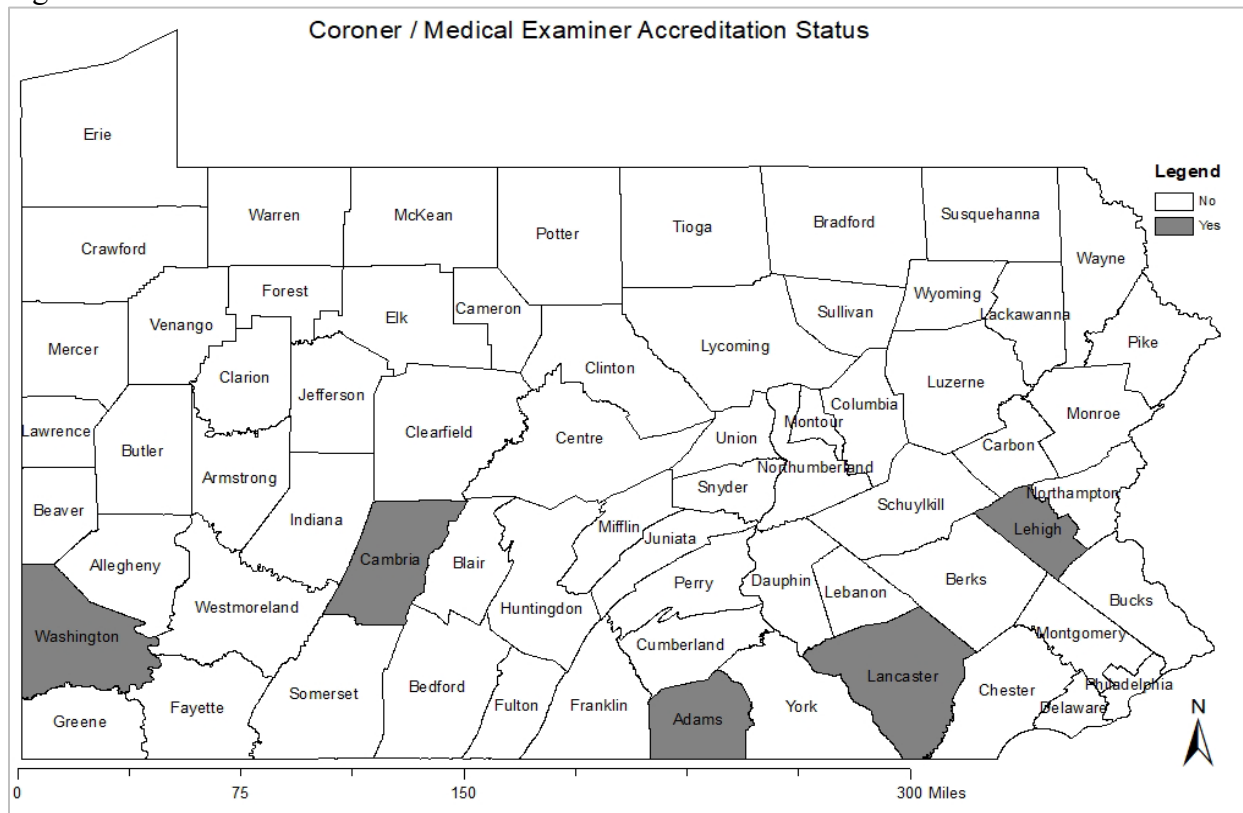


Figure 5 displays the accreditation status among all Pennsylvania counties: five counties

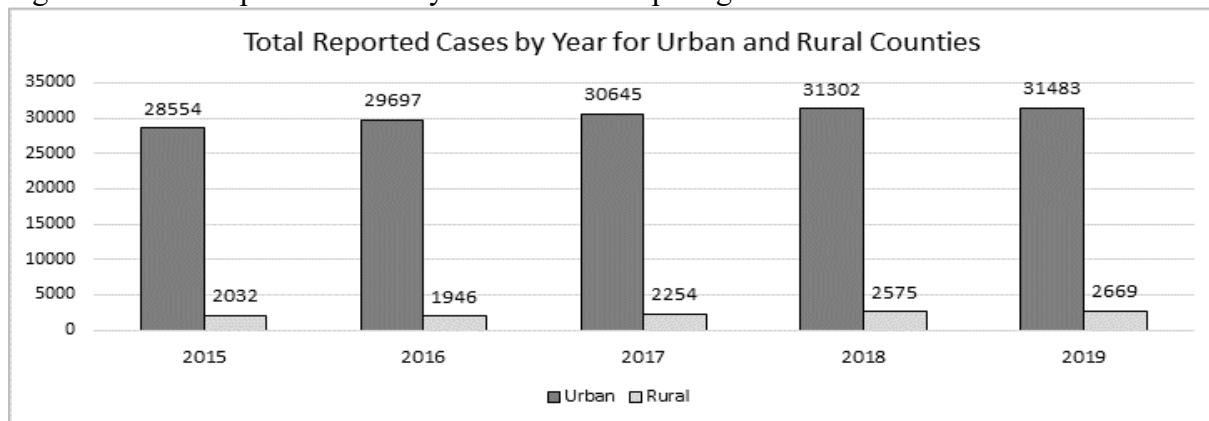
are accredited by IACME. One county is known to have failed accreditation due to inadequate facilities and excessive forensic pathologist workload (IACME, 2022).

Documentation and trend analysis of the total number of jurisdictional and non-jurisdictional cases for each county C/ME office over the past five years.

Jurisdictional and non-jurisdictional cases combined make up the total reported cases of a C/ME office. When a death is reported or referred to a C/ME office, a determination is made as to whether the office will take jurisdiction (sometimes called “accepting” the case). Accepting jurisdiction means the office will conduct further investigation into the death, ranging from review of medical records up to and including autopsy. Cases not accepted for further investigation are classified as non-jurisdictional. Investigation of non-jurisdictional cases is usually limited to taking a phone report, confirming the death was due to natural causes, and contacting health care providers for information and confirmation they are willing and able to sign the death certificate.

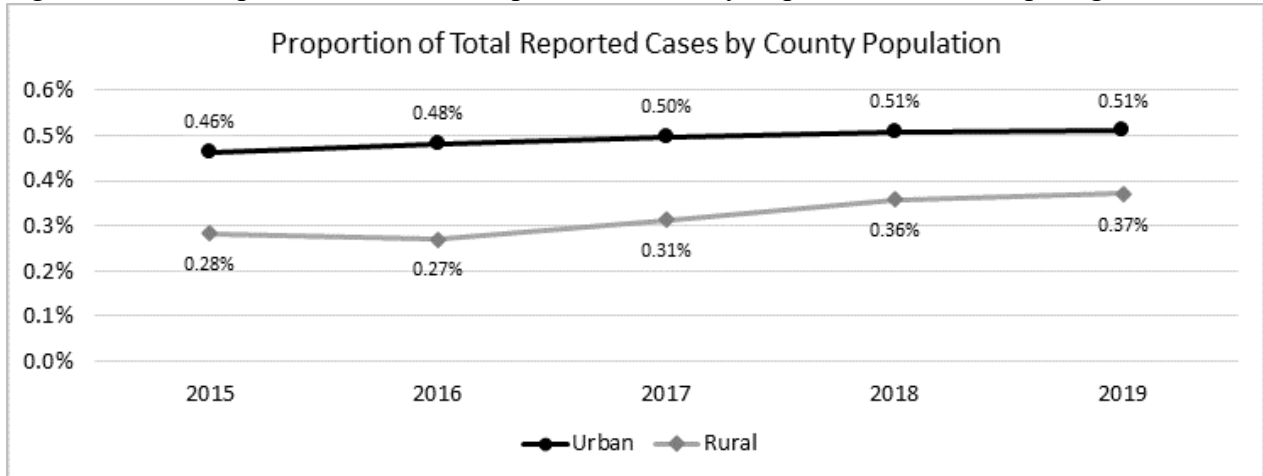
Total Reported Cases: The survey respondents from the participating urban and rural counties reported their number of cases for 2015 through 2019, as shown in Figure 6; the rural/urban caseload ratio is less than 1:10.

Figure 6. Total Reported Cases by Year for Participating Urban and Rural Counties



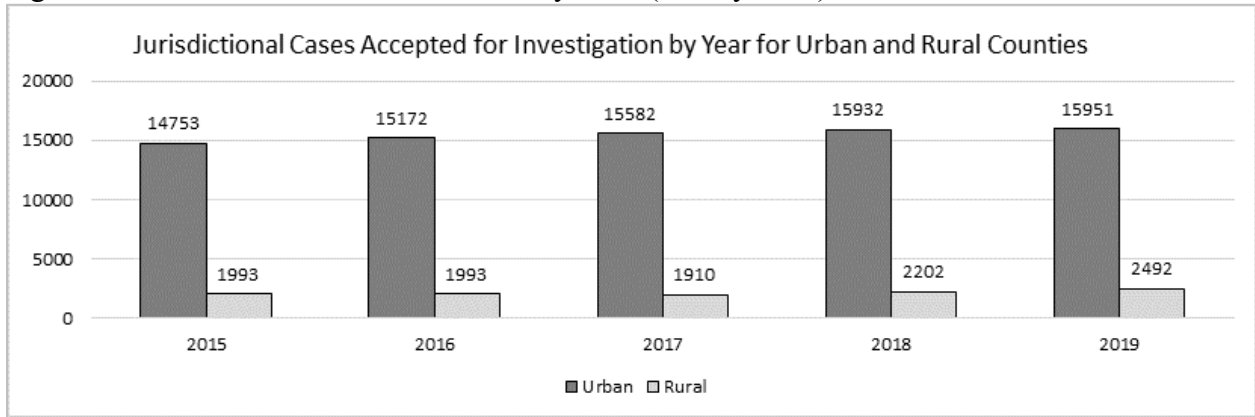
The overall proportion of cases in urban counties was fairly constant over the five-year period, while the proportion of cases in rural areas was on the rise (Figure 7).

Figure 7. Total Reported Cases as a Proportion of County Population for Participating Counties



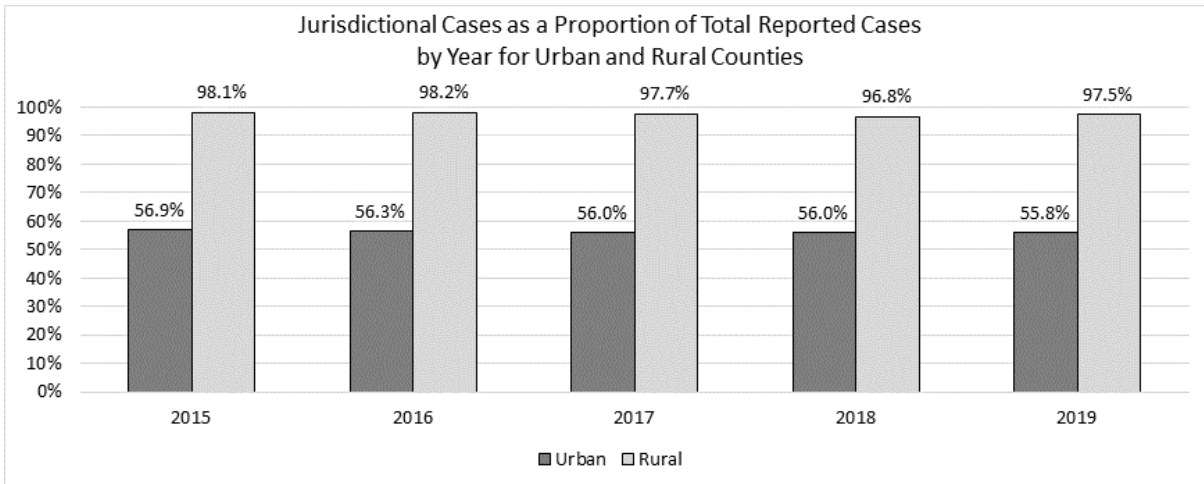
Jurisdictional Cases: Twenty-one counties submitted reliable 5-year data on jurisdictional cases. The number of jurisdictional cases in the urban and rural counties is shown in Figure 8; the jurisdictional caseload in urban counties was approximately 15,000 to 16,000 deaths per year, while in rural counties it was 2,000 cases, on average. Urban counties had an 8 percent increase and rural counties had a 25 percent increase in jurisdictional cases over the five years. Total reported caseload was available for 12 urban and 10 rural counties, while jurisdictional cases were reported by 11 urban and 10 rural counties. It is noteworthy that Montour County had a significantly higher number of jurisdictional cases than the rest of the counties, urban or rural. This may be because Montour County has more hospitals per capita than any other Pennsylvania county. It is also possible that these data might be inaccurate (See Appendix E, Table E2). Note the striking similarities between the number of cases reported by Montour and Monroe counties for the years in the study period; the similarity is impossible to explain.

