

TECHNICAL NOTE**PATHOLOGY/BIOLOGY**

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Essential Medicolegal Death Investigation Services: Standardization of a Survey Instrument Based on the Essential Public Health Services

ABSTRACT: The National Academy of Sciences recommends that states assess the performance of medicolegal death investigation agencies. To aid in performance assessment, we adapted an instrument based on the CDC's 10 Essential Public Health Services by translating the terminology to that of essential medicolegal death investigation services. This produced a survey that could be used to standardize reporting practices and services of agencies. To validate the instrument, a stratified random sample of 12 death investigation chiefs in 12 states was interviewed. This sample represented both medical examiner and coroner jurisdictions within the varying medicolegal structures. A cognitive testing process elicited how well participants could respond to and interpret the survey questions. The response was favorable in that the respondents agreed that given specific revisions toward question clarification, the instrument would be a useful and relevant tool for assessing system performance.

KEYWORDS: forensic science, forensic pathology, medicolegal death investigation, medical examiner, public health, cognitive testing

The medicolegal death investigation system supports both the public health and the public safety. In 2004, a Department of Justice report stated that 40% of all deaths in the United States were referred to medical examiner and coroner offices and that almost half of these deaths (487,000) merited further investigation (1). An Institute of Medicine (IOM) report underscored a need for quality, standards, accountability, and professionalism in the medicolegal death investigation and noted that inadequacies of the current system affect public health and safety practice (2). Our study is a first step toward pinpointing what these inadequacies are and how they may affect policy and practice.

A National Academy of Sciences (NAS) report outlined several issues facing the medicolegal death investigation system. This report highlighted deficiencies in both medical examiner and coroner agencies and addressed the need for "states to perform an assessment of death investigation systems to determine status and needs" (3). To this end, several reports (1–5) suggest a standard approach to measuring performance to achieve scientific-based improvement and public accountability.

In 1998, the National Public Health Performance Standards Program (NPHPSP) developed standards to improve the quality of public health practice and the performance of public health systems (4). These NPHPSP standards permitted state and local agencies to measure quality of service in an effort to assess performance. The standards incorporate the 10 Essential Public Health Services (EPHS) published and supported by the Centers for Disease

Control and Prevention (4). The EPHS overlap with some of the recommendations of the NAS report (3,4). A premise of our study is that these same 10 EPHS provide the foundation and framework for developing an Essential Medicolegal Death Investigation Services (EMLDIS) survey.

We designed an instrument to assess medicolegal death investigative systems and give national policy planners as well as state and county officials the quantitative and qualitative data for implementing or supporting various medicolegal death investigative practices. As the instrument has to be applicable across systems and states, the instrument was tested on potential users in an interview format.

Methods

An initial step was to adapt the EPHS to EMLDIS parameters, as shown in Table 1. As the intent of our study was to validate the instrument for accuracy and usefulness, methods of cognitive survey were used (6). Instrument development was based on the premise that respondents go through cognitive stages of information comprehension/interpretation, retrieval, estimate/judgment, and response. In considering an item, the participant would weigh factors such as sensitivity, threat, and social acceptability or accuracy of questions and answers. This method permitted determining whether respondents interpreted the survey items in the way they were intended and whether the items were relevant to the field of medicolegal death investigation (6,7). Also, it permitted asking chief medical examiners and coroners whether the survey adequately reflected appropriate and relevant domains of interest.

To obtain a representative sample, we selected 12 participants based on a stratified random sample of states according to two strata, state laws and type of system. Counties/districts were randomly selected, and respondents within each county/district were identified

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TABLE 1—Comparison of essential public health and medicolegal death investigation services.

