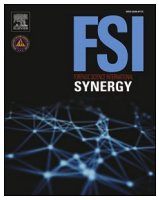
Forensic Science International: Synergy 8 (2024) 100480

Contents lists available at ScienceDirect

Forensic Science International: Synergy

journal homepage: www.sciencedirect.com/journal/forensic-science-international-synergy



Medicolegal death investigations on tribal lands—underrepresented or underserved?

Jeri D. Ropero-Miller [a,*], Wayne J. Pitts [a], Anum Imran [a], Ronny A. Bell [b], Hope M. Smiley-McDonald [a]

[a] RTI International, 3040 E. Cornwallis Road, Research Triangle Park, NC, 27709, USA
[b] University of North Carolina at Chapel Hill, Division of Pharmaceutical Outcomes and Policy, Eshelman School of Pharmacy, 301 Pharmacy Lane, Chapel Hill, NC, USA, 27599

ARTICLE INFO

Keywords:
American Indian/Alaska Native
Medical examiner and coroner
Medicolegal death investigation
Missing and unidentified persons
Tribal lands

ABSTRACT

Death investigation on tribal lands and of American Indian/Alaska Native (AIAN) people is complex and not well documented. An analysis of data from the 2018 Census of Medical Examiner and Coroner Offices (CMEC) provides a timely update on the extent of medicolegal death investigations (MDIs) on federal and state-recognized tribal lands. An estimated 150 MEC offices serve tribal lands, however, 44 % of these offices (i.e., 4 % of MEC offices) do not track cases from tribal lands separately. MEC offices with a population of 25,000 to 250,000 that serve tribal lands had more resources and access to information to perform MDIs than all other MEC offices. Analysis also indicates that the median number of unidentified human remains cases from MECs serving tribal lands is 6 times higher than that of jurisdictions not serving tribal lands. This analysis begins to elucidate gaps in the nation's understanding of MDI on tribal lands.

1. Introduction

Death investigations in the US are not conducted consistently, and nowhere is this more apparent than within American Indian and Alaska Native (AIAN) tribal populations [1–5]. "Tribal lands"[1] refers to any land or interests in land owned by any AIAN tribe, title to which is held in trust by the US or is subject to a restriction against alienation under US laws [6]. Medicolegal death investigations (MDIs) are carried out by medical examiner and coroner (MEC) offices to determine the cause and manner of death in cases of unexpected, unnatural, or unexplained deaths. Information discovered during a death investigation can support public health and safety and the US criminal legal system—to prevent disease and injury, to promote healthy lifestyles, to identify evidence of a crime, and, overall, to provide answers to the family. Given the pivotal societal role of MDI, it is imperative that it is an equitable system. MDI is embedded within systems that disproportionately affect marginalized groups at many junctures, including access to forensic services and death investigations involving undiagnosed diseases, violent crimes, and missing and unidentified persons [7–9].

1.1. The AIAN population and tribal lands

In 2021, there were an estimated 9.7 million AIAN people, identifying as AIAN alone or in combination with another racial group, in the US [10]. AIAN people represent less than 2.9 % of the total US population, and approximately 22 % of the AIAN population (an estimated 2.1 million people) live on tribal lands, meaning approximately 3 out of 4 AIAN people live in urban, suburban, or rural settings outside tribal lands [10].

1.2. Type and prevalence of AIAN mortality and morbidity

AIAN people experience health challenges (e.g., diabetes, heart disease, influenza and pneumonia, mental health and substance use disorders) at a disproportionately higher rate than the general population [11]. These higher disease burdens and mortality rates have been

* Corresponding author.
E-mail addresses: jerimiller@rti.org (J.D. Ropero-Miller), wpitts@rti.org (W.J. Pitts), aimran@rti.org (A. Imran), bellr@unc.edu (R.A. Bell), smiley@rti.org (H.M. Smiley-McDonald).

[1] The 2018 Census of Medical Examiner and Coroner Offices (CMEC) used tribal lands in its questions and included in its definition federal and state-recognized tribes located in *areas labeled Indian Country, reservations, trust lands, Alaska Native villages, and tribal communities (CMEC Question C5)*. Further definitions or descriptions were not provided. For the purpose of this analysis, the authors use "tribal lands," "AIAN," and "indigenous peoples" as non-legal terms.

https://doi.org/10.1016/j.fsisyn.2024.100480
Received 5 May 2024; Accepted 22 May 2024

attributed to adverse social determinants of health, including structural racism, education, disproportionate poverty, access to healthcare and health insurance, discrimination in the delivery of health services, exposure to environmental toxins, broad quality-of-life adversities linked to socioeconomic characteristics, among other causal mortality and morbidity relationships [12–29]. Moreover, the COVID-19 pandemic had a sharp impact on the non-Hispanic AIAN population, which experienced the greatest decline in life expectancy (1.9 years) relative to other racial/ethnic groups between 2020 and 2021 [30]. Similarly, accidental and violent deaths are greater in the AIAN population; specifically, preventable death rates (i.e., choking; drowning; falls; fire, flames, or smoke; motor vehicle injuries; and poisonings) from 2018 to 2021 were highest for non-Hispanic or Latino AIAN people (82.4–120.9 per 100,000) compared with people reporting as other races and ethnicities (i.e., White—not Hispanic or Latino, Black or African American—not Hispanic or Latino, all Hispanic or Latino), a mortality burden 1.3 to 2.9 times higher across all years [31]. Finally, intentional, violent deaths are also higher among the U.S. AIAN population. The Centers for Disease Control and Prevention (CDC) reported suicide rates among non-Hispanic or Latino AIAN people increased nearly 20 % during a 5-year span from 2015 (20.0 per 100,000) to 2020 (23.9 per 100,000), compared with a <1 % increase among the overall U.S. population (13.3 and 13.5 per 100,000, respectively) [32]. Herne et al. [33] reported that homicide death rates were 4 times higher among AIAN people than among non-Hispanic or Latino White people (12.1 vs. 2.8 per 100,000 population). The murder rate among AIAN women is almost 3 times that among non-Hispanic or Latino White women [9]. Arias et al. [34] reported that the misclassification of AIAN reporting on death certificates spanning more than 3 decades (1979–2011) remained high at 40%—the next-closest misclassification being 13 times less at 3 % for Hispanic or Latino and Asian or Pacific Islander populations. Similarly, Appel et al. [35] recently determined that death investigators frequently describe race and ethnicity incorrectly for Hispanic or Latino decedents, indicating a systematic bias in investigative processes. Recent data show that AIAN have lower life expectancy compared to the non-Hispanic white population and other racial groups [30].