Figure 8. Number of Jurisdictional Cases by Year (Survey Data)



Among rural counties, with very few exceptions, jurisdiction was accepted in almost all reported cases, while in urban areas, the proportion of cases accepted for investigation was about 56 percent across all five years. Figure 9 shows the proportion of jurisdictional cases that were accepted for investigation from among all cases, by year, for urban and rural regions. In urban areas, the proportion of cases accepted for investigation and certification was about the same (56 percent) over the study period (2015-2019), while in rural areas the proportions ranged between 96.8 percent and 98.1 percent.

Figure 9. Jurisdictional Cases as a Proportion of Total Reported Cases by Year for Urban and Rural Counties



Documentation and trend analysis of the total number of autopsies for participating county C/ME office over the past five years.

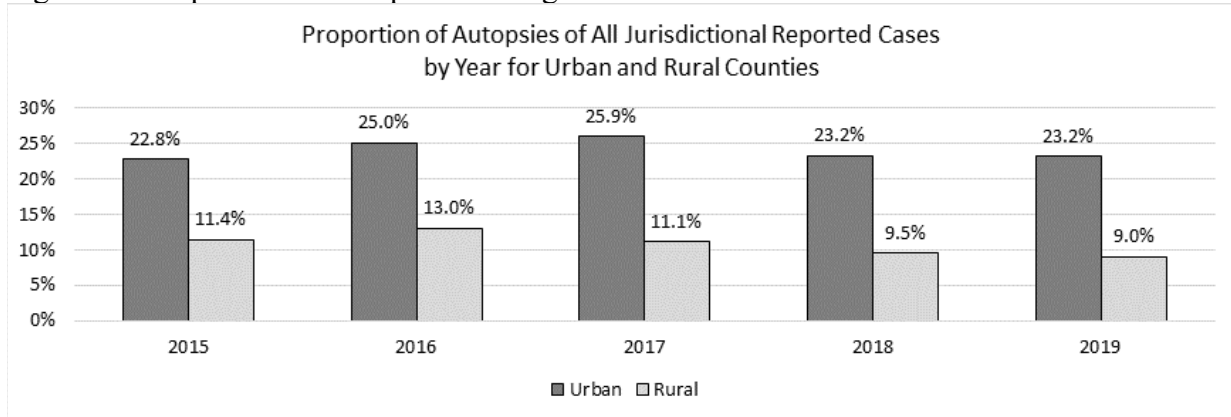
Survey participants from 27 counties (11 urban and 16 rural) reported that during 2015-2019 they conducted a total of 21,617 autopsies; on average, there were 4,323 autopsies conducted every year. The average number of autopsies per year was 3,718 for all urban areas combined and 605 for all rural areas. Table 2 displays the number of autopsies (external, partial, full) conducted annually in urban and rural areas.

Table 2. Number of Autopsies (external, partial, and full) Reported in the Survey (2015-2019)

	2015	2016	2017	2018	2019	# Performed by a BCFP	Trend
Urban	3,365	3,798	4,036	3,700	3,693	11	No change
Rural	569	651	648	575	582	16	No change
Total	3,934	4,449	4,684	4,275	4,275	27	No change

In 29 of the 33 counties that were surveyed, autopsies were performed by a board-certified forensic pathologist (BCFP); the other four counties (Clarion, Lycoming, Mifflin, Venango) either did not answer the question or their autopsies were not performed by a BCFP. The number of autopsies per year appear to be fairly consistent over time; the variations from one year to another may be accounted for by the changes in the population. During the five-year period, about a quarter of all urban jurisdictional cases had an autopsy, as compared to about 10 percent of all rural jurisdictional cases (Figure 10).

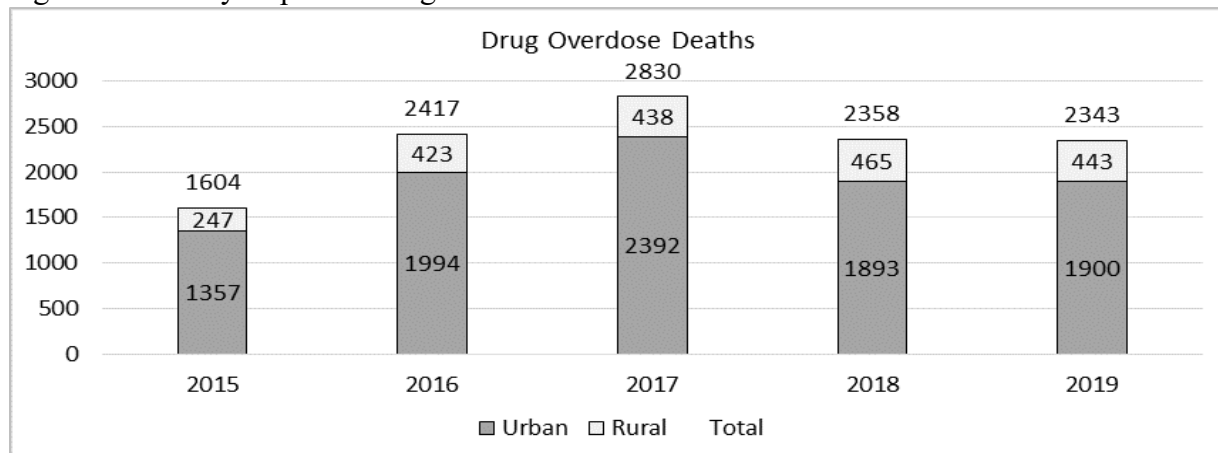
Figure 10. Proportion of Autopsies Among Jurisdictional Cases for Urban and Rural Counties



Documentation and trend analysis of the total number of overdose deaths for each county C/ME office over the past five years.

Figure 11 displays the total number of deaths due to drug overdose in the urban and rural counties participating in the survey.

Figure 11. Survey Reported Drug Overdose Deaths



The survey data indicated that, while there was an increase in the number of cases between 2015 and 2017, overall, the number of drug overdose deaths dropped in 2018 and 2019. In rural areas, the number of drug overdose deaths increased in 2016 and 2017, as compared to the prior year, with the greatest increase in 2016. Urban areas experienced an increase in 2016 and 2017, but recorded a significant decrease in 2018, and maintained it in 2019.

Table 3 shows the number of drug overdose deaths collected via the survey, side-by-side with the data obtained from OverDoseFreePA (2021). This table shows the presence of slight discrepancies between the two data sources.

Table 3. Number of Drug Overdose Deaths (any manner) by Year (Survey & Official Data)

	2015		2016		2017		2018		2019		2020
	Survey	DEA	Survey	DEA	Survey	DEA	Survey	DEA	Survey	DEA	DEA
URBAN											
Allegheny	424	424	650	650	737	737	492	492	571	571	690
Berks	73	66	123	111	119	111	100	95	126	117	129
Bucks	134	106	187	168	248	231	236	214	188	184	193
Chester	68	74	98	98	144	144	112	112	104	97	105
Cumberland	41	38	66	58	84	74	52	47	46	40	43
Erie	59	61	95	90	124	117	82	75	76	70	n/a
Lancaster	80	77	117	116	168	165	108	108	104	102	148
Lehigh	110	99	144	134	188	174	173	160	166	158	134
Luzerne	95	144	142	140	164	160	172	157	128	126	166
Montgomery	178	142	249	231	245	225	210	197	252	234	244
Westmoreland	n/a	126	n/a	173	n/a	193	n/a	122	n/a	115	123
York	95	95	123	129	171	173	156	157	139	141	194
Total Urban	1357	1452	1994	2098	2392	2504	1893	1936	1900	1955	1009
RURAL											
Armstrong	20	27	42	41	36	39	28	22	28	20	27
Blair	32	21	29	43	27	48	29	25	27	29	55
Bradford	16	12	21	17	22	15	24	18	28	17	12
Carbon	18	17	18	17	28	27	36	35	26	25	19
Clarion	n/a	5	n/a	7	n/a	6	n/a	11	n/a	5	6
Columbia	8	13	16	18	22	15	16	19	17	14	4
Forest	1	4	0	0	1	4	1	0	1	4	4
Franklin	24	21	46	39	35	36	32	32	26	26	29
Greene	n/a	14	n/a	19	n/a	13	n/a	9	n/a	17	12
Lycoming	n/a	19	n/a	34	n/a	34	n/a	25	n/a	21	36
Mercer	16	16	31	31	41	40	53	51	43	40	44
Mifflin	15	5	11	6	17	13	13	13	7	6	4
Monroe	3	45	5	41	11	57	16	54	18	59	86
Montour	n/a	5	n/a	5	16	12	19	18	24	20	22
Pike	7	6	14	10	15	13	17	17	14	13	15
Schuylkill	0	25	61	59	48	38	78	68	93	81	87
Sullivan	2	4	1	4	1	4	0	0	0	0	0
Susquehanna	3	6	9	9	6	6	9	10	3	4	4
Venango	n/a	11	n/a	9	n/a	4	n/a	9	n/a	7	14
Washington	73	73	109	106	97	97	76	71	76	75	75
Wyoming	9	7	10	7	15	11	18	15	12	9	4
Total Rural	247	356	423	522	438	532	465	522	443	492	559
Total	1604	1808	2417	2620	2830	3036	2358	2458	2343	2447	1568

Table 4 reports the death rates per 100,000 people for urban and rural counties, and by year.

COVID-19 death rates per 100,000 for 2020 and 2021 were computed with data from the

USAFACTS (2022).

