

# Autopsy Service Death Certificate Review

## An Educational Experience and Public Health Service

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• **Context.**—Despite the importance of accurate death statistics for epidemiologic studies and public health initiatives, there remains a high frequency of errors in death certification. This deficiency can be addressed by the hospital autopsy service.

**Objectives.**—To improve the quality and accuracy of death certificates issued in the hospital and improve resident and clinician education by initiating a death certificate review process, performed by pathology residents while on their hospital autopsy rotation.

**Design.**—A resident reviewed all death certificates issued in the hospital daily through the state electronic death certificate filing system and correlated with the decedent's medical record. When errors were found, the resident filed an amended death certificate with the state. If applicable, the Office of the Medical Examiner was contacted to investigate. The original certifying physician

was then contacted via email with an explanation for the amendment.

**Results.**—In 12 months, 590 death certificates were issued by the hospital. Eighty-eight of 590 (15%) were amended. Of those 88 amended, 41 (47%) were missing an underlying cause of death, 7 (8%) had an inaccurate cause of death, 41 (47%) failed to include relevant contributory causes of death, and 17 (19%) had major typographic errors. Of 88, 24 (27%) fell under the Office of the Medical Examiner's jurisdiction and were reported with a subsequent change in the manner of death in 23 of 88 cases (26%).

**Conclusions.**—Death certificate review by the autopsy service improves the accuracy of death certification, impacts resident and clinician education, and serves as quality assurance for both the hospital and the state.

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Death certificates serve a variety of important functions. They are legal documents that provide proof of death as well as a measure of closure to the decedent's family. They are also the source of national and regional mortality data, which are used for epidemiologic studies and monitoring public health. Accurate mortality statistics are of the utmost importance for appropriate allocation of resources for public health initiatives. Unfortunately, the high frequency of death certificate errors has been well-described, in settings ranging from community practice to tertiary academic centers.<sup>1–5</sup> This problem has been attributed to a lack of training, the infrequency with which some

physicians certify deaths, and failure to appreciate the importance of death certificates.<sup>1,2,6–8</sup> The hospital autopsy service can play a proactive role in addressing these deficiencies and ensure the quality of resulting public health data. A death certificate review program was initiated as part of the pathology resident autopsy rotation at a tertiary academic medical center. The goal of this program was to improve the quality and accuracy of death certificates issued from the hospital and to improve resident and clinician education.

### MATERIALS AND METHODS

Our facility is a 560-bed, academic medical center affiliated with a medical school. The pathology residency program has 16 residents training in anatomic and clinical pathology, who each spend 4 months on the hospital autopsy service and 1 month at the Office of the Medical Examiner (OME) for forensic pathology. Death certificates are filed by clinicians electronically via a state-wide, electronic death reporting system at any point in time during the day or night. The pathology resident rotating on the hospital autopsy service was responsible for performing a daily review of all death certificates issued within the hospital from the previous day. The death certificate was examined to ensure that a cause of death was provided and that there were no typographic errors (including misspellings or incorrect dates). Then, the resident reviewed the decedent's medical record to correlate with the death certificate. The resident assessed whether the cause of death was accurate, whether relevant comorbidities were included, and if the case fell under the jurisdiction of the OME. When errors were found, the pathology resident wrote an amended death certificate and filed it

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Hello Dr. Seuss,

During our routine evaluation of hospital-issued death certificates, we reviewed the death certificate you certified for J.M. As a reminder “intracerebral hemorrhage” is considered a mechanism rather than a cause of death. Especially in cases of intracerebral hemorrhage, it is important to include the etiology of the bleed (underlying medical condition vs trauma) as that information affects the manner of death (natural vs accident).

Therefore, J.M.’s death certificate will be amended to:

Part I: Right occipital lobe hemorrhage due to hypertensive and atherosclerotic cardiovascular disease.

Part II: Diabetes Mellitus - Type 2, Atrial flutter (on anticoagulation).

