

CAUSE OF DEATH?—
IT'S PROBABLY NOT WHAT'S REPORTED ON THE DEATH
CERTIFICATE

by
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In the age of big data, this country has a data problem—inaccurate and incomplete information in death certificates. The problem has long been hidden by the numbers reported—as have the people whose deaths go uncounted, but the COVID-19 pandemic unveiled the scope of the issue. Since the beginning of the pandemic, “excess deaths” (i.e., any deaths above the number predicted by existing mortality models) have increased significantly. Most of these excess deaths are likely attributable to COVID-19 because the decedent was never tested for COVID-19 or it was one of multiple factors contributing to their death. Other deaths are uncounted because of a lack of resources and training for death investigations and a focus on a linear chain of medical conditions leading to death in the death certificate.

Given difficulties in determining a cause of death, particularly where there may be multiple or unknown factors, the determination can result in uncertainty or incorrect decisions by public health authorities and legislators. Implications for this failure to properly attribute deaths may include harm to vulnerable populations, a lack of political will due to the underestimation of deaths from a particular cause, and resource misallocation because of the absence of supporting statistical data.

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This Article addresses the need for reform in determining and reporting cause of death. I examine state regulations related to the production of death certificates and make suggestions for increasing accuracy and uniformity. Potential solutions include expanding the use of laboratory testing and virtual autopsies, increasing training to reduce racial bias, and—most importantly—increasing funding for death investigations and statistical compilation to incorporate social data. In the end, I propose mapping both medical and non-medical causes of death instead of sequencing only medical causes.

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INTRODUCTION

Cayne Miceli, age 43, died in 2009 “after being held in a cell in the parish jail, bound to a metal bed by five-point leather restraints.”¹ Dr. Paul McGarry, a long-time pathologist in New Orleans supervised by the parish coroner first elected decades earlier, performed his autopsy of Miceli in the morgue, “a dingy, makeshift facility in a converted funeral home.”² He noted injection sites on her forearms and concluded that drugs (he did not say which drugs) were the cause of death.³

Alerted to a potential problem with that conclusion, Miceli’s father had a second autopsy performed by Dr. James Lauridson, the retired chief medical examiner for the Alabama Department of Forensic Sciences. Lauridson found that the needle marks were from drawing blood and IV’s, which was confirmed by tests that showed no drugs or alcohol in Miceli’s blood—results not finalized at the time of McGarry’s autopsy results. Instead, Dr. Lauridson concluded after examining her lung tissue that Miceli died from being laid flat and bound to the bed while having a severe asthma attack.⁴

The harms caused by the erroneous finding of Miceli’s cause of death—which would typically go uncorrected because no second death investigation takes place—are many. Two of the most important are a failure to properly hold employees at the jail criminally or civilly responsible for causing the death of an asthmatic inmate and the inability to change policies designed to protect the health of prisoners. Honoring Miceli in death by acknowledging her experience is also of great importance.

But this is a story that has been told. In fact, it is the only story about death investigations in the United States that has been consistently and repeatedly told in legal scholarship.⁵ In many jurisdictions, short-staffed morgues, supervised by a coroner who is not a pathologist—and sometimes not even a physician—incorrectly determine cause of death in the few cases where they conduct autopsies, leading to

¹ A.C. Thompson, *The Real ‘CSI’: How America’s Patchwork System of Death Investigations Puts the Living at Risk*, PROPUBLICA (Feb. 1, 2011), <https://www.propublica.org/article/the-real-csi-americas-patchwork-system-of-death-investigation> (discussing problems with U.S. death investigations resulting from the presence of elected and/or part-time coroners instead of medical examiners and the shortage of pathologists).

² *Id.*

³ *Id.*

⁴ *Id.*

⁵ See, e.g., Sai Lui, *Restore Indigent Health Care in New Orleans Now: A Fundamental Right to Health Care in Louisiana Following the Constitutional Aspirations of South Africa and India*, 28 WIS. INT’L L.J. 357, 367 n.71 (2010); Alexandra E. Faia, *Prisons, Politics, and Pointing Fingers: The Issues Plaguing Orleans Parish Prison’s Consent Decrees*, 16 LOY. J. PUB. INT. L. 129, 143 (2014).

calls for reform that focus on switching to a medical examiner system and increasing the number of pathologists deciding cause of death.⁶

Yet “[m]aybe sometimes it’s the questions that are biased, not the answers.”⁷ Or, I argue here, it is the lack of questions that is biased. Most decedents will never undergo an autopsy or have a death investigation beyond what a treating physician or funeral home director observes and lists on the death certificate. Deaths of older Americans and those with significant preexisting health conditions, for example, are unlikely to receive more than cursory attention. There is a dearth of information from the start, then.

With the available information, however, the person completing the death certificate—a “relatively primitive” form of death reporting⁸—must determine and record a cause of death. Cause of death is typically described in linear, medical terms. Did a person die from a heart attack or COVID-19? Was there a car accident that caused traumatic injuries, or did the decedent commit suicide?⁹ Until recently, few focused on whether the decedent had been feeling depressed lately or struggling with their gender identity—let alone reported it on the death certificate.¹⁰

In addition to being overly medicalized, the decision about what to report on the death certificate is political. Determining whether the inability to access an abortion due to restrictive state laws (or delay in receiving an abortion as a result) contributed to death will be nearly impossible from a death certificate, both because of the medicalized cause of death (e.g., sepsis) and political pressure not to indicate that lack of abortion access resulted in the medical pathway that led to death.¹¹ The

⁶ See Sandra Bartlett, *Coroners Don’t Need Degrees to Determine Death*, NPR (Feb. 2, 2011), <https://www.npr.org/2011/02/02/133403760/coroners-dont-need-degrees-to-determine-death>.

⁷ David H. Freedman, *Lies, Damned Lies, and Medical Science*, THE ATLANTIC, Nov. 2010, at 76, 80 (quoting John Ioannidis) (calling attention to biases in all medical studies, including in the “gold standard” of large, randomized research studies).

⁸ E-mail from Jill Wieber Lens, Professor of L., Univ. of Iowa Coll. of L., to author (Sept. 30, 2023) (on file with author).

⁹ CTRS. FOR DISEASE CONTROL & PREVENTION, PHYSICIANS’ HANDBOOK ON MEDICAL CERTIFICATION OF DEATH 5, 8–9, 11–12 (2023) [hereinafter HANDBOOK ON MEDICAL CERTIFICATION OF DEATH].

¹⁰ California, however, records the decedent’s sex as female, male, or nonbinary, and also has provisions for what to do if the deceased was transitioning or if there is disagreement about their gender. CAL. HEALTH & SAFETY CODE § 102875 (2024) (providing for a petition “seeking an order of the court determining, as appropriate, who among those parties shall determine the gender identity of the decedent.”).

¹¹ See Kavitha Surana, *Maternal Deaths Are Expected to Rise Under Abortion Bans, but the Increase May Be Hard to Measure*, PROPUBLICA (July 27, 2023, 5:00 AM), <https://www.propublica.org/article/tracking-maternal-deaths-under-abortion-bans> (explaining that there is no box to check to indicate that death may have been caused by lack of access to an abortion, but suggesting that

decision about cause of death can also be self-serving, as indicated when researchers at Johns Hopkins Medicine determined that “death certificate data doesn’t capture things like communication breakdowns, diagnostic errors and poor judgment,” which would show that over 250,000 Americans die annually from medical errors and make that the third-leading cause of death.¹²

When describing cause of death to the physicians who are typically the people certifying deaths in the United States, the Centers for Disease Control and Prevention (CDC) states: “Cause of death is the most important statistical research item on the death certificate. It provides medical information that serves as a basis for describing trends in human health and mortality and for analyzing the conditions leading to death.”¹³ Cause of death is determined locally, but it is the basis for national vital statistics and research on population health and public health crises.¹⁴

Given the lack of resources devoted to death investigations and the overly medicalized and linear cause of death determination, it was not surprising that the COVID-19 pandemic highlighted uncounted deaths—especially because of the sheer amount of deaths to count and report. Since the start of the pandemic, “excess deaths” (i.e., any deaths above the number predicted by existing mortality models) have numbered over a million, although many of them took place before testing for the virus was widely available. Most of the excess deaths since testing became available are still likely attributable to COVID-19 because the decedent was never tested for COVID-19, or it was one of multiple factors contributing to their death.¹⁵

The sheer number of excess deaths during the pandemic indicates the extent to which national death statistics are flawed and the harms that result. As a result of undercounting, it was easier to downplay the crisis—to argue that the pandemic was over and restrictions were unnecessary, to allocate less money for research on how the virus interacts with preexisting conditions to contribute to mortality, and to focus less on the impact of long COVID-19.¹⁶

causes of death such as sepsis, hemorrhage, and heart issues during pregnancy may be indicative of the increased dangers pregnant women in states with restrictive abortion laws face).

¹² Marshall Allen & Olga Pierce, *Study Urges CDC to Revise Count of Deaths from Medical Error*, PROPUBLICA (May 3, 2016, 6:31 PM), <https://www.propublica.org/article/study-urges-cdc-to-revise-count-of-deaths-from-medical-error>.

¹³ HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 41.

¹⁴ *Id.* at 1, 3.

¹⁵ See discussion *infra* Section I.B (discussing excess mortality during the COVID-19 pandemic); David Wallace-Wells, *Why Are So Many Americans Dying Right Now?*, N.Y. TIMES (Feb. 2, 2023), <https://www.nytimes.com/2023/02/02/opinion/covid-pandemic-deaths.html> (“[A]re we supposed to call that dying ‘from’ Covid or ‘with’ Covid?”).

¹⁶ Andrew Stokes, Dielle Lundberg, Elizabeth Wrigley-Field & Yea-Hung Chen, *COVID-19 Deaths in the US Continue to Be Undercounted, Research Shows, Despite Claims of ‘Overcounts’*, B.U. SCH. OF PUB. HEALTH (Jan. 25, 2023), <https://www.bu.edu/sph/news/articles/2023/covid->

Not recording these deaths properly reveals flaws in the system of death investigations and reporting. People died at home, and death investigators did not test them for COVID-19, even though it was important to know whether it was a contributing factor.¹⁷ Sometimes, they did not know to test for COVID-19 or ask questions that might lead to the conclusion that COVID-19 played a role in death.¹⁸ Sometimes, they may have suspected that COVID-19 was a factor, but lacked the resources to confirm that suspicion—and perhaps figured it was not that important to investigate and report the death accurately.

The problem extends far beyond COVID-19, however. Death investigators who lack either the knowledge or funding to ensure that they have found and reported all factors contributing to the decedent's death on the death certificate are unlikely to investigate and report social and psychological factors that influenced a person to commit suicide or die by car accident while driving under the influence, for example. This is a problem ethically (because it reflects either a lack of interest in understanding and preventing such deaths or a dangerous lack of resources to support vulnerable groups likely to commit suicide or develop substance use disorders, for example) and also from a data collection standpoint. These statistics help the public and legislators determine where there is a public health problem and formulate legislative agendas and budgets.¹⁹

The National Center for Health Statistics (NCHS) at the CDC includes under its organizational chart the Division of Vital Statistics, which incorporates the Mortality Statistics Branch.²⁰ As part of its National Vital Statistics System (NVSS), it “analyzes [approximately] 2.8 million records each year to produce timely and accurate information on death and its causes in the United States.”²¹ While it

19-deaths-in-the-us-continue-to-be-undercounted-research-shows-despite-claims-of-overcounts/ (“Knowing how many people died and where these deaths occurred has widespread implications for informing how current pandemic response resources are allocated and for preparing for future public health emergencies.”).

¹⁷ Andrew C. Stokes, Dielle J. Lundberg, Jacob Bor, Irma T. Elo, Katherine Hempstead & Samuel H. Preston, *Association of Health Care Factors with Excess Deaths Not Assigned to COVID-19 in the US*, JAMA NETWORK OPEN, Sept. 13, 2021, at 1, 3.

¹⁸ *Id.*; Patrick Boyle, *How are COVID-19 Deaths Counted? It's Complicated*, ASS'N AM. MED. COLLS. (Feb. 18, 2021), <https://www.aamc.org/news/how-are-covid-19-deaths-counted-it-s-complicated>.

¹⁹ See discussion *infra* Sections I.A, I.C (discussing the scope of the problem beyond the pandemic, including the influence of stigma and the social determinants of health and their disproportionate impact on the reporting of deaths among marginalized groups).

²⁰ *Organizational Chart*, CTRS. FOR DISEASE CONTROL & PREVENTION (Sept. 10, 2024), <https://www.cdc.gov/nchs/about/nchs-org-chart.pdf>. See generally *CDC WONDER Online Databases*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://wonder.cdc.gov/datasets.html> (Feb. 12, 2025).

²¹ *Mortality Statistics*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nchs/nvss/deaths.htm> (Dec. 19, 2024).

produces and revises the U.S. Standard Certificate of Death and offers training on how to complete the certificate, it cannot require states to adopt the form document. It also cannot mandate that states hire pathologists as medical examiners instead of using elected coroners. Nor can it require that states properly fund their system of death investigations and vital statistics collection and reporting.²² In other words, NCHS does what it can with the death certificate data it gets, but it does not produce the underlying data—or determine how it is produced.²³

Death data is local then—and this country has a data problem. Data submitted in death certificates is frequently incomplete or inaccurate. While the questions asked by the death certificate form help determine what information will be gathered, so does the number and training of certifiers involved in producing the death certificates. The death certificate is at its most useful when it is completed consistently by those with the resources to provide full information on how a person died.

When death investigations and reporting are incomplete, certain deaths—and people—become “invisible.”²⁴ If a cause of death is not properly attributed, then that person does not become part of national statistics that support efforts to prevent deaths of that type. People traditionally marginalized in life because of their race, gender, or class are also often marginalized in death. If they are made invisible because they are not included in the data,²⁵ then disparities in death rates from a particular cause of death due to race, gender, or class (or other minority status) will shrink or disappear.

²² See 42 U.S.C. § 242k (authorizing the NCHS to collect and disseminate health statistic and provide technical assistance to states, but not empowering the Secretary to mandate state adoption of standardized forms, specific hiring practices, or funding of state death investigation systems).

²³ See WESTAT, ELECTRONIC DEATH REPORTING SYSTEM ONLINE REFERENCE MANUAL 1–2 (2016), <https://www.cdc.gov/nchs/data/dvs/EDRS-Online-Reference-Manual.pdf> (discussing electronic data collection of death information from “57 vital statistics jurisdictions” and how the NCHS works with these jurisdictions “to improve their death reporting to strengthen the National Vital Statistics System (NVSS) and improve jurisdictional performance for the Vital Statistics Cooperative Program (VSCP)”). But see Steve Pierson, *State of the Nation’s Health Data Infrastructure: Experts Weigh in Two Years into Pandemic*, AMSTATNEWS, Mar. 2022, at 15–17 (quoting Jennifer Madans) (praising the work of the NCHS given its severely constrained budget and particularly highlighting its survey data).

²⁴ For an example of literature dubbing the uncounted in vital statistics as “invisible,” see Philip W. Setel, Sarah B. Macfarlane, Simon Szreter, Lene Mikkelsen, Prabhat Jha, Susan Stout & Carla AbouZahr, *A Scandal of Invisibility: Making Everyone Count by Counting Everyone*, 370 LANCET 1569, 1569 (2007); see also Stefan Timmermans & Pamela J. Prickett, *The Social Autopsy*, 52 SOCIO. METHODS & RSCH. 1681, 1687–88 (2023) (discussing visible and invisible deaths).

²⁵ See, e.g., Mario Marazzi, Boriana Miloucheva & Gustavo J. Bobonis, *Mortality of Puerto Ricans in the USA Post Hurricane Maria: An Interrupted Time Series Analysis*, BMJ OPEN, Aug. 29, 2022, at 1 (analyzing the “undercounting” of deaths resulting from Hurricane Maria due to population displacement post-disaster).

People can be made to disappear intentionally or unintentionally. If politicians have an idea what the data will show and do not want that information disclosed and publicized, then they can make sure specific questions are not asked or deaths investigated further. By prioritizing data uniformity, the CDC also censors itself by not asking questions on the U.S. Standard Certificate of Death that it knows will be controversial and may not be universally adopted by the states.²⁶ In this way, the politics of some states affect the data that all states receive.

People can also be made to disappear unintentionally through simply not prioritizing the funding necessary to properly investigate their deaths and gather information about them. While failing to appropriate funding for death investigations and reporting can be intentional,²⁷ it can also simply be the result of constrained resources or a failure to prioritize this type of spending because of the false notion that spending on the dead does not help the living.

Implications for the failure to properly investigate and report cause of death include harm to vulnerable populations, a lack of political will due to the underestimation of deaths from a particular cause, and resource misallocation because of the absence of statistical data. For example, research has shown problems with recording maternal and stillborn deaths and that minority populations are disproportionately harmed.²⁸ Similarly, the lack of accurate data on deaths related to firearms underestimates the true number of deaths attributable to this cause.²⁹ Whether intentional or unintentional, many of these deaths disappear statistically.

There are new tools available that can help properly attribute deaths.³⁰ In addition to the long-discussed need for pathologists instead of elected officials without medical training to serve as lead death investigators in each county,³¹ there are new technologies and methods that can assist with their work, such as verbal and social autopsies, as well as virtual autopsies—enhanced by artificial intelligence in a developing field.³² While funding is always an issue, the federal government is wrong to

²⁶ HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 3–4.

²⁷ See *infra* Section II.A.2 (discussing the statutory discretion permitted for coroners and medical examiners about which deaths to investigate and how).

²⁸ See Jill Wieber Lens, *Counting Stillbirths*, 56 U.C. DAVIS L. REV. 525, 553–54 (2022) [hereinafter Lens, *Counting Stillbirths*]; Khiara M. Bridges, *Racial Disparities in Maternal Mortality*, 95 N.Y.U. L. REV. 1229, 1248, 1288–89 (2020).

²⁹ See Allison Durkin, Brandon Willmore, Caroline Nobo & David Hemenway, *The Firearms Data Gap*, 48 J.L. MED. & ETHICS 32 (2020).

³⁰ See *infra* Section II.C (exploring new methods and technologies that can help states and localities gather more information more efficiently about deaths, including the use of artificial intelligence).