Essential Public Health Services	Essential Medicolegal Death Investigation Services
Monitor health status to identify community health problems	Monitor health and safety status to identify community problems
Population-based community health profile	Population-based community death profile
Current technology to manage and communicate population health data	Current technology to manage and communicate death data
Maintenance of population health registries	Maintenance of death registries
Diagnose and investigate health problems and health hazards in the community	Diagnose and investigate health and safety problems in the community
Identification and surveillance of health threats	Identification and surveillance of health threats
Investigation and response to public health threats and emergencies	Investigation and response to mass casualty threats and emergencies
Laboratory support for investigation of health threats	Laboratory support for investigation of deaths
Inform, educate, and empower people	Inform, educate, and empower people
Health education and promotion	Medicolegal death investigation education
Health communication	Communication plans regarding medicolegal death investigation
Risk communication	Risk communication
Mobilize community partnerships to identify and solve problems	Mobilize community partnerships to identify and solve problems
Constituency development	Constituency development
Community partnerships	Community partnerships
Develop policies and plans that support individual and community efforts	Develop policies and plans that support individual and community efforts
Governmental presence at the local level	Governmental presence at the local level
Public health policy development	Public policy development
Community health improvement process and strategic planning	Medicolegal death investigation process and strategic planning
Plan for public health emergencies	Plan for public health and mass casualty emergencies
Enforce laws and regulations that protect health and ensure safety	Enforce laws and regulations of medicolegal death investigation and that protect health and ensure safety
Review and evaluation of laws, regulations, and ordinances	Review and evaluation of laws, regulations, and ordinances
Involvement in the improvement of laws, regulations, and ordinances	Involvement in the improvement of laws, regulations, and ordinances
Enforcement of laws, regulations, and ordinances	Enforcement of laws, regulations, and ordinances
Link people to needed personal health services and assure the provision of health care when otherwise unavailable	Link people to needed burial and grieving services when otherwise unavailable
Identification of personal health service needs of populations	Identification of health service and grief needs of populations
Assuring the linkage of people to personal health services	Assuring the linkage of services for decedent's survivors
Assure a competent workforce	Assure a competent workforce
Workforce assessment, planning, and development	Workforce assessment, planning, and development
Public health workforce standards	Medicolegal death investigation workforce standards
Life-long learning through continuing education, training, and mentoring	Assures learning through continuing education, training, and mentoring
Public health leadership development	Leadership development
Evaluate the effectiveness, accessibility, and quality of personal and population-based health services	Evaluate the effectiveness, accessibility, and quality of services
Evaluation of population-based services	Evaluation of services and programs
Evaluation of personal health services	Evaluation of practice
Evaluation of the local public health service	Evaluation of the collaborative local medicolegal death investigation services
Research for new insights and innovative solutions to problems	Research for new insights and innovative solutions to problems
Fostering innovation	Fostering innovation
Linkage with institutions of higher learning and/or research	Linkage with institutions of higher learning and/or research
Capacity to initiate or participate in research	Capacity to initiate or participate in research

through Internet searches. The states selected were Delaware, Alabama, Arizona, Connecticut, New York, Florida, Illinois, Indiana, Kansas, Montana, Rhode Island, and North Dakota. The respondents were the chief or equivalent medical examiner, coroner, or justice of the peace. Once contacted, cognitive interviews were conducted and themes of response were identified. For the most part, people contacted were willing to participate. Although contacts at two medical examiner offices and six coroner offices declined, they provided contact names for experts within their respective states.

Results

Respondent descriptive information is shown in Table 2. The median jurisdiction population size was 600,350. The median of respondent experience in medicolegal death investigation was 23.5 years and a median of 10 years of administrative experience. As noted, the range of education varies greatly. In relation to the survey questions, two respondents identified a question on Organizational Oversight and Conflict of Interest as being a "hot topic"; they further stated they were uncertain if participants would be

TABLE 2—Respondent descriptive information.

Respondent	Years Experience	Years Experience at Administrative Level	Education	Estimated Population
Exp 01	15	8	MD FP	1,000,000
Exp 02	33	27	MD FP	600,350
Exp 03	8	6	High school	60,000
Exp 04	24	13	AA-mortuary science	16,000
Exp 05	28	23	MD FP	1,300,000
Exp 06	16	12	BBA	78,000
Exp 07	23	1.5	MD FP	6,000,000
Exp 08	25	20	MD FP	3, 500,000
Exp 09	25	17	MD FP	900,000
Exp 10	20	4	MD FP	2,500,000
Exp 11	3	3	MPA	100,000
Exp 12	29	4	MD FP	80,000

truthful when responding. In relation to a question about listing cause and manner of death as stated by a forensic pathologist, one respondent discussed how the contracted forensic pathologist and

TABLE 3—Participant recommendations for selected questions.