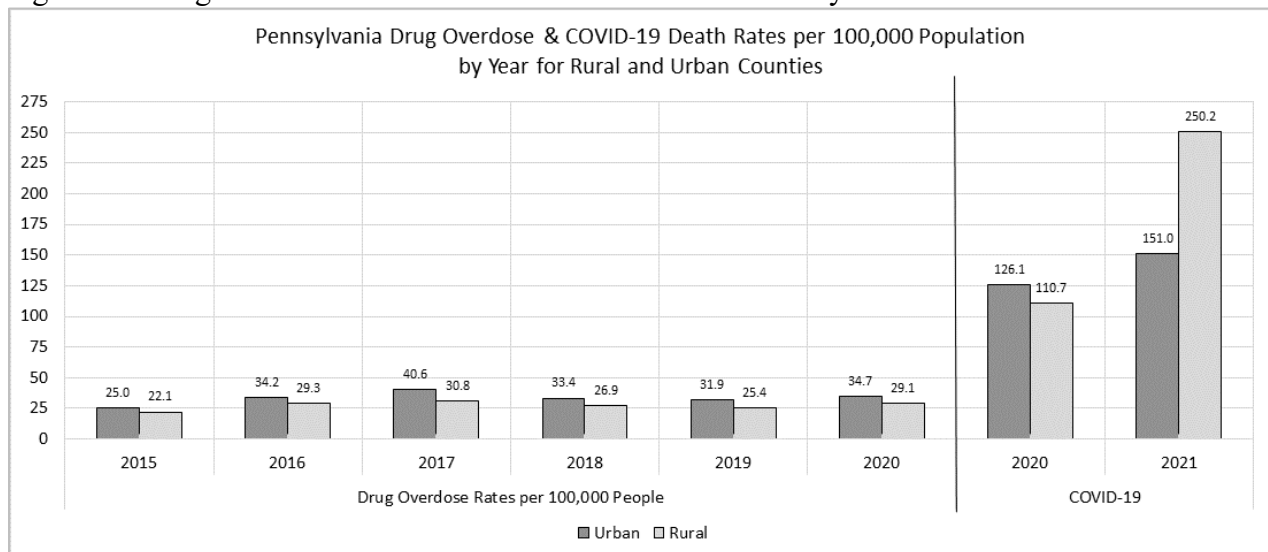
Table 4. Drug Overdose Death Rates and COVID-19 Death Rates per 100,000 People in Urban and Rural Pennsylvania Counties Participating in the Survey (DEA, 2021)

	OD 2015	OD 2016	OD 2017	OD 2018	OD 2019	OD 2020	COVID- 19 2020	COVID- 19 2021
URBAN								
Allegheny	34.9	53.5	60.6	40.5	47.0	56.7	83.0	141.1
Berks	15.7	26.4	26.4	22.6	27.8	30.6	134.2	179.0
Bucks	16.9	26.7	36.8	34.1	29.3	30.7	143.9	103.3
Chester	14.1	18.7	27.4	21.3	18.5	20.0	97.5	86.7
Cumberland	15.0	22.9	29.2	18.5	15.8	17.0	118.0	166.6
Erie	22.6	33.4	43.4	27.8	26.0	n/a	80.8	152.7
Lancaster	14.1	21.3	30.2	19.8	18.7	27.1	134.0	150.8
Lehigh	26.8	36.3	47.1	43.3	42.8	36.3	136.2	147.3
Luzerne	45.4	44.1	50.4	49.5	39.7	52.3	145.9	191.2
Montgomery	17.1	27.8	27.1	23.7	28.2	29.4	138.0	102.2
Westmoreland	36.1	49.6	55.3	35.0	33.0	35.3	121.2	200.1
York	21.2	28.7	38.5	35.0	31.4	43.2	93.3	172.8
RURAL								
Armstrong*	41.7	63.3	60.2	34.0	30.9	41.7	106.59	318.22
Blair	17.2	35.3	39.4	20.5	23.8	45.1	143.64	265.95
Bradford	19.9	28.2	24.9	29.8	28.2	19.9	92.83	162.46
Carbon	26.5	26.5	42.1	54.5	39.0	29.6	140.23	221.25
Clarion	13.0	18.2	15.6	28.6	13.0	15.6	119.67	325.20
Columbia	20.0	27.7	23.1	29.2	21.6	6.2	109.29	184.72
Forest	55.2	0.0	55.2	0.0	55.2	55.2	41.40	386.37
Franklin	13.5	25.2	23.2	20.6	16.8	18.7	145.14	209.64
Greene	38.6	52.4	35.9	24.8	46.9	33.1	41.40	179.39
Lycoming	16.8	30.0	30.0	22.1	18.5	31.8	106.80	284.20
Mercer	14.6	28.3	36.6	46.6	36.6	40.2	129.77	263.20
Mifflin	10.8	13.0	28.2	28.2	13.0	8.7	257.92	257.92
Monroe	26.4	24.1	33.5	31.7	34.7	50.5	117.46	127.44
Montour*	27.4	27.4	65.8	98.7	109.7	120.7	137.14	307.19
Pike	10.8	17.9	23.3	30.5	23.3	26.9	59.13	71.67
Schuylkill	17.7	41.7	26.9	48.1	57.3	61.5	173.32	218.59
Sullivan	65.9	65.9	65.9	0.0	0.0	n/a	49.46	412.13
Susquehanna	14.9	22.3	14.9	24.8	9.9	9.9	96.71	116.54
Venango	21.7	17.8	7.9	17.8	13.8	27.6	92.76	301.97
Washington	35.3	51.2	46.9	34.3	36.3	36.3	63.33	184.66
Wyoming	26.1	26.1	41.1	56.0	33.6	14.9	108.23	223.93

Between 2015 and 2017, drug overdose death rates increased in most counties; in 2018 and 2019 the rates were slightly lower, but they rose again in 2020, during the pandemic. During the first 10 months of the COVID-19 pandemic, the death rates varied greatly across urban and rural counties. At best, the COVID-19 death rates were only slightly above the drug overdose death rates, but most counties, especially those with regional hospitals, recorded rates that were three to 17 times greater than the drug overdose death rates.

Using the data for the entire state, not just for the survey participants, Figure 12 presents the death rates per 100,000 for drug overdoses (2015-2020) and for COVID-19 (2020-2021).

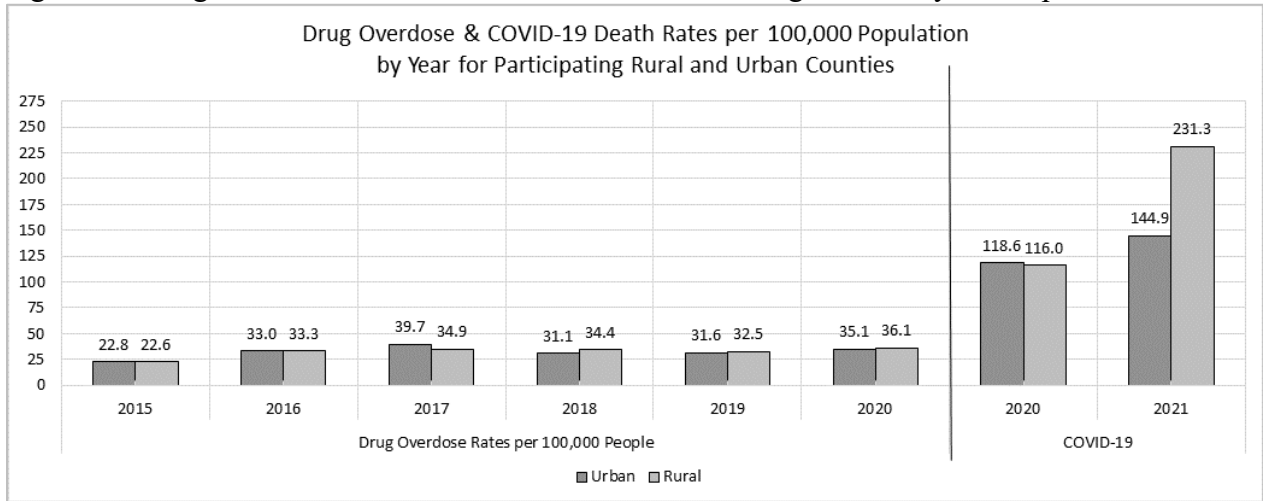
Figure 12. Drug Overdose and COVID-19 Death Rates in Pennsylvania



Similarly, the data were graphed for the counties participating in this study (Figure 13). A close inspection of these two graphs shows that whether the data are analyzed for the entire state or only for the 33 participant counties, the patterns are the same. This means that, in spite of only half of Pennsylvania counties participating in the study, similar patterns emerged. Between 2015 and 2019, Pennsylvania’s drug overdose death rates varied between 25.0 to 40.6 per 100,000 in urban areas, and from 22.1 to 30.8 per 100,000 in rural areas (Figure 12). Among the survey participants, for the same time period, drug overdose death rates varied between 22.8 and 39.7

per 100,000 people for urban areas, and between 22.6 and 39.7 per 100,000 for rural areas (Figure 13). The overall state data show that drug overdose death rates were consistently lower in rural areas as compared to urban areas, although this pattern was not as noticeable among the counties participating in this study. COVID-19 death rates were significantly higher in rural areas as compared to urban areas, the opposite to drug overdose death rates.

Figure 13. Drug Overdose and COVID-19 Death Rates among the Survey Participants



Figures 14 and 15 show the hot spot similarities between the distribution of deaths associated with the opioid crisis (Figure 14) and the COVID-19 pandemic (Figure 15) per 100,000 people for 2020. Note that the shading palette has different meanings in these two maps, given the large difference in the range of rates. At the time of this research, in January 2022, drug overdose deaths were not available for all counties; data are missing for Bedford, Delaware, Erie, Huntingdon, Lebanon, Potter, Somerset, Sullivan, and Warren counties. The visual inspection of the two maps shows that COVID-19 death rates appear to be higher in the counties located in the western I-76 corridor, central I-99 corridor, and eastern I-81 corridor, where drug overdose death rates are also higher. The death rates for drug overdose and for COVID-19 were lowest in the northern part of the state, above I-80.

Figure 14. Drug Overdose Death Rates per 100,000 in Pennsylvania (OverdoseFreePA, 2021)