1.3. Missing persons and unidentified remains databases

Identifying and investigating missing person cases is complex, made even more challenging on tribal lands [36]. Although not unique to tribal lands, a confounding factor is how to define a person as missing because going missing is a completely legitimate and legal behavior [37]. However, statistics show that AIAN people have a mortality rate by homicide (5.7 per 100,000) 2.3 times that of their non-Hispanic or Latino White counterparts [38]. Other research has demonstrated that AIAN women in counties with tribal lands are 10 times more likely to be a victim of violent crime than women in the US overall [39]. Currently, there are no standardized protocols or policies for reporting and investigating missing persons cases that introduce individual discretion in deciding how or whether something should be done [37]. National databases to collect and provide access to information that can help solve missing and unidentified person cases exist, including the National Crime Information Center (NCIC), the National Missing and Unidentified Persons System (NamUs), the Bureau of Indian Affairs Missing and Murdered Unit, and the National Center for Missing & Exploited Children. Recently, these federally funded resources began analysis of and outreach and awareness programming specific to AIAN people [1,2,40–42], including designating May 5, 2024 as Missing or Murdered Indigenous Persons Awareness Day [43]. Similarly, databases maintained by indigenous peoples' organizations such as the Missing and Murdered Indigenous Persons; the Missing and Murdered Indigenous Women, Girls, and Two Spirit; and the Missing Murdered Indigenous Women, and Girls in NC are also maintained. These databases are not linked to each other or to the agencies that investigate missing and unidentified persons cases such as MEC offices. These databases are also voluntary programs that require families and authorities to provide information to enter a case and remove a case, which requires great effort and coordination. Misclassification of race and ethnicity, which can stem from race being reported in official documentation without confirmation from the family, may affect investigative processes such as identifying missing and unidentified human remains (UHR) [35].

The purpose of this analysis is to use public data from the 2018 Census of Medical Examiner and Coroner Offices (CMEC) to provide an overview of MEC offices serving tribal lands and increase our understanding of their basic infrastructure, resources, and workload. MEC offices can serve tribal lands as part of their jurisdictions. Thus, the present analysis reviews a national census data set to compare MDI offices whose jurisdictions include serving tribal lands with those MECs that do not serve tribal lands as part of their catchment area.

2. Methods

We performed a secondary analysis of the publicly available 2018 CMEC data set maintained by the National Archive of Criminal Justice Data (NACJD) for the Bureau of Justice Statistics (BJS). RTI International (RTI) collected these data on behalf of BJS (contract number 2017-MU-CX-K052). Five questions in the Workload section of the full survey (Questions C5–C10) that addressed "tribal lands," which was defined as "areas labeled Indian country, federal or state recognized reservations, trust lands, Alaska Native villages, and tribal communities" within Question C5.[2] Additional data were also analyzed when they provided necessary context for MEC offices that was relevant to this analysis. The 2018 CMEC public data set, which contains the most recent data for this collection, may be obtained through NACJD. The 2004 and 2018 CMEC surveys may be found on the BJS website.

2.1. 2018 CMEC

The 2018 CMEC captures critical information about MEC offices (budget, staffing, and caseload) and the practices, operations, and resources of all MEC offices that perform MDIs in the United States. The 2018 CMEC data collection period lasted from June 2019 through March 2020 [45] and included long and short versions of the survey. A total of 2036 MEC offices were enumerated for the 2018 CMEC. Of these, 1341 responded to the long version of the survey (63.5 %). To increase response, under BJS approval, RTI administered a shortened survey, to which an additional 307 MEC offices responded. Notably, the short version of the survey *did not* include tribal land questions; therefore, the offices responding to the short form are not part of the current analysis. When overall numbers or percentages for national MEC offices are presented, we used the full data set (e.g., national percentages in Fig. 1). For the present analysis, item nonresponse ranged from 0.0 % (e.g., Question 2 related to office type) to 45.1 % for the workload questions regarding reported cases from tribal lands (Questions C5 and C6).

2.2. Data analysis

The data in this analysis are from the weighted variables within the public data set included for long-form survey items, which are found within the 2018 CMEC public data set [44]. BJS's method for designing these weights is described elsewhere [3], but broadly, it is based on a propensity weighting method that includes (1) office type, (2) jurisdiction size, (3) region, (4) level of government (e.g., county or state government), and (5) the interaction between office type and jurisdiction

[2] Questions C5–C10 can be found on the long form of the 2018 CMEC, which can be found on BJS' website: https://bjs.ojp.gov/data-collection/census-medical-examiner-and-coroner-mec-offices [44] Bureau of Justice Statistics, Census of Medical Examiner and Coroner Offices, 2018. <https://doi.org/10.3886/ICPSR38251.v1>, 2021).