³¹ See *infra* Section II.A.1 (discussing required medical training—or the lack thereof—for death investigators).

³² See *infra* Section II.C.

taut its system of vital records when it is based on incomplete and faulty data. Uniformity without full information is not a laudable goal. Instead, full information requires greater federal funding and oversight.

This Article will address the need for reform in determining and reporting cause of death. Part I discusses the ways in which deaths become invisible and who is most likely to be affected by process failures. In Part II, I explain the current system of death investigating and reporting based on state statutory requirements and then explore new technologies and methods that can provide more accurate data. In Part III, I address the NCHS's involvement in data collection, including discussing in detail the U.S. Standard Certificate of Death and how it leads to data problems at the local level. In Part IV, I explain the need to expand death investigations and local data gathering (in part ensured by greater supervision from the federal government) and ways to improve the quality of that data, including the use of social autopsies and other methods explored in low and middle-income countries, and to move from sequencing cause of death to mapping causes of death outside of the medical sequence.

I. MAKING DEATHS DISAPPEAR

Long before the COVID-19 pandemic, cause of death determinations on death certificates were inaccurate because of errors and misclassifications. Sometimes, those misclassifications were unintentional—the result of poor training or a lack of resources for death investigations. However, sometimes those misclassifications were intentional—the result of the stigma that historically attached to decedents with HIV or AIDS and their families, for example. HIV and AIDS also made decedents more likely to contract other conditions, such as infections and cancers. Although their deaths were still the result of HIV or AIDS, they were not always recorded that way on death certificates.

Issues of misclassification were highlighted with the COVID-19 problem of “excess deaths.”³³ When deaths in the United States were higher than expected during the pandemic, the gap was large—1,366,642 since February 1, 2020.³⁴ Once testing for COVID-19 was widely available, there was another problem, however. The problem of excess deaths went beyond what was predicted using mortality models plus deaths officially attributed to the virus—reaching over 300,000 so-called

³³ *Excess Deaths Associated with COVID-19: Provisional Death Counts for COVID-19*, CTRS. FOR DISEASE CONTROL & PREVENTION: ARCHIVE [hereinafter *Excess Deaths*], https://www.cdc.gov/nchs/nvss/vsrr/covid19/excess_deaths.htm (Sep. 27, 2023) (“Excess deaths are typically defined as the difference between the observed numbers of deaths in specific time periods and expected numbers of deaths in the same time periods.”); see Wallace-Wells, *supra* note 15.

³⁴ *Excess Deaths*, *supra* note 33 (including a chart of total predicted number of excess deaths since February 1, 2020, by state).

“excess excess” deaths.³⁵ “Excess excess” deaths are the “extra and unexpected” deaths during the pandemic that cannot be directly attributed to COVID-19 infection based on current scientific and statistical research into pandemic deaths—as opposed to excess deaths that are directly attributed to COVID-19 and push normal death totals above predictions because of the unexpected and unpredictable virus waves.³⁶ Given the ability now to include most confirmed COVID-19-related deaths in the models and calculations, I will call the unpredicted deaths beyond those attributed officially to COVID-19 simply “excess deaths” or “excess mortality.”

Stigmatized and underreported HIV and AIDS deaths and excess COVID-19 deaths during the pandemic drew attention in a way that the quiet crisis of uncounted and undercounted deaths from various causes, what I call “invisible deaths,” could not. While studies show that our brains have trouble comprehending the magnitude of large numbers,³⁷ in this situation, large numbers uncovered an issue that was neither new nor limited to the pandemic. Noticing and acknowledging the problem allows for additional scrutiny of the many deaths within marginalized groups that are misclassified.

A. *HIV and AIDS*

HIV and AIDS deaths have long been undercounted. People infected by HIV, often made invisible in life because of their sexual identity and/or their disease, long faced stigma that resulted in both hiding and covering up this cause of death because society did not want to bear witness to the disease.

Early on in the AIDS epidemic, thousands of Americans died but “only a handful of obituaries” noted those deaths publicly.³⁸ A 1989 article in the *British Medical Journal* bears the heading *AIDS on the death certificate: the final stigma*.³⁹ The article discusses the long history of issues in Europe and the United States with accurate recording of cause of death.

³⁵ Wallace-Wells, *supra* note 15.

³⁶ *Id.*

³⁷ See Lindsey Hasak & Elizabeth Y. Toomarian, *Our Brains Can't Grasp What a Million COVID-19 Deaths Really Means - Commentary*, N.H. BULL. (Apr. 1, 2022, 5:41 AM), <https://newhampshirebulletin.com/2022/04/01/our-brains-cant-grasp-what-a-million-covid-19-deaths-really-means-commentary/>.

³⁸ Kenji Yoshino, *Covering*, 111 YALE L.J. 769, 823 (2002) (“Silence, in turn, has been seen to cause literal death, as when censorship of AIDS education has been characterized as condemning homosexuals to death.”).

³⁹ Michael King, *AIDS on the Death Certificate: The Final Stigma*, 298 BRIT. MED. J. 734, 734 (1989).

Scrutiny of records has revealed incorrect clinical diagnosis, clerical errors, and confusion of “mode” of death with “cause” of death, resulting in imprecision and delay for relatives. Cynics have even depicted statistical data from death certification as “rubbish in—rubbish out.” . . . Until the advent of AIDS more liberal attitudes in society had lessened the stigma of most causes of death as an obstacle to their accurate certification.⁴⁰

The article addresses how, in earlier times, deaths due to chronic alcoholism were attributed to heart disease and deaths due to suicide were similarly concealed to prevent “embarrassment” to families, some of whom actively concealed these causes of death themselves due to stigma.⁴¹ Given the legal implications of particular cause of death determinations, such as lost life insurance benefits for suicide, physicians and coroners have also, at times, intentionally altered cause of death for reasons other than stigma.⁴²

In the 1980s, AIDS became the “greatest stigma to affect death certification for decades.”⁴³ That stigma caused inaccurate death data as a result of privacy and legal concerns by physicians, coroners, or medical examiners, and also relatives.⁴⁴ HIV and AIDS also have symptoms that overlap with other diseases and make patients “vulnerable to opportunistic infections (e.g., cryptococcal meningitis and cerebral toxoplasmosis), co-infections (e.g., HIV-tuberculosis co-infection and HIV-hepatitis B virus co-infection), certain malignant neoplasms (e.g., Kaposi sarcoma and non-Hodgkin lymphoma) and other comorbid conditions (e.g., endocrine disorders),” which all make death classification more difficult.⁴⁵

⁴⁰ *Id.*

⁴¹ *Id.* at 734–35 (discussing the earlier stigma surrounding deaths due to chronic alcoholism that resulted in recorded causes of death such as heart disease or cirrhosis of the liver due to “poor nutrition”).

⁴² *Id.* at 735.

⁴³ *Id.* (addressing ethical concerns for those involved in the death certification process with listing AIDS or HIV infection as the cause of death when both the living and the dead could be stigmatized by it and presenting the case of a 37-year-old gay man with HIV who had not previously told his parents about his sexuality or medical condition).

⁴⁴ *Id.*

⁴⁵ Hmwe Kyu, Deepa Jahagirdar, Matthew Cunningham, Magdalene Walters, Edmond Brewer & Amanda Novotney, *Accounting for Misclassified and Unknown Cause of Death Data in Vital Registration Systems for Estimating Trends in HIV Mortality*, 24 J. INTL. AIDS SOC. 61, 62 (2021) (“Four types of misclassification of HIV deaths can occur: (1) incorrectly assigning intermediate causes or ill-defined causes as the underlying cause of death; (2) assignment of HIV deaths to relevant garbage codes, such as unspecified immunodeficiency; (3) allocation of HIV deaths to diseases that can mimic HIV infection (e.g., inflammatory bowel disease and some skin diseases); and (4) misassigning HIV deaths to other underlying causes of death, such as tuberculosis and meningitis.”).

A study that examined HIV deaths in 132 countries and territories from 1990 to 2018 found that although 1,848,761 deaths were reportedly caused by HIV and AIDS, statistical analysis for “misclassification” increased the number to 4,165,015.⁴⁶ “Misclassification of HIV deaths can substantially diminish the usefulness of cause of death data for decision-making.”⁴⁷ Data helps create policies, showing the importance of accurate data.⁴⁸ HIV and AIDS deaths are an example of how stigma can make vital statistics inaccurate. In the end, this harms the very groups dying from this disease because surveillance of the disease underestimates its prevalence in society—resulting in diminished attention and resources devoted to better treatments and decreasing the visibility of those afflicted.

The description above also indicates that, in many cases, neither the person certifying the death nor the relatives of the decedent prioritize or are incentivized to prioritize the accuracy of the cause of death determination. Having local people connected to the decedent or relatives determine cause of death makes them subject to pressure to achieve a “good” outcome—one that minimizes stigma—over an outcome that prioritizes broad public health. One death incorrectly reported may not impact public health, but the problem recurs on a large scale.

B. COVID-19

Excess mortality became a frequent topic of media reports during the COVID-19 pandemic. Political battles over whether the CDC was undercounting or overcounting the number of deaths from the virus resulted from disagreements about how to address the pandemic (e.g., whether to continue mask mandates and school closures). Control of the data was key to finding support for particular policy outcomes. Assuming one cannot ignore the data (which is difficult when media attention is high), then suppressing and manipulating data is another way to make COVID-19 deaths—and the pandemic itself—invisible.

The World Health Organization (WHO) defines excess mortality as “the difference between the total number of deaths estimated for a specific place and given time period and the number that would have been expected in the absence of a crisis (e.g., COVID-19 pandemic).”⁴⁹ Excess mortality includes deaths attributable

⁴⁶ *Id.* at 64.

⁴⁷ *Id.* at 61.

⁴⁸ See Deepa Jahagirdar, *Wrong Code: How Many HIV/AIDS Deaths Are We Missing?*, THINK GLOB. HEALTH (Dec. 1, 2021), <https://www.thinkglobalhealth.org/article/wrong-code> (“More accurate death data will lead to understanding how many people are still dying of HIV/AIDS—deaths that should now be almost entirely preventable.”).

⁴⁹ *Global Excess Deaths Associated with the COVID-19 Pandemic*, WORLD HEALTH ORG. (May 10, 2022) [hereinafter *Global Excess Deaths Associated with COVID-19*], <https://www.who.int/news-room/questions-and-answers/item/global-excess-deaths-associated-with-the-COVID-19-pandemic>.

directly to the virus and also those attributable to the pandemic indirectly through changes and dislocations in society—for example, delays in seeking care for other health conditions due to fear of the virus and even deaths from political instability that resulted from the virus in some countries.⁵⁰ In the United States, deaths medically attributed to another cause of death may be the result of COVID-19 indirectly. From this number, however, deaths that were avoided as a result of the pandemic must be subtracted—such as traffic deaths avoided because people were not commuting to work.⁵¹

Potential explanations for excess mortality during the COVID-19 pandemic are frequently COVID-adjacent, as indicated above.⁵² They focus on ways in which the pandemic contributed to or accelerated death—even if it was not listed as a cause of death on the death certificate. COVID-19 delayed preventive medical appointments and screenings, in addition to delaying both “elective” and more urgent procedures and surgeries.⁵³ This likely resulted in additional deaths attributed to other health conditions that killed the decedent on an accelerated trajectory. However, it is difficult to determine conclusively that delays in treatment caused an accelerated death, and the ultimate cause of death is typically not listed as COVID-19, which has consequences.

There is also long-term harm from COVID-19 that impacts the body in ways not yet fully understood.⁵⁴ Long after a person is no longer suffering from the early symptoms of the virus and tests negative, COVID-19 could be causing ongoing harm, reflected in symptoms like fatigue, shortness of breath, and neurological symptoms.⁵⁵ Scientists do not yet understand “long COVID,” which makes it

⁵⁰ *Id.*

⁵¹ *Id.* On the other hand, traffic deaths in the U.S. soared during the pandemic, even though people were driving less. Matthew Shaer, *Why Are American Drivers So Deadly?*, N.Y. TIMES, <https://www.nytimes.com/2024/01/10/magazine/dangerous-driving.html> (Jan. 16, 2024) (describing the uptick in dangerous behavior by American drivers that began with COVID-19 and continues now).

⁵² Attributing many excess deaths during the pandemic to COVID-19, at least in part, makes sense because those deaths frequently accelerated during times of COVID-19 outbreaks and ebbed following. Jeremy Faust, Benjamin Renton, Alexander Junxiang Chen, Chengan Du, Chenxue Liang, Shu-Xia Li, Zhenqiu Lin & Harlan M Krumholz, *Uncoupling of All-Cause Excess Mortality from COVID-19 Cases in a Highly Vaccinated State*, 22 LANCET: INFECTIOUS DISEASES 1419, 1419–20 (2022); Jeremy Faust, *A Point-by-Point Rebuttal of the Washington Post’s Double Down on Covid Deaths Being “Overcounted”*, INSIDE MED. (Jan. 20, 2023), <https://insidemedicine.substack.com/p/a-point-by-point-rebuttal-of-the>.

⁵³ Wallace-Wells, *supra* note 15.

⁵⁴ *Id.*

⁵⁵ *Clinical Overview of Long COVID*, CTRS. FOR DISEASE CONTROL & PREVENTION (Feb. 3, 2025), <https://www.cdc.gov/covid/hcp/clinical-overview/index.html> (noting that “Long COVID,” like many chronic illnesses, can be hard to diagnose and also that those from marginalized racial or ethnic groups and the disabled may be impacted at higher rates).

difficult to attribute deaths to this particular form of COVID-19 disease—deaths that would not have occurred but for the COVID-19 infection.

Another theory about excess COVID-19 deaths highlights the mental health problems caused by both formal and voluntary pandemic social restrictions.⁵⁶ Discussions about how COVID-19 contributed to “suicide and homicide and even car accidents and overdoses” suggest the extent of the country’s true excess death problem beyond COVID-19.⁵⁷ If the NCHS was not properly counting the number of deaths linked to the virus through mental health issues, then it is also likely not correctly attributing deaths linked to discrimination against LGBTQ+ individuals who commit suicide or overdose on opioids as a result.⁵⁸ The connections are indirect and require examining a social chain of events leading to death in addition to the medical chain of events. The death certificate and state statutes and regulations are not designed to fully incorporate this information.

All of this relates to the issue of “how simplistic it often feels to apply a single cause of death.”⁵⁹ Even where multiple causes of death are cited, how do we determine whether someone died “from” COVID-19 or “with” COVID-19?⁶⁰ Frequently, when deaths take place at home instead of in a hospital, those making decisions about cause of death may not even know that the decedent had COVID-19—let alone have the choice about how to record the role COVID-19 played in that death.⁶¹

C. *Beyond Viruses*

Although COVID-19 called attention to the problem of invisible deaths and how to properly investigate and attribute primary and contributing factors causing

⁵⁶ *Id.*; see also Jayati Das-Munshi, Chin Kuo Chang, Ioannis Bakolis, Matthew Broadbent, Alex Dregan, Matthew Hotopf, Craig Morgan & Robert Stewart, *All-Cause and Cause-Specific Mortality in People with Mental Disorders and Intellectual Disabilities, Before and During the COVID-19 Pandemic: Cohort Study*, LANCET: REG’L HEALTH EUR., Dec. 2021, at 1, 2, 9 (Dec. 2021) (finding support for “concerns that people with mental disorders and intellectual disabilities are at an increased risk of death, which may be associated with COVID-19 infection and/or, potentially, policies and other changes impacting healthcare delivery which may have exacerbated inequalities during the first wave in the UK.”).

⁵⁷ Wallace-Wells, *supra* note 15.

⁵⁸ See Azeen Ghorayshi, *No One Knows How Many L.G.B.T.Q. Americans Die by Suicide*, N.Y. TIMES (June 1, 2023), <https://www.nytimes.com/2023/06/01/health/lgbtq-suicide-data.html>.

⁵⁹ Wallace-Wells, *supra* note 15.

⁶⁰ *Id.* Compare Leana Wen, *We are Overcounting COVID Deaths and Hospitalizations. That’s a Problem*, WASH. POST (Jan. 13, 2023, 7:00 AM), <https://www.washingtonpost.com/opinions/2023/01/13/covid-pandemic-deaths-hospitalizations-overcounting/> (arguing that COVID-19 deaths are being overcounted in Massachusetts), with Faust et al., *supra* note 52 (arguing that COVID-19 deaths are not being overcounted).

⁶¹ Wallace-Wells, *supra* note 15.

death, the issue extends beyond the virus. Deaths impacted by the social determinants of health are also likely contributing to the invisible death problem. Social factors that include racism and other types of discrimination, inferior housing, and lack of access to high quality healthcare contribute to accelerated death—statistics show lifespan differentials between different races and socioeconomic groups.⁶² Failing to consider social factors as a cause of death will result in higher than expected death rates and inaccurate death data when inequalities rise and more individuals are impacted by the social determinants of health (and of death).

There is, however, no consensus on whether and how social factors should be investigated—let alone widespread training for death investigators to recognize the social determinants of health as causes of death (e.g., “stroke due to hypertension secondary to poverty, obesity, and poor nutrition”⁶³). In addition, the desire for uniform, consistent death data counsels against considering social factors. Not only is it more difficult to gather complete information, but causation is murkier and could result in data that is less uniform. Nevertheless, without incorporating this information, death data can never meet the government’s purported goal of complete information.

One area in which miscounting has generated controversy and advocacy is maternal and fetal deaths. Jill Wieber Lens discusses the importance of properly counting stillbirths, which occur at double the rate among Black women and poor women.⁶⁴ The problems she identifies with miscounting are a lack of population-level data about causes of stillbirth and the difficulty of reducing the number of stillbirths through outreach to the public or policymakers without supporting data.⁶⁵ Her proposed solutions are to require fetal autopsies after stillbirth and create registries for surveillance data.⁶⁶

⁶² Joshua Bundy, Katherine T. Mills, Hua He, Thomas A. LaVeist, Keith C. Ferdinand, Jing Chen & Jiang He, *Social Determinants of Health and Premature Death Among Adults in the USA from 1999 to 2018: A National Cohort Study*, 8 LANCET: PUB. HEALTH e422 (2023) (finding Black and Hispanic adults have less favorable social determinants of health than whites and discussing their research’s implication that “racial differences in premature all-cause mortality are completely explained by differences in [social determinants of health]”).