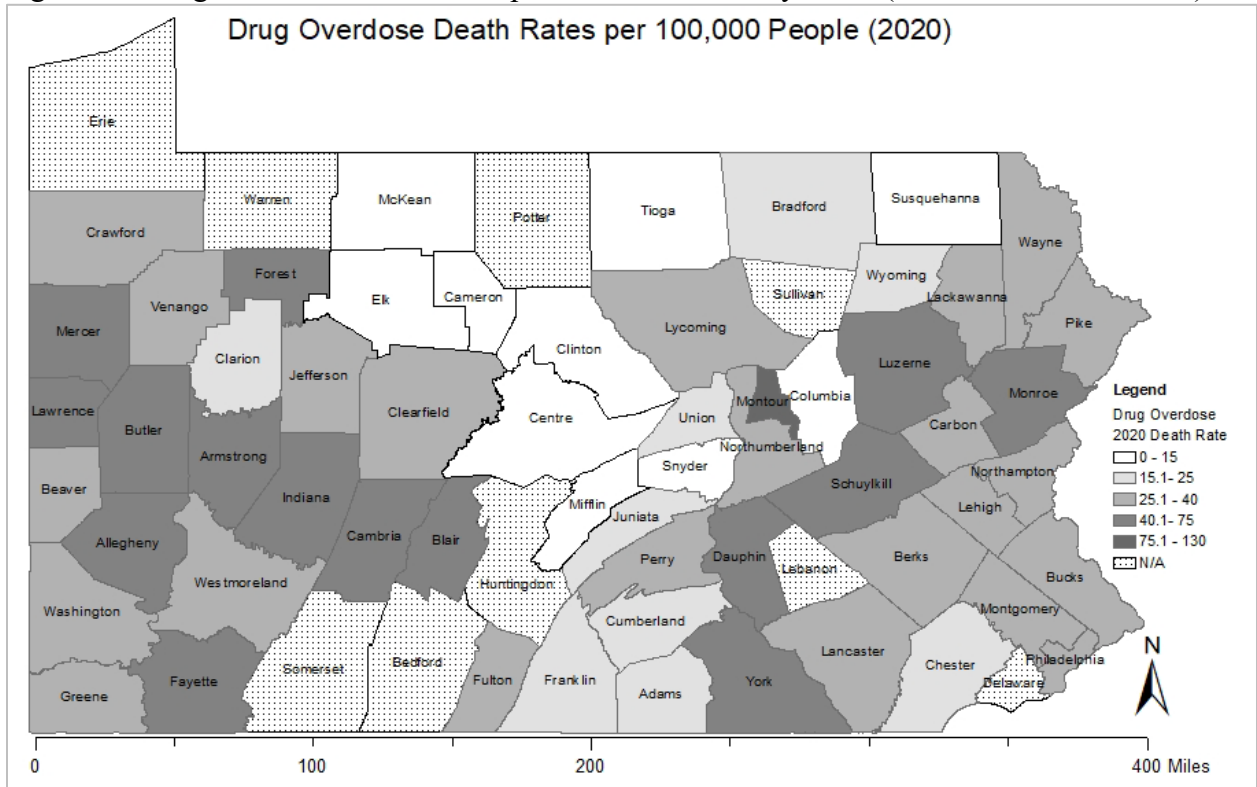
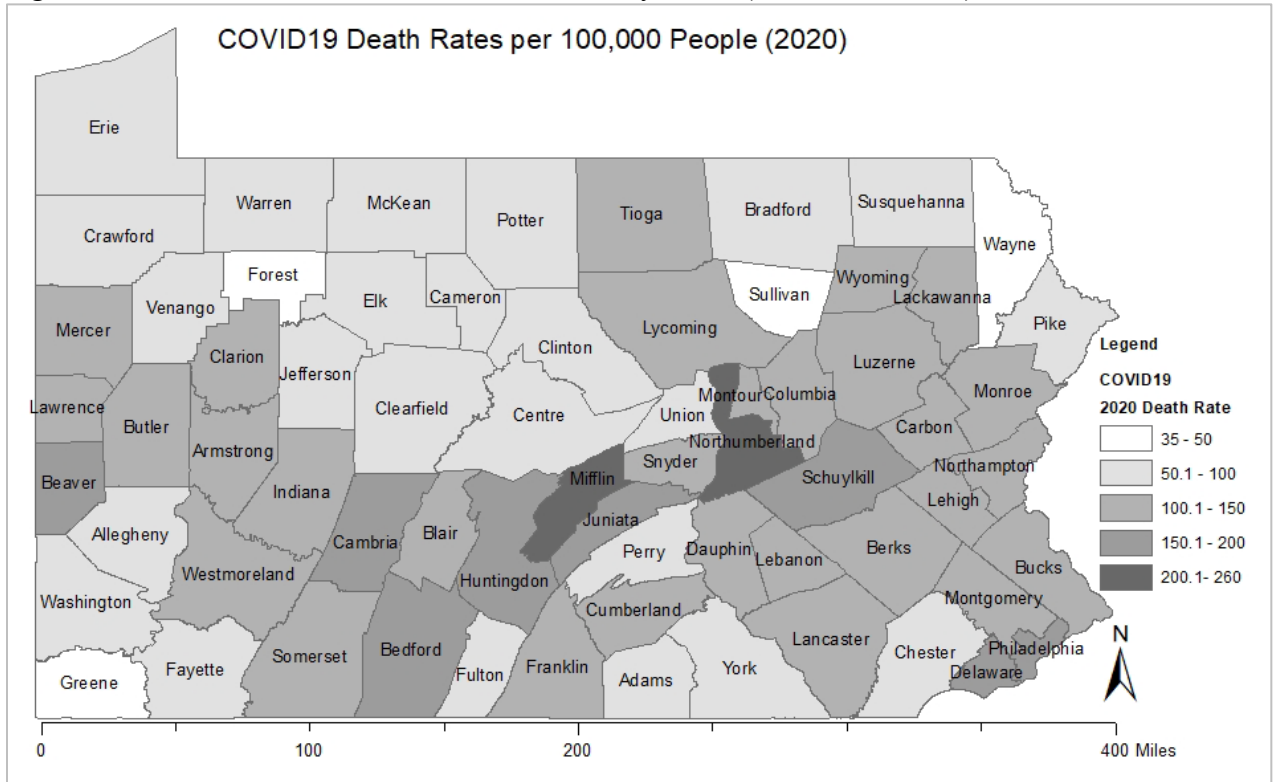


Figure 15. 2020 COVID-19 Death Rates in Pennsylvania (USAfacts, 2022)



Finally, Figure 16 and Table 5 show the reported current and the next 12-month COVID-19 impact across the counties participating in the survey.

Figure 16. Survey Reported COVID-19 Impact: Current and 12-Month

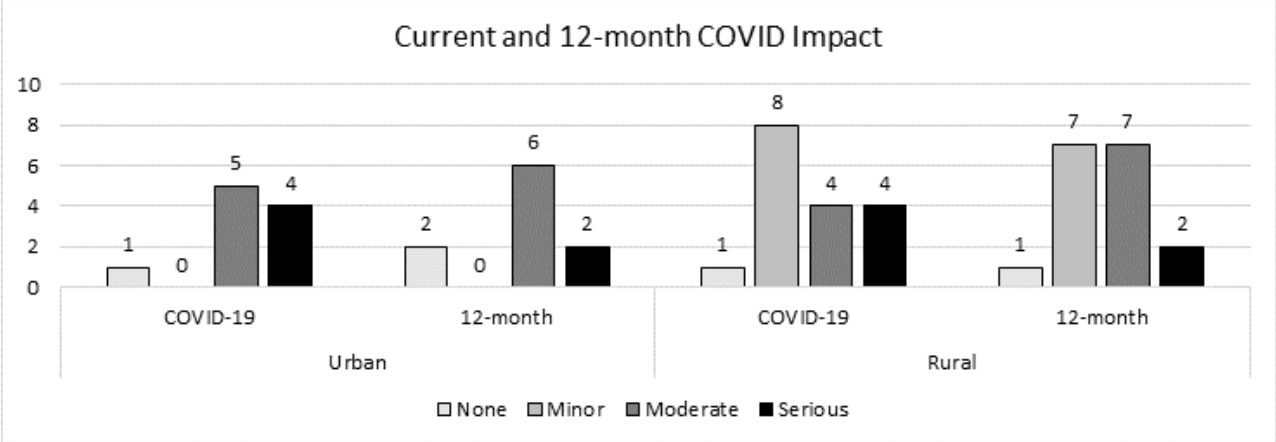


Table 5 shows that two counties (one urban, one rural) reported that the COVID-19 pandemic had no impact on their ability to provide services, eight rural counties were minimally affected, nine (five urban and four rural) were moderately affected, while eight counties (four urban and four rural) were seriously affected by the pandemic. Specifically, the C/ME services in Bucks, Chester, Montgomery, York, Armstrong, Blair, Monroe, and Montour counties were seriously affected by the pandemic.

The COVID-19 pandemic is expected to have no impact on C/ME offices’ abilities to provide services in three counties (Cumberland, Erie, and Susquehanna), seven rural counties expect to be minimally affected, 13 (six urban and seven rural) expect to be moderately affected, and four counties (two urban and two rural) expect a serious impact. In four counties (Chester, York, Blair and Monroe) the COVID-19 pandemic had a serious impact and will continue to severely impact the C/ME offices’ abilities to provide services. The rural counties that appear to have been least affected are Sullivan, Susquehanna, Schuylkill, Carbon, Columbia, Forest, Franklin, and Lycoming (Table 5).

Table 5. Impact of Coronavirus Pandemic on Office Services

	2020-2021 (During Pandemic)	12-Month (2022 expected impact)
URBAN		
Berks	Moderate	Moderate
Bucks	Serious	Moderate
Chester	Serious	Serious
Cumberland	Moderate	None
Erie	None	None
Lancaster	Moderate	Moderate
Lehigh	Moderate	Moderate
Luzerne	Moderate	Moderate
Montgomery	Serious	Moderate
York	Serious	Serious
Total Urban		
RURAL		
Armstrong	Serious	Moderate
Blair	Serious	Serious
Bradford	Moderate	Moderate
Carbon	Minor	Minor
Columbia	Minor	Minor
Forest	Minor	Minor
Franklin	Minor	Minor
Lycoming	Minor	Minor
Mercer	Moderate	Moderate
Mifflin	Minor	Moderate
Monroe	Serious	Serious
Montour	Serious	Moderate
Pike	Moderate	Moderate
Schuylkill	Minor	Minor
Sullivan	None	Minor
Susquehanna	Minor	None
Washington	Moderate	Moderate

Assessment of funding sources, levels, per case salary levels and comparison of rural and urban differences for C/ME offices in Pennsylvania.

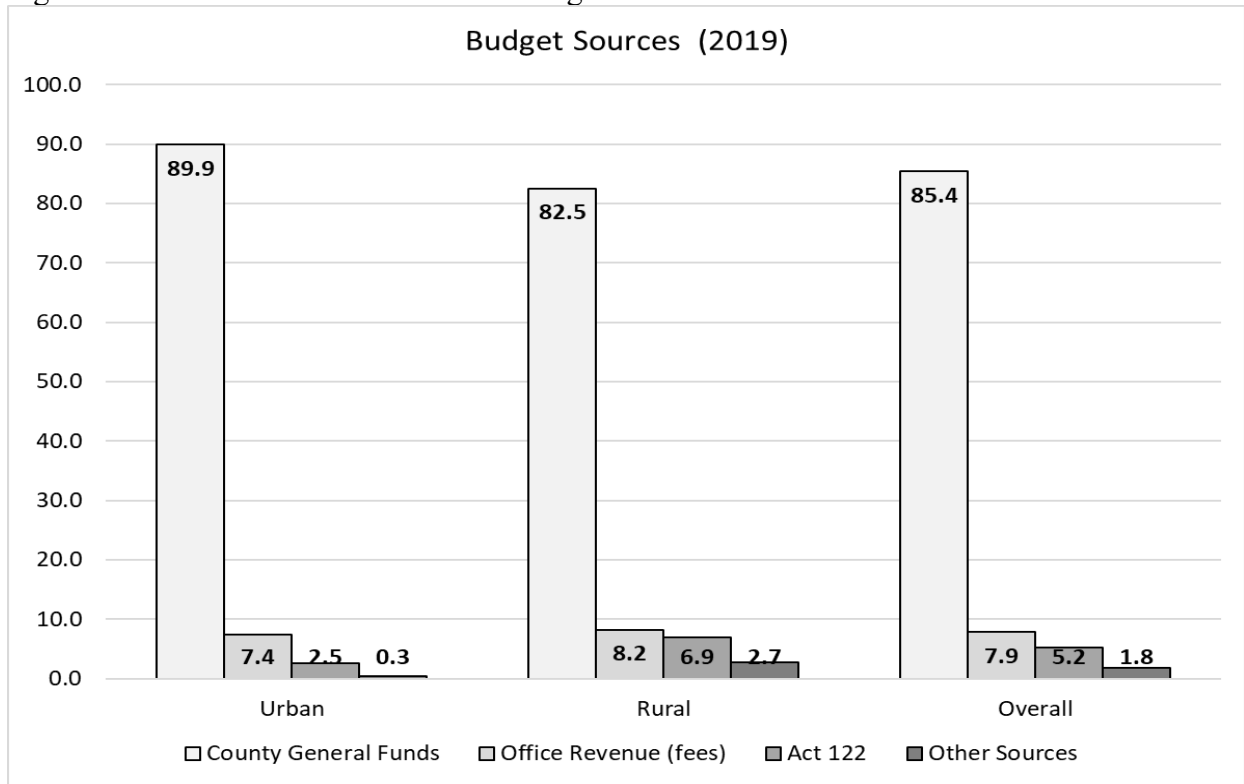
Table 6 and Figure 17 show that C/ME offices rely heavily on county funds. The largest proportion of Act 122 funds was found in Armstrong (30 percent), Blair (25 percent), and Susquehanna (20 percent). Office revenue (fees) provided at least 15 percent of the C/ME budget in three urban counties (Chester, Luzerne, and Montgomery) and two rural counties (Armstrong and Monroe). In 2018, the state legislature set cremation authorization permit fees at \$50, which

was less than some offices had been charging, resulting in a decrease in office revenue. Other sources (unspecified) were a significant proportion of office funding in only two rural counties, Blair (25 percent) and Susquehanna (10 percent).