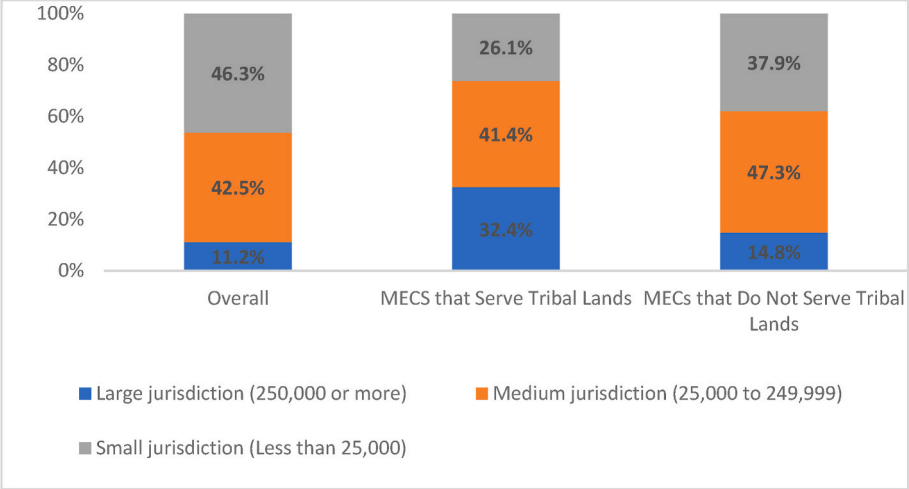


Fig. 1. Percentage of MEC Offices, by population Served and by Whether the MEC office Serves Tribal Lands: 2018. Note: The percentages for MEC offices overall are extrapolated based on the number of offices reported by office size in Table 1 of BJS's 2018 CMEC report [3]. The overall MEC office population of 2036 offices was used as the denominator to generate the overall percentages in this figure. The number of state medical examiner offices within Table 1 of the BJS report was included in the large jurisdiction category to derive the percentages presented herein.
Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices (CMEC).

size. Notably, the numbers may not exactly match the 2021 BJS report [3] for tribal lands data due to rounding issues.

Given the dearth of information about MEC offices serving tribal lands, the analysis is largely descriptive and presents frequencies or percentage frequencies and cross-tabulations. Measures of central tendency (e.g., averages, medians) and cross-tabulations are also presented. Notably, many variables examined were highly skewed—including budget, staffing, caseload, and number of UHR on record—necessitating the need to present medians. We calculated ratios to illustrate workload per staff. In some cases, the size of the jurisdiction served was included for context.

Data were analyzed with SAS ENTERPRISE GUIDE software, version 7.15 (Cary, NC), to group results by characteristics of MEC offices serving tribal lands. We used the 2018 CMEC Questions C5–C10 to separate MEC offices into two categories to examine whether they served tribal lands. Additional questions were used to establish jurisdictions (Questions A2–A4 on the long form), staffing (Question A8), budgets (Question B1), workload (Questions C1–C4), measures around forensic functions (Questions C12 and C13) and UHR (Questions D1–D3), recordkeeping (Questions E1 and E2), access to resources (Questions F1 and F2), and participation in data collection efforts (Question F8).

3. Results

Approximately 150 MEC offices across the US reported receiving cases from tribal lands in 2018, representing about 7.4 % of offices nationwide ($N = 2036$ offices; [44]). Among offices that received cases from tribal lands, about one-third (32.4 %) served populations of 250,000 or more, including centralized state medical examiner offices encompassing tribal lands (large); 41.4 % served populations between 25,000 and 249,999 (medium); and 26.1 % served populations of fewer than 25,000 (small) (Fig. 1). When compared with the overall proportions of offices nationally, a higher proportion of MEC offices served tribal lands with the largest populations (32.4 % compared with 11.2 %), which is likely in part because the larger offices include state medical examiner offices.

MEC offices responding to the CMEC were asked about their fiscal year 2018 budget. The values ranged from $0 to $85.3 million; thus, there were extreme outliers. Because of the outliers, medians and averages are included in Table 1, although medians are the better measure of central tendency. As shown, MEC offices serving tribal lands had a median budget of $383,666, which was substantially higher than the overall median budget across all offices nationwide ($89,500) and the budget for offices that did not serve tribal lands in 2018 ($80,000).

Table 1
Budget, by Whether the MEC office Serves Tribal Lands: 2018.

Budget Measure	Overall (N = 1196)	MEC Offices Serving	
		Tribal Lands (n = 115)	Not Tribal Lands (n = 1077)
Median	$89,500	$383,666	$80,000
Average	$941,478	$1,770,217	$856,380

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices (CMEC).

Of the estimated 150 MEC offices serving tribal lands, approximately 84 offices—or about 4 % of all offices nationally—tracked cases from tribal lands separate from their non–tribal land cases. The responding MEC offices that tracked tribal land cases separately reported a total of 1123 death cases from tribal lands in 2018, of which 862 were accepted for death investigation (Table 2). "Accepted cases" was defined in the 2018 CMEC as cases for which the office completes the death certificate or otherwise determines the cause and manner of death, excluding cremation approval cases or cases in which jurisdiction was declined. Less than half (43.4 %) of total reported death cases in the US were accepted by MEC offices nationally (375,090 of 863,907 cases), whereas 76.8 % of total reported death cases from tribal lands were accepted by the MEC office (862 of 1123 cases). Because the average number of cases

Table 2
Total, Median, and Average Cases Reported and Accepted by Medical Examiner and Coroner Offices Serving Tribal Lands: 2018.