⁶³ Quotation from Laura Hermer, Professor of L., Mitchell Hamline Sch. of L. (Aug. 22, 2023) (on file with author). This is a key point about what it would look like to develop a death investigation and reporting system that took the social determinants seriously.

⁶⁴ See generally Lens, *Counting Stillbirths*, *supra* note 28; E-mail from Jill Wieber Lens to author, *supra* note 8.

⁶⁵ Lens, *Counting Stillbirths*, *supra* note 28, at 529; E-mail from Jill Wieber Lens to author, *supra* note 8.

⁶⁶ Lens, *Counting Stillbirths*, *supra* note 28, at 530–32, 546–47 (discussing how physicians need training to encourage the use of fetal autopsies at such a difficult time).

Similarly, as part of her analysis of why Black women are four times more likely than white women in the United States to die as a result of pregnancy and post-pregnancy complications, Khiara Bridges addresses data problems.⁶⁷ Researchers have found that there is insufficient data to address maternal deaths because the information in death certificates lacks “nuance” and does not communicate (or, I would argue, investigate) social factors that contribute to such deaths.⁶⁸ Bridges’s recommended solution is to focus on having state entities gather and analyze maternal death data, which would help identify causes of death that “exceed the strictly medical.”⁶⁹

Recent concerns have also arisen as to other areas where data is missing and people go uncounted. For examples, few death investigators ask questions about the sexual orientation or gender identity of decedents, making it difficult to fully understand their causes of death and impossible to accurately count the number of LGBTQ+ individuals who commit suicide annually.⁷⁰ Given the recent prominence of transgender rights as a political issue, the lack of data—and the lack of calls to gather such data—may be the result of political divisions.⁷¹ Certainly, those seeking to eliminate transgender care for children would not want data published that could demonstrate increased rates of suicide among this population following the implementation of state laws banning such care.

In addition, the opioid epidemic has hidden suicides within its classification of accidental overdoses and brought up difficult questions about how to draw the line between intentional and unintentional overdoses.⁷² The percentage of overdose deaths listed as “undetermined” varies state-by-state based on “individual factors (e.g., observer bias, fear of litigation), system factors (e.g., variability in definitions, death-scene investigations), and state-level factors (e.g., variation in classification of multidrug overdoses).”⁷³ The CDC has called for

⁶⁷ Bridges, *supra* note 28, at 1287–93 (“Many have argued that the United States’ comparatively high MMR is attributable to the poor quality of the data that is currently available about maternal deaths.”).

⁶⁸ *Id.* at 1288–89.

⁶⁹ *Id.* at 1291 (providing examples of death factors that are not “strictly medical,” such as “the distribution of hospital facilities in an area, poor communication within a hospital or between hospitals, a hospital’s failure to implement policies or practices regarding treatment regimens for women presenting with certain symptoms, or the premature termination of postpartum care at eight weeks after birth”).

⁷⁰ Ghorayshi, *supra* note 58.

⁷¹ *Id.*

⁷² See Maria A. Oquendo & Nora D. Volkow, *Suicide: A Silent Contributor to Opioid-Overdose Deaths*, 378 NEW ENG. J. MED. 1567, 1568 (2018).

⁷³ *Id.*

“standardization” to prevent misclassification,⁷⁴ but this requires drawing lines that could increasingly destigmatize opioid deaths while putting pressure on legislatures if they are added to the category of intentional suicides. There are political reasons to keep opioid deaths separate from other forms of suicide and other accidental deaths, which detract from the common societal problems that cause opioid overdoses and other deaths of despair.⁷⁵

For the same reason, data collection on firearms-related deaths has historically been restricted to prevent it from being used to support gun control advocacy.⁷⁶ In 2019, however, Congress funded the National Violent Death Reporting System (NVDRS). The NVDRS only asks states to compile and report data already collected,⁷⁷ but it does collect important background information related to suicides and homicides from witnesses, family, friends, and “informants.”⁷⁸ This information shows that states and localities classify “assault-related, suicide-related, undetermined, and unintentional firearm deaths” differently.⁷⁹

On a macro level, the problem of invisible deaths results from a failure to gather all necessary information, inconsistent classification when reporting data—even if it is gathered, and conscious and subconscious bias based on race, ethnicity, gender, and disability. Those most likely to receive the least attention from government during their lives are also the most likely to disappear in death. The research discussed in this Section shows a tendency to highlight individual social or medical problems resulting in death and calls for special surveillance procedures to address that subset of the larger problem within death investigations and reporting in this country. In this Article, I focus on the need to stop addressing the problem piecemeal and implement comprehensive change.

⁷⁴ *Id.*

⁷⁵ See SOC. CAP. PROJECT, REPUBLICANS OF J. ECON. COMM., 116TH CONG., LONG-TERM TRENDS IN DEATHS OF DESPAIR 2–3 (Comm. Print 2019).

⁷⁶ Cristina Corujo & Jessie DiMartino, *Decadeslong Gap in Gun Violence Research Funding has Lasting Impact*, ABC NEWS (Nov. 5, 2021), <https://abcnews.go.com/Politics/decades-long-gap-gun-violence-research-funding-lasting/story?id=80646946>.

⁷⁷ Durkin et al., *supra* note 29, at 33. Efforts to restrict the collection of firearms data contrast with recent efforts to gather expansive data on women that could result in prosecutions for violation of restrictive abortion statutes.

⁷⁸ For suicides, information collected includes any mental health conditions and financial or family problems. For homicides, information collected includes domestic violence incidents and gang or drug activity. *National Violent Death Reporting System Frequently Asked Questions*, CTRS. FOR DISEASE CONTROL & PREVENTION [hereinafter *NVDRS Frequently Asked Questions*], https://www.cdc.gov/nvdrs/faq/?CDC_AAref_Val=https://www.cdc.gov/violenceprevention/data-sources/nvdrs/faqs.html (May 16, 2024).

⁷⁹ *Id.*

II. DEATH INVESTIGATIONS AND REPORTING

Data collection on deaths is, of necessity, local. The Secretary of the Department of Health and Human Services, through the NCHS, uses statistical and epidemiological methods “for the purpose of improving the effectiveness, efficiency, and quality of health services in the United States.”⁸⁰ The NCHS collects annual data on deaths “from and restricted to such records of the States and municipalities which the Secretary, in his discretion, determines possess records affording satisfactory data in necessary detail and form.”⁸¹ The language of federalism runs throughout the statute, emphasizing cooperation between the NCHS and states, as does the focus on data uniformity.⁸² The NCHS advocates for standardization, even though that can be difficult when localities have such differing resources available for death investigations.

States, for their part, have found the collection and recording of vital statistics to be “a valid exercise of the police power” that states possess to protect the health and welfare of their populations.⁸³ With respect to health data other than vital statistics, states have slowly been ceding their traditional control to the federal

⁸⁰ 42 U.S.C. § 242k(a).

⁸¹ *Id.* § 242k(h)(1) (authorizing the “annual collection of data from the records of births, deaths, marriages, and divorces in registration areas.”).

⁸² *Id.* § 242k(d) (“To insure comparability and reliability of health statistics, the Secretary shall, through the Center, provide adequate technical assistance to assist State and local jurisdictions in the development of model laws dealing with issues of confidentiality and comparability of data.”); *id.* § 242k(e) (“For the purpose of producing comparable and uniform health information and statistics, there is established the Cooperative Health Statistics System. The Secretary, acting through the Center, shall . . . (3) make grants to and enter into contracts with State and local health agencies to assist them in meeting the costs of data collection and other activities carried out under the System . . . States participating in the System shall designate a State agency to administer or be responsible for the administration of the statistical activities within the State under the System. The Secretary, acting through the Center, shall prescribe guidelines to assure that statistical activities within States participating in the system produce uniform and timely data and assure appropriate access to such data.”); *id.* § 242k(f) (“To assist in carrying out this section, the Secretary, acting through the Center, shall cooperate and consult with the Departments of Commerce and Labor and any other interested Federal departments or agencies and with State and local health departments and agencies.”).

⁸³ See, e.g., *People v. McNichols*, 13 P.2d 266, 268 (Colo. 1932) (noting that the police power “operates in all parts of the state, including Denver and other ‘home rule’ cities”).

government and private actors.⁸⁴ Yet vital statistics remain largely under state control.⁸⁵

When it comes to data analysis, any researcher crunching numbers will tell you some version of the phrase “garbage in equals garbage out.”⁸⁶ If the information being reported is incomplete (either missing details about the deaths reported or not counting relevant deaths at all) or inaccurate, then later analysis of that data will be faulty as well.⁸⁷ What follows below is an explanation of why local data flowing up to the NCHS is insufficient for today’s data-driven world and how new tools and technologies can help.

A. Coroners and Medical Examiners

Although only about 20% of death certificates are certified by a coroner or medical examiner,⁸⁸ issues with these death investigators and their investigations receive outsized attention because they often handle deaths that are not from supposedly natural causes and where causality is difficult to determine. The implication is that the many deaths certified by treating physicians, inside or outside of hospital settings, are easier to certify and therefore more accurate, which is not necessarily correct.

Regardless of whether a treating physician, coroner, or medical examiner signs the death certificate, the process includes reaching a conclusion on both cause of death and manner of death. Cause of death “refers to the physical antecedent of death, such as disease or injury,” while manner of death “pertain[s] to the broader circumstances by which the death was brought about.”⁸⁹ The U.S. Standard

⁸⁴ See Craig Konnoth, *Health Data Federalism*, 101 B.U. L. REV. 2169, 2177 (2021). The federal government has allowed private firms to displace state laws on health data after a transition period in which the federal government still deferred to state powers: “[I]n 2009, the federal government took steps to assist state networks’ health data exchanges. But while the states were no longer solo actors, they largely remained the stars; the federal government would often defer to, or support, state efforts.” *Id.*

⁸⁵ MICHAEL J. SIRI & DANIEL L. CORK, NAT’L RSCH. COUNCIL, VITAL STAT.: SUMMARY OF A WORKSHOP 88 (2009).

⁸⁶ Or, as they say in England, “rubbish in—rubbish out.” King, *supra* note 39, at 734.

⁸⁷ See Lens, *Counting Stillbirths*, *supra* note 28, at 557 (citing data problems of “underreporting, data incompleteness, and data inaccuracy” in her discussion of the miscounting of stillbirths).

⁸⁸ *Documenting Death—The Certificate*, FRONTLINE (Feb. 1, 2011), <https://www.pbs.org/wgbh/pages/frontline/post-mortem/things-to-know/death-certificates.html>.

⁸⁹ Dan Simon, *Minimizing Error and Bias in Death Investigations*, 49 SETON HALL L. REV. 255, 265–66 (2019) (“Though for medicolegal forensic purposes, the ultimate physiological disturbance—such as a hemorrhagic shock or respiratory paralysis—is of limited value. We are interested rather in the ‘underlying’ or ‘primary’ event that brought about that disturbance, such as a drowning or a gunshot wound to the head.”).

Certificate of Death lists the options for manner of death as: “Natural,” “Accident,” “Suicide,” “Homicide,” “Pending Investigation,” and “Could not be determined.”⁹⁰ Following the tradition in legal academia of prioritizing discussion of coroners and medical examiners (in contrast to the practice of medical and public health researchers working on cause of death determination, who prioritize physician determinations of cause of death), this Section begins there.

1. *Medical Training*

Much has been said in legal scholarship about the split between states that have coroners at the top of their death investigation hierarchy and states that have medical examiners.⁹¹ A coroner is defined as a “public official whose duty is to investigate the causes and circumstances of any death that occurs suddenly, suspiciously, or violently.”⁹² Similarly, a medical examiner is a “public official who investigates deaths, conducts autopsies, and helps the state prosecute homicide cases.”⁹³ Both coroners and medical examiners must determine the cause of death in cases they investigate (usually those that occur under unusual circumstances) and ensure proper reporting of that information, but medical examiners are typically better trained for the job and viewed by physicians as more capable of determining the cause of death. In the United States, there are: 16 states (and Washington, D.C.) that have a centralized medical examiner system; 6 states that have a county- or district-based medical examiner system; 14 states that have a county-based mixed system of coroner and medical examiner offices; and 14 states that have a district-based coroner system.⁹⁴

⁹⁰ CTRS. FOR DISEASE CONTROL & PREVENTION; U.S. STANDARD CERTIFICATE OF DEATH (2003) [hereinafter STANDARD DEATH CERTIFICATE], <https://www.cdc.gov/nchs/data/dvs/death11-03final-acc.pdf> (available at Appendix A).

⁹¹ See, e.g., Stephen J. Choi & Mitu Gulati, *Adjudicating Death: Professionals or Politicians*, 70 VAND. L. REV. 1709 (2017).

⁹² *Coroner*, BLACK’S LAW DICTIONARY (12th ed. 2024) (noting that the reader should also review the term “Medical Examiner”).

⁹³ *Medical Examiner*, BLACK’S LAW DICTIONARY (12th ed. 2024) (“Medical examiners have replaced coroners in many states.”).

⁹⁴ Michelle Rippey, *Improving Public Health by Advancing the Medicolegal Death Investigation Profession*, FED’N AM. SCIENTISTS (May 15, 2024), <https://fas.org/publication/advancing-medicolegal-investigation-profession/>; CONNOR BROOKS, U.S. DEP’T OF JUST., BUREAU OF JUST. STATISTICS, MEDICAL EXAMINER AND CORONER OFFICES, 2018, at 1 (2021), <https://bjs.ojp.gov/content/pub/pdf/meco18.pdf>.

Coroners complete the death certificate, like medical examiners.⁹⁵ Many are elected and do not have medical training, although some are appointed.⁹⁶ In rural states, the sheriff or another agent of criminal investigation may act as coroner.⁹⁷ This presents a problem because death investigations should be independent of the criminal justice system. Although coroner systems vary from each other, making it difficult to generalize, they are typically viewed as being less rigorous than medical examiner systems.⁹⁸ Louisiana, for example, elects coroners and attempts to make sure they will not be held liable for how they use their discretion within the framework of the statutory requirements.⁹⁹ Kansas, on the other hand, requires each district coroner to be a resident licensed to practice medicine and surgery who is nominated by the local medical society or societies.¹⁰⁰ Elected coroners, however, require assistance from medical professionals to determine cause of death.¹⁰¹

“Medical examiners are physicians,” and typically they are pathologists.¹⁰² Their positions may be part-time or full-time, depending on the jurisdiction.¹⁰³

⁹⁵ Samuel Hodge, Jr. & Lauren Williams, *Virtual Autopsies—The New Kid on the Block in Death Investigations*, 46 U. DAYTON L. REV. 265, 272–73 (2021) (explaining how coroner traditionally meant “Crown,” or a person who would “determine taxes to be paid to the King or Crown upon death”).

⁹⁶ *Id.* at 273–74 (“Coroners are considered ‘public officers’ and operate in a quasi-judicial manner.”).

⁹⁷ *See, e.g.*, N.D. CENT. CODE § 11-19.1-06 (2024) (authorizing the duties of coroner to be performed by the sheriff, state highway patrol, or any “special agent of the bureau of criminal investigation” where there is no coroner or they are not available, with that individual then seeking assistance from the nearest coroner or a state forensic examiner to certify the medical cause of death).

⁹⁸ *State v. Beecroft*, 813 N.W.2d 814, 831–33 (Minn. 2012).

⁹⁹ LA. STAT. ANN. § 13:5713(I)(1) (2024) (“Liability shall not be imposed on an elected coroner or his support staff based upon the exercise or performance or the failure to exercise or perform their policymaking or discretionary acts when such acts are within the course and scope of their lawful powers and duties.”).

¹⁰⁰ KAN. STAT. ANN. § 22a-226 (2024).

¹⁰¹ *See, e.g.*, NEB. REV. STAT. § 23-1820 (1999) (“In each county there is hereby created the office of coroner’s physician, who shall be appointed by the coroner of the county and be removable by the corner. . . . Such physician shall certify the cause of death in every case of death in such county not certified by an attending physician and shall perform or cause to be performed an autopsy when requested by the coroner or as provided in section 23-1824.”); WYO. STAT. ANN. § 35-1-418 (2017) (“If the circumstances of the case suggest that the death was caused by other than natural causes, the local registrar shall refer the case to the coroner for investigation and certification. The coroner shall examine the body and consider the history of the case, and obtain the assistance and advice of a competent physician who will assist the coroner in determining the cause of death by examination of the body, autopsy, inquest or other procedure determined necessary. The nonmedical coroner shall not diagnose the cause of death without the assistance and advice of a competent physician, advanced practice registered nurse or physician assistant.”).

¹⁰² Hodge, Jr. & Williams, *supra* note 95, at 272–73.

¹⁰³ *See id.*

There is supposedly a shortage of pathologists (discussed further below), which is relevant to any proposals to expand or require the use of pathologists as death investigators.¹⁰⁴

This choice of a coroner or medical examiner system raises two important questions: (1) whether death investigators should be elected or appointed and (2) how much medical training death investigators should have prior to starting the job.

First, the issue of whether death investigators are elected or appointed implicates their responsiveness to the public interest, conflicts of interest (such as deference to law enforcement and prosecutors), and which process results in a more qualified candidate.¹⁰⁵ Coroners are typically elected, while medical examiners are appointed.¹⁰⁶ Research by Stephen Choi and Mitu Gulati, although based on limited data, found that death examiner offices run by coroners generally “perform fewer autopsies than they should, are less likely to be accredited by the major national organization [the National Association of Medical Examiners], and generate greater amounts of litigation.”¹⁰⁷ They suggest further research into whether states that retain coroner systems do so as a form of political patronage (rewarding supporters with party nominations for this position) and/or because they broadly “prefer direct democracy.”¹⁰⁸

On the second point, some states require as little as a high school degree to obtain the position of coroner.¹⁰⁹ Even if the death investigator is not the person conducting the autopsy, relevant education is necessary to make appropriate decisions about when to conduct investigations and what resources to utilize. A separate question relates to on-the-job training offered to death investigators. States have

¹⁰⁴ See Choi & Gulati, *supra* note 91, at 1718 (citing Thompson, *supra* note 1). In 2018, there were 890 autopsy pathologists employed by medical examiner and coroner offices. BROOKS, *supra* note 94, at 1–2.