Table 6. Estimated Percentage (%) of 2019 Budget by Source

	County General Funds	Office Revenue (fees)	Act 122	Other Sources
URBAN				
Allegheny	90	5	5	0
Berks	100	0	0	0
Bucks	95	0	5	0
Chester	80	15	4	1
Cumberland	95	3	1	1
Erie	100	0	0	0
Lancaster	100	0	0	0
Lehigh	90	8	2	0
Luzerne	72	25	3	0
Montgomery	76	18	5	1
York	91	7	3	0
Total Urban	90.1	7.1	2.6	0.3
RURAL				
Armstrong	50	20	30	0
Blair	40	10	25	25
Bradford	86	8	2	4
Carbon	98	1	1	0
Columbia	90	5	5	0
Forest	85	14	1	0
Franklin	86	10	2	2
Lycoming	85	14	1	0
Mercer	85	10	5	0
Mifflin	95	0	5	0
Monroe	70	20	10	0
Montour	80	10	10	0
Pike	100	0	0	0
Schuylkill	100	0	0	0
Sullivan	98	1	1	0
Susquehanna	60	10	20	10
Washington	94	6	0	0
Total Rural	82.5	8.2	6.9	2.7
Total	85.5	7.8	5.2	1.8

Figure 17. Coroner/ Medical Examiner Budget Source



Comparison of rural and urban Pennsylvania C/ME resources with established caseload benchmarks.

Table 7 reports county annual budgets for 2015-2019, the five-year average budget, and the five-year average 2013 benchmark, unadjusted for inflation. The five-year average benchmark was computed by multiplying the \$3.75/capita benchmark with the county estimated population for each year and then taking the average of the five annual estimated benchmarks. The five-year average of the reported budget for 2015-2019 was divided by the five-year average estimated benchmark to compute the proportion of the benchmark covered with the budget. The dollars are not adjusted for inflation.

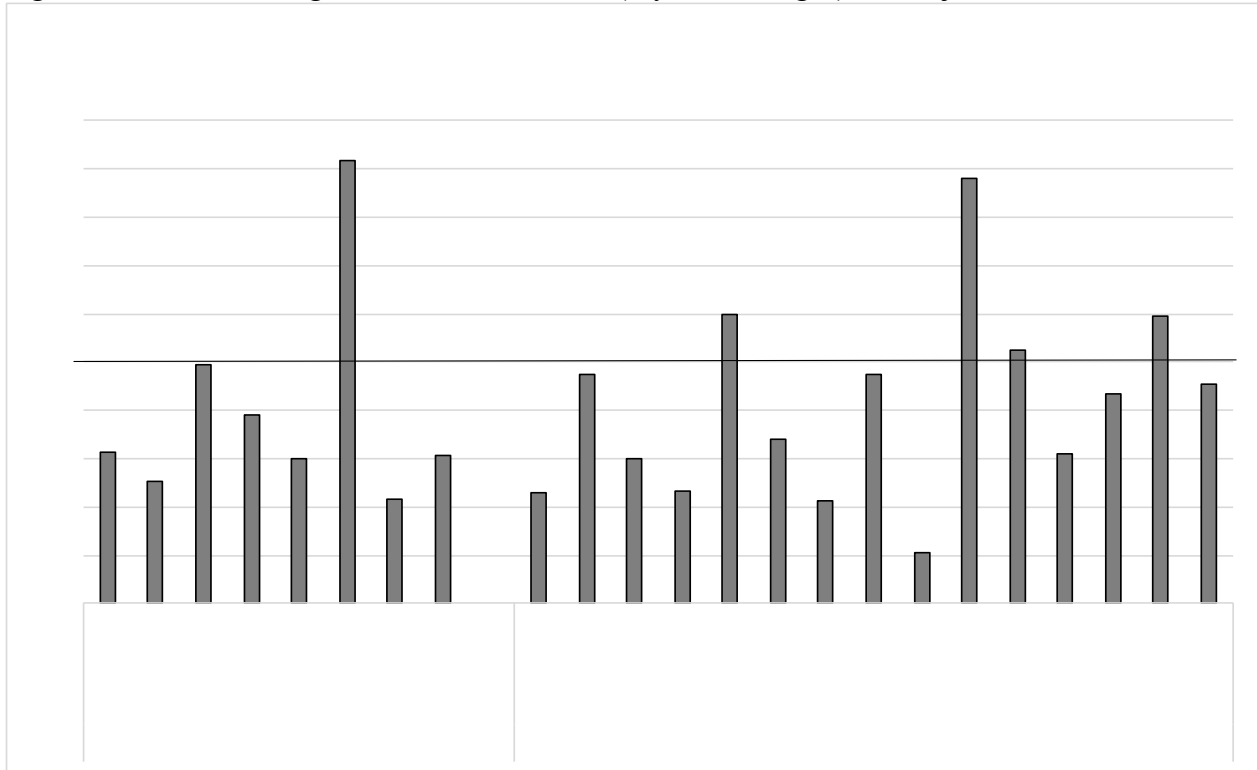
Table 7. Annual Budgets (\$) vs. Five-Year Benchmark

	2015	2016	2017	2018	2019	5-year Avg. Budget	5-year Avg. Benchmark	%Budget / Benchmark
URBAN								
Bucks	n/a	n/a	1,400,000	1,450,000	1,550,000	1,466,667	2,350,523	62.4%
Chester	848,000	900,000	996,400	987,300	1,175,300	981,400	1,948,349	50.4%
Cumberland	800,000	875,000	970,000	975,000	1,000,000	924,000	934,979	98.8%
Erie	700,000	700,000	800,000	850,000	950,000	800,000	1,026,881	77.9%
Lancaster	1,050,500	1,105,250	1,200,525	1,255,000	1,463,650	1,214,985	2,028,747	59.9%
Lehigh	2,024,525	2,413,095	2,574,360	2,736,475	2,795,083	2,508,708	1,368,947	183.3%
Luzerne	480,000	504,000	533,000	536,000	529,000	516,400	1,191,236	43.3%
York	695,000	875,000	1,207,000	1,104,000	1,232,000	1,022,600	1,670,867	61.2%
Total Urban	6,598,025	7,372,345	9,681,285	9,893,775	10,695,033	8,848,093	23,081,210	38.3%
RURAL								
Blair	190,200	197,500	220,400	227,200	225,900	212,240	461,837	46.0%
Bradford	177,000	229,786	221,050	206,834	253,272	217,588	228,612	95.2%
Carbon	140,000	140,000	144,000	145,000	152,000	144,200	239,578	60.2%
Columbia	100,000	100,000	130,000	120,000	120,000	114,000	246,431	46.3%
Forest	30,000	31,009	32,407	33,567	36,789	32,754	27,422	119.4%
Franklin	372,977	323,026	369,577	389,577	516,236	394,279	578,051	68.2%
Mercer	171,117	172,210	178,329	179,817	181,371	176,569	418,193	42.2%
Mifflin	130,978	140,791	153,491	184,187	213,000	164,489	173,537	94.8%
Monroe	110,000	115,000	130,000	145,000	155,000	131,000	630,121	20.8%
Montour	100,000	110,000	118,000	125,000	150,000	120,600	68,472	176.1%
Pike	181,506	224,668	226,959	227,735	228,190	217,812	207,947	104.7%
Schuylkill	331,000	331,000	331,000	331,000	331,000	331,000	535,026	61.9%
Sullivan	19,000	19,600	19,850	20,060	21,042	19,910	23,008	86.5%
Susquehanna	228,695	217,140	23,222	215,221	231,819	183,219	153,637	119.3%
Washington	570,000	600,000	700,000	849,551	812,144	706,339	777,047	90.9%
Total Rural	2,852,473	2,951,730	2,998,285	3,399,749	3,627,763	3,166,000	6,024,894	52.5%
Total	9,450,498	10,324,075	12,679,570	13,293,524	14,322,796	12,014,093	29,106,104	41.3%

Five counties (one urban and four rural) had a budget above the benchmark: Lehigh, Forest, Montour, Pike, and Susquehanna (Figure 18). Four counties were very close to the estimated benchmark: Cumberland, Bradford, Mifflin, and Washington. All others (14 counties) had a five-year budget that was below the estimated benchmark, for the same time period,

unadjusted for inflation. The lowest budget-to-benchmark ratios were in Luzerne and Chester among urban counties, and in Monroe, Mercer, Blair, and Columbia among rural counties.

Figure 18. Ratio of Budget to 2013 Benchmark (5-year Averages) - Unadjusted for Inflation



Overall, for 2019, the ratio between the reported costs and budgets for urban and rural areas was 86.6 percent, indicating that, after covering the reported known costs (personnel, staff training, autopsies, and toxicology), only about 13.4 percent of the budget remained to cover other costs (only counties with information reported on all of these measures were included in computations). In rural areas the residual budget was 22.2 percent versus 10.4 percent in urban areas.

County C/ME Website Data

Due to the limited response to the quantitative survey, the researchers performed an ad hoc review of publicly available data on C/ME office websites to determine if more reliable or confirmatory data were available. Eleven of the 19 urban counties and six of the 48 rural

counties posted either statistical data or an annual report. Further, 11 (16.4 percent) of the 67 C/ME offices provided current or past statistical information on their county website. Thirteen (19.4 percent) of the 67 C/ME offices posted an annual report, of which only four reported for 2020; the most recent posted annual reports for the other nine counties ranged from 2017-2019. Due to the low availability of public data, county website information was not included in the quantitative data analysis.

CONCLUSION

This study assessed how the opioid crisis and the COVID-19 pandemic, and the deaths resulting from these simultaneous crises, have impacted county C/ME offices in Pennsylvania. The results indicated a significant strain on county C/ME offices and revealed that there is significant room for improvement in the funding and quality of medicolegal death investigation in Pennsylvania.

The study also indicated that the processes of death investigation vary widely throughout the state. This may be due to the lack of uniformity and standardization of training, education, policies, and resources among C/ME offices in Pennsylvania, with resultant inequitable application of death investigations across counties. For example, there is an unexplained variability in the percent of autopsies performed out of the jurisdictional deaths. A small minority of county C/ME offices are accredited by the International Association of Coroners and Medical Examiners (IACME). The hodgepodge and multiplicity of county processes and standards make standardization of death investigation and performance impossible.

This study experienced challenges in that only a minority of Pennsylvania C/MEs participated and only a few have publicly available data. This challenge may present itself again

should there be a statewide assessment of the death investigation system that would determine if it meets the needs of key stakeholders in the death investigation process - including the citizens of Pennsylvania, the criminal and civil justice system, and public health and safety agencies.

The results from this study indicated that most rural and urban coroners have neutral or inadequate support from the county officials who control almost all of their funding. Most C/ME offices operate below benchmark levels of funding. The benchmark used in this study to examine the cost of death investigations was \$3.75 per capita, in 2013-dollars unadjusted for inflation. This benchmark was developed by the Scientific Working Group for Medical Death Investigations (SWGMDI, 2013), and it is recommended for regional death investigation centers; no other benchmark recommendation could be identified in the literature. The lack of funding creates a domino effect in death investigation services, such as the ability to seek accreditation from IACME, complete forensic death investigation services, and respond to the multitude of demands for data from state agencies. Further, C/ME autopsy rates vary considerably, perhaps due to variations in funding, staffing, practice preferences, and practice patterns that have evolved through past practices.