Cases			
Reported/accepted Death	Total	Median	Average
Total reported death cases in the United States	863,907	126.0	651.0
Total accepted death cases in the United States	375,090	89.0	292.1
Total reported death cases in tribal lands	1123	5.0	13.6
Total accepted death cases in tribal lands	862	5.0	11.8

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices (CMEC).

that were reported to and accepted by MEC offices overall had extreme outliers, medians are reported in addition to averages. There were a median 5 death cases from MEC offices serving tribal lands reported to and accepted by MEC offices in 2018.

Similar to budget and caseload, the distribution for staffing was also skewed, and there were extreme outliers. As such, medians are presented for staffing levels (Table 3). MEC offices that served tribal lands had a median of three full-time staff compared with one full-time staff for MEC offices that did not serve tribal lands. The median for full-time pathologists across both groups and overall was zero, which reflects known shortages of forensic pathologists across the US [46] and may reflect that full-time forensic pathologists are not needed in smaller offices.

Finally, ratios of full-time forensic pathologists and full-time death investigators to death cases reported were calculated. Regardless of MEC office type, there was one full-time forensic pathologist for every 674 death cases and one full-time death investigator for every 160 death cases. MEC offices that served tribal lands had lower ratios for both types of positions compared with the national ratio and compared with those MEC offices that did not serve tribal lands. Specifically, there was one forensic pathologist in MEC offices that served tribal lands for every 587 death cases compared with one for every 699 death cases for MEC offices that did not serve tribal lands. The ratio for death investigators was narrower between the two types of offices, with one death investigator for every 130 death cases in MEC offices that served tribal lands compared with one for every 170 death cases for MEC offices that did not serve tribal lands.

The two office types were compared by whether they performed selected MEC functions, including death scene investigations, death scene photography, medical record reviews, external examinations, partial autopsy (defined in Question C12e as "minimal dissection, less than a complete autopsy"), and complete autopsy (defined in Question C12f as "remove and examine the brain, thoracic, and abdominal organs"). The vast majority—over 94 % or higher—of both office types performed death scene investigations, death scene photography, medical record reviews, and external examinations. Offices that served tribal lands had higher proportions performing partial autopsies (77.5 % vs. 70.0 %) and complete autopsies (88.3 % vs. 82.7 %).

The 2018 CMEC also included a series of questions about types of MEC office auxiliary testing services. Overall, the majority of MEC office types offered each of the selected 11 forensic testing services. Among MEC offices that served tribal lands, the least common forensic testing services included neuropathology (83.5 %) and metabolic screens (83.8 %). Among MEC offices that did not serve tribal lands, the least common forensic and clinical services included anthropology (74.2 %) and neuropathology (74.9 %) (data not shown).

MECs that served tribal lands offered each of the 11 selected testing services at higher proportions. The largest percentage point differences between the two types of MEC offices were found for anthropology (87.3 % vs. 74.2 %), odontology (88.2 % vs. 76.0 %), microbiology (85.5 % vs. 75.9 %), and neuropathology (83.5 % vs. 74.9 %) (data not shown).

The percentages of offices that had a written policy for final disposition of UHR after a specified period were roughly the same between the two comparison groups (42 % for offices serving tribal lands and 44 % for those not serving tribal lands; Table 4). When the number of UHR cases was examined, the distribution was highly skewed, necessitating the need to report medians. The median number of UHR cases on record as of December 31, 2018, varied by office type, with a median of eight cases for offices that serve tribal lands compared with only two cases for those offices that did not serve tribal lands.

The 2018 CMEC included several questions related to information infrastructure and access to key databases. As seen in Fig. 2, across all items, MEC offices that served tribal lands consistently showed higher proportions of access. Nearly 9 in 10 (87.4 %) MEC offices that served tribal lands had access to the internet separate from personal devices, which was higher than the overall percentage (78.7 %) and the percentage for those offices that did not serve tribal lands (77.8 %). Over two-thirds (67.6 %) of offices that served tribal lands had computerized, networked recordkeeping systems compared with 46.6 % of offices that did not serve tribal lands.

Next, access to key databases that facilitate casework were examined. Almost three-quarters of MEC offices that served tribal lands (73.0 %) had access to prescription drug monitoring programs compared with only 63.3 % of offices that did not serve tribal lands. Offices that served tribal lands were higher by over 10 percentage points than MEC offices that did not serve tribal lands in terms of their access to criminal history databases (83.8 % vs. 72.2 %) and fingerprint databases (81.1 % vs. 70.1 %).

Given the public health and public safety roles that MECs play, the 2018 CMEC asked respondents about their participation in several major mortality data collections. Overall, participation across each of these queried data collections was low, with the highest level of participation being shown in state or local collections (69.0 %) and the rest of the participation percentages being lower than half (data not shown).

When offices were compared by whether they served tribal lands, across all data collection efforts, MEC offices that served tribal lands had higher proportions of database participation compared with offices that did not. The most striking differences—that is, with 24 percentage points or higher—between the two groups were found for NamUs (70.3 % vs. 42.1 %), the Combined DNA Index System (46.8 vs. 21.6 %), and NCIC (45.0 % vs. 20.6 %). The highest level of participation from any of the three groups was 79.3 % for MEC offices that served tribal lands and participated in state or local data collections, followed by that group's participation in NamUs (data not shown).

Table 3
Full-time Staffing Status for Medical Examiner and Coroner Offices Serving Tribal Lands: 2018.

Staffing	Overall	MEC Offices	
		Serving Tribal Lands	Not Serving Tribal Lands
Median full-time staff	1	3	1
Median full-time forensic pathologists	0	0	0
Median full-time death investigators	0	1	0
Ratio of full-time forensic pathologists to death cases	1:674	1:587	1:699
Ratio of full-time death investigators to death cases	1:160	1:130	1:170

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices (CMEC).