¹⁰⁵ See Choi & Gulati, *supra* note 91, at 1711–12 (“Politicians are likely to be more responsive to the immediate needs of the voting public; after all, they want to be reelected. But that also means that they are likely to be less independent. . . . On the flip side, the professionals . . . have little incentive to consider the preferences and needs of those who they are supposed to be serving. They are going to be more independent, which does not always result in what is good for society; they may use that independence to shirk their job obligations.”).

¹⁰⁶ *Id.* at 1710 n.6.

¹⁰⁷ *Id.* at 1726–27.

¹⁰⁸ *Id.* at 1724 (finding some evidence that “the states using the coroner system are among the most corrupt in terms of government officials”). Cost is also a likely factor for choosing a coroner system because death investigators with lesser credentials typically command a lower salary.

¹⁰⁹ See, e.g., ALA. CODE § 45-2-61.01 (1975) (“The county coroner must have a high school education or an equivalent degree.”); see also Choi & Gulati, *supra* note 91, at 1712.

varied training requirements for their coroners or medical examiners.¹¹⁰ Overall, “the field is characterized by ‘disparate and often inadequate educational and training requirements, resources, and capacities—in short, a system in need of significant improvement.’”¹¹¹

2. *Discretion*

The result of the death investigation is the production of the death certificate. State statutes detail who is allowed to complete a death certificate and in what circumstances.¹¹² Typically, physicians, coroners (or their assistants), and medical examiners (or their assistants) may complete the death certificate, but others such as nurses, physician assistants, or dentists are occasionally permitted.¹¹³ In some states,

¹¹⁰ See, e.g., ALA. CODE § 45-2-61.01 (“The county coroner prior to beginning his or her first term and all deputy coroners prior to their first such appointment shall complete at least a 20-hour coroner’s death investigation course comparable to the standard course designed for death investigators by the National Association of Medical Examiners. After their first year of service, all coroners and deputy coroners shall attend not less than 20 hours of coroner’s death investigation training during each calendar year that they serve . . .”); WASH. REV. CODE § 36.24.205 (2021) (requiring a coroner or medical examiner to complete within 12 months “medicolegal forensic investigation training that complies with the standards adopted for the medicolegal training academy adopted by the criminal justice training commission in conjunction with the Washington association of coroners and medical examiners and a practicing physician selected by the commission . . .”).

¹¹¹ Simon, *supra* note 89, at 266.

¹¹² See, e.g., MINN. STAT. § 390.23 (2024) (“No person, other than the county coroner or medical examiner or, for deaths occurring within a facility licensed by the Department of Corrections, the forensic pathologist who reviewed the death, shall file or amend the cause or manner of death information with the state registrar in cases of likely or suspected accidental, suicidal, homicidal, violent, or mysterious deaths occurring in the county.”); OHIO REV. CODE ANN. § 3705.16 (LexisNexis 2008) (“A physician other than the coroner in the county in which a death or fetal death occurs, or a deputy coroner, medical examiner, or deputy medical examiner serving in an equivalent capacity, may certify only those deaths that occur under natural circumstances.”); WASH. REV. CODE § 70.58A.200(5)(a)–(b) (2019) (“The report of death may be completed by another individual qualified to be a medical certifier . . . who has access to the medical history of the decedent when: (a) The medical certifier is absent or unable to attest . . . or (b) The death occurred due to natural causes, and the medical certifier gives approval.”).

¹¹³ See, e.g., 410 ILL. COMP. STAT. 535 / 18(2) (2024) (“The medical certification shall be completed . . . by the certifying health care professional who, within 12 months prior to the date of the patient’s death, was treating or managing treatment of the patient’s illness or condition which resulted in death, except when death is subject to the coroner’s or medical examiner’s investigation. In the absence of the certifying health care professional or with his or her approval, the medical certificate may be completed and signed by his or her associate physician, advanced practice registered nurse, or physician assistant, the chief medical officer of the institution in which death occurred, or the physician who performed an autopsy upon the decedent.”); N.J. STAT. ANN. § 26:6-8 (West 2018) (“Within a reasonable time, not to exceed 24 hours after the pronouncement of death, the attending, covering, or resident physician, the attending advanced

a funeral director can complete a death certificate, even on behalf of a deceased family member or friend.¹¹⁴ To sign the death certificate, a coroner or medical examiner must be able to attest to the cause of death with some degree of certainty.¹¹⁵ There are times when a coroner is required to seek assistance from a pathologist, such as when the deceased is unidentified, cause of death is difficult to identify, or a homicide may have been committed.¹¹⁶

There is an emphasis on the need for the quick completion of the death certificate.¹¹⁷ The time pressure, as well as limited resources, makes additional investigation difficult, and it is less likely to lead to accurate national mortality data. There are circumstances when the coroner or medical examiner may amend the death certificate, however.¹¹⁸

practice nurse . . . or the county or intercounty medical examiner or the assistant county or intercounty medical examiner shall execute the death certification.”); 35 PA. STAT. AND CONS. STAT. ANN. § 450.502 (West 2022) (permitting dentists to complete the medical certification, among other medical professionals).

¹¹⁴ S.C. CODE ANN. § 44-63-74(A)(4) (2002) (“An individual who acts, without compensation, as a funeral director on behalf of a deceased family member or friend, is exempt from the requirement to file electronically but must comply with [other requirements], as applicable.”).

¹¹⁵ See, e.g., ALA. CODE § 45-2-61-06 (1975) (requiring a “reasonable certainty” of cause of death to execute a death certificate).

¹¹⁶ See, e.g., *id.* (“The state medical examiner or a qualified pathologist under his or her direction, may then execute a death certificate. . . .”); IND. CODE § 16-37-3-6 (2020) (“The local health officer may issue a subpoena to obtain information and to employ a qualified pathologist to perform an autopsy when, in the judgment of the local health officer, those procedures are required to complete the inquiry.”).

¹¹⁷ See, e.g., KY. REV. STAT. ANN. § 213.076 (West 2024) (requiring the funeral director to present the death certificate for medical certification of the cause of death to the parties listed as capable of certifying death within five days); OHIO REV. CODE ANN. § 3705.16 (West 2008) (“The medical certificate of death shall be completed and signed . . . within forty-eight hours after the death or fetal death.”); S.C. CODE ANN. § 17-5-560 (2024) (requiring the coroner or medical examiner to complete the medical certification part of the death certificate within 24 hours of notification of the death, and if awaiting the results of an autopsy to determine cause of death, to indicate that it is pending and sign the certificate). *But see* MO. REV. STAT. § 58.720(8) (2024) (“There shall not be any statute of limitations or time limits on cause of death when death is the final result or determined to be caused by homicide, suicide, accident, criminal abortion including those self-induced, child fatality, or any unusual or suspicious manner.”).

¹¹⁸ See, e.g., GA. CODE ANN. § 17-21-4(c) (2024) (“In a case where the cause of death is listed as nonspecific homicidal means or undetermined and subsequent investigative information is provided sufficient to determine a specific cause of death, the coroner or medical examiner shall have six months from the date of final disposition of the investigation to file an amended death certificate to include the official cause of death.”); KY. REV. STAT. ANN. § 213.076 (West 2024) (requiring a court order to amend a death certificate that has been on file for five years, although amendments may be made with *prima facie* evidence prior to that time); N.J. STAT. ANN. § 26:6B-22(a) (West 2024) (providing the procedure where a “person in interest” may request

In the end, there is a large amount of discretion accorded to death investigators about whether to investigate at all and, if so, the extent of the investigation.¹¹⁹ Whether to conduct an autopsy is typically within this discretion.¹²⁰ Extensive investigation is usually limited to deaths that are not from “natural causes”—limiting resources to circumstances that include homicides, suicides, and accidents.¹²¹ However, some jurisdictions mandate that the coroner or medical examiner must investigate cause of death when there is a disease that poses a public health threat.¹²²

that the medical examiner’s office “correct the findings and conclusions on the cause and manner of death recorded on a death certificate within 60 days”).

¹¹⁹ See, e.g., CAL. GOV’T CODE § 27491(c) (West 2025) (“The coroner shall have discretion to determine the extent of the inquiry to be made into any death occurring under natural circumstances and falling within the provisions of this section”); MO. REV. STAT. § 58.720(2) (2024) (“When a death occurs outside a licensed health care facility, . . . the medical examiner or the medical examiner’s deputy shall make a determination if further investigation is necessary, based on information provided by the individual contacting the medical examiner”).

¹²⁰ See, e.g., LA. STAT. ANN. § 13:5713(B)(1) (2024) (“The coroner may perform or cause to be performed by a competent physician an autopsy in any case in his discretion.”). *But see* S.C. CODE ANN. § 17-7-10 (1993) (“The coroner of the county in which a body is found dead or the solicitor of the judicial circuit in which the county lies shall order an autopsy or post-mortem examination to be conducted to ascertain the cause of death.”).

¹²¹ See, e.g., ALA. CODE § 45-27-60.06 (2024) (requiring further investigation if, among other potential reasons, “the cause of death is obscure”); HAW. REV. STAT. § 338-9 (2022) (“If the circumstances of the case suggest that the death or fetal death was caused by other than natural causes, the local agent shall refer the case to the coroner for investigation and certification.”); IDAHO CODE § 19-4301 (2022) (requiring county coroner to investigate a death if it was the result of violence (whether homicide, suicide, or accident), “occurred under suspicious or unknown circumstances,” or in the case of unexplained deaths of children or stillborn children); MO. REV. STAT. § 193.145(7) (2024) (“If the circumstances suggest that the death was caused by other than natural causes, the medical examiner or coroner shall determine the cause of death”); Simon, *supra* note 89, at 265 (“Medical examiners accept a death for investigation only after conducting a triage decision that determines their jurisdiction over it. Jurisdiction is typically assumed when the death appears to have come about unnaturally or caused by violence, when infants and children die unexpectedly or inexplicably, and when people die in police custody. Historically, death investigations were designed with the criminal process in mind, though over time death investigation has become increasingly focused on serving other public purposes.”).

¹²² See, e.g., COLO. REV. STAT. § 30-10-606 (2024) (requiring the coroner to make inquiry where the decedent died “[f]rom a disease which may be hazardous or contagious or which may constitute a threat to the health of the general public”); LA. STAT. ANN. § 13:5713(A)(1–3) (2024) (requiring coroner to “view the body or make an investigation into the cause and manner of death” where the death is: “suspicious;” “violent;” “unusual;” the result of suicide or homicide; a case of suspected poisoning; follows an accident or injury; “due to drowning, hanging, burns, electrocution, gunshot wounds, stabs or cutting, lightning, starvation, radiation, exposure, alcoholism, addiction, tetanus, strangulation, suffocation, or smothering;” the result of any type of trauma; due to a crime; occurs in prison; or “*due to virulent contagious disease that might be*

There are also times when health departments or registrars have statutory authority to require further investigation into the cause of death.¹²³ Specific and enhanced investigation requirements for deaths of interest for public health reasons are enacted at times, such as deaths due to AIDS, SIDS or other fetal or infant deaths, and opioid overdoses.¹²⁴

B. Hospital Physicians

One-third of deaths in this country take place in hospitals.¹²⁵ “In most teaching hospitals, resident physicians are responsible for the completion of death certificates.”¹²⁶ This important task, then, is left to the physicians who have the least amount of medical training—which indicates how this task is deprioritized in hospital settings.

Even physicians who regularly complete death certificates doubt the accuracy of the cause of death determinations they certify.¹²⁷

“Only one-third of the respondents . . . believed the current system accurately documents correct cause of death.” Nearly half—48.6 percent—of respondents reported having identified a cause of death that did not actually represent

caused by or cause a public hazard, including acquired immune deficiency syndrome [AIDS]” (emphasis added)).

¹²³ See, e.g., KY. REV. STAT. ANN. § 213.076 (West 2024) (“If any certificate of death is incomplete or unsatisfactory, the state registrar shall call attention to the defects in the certificate and require the person responsible for the entry to complete or correct. The state registrar may also require additional information about the circumstances and medical conditions surrounding a death in order to properly code and classify the underlying cause.”); WASH. REV. CODE § 70.58A.200 (2019) (“The department may require a medical certifier, coroner, medical examiner, or local health officer to provide additional or clarifying information to properly code and classify cause of death.”).

¹²⁴ See, e.g., IND. CODE § 36-2-14-6.7 (2024) (sudden infant death syndrome); MO. REV. STAT. § 58.722 (1994) (child fatalities); N.D. CENT. CODE § 11-19.1-13 (2024) (sudden infant death syndrome); WASH. REV. CODE § 70.05.210 (2024) (opioid overdoses).

¹²⁵ Barbara Wexelman, Edward Eden & Keith Rose, *Survey of New York City Resident Physicians on Cause-of-Death Reporting, 2010*, CTRS. FOR DISEASE CONTROL & PREVENTION (May 9, 2013), https://www.cdc.gov/pcd/issues/2013/12_0288.htm.

¹²⁶ *Id.* (“All hospitals in New York City use the same cause-of-death reporting system. Death certificates are typically processed by personnel in the hospital admitting department. The admitting personnel may help physicians enter the data into the electronic death reporting system and advise physicians on rules for reporting cause of death. Certificates are then submitted to the New York City Department of Health and Mental Hygiene. In 2011, of 4,145 residents, 71% were in internal medicine, 14% in emergency medicine, and 15% in general surgery.”).

¹²⁷ Sarah Kliff, *Study: Nearly One-Third of All Death Certificates are Wrong*, WASH. POST (May 12, 2013), <https://www.washingtonpost.com/news/wonk/wp/2013/05/12/study-nearly-half-of-all-death-certificates-are-wrong/>.

what the person died from. A small number, 2.9 percent, had ever gone back and updated a death certificate after learning new information about the patient's circumstance.¹²⁸

Reasons for inaccurate cause of death cited by physicians included difficulties filling out the form, uncertainty about the cause of death, or disagreement between what the attending physician believed to be the cause of death and what the resident physician completing the death certificate thought was the true cause of death.¹²⁹ Treating physicians and other health care providers who complete death certificates also lack training about how to properly complete death certificates, unlike medical examiners.¹³⁰

Studies determining the accuracy of cause of death determinations in hospital settings are easier because of the ability to compare conclusions to medical records. It is, however, almost impossible to confirm the accuracy of cause of death determinations outside of hospital settings.

Current research does little to address the medicalized nature of cause of death determinations made in the hospital setting. Although patients often reveal non-medical information to physicians, studies have not addressed the extent to which that information is included in death certificates, given the focus on a medical, sequential chain of events leading to death on the form.

C. Autopsies and New Tools

Aside from the question of who determines cause of death, the most important question in death investigations is how they make that determination. The gold standard for determining cause of death in complicated or difficult cases is the autopsy. Relatively few autopsies are conducted each year, however. In 2020, the autopsy rate was 7.4% overall.¹³¹ The recent focus then has been on how to increase the amount of data available on cause of death—both by expanding the number of traditional autopsies performed and by looking to information available through methods and technology outside of the traditional autopsy. Verbal and social autopsies, virtual autopsies, and AI-enhanced autopsies can dramatically expand the numbers and scope of death investigations.

¹²⁸ *Id.* (citing and quoting Wexelman, Eden & Rose, *supra* note 125).

¹²⁹ *Id.*

¹³⁰ Lauri McGivern, Leanne Shulman, Jan K. Carney, Steven Shapiro & Elizabeth Bundock, *Death Certification Errors and the Effect on Mortality Statistics*, 132 PUB. HEALTH REPS. 669, 669–70 (2017) (citing numerous studies on problems resulting from inaccurate cause of death determinations, including impacts on “families, mortality statistics, and public health research”).

¹³¹ Donna L. Hoyert, *Autopsies in the United States in 2020*, NAT'L VITAL STAT. REPS., May 24, 2023, at 2.

A traditional autopsy involves the “dissection” of a body by a pathologist to help determine the cause (or causes) of death.¹³² More limited necropsies typically do not examine the brain or focus on specific parts of the body.¹³³ The vast majority of autopsies are forensic autopsies for deaths that occur in violent or suspicious circumstances (hereinafter “autopsies”), not clinical autopsies performed in hospitals that seek to determine what disease or medical intervention resulted in death.¹³⁴

During an autopsy, the pathologist examines the body, takes samples, and decides on the cause of death.¹³⁵ The process involves removing organs, fluids, and tissues from the body, and testing them.¹³⁶ Photographs and measurements are taken, and x-rays may be used to detect fractures and the presence of foreign objects.¹³⁷

Autopsies are more frequently performed on children and young adults who die from external causes (homicide, suicide, accidents, etc.) or under suspicious circumstances.¹³⁸ Consent is required for an autopsy in the absence of circumstances that justify using state power to compel the procedure.¹³⁹ Religious objections to autopsies occur based on both the changes to the body and also the delay in burial as a result of the procedure.¹⁴⁰

Studies show that information from death certificates in cases where no forensic or hospital autopsy was performed is often inaccurate and unhelpful.¹⁴¹ However, the cost of an autopsy is at least \$1,000.¹⁴²

Virtual autopsies, or virtopsies, focus on enhancing information available to determine medical cause of death. They involve the use of imaging technologies such as x-rays, computed tomography (CT), 3D photogrammetry, and magnetic

¹³² Hodge, Jr. & Williams, *supra* note 95, at 267–68 (“The word ‘autopsy’ is used interchangeably with post-mortem, and is Latin for ‘after-death.’”).

¹³³ *Id.* at 269.

¹³⁴ *Id.* at 269–71 (“[T]he information pursued during a forensic autopsy may include the deceased’s identity; reason, manner, and time of death; events behind the demise; and associated matters such as the collection of trace evidence and additional information about the crime scene.”); see also Cheryl Clark, *Return of the Autopsy*, HEALTHLEADERS (May 1, 2014), <https://www.healthleadersmedia.com/clinical-care/return-autopsy> (“Rare is the hospital where the autopsy rate is greater than 5% of nonforensic deaths.”).

¹³⁵ Hodge, Jr. & Williams, *supra* note 95, at 271.

¹³⁶ *Id.* at 273.

¹³⁷ *Id.* at 275.

¹³⁸ See *id.* at 269–70 (“The number of autopsies decreases with older people because they tend to die from diseases rather than from external reasons.”); Hoyert, *supra* note 131, at 2, 4–5.

¹³⁹ Hodge, Jr. & Williams, *supra* note 95, at 278.