Pennsylvania, like the rest of the U.S., has a severe shortage of forensic pathologists who can serve as medical examiners or perform autopsies. The shortage of forensic pathologists, along with the limited resources available, serve as substantial barriers for C/ME office accreditation (IACME, 2022). An adequate supply of forensic pathologists ensures timely and accurate autopsies. Accurate autopsy findings identify trends in disease and death, and support quality death investigation for public health, the justice system, families, and hospitals (ASTHO Brief, 2019).

Efforts are needed to recruit and retain forensic pathology trainees in the specialty of forensic pathology. State policymakers can consider opportunities to increase the number of board-certified forensic pathologists, such as increasing funding for pathologists' salaries and forensic pathology fellowships. The state could also consider supporting an increase in the number of accredited forensic pathology fellowship programs along with medical school loan forgiveness. Forensic pathologists who train in a fellowship program and who chose to practice in Pennsylvania may have a meaningful impact on the quality of death investigation. However, student loan forgiveness may be critical to encourage them to remain in the state and practice forensic medicine in the public sector.

The study results indicate that there is opportunity to increase the number of medicolegal death investigators who are ABMDI-certified. Of the counties that participated in the study, 11 of the 19 urban (57.8 percent) and 10 of the 48 rural counties (20.8 percent) had at least one person listed as ABMDI-certified. This may represent an opportunity for medicolegal death investigators to pursue ABMDI certification to enhance the quality and accuracy of death investigation services. The results indicate that there is a strong need for increased education and training opportunities in all of the disciplines related to medicolegal death investigation.

Death investigators in rural counties may face greater barriers to pursuing certification, such as insufficient financial resources, the additional time needed to dedicate to education and training, and the part-time nature of their position.

Five Pennsylvania counties have a nationally accredited C/ME office. This represents an opportunity for the state to support additional county offices in their pursuit of accreditation by IACME. Death investigations should be conducted by accredited organizations and certified practitioners, and be in compliance with professional guidelines and practice standards (Hanzlick

and Fundenberg, 2014). Accreditation verifies that an office has a functional governing code, sufficient staff, equipment, training, and a suitable physical facility and produces a forensically documented, accurate, credible death investigation service (National Research Council, 2009)

The opioid crisis and the COVID-19 pandemic have had a significant impact on C/ME office operations and their caseload. C/ME offices have significant responsibility in death investigations related to the opioid crisis. They are responsible by law for investigating drug overdose deaths because they are not due to natural causes and often involve illicit substances. Opioids are a factor in more than 70 percent of cases in Pennsylvania. In Pennsylvania, there were 5,460 overdose deaths from June 2020 to June 2021, an 8.6 percent increase from the previous 12 months (Ahmad *et al*, 2022). This crisis has strained the budgets, staff time, capacity, and caseload of many C/ME offices. C/MEs reported that their staff experienced apathy, burnout, and psychological trauma as the number of drug overdose deaths increased throughout the crisis.

The opioid crisis and the strain that it places on C/MEs has been exacerbated by the continuing COVID-19 pandemic. COVID-19 death rates appear to be higher in counties that also have higher drug overdose death rates. This may intensify the stress placed on the C/ME office caseload capacity and strain the budget and resources of the office.

Public sources, such as county websites, were rarely informative about deaths and coroner operations. The research conclusion was that Pennsylvania's current death investigation system is not transparent and may not be providing the reliable and timely death data needed to inform the public, especially at the local county level. This topic requires additional research and identification of best practices that could be applied in Pennsylvania.

Clear and efficient communication channels between the C/ME office and the many agencies involved in death investigation - law enforcement, health care facilities, public health departments - are critical for collaboration and information sharing (Pearsall, 2010). Such agencies often do not understand the C/ME function and the importance of his or her involvement in forensic death investigation. Education and training across disciplines are needed to build communication channels.

The majority of C/MEs support investment in regional centers for autopsy/forensic pathology services as this would not be a significant change to their usual practice. C/MEs indicated that they currently transport bodies to regional centers for forensic pathology services and if there were a regional center, their process would not be disrupted. In fact, many considered this type of model the same as their current practice. C/MEs reported that it seemed appropriate for counties to share and contribute resources to a regional center for autopsy/forensic pathology services.

A low proportion of Pennsylvania C/MEs participated in this study, significantly limiting the conclusions that can be drawn from the data. Missing and occasionally unreliable data in this study therefore limit the conclusions that can be drawn. It is not known to what degree factors such as inadequate resources, lack of training, or perceptions of state government, influenced the low level of C/ME participation.

POLICY CONSIDERATIONS

Pennsylvania's Death Investigation Model

Pennsylvania's current decentralized county-based C/ME system means deaths are not investigated or reported in a uniform manner across the state. Increased standardization of operations and training might improve the quality and equitability of the current system:

- (1) The legislature should consider amending the County Code (Coroner statutes) to require every C/ME office to have written standard operating procedures (SOPs):
 - a. Pennsylvania State Coroners' Education Board to develop model standard operating procedures and include in training modules.
 - b. SOPs to include definition and standardization of policies regarding which cases are accepted for investigation and autopsy.
- (2) The legislature should consider state statutes to enact more stringent coroner qualifications and certification and training requirements (see below for specific recommendations).
- (3) A longer term recommendation is for the Pennsylvania General Assembly to explore whether a centralized state medical examiner system, such as that in Virginia, would better serve the future needs of Pennsylvania.

Forensic Pathologist Shortage

The following measures might increase the number of forensic pathologists in Pennsylvania:

- (1) Higher salaries for public sector forensic pathologists to be commensurate with those in the private sector (ex., state sets salaries, or shared county and state funding).
- (2) Medical school loan forgiveness for forensic pathologists working in the public sector for a minimum number of years (state funding).

(3) State grant similar to federal grant program (\$100,000 for one-year forensic pathology fellowship).

(4) J-1 visa sponsorship to recruit forensic pathologists.

Funding for Coroner/Medical Examiner Offices

The wide variability in funding of C/ME offices in Pennsylvania, with most C/ME offices operating below benchmark levels of funding, should be addressed to achieve more equitable death investigations across the state. The following actions could be considered:

(1) Standardize coroner salaries as in Ohio, a state of similar size that also has a county-based death investigation system.

(2) Increase Act 122 funding by increasing the C/ME proportion of death certificate fees from \$1 per death certificate issued to \$5 per death certificate issued.

(3) Increase cremation authorization permit fees from \$50 to \$100.

(4) Require C/ME office budgets to be no less than 80 percent of the 2013 national benchmark, adjusted for inflation.

Coroner Qualifications, Certification, and Training

There is general consensus in the scientific and professional literature that Pennsylvania needs to enact more stringent qualifications for coroners. Policy considerations include:

(1) Emulate legislation in other states (Ohio, Virginia, New York) requiring some level of medical expertise in county coroner offices.

(2) Require the lead investigator or coroner and the majority of death investigators (deputy coroners) to be ABMDI-certified.

(3) Increase state-required annual continuing education hours from eight to at least 12.

- (4) Pennsylvania State Coroners' Education Board to deliver regional training programs for C/MEs.

Accreditation of C/ME Offices

Only five of 67 C/ME offices in Pennsylvania are currently accredited by national agencies. The following policy considerations are suggested regarding physical facilities:

- (1) Implement Department of Labor and Industry inspections of all autopsy facilities that currently provide publicly funded forensic services.
- (2) Require hospitals, nursing homes, and counties to have a minimum amount of refrigerated morgue space for their occupancy or population.
- (3) Fund construction or modernization of forensic pathology facilities (minimum catchment area of 500,000) with American Rescue Plan or federal infrastructure grants.

Public Health and Judicial System

C/ME offices serve as a critical source of data for local, state, and national public health and judicial systems. C/MEs contribute key data to and sit on review committees that address deaths of children, mothers, and elders. Committees may also be focused on deaths due to opioids and other drugs. They serve their community by providing important health and safety information, as with the opioid crisis and the COVID-19 pandemic. C/MEs lack staff with data analysis expertise to respond quickly, accurately, and comprehensively to the overwhelming need for data. The results from this study indicate that little to no funding is available to C/ME offices for this work. The following policy considerations are suggested:

- (1) Increase grant-funded compensation directly to C/ME offices for fulfilling Pennsylvania Department of Health data requests; funding should be adjusted for population.

- (2) Counties with a population of 500,000 or more should employ at least one full-time data professional in the C/ME office to analyze and communicate office data.
- (3) Perform a state death certificate audit of physician and C/ME certifiers to assess whether these source documents conform to Centers for Disease Control and Prevention (CDC) standards.
- (4) Assess public communication strategies of C/ME offices.
- (5) Ensure C/ME offices have access to secure computer networks with robust case management systems.
- (6) Require annual reports that meet IACME or NAME accreditation standards.
- (7) Require statistical summaries of C/ME office caseloads to be posted monthly.
- (8) Require C/ME office annual reports to be posted on county website within six months of year's end.
- (9) Pennsylvania State Coroners' Education Board to include training in communication strategies and technology to enhance the quality and efficiency of C/ME offices.

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APPENDICES

Appendix A. Glossary

Coroner: Elected (occasionally appointed) officials, usually at a county level, responsible for investigating certain types of deaths as defined by state law occurring within their jurisdiction.

Coroners can be physicians, but a medical background is not required in Pennsylvania.

Medical Examiner: Medical doctors trained in forensic pathology who oversee death investigations in a specific jurisdiction, usually a city or heavily populated area. They are trained to perform autopsies in non-natural as well as natural deaths.

Forensic Pathologist: A physician who is certified in forensic pathology by the American Board of Pathology or who, prior to 2006, has completed a training program in forensic pathology that is accredited by the Accreditation Council on Graduate Medical Education or its international equivalent or has been officially “qualified for examination” in forensic pathology by the ABP (National Association of Medical Examiners [NAME], 2019).

Jurisdictional Case: A case that is reported to a C/ME office and is determined by the C/ME to require further investigation (also referred to as an “accepted” case).

Medicolegal Death Investigator: An individual who is employed by a medicolegal death investigation system to conduct investigations into the circumstances of deaths in a jurisdiction (NAME, 2019)

Autopsy: An external and internal examination of a deceased person.

Toxicology: The analysis of body fluids or other tissues for the presence of drugs, poisons, and other chemicals.

Appendix B. Qualitative Interview Guide: Coroner

Qualitative Questions : Coroner Interviews

1. How long have you been Coroner?
2. What is your background professionally? (Highest degree, discipline, last job, etc)
3. What percent of your worktime is spent on Coroner duties? (in increments of 10%)
 - a. If the salary was higher, would you be able to spend more time?
4. What other job or work do you do (or did you do previously)?
5. What's your biggest challenge in terms of daily operations?
 - a. Staffing?
 - b. Facilities (office, morgue, autopsy)?
 - c. Budget?
6. Describe the kind of training you or your staff have been able to access (beyond the PA Coroners' Ed Board course)?
 - a. Annual Coroner's meeting
 - b. On-line (which)
 - c. Local or regional short courses (which)
 - d. Longer courses like St. Louis Death Investigation Course or IACME programs?
7. Have you or your staff pursued ABMDI certification? Why or why not? #/% certified?
8. How would you rate (1-10) the support you get from
 - a. Commissioners (funding, staffing, facility, vehicles approvals)
 - b. District Attorney (scenes, information sharing, respect, collaboration)
 - c. PSCA
9. Are you able to complete and submit all reports and forms requested by various agencies (County departments, DOH - Drug deaths, AA-34, VDRS, MMRC, SUIDI, etc.)
10. Are you using EDRS, if not, why not?
11. Where do you get autopsies done? (Follow-up: costs, convenience, timeliness)
12. What's your practice or policy for investigation of drug deaths? (Toxicology only, autopsy and tox all, or how decided?)
13. Do you think a shared or regional autopsy/forensic pathologist service would work for your county? How far would you be willing to transport decedents (and who does the transport?)
14. Has your budget or staffing affected criminal justice proceedings in any way, in your opinion?
 - a. Delayed response to scenes (impacting local law enforcement availability)
 - b. Lack of evidence (autopsy)
 - c. Chain of custody problem due to lack of evidence security?
 - d. Inadequate training on investigational technique, toxicology, forensic pathology limit ability to testify or answer questions from law enforcement?
15. How have drug overdose deaths impacted your office?
16. How has the COVID-19 pandemic affected your office?
 - a. # of deaths
 - b. Reporting Accuracy/Completeness
 - c. EDRS or paper
 - d. What information was collected on cases?
 - e. Morgue space and funeral disposition

- f. Impact on other caseload and autopsies
17. What would be considered a mass fatality event in your County (definition - more cases than your office can handle with available resources)
 18. Do you think your office is prepared to handle a sudden surge in deaths? If not, what resource(s) would you turn to?
 19. Can you tell me about a recent challenge you faced as Coroner/ME, and how you handled it?