Please let me know if you have any questions regarding the switch and remember you can always refer to the death certificate tutorial for assistance completing death certificates (include URL here).

**Figure 1.** Sample email sent to clinicians regarding amended death certificates.

with the state. If applicable, the OME was contacted to investigate the death. The original certifying physician was then contacted via email with an explanation for the amendment (Figure 1); at the time of this study, the state electronic death reporting system required that the original certifying physician sign the amended death certificate. All of the information from the death certificate, and any corrective actions taken, are documented in a shared Microsoft Excel spreadsheet (Microsoft, Redmond, Washington). Institutional guidelines regarding research limited to deceased patients were followed.

## RESULTS

Fourteen months of data were reviewed; 2 months of data were excluded from analysis due to failure to perform or adequately document the review process. During this time, 590 death certificates were issued by the hospital. Eighty-eight of 590 (15%) were amended. Of those 88 amended, 41 (47%) were missing an underlying cause of death, 7 (8%) had an inaccurate cause of death, 41 (47%) failed to include relevant contributory causes of death, and 17 (19%) had major typographic errors (Figure 2). Thirty-five of 590 (6%) certificates had multiple errors. Twenty-four of 88 (27%) death certificates were reported to the OME for investigation, with a subsequent change in the manner of death in 23 of 88 cases (26%); natural to accident in 14 of 88 cases (16%), natural to undetermined/therapeutic complication in 8 of 88 cases (9%), and natural to suicide in 1 of 88 cases (1%) (Figure 3). Of note, in this state, “therapeutic complication” is not a separate manner of death; instead, these deaths are classified as “undetermined,” with the therapeutic complication described in the “how injury occurred” section of the death certificate.

## DISCUSSION

Over a single year, the pathology residents on their autopsy rotation amended 15% (88 of 590) of the death certificates issued within the hospital. The most common errors identified were not providing a cause of death or omitting relevant contributory causes of death. A significant proportion of the amended death certificates (27%; 24 of 88) fell under the jurisdiction of the OME but had not been reported by the certifying physician. In nearly all of these cases, after investigation by the OME, the manner of death

was changed from natural to unnatural (accident, undetermined/therapeutic complication, or suicide). Common errors included omitting and failing to report trauma related to falls in the elderly and certifying choking incidents as natural (Figure 4).

Several studies have described various education initiatives that have decreased the death certificate error rate; however, there has been no study that examines the long-term success of these interventions.<sup>3-5,9-11</sup> Interactive workshops and seminars have been described as the most effective form of education<sup>3,9,10</sup>; however, with the time constraints placed on resident education, it is unlikely that several hours of time will be allotted to teach death certification. Additionally, any such intervention in a teaching hospital would need to be done annually to address the new interns, who often are responsible for filling out the death certificate. In contrast to a single point of intervention, our system offers the benefit of continuous, real-time feedback to the clinicians, while simultaneously intervening to ensure that every patient who dies in the hospital has an accurate cause and manner of death recorded.

