Attitudes Towards Forensic Autopsy Standard B3.7 and the Use of Physician Extenders in Select Autopsy Cases

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ABSTRACT

Studies have demonstrated that autopsy is the gold standard for determining cause and manner of death. Indeed, the current National Association of Medical Examiners standard B3.7 states that a forensic pathologist (FP) shall perform a forensic autopsy when the death is by apparent intoxication by alcohol, drugs, or poison. Unfortunately, the recent increase in drug-related deaths has led to some question about the feasibility of maintaining compliance with standard B3.7. We constructed a voluntary survey to address consensus on standard B3.7 and the use of supervised accredited pathologists' assistants (PAs) in performing select medicolegal autopsies. Additional questions were included to help characterize variables related to FP's workload and experience. Each of these variables was predicted to influence FP's attitudes toward B3.7 and the use of PAs. Our respondent pool ($n = 107$) consisted primarily of actively practicing FPs with administrative responsibilities (42%) and actively practicing FPs without administrative responsibilities (41%). Sixty-five percent agreed that standard B3.7 is appropriate. Opinion on the use of PAs was split between those who agreed (45%) and those who did not (44%). Tendency to agree with either B3.7 or the use of PAs was not a function of FP's individual or office workload; however, respondents were more likely to agree with B3.7 if they previously experienced a case where internal autopsy findings radically altered diagnosis in an otherwise suggestive overdose case ($P < 0.001$). In certain offices and under certain conditions, the use of PAs may be one solution to ensuring all potential overdose deaths receive an autopsy. *Acad Forensic Pathol.* 2019 9(3-4): 181-190

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INTRODUCTION

Previous studies have demonstrated that assigning cause and manner of death based on external examination alone may be erroneous up to 30% of the time (1-3). For these reasons, the current (as of September 2019) National Association of Medical Examiners (NAME) forensic autopsy standard B3.7 states that “a forensic pathologist shall perform a forensic autopsy when the death is by apparent intoxication by alcohol, drugs or poison, unless a significant interval has passed, and the medical findings and absence of trauma are well documented” (emphasis ours) (4).

Unfortunately, the acute rise in drug-related deaths (5) has led to some question about the feasibility of compliance with standard B3.7, especially for offices located in busy urban centers with high rates of drug abuse and for smaller offices with lower staffing ratios and finite resources.

The issue of compliance with standard B3.7 was discussed at the 2018 annual NAME Business Meeting. Here, it was suggested that utilizing supervised certified pathologists’ assistants (PAs) may be one solution to ensuring that every potential overdose case receives a full forensic autopsy including internal examination.

PAs are physician extenders who participate in activities related to anatomical pathology under a supervising pathologist or group of pathologists. PAs receive two or more years of education in anatomical pathology following the completion of an undergraduate degree. According to the American Association of Pathologist Assistants, these providers are academically and practically trained in comprehensive macroscopic examination and evaluation of all surgical specimens, postmortem examinations including prosection, rendering provisional anatomic diagnosis, composing clinical histories, recording macroscopic anatomic findings, and submitting tissue sections for intraoperative microscopic examination, as well as for permanent histology (6). In addition to their clinical duties, PAs often engage in pathology resident education and administrative work related to the organization and effective operation of the surgical pathology laboratory.

Despite routine employment of PAs in academic, community, and private practice settings, there is little consensus regarding the utilization of these providers for the performance of forensic autopsies in medical examiner or coroner offices. To our knowledge, there are currently no peer-reviewed articles concerning the use of PAs in forensic pathology, and NAME mandated guidelines do not exist as of summer 2019.

The current study aimed to address two issues: 1) consensus on the appropriateness of NAME standard B3.7 and 2) consensus on the use of supervised accredited PAs (providers holding a PA [ASCP] degree) in performing nonsuspicious (i.e., potential overdose deaths with suggestive scene findings or suspected natural deaths) forensic autopsies. Additionally, we sought to determine whether factors related to workload and experience influence FP’s opinions on either matter.

METHODS

We constructed a voluntary survey consisting of 17 multiple-choice questions and three fictitious death scenarios using Google Forms. All responses were anonymous.

The survey was distributed via the NAME-L electronic mailing list and remained open for three weeks in March 2019. Participants were asked to specify their age, gender, geographic location, job role/level of training, and years of experience in forensic pathology. Next, respondents were asked a series of questions about their individual workload (average number of autopsies they perform per year), office workload (number of pathologists in their office who perform greater than 275 autopsies per year and number of overdose deaths processed by their office per year), and access to autopsy technicians (whether their current or previous office employs autopsy technicians to assist with eviscerations). Additional questions were included to assess respondent’s professional experience with PAs (respondents were also asked to specify the types of duties performed by PAs), past experience with unexpected internal autopsy findings in an otherwise suggestive overdose death, and whether they currently or previ-

ously work(ed) in a jurisdiction that routinely attempts to prosecute drug dealers in overdose deaths.