¹⁴⁰ See *id.* at 266, 279.

¹⁴¹ *Id.* at 272 (noting that autopsy data is important for accurate mortality statistics).

¹⁴² Choi & Gulati, *supra* note 91, at 1713.

resonance imaging (MRI) to supplement or substitute for traditional autopsies.¹⁴³ The 3D photogrammetry can produce an outline of the body's frame, while the CT scan and x-rays then reveal the status of bones and organs, foreign objects, and fluids and gases. The MRI then images the soft tissues and reveals the condition of the heart, brain, or other organs. A computer and robotic arm can take tissue samples.¹⁴⁴ The use of virtopsies has been inconsistent within and outside the United States.¹⁴⁵ Virtopsies have an accuracy rate only slightly below traditional autopsies, but that rate varies depending on the cause of death and age of the decedent.¹⁴⁶ Disadvantages include cost and the need for specialized training.¹⁴⁷

In addition, artificial intelligence (AI) is poised to revolutionize forensic medicine and toxicology.¹⁴⁸ Autopsies require the examiner to take on many tasks and look for small details, including to discover the identity of the decedent and look for stains on clothing and wounds, fractures, and fluids on the body.¹⁴⁹ AI can help establish a person's identity using "facial features, retinal patterns, and fingerprints" in addition to palm prints, voice patterns, and DNA patterns.¹⁵⁰

AI-enhanced virtual autopsy is an advancement on the current tools available to some coroners and medical examiners. Computers can use the MRI and CT scans to identify the condition of organs and other structures to reach their own conclusions about cause of death.¹⁵¹ The machine can also use the data from biomarkers to better estimate time of death.¹⁵² Robots can help take samples, in addition to having machines analyze them.¹⁵³

¹⁴³ Hodge, Jr. & Williams, *supra* note 95, at 284–90.

¹⁴⁴ *Id.* at 286.

¹⁴⁵ *Id.* at 287 ("These imaging approaches are commonly employed in some parts of the world. . . . On the other hand, other nations, such as the United States, have been much more cautious about using these post-mortem techniques in their routine practices.").

¹⁴⁶ *See id.* at 288–89 (noting a 2012 study that found traditional autopsies confirmed pre-mortem diagnoses in 93% of cases and virtopsies alone had an accuracy rate of 88% but also discussing research reviews in Europe that show inconsistent results depending on the decedent's characteristics or cause of death).

¹⁴⁷ *Id.* at 288–90.

¹⁴⁸ Toshali D. Wankhade, Sundeep W. Ingale, Prakash M. Mohite & Nandkishor J. Bankar, *Artificial Intelligence in Forensic Medicine and Toxicology: The Future of Forensic Medicine*, CUREUS, Aug. 25, 2022, at 1 (comparing the coming impact of AI on forensic medicine to the Industrial Revolution).

¹⁴⁹ *Id.* at 2.

¹⁵⁰ *Id.*

¹⁵¹ *Id.* at 3.

¹⁵² *Id.*

¹⁵³ *Id.*

Finally, AI may be able to reduce costs while allowing death investigators to incorporate more social data on cause of death, which is the focus of this Article. Where machines can quickly search both social data entered by investigators about the decedent, public records, news reports, and even social media accounts, computers can produce relevant information and flag items relevant to cause of death even in under-resourced communities that do not have the staff to complete such data compilation and analysis. Increasing social and environmental data available to death investigators and certifiers will likely include the use of verbal and social autopsies, regardless of whether AI is used to sift through and categorize the data (although AI will likely be the only way to keep costs down while dramatically increasing the volume of data incorporated into death investigations).

The WHO recommends the use of the “verbal autopsy” to help with the worldwide problem of undetermined cause of death.¹⁵⁴ This technique, increasingly used in low- and middle-income countries, could hold the key to filling in gaps in data gathered in the United States, too. A verbal autopsy occurs when death investigators interview relatives and caregivers of the deceased to gain information about the events leading up to death.¹⁵⁵ Either physicians or automated programs (which may involve AI) then assign a cause of death using a standardized form.¹⁵⁶ Verbal autopsy is currently seen as making the best possible determination of cause of death in “settings with limited access to health care,”¹⁵⁷ though this tool need not be limited to those settings.

Questions arise with verbal autopsies about the training of interviewers, the drafting of questions asked and how well open-ended questions work, the accuracy of the memories recalled by interviewees (and conveyed, because what is recalled and what is conveyed may differ), and the accuracy of cause of death as coded by a

¹⁵⁴ Samuel Danso, Alexander Manu, Justin Fenty, Seeba Amanga-Etego, Bilal Iqbal Avan, Sam Newton, Seyi Soremekun & Betty Kirkwood, *Population Cause of Death Estimation Using Verbal Autopsy Methods in Large-Scale Field Trials of Maternal and Child Health: Lessons Learned From a 20-Year Research Collaboration in Central Ghana*, 20 EMERGING THEMES EPIDEMIOLOGY 1 (2023). The Bill and Melinda Gates Foundation has provided financial support for “improved global estimates and measures of the causes and determinants of maternal, neonatal and child morbidity and mortality.” *Verbal Autopsy and Social Autopsy Studies (VASA)*, JOHNS HOPKINS BLOOMBERG SCH. OF PUB. HEALTH [hereinafter *VASA*], <https://publichealth.jhu.edu/institute-for-international-programs/our-work/verbal-autopsy-and-social-autopsy-studies-vasa> (last visited Apr. 7, 2025).

¹⁵⁵ *VASA*, *supra* note 154.

¹⁵⁶ *Id.*

¹⁵⁷ *Id.* (“Verbal Autopsy is not intended to make a gold standard diagnosis of an individual’s cause of death, however it is the best available method for diagnosing cause of death in settings where many deaths occur outside of medical care and lack proper medical certification.”).

physician or computer.¹⁵⁸ In addition, this approach has largely been confined to low- and middle-income countries, which of necessity rely more on physicians to decide on cause of death in the absence of the expertise and resources to use emerging technologies but reach limited numbers of people.¹⁵⁹ Therefore, much is unknown about how this technique would apply in a different setting.

Similarly, “social autopsies,” also called the “social and behavioral determinants of death,” move beyond the medical causes of death and the isolated interviews of verbal autopsies to look at all individual, household, and community factors that contributed to death.¹⁶⁰

While research on social autopsies has often focused on low- and middle-income countries (like verbal autopsies) with an aim of improving mortality data for children, the technique has more recently been adapted in wealthier countries such as the United States.¹⁶¹ For an example of how it has been used, in a study of social autopsies in Cameroon, researchers concluded that living conditions that included untreated water, exposure to indoor smoke, and delays in seeking formal health care interventions for sick children contributed to many deaths—adding nuance to the typical medical causes of death for children in the country of pneumonia, diarrhea, and malaria.¹⁶² Social autopsy data focuses on environmental factors “in the home, community and health system” that can be improved to result in better health

¹⁵⁸ See *id.*

¹⁵⁹ See *id.* (“[C]ountries with high burden of child mortality and inadequate data on the causes and determinants of child death were selected [for Verbal Autopsy and Social Autopsy studies]. . . . To-date, VASA studies have been conducted in the following countries: Cameroon, Malawi, Niger, Nigeria and Tanzania.”).

¹⁶⁰ *Id.*; see Timmermans & Prickett, *supra* note 24, at 1–2 (noting that a social autopsy typically analyzes the “death of a set of individuals in similar circumstances” and recounting research on this “social science research method” within the discipline of sociology).

¹⁶¹ VASA, *supra* note 154 (explaining that, for VASA, research in low- and middle-income countries, social autopsies “detail the most common household (e.g., mother’s and father’s education, pregnancy and wellness care, care seeking and constraints), community (e.g., residence place, time to reach health care in an emergency, social capital) and health system (e.g., ANC [antenatal care] content, delivery care, newborn and child care, child illness care) factors that contributed to the deaths.”); see Ghorayshi, *supra* note 58.

¹⁶² Alain K. Koffi, Romain S. Wounang, Félicitée Nguefack, Seidou Moluh, Paul-Roger Libite & Henry D. Kalter, *Sociodemographic, Behavioral, and Environmental Factors of Child Mortality in Eastern Region of Cameroon: Results from a Social Autopsy Study*, 7 J. GLOBAL HEALTH 298, 302, 306 (2017).

outcomes.¹⁶³ “The social autopsy starts with mortality but is ultimately about some breakdown of living together.”¹⁶⁴

Shortcomings for social autopsies include that they are still in the early stages of development, without standardization for types of data collected and methodology.¹⁶⁵ As with traditional autopsies and death data reporting in this country, however, efforts to “simplify and standardize social autopsy methods” also limit the amount and types of data collected, sacrificing accuracy for ease of implementation and efficiency.¹⁶⁶ Social autopsies also raise political and privacy concerns. Like all autopsies, social autopsies are “political project[s].”¹⁶⁷

AI has the potential to vastly increase the amount of data that can be incorporated into death investigations. It will be important, however, that the information AI uses includes both medical and social data.

III. BIAS AND INVISIBLE DEATHS

Marginalized groups can become invisible during the death investigation and reporting process through either (1) conscious or unconscious bias or (2) the lack of attention devoted to social determinants of death. The distinction is based on the source of the harm, though not whether that harm is inflicted intentionally or unintentionally. Bias is the result of humans making different decisions or reaching different conclusions based on characteristics of a decedent, such as race or class. The social determinants of death, however, result from harm inflicted by economic and social structures. Though they may have been intentionally implemented to oppress certain groups within the population, that is not always the case.

A. *Conscious and Unconscious Bias*

On the first point, Dan Simon analyzes “whether and how death investigations might be skewed by exposure to background information about the decedent or the circumstances of the death”¹⁶⁸ Although his focus is on “ambiguous investigations destined to be used in criminal proceedings,” his findings and

¹⁶³ Peter Waiswa, Henry D. Kalter, Robert Jakob & Robert E. Black, *Increased Use of Social Autopsy is Needed to Improve Maternal, Neonatal and Child Health Programmes in Low-income Countries*, 90 BULL. WORLD HEALTH ORGAN. 403, 403 (2012).

¹⁶⁴ Timmermans & Prickett, *supra* note 24, at 1683.

¹⁶⁵ Waiswa et al., *supra* note 163, at 403.

¹⁶⁶ *See id.*

¹⁶⁷ McMaster University, *The Social Autopsy with Dr. Stefan Timmermans – Spark Talks*, MACVIDEO, at 34:41 (Jan. 18, 2022), https://www.macvideo.ca/media/The+Social+Autopsy+with+Dr.+Stefan+Timmermans+%E2%80%93+Spark+Talks/1_0w5tbsl3.

¹⁶⁸ Simon, *supra* note 89, at 257.

recommendations have relevance when analyzing death investigations to reveal how they skew data as well.¹⁶⁹ Just as “imprecise, exaggerated, and outright invalid forensic work” has been used in the criminal justice system,¹⁷⁰ it frequently results in flawed death data for national statistical compilation. In addition to using questionable scientific methods, “inadequate oversight, staffing, certification, and accreditation of forensic agencies” result in a lack of guardrails for the investigations and conclusions reached.¹⁷¹

“Cognitive and contextual bias” emerged as one of the gravest dangers to the validity of forensic science and gave birth to the new field of “human factors” within forensic science.¹⁷² The consensus has been that, when figuring out a solution to this characteristic of decision making, it is easier to limit access to types of information likely to result in bias than to “debias the person.”¹⁷³

Simon zeroes in on the technique of “context management,” now commonly accepted in certain pattern comparison forensic fields such as fingerprints and ballistics, which limits forensic investigators’ access to information considered irrelevant for the task being performed.¹⁷⁴ Context management results in a case manager, with access to all available information on the decedent and death, assigning tasks to analysts and providing only relevant information needed to perform each task.¹⁷⁵ The “Linear Sequential Unmasking model” allows the case manager to later reveal the hidden information and see if the analyst would change her conclusion.¹⁷⁶ Here then is a proposal to limit information used in death investigations (at least by some investigators) instead of broadening it.

¹⁶⁹ *Id.*

¹⁷⁰ *Id.* at 257–58 (citing NAT’L RSCH. COUNCIL, STRENGTHENING FORENSIC SCIENCE IN THE UNITED STATES: A PATH FORWARD (2009) [hereinafter 2009 NRC Report], <https://www.ojp.gov/pdffiles1/nij/grants/228091.pdf>).

¹⁷¹ *See id.* at 258.

¹⁷² *Id.* (citing 2009 NRC Report, *supra* note 170).

¹⁷³ *See id.* at 258–59 (discussing the “disruptive potential of exposing forensic analysts to certain types of investigative information, a phenomenon known as *context bias*.”). This feature of decision making may not even be avoided with artificial intelligence if machines replicate biased conclusions using pattern recognition.

¹⁷⁴ *Id.* at 259–60.

¹⁷⁵ *Id.* at 259 (“This functional separation allows case managers to manage and steer the forensic examination required in the case, while keeping analysts blind—at least during critical phases of the investigation—to extraneous investigative facts that are unnecessary for the analyses they are assigned to perform.”).

¹⁷⁶ *Id.* at 259–60.

There has been strong resistance to expanding the use of context management in death investigations, however, and Simon takes on this resistance.¹⁷⁷ He writes disapprovingly of medical examiners classifying deaths as homicides “based primarily on non-medical evidence,”¹⁷⁸ but he both elevates medical evidence above non-medical evidence and also presumes that the interpretation of medical evidence is less susceptible to bias than non-medical evidence. Given that medical evidence includes information from “hospital records, primary care physicians, emergency response reports, and statements by family members, friends, and caregivers”¹⁷⁹ and systemic bias in healthcare has been well-established,¹⁸⁰ there is reason to doubt that it is possible to debias even medical evidence used in death investigations.

Though Simon is concerned with “task-irrelevant information” affecting death investigations, my argument here is that all information—whether medical or social—derived from physicians, law enforcement, or even the medical examiners own analysis is inherently subject to bias. The answer is not to mask some information and then unmask it to see if that changes conclusions; instead, death investigators should be trained directly on the potential for bias from each type of information used to reach a conclusion during death investigations.

B. *Social Determinants of Death*

Second (and related), the social determinants of death are relevant to all death investigations—and necessary to increase the accuracy of data that results. In recent years, there has been a shift from focusing on what science can do to improve health to focusing on how “economic, political, and social” factors impact health.¹⁸¹ These factors are known as the social determinants of health.¹⁸² Scholarship has explored

¹⁷⁷ *Id.* at 261–62 (noting four major objections: (1) may result in incorrect conclusion; (2) “unworkable” and will impede investigations; (3) does not solve other issues in forensic pathology such as “honest scientific disagreement, lack of uniform training and uneven professional competence, occasional unethical behavior, and political and institutional pressure”; and (4) does not influence overall conclusions of death investigations).

¹⁷⁸ *Id.* at 269.

¹⁷⁹ *Id.* at 270.

¹⁸⁰ See, e.g., Khiara Bridges, *Implicit Bias and Racial Disparities in Health Care*, HUM. RTS., Nov. 2018, at 19.

¹⁸¹ See Alan Weil, *The Social Determinants of Death*, HEALTH AFFS. (June 3, 2020), <https://www.healthaffairs.org/content/forefront/social-determinants-death>; *Social Determinants of Health*, WORLD HEALTH ORG., https://www.who.int/health-topics/social-determinants-of-health#tab=tab_1 (last visited Apr. 7, 2025).

¹⁸² Weil, *supra* note 181.

the ways in which legal structures contribute to—or can help improve—poor health outcomes among certain races, genders, and socioeconomic groups.¹⁸³

The social determinants of health result in shorter lifespans for marginalized groups (in addition to their impact on quality of life). Public attention to the ways in which they cut lives short was low until the COVID-19 pandemic and the death of George Floyd (and others) from police brutality.¹⁸⁴ During the pandemic, death data showed early on that the virus was disproportionately impacting American Indian and Alaska Native (AIAN), Black, and Hispanic people through higher age-adjusted rates of infection, hospitalization, and death—and those disparities persisted.¹⁸⁵ Similarly, protests swept the country after George Floyd's death as a rash of cases showed that police brutality, particularly against Black men, was a pervasive and systemic issue instead of just a small series of isolated incidents.¹⁸⁶

Similarly, public attention has recently focused on how doing mundane daily activities while Black can result in getting shot or dying. At first, it was still mediated through law enforcement (such as when someone called the police to report a Black man who was birding in Central Park¹⁸⁷). Then, it shifted to individuals shooting Black people for knocking on their door¹⁸⁸ or accidentally getting into the wrong

¹⁸³ See, e.g., Scott Burris, *From Health Care Law to the Social Determinants of Health: A Public Health Law Research Perspective*, 159 U. PA. L. REV. 1649, 1666–67 (2011) (“Health researchers are invited to accept that law influences environments and behaviors in ways that they cannot, from a scientific standpoint, credibly ignore. They are challenged to acquire the skills—or build the collaborations—they need to include law as a variable in rigorous research. Legal scholars (including, but not limited to, health law scholars) are encouraged to appreciate that health is actually one of the most important things law can influence and that empirical research on law’s impact on health makes an important contribution to legal scholarship.”).

¹⁸⁴ Weil, *supra* note 181.

¹⁸⁵ Nambi Ndugga, Latoya Hill & Samantha Artiga, *COVID-19 Cases and Deaths, Vaccinations, and Treatments by Race/Ethnicity as of Fall 2022*, KFF (Nov. 17, 2022), <https://www.kff.org/racial-equity-and-health-policy/issue-brief/covid-19-cases-and-deaths-vaccinations-and-treatments-by-race-ethnicity-as-of-fall-2022/>.

¹⁸⁶ *What George Floyd Changed*, POLITICO (May 23, 2021), <https://www.politico.com/news/magazine/2021/05/23/what-george-floyd-changed-490199>.

¹⁸⁷ See Colin Moynihan, *A Birder is Back in the Public Eye, Now on His Own Terms*, N.Y. TIMES, <https://www.nytimes.com/2022/05/17/arts/television/christian-cooper-central-park-birder.html> (May 19, 2022).