Question	Recommendation(s)
ES2: In the last year, has your agency: identified barriers to utilizing credentialed forensic laboratories that support medicolegal death investigation?	Add examples for barriers or make into two questions because the question has “different meanings as there are toxicology labs and other forensic labs.” Also, some agencies may have “forensic labs in-house.”
ES7: Does your agency provide referral to families in need of indigent services?	Add example as most agencies probably would not know much about community agencies offering social services.
ES5: In the last year, has your agency: contributed to the development of local, state, or national public policy affecting medicolegal death investigations (i.e., organ procurement)?	Move question to appropriate domain and clarify. Question has multiple questions within one. Also, “it is unlikely that one chief or one agency could affect national policy. They are only responsible for their own kingdom. In addition, organ and tissue donation is a separate issue.”
ES8: Did your agency conduct routinely scheduled individual performance evaluations?	Clarify question. Respondents indicated only “select staff” were evaluated and also asked if intent was “formal vs. informal.”

TABLE 4—Essential services 1 revisions based on comments and recommendations.

Original Question	Comment and Recommendation	Revised Question
In the last year, has your agency: provided data regarding substance abuse-related deaths to public health authorities?	Intent of question was to address prescription abuse. “Board of Medical Examiners” was designated an appropriate authority.	In the last year, has your agency: provided data regarding <i>prescription</i> substance abuse-related deaths to: appropriate authorities (e.g., public health agencies, board of medical examiners)?
In the last year, has your agency: provided data regarding patient safety or healthcare treatment-related deaths to the appropriate agency (hospital, public health department)?	Respondents indicated question is vague—casting a net over patient safety. Examples should be included. Nursing home deaths in addition to hospital should also be included. One respondent indicated the agency was more into identifying crime than patient safety.	In the last year, has your agency: provided data regarding patient safety or healthcare treatment related deaths (i.e., surgery-related deaths, medication errors, malfunctioning equipment, falls) to the appropriate agency (e.g., hospital, nursing homes)?
In the last year, has your agency: provided any data to aid in the evaluation of injury prevention programs?	Respondents suggested adding examples to aid in recall.	In the last year, has your agency: provided data to aid in the evaluation of injury prevention programs (e.g., Product Safety Commission, OSHA)?

nonforensic pathologist coroner first discuss cases prior to the forensic pathologist issuing an official statement. Therefore, if there was any disagreement as to cause and manner of death, the question as written would not capture this information.

Table 3 provides a summary of participant recommendations concerning several items in the survey. The participants’ recommendations were used to revise the survey instrument for better comprehension and therefore, accurate response.

Instrument Revision

As the purpose of the telephone interviews with agency chiefs was to produce a workable survey instrument that would return accurate and valuable information, the original items were reviewed in light of respondents’ remarks. Table 4 shows how the questions in Essential Services 1, Monitor health and safety status to identify community problem, were revised.

Respondents found some questions difficult to answer, and they provided feedback that allowed the instrument to be revised. The most common changes were to include examples that were specific and relevant to the medicolegal death investigative system. The second most common revision related to unclear or ambiguous terms, and time intervals. For example, questions about updating guidelines were modified as respondents indicated that guidelines might be reviewed but not updated. As shown in the Appendix, cognitive testing as accomplished with the 12 agency chiefs did permit adequate instrument revision that would increase the survey’s usefulness.

Discussion

Our survey proved to be valuable in both defining the relationship between public health and medicolegal death investigation

and in assessing agency performance. The medicolegal death investigation system is diverse on a number of different levels, including type of agencies, governing laws, and personnel eligibility and training requirements. Specifically, personnel differ in terms of education, training, leadership, practice, and quality. Consequently, respondent comments were based on the respondents’ years of overall experience in medicolegal death investigation, years of administrative experience in medicolegal death investigation, and level of education. The experienced respondents with higher levels of education were more likely to comprehend and interpret questions and ascertain whether a question was relevant.