Table 4
Written Policy for Final Disposition of Unidentified Human Remains (UHR) and Median Number of UHR Cases, by whether the MEC Office Serves Tribal Lands: 2018.

UHR Measure	MEC Offices	
	Serving Tribal Lands	Not Serving Tribal Lands
Office has a written policy for final disposition (e.g., burial, cremation) of UHR after a specified period	41.9 %	44.3 %
Number of offices with UHR cases on record as of December 31, 2018	17	125
Median number of UHR cases on record as of December 31, 2018	8	2

Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices (CMEC).

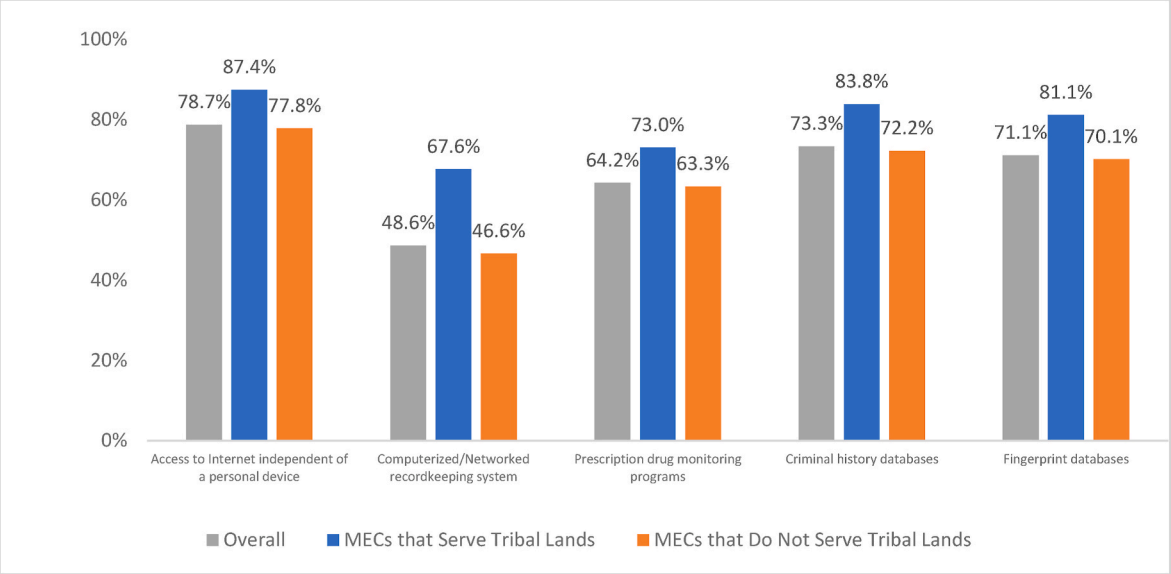


Fig. 2. Percentages of MEC Offices with Information Infrastructure and Access to Key Databases, by Whether the MEC Office Serves tribal Lands: 2018. Source: Bureau of Justice Statistics, 2018 Census of Medical Examiner and Coroner Offices (CMEC).

4. Discussion

It is well documented that the US MEC system consists of a patchwork of agencies and organizations that lacks adequate funding and basic infrastructure [46,47]. The National Institute of Justice's (NIJ's) 2019 report to Congress noted that the MEC system experienced a $640 million deficit in 2017, had high turnover and low morale, and the existing number of board-certified forensic pathologists was less than half what is needed [46]. The actual needs of MECs on tribal lands are difficult to estimate due to complex jurisdictional issues and a lack of consistent reporting [46,48]. Nonetheless, this same MDI system is sometimes responsible for serving tribal lands whose needs are disproportionally greater than those of the general population due to higher crime and death rates [11,32,33,49].

Overall, this analysis showed that about 150 MEC offices reported serving tribal lands, representing about 7 % of all MEC offices nationally. These offices tended to serve the largest populations, including state agencies. An examination of budgets shows that the median budget ($384,000) for MEC offices serving tribal lands was significantly higher than the median budget ($80,000) of those offices that did not serve tribal lands. Although the median is a better measure of central tendency when outliers like the ones herein exist, the near five-fold difference in budgets may indicate that these numbers may still suffer from bias. Specifically, the data demonstrate that MEC offices serving tribal lands report budgets on the higher side of the MEC office budget scale, likely because many of the offices that reported serving tribal lands include central state medical examiner offices and offices that serve larger and more urban populations in general, which tend to be better resourced.

In addition, staffing levels for MEC offices that served tribal lands had 3 times the number of full-time staff than MEC offices that did not serve tribal lands (median of 3 to 1). However, the median for full-time pathologists overall and across both groups was zero, which reflects known shortages of forensic pathologists across the US and indicates that MEC offices serving smaller jurisdictions may not need full-time forensic pathologists [46].

Although most of both types of MEC offices had access to and performed a wide array of selected forensic functions, MEC offices that served tribal lands had notably higher proportions of resources and functions compared with those MEC offices that did not serve tribal lands. Interestingly, the infrastructure supporting MEC off ices serving tribal lands is generally better than that of MEC offices that do not serve tribal lands. Over two-thirds of offices serving tribal lands report having computerized, networked recordkeeping, which is 20 % higher than the percentage among MEC offices not serving tribal lands. Concerning access to the internet separate from personal devices, again, the number of MEC offices serving tribal lands was 10 % greater than the number of offices not serving tribal lands. MEC offices serving tribal lands also had more access to key databases than did offices not serving tribal lands.