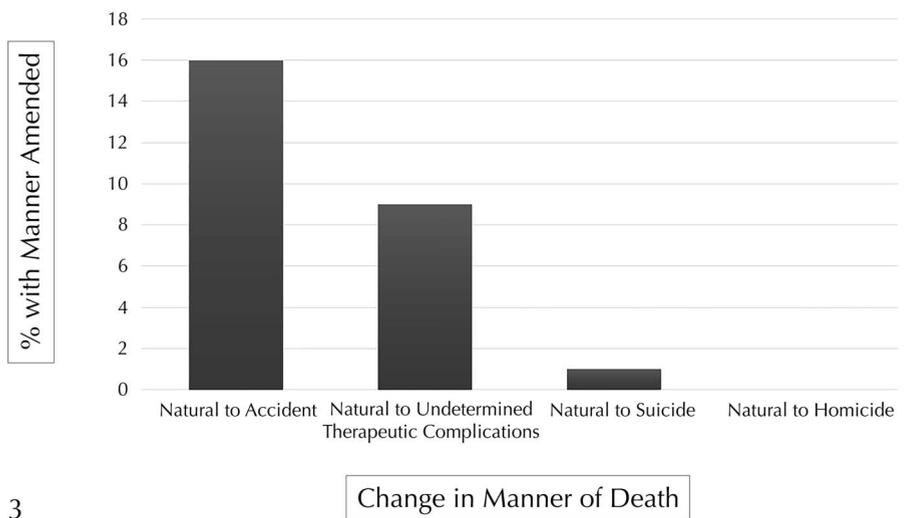
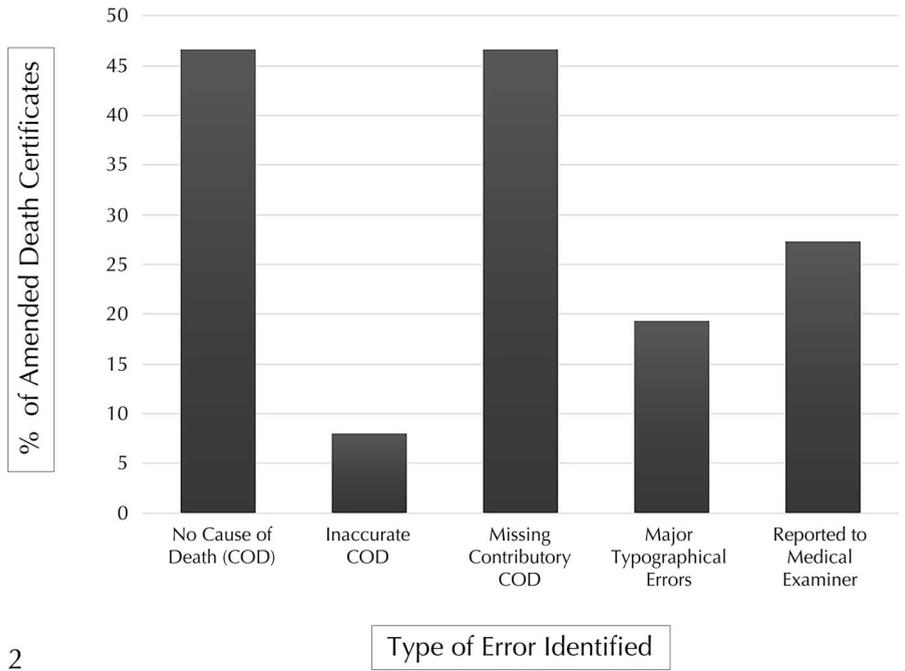
Reviewing death certificates as a form of quality assurance has been previously described by Medical Examiners’ offices<sup>12,13</sup>; however, these forms of review are reliant solely on the information provided on the certificate. Pathology residents have access to patients’ medical records; therefore, they can discover information that has not been directly reported and can more effectively assess the accuracy of the cause and manner of death.

An additional benefit anecdotally noted by the authors is the effect of death certificate review on autopsy rates. While many residency programs struggle with decreasing autopsy volume,<sup>14,15</sup> our institution has experienced increasing autopsy rates since initiating this program. While there may be several underlying factors affecting this change, we believe that the review program has increased the visibility and accessibility of the autopsy service to our clinical colleagues. Residents and clinicians may then be more likely to raise the option of autopsy with families.