¹⁸⁸ Nouran Salahieh, Taylor Romine & Holly Yan, *The White Homeowner Accused of Shooting a Black Teen Who Rang His Doorbell Turns Himself In and is Released on Bail*, CNN, <https://www.cnn.com/2023/04/18/us/kansas-city-ralph-yarl-shooting-tuesday/index.html> (Apr. 19, 2023, 12:19 AM).

car.¹⁸⁹ Whether these incidents resulted in death or not, it forced the public to confront risks for early death due to conscious and unconscious racial bias.

Far less attention is paid to the social determinants of death that are unrelated to a global pandemic or violent deaths. These are the types of deaths that do not gain widespread media or social media attention—the deaths that are invisible. No one investigates deaths where a person has a heart attack after living in inferior housing or without housing for years, or after years of stress from racial or gender discrimination. But the discussion has at least shifted from the social determinants of health to the social determinants of death.¹⁹⁰ Additional data from death investigations would add to attempts to reduce those death disparities.

The use of maternal mortality review committees (MMRCs) to address the significantly higher risk of mortality faced by pregnant and post-partum Black women is instructive. In the face of overwhelming public attention to the issue resulting from investigative journalism and horrific stories of young Black women dying suddenly in their prime, Congress and President Trump enacted the Preventing Maternal Deaths Act in 2018.¹⁹¹ The Act funds MMRCs with medical and public health experts who analyze each maternal death to “understand why each death occurred and what can be done to prevent similar deaths in the future.”¹⁹² Specifically, it “promotes a uniform way for MMRCs to collect and report on maternal deaths, to study causes of maternal mortality and disparities therein, and to develop policies, educational practices, and other solutions to the problem at the state level.”¹⁹³ The focus is “supposed to be broader” than just reviewing clinical care, including “analyzing the healthcare system that dispensed the care, the quality of the hospital that provided the care, the accessibility of providers to the pregnant woman, and the social context in which a woman lived.”¹⁹⁴ The idea was to move beyond the ultimate determination of a medical cause of death, such as cardiomyopathy or sepsis, to look at social factors and structures that result in death and will need to be changed to decrease maternal mortality.¹⁹⁵

¹⁸⁹ Rachel Treisman, *2 Texas Cheerleaders Were Shot After 1 Tried to Get in the Wrong Car After Practice*, NPR (Apr. 19, 2023, 10:22 AM), <https://www.npr.org/2023/04/19/1170823978/texas-cheerleaders-shot-car-parking-lot-practice>.

¹⁹⁰ See Bundy, et al., *supra* note 62.

¹⁹¹ Bridges, *supra* note 28, at 1233–34 (noting that the law provides states with 12 million dollars per year for five years to establish maternal mortality review committees).

¹⁹² *Id.* at 1234; Valarie Blake & Michelle McGowan, *Filling a Federal Void: Promises and Perils of State Law in Addressing Women's Health Disparities*, 48 J.L. MED. & ETHICS 485, 486–87 (2020).

¹⁹³ Blake & McGowan, *supra* note 192, at 486.

¹⁹⁴ Bridges, *supra* note 28, at 1291.

¹⁹⁵ *Id.* at 1291–93 (highlighting the success of MMRCs in the United Kingdom).

In resuscitating MMRCs, which have been used by some states for nearly a century,¹⁹⁶ states found a tool to focus on particular deaths that were too high—reflecting both a medical and a social problem. Before the enactment of the Preventing Maternal Deaths Act, 36 states had MMRCs, but they lacked funding and varied in quality.¹⁹⁷ Although the Act increased funding and attention for MMRCs and focused on better data collection, it also reflected existing biases in death investigations by discounting race and emphasizing medical causation at the expense of social causation.¹⁹⁸

Bridges argues that the Preventing Maternal Death Act “completely ignores race. . . . The irony is striking: An effort to address a phenomenon that has become salient *because* of its racial nature ignores race entirely.”¹⁹⁹ She questions how effective reforms could come from a statute that refuses to acknowledge that racial inequity is the cause of the problem.²⁰⁰ Her work demonstrates that the way data is collected, including biases from the start, determines statistical outcomes. More data collection is not always better.

In addition, MMRCs have been largely run by medical professionals and have deflected blame for mortality onto “individual lifestyle choices such as smoking or ‘getting too fat’ or larger social and environmental issues such as opioid abuse, motor vehicle crashes, and lack of smoke detectors instead of scrutinizing the quality of medical care” because of the role played by physicians and hospital executives.²⁰¹ The Act mandates that MMRCs:

Include multidisciplinary and diverse membership that represents a variety of clinical specialties, State, tribal, or local public health officials, epidemiologists, statisticians, community organizations, geographic regions within the

¹⁹⁶ See Jennifer Hickey, *Nature is Smarter Than We Are: Midwifery and the Responsive State*, 40 COLUM. J. GENDER & L. 245, 280–81 (2020).

¹⁹⁷ *Id.* at 281 (decrying how medical professionals “dominate MMRC membership”—diminishing the role of midwives).

¹⁹⁸ See Asia Evans, *More Money, More Problems: Why H.R. 1318 is an Insufficient Fix to Remedy the Maternal Mortality Crisis*, 16 FLA. A & M U. L. REV. 67, 73–75 (2022); Bridges, *supra* note 28, at 1295.

¹⁹⁹ Bridges, *supra* note 28, at 1234–35, 1293–97.

²⁰⁰ *Id.* at 1293–97 (“The erasure of race in the Preventing Maternal Deaths Act likely explains why the law was ‘bipartisan.’ Inattention to the fact that the United States is a dangerous place for *black* women to give birth probably accounts for why it was easy for lawmakers to reach across the aisle and find a point of agreement with lawmakers who share different political commitments.”).

²⁰¹ Hickey, *supra* note 196, at 281–82 (“Efforts to require MMRCs to conduct a more thorough examination of medical care were met with resistance from state legislators concerned about intruding on the doctor-patient relationship”). See generally Britney R. Wilson, *Predisposed: Race, Disability, and Death Investigations*, 72 UCLA L. REV. (forthcoming 2025), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5103315 (highlighting government efforts to blame Black deaths on disabilities or underlying conditions instead of police violence, for example).

area covered by such committee, and individuals or organizations that represent the populations in the area covered by such committee that are most affected by pregnancy-related deaths or pregnancy-associated deaths and lack of access to maternal health care services.²⁰²

Yet medical interests are the focus of membership on MMRCs instead of experts with a deep knowledge base of social causation and data.²⁰³

Bias has thus impacted efforts to expand death investigations to include the social and environmental factors now considered relevant. Though MMRCs focus attention on a particular problem, the data that results is impacted by the process (and statute) that produce it. The questions asked, and the process used to produce mortality data, influence the outcomes.

IV. FEDERAL DEATH DATA

After the death investigation and certification process is completed at the local level, death data flows into the CDC and is processed then used to understand who is dying and why at the population level.²⁰⁴ Death certificates and reports ideally are transmitted to the NCHS through an electronic death reporting system.²⁰⁵

As noted above, however, the data reported to the NCHS is only useful if it is accurate and complete. This begs the question of why the NCHS does not ask the states for more or different data. For example, some deaths reported to the NCHS are highly salient and require additional reporting, such as data on homicides and suicides sent to the NCHS for its database.²⁰⁶ Yet information on such cases is often incomplete. A study of 10,000 adolescent suicides reported to the CDC, for example, found that only 20% addressed the decedent's sexuality or gender identity.²⁰⁷

²⁰² Preventing Maternal Deaths Act, 42 U.S.C. § 247b-12(d)(1)(A).

²⁰³ Laura Ungar, *What States Aren't Doing to Save New Mothers' Lives*, USA TODAY, <https://www.usatoday.com/in-depth/news/investigations/deadly-deliveries/2018/09/19/maternal-death-rate-state-medical-deadly-deliveries/547050002/> (Nov. 14, 2019, 2:15 PM).

²⁰⁴ Maura DeJoseph & James R. Gill, *Death Certificates and Death Investigation in the United States*, UPTODATE, <https://www.uptodate.com/contents/death-certificates-and-death-investigations-in-the-united-states> (Sept. 04, 2024).

²⁰⁵ NAT. VITAL STAT. SYS., *Modernization: Tools and Technologies*, CTDS. FOR DISEASE CONTROL & PREVENTION: NAT'L CTR. FOR HEALTH STATS., <https://www.cdc.gov/nchs/nvss/modernization/tools.htm> (Dec. 29, 2023) ("An Electronic Death Registration System (EDRS) is a secure, web-based system for electronically registering deaths. An EDRS simplifies the data collection process and enhances communication between medical certifiers (medical examiners/coroners and health care providers), funeral directors, and local and state registrars as they work together to register deaths."); WESTAT, *supra* note 23, at 2–3.

²⁰⁶ NVDRS *Frequently Asked Questions*, *supra* note 78.

²⁰⁷ Ghorayshi, *supra* note 58.

This Part will explain how the federal government has chosen to prioritize simplicity and uniformity over completeness of death data. Reasons for this decision include varying resources among states as well as avoiding politically controversial issues such as transgender rights.²⁰⁸ The challenges for the cooperative program of national vital statistics that the United States maintains are a lack of “control over the original source of the data”²⁰⁹ and a need to re-envision the way cause of death is reported on the death certificate.

A. *U.S. Standard Certificate of Death*

Any discussion of national death data must begin with the U.S. Standard Certificate of Death, including its instructions, which is reproduced here in the Appendix. Only the information requested on this short form is collected for all deaths in this country—although certain deaths receive higher levels of surveillance and require additional data.²¹⁰

National vital statistics reporting to the federal government, like the production of all death data, starts locally. Registrars in the 50 states, Washington, D.C., New York City (an additional reporter, separate from the state), and four commonwealths and territories gather data and send it to the NCHS.²¹¹ The federal government uses data from state records to compile national vital statistics through the NVSS.²¹² Overall issues with the program include difficulties getting data reported in a timely manner.²¹³

Focusing on “consistency,” the NCHS developed a standardized death certificate for the states (the U.S. Standard Certificate of Death).²¹⁴ The model certificate was most recently revised in 2003.²¹⁵ Its adoption was slow, which demonstrates the

²⁰⁸ See Amanda Arden, *Study: Transgender People are Often Misgendered on Death Certificates*, KOIN, <https://www.koin.com/news/oregon/study-transgender-people-are-often-misgendered-on-death-certificates/> (Oct 6, 2022, 7:41 AM).

²⁰⁹ MICHAEL J. SIRI & DANIEL L. CORK, NAT’L RSCH. COUNCIL, VITAL STAT.: SUMMARY OF A WORKSHOP 65–67 (2009) (noting the need to examine infrastructure, content, short-term needs, and long-term needs when mapping out a future for the program).

²¹⁰ *NVDRS Frequently Asked Questions*, *supra* note 78.

²¹¹ SIRI & CORK, *supra* note 209, at 1–2.

²¹² HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 3–4.

²¹³ SIRI & CORK, *supra* note 209, at 7.

²¹⁴ HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 4.

²¹⁵ *Id.* (noting the involvement of the American Medical Association, the National Association of Medical Examiners, the College of American Pathologists, and the American Hospital Association in the revision process); SIRI & CORK, *supra* note 209, at 49–50 (“The 2003 revision marked . . . the 11th revision of the death certificate, . . . the first revision of the standard certificate[] since 1989.”).

difficulty of making further changes and makes the death certificate a less flexible tool.²¹⁶

The 2003 revision of the death certificate was designed, among other changes, to establish a “minimum set of race categories” and also to comply with regulations allowing multiple race categories for the decedent.²¹⁷ Uneven adoption made it difficult to compile national data and compare data between states because it was provided in different formats.²¹⁸ Three years after the 2003 release, 26 jurisdictions were not using the new model death certificate.²¹⁹

Now, all states use the current version of the U.S. Standard Certificate of Death, with only minor changes to comply with state laws or priorities.²²⁰ The CDC emphasizes the need for consistency in order to compile national data and to compare data between states and between a state and the national compilation.²²¹

The cause of death section in the death certificate follows WHO recommendations.²²² The underlying cause of death can be either the “disease or injury that started the sequence of events leading directly to death or the circumstances of the accident or violence that produced the fatal injury.”²²³ Reporting is supposed to include the entire sequence leading to death and any “significant conditions contributing to death.”²²⁴ Each cause of death statement is then coded according to the *International Classification of Diseases*.²²⁵ Where there is doubt as to the cause of death, the CDC recommends that an autopsy be performed.²²⁶

²¹⁶ SIRI & CORK, *supra* note 209, at 7.

²¹⁷ *Id.* at 49–51. New items on the death certificate included whether the decedent was pregnant, decedent’s “role in the event of death due to transportation injury (e.g., passenger, driver),” and tobacco use. Modified items included decedent’s race, education, marital status, and place of death—to provide further data on these items. *Id.* at 51.

²¹⁸ *Id.* at 52.

²¹⁹ *Id.*

²²⁰ *Revisions of the U.S. Standard Certificates and Reports*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nchs/nvss/revisions-of-the-us-standard-certificates-and-reports.htm> (Oct. 3, 2023).

²²¹ *Id.*

²²² WORLD HEALTH ORG., INTERNATIONAL CLASSIFICATION OF DISEASES (ICD-11) § 2.15.2 (11th ed. 2022) [hereinafter ICD-11].

²²³ *Compare* HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 12, *with Cause of Death*, WORLD HEALTH ORG., <https://www.who.int/standards/classifications/classification-of-diseases/cause-of-death> (last visited Apr. 7, 2025).

²²⁴ *Compare* HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 13, *with* ICD-11, *supra* note 222, § 2.15.2.

²²⁵ HANDBOOK ON MEDICAL CERTIFICATION OF DEATH, *supra* note 9, at 10.

²²⁶ *Id.* at 14.

B. Data Problems

As discussed above, data problems related to the reporting of COVID-19 deaths highlighted longstanding issues with the death certificate, and they are a useful lens for analyzing issues with that form. On a webpage where the NCHS discusses reporting and coding deaths due to COVID-19, it states, “When COVID-19 is determined to be a cause of death, it is important that it be reported on the death certificate to accurately assess the effects of this pandemic and appropriately direct public health response.”²²⁷ While I discuss in this subsection efforts to ensure accurate reporting and coding, these efforts do not address the problem of invisible deaths from cases where death certifiers miss the fact that COVID-19 was the cause of death or a contributing factor. The NCHS acknowledges the need for “complete and accurate” information about COVID-19 deaths,²²⁸ but it lacks the ability with current measures to control for the systemic underreporting of COVID-19 deaths—or those from other underlying conditions that are the indirect cause of death. Invisible deaths from COVID-19—and from the social determinants of death, for example—remain hidden.

The death certificate is not designed to capture all non-medical factors contributing to death. The CDC, including the NCHS, emphasizes the reporting of the logical sequence of conditions leading to death, but the model is a medical one. The U.S. Standard Certificate of Death requires in Question 32 (or the Cause of Death Statement) that the certifier list in Part I the “chain of events—diseases, injuries, or complications—that directly caused the death.”²²⁹ It also cautions certifiers, “DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology.”²³⁰ Next to line a and below the instructions, the form indicates that the certifier should list the immediate cause of death, or the “[f]inal disease or condition resulting in death.”²³¹ Then, next to lines b, c, and d (and additional lines may be added if necessary), the form directs the certifier to “[s]equentially list conditions, if any, leading to the cause listed on line a” with the underlying cause, or “disease or injury that initiated the events resulting in death” listed last.²³² Comorbidities that did not directly contribute to death are

²²⁷ *Reporting and Coding Deaths Due to COVID-19*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nchs/covid19/coding-and-reporting.htm> (May 20, 2020).

²²⁸ Centers for Disease Control and Prevention (CDC), *Certifying Deaths Due to Coronavirus Disease (COVID-19)*, YOUTUBE (May 22, 2020), <https://youtu.be/5Vxf7ed3jBE>.

²²⁹ STANDARD DEATH CERTIFICATE, *supra* note 90.

²³⁰ *Id.*

²³¹ *Id.*

²³² *Id.*

included in Part II of the U.S. Standard Certificate of Death—outside of the sequence.²³³

The emphasis on a logical sequence of death assumes both (1) that all steps in the sequence can or will be listed and (2) that they can be separated and properly ordered. The second part of this affects data analysis less. Assuming all information is present (e.g., COVID-19), differences of opinion about where COVID-19 should be properly listed in the sequence should not impact national data as research tries to parse the interaction of COVID-19 with other medical conditions and what it means to die with COVID-19 versus from COVID-19. If the person had COVID-19, either at the time of her death or months or years earlier, and it was either unknown or not considered to be a contributing factor in her death by the certifier (e.g., because a significant amount of time had passed since the positive test result),²³⁴ then all the steps in the sequence are not present. This presents a far greater challenge for data analysis because it underestimates the number of people who died—in whole or in part—because of COVID-19. Even if COVID-19 merely accelerated (rather than caused) the death, the information is relevant to researchers. Once the vast majority of COVID-19 cases were either discovered via at-home tests or not confirmed by testing at all, the data were no longer complete and death certificates became less reliable for COVID-19 research.²³⁵

Beyond COVID-19, this problem results in a large amount of missing data that impacts national vital statistics and research. For example, sexuality and gender identity are not only missing from the standard death certificate, they are unlikely to be listed in the cause of death statement even if they are related to a decedent's suicide. First, if no one asks questions related to sexuality or gender identity, then the certifier would not know the information—let alone be able to decide how it relates to cause of death. Second, the cause of death statement is focused on presenting a sequence of physical events that results in death (whether from illness or disease within the body or from forces outside the body in the case of a homicide or

²³³ *Id.*; see also NAT'L VITAL STAT. SYS., GUIDANCE FOR CERTIFYING DEATHS DUE TO CORONAVIRUS DISEASE 2019 (COVID-19) 2 (2023) [hereinafter NVSS GUIDANCE FOR COVID-19 DEATHS], https://stacks.cdc.gov/view/cdc/124588/cdc_124588_DS1.pdf (“Not all conditions present at the time of death have to be reported—only those conditions that actually contributed to death.”).

²³⁴ NVSS GUIDANCE FOR COVID-19 DEATHS, *supra* note 233, at 2–3 (instructing certifiers to examine the decedent's medical history because long COVID can be part of the cause of death or a comorbidity that should be listed in Part II of the death certificate).