Opinion on NAME standard B3.7 was assessed with the following question: “In your opinion, is the current NAME standard to autopsy every overdose case appropriate?” Similarly, opinion on the use of PAs in select autopsy cases was assessed with the following statement: “I would feel comfortable supervising an accredited PA performing a non-suspicious forensic autopsy (i.e., potential opioid overdose case with suggestive scene findings)”. In both cases, participants were asked to choose from one of the following responses: “strongly agree,” “strongly disagree,” “agree,” “disagree,” and “neutral.”

Finally, we designed three fictitious death scenarios to measure the internal validity of our survey results. For each scenario, participants were asked to specify the minimum suitable examination type (full autopsy with internal examination vs. external examination only) within the scope of their current practice. We predicted that 50% of respondents would choose to perform a full autopsy in scenario 1, greater than 50% would choose to perform a full autopsy in scenario 2, and 100% would choose to perform a full autopsy in scenario 3.

All statistical comparisons were performed by one-way analysis of variance (ANOVA) using SPSS software. Descriptive data (percentages and n values) were obtained from Google Forms.

RESULTS

The survey received a total of 107 responses. Basic demographic data including respondent’s gender, age range, job role/level of training, and geographic location are provided in **Table 1**. Response breakdown concerning variables predicted to influence agreement with standard B3.7 and the use of PAs in select autopsy cases are represented in **Table 2**. Opinion on the appropriateness of NAME standard B3.7 and the use of supervised PAs in select autopsy cases are summarized in **Table 3**. **Tables 4 and 5** include results of one-way ANOVA comparisons of all factors listed in **Table 2** and agreement with NAME standard B3.7

and use of PAs in forensic autopsy, respectively. Fictitious death scenarios (and participant’s responses) are provided in **Table 6**.

Our respondent pool consisted of 42% actively practicing FPs with administrative responsibilities (chiefs and deputy chiefs) and 41% actively practicing FPs without administrative responsibilities (staff pathologists). Respondents were roughly equal parts male (44%) and female (54%), with a majority between 30 and 59 years old (76%). Sixty-three percent of respondents reporting having over 10 years of experience in forensic pathology.

In terms of individual workload, 47% of our respondents perform greater than 250 forensic autopsies per year (29% perform 250-300, 8% perform 300-350, and 9% perform greater than 350). Office workload was measured by the number of forensic pathologists per office who perform greater than 275 autopsies per year and the number of potential overdose deaths processed per office per year. Seventy-three percent of respondents report working in an office where at least one forensic pathologist performs greater than 275 autopsies per year, and 50% work for offices that process greater than 250 overdose deaths per year. Eighty-seven percent of respondents report working for offices that employ morgue technicians to assist with eviscerations.

Forty-eight percent of respondents currently work (or previously worked) in jurisdictions where prosecution of drug dealers in overdose deaths is routine, 64% report having professional experience with PAs, and 67% report having experience where internal autopsy findings radically altered diagnosis in a suspected overdose case. Participants were also asked to specify the types of duties (i.e., grossing benign vs. malignant surgical specimens) routinely performed by PAs (**Figure 1**).

A clear majority (65%) of respondents agree that NAME standard B3.7 is appropriate. On the utilization of supervised PAs in forensic autopsy, respondents were split between those who endorse the notion (45%) and those who do not (44%).

Table 1: Demographics of Survey Respondents

	%	n
Sex		
Male	43.9	47
Female	55.2	58
Prefer not to specify	1.9	2
Age Range		
Under 30 years	1.9	2
30-39 years	27.1	29
40-49 years	27.1	29
50-59 years	22.4	24
60 years and older	21.5	23
Job Role/Level of Training		
Pathology Resident	3.8	4
Forensic Pathology Fellow	3.8	4
Actively Practicing Forensic Pathologist with Administrative Duties (i.e. Chief)	41.5	44
Actively Practicing Forensic Pathologist without Administrative Duties	40.6	43
Actively Practicing Forensic Pathologist in Predominantly Private Practice	2.8	3
Retired Forensic Pathologist	1.9	2
Other*	5.7	6
Geographic Location		
West (WA, OR, MT, ID, WY, CA, NV, UT, CO, AZ, NM, AK, HI)	17.8	19
Midwest (ND, MN, WI, SD, IA, NE, KS, MO, IL, IN, OH)	19.6	21
South (TX, OK, AR, LA, MS, KY, TN, AL, GA, FL, SC, NC, WV, VA, DE, MD, DC)	42.1	45
Northeast (PA, NY, NJ, CT, RI, MA, NH, VT, ME)	11.2	12
Other/Outside USA	9.3	10