As this review process was initiated, a few issues arose. Step-by-step instructions were provided to the residents; however, specific instructions as to what constituted a

**Figure 2.** Types of errors identified in amended death certificates.

**Figure 3.** Changes in manner of death in death certificates reported to the Office of the Medical Examiner.



significant error were initially lacking. The residents rotate on a monthly basis, and on review of the data it is clear some residents had higher thresholds for issuing amendments than others. For example, some residents would permit a death certificate with the events in part 1 reversed in temporal sequence, as long as an underlying cause of death was present; however, other residents would addend it to correct the order of events. Occasionally new residents on service only reviewed the medical record if the death certificate showed obvious errors (or failed to perform or document the review); as a result of this problem, 2 months of data were excluded from this analysis. A solution to both of these problems was to provide written instructions to the residents on service, and to have the attending pathologist readily available for consultation. However, both of these points indicate our data underestimate the actual error rate of death certificates issued in this hospital, further demonstrating the value of such a program.

This review program represents an added value to the autopsy service, and illustrates how pathologists can play a

proactive role in public health. As healthcare moves toward reimbursement models based on quality of care, accurate death certificates become even more important to determine patient outcomes. Autopsy pathologists have the most training and best understand the concepts of cause and manner of death, and therefore are optimally suited to critique the accuracy of death certificates. Knowing their death certificates will be reviewed also reinforces to clinicians that accuracy and completeness in these documents is a priority to the hospital. After presenting these data to our Graduate Medical Education Committee, the committee agreed to add the new Center for Disease Control Death Certificate Tutorial to the list of mandatory training modules for all incoming residents.<sup>16</sup> Additionally, based on this study, the state health department changed their policy regarding the amendment of death certificates, and the name of the pathologist or pathology resident filing the amended certificate now replaces the name of the original certifying physician. In an effort to continue our educational mission, an explanatory email is still sent to the

**Figure 4.** Examples of common errors in death certificates.

**ERROR: Omitting trauma from falls in the elderly**

**ORIGINAL CERTIFICATE:**

Part I: Alzheimer's  
Part II: Congestive heart failure, chronic obstructive pulmonary disease  
Manner: Natural

**AMENDED CERTIFICATE:**

Part I: Femoral fracture due to blunt impacts of lower extremity  
Part II: Alzheimer's dementia, hypertensive and atherosclerotic cardiovascular disease, chronic obstructive pulmonary disease  
Manner: Accident

**ERROR: No underlying cause of death provided**

**ORIGINAL CERTIFICATE:**

Part I: Hypoxic respiratory failure due to systolic heart failure  
Part II: Anion-gap metabolic acidosis, chronic renal failure of unknown etiology  
Manner: Natural

**AMENDED CERTIFICATE:**

Part I: Systolic heart failure due to hypertensive and atherosclerotic cardiovascular disease  
Part II: Type II diabetes mellitus  
Manner: Natural

**ERROR: Important contributory causes omitted from Part II**

**ORIGINAL CERTIFICATE:**

Part I: Hypertensive cardiovascular disease  
Manner: Natural

**AMENDED CERTIFICATE:**

Part I: Hypertensive cardiovascular disease  
Part II: Obesity. Type II diabetes mellitus.  
Manner: Natural

original certifier (even though their signature is no longer required).

Two prior, brief publications have proposed similar review processes; the first proposes an institution-based physician committee, which would be responsible for quality review of death certificates.<sup>17</sup> The physician-committee model may be beneficial in hospitals without a pathology residency training program, or without a pathology department on-site. However, whoever serves on the committee must be well-versed in the concepts of cause, manner, and mechanism of death, and whenever possible a pathologist should be involved in the process. The second publication describes a pathologist-lead process of death certificate quality review, with noted benefits of improving clinician education and increased consistency of terminology and approach to certification,<sup>18</sup> and we agree with the opinion of the author that pathologists are ideally suited to perform this quality assurance process.

Death certificate review by the autopsy service is a relatively simple intervention to improve the accuracy of death certification, with the added benefit of improving pathology resident and clinician education. Increasing visibility of the autopsy service to clinicians may result in

increasing autopsy rates. Failure to report cases that fall under the jurisdiction of the OME also has possible medicolegal implications for the hospital. This review process underscores the value of the pathologist in both public health and hospital quality assurance.

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