²³⁵ See CTRS. FOR DISEASE CONTROL & PREVENTION, UNDERSTANDING DEATH DATA QUALITY: CAUSE OF DEATH FROM DEATH CERTIFICATES (n.d.), <https://www.cdc.gov/nchs/data/nvss/coronavirus/cause-of-death-data-quality.pdf>; NVSS GUIDANCE FOR COVID-19 DEATHS, *supra* note 233, at 2.

accident). Social or undiagnosed psychological factors seem to have no place in the cause of death statement.

This is illustrated by the examples provided in the death certificate and also the requirement to focus on the time that it took to die as a result of the cause. Example one lists the immediate cause of death as rupture of myocardium (with an interval to death of minutes), preceded in the chain by acute myocardial infarction (six days), coronary artery thrombosis (five years), and atherosclerotic coronary artery disease (seven years).²³⁶ Example two lists aspiration pneumonia as the immediate cause of death (with an interval to death of two days), preceded in the chain by complications of coma (seven weeks), blunt force injuries (seven weeks), and a motor vehicle accident (seven weeks).²³⁷ Nowhere do we learn if the heart disease in the first example was caused or impacted by poor eating habits, a lack of exercise, or depression. Similarly, there is no information about whether the decedent was tired or inattentive due to being overworked or going through a divorce, resulting in the car accident in the second example. The federal government says that “[d]eath certificates are registered for every death occurring in the United States, offering a complete picture of mortality nationwide.”²³⁸ That does not, however, seem to be the case.

C. *Victims of Linearity*

The idea of a linear medical chain resulting in death is too simplistic. It indicates that events outside the chain are irrelevant, and it ignores the contributions that non-medical information, or even medical information far removed from the immediate chain temporally, contribute to cause of death and resulting vital statistics.

For example, obituaries for people who die from causes like Parkinson’s disease and Alzheimer’s disease frequently report that the person died from “complications of” the disease.²³⁹ Parkinson’s patients may fall. Those with dementia may aspirate their food and “die of” pneumonia—according to the death certificate.²⁴⁰ Listing these proximate causes of death and ignoring the underlying disease on the death certificate frequently results in undercounting and ignoring these deaths from causes made invisible.²⁴¹

²³⁶ STANDARD DEATH CERTIFICATE, *supra* note 90.

²³⁷ *Id.*

²³⁸ NVSS GUIDANCE FOR COVID-19 DEATHS, *supra* note 233, at 1.

²³⁹ Jane Brody, *When the Death Certificate Omits the True Cause of Death*, N.Y. TIMES, (Feb. 14, 2022), <https://www.nytimes.com/2022/02/14/well/death-certificate-cause.html>.

²⁴⁰ *Id.*

²⁴¹ *See id.*

The question of why the death occurred is the one that matters.²⁴² Sometimes, as with Parkinson's and Alzheimer's diseases, the focus on linearity obscures the true medical issue. More often, because it is further removed from the proximate cause of death, it obscures the true social issue.

Linearity results in hidden deaths and is so pervasive that a recent study comparing medical records with death certificates in Scotland concluded that "[d]eaths certificates often do not mention underlying Parkinsonism or associated dementia and so epidemiological studies should not rely on this as a sole method of identifying cases or studying mortality."²⁴³ Death certificate data are used both to track the "incidence over time" of a disease and also for epidemiological purposes, such as survival rates.²⁴⁴ In this 2021 study, the sensitivity of death certificates for a correct diagnosis of Parkinson's disease was 68.4%.²⁴⁵ Another UK study found that 53.6% of those dying with any form of dementia had that information accurately included on their death certificates.²⁴⁶

If the data are unacceptable for epidemiological purposes, it should also be insufficient for policymaking purposes. Mortality from certain diseases, like mortality for marginalized groups, is undercounted and, at times, uncounted.

V. REDUCING INVISIBLE DEATHS

Invisible deaths are a sign of weaknesses in death investigations and reporting. Failure to properly investigate and attribute the deaths makes it difficult to see trends in causes of death and compare data among different groups. It is really just the proverbial canary in the coal mine, though. It highlights cases where no one seems to know why there are so many deaths, but it says nothing about whether other deaths are properly attributed or what information may be missing. Only by elevating the role of social factors in death investigations and increasing the reporting of such information on death certificates will national vital statistics be able to support appropriate social, political, and economic policy reform. AI technology will make

²⁴² *Id.* ("As Dr. Gill said, 'Everyone who dies, dies of cardiopulmonary arrest. The critical question is: Why did this happen? Let's say someone dies of a stomach hemorrhage. What caused it? Stomach cancer, an ulcer or what?'").

²⁴³ Hanxu Shi & Carl Counsell, *Accuracy of Death Certificates for Recording Parkinsonian Syndromes and Associated Dementia*, 268 J. NEUROLOGY 140, 140 (2021).

²⁴⁴ *Id.* ("If accurate, information associated with neurodegenerative disorders on death certificates could be used to explore disease burden and course, identify causes of death, evaluate the long-term interventions and recognize priorities for clinical research and health service planning.").

²⁴⁵ *Id.* at 142.

²⁴⁶ *Id.* at 145.

the processing of this data easier and reduce the burdens associated with additional investigation and reporting requirements.²⁴⁷

To encourage the reporting of relevant non-medical information on death certificates and to piece all information reported together to reach valid conclusions, cause of death should be mapped, not sequenced. Given the inaccurate and incomplete data discussed throughout this Article, information on cause of death should not be narrowed by forcing certifiers to present a single, sequential chain resulting in death. Instead, a map of relevant information should be reported, and statistical research can help determine causation. Federal and state legislative changes and additional training for death investigators and health care providers on this new process are essential.

A. *Increase Scope of Death Data*

1. *Incorporate Electronic Health Records*

A convenient (and currently existing) source of data available to aid in cause of death determinations is electronic health records systems (EHRs), which often contain both medical and non-medical information but are not always accessible to all death certifiers.²⁴⁸ Electronic health records were supposed to “harness the big data” to make medical information portable and ensure accurate and consistent treatment based on the most updated standards of care.²⁴⁹ While in office, President Barack Obama facilitated the adoption of EHRs, in part through financial incentives.²⁵⁰ In

²⁴⁷ Patrícia Pita Ferreira, Diogo Godinho Simões, Constança Pinto de Carvalho, Francisco Duarte, Eugénia Fernandes, Pedro Casaca Carvalho, José Francisco Loff et al., *Real-Time Classification of Causes of Death Using AI: Sensitivity Analysis*, 2 JMIR AI 545, 546, 558 (2023).

²⁴⁸ *Electronic Health Records Explained*, INT’L ORG. FOR STANDARDIZATION, <https://www.iso.org/healthcare/electronic-health-records>; Vera Ehrenstein, Hadi Kharrazi, Harold Lehmann & Casey Overby Taylor, *Obtaining Data from Electronic Health Records*, in REGISTRIES FOR EVALUATING PATIENT OUTCOMES: A USER’S GUIDE 52, 54–59 (3d ed., Addendum 2, 2019).

²⁴⁹ See Fred Schulte & Erika Fry, *Death by 1,000 Clicks: Where Electronic Health Records Went Wrong*, KFF HEALTH NEWS (Mar. 18, 2019), <https://kffhealthnews.org/news/death-by-a-thousand-clicks/> (“Boosters heralded an age when researchers could harness the big data within to reveal the most effective treatments for disease and sharply reduce medical errors. Patients, in turn, would have truly portable health records, being able to share their medical histories in a flash with doctors and hospitals anywhere in the country . . .”).

²⁵⁰ Sarah Kliff, *Obama’s Surprising Answer on Which Part of Obamacare Has Disappointed Him the Most*, VOX (Jan. 9, 2017), <https://www.vox.com/2017/1/9/14211778/obama-electronic-medical-records> (noting how President Obama “put a big slug of money” into the adoption of electronic records, including \$27 billion in the 2009 stimulus bill).

fact, when asked which part of the implementation of the Affordable Care Act was most disappointing, Obama cited the slow pace of digitizing medical records.²⁵¹

As of 2021, however, 88.2% of office-based physicians used electronic records in some form.²⁵² Yet the implementation of EHRs has been troubled.²⁵³ The system “largely remain[s] a sprawling, disconnected patchwork,” and physicians (increasingly consolidated by large, corporate entities because of the financial demands of maintaining such systems, among other demands) complain bitterly about how much time they spend entering information into these databases instead of on patient care.²⁵⁴ “Patient deaths, serious injuries and near misses” have reportedly been tied to software and user errors that are frequently hidden from public view.²⁵⁵ Medical errors due to a lack of communication and digital safeguards have at times been exchanged for other types of errors.²⁵⁶

Yet many health care providers lack the incentives to create a seamless system of electronic health records that allows patients to move easily between providers and medical groups. The “friction” in switching is what allows service providers to retain their patients, even in the absence of customer satisfaction.²⁵⁷

The volume of available data is one reason to consider how electronic health records could be better incorporated into cause of death determinations, which are often mediated by physicians who may not take the time to consult the full records before certifying a cause of death. Scholars have looked at how often cause of death reported on death certificates—and used by governments when surveilling public health conditions—matches underlying diagnoses in electronic health records.²⁵⁸

²⁵¹ *Id.* (quoting President Obama’s comments on the reasons for the slow pace of EHR adoption, including incompatible systems and financial incentives working against making those systems more compatible).

²⁵² *Electronic Medical Records/Electronic Health Records (EMRs/EHRs)*, CTRS. FOR DISEASE CONTROL & PREVENTION, <https://www.cdc.gov/nchs/fastats/electronic-medical-records.htm> (Nov. 3, 2023).

²⁵³ See generally Schulte & Fry, *supra* note 249 (reviewing the first decade of EHRs in the United States and pointing to broad systemic issues with implementation and use).

²⁵⁴ Schulte & Fry, *supra* note 249.

²⁵⁵ *Id.* (“EHR vendors often impose contractual ‘gag clauses’ that discourage buyers from speaking out about safety issues and disastrous software installations—though some customers have taken to the courts to air their grievances.”).

²⁵⁶ *Id.*

²⁵⁷ See Kliff, *supra* note 250 (“That’s exactly why interoperability is bad business for hospitals: It makes it easier for patients to switch providers and take their business elsewhere. Hospitals with interoperable records would be taking away all the friction that’s associated with switching providers in the current health care system.”).

²⁵⁸ See Maya Leventer-Roberts, Ziona Haklai, Yael Applbaum, Nehama Goldberger, Dror Cohen, Ohad Levinkron, Becca Feldman et al., *Validating Reported Cause of Death Using*

Deaths from leading causes such as cancer and heart disease were likely to match electronic health records, while out-of-hospital deaths from both chronic conditions like heart disease and acute conditions such as accidents and septicemia were less likely to match information in those records.²⁵⁹

The experience of the UC Davis Health System when enabling “data capture of death certificate medical section data from within a certified electronic health system (EHR)” demonstrates the difficulties with relying exclusively on electronic health records to improve the accuracy of cause of death reporting, however.²⁶⁰ UC Davis implemented the EHR-electronic death reporting system (EDRS) in May 2017 in the Intensive Care Unit because of higher mortality in that unit (making it easier to see quickly how the new system is functioning) and tightly-coordinated teams (making the medical residents who typically fill out the death certificate in academic medical centers easier to train and supervise).²⁶¹ Among the early lessons from the new system were “a fundamental lack of physician knowledge and understanding in entering causes of death . . . [Which] is not a new problem.”²⁶² The report suggested that the system could help assist residents in determining cause of death “at the point of data entry.”²⁶³ Separately, the report lists the issue of “[p]hysician lack of knowledge about causes of death” as a problem, highlighting the difficulty in consistently determining and reporting cause of death, even for physicians with access to electronic health records.²⁶⁴

EHRs present an opportunity to utilize information gathered by physicians during the treatment process to make death reporting more accurate (with substantial training of physicians who certify these deaths to ensure accuracy and consistency), but they do not address the problem of information that never makes it into those records—whether because a decedent did not seek medical treatment or because the decedent did not reveal important information during the treatment process and the physician did not discover it. While access to electronic health

Integrated Electronic Health Records from a Nation-wide Database, 43 J. PUB. HEALTH 341, 342 (2021) (comparing Israeli health records and reported causes of death).

²⁵⁹ *Id.* at 344 (citing Mercè Gotsens, Marc Mari-Dell’Olmo, Maica Rodríguez-Sanz, Dolores Martos, Albert Espelt, Glòria Pérez, Katherine Pérez et. al., *Validation of the Underlying Cause of Death in Medicolegal Deaths*, 85 REV. ESP. SALUD PUBLICA 163 (2011) for a similar finding).

²⁶⁰ See *Improving Adoption of EHR-based Electronic Death Reporting*, CTRS. FOR DISEASE CONTROL & PREVENTION, https://archive.cdc.gov/www_cdc_gov/nchs/data/nvss/evital/Adoption_EHR_EDRS_Final_Observations_July_2017.pdf (last visited Apr. 7, 2025).

²⁶¹ *Id.*

²⁶² *Id.* (acknowledging that the physicians determining cause of death “had a poor understanding of how to optimally articulate the causes of death”).

²⁶³ *Id.*

²⁶⁴ *Id.*

records may assist coroners and medical examiners (not just physicians working at hospitals) with cause of death determinations, it is insufficient to solve the problem.

2. *Increase Social Autopsies and Funding*

For many years, the government and medical examiners have focused on the shortage of pathologists as an obstacle to better death investigations, arguing that more traditional autopsies are the main solution to the problem of low-quality death investigations and certifications.²⁶⁵ It is unclear, however, if the workforce is actually declining. One study found that the number of pathologists in the United States declined by about 17% from 2007 to 2017.²⁶⁶ Another, however, found that at least one source used did not include the full pathologist workforce, such as foreign medical graduates.²⁶⁷ Medical school graduates from the United States filled only 33.4% of available positions for first-year pathology residents in 2019, according to the National Resident Matching Program.²⁶⁸ Suggestions for increasing the pipeline of pathologists include additional exposure to pathology during medical school.²⁶⁹

The focus on increasing the number of pathologists when discussing death investigations, however, is a band-aid on the larger problem. Autopsies are expensive and performed in relatively small numbers in circumstances that typically do not involve disease outbreaks or determine social circumstances contributing to death.²⁷⁰ Funding and training more death investigators to perform social autopsies would instead substantially improve the quality of local data while providing more bang for the buck (providing information related to death for larger numbers of people than increasing the number of pathologists examining medical causation)—especially with the development of AI to process that data. If state health departments were able to reach out to individuals who tested positive with COVID-19 to monitor their symptoms, then they should be able to reach out to individuals connected to decedents to gather information relevant to their deaths.

A few states have taken steps to incorporate social information into their death investigations for deaths of particular concern. Since 2017, Utah has used

²⁶⁵ *Strengthening the Medical Examiner-Coroner System Program*, U.S. DEP'T OF JUST.: BUREAU OF JUST. ASSISTANCE, <https://bja.ojp.gov/program/strengthening-mec/overview> (Oct. 24, 2024).

²⁶⁶ George Lundberg, Commentary, *How Many Pathologists Does the United States Need?*, JAMA NETWORK OPEN, May 2019, at 1.

²⁶⁷ See *id.* at 6.

²⁶⁸ NAT'L RESIDENT MATCHING PROGRAM, 2019 MAIN RESIDENCY MATCH 4 (2019) (noting that this was the lowest of all specialties with at least 100 graduates entering a "specialty program").

²⁶⁹ See Wesley Naritoku, Mary A. Furlong, Barbara Knollman-Ritschel & Karen L. Kaul, *Enhancing the Pipeline of Pathologists in the United States*, ACAD. PATHOLOGY, Jan. 2021, at 1.

²⁷⁰ Mark Mancini, *5 Things You Didn't Know About Autopsies*, HOWSTUFFWORKS, <https://science.howstuffworks.com/5-things-didnt-know-about-autopsies.htm> (Mar. 7, 2024); Hoyert, *supra* note 131, at 1–4.

“psychological autopsies” when a person dies by suicide or drug overdose, which involves reaching out to family members for additional information about the deceased.²⁷¹ The information collected includes “information on sexual relationships and gender, as well as housing, mental health, drug problems and social media use.”²⁷² For minors, death investigators also interview friends of the deceased.²⁷³ In 2023, Utah was not among the top 10 states with the highest suicide rates for the first time in years.²⁷⁴ Although others have called for the use of social autopsies in situations such as these—particular types or patterns of death that are similar and of concern²⁷⁵—I argue for the more widespread use of such techniques.

However, increasing the use of social autopsies would increase the risk of bias and the further intrusion of politics into local death investigations. Consider who decides what questions to ask during a social autopsy and who to ask. Outside of the social autopsy, consider who interprets the data produced and decides what to report and how to report it. Bias is already built into the system since local death investigators determine which deaths to investigate and how.

There are several avenues to pursue reform given concerns about bias and politicization of the death investigation process. Minimum qualifications for coroners and medical examiners is a start. Increased funding for death investigations is key, and to equalize disparities in resources, it would likely have to come from the federal government—with strings tied to increased data collection on deaths of vulnerable populations through social autopsies.

Whether through financial incentives or revision of the U.S. Standard Certificate of Death, the federal government needs to broaden its collection of data to include additional social factors on the certificate. Asking about gender and sexuality is an important point. Adding a section related to the social determinants of death that asks questions about housing, employment, and relationships is another.

While having the federal government draft the questions and instructions can help reduce bias, it may depend on the goals of the administration in power. There are political reasons why an administration would not want certain information gathered or disclosed, and the Trump administration’s efforts to suppress data on

²⁷¹ See UTAH CODE § 26B-8-229 (2024) (and its previous versions); see also Ghorayshi, *supra* note 58; UTAH DEP’T OF HUMAN SERVS., UTAH SUICIDE PREVENTION PLAN (2022–2026) 12 (2022), https://dsamh-training.utah.gov/_documents/SuicidePrevention/UtahSuicidePreventionPlan_22-26.pdf.

²⁷² Ghorayshi, *supra* note 58.

²⁷³ *Id.*

²⁷⁴ Aley Davis, *Utah Drops Out of Top 10 States for Highest Suicide Rate, But Experts Remain Concerned*, KSL TV, <https://ksltv.com/549273/utah-drops-out-of-top-10-states-for-highest-suicide-rate-but-experts-remain-concerned/> (May 12, 2023, 11:16 AM).