Table 2: Variables Hypothesized To Predict Agreement With NAME Standard B3.7 and the Use of PAs In Forensic Autopsy

	%	n
Years of experience in forensic pathology		
Less than 1 year	4.7	5
1-5 years	19.6	21
5-10 years	13.1	14
10-15 years	16.8	18
15-20 years	11.2	12
Over 20 years	34.6	37
Average number of forensic autopsies individually perform(ed) per year		
Less than 200	18.7	20
200-250	32.7	35
250-300	29	31
300-350	8.4	9
Greater than 350	9.3	10
Currently in training	1.9	2
Number of colleagues (working in the same office) who perform(ed) greater than 275 forensic autopsies per year		
0	17.1	18
1-3	37.1	39
4-6	19	20
7-9	10.5	11
Greater than 10	5.7	6
I don't know	10.5	11
Number of potential overdose cases per office (per year)		
Less than 200	23.6	25
200-250	11.3	12
250-300	3.8	4
300-350	10.4	11
Greater than 350	35.8	38
I don't know	15.1	16

Table 2: Continued

	%	n
Office employs morgue technicians		
Yes	86.9	93
No	13.1	14
I don't know	0	0
Working in (or previously worked in) a jurisdiction that routinely attempts to prosecute drug dealers in overdose deaths		
Yes	47.7	51
No	37.4	40
I don't know	15	16
Experience working with PA(ASCP) accredited pathologist assistants		
Yes	63.6	68
No	35.5	38
I don't know	0.9	1
Experience where autopsy findings radically changed a diagnosis that may have otherwise been reached by external examination (+toxicology testing) alone		
Yes	67	71
No	25.5	27
I don't know	7.5	8

Table 3: Survey Respondent's Agreement With NAME Standard B3.7 and the Use of Pathologists' Assistants In Select Forensic Autopsy Cases

	%	n
In your opinion, is the current NAME standard (B3.7) to autopsy every potential overdose case appropriate?		
Strongly Agree	29	31
Agree	36.4	39
Strongly Disagree	8.4	29
Disagree	17.8	19
Neutral	8.4	9
I would feel comfortable supervising an accredited PA performing a non-suspicious (i.e. potential overdose case with suggestive scene findings)		
Strongly Agree	18.9	20
Agree	26.4	28
Strongly Disagree	17.9	19
Disagree	26.4	28
Neutral	10.4	11

Table 4: One-way ANOVA Comparisons of Predictive Variables VERSUS Agreement With NAME Standard B3.7

	F-Statistic	Degrees of Freedom	p-value
Years of experience in forensic pathology	2.01	1,106	0.08
Average number of forensic autopsies individually perform(ed) per year	0.71	1,106	0.62
Number of colleagues (working in the same office) who perform(ed) greater than 275 forensic autopsies per year	1.86	1,86	0.13
Number of potential overdose cases per office (per year)	1.62	1,105	0.52
Office employs morgue technicians	0.13	1,106	0.72
Working in (or previously worked in) a jurisdiction that routinely attempts to prosecute drug dealers in overdose deaths	2.64	1,106	0.08
Experience working with PA(ASCP) accredited pathologist assistants	1.21	1,106	0.30
Experience where autopsy findings radically changed a diagnosis that may have otherwise been reached by external examination (+toxicology testing) alone	2.99	1,104	2.9x10 ⁻⁸

Table 5: One-way ANOVA Comparisons of Predictive Variables Versus Agreement With the Use of Pathologists' Assistants in Forensic Autopsy

	F-Statistic	Degrees of Freedom	p-value
Years of experience in forensic pathology	0.70	1,105	0.62
Average number of forensic autopsies individually perform(ed) per year	1.62	1,105	0.16
Number of colleagues (working in the same office) who perform(ed) greater than 275 forensic autopsies per year	0.78	1,86	0.54
Number of potential overdose cases per office (per year)	0.97	1,104	0.44
Office employs morgue technicians	0.02	1,105	0.88
Working in (or previously worked in) a jurisdiction that routinely attempts to prosecute drug dealers in overdose deaths	0.23	1,105	0.80
Experience working with PA(ASCP) accredited pathologist assistants	0.78	1,105	0.46
Experience where autopsy findings radically changed a diagnosis that may have otherwise been reached by external examination (+toxicology testing) alone	20.6	1,105	0.054