In the future, we plan to conduct a national stratified survey with a larger sample size that will allow conclusions to be made about the status of the medicolegal death investigative system. The answers could provide more than anecdotal stories of systemic problems; they could reveal what is working and what is not working. Future assessment studies using this instrument could have implications for medicolegal death investigation education, quality, public policy, allocation of funding, and further research. Educational programs focusing on quality assurance, leadership, and the development of a program of research could benefit agencies and the public health system. Current public policies might be revised to reflect an increasing system of complexity and change. Further, delineating gaps in practice could aid states in identifying how to allocate funds to support improved practices and research.

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Appendix

Revised medicolegal death investigation system instrument; adapted from version 2, the local public health system performance assessment instrument.

Each item has the response of Yes, explain; No, explain; Don't know.

Section A. The following questions are related to the monitoring and reporting of your community's health and safety issues. In the last year, has your agency:

1. Provided data regarding prescription substance abuse related deaths to appropriate authorities (e.g., public health, board of medical examiners).....
2. Provided data regarding patient safety or healthcare treatment related deaths (i.e., surgery deaths, medication errors, malfunctioning equipments, falls) to the appropriate agency (e.g., hospital, nursing home).....
3. Provided any data to aid in the evaluation of injury prevention programs (e.g., product safety commission, OSHA).....

Section B. The following questions are related to the assessment of your community health and safety needs through surveillance and investigation techniques.

In the last year, has your agency:

1. Reviewed protocols addressing criteria of reportable diseases (e.g., meningitis, tuberculosis).....
2. Identified barriers (e.g., contact person, forms) to submitting these reports in a timely manner (<72 h) to the local or state public health department(s).....
3. Reviewed protocols to guide investigations involving public health emergencies or disasters.....
4. Reviewed protocols addressing criteria when microbiologic laboratories for diagnostic and surveillance are needed (e.g., HIV, other viral and bacterial infections).....
5. Reviewed protocols addressing criteria when forensic toxicology tests are needed to support medicolegal death investigation.....
6. Identified barriers (e.g., budget, backlog) to utilizing credentialed forensic toxicology laboratories that support medicolegal death investigation.....
7. Reviewed protocols for handling of forensic evidence (e.g., biological samples, clothing, projectiles).....

Section C. The following questions are related to how your agency provides individuals, public, policymakers, interested parties, and key community leaders' information about medicolegal death investigation needs, practices, and trends through educational or other means of information sharing.

In the last year, has your agency:

1. Provided the public, policymakers, or interested parties with educational information regarding medicolegal death investigation practice procedures, or population trends
2. Aligned with affiliates (e.g., hospitals, schools) in the community to implement medicolegal death investigation education programs.....
3. Reviewed communication protocols for sharing information among media or key community leaders for high profile deaths or situations.....

Section D. The following questions are related to the identification of interested parties or key community leaders that contribute to or benefit from the public health roles of medicolegal death investigation in order to increase their awareness of public health role and better facilitate partnerships.

In the last year, has your agency:

1. Updated a directory of organizations (e.g., CPS, APS, FDA) that may be utilized for specific health and safety concerns that present themselves during medicolegal death investigation

2. Encouraged (e.g., focus groups, email, town hall meetings) the participation of interested parties or key community leaders to aid in improving medicolegal death investigations.....
3. Updated a directory of organizations that may be utilized as forensic consultants in conducting medicolegal death investigations (e.g., anthropology, odontology, entomology).....
4. Aligned with interested parties or key community leaders to build awareness of medicolegal death investigation needs.....
5. Taken advantage of community partnerships (e.g., media, mortuaries, transportation agencies) to improve medicolegal death investigations.....
6. Coordinated or participated in committees that address health and safety issues on a population level (i.e., fatality review teams, trauma morbidity and mortality).....

Section E. The following questions are related to the presence of, planning, and development of policies and plans at a local level that support or improve medicolegal death investigation efforts.