MEC offices serving tribal lands had the highest levels of access across all 11 testing services, yet their performed MEC functions (e.g., death scene investigations, death scene photography, medical record reviews, external examinations, partial autopsy, complete autopsy) were relatively comparable with those of MEC offices not serving tribal lands. Similarly, MEC offices serving tribal lands used critical databases to inform casework, participated in more data collections, and had the highest rates of having internet access and computerized, networked recordkeeping systems.

UHR is the only category that shows MEC offices serving tribal lands lagging behind those offices that do not. The most significant finding related to the number of UHR cases as of December 31, 2018. The median number of UHR cases for MEC offices serving tribal lands was 8 compared with 2 for those offices that do not serve tribal lands. Notably, more than 7 in 10 MEC offices that served tribal lands engaged in NamUs, which is important because the AIAN population has a disproportionate number of active missing person and UHR cases [40,41]. Given the complicating factors associated with tribal lands cases outlined in the literature review, future research should address how these cases are worked and the existing barriers for the 30 % of MEC offices that serve tribal lands and do not engage in NamUs.

The data presented here have several limitations that make correlations and drawing definitive conclusions difficult due to many contributing variables, lack of uniformity among respondents, and consistency in the interpretation of questions. Although the data seem to support that MEC offices serving tribal lands generally have better support and infrastructure than those that do not, caution should be exercised before definitive conclusions are drawn. Although median values are reported for findings in this analysis, extreme outliers, smaller data sets, and unknown or unrepresented status of some MEC offices serving tribal lands reporting or not reporting to the CMEC, may still result in bias. Bias may have also been introduced since the approximate 700 Texas Justices of the Peace, whose duties do include medicolegal death investigation, were excluded from the 2018 CMEC survey frame.

Moreover, although the CMEC was intended to be a census, some offices did not participate, and of those that did, the question series about tribal lands' caseload suffered from higher nonresponse relative to the rest of the survey. Thus, some offices that serve tribal lands may not be represented overall because they did not submit surveys, and of those that did, some may have skipped that question series for various reasons. In addition, of those offices indicating that they serve tribal lands, a sizable proportion were unable to track cases from tribal lands separately. Another limitation may have been due to how the tribal land gate question was interpreted, with some respondents interpreting the question to include cases with incident locations on tribal lands and others interpreting it to mean for deaths pronounced within tribal land borders. Finally, many AIAN populations do not reside on tribal lands and are thus served by offices categorized herein as offices that do not serve tribal lands. These factors all could have introduced some bias into the analysis. Moreover, one limitation of the 2018 CMEC is that the short form did not include the tribal lands caseload questions as critical items, so the extent to which the short-form respondents (307 respondents) and the nonresponding MEC offices (about 400 respondents) served tribal lands and what their corresponding infrastructure and resources look like is not known. It is also a limitation that these data are from 2018. However, at a minimum, this analysis demonstrates there are conspicuous differences for MEC offices serving tribal lands and provides an evidence base for many previously unknown findings.

5. Conclusion

Although MEC offices nationwide clearly lack basic infrastructure, resources, and access to fundamental tools and specialists to perform their duties, this analysis indicates that MEC offices that serve tribal lands have greater resources and access to information to perform MDIs. In light of the extant literature suggesting major gaps in our understanding of missing and unidentified AIAN populations, these populations are overrepresented among violent deaths and the accepted-to-reported ratio for overall total cases was lower than that for offices serving tribal lands. This suggests that when a death is reported, it is more likely to be accepted. Future national surveys would need to include more comprehensive questions about tribal lands for a better understanding of U.S. death investigations and how these cases are received, triaged, and prioritized. This analysis provides previously unknown foundational knowledge of medicolegal death investigations on tribal lands, but additional research is needed to determine to what extent these special death investiagtions may be underrepresented or underserved.

Funding

This analysis was supported, in part, by RTI International internal research funding, a cooperative agreement with NIJ (NIJ Forensic Technology Center of Excellence [FTCOE] Award 15PNIJ-21-GK-02192-MUMU). The FTCOE project received funding from CDC, contract number HHSM500201200008I, task order number 200-2016-F-91567. The findings and conclusions of this paper are those of the authors and do not necessarily represent the official position of NIJ or CDC.

CRediT authorship contribution statement

Jeri D. Ropero-Miller: Conceptualization, Funding acquisition, Investigation, Methodology, Supervision, Writing – original draft, Writing – review & editing, Project administration. **Wayne J. Pitts:** Investigation, Writing – original draft. **Anum Imran:** Data curation, Formal analysis, Methodology, Writing – review & editing. **Ronny A. Bell:** Writing – review & editing. **Hope M. Smiley-McDonald:** Conceptualization, Investigation, Methodology, Project administration, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

The authors would like to thank the following who reviewed this paper and provided invaluable input: Nelson A. Santos, Kelly A. Keyes, Ashley L. Rodriguez, Margaret Warner (CDC), Jennifer C. Love (NIJ), and Lucas A. Zarwell (NIJ). The authors are grateful to Margaret Johnson, who edited the manuscript. Finally, we would like to acknowledge and thank all of the individuals who helped contribute data from participating MEC offices across the United States whose inputs were critical for ensuring that their offices were represented.