Table 6: Death Scenarios In Which Respondents Were Asked To Specify the Minimum Examination Type They Would Deem Suitable Within the Scope of Their Current Practice

	Full Autopsy	External Examination
Scenario 1		
A 63-year-old man with history of hypertension, hyperlipidemia, diabetes mellitus, and previous myocardial infarction requiring RCA stenting is found deceased in his secured residence when he failed to answer the phone for two days. The medicolegal investigator finds a "dime bag" and unmarked pills on the decedent's nightstand.	63% (n=60)	37% (n=35)
Scenario 2		
A 28-year-old woman is found unconscious by her roommate in their secured apartment. The decedent has a history of illicit substance use including opioids, however, her roommate reports she has been "trying to stay sober" for the past 6 months. The immediate scene lacks visible drug paraphernalia, however, marijuana and a prescription for benzodiazepines are identified in the decedent's drawer (name on prescription matches that of the decedent). On external exam, the decedent has scarring in her left antecubital fossa. Urine quick tox testing is positive for marijuana, opioids, benzodiazepines and cocaine.	73% (n=69)	27% (n=26)
Scenario 3		
A 31-year-old man collapses while jogging with his partner. The decedent was a surgical resident who frequently took stimulant medication (ie. Dexedrine) to stay awake. External examination is unremarkable and urine quick tox screening is not performed.	99% (n=95)	1% (n=1)

Tendency to agree with NAME standard B3.7 and the use of PAs in nonsuspicious forensic autopsy was independent to each of the following factors, respectively: 1) number of years of experience in forensic pathology ($p = 0.08$; $p = 0.62$), 2) number of autopsies individually performed per year ($p = 0.62$; $p = 0.16$), 3) number of forensic pathologists per office that perform greater than 275 autopsies per year ($p = 0.13$; $p = 0.54$), 4) number of overdose cases per office per year ($p = 0.52$; $p = 0.44$), 5) office employment of autopsy technicians ($p = 0.72$; $p = 0.88$), 6) past experience working with PAs ($p = 0.08$; $p = 0.80$), and 7) working in a jurisdiction that routinely attempts to prosecute drug dealers in overdose deaths ($p = 0.30$; $p = 0.46$).

We found that the most significant factor related to respondents agreeing with NAME standard B3.7 was whether they had personal experience with a potential overdose case where internal autopsy findings radically changed a diagnosis that may have otherwise been determined by external examination alone, and this relationship was highly statistically significant ($p =$

2.9×10^{-8}). The relationship between unexpected autopsy findings and agreement with the use of PAs approached, but did not reach, significance ($p = 0.054$).

Sixty-three percent of respondents believe that a full autopsy is the minimum acceptable examination type for death scenario 1, 73% of respondents believe that a full autopsy is the minimum acceptable examination type for death scenario 2, and 99% of respondents believe that a full autopsy is the minimum examination type for death scenario 3 (Table 6).

DISCUSSION

The primary aim of this study was to evaluate consensus on NAME forensic autopsy standard B3.7 and the use of supervised accredited PAs in performing select (i.e., nonsuspicious) forensic autopsy cases. We further queried whether variables related to personal experience and workload influences an FP's tendency to either support or oppose B3.7 and the utilization of PAs in forensic autopsy.

Figure 1: Duties routinely performed by PAs

Our data suggests that while a majority of FPs (65%) agree that NAME standard B3.7 is appropriate, consensus on the use of PAs is equally split between those who approve (45%) and those who do not (44%). Only one of the variables we examined in this study demonstrated a statistical relationship with an FP's tendency to agree with standard B3.7. To assess the internal validity of our results, we included three fictitious death scenarios. Scenario 1 was designed to represent a "gray zone" medicolegal death case (i.e., a middle-aged individual with multiple documented medical comorbidities and scene findings suggestive of recent illicit drug use) that some FPs might choose to certify based on external examination plus toxicology testing alone. Here, we found that the percentage of FPs who would choose to perform a full autopsy (63%) roughly approximates the percentage of forensic pathologists who support B3.7 (65%). In contrast, scenario 3 (a young individual with a history of prescription stimulant abuse who dies suddenly during exercise) was designed to represent the type of case that virtually 100% of forensic pathologists would choose to autopsy. Indeed, 99% of our respondents agreed that a full forensic autopsy with internal examination is required in scenario 3.