In the last year, has your agency:

1. Presented a formal plan to local government officials to assure adequate resources (e.g., equipment, facilities, personnel, funding) are available to conduct medicolegal death investigation...
2. Reviewed existing internal policies affecting medicolegal death investigation.....
3. Participated on state or national boards (NAME, AAFS) or advisory panels (IOM) that influence medicolegal death investigation.....
4. Reviewed organizational strategic plan (e.g., goals) to determine how it can be best aligned with local government plans.
5. Participated in simulations of “mock” multi-casualty disaster involving various agencies (e.g., law enforcement, hospitals, EMS).....

Section F. The following questions are related to your agency’s involvement in and enforcement of the quality and compliance of existing medicolegal death investigation federal, state, or local laws, regulations, and ordinances that protect health and safety.

In the last 5 years, has your agency:

1. Contributed to the development or modification of state death investigation laws that will affect medicolegal death investigation practices.....
2. Contributed to the development or modification of public policy affecting medicolegal death investigations (i.e., organ and tissue procurement).....

In the last year, has your agency:

3. Utilized legal counsel to assist with the review of laws, regulations, or ordinances related to medicolegal death investigations.....
4. Provided information about medicolegal death investigation laws, regulations, and ordinances to the individuals or agencies required to comply (i.e., law enforcement, hospitals, hospices, emergency medical services, nursing homes).....
5. Formally evaluated (quality assurance process) the compliance of organizations that are required to comply with medicolegal death investigation laws, regulations, or ordinances.....
6. Exercised its authority to enforce (police power) medicolegal death investigation laws, regulations, or ordinances (e.g., exhumation, religious objections, state laws).....

Section G. The following questions are related to assuring the linkage of surviving family, friends, and the medicolegal death investigation team to available grieving services within the community.

Does your agency:

1. Provide information (e.g., brochures, website) to decedent family/friends regarding grief services (e.g., clergy, mental health professionals, social work).....
2. Provide translational services that are sufficient for your population needs to assist in conducting medicolegal death investigation.....
3. Provide referral to families in need of indigent services (i.e., county burial).....
4. Provide information for debriefing services to medicolegal scene responders (e.g., investigators, EMS, law enforcement).....

Section H. The following questions are related to assuring the community that your agency is providing high quality standards and ethics in the workforce.

In the last year, has your agencies’ budget or human resource department conducted a workforce needs assessment to develop the following:

1. Size of workforce (i.e., investigators, administrative assistances, autopsy technicians).....

In the last year, has your agency:

2. Reviewed job descriptions that incorporate specific competency and performance expectations (e.g., investigators, forensic pathologists).....

3. Conducted formal individual performance evaluations.....
4. Provided or sought outside assistance to provide educational or training for workforce development (i.e., cross-training).....
5. Administrative level professionals (i.e., Chief, Deputy Chief) attended formal leadership training
6. Retained or developed new employees through coaching and mentoring.....

Section I. The following questions are related to your agency’s evaluation of effectiveness, accessibility, and quality of medicolegal death investigation services.

Does your agency:

1. Participate in formal evaluations of available ancillary services (e.g., transportation, toxicology).....
2. Conduct formal internal evaluations against established standards (i.e., National Association of Medical Examiners, American Board Medicolegal Death Investigation).....
3. Formally assess the consumer’s satisfaction (e.g., law enforcement, attorneys, families, hospitals) with available services (e.g., autopsy, medicolegal death investigation).....
4. Use a formal continuous quality improvement process to evaluate the effectiveness of current practice within medicolegal death investigation.....
5. Formally evaluate forensic consultants that contribute to the delivery of medicolegal death investigation.....

Section J. The following questions are related to the degree your agency encourages collaborative scientific research.

Does your agency:

1. Medicolegal death investigation state statues permit biomedical research (e.g., tissue samples).....
2. Research and monitor “best practices” developed by other medicolegal death investigation agencies or professional organizations (e.g., NAME, ABMDI).....
3. Encourage staff to development or implement new solutions to problems within the medicolegal death investigation system.....
4. Collaborate with institutions of higher learning (e.g., Universities, Health Science Centers).....
5. Have access to resources (i.e., funding) to facilitate research.....