References

[1] Bureau of Indian Affairs, Learn about Indian Affairs. https://www.bia.gov/, 2023. (Accessed 20 October 2023).
[2] Bureau of Indian Affairs, Office of Justice services, missing and murdered unit victim services: missing and murdered cases. https://www.bia.gov/service/mmu/missing-murdered-cases, 2023. (Accessed 20 October 2023).
[3] C. Brooks, Medical Examiner and coroner Offices, U.S. Department of Justice, Office of Justice Programs, Bureau of Justice Statistics, 2018.
[4] A.S. Joseph, A modern trail of tears: the Missing and Murdered Indigenous Women (MMIW) crisis in the US, J Forensic Leg Med 79 (2021), https://doi.org/10.1016/j.jflm.2021.102136.
[5] A.L. Rodriguez, H.M. Smiley-McDonald, M.S. Cummings, S. Wire, D. Slack, C. L. Williams, K.A. Keyes, J.D. Ropero-Miller, Understanding unidentified human remains investigations through the United States census data, Forensic Sci Int Synerg 4 (2022) 100225. https://doi.org/10.1016/j.fsisyn.2022.100225.
[6] United States Code, Major Crimes Act, 18 U.S.C. §1153, U.S. Government Printing Office, 2011.
[7] G. Goad, Expanding humanitarian forensic action: an approach to U.S. Cold cases, Forensic Anthropology 3 (2020) 50–58.
[8] C.L. Znachko, A.P. Winburn, M. Frame, S. Maines, Operationalizing the structural vulnerability profile within the medical examiner context, Forensic Sci Int Synerg 6 (2023) 100334.
[9] E. Petrosky, J.M. Blair, C.J. Betz, K.A. Fowler, S.P.D. Jack, B.H. Lyons, Racial and ethnic differences in homicides of adult women and the role of intimate partner violence - United States, 2003-2014, MMWR Morb. Mortal. Wkly. Rep. 66 (28) (2017) 741–746.
[10] National Council on Aging, American Indians and Alaska Natives: key demographics and characteristics. https://www.ncoa.org/article/american-indians-and-alaska-natives-key-demographics-and-characteristics, 2023. (Accessed 20 October 2023).
[11] Indian Health Service, Disparities. October, 2019.https://www.ihs.gov/newsroom/factsheets/disparities/ (Accessed April 2024).
[12] T.A. Burningham, L.W. Day, American Indian and Alaska Native digestive health: challenges, opportunities, and a path forward, Clin. Gastroenterol. Hepatol. 21 (13) (2023) 3203–3208.
[13] J. Burns, A.C. Angelino, K. Lewis, M.E. Gotcsik, R.A. Bell, J. Bell, A. Empey, Land rights and health outcomes in American Indian/Alaska Native children, Pediatrics 148 (5) (2021).
[14] K. Churchwell, M.S.V. Elkind, R.M. Benjamin, A.P. Carson, E.K. Chang, W. Lawrence, A. Mills, T.M. Odom, C.J. Rodriguez, F. Rodriguez, E. Sanchez, A. Z. Sharrief, M. Sims, O. Williams, A. American Heart, Call to action: structural racism as a fundamental driver of health disparities: a presidential advisory from the American heart association, Circulation 142 (24) (2020) e454–e468.
[15] L. Frerichs, R. Bell, K.H. Lich, D. Reuland, D.K. Warne, Health insurance coverage among American Indians and Alaska natives in the context of the affordable care act, Ethn. Health 27 (1) (2022) 174–189.
[16] E. Giacci, K.J.E. Straits, A. Gelman, S. Miller-Walfish, R. Iwuanyanwu, E. Miller, Intimate partner and sexual violence, reproductive coercion, and reproductive health among American Indian and Alaska Native women: a Narrative Interview Study, J Womens Health (Larchmt) 31 (1) (2022) 13–22.
[17] T.M. Godfrey, F.M. Cordova-Marks, D. Jones, F. Melton, K. Breathett, Metabolic syndrome among American Indian and Alaska Native populations: implications for cardiovascular health, Curr. Hypertens. Rep. 24 (5) (2022) 107–114.
[18] E.A. Haozous, American Indians and Alaska Natives: resolving disparate cancer outcomes, Clin. J. Oncol. Nurs. 24 (1) (2020) 107–110.
[19] J.L. Heck, E.J. Jones, D. Bohn, S. McCage, J.G. Parker, M. Parker, S.L. Pierce, J. Campbell, Maternal mortality among American Indian/Alaska Native Women: a scoping review, J Womens Health (Larchmt) 30 (2) (2021) 220–229.
[20] N.A. John-Henderson, E.J. White, T.L. Crowder, Resilience and health in American Indians and Alaska Natives: a scoping review of the literature, Dev. Psychopathol. 35 (5) (2023) 2241–2252.