Other challenging scenarios exist in daily practice for forensic pathologists. For example, an elderly individual with extensive natural disease who takes prescription opiates for pain control is found deceased in their secured residence and a medication bottle is found at the scene. Such scenarios are handled differently across North America, based on local custom and available resources. Whether such a patient requires a full autopsy to comply with standard B3.7 is unclear based on the current specific language of the standard. Future research efforts might consider focusing on similar gray zone type cases to help identify nuances in the interpretation of standard B3.7.

In terms of variables hypothesized to influence FP's opinion on B3.7 and the use of PAs, we first predicted that forensic pathologists with larger caseloads are less likely to agree with standard B3.7 and more likely to support the utilization of PAs in performing a subset of autopsy cases. Our prediction was based on

a number of assumptions: 1) larger caseloads make it increasingly difficult to finalize 90% of death certificates within 90 days, in accordance with current NAME accreditation guidelines, 2) institutions with larger caseloads are more likely to be located in urban centers with higher rates of overdose deaths, and 3) since internal autopsy findings in overdose cases are frequently nonspecific (i.e., edematous lungs and distended urinary bladder), PAs can be trained to identify and document these findings under a supervising FP. Here, we found no statistical relationship between workload (individual and office) and FP's opinion on B3.7 or the use of PAs. Similarly, access to autopsy technicians did not appear to influence FP's opinion on B3.7 or the use of PAs.

We also investigated whether any of the following variables influence FP's attitudes toward B3.7 and the use of PAs in forensic autopsy: 1) number of years of experience in the field of forensic pathology, 2) professional experience working with PAs, or 3) working in a jurisdiction (either currently or previously) that routinely attempts to implicate drug dealers in overdose deaths. There was no statistical relationship between FP's opinions on B3.7 and the use of PAs and any of the above mentioned variables. We did, however, find that forensic pathologists were statistically more likely ($p < 0.001$) to endorse B3.7 if they reported having a past experience where internal autopsy findings were radically discordant from external examination findings in an otherwise suggestive overdose case. This relationship approached, but did not reach, significance with respect to the use of PAs ($p = 0.054$).

Our results indicate a majority of forensic pathologists support standard B3.7. This consensus appears to be independent of virtually all of the variables related to workload and personal experience included in this study. While an inherent amount of selection bias exists in voluntary surveys, based on these results, it is reasonable to conclude that clinical judgment plays an important role in a forensic pathologist's decision to perform a full autopsy in nonsuspicious overdose deaths.

The alternative side of this discussion relates to the matter of how clinical decisions are ultimately made. The only variable found to significantly impact agreement with B3.7 was whether FPs could recall a case where internal autopsy findings radically changed a diagnosis that may have otherwise been made by external examination alone. Interestingly, the proportion of respondents who agreed with B3.7 (65%) was roughly equal to the proportion of respondents who reported having such a case (68%). This highlights that “near miss” experiences play an important role in the decision to perform a full autopsy versus external exam, especially in cases of suspected overdose.

In contrary to a majority consensus on the appropriateness of standard B3.7, we found that FP’s opinions on the use of PAs in forensic autopsy are split. There was no statistical relationship between any of the predictive variables examined in this study and FP’s willingness to supervise a PA performing a medicolegal autopsy.

As offices continue to struggle with increasing workloads, many jurisdictions are faced with a list of unappealing options: 1) choose to perform external exams with toxicology testing in a subset of overdose cases, 2) hire a qualified PA to assist with full autopsies under the supervision of an FP, or 3) continue to perform full autopsies with toxicology testing, thus, causing autopsy numbers to exceed allowances for NAME accreditation. While most FPs recognize none of these options are ideal, many offices are currently faced with the above dilemma. Follow-up studies are required to further characterize FP’s consensus on the use of PAs in forensic autopsy beyond simple “agreement” versus “disagreement.”

Based on our results, we conclude that consensus on B3.7 and the use of supervised accredited PAs in forensic autopsy is independent of workload (individual and office), years of experience in forensic patholo-

gy, professional experience with PAs, and likelihood of drug dealer prosecution in overdose deaths. FPs who have prior experience with “near miss” type cases are statistically more likely to agree with B3.7. In certain offices under certain conditions, the use of supervised accredited PAs may be one option to ensure a majority of overdose deaths receive a full forensic autopsy with internal examination. Individual clinical judgment and professional discretion appear to play a notable role in both the decision to perform a full autopsy in otherwise suggestive overdose deaths and the decision to utilize PAs in performing a subset of these cases. Future investigative efforts are warranted to establish a set of guidelines for the use of such practitioners in forensic autopsy proceedings, for offices that choose to do so.

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