Section K. The following questions are related to agency demographics and practice characteristics

1. Please estimate the population size of your jurisdiction: _____
2. Please indicate the state/county/district your agency serves: _____
- 2a. Please estimate the number of square miles your jurisdiction covers: _____
3. Please circle the type of agency which best describes yours: Justice of the Peace Medical Examiner Coroner
- 3a. Please circle the organizational oversight which best describes yours:

Independent, Government	Independent, Private	Public Health
Department		
Law Enforcement		Other _____
- 3a1. Has your agency encountered any conflicts of interest with the existing oversight structure?
- 3b. Does your agency provide forensic autopsy services? If YES, skip to question 4.
- 3c. Does your agency have a Board Certified Forensic Pathologist available for autopsy services?
- 3d. If yes, does your agency communicate with the forensic pathologist prior to cause and manner of death determination?
- 3e. If yes, how frequently does your agency list the cause and manner of death as provided by forensic pathologist?

Never	Almost Never	Sometimes	Fairly often	Always
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- 3f. If yes, how frequently does your agency always provide investigative information (i.e., field report and scene photos) to be present before autopsy?

Never	Almost never	Sometimes	Fairly often	Always
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4. How frequently does your agency investigate infant deaths using doll re-enactment?

Never	Almost never	Sometimes	Fairly often	Always
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5. Are all investigators within your agency certified by the American Board of Medicolegal Death Investigations?
6. Does your agency have a designated individual to serve as the emergency response coordinator?
7. Does your agency have the authority to enforce (police power) medicolegal death investigation laws, regulations, or ordinances?
8. Does your agency have protocols in place for addressing biosafety issues (e.g., underground small spaces, fire, biochemical events) while on the scene of a death investigation?
9. Does your agency have a governing board that provides oversight?
10. Please indicate the number of employees (investigators, physicians, nurses) in your agency that actively conduct scene or telephone medicolegal death investigations:

a. 1–4	b. 5–9	c. 10–14	d. 15–20	e. more than 20
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11. Please indicate your annual budget: \$ _____

12. Please estimate your annual budget spent on autopsy services (includes physicians salaries, morgue staff, equipment, and supplies):
- | | | | |
|---------------|---------------------------------------|------------------------------------------|--------------------------|
| a. <\$100,000 | b. more than \$100,001 but <\$500,000 | c. more than \$ 500,001 but <\$1,000,000 | d. more than \$1,000,001 |
|---------------|---------------------------------------|------------------------------------------|--------------------------|
13. Please estimate your annual budget spent on other forensic services (excluding autopsy) i.e., toxicology:
- | | | | |
|---------------|---------------------------------------|-----------------------------------------|--------------------------|
| a. <\$100,000 | b. more than \$100,001 but <\$500,000 | c. more than \$500,001 but <\$1,000,000 | d. more than \$1,000,001 |
|---------------|---------------------------------------|-----------------------------------------|--------------------------|
14. Please estimate the number of deaths by manner that your agency has investigated within your jurisdiction in the last month:
- | | | | | | |
|-----------------|-----------------|------------------|-------------------|----------------------|-----------------|
| a. Natural_____ | b. Suicide_____ | c. Homicide_____ | d. Accident _____ | e. Undetermined_____ | d. Pending_____ |
|-----------------|-----------------|------------------|-------------------|----------------------|-----------------|
15. Please estimate the number of infant deaths your agency investigated in the last year. _____
16. Please indicate if your agency has educational requirements for the position of a medicolegal death investigator.
17. Please indicate if your agency is submitting death certificates online.
18. Please indicate if your agency role includes that of the local death registrar (vital statistics).
19. Does your agency attempt to positively identify multiple, more than two occupants in motor vehicle crash, using scientific identification?
20. Does your agency have access to radiography services (x-ray; CT scan)?
- 20a. Does your agency have practice protocols in place that indicates when radiography is needed?
21. Does your medicolegal death investigation state statute require healthcare institutions to report treatment-related deaths (e.g., surgical deaths, medication errors, equipment malfunctions)?
22. If given the opportunity, what would you change about the medicolegal death investigation system? Please provide response below. If additional space is need please use back of booklet.