Added April 8, 2021

20. When you consider PA's mixed Coroner/ME Medicolegal Death Investigation system
 - a. What do you think is the best/most important characteristic of this system?
 - b. What would you change?

For Interviewer:

The following items are some characteristics of PA's system; please use them if the interviewee needs examples for the last question (Q20).

- Independence of Coroners (from Law Enforcement, Health Departments, County Management supervision) as far as investigations and death certification
- Local Funding controlled by each County Commissioners/Council
- Decentralized system (each Coroner sets their own policies and procedures; there is no state government central agency)
- Minimal requirements to be elected or appointed Coroner
- Staff certification (ABMDI) and national accreditation is voluntary

Appendix C. Qualitative Interview Guide: Forensic Pathologist

Qualitative Questions: Forensic Pathologist Interview Guide

1. How long have you been a Forensic Pathologist?
2. What best describes your primary practice setting?
 - a. Government office (county or city medical examiner system)
 - b. Private Entity (LLC, Corporation, Healthcare Organization)
 - c. Independent Contractor
 - d. Academic (Medical School)
3. How many board-certified forensic pathologists currently in your setting?
4. How many are N.A.M.E.* certified?
5. How many are planning to retire or will reach age 70 in the next 10 years?
6. Approximately many autopsies did your office perform in 2019?
7. How many autopsies did you personally do in 2019?
8. Does your office (or you) perform autopsies for any other Counties? If so, please state which counties
9. Does your primary practice setting have refrigerated storage to hold bodies before or after autopsy?
10. How have drug overdose deaths impacted your office?
11. Which best describes the (2020) capacity of your office to perform autopsies, assuming staffing remains the same:
 - a. At full capacity
 - b. At 75-99% capacity
 - c. Less than 75% of capacity
12. Have you worked as a Forensic Pathologist in any other states? If so, how would you compare the systems?
13. What thoughts do you have on how to increase the number of qualified forensic pathologists in Pennsylvania?

*N.A.M.E.: National Association of Medical Examiners

Appendix D. Quantitative Survey Instrument

Quantitative Questions: Coroners and Medical Examiners Survey

Thank you for agreeing to take this survey. It should not take more than 20 minutes to complete. The information is extremely important to assist the Center for Rural Pennsylvania in understanding the impact of the opioid crisis on the caseloads and capacities for Pennsylvania coroners and medical examiners. All information provided is anonymous and confidential and you will not be individually identified in the final report.

A. Facilities

1. Does your county have a centralized forensic facility (administrative, morgue, and autopsy spaces all in one location)?
 1. Yes
 2. No
2. Do you have a county morgue (not in a private facility such as a funeral home or hospital)?
 1. Yes
 2. No. (if no skip to # 5)
3. How many refrigerated morgue spaces do you have available for coroner cases in your county? Options: 0, 1-5, 6-10, more than 10
4. Do you have separate storage available in your county for decomposed or hazardous bodies?
5. How many County-owned vehicles are available to you for transportation, administrative, and/or investigator use? Options: 0, 1, 2, 3 or more
6. Do you have a county-provided office?
 1. Yes
 2. No
7. Do you have a county-provided computer?
 1. Yes
 2. No
8. Do you have a **county-provided** digital camera or smart phone that can take pictures?
9. What is the accreditation status of your Coroner/Medical Examiner office?
 1. accredited by IACME or NAME
 2. seeking accreditation
 3. failed accreditation
 4. not seeking accreditation

B. Caseload

1. How many reported cases, jurisdictional and non-jurisdictional combined, did your office investigate in each of the past 5 years? (Do not include cremation authorizations or non-reportable deaths).
 1. 2015
 2. 2016
 3. 2017
 4. 2018
 5. 2019

2. How many jurisdictional cases did you accept (for investigation and certification) in each of the past 5 years?
 1. 2015
 2. 2016
 3. 2017
 4. 2018
 5. 2019
3. What was the number of drug overdose deaths (any manner) in each of the past 5 years?
 1. 2015
 2. 2016
 3. 2017
 4. 2018
 5. 2019
4. How many autopsies (external, partial, and full) were done in each of the past 5 years?
 1. 2015
 2. 2016
 3. 2017
 4. 2018
 5. 2019

C. Staffing and Training

1. How many of each of the following types of full-time and part-time positions were budgeted (regardless of whether they were filled) for your office as of 12/31/2019 (excluding Medical Examiner (ME) or Coroner)? If you did not have any positions budgeted for a particular category, please enter 0.

	# Full-Time Positions Budgeted (as of 12/31/19)	# Part-Time Positions Budgeted (as of 12/31/19)
Chiefs or First Deputies		
Coroner Investigators or Deputy Coroners		
Forensic Pathologists		
Administrative or Clerical		
Transporters		

2. Are autopsies performed by a board-certified forensic pathologist?
3. How many staff (Coroner/ME and/or any Deputies or Investigators) were ABMDI-certified as of 12/31/2019?
4. How many hours of continuing education did you (Coroner/Medical Examiner) complete in 2019?

D. Funding

1. What was the annual budget (actual dollars, all sources and expenses) for your office in each of the past five (5) years? If you do not know, please provide your best estimate.

1. 2015
2. 2016
3. 2017
4. 2018
5. 2019

2. For 2019 only: What is the estimated percentage of your budget from each of the following:

1. County General Funds
2. Office revenue (fees)
3. Act 122
4. Other sources

3. What was your 2019 budget for personnel (full-time and part-time)?

4. What were your 2019 actual costs for autopsies?

5. What were your 2019 actual costs for toxicology?

6. What was your 2019 budget for staff training (other than Coroners' Education Board-required)?

E. Pandemic

1. How much of an impact has the Coronavirus Pandemic had on your office's ability to offer services (ex., , caseload, access to equipment, access to testing services)?

- a. It has had a serious impact
- b. It has had a moderate impact
- c. It has had a minor impact
- d. It has had no impact

2. Looking ahead, how much do you expect the Coronavirus Pandemic to impact the services that are offered by the Office of the Coroner **in the next year**?

- a. It will have a serious impact
- b. It will have a moderate impact
- c. It will have a minor impact
- d. It will have no impact
- e. Don't know / Not sure

Survey Item	Responses	Missing	Percent Valid
FACILITIES			
a1_facility Does your county have a centralized forensic...one location)?	32	1	97.0%
a2_havemorgue Do you have a county morgue (not in a private...e or hospital)?	32	1	97.0%
a3_morguespaces How many refrigerated morgue spaces do you...in your county?	33	0	100.0%
a4_sepstorage Do you have separate storage available in ... hazardous bodies?	31	2	93.9%
a5_vehicles How many county-owned vehicles are available... investigator use?	32	1	97.0%
a6_office Do you have a county-provided office?	32	1	97.0%
a7_computer Do you have a county-provided computer?	32	1	97.0%
a8_camera Do you have a county-provided digital camera...take pictures?	32	1	97.0%
a9_accreditation What is the accreditation status of your C... examiner office?	32	1	97.0%
CASELOAD			
b1_casesinvestigate_2015 How many reported cases, jurisdictional and... reportable deaths.	30	3	90.9%
b1_casesinvestigate_2016 How many reported cases, jurisdictional and... reportable deaths.	30	3	90.9%
b1_casesinvestigate_2017 How many reported cases, jurisdictional and... reportable deaths.	30	3	90.9%
b1_casesinvestigate_2018 How many reported cases, jurisdictional and... reportable deaths.	30	3	90.9%
b1_casesinvestigate_2019 How many reported cases, jurisdictional and... reportable deaths.	30	3	90.9%
b2_accepted_2015 How many jurisdictional cases did you accep...t 5 years? 2015	30	3	90.9%
b2_accepted_2016 How many jurisdictional cases did you accep...t 5 years? 2016	30	3	90.9%
b2_accepted_2017 How many jurisdictional cases did you accep...t 5 years? 2017	30	3	90.9%
b2_accepted_2018 How many jurisdictional cases did you accep...t 5 years? 2018	30	3	90.9%
b2_accepted_2019 How many jurisdictional cases did you accep...t 5 years? 2019	30	3	90.9%
b3_overdose_2015 What was the number of drug overdose deaths...t 5 years? 2015	28	5	84.8%
b3_overdose_2016 What was the number of drug overdose deaths...t 5 years? 2016	28	5	84.8%
b3_overdose_2017 What was the number of drug overdose deaths...t 5 years? 2017	29	4	87.9%
b3_overdose_2018 What was the number of drug overdose deaths...t 5 years? 2018	29	4	87.9%
b3_overdose_2019 What was the number of drug overdose deaths...t 5 years? 2019	29	4	87.9%
b4_autopsies_2015 How many autopsies (external, partial, and...t 5 years? 2015	29	4	87.9%
b4_autopsies_2016 How many autopsies (external, partial, and...t 5 years? 2016	29	4	87.9%
b4_autopsies_2017 How many autopsies (external, partial, and...t 5 years? 2017	29	4	87.9%
b4_autopsies_2018 How many autopsies (external, partial, and...t 5 years? 2018	29	4	87.9%

Survey Item	Responses	Missing	Percent Valid
b4_autopsies_2019 How many autopsies (external, partial, and...t 5 years? 2019	29	4	87.9%
STAFFING & TRAINING			
c1_chiefsfirstdeputies_1 Posit...Time)	25	8	75.8%
c1_chiefsfirstdeputies_2 Posit...Time)	26	7	78.8%
c1_coronerinvestigators_1 Posit...Time)	26	7	78.8%
c1_coronerinvestigators_2 Posit...Time)	28	5	84.8%
c1_forensicpathologists_1 Posit...Time)	26	7	78.8%
c1_forensicpathologists_2 Posit...Time)	26	7	78.8%
c1_adminclerical_1 Posit...Time)	25	8	75.8%
c1_adminclerical_2 Posit...Time)	26	7	78.8%
c1_transporters_1 Posit...Time)	24	9	72.7%
c1_transporters_2 Posit...Time)	27	6	81.8%
c2_autopathologist Are autopsies performed by a board-certified...forensic pathologist?	29	4	87.9%
c2_abmdi How many staff (Coroner/ME and/or any Deputy...of 12/31/2019?	29	4	87.9%
c3_hrsconted How many hours of continuing education did...complete in 2019?	28	5	84.8%
FUNDING			
d1_budget_2015 What was the annual budget (actual dollars,...five (5) years?	22	11	66.7%
d1_budget_2016 What was the annual budget (actual dollars,...five (5) years?	22	11	66.7%
d1_budget_2017 What was the annual budget (actual dollars,...five (5) years?	23	10	69.7%
d1_budget_2018 What was the annual budget (actual dollars,...five (5) years?	23	10	69.7%
d1_budget_2019 What was the annual budget (actual dollars,...five (5) years?	23	10	69.7%
d2_2019budget_1	28	5	84.8%
d2_2019budget_4	28	5	84.8%
d2_2019budget_5	28	5	84.8%
d2_2019budget_6	24	9	72.7%
d2_2019budget_total	28	5	84.8%
d3_2019budget_1 What was your 2019 budget for the personnel...and part-time)?	25	8	75.8%
d3_2019budget_2 What was your 2019 budget for staff training...ard required)?	33	0	100.0%
q98_1 What were your 2019 actual costs for autopsies?	24	9	72.7%
q98_2 What were your 2019 actual costs for toxicology?	24	9	72.7%
PANDEMIC			
e1_pandemicpast How much of an impact has the Coronavirus P...ting services)?	27	6	81.8%
e2_pandemicfuture Looking ahead, how much do you expect the C...the next year?	27	6	81.8%