[21] G. Kruse, V.A. Lopez-Carmen, A. Jensen, L. Hardie, T.D. Sequist, The Indian health service and American Indian/Alaska native health outcomes, Annu Rev Public Health 43 (2022) 559–576.
[22] K.G. Laffey, A.D. Nelson, M.J. Laffey, Q. Nguyen, L.R. Sheets, A.G. Schrum, Chronic respiratory disease disparity between American Indian/Alaska Native and white populations, 2011-2018, BMC Publ. Health 21 (1) (2021) 1466.
[23] S. Levin, V.L. Welch, R.A. Bell, M.L. Casper, Geographic variation in cardiovascular disease risk factors among American Indians and comparisons with the corresponding state populations, Ethn. Health 7 (1) (2002) 57–67.
[24] G.Y. Meltzer, B.X. Watkins, D. Vieira, J.T. Zelikoff, B. Boden-Albala, A systematic review of environmental health outcomes in selected American Indian and Alaska Native populations, J Racial Ethn Health Disparities 7 (4) (2020) 698–739.
[25] M.A. Roubidoux, J.S. Kaur, D.A. Rhoades, Health disparities in cancer among American Indians and Alaska Natives, Acad. Radiol. 29 (7) (2022) 1013–1021.
[26] L.M. Schell, M.V. Gallo, H.D. Horton, Power and pollutant exposure in the context of American Indian health and survival, Ann. Hum. Biol. 43 (2) (2016) 107–114.
[27] S.M. Schroeder, C. Adamsen, R. Besse, The relationship between diabetes and oral health status, and dental visits among American Indian, Alaska Native, and Native Hawaiian elders, J Am Dent Assoc 152 (4) (2021) 293–301.
[28] A.C. Dennis, E.O. Chung, E.K. Lodge, R.A. Martinez, R.E. Wilbur, Looking back to leap forward: a framework for operationalizing the structural racism construct in minority health research, Ethn. Dis. 31 (Suppl 1) (2021) 301–310.
[29] T.D. Sequist, Improving the health of the American Indian and Alaska Native population, JAMA 325 (11) (2021) 1035–1036.
[30] E. Arias, B. Tejada-Vera, K. Kochanek, F. Ahmad, Provisional Life Expectancy Estimates for 2021, Atlanta, GA, 2022. Vital Statistics Rapid Release; No 23, National Center for Health Statistics, Hyattsville, MD, August 2022, https://doi.org/10.15620/cdc:118999.
[31] National Safety Council, Preventable injury and fatality, deaths by demographics, race and ethnicity. https://injuryfacts.nsc.org/all-injuries/deaths-by-demographics/race-and-ethnicity/data-details/, 2023. (Accessed 20 October 2023).
[32] D. Stone, E. Trinh, H. Zhou, L. Welder, P. End Of Horn, K. Fowler, A. Ivey-Stephenson, Suicides among American Indian or Alaska native persons - national violent death reporting system, United States, 2015-2020, MMWR Morb. Mortal. Wkly. Rep. 71 (37) (2022) 1161–1168.
[33] M.A. Herne, A.C. Maschino, A.L. Graham-Phillips, Homicide among American Indians/Alaska natives, 1999-2009: implications for public health interventions, Public Health Rep 131 (4) (2016) 597–604.
[34] E. Arias, M. Heron, S. National Center for Health, J. Hakes, U.S.C. Bureau, The validity of race and hispanic-origin reporting on death certificates in the United States: an update, Vital Health Stat 2 (172) (2016) 1–21.
[35] N.S. Appel, H.J.H. Edgar, S.D. Berry, K. Hunley, Error and bias in race and ethnicity descriptions in medical examiner records in New Mexico: consequences for understanding mortality among Hispanic/Latinos, Forensic Sci Int Synerg 7 (2023) 100338.
[36] Southwest Indian law clinic of the university of New Mexico school of law, investigating murder and major crime on tribal lands, Prepared for the New Mexico Indian Affairs Department, https://www.iad.state.nm.us/wp-content/uploads/2021/01/MMIW-Project-Final-Draft-OCT.-23-docx.pdf, 2020.
[37] T. Chakraborty, Reporting & Investigating Missing Persons: A Background Paper on How to Frame the Issue (Report 255934), U.S. Department of Justice, National Institute of Justice, Washington, DC, 2020.
[38] Urban Indian Health Institute, Seattle Indian Health Board, Community Health Profile: National Aggregate of Urban Indian Organization Service Areas, Urban Indian Health Institute, Seattle, WA, 2021.
[39] R. Bachman, H. Zaykowski, R. Kallmyer, M. Poteyeva, C. Lanier, Violence against American Indian and Alaska Native Women and the Criminal Justice Response: what Is Known, U.S. Department of Justice, 2008. National Institute of Justice Report.
[40] NamUs, Cases created in NamUs. https://namus.nij.ojp.gov/sites/g/files/xyckuh336/files/media/document/namus-stats-all-july-2023.pdf, July 2023. (Accessed 20 October 2023).
[41] National Center for Missing & Exploited Children, Native American Children Reported Missing to NCMEC (NCJ Number 303101), National Center for Missing & Exploited Children, Alexandria, VA, 2020.
[42] United States Department of Justice, FBI's National Crime Information Center's Missing Person and Unidentified Person Statistics for 2022, Office of Juvenile Justice and Delinquency Prevention, Washington, DC, 2023.
[43] WhiteHouse.gov, A proclamation on missing or murdered indigenous persons awareness day, in: https://www.whitehouse.gov/briefing-room/presidential-actions/2023/05/04/a-proclamation-on-missing-or-murdered-indigenous-persons-awareness-day-2023/, 2023. (Accessed 29 April 2024).
[44] Bureau of Justice Statistics, Census of medical examiner and coroner offices. [data set] 2018. https://doi.org/10.3886/ICPSR38251.v1. Inter-University Consortium for Political and Social Research, [distributor], 2021.
[45] Bureau of Justice Statistics, Census of Medical Examiner and Coroner Offices, Census instrument, 2018. https://bjs.ojp.gov/sites/g/files/xyckuh236/files/media/survey/cmec18_q_long.pdf. (Accessed 20 October 2023).
[46] United States Department of Justice, Office of Justice Reports, National Institute of Justice, Report to Congress: Needs Assessment of Forensic Laboratories and Medical Examiner/coroner Offices, U.S. Department of Justice, Office of Justice Programs, Washington, DC, 2019.
[47] Bureau of Justice Assistance, Strengthen the medical examiner-coroner (MEC) system program. https://bja.ojp.gov/funding/opportunities/o-bja-2022-171339, 2022. (Accessed 20 October 2023).
[48] M.R. LeBlanc, C.P. Clifford, S.L. Lathrop, Evaluation of non-natural deaths among veterans: New Mexico medical examiner-investigated deaths, 2002-2011, J. Forensic Sci. 62 (3) (2017) 668–673.
[49] E. Petrosky, L.M. Mercer Kollar, M.C. Kearns, S.G. Smith, C.J. Betz, K.A. Fowler, D. E. Satter, Homicides of American Indians/Alaska natives - national violent death reporting system, United States, 2003-2018, MMWR Surveill Summ 70 (8) (2021) 1–19.