Appendix E. Survey Reported Data

Table E1. Number of Jurisdictional and Non-Jurisdictional Reported Cases (per county pop)

	Population	2015		2016		2017		2018		2019	
URBAN	N	N	%	N	%	N	%	N	%	N	%
Allegheny	1,216,045	10078	0.83	10332	0.85	10307	0.85	10423	0.86	10394	0.85
Berks	421,164	3230	0.77	3386	0.80	3371	0.80	3363	0.80	3505	0.83
Bucks	628,270	1286	0.20	1395	0.22	1492	0.24	1593	0.25	1484	0.24
Chester	524,989	1156	0.22	1146	0.22	1220	0.23	1137	0.22	1112	0.21
Cumberland	253,370	583	0.23	638	0.25	821	0.32	884	0.35	794	0.31
Erie	269,728	530	0.20	580	0.22	614	0.23	594	0.22	610	0.23
Lancaster	545,724	991	0.18	1055	0.19	1180	0.22	1098	0.20	1204	0.22
Lehigh	369,318	3711	1.00	3969	1.07	4067	1.10	4329	1.17	4341	1.18
Luzerne	317,417	1290	0.41	1288	0.41	1264	0.40	1274	0.40	1272	0.40
Montgomery	830,915	2298	0.28	2447	0.29	2527	0.30	2543	0.31	2586	0.31
Westmoreland	348,899	2643	0.76	2763	0.79	2822	0.81	2875	0.82	2906	0.83
York	449,058	758	0.17	698	0.16	960	0.21	1189	0.26	1275	0.28
Total Urban	6,174,897	28554	0.46	29697	0.48	30645	0.50	31302	0.51	31483	0.51
RURAL											
Armstrong	64,735	465	0.72	583	0.90	569	0.88	539	0.83	585	0.90
Blair	121,829	220	0.18	190	0.16	260	0.21	200	0.16	220	0.18
Columbia	64,964	150	0.23	180	0.28	200	0.31	203	0.31	200	0.31
Forest	7,247	15	0.21	18	0.25	12	0.17	18	0.25	19	0.26
Franklin	155,027	132	0.09	154	0.10	154	0.10	170	0.11	137	0.09
Mercer	109,424	153	0.14	150	0.14	177	0.16	171	0.16	198	0.18
Mifflin	46,138	293	0.64	246	0.53	306	0.66	358	0.78	398	0.86
Monroe	170,271	614	0.36	422	0.25	589	0.35	845	0.50	906	0.53
Montour	18,230	614	3.37	422	2.31	589	3.23	845	4.64	905	4.96
Pike	55,809	91	0.16	86	0.15	104	0.19	128	0.23	114	0.20
Sullivan	6,066	14	0.23	12	0.20	22	0.36	4	0.07	8	0.13
Susquehanna	40,328	105	0.26	95	0.24	118	0.29	139	0.34	104	0.26
Washington	206,865	2018	0.98	2137	1.03	2068	1.00	2188	1.06	2369	1.15
Wyoming	26,794	32	0.12	36	0.13	66	0.25	68	0.25	58	0.22
Total Rural	1,093,727	4916	0.45	4731	0.43	5234	0.48	5876	0.54	6221	0.57
Total	7,268,624	33470	0.46	34428	0.47	35879	0.49	37178	0.51	37704	0.52

*Missing data for Bradford, Carbon, Clarion, Lycoming, Schuylkill, and Venango.

NOTE: These data are not reliable

Table E2. Proportion of Jurisdictional Cases of All Cases Accepted for Investigation

	2015		2016		2017		2018		2019	
	N	%	N	%	N	%	N	%	N	%
URBAN										
Allegheny	7,742	76.8	7,679	74.3	7,603	73.8	7,954	76.3	7,992	76.9
Berks	777	24.1	837	24.7	839	24.9	807	24.0	863	24.6
Bucks	583	45.3	641	45.9	719	48.2	754	47.3	670	45.1
Chester	524	45.3	593	51.7	661	54.2	668	58.8	561	50.4
Cumberland	233	40.0	269	42.2	349	42.5	328	37.1	313	39.4
Erie	530	100.0	580	100.0	614	100.0	594	100.0	610	100.0
Lancaster	814	82.1	891	84.5	922	78.1	808	73.6	881	73.2
Lehigh	907	24.4	907	22.9	996	24.5	1,049	24.2	1,004	23.1
Luzerne	1,290	100.0	1,288	100.0	1,264	100.0	1,274	100.0	1,272	100.0
Montgomery	842	36.6	949	38.8	983	38.9	1,008	39.6	1,070	41.4
York	511	67.4	538	77.1	632	65.8	688	57.9	715	56.1
Total Urban	14,753	56.9	15,172	56.3	15,582	56.0	15,932	56.0	15,951	55.8
RURAL										
Armstrong	465	100.0	583	100.0	569	100.0	539	100.0	585	100.0
Columbia	125	83.3	150	83.3	161	80.5	149	73.4	156	78.0
Forest	15	100.0	18	100.0	15	125.0	12	66.7	19	100.0
Franklin	132	100.0	154	100.0	154	100.0	170	100.0	137	100.0
Mercer	153	100.0	150	100.0	177	100.0	171	100.0	198	100.0
Mifflin	293	100.0	246	100.0	306	100.0	358	100.0	398	100.0
Monroe	614	100.0	422	100.0	589	100.0	845	100.0	906	100.0
Montour	614	100.0	422	100.0	589	100.0	845	100.0	905	100.0
Pike	77	84.6	80	93.0	91	87.5	105	82.0	91	79.8
Sullivan	14	100.0	12	100.0	22	100.0	4	100.0	8	100.0
Susquehanna	105	100.0	95	100.0	118	100.0	139	100.0	104	100.0
Washington	225	11.1	250	11.7	236	11.4	220	10.1	220	9.3
Wyoming	97	303.1	88	244.4	117	177.3	118	173.5	132	227.6
Total Rural	3,264	66.4	3,010	63.6	3,519	67.2	4,185	71.2	4,395	70.6
Total	18,017	53.8	18,182	52.8	19,101	53.2	20,117	54.1	157,346	54.0

*Missing data for Westmoreland, Blair, Bradford, Carbon, Clarion, Greene, Lycoming, Schuylkill, Venango

NOTE: These data are not reliable

Table E3. County / Medical Examiner Office Personnel

	Chiefs or First Deputies FTE	Chiefs or First Deputies PTE	Coroner Investigators or Deputy Coroners FTE	Coroner Investigators or Deputy Coroners PTE	Forensic pathologists FTE	Forensic pathologists PTE	Administrative or Clerical FTE	Administrative or Clerical PTE	Transporters FTE	Transporters PTE	As of 12/31/2019			
											# Coroner/ME Deputies Investigators	#ABMDI-certified Coroner/ME Deputies Investigators	2019 Coroner/ME #Continuing Education Hours	
URBAN														
Allegheny	2	0	21	0	4	0	5	0	0	0	23	17		
Berks	3	0	9	4	0	0	0	1	0	0	16	2	43	
Bucks	2	0	4	3	3		1		0	0	9	1	72	
Chester	2	0	4	6	0	3	1	1	0	4	12	4	25	
Cumberland	2	0	6	3	1	0	1	0	0	0	11	4	60	
Erie	2		3		1		1				5	1	15	
Lancaster	2	0	5	3	1	0	1	1	0	4	10	9	48	
Lehigh	3	0	10	7	0	0	1	0	0	0	20	14	40	
Luzerne	1	0	1	10	0	1	1	0	0	0	12	1	0	
Montgomery	1	1	5	0	0	0	1	0	0	4	7	2	0	
York	1	0	3	7	0	0	1	1	0	0	11	5	50	
Total Urban	21	1	71	43	10	4	14	4	0	12	136	60	353	
RURAL														
Armstrong		1		4		0		1		0	5	0	6	
Blair		1		10		0		1		1	11	8	42	
Bradford	0	0	0	0	0	0	1	0	0	0	0	1	16	
Carbon	0	1	0	9	0	0	0	0	0	3	10	2	8	
Columbia	0	1	0	6	0	0	0	1	0	0	7	0	32	
Forest	0	1	0	0	0	0	0	0	0	0	1	0	8	
Franklin	1	0	0	2	0	0	0	0	0	8	3	4	10	
Greene	1	0	3	0	1	0	0	0	1	0	4	0	8	
Mercer	0	1	0	4	0	0	1	0	0	0	5	1	36	
Mifflin		1		3	0	0		1		0	4	1	60	
Monroe	1	0	2	3	0	0	0	0	0	0	6	0	24	
Montour			1	3	0	0	0	0	0	0	4	0	28	
Pike	1	0	0	4	0	0	1	0	0	0	5	0	12	
Schuylkill	1	0	0	16	0	2	0	0	0	4	17	0	16	
Sullivan	0	1	0	2	0	0	0	0	0	0	3	0	20	
Susquehanna	1		1	1							3	3	8	
Washington	1	0	1	1	0	1	0	0	0	1	3	1	26	
Wyoming	0	1	1	3	0	0	0	0	0	0	5	1	8	
Total Rural	7	9	9	71	1	3	3	4	1	17	96	22	368	
Total	28	10	80	114	11	7	17	8	1	29	232	82	721	

NOTE: Missing data for Clarion, Lycoming Venango, Westmoreland

Appendix F. Comments on Survey Responses

Comments related to the data collected via the online quantitative instrument.

Urban	Bucks	No budget entered for 2014 and 2015, but answered for other years.
	Luzerne	0 hours entered for Continuing Education
	Montgomery	0 hours entered for Continuing Education
	Westmoreland	This respondent entered '0' for all of the Cases Accepted questions
Rural	Blair	This respondent entered '0' for many of the Cases Accepted questions
	Bradford	This respondent entered '0' for the Cases Reported questions but entered data for the Cases Accepted questions and the Autopsies questions. This respondent also indicated only one clerical staff, despite saying that autopsies are performed by a board-certified forensic pathologist.
	Carbon	This respondent entered '0' for all of the Cases Reported/Accepted questions and the Autopsies questions
	Greene	This respondent entered '0' for all of the Cases Reported/Accepted questions and the Autopsies questions
	Lycoming	This respondent skipped most of the survey, but answered some questions near the end of the survey.
	Mifflin	2019 Budget for Personnel and Training = 80 and 12. Numbers are questionable.
	Schuylkill	This respondent entered '0' for the Cases Reported questions but entered data for the Cases Accepted questions and the Autopsies questions.
	Sullivan	2019 Actual Costs for Autopsies = \$0.

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