²⁷⁵ See generally Timmermans & Prickett, *supra* note 24, at 1693–98 (recommending the use of social autopsies for “school shootings, Black deaths at the hands of police, and immigrant border deaths”).

COVID-19 are an example.²⁷⁶ The CDC has tried to prevent the death certificate from becoming a political battlefield, but even adding a few race categories resulted in delayed adoption of the last version.²⁷⁷ Willful blindness to the insufficiency of death data does not solve the problem, though. It is time to propose more extensive changes to the death certificate and let interest groups fight it out with the government in court. The Census process has faced a similar path,²⁷⁸ and the death certificate can no longer avoid it. Data is power.

B. *Map, Don't Sequence*

An emphasis on the lack of reliable death data can obscure a lack of commitment to known solutions.²⁷⁹ Throwing up our hands over the difficulty in solving local data collection problems could result in ignoring potential fixes that are available and possible . . . even those that have been used since the mid-1800s.

The cholera epidemic in the Golden Square area of London in 1854 began with a sick baby.²⁸⁰ Thomas and Sarah Lewis lived at 40 Broad Street with their new baby girl. When the baby fell ill, Sarah Lewis soaked her dirty diapers in a pail and then tossed the water from the pail into a cesspool in front of their home.²⁸¹ From the decaying cesspool, the contaminated water traveled a distance of two feet and eight inches to the Broad Street well, where most people living in the immediate vicinity drew their drinking water.²⁸²

But no one ever would have known about this cause of hundreds of deaths if it were not for the science and mapping of Dr. John Snow and the local, social data provided by clergyman Henry Whitehead.²⁸³ Common theories at the time included that the poor living conditions and moral depravity of the lower classes made them more easily victimized by diseases like cholera. Most people supported a theory

²⁷⁶ Sheryl Gay Stolberg, *Trump Administration Strips C.D.C. of Control of Coronavirus Data*, N.Y. TIMES, <https://www.nytimes.com/2020/07/14/us/politics/trump-cdc-coronavirus.html> (Sept. 9, 2020).

²⁷⁷ *Race*, CTRS. FOR DISEASE CONTROL & PREVENTION (Oct. 3, 2024), <https://www.cdc.gov/nchs/hs/sources-definitions/race.html>.

²⁷⁸ Mark Mather & Diana Elliott, *Race and Ethnicity Categories in Federal Surveys Are Changing: Implications for Data Users*, POPULATION REFERENCE BUREAU (Apr. 8, 2024), <https://www.prb.org/articles/race-ethnicity-categories-in-federal-surveys-are-changing-implications-for-data-users/>.

²⁷⁹ See Bridges, *supra* note 28, at 1312–17 (arguing against “data fetishization” because “data will not save women”).

²⁸⁰ STEVEN JOHNSON, *THE GHOST MAP* 21–22 (2006).

²⁸¹ *Id.*

²⁸² *Id.* at 30–31, 179.

²⁸³ *Id.* at 199 (“But Whitehead’s investigations in 1855 were ultimately as decisive as Snow’s in solving the Broad Street mystery.”).

that the terrible stench, or miasma, of 1850s London was to blame for the outbreaks—the smell of the impure air literally made people sick.²⁸⁴

Snow had long believed that cholera arose from a tainted water supply, and he used the 1854 epidemic near his own home to prove it—and mapping was the key. Snow charted deaths and investigated why some people who lived closer to other water sources died in the epidemic (and why some people who lived near the Broad Street pump did not die), trying to rebut other potential explanations.²⁸⁵ But Whitehead, with his knowledge of the neighborhood and relationships with its people, was able to supply missing details on those who lived and died—and those who fled the city when the outbreak started.²⁸⁶

Snow worked on his first version of a map documenting cholera deaths on Broad Street shortly after the end of the epidemic, and Steven Johnson's well-known book, *The Ghost Map*, culminates in this achievement. "Each death was represented by a thick black bar, which made the houses that had suffered significant deaths more vivid on the map."²⁸⁷ Most importantly, the Broad Street pump was shown clearly on the map, highlighting its proximity to the circle of death that surrounded it.²⁸⁸ The combination of science, social data, and the visual representation of both on the map was the achievement.²⁸⁹

Yet Snow's greater achievement may have been the second version of his map that incorporated more social data to better highlight the drinking of the water from the pump as the cause of death. He "realized he needed a way to represent graphically the foot-traffic activity around the pump that he had so painstakingly reconstructed. He needed to show *lives*, not just deaths; he needed to show the way the neighborhood was actually traversed by its residents."²⁹⁰ As a result, Snow's second version included a line that outlined the area in which residents lived closer to the Broad Street pump than to any other water pump.²⁹¹ It was convincing evidence that death had not only surrounded the Broad Street pump—it had been caused by drinking water from the well.

²⁸⁴ *Id.* at 114, 121–23, 126–27, 131–34.

²⁸⁵ *Id.* at 141–43.

²⁸⁶ *Id.* at 167–83.

²⁸⁷ *Id.* at 193.

²⁸⁸ *Id.* at 193–94 ("The Little Marlborough Street pump had a few black bars in its immediate vicinity, but they were nothing compared with the concentration of death around the Broad Street pump, black bars lining the nearby streets like solemn high-rises. . . . Cholera wasn't lingering over the neighborhood in a diffuse form. It was radiating out from a single point.").

²⁸⁹ *Id.* at 194.

²⁹⁰ *Id.* at 195 (discussing how Snow used a mathematical concept known as the Voronoi diagram).

²⁹¹ *Id.* at 195–97.

The map eventually convinced health authorities, and the world, that Snow's theory was correct. "It is a subtle chain of causal connections," and Snow had not yet identified the bacterial villain in the story directly, but the map marshalled all the facts and pointed towards that Broad Street water pump.²⁹² The science from Snow's research, the social data from the local investigative work done by Snow and Whitehead, and the visual representation of the evidence made the case for cause of death.

Yet today we settle for far less rigor when determining cause of death—even when we are looking at aggregate data to determine population-level causes of death. The overemphasis on medical data is unhelpful if social factors are ignored or if medical data is not fully or accurately collected. The death certificate's emphasis on sequencing calls for certifiers to decide quickly on one medical pathway that resulted in death. This ignores the fact (and allows physicians to ignore the fact) that there may be multiple, equally plausible pathways to the decedent's death. Or a step in the sequence may be unknown. Or two pathways may have occurred at the same time and interacted to produce the death. Even within the domain of medical information, sequencing harms full data production.

Instead, medical cause of death should be mapped. All medical factors that occurred proximate to death should be listed, and timing can be included, but they should not be listed in a single sequence because correlation does not necessarily equal causation. The certifier can give their conclusion about the medical cause of death, but full information should be reported. One of the "common problems in cause-of-death certification" identified by the CDC is "illogical sequences."²⁹³ Sequences may be illogical because they are incomplete (information is unknown) or because science has not advanced to a point where it understands how Step 1 leads to Step 2 in the sequence. Forcing certifiers to commit to a single sequence suppresses helpful data that could be entered into national vital statistics databases for further analysis or forces it into incorrect boxes since they are limited by the form. Computers may see a connection that humans do not. Similarly, adding social factors into the map may provide information that is helpful to determine possible pathways leading to death and ultimately the cause of death.

²⁹² *Id.* at 201 ("The map may not have persuaded Benjamin Hall [President of the Board of Health] of the dangers of contaminated water in the spring of 1855. But that doesn't mean it didn't change the world in the long run.").

²⁹³ NVSS GUIDANCE FOR COVID-19 DEATHS, *supra* note 233, at 2 ("All causal sequences reported in Part I [of the standard death certificate] should be logical in terms of time and pathology. For example, reporting 'COVID-19' due to 'chronic obstructive pulmonary disease' in Part I would be an illogical sequence as COPD cannot cause an infection, although it may increase susceptibility to or exacerbate an infection.").

Looking at a visual representation of all factors in a decedent's death may change cause of death or at least contribute to better data analysis on the national level.

C. Address Privacy Concerns

With any call to expand data collection, privacy rights are implicated. The use of social autopsies implicates the privacy of the dead but also the privacy rights of their family members and friends.²⁹⁴ Having government employees delve into the personal lives of decedents and ask questions about their physical ailments or complaints, let alone their social lives and mental health issues, is likely to result in particular concerns from marginalized communities that are already estranged from health and government systems due to bias and inequity. This is why it will need to be a community-led effort with involvement from local and religious organizations to promote the information-gathering process and hire and train workers from within those communities to honor the dead and the living by shining a light on cause of death.

My argument here is that the benefits of improved death data outweigh any harms to the dignity of the dead or reputational concerns of the living, but I recognize that many would disagree and that would be an impediment to using social autopsies as a tool to uncover data. Given the recent trend of prioritizing individual rights over public health,²⁹⁵ a uniform legal approach to protecting the privacy rights of decedents and their families and friends through limited access to materials produced during death investigations and death certificates will be necessary to ensure participation in social autopsies and public acceptance of the process.

Courts have consistently found that a person's privacy right ends with death.²⁹⁶ However, statutes provide for the protection of some information after death—either through rules related to protecting certain types of information such as medical records or through rules that protect access to certain types of documents such as death certificates.

On the first point, confidentiality rules relating to medical records are less strict after death but still provide protection. The Health Insurance Portability and Accountability Act of 1996 (HIPAA) restricts access to the protected health

²⁹⁴ The privacy implications of my proposals in this Article (and potential solutions) will be the subject of a future Article, which is why I delve lightly into the topic here.

²⁹⁵ See Lauren R. Roth, *Sanitation: Reducing the Administrative State's Control over Public Health*, 75 RUTGERS L. REV. 777, 819, 822–823 (2023).

²⁹⁶ Jeffrey R. Boles, *Documenting Death: Public Access to Government Death Records and Attendant Privacy Concerns*, 22 CORNELL J.L. & PUB. POL'Y 237, 241 (2012) (citing, for example, *New Era Pubs. Int'l v. Henry Holt & Co.*, 873 F.2d 576, 588 n.4 (2d Cir. 1989)).

information (PHI) of deceased individuals for 50 years after death.²⁹⁷ The next of kin or a representative of the estate may typically gain access to the records, though.²⁹⁸

On the second point, state laws frequently limit who can obtain a copy of a death certificate, given the medical data included—data that would be protected for the living.²⁹⁹ There are exceptions made, including for reporting death data to the federal government.³⁰⁰

Similarly, family members of the deceased may have a privacy interest in material produced during a death investigation. In *National Archives and Records Administration v. Favish*, for example, the Court refused a Freedom of Information Act (FOIA) request for photographs related to Deputy White House Counsel Vince Foster's suicide because of the family's privacy right.³⁰¹

Limiting access to death certificates can have drawbacks when seeking to expose invisible deaths, however. It violates principles of open government and freedom of information.³⁰² Journalists and other public advocates who seek to expose public health or safety issues would be limited just like those merely looking to access the information out of curiosity or for personal gain.³⁰³ States vary in their approach to balancing open access with privacy interests, with about ten states offering “open access,” others offering “partial-access” by limiting required disclosure of medical information, and over thirty states using a “closed-access” approach to exempt certificates from FOIA (or state analogue) requests.³⁰⁴ While some have argued in favor of open access to death certificates,³⁰⁵ those death certificates do not typically include sensitive social information—which might change the argument for some.

²⁹⁷ 45 C.F.R. § 160.103 (2024) (paragraph (2)(iv) of the definition of “protected health information”).

²⁹⁸ Kirsten Rabe Smolensky, *Rights of the Dead*, 37 HOFSTRA L. REV. 763, 795 (2009).

²⁹⁹ *Id.* at 796 (“States give several reasons for promulgating these laws, the most common of which include concerns about identity theft and the privacy of the citizens whose records might be requested [here, the dead].”); *see, e.g.*, N.D. CENT. CODE § 23-02.1-27 (2024) (restricting access to death certificates).

³⁰⁰ Smolensky, *supra* note 298, at 797.

³⁰¹ Kate Ashley, *Data of the Dead: A Proposal for Protecting Posthumous Data Privacy*, 62 WM. & MARY L. REV. 649, 661 (2020) (citing *Nat'l Archives & Records Admin. v. Favish*, 541 U.S. 157, 170 (2004)).

³⁰² Boles, *supra* note 296, at 241–42.

³⁰³ *See id.* at 269; *see also* Ira Robbins, *Sunshine Laws Behind the Clouds: Limited Transparency in a Time of National Emergency*, 56 U.C. DAVIS L. REV. 1, 40–44, 49, 53–54, 58–60 (2022).

³⁰⁴ Boles, *supra* note 296, at 260–64 (tracing the movement to limit open access to death certificates starting in the 1970s and noting that a few states permit access after a set number of years have passed).

³⁰⁵ *See id.* at 266 (“The public interests in death certificate access are valid, and these public records should be accessible to any member of the public who submits a proper freedom of

There are measures that can be taken to protect information gathered during social autopsies, however. Information can be redacted when it is included in a death certificate since it is more likely to tip the scales in favor of privacy over disclosure. On the side of researchers and public advocates, information could be anonymized and then disclosed.

In the age of big data, large corporations regularly sweep in tiny details about our daily activities.³⁰⁶ We either do not realize they are doing so or, in many cases, ignore the privacy concerns generated because we want access to the products and services they sell. Given our increasing desensitization to exposing intimate details of our lives to corporations, there is likely to be more acceptance of additional scrutiny of our lives after death than in past generations. Those who spend their lives posting publicly about their thoughts, movements, and relationships are less likely to have privacy concerns about what people will find out after their deaths.

CONCLUSION

This Article addresses the problem of invisible deaths. The problem is not only that we do not generate the death data needed during times of crisis, such as the COVID-19 pandemic, the problem is also that national statistics and models are generally inaccurate because of deficiencies with the death investigation and reporting process. Expanding the information sought for national mortality statistics and databases is more important than maintaining strict uniformity that allows for national comparisons across states and demographic groups, but federal carrots and sticks can help ensure both data expansion and continuing uniformity.

Laws that permit less qualified coroners to serve and also laws that provide death investigators with nearly unlimited discretion in the name of federalism make certain deaths invisible. If the invisible deaths were equally distributed across the population, this might not be a public health emergency. However, the fact that invisible death rates are higher among marginalized groups and those with low socioeconomic status—as well as those who die from stigmatized or politically unpalatable causes—raises the level of urgency.

Fixing the problem will require both money and new technology. Federal spending with strings attached requiring reform must be part of the solution. AI that can search through available data and help generate possible causes of death is an example of a way that even districts with scarce resources may be able to add to

information request. Autopsy records implicate stronger privacy concerns and warrant withholding in some instances, depending on the presence of sensitive medical information within the records.”).

³⁰⁶ *Your Data Is Shared and Sold . . . What’s Being Done About It?*, KNOWLEDGE AT WHARTON (Oct. 28, 2019), <https://knowledge.wharton.upenn.edu/article/data-shared-sold-whats-done/>.

the number and depth of their death investigations. More data and better data are needed—to honor the dead and improve the health of the living.

MEDICAL CERTIFIER INSTRUCTIONS for selected items on U.S. Standard Certificate of Death

(See Physicians' Handbook or Medical Examiner/Coroner Handbook on Death Registration for instructions on all items)

ITEMS ON WHEN DEATH OCCURRED

Items 24-25 and 29-31 should always be completed. If the facility uses a separate pronouncer or other person to indicate that death has taken place with another person more familiar with the case completing the remainder of the medical portion of the death certificate, the pronouncer completes Items 24-28. If a certifier completes Items 24-25 as well as items 29-48, Items 26-28 may be left blank.

ITEMS 24-25, 29-30 – DATE AND TIME OF DEATH

Spell out the name of the month. If the exact date of death is unknown, enter the approximate date. If the date cannot be approximated, enter the date the body is found and identify as date found. Date pronounced and actual date may be the same. Enter the exact hour and minutes according to a 24-hour clock; estimates may be provided with "Approx." placed before the time.

ITEM 32 – CAUSE OF DEATH (See attached examples)

Take care to make the entry legible. Use a computer printer with high resolution, typewriter with good black ribbon and clean keys, or print legibly using permanent black ink in completing the CAUSE OF DEATH Section. **Do not abbreviate** conditions entered in section.

Part I (Chain of events leading directly to death)

•Only one cause should be entered on each line. Line (a) **MUST ALWAYS** have an entry. **DO NOT** leave blank. Additional lines may be added if necessary.

•If the condition on Line (a) resulted from an underlying condition, put the underlying condition on Line (b), and so on, until the full sequence is reported. **ALWAYS** enter the underlying cause of death on the lowest used line in Part I.

•For each cause indicate the best estimate of the interval between the presumed onset and the date of death. The terms "unknown" or "approximately" may be used. General terms, such as minutes, hours, or days, are acceptable, if necessary. **DO NOT** leave blank.

•The terminal event (for example, cardiac arrest or respiratory arrest) should not be used. If a mechanism of death seems most appropriate to you for line (a), then you must always list its cause(s) on the line(s) below it (for example, cardiac arrest due to coronary artery atherosclerosis or cardiac arrest due to blunt impact to chest).

•If an organ system failure such as congestive heart failure, hepatic failure, renal failure, or respiratory failure is listed as a cause of death, always report its etiology on the line(s) beneath it (for example, renal failure due to Type I diabetes mellitus).

•When indicating neoplasms as a cause of death, include the following: 1) primary site or that the primary site is unknown, 2) benign or malignant, 3) cell type or that the cell type is unknown, 4) grade of neoplasm, and 5) part or lobe of organ affected. (For example, a primary well-differentiated squamous cell carcinoma, lung, left upper lobe.)

•Always report the fatal injury (for example, stab wound of chest), the trauma (for example, transection of subclavian vein), and impairment of function (for example, air embolism).

PART II (Other significant conditions)

•Enter all diseases or conditions contributing to death that were not reported in the chain of events in Part I and that did not result in the underlying cause of death. See attached examples.

•If two or more possible sequences resulted in death, or if two conditions seem to have added together, report in Part I the one that, in your opinion, most directly caused death. Report in Part II the other conditions or diseases.

CHANGES TO CAUSE OF DEATH

Should additional medical information or autopsy findings become available that would change the cause of death originally reported, the original death certificate should be amended by the certifying physician by **immediately** reporting the revised cause of death to the State Vital Records Office.

ITEMS 33-34 - AUTOPSY

•33 - Enter "Yes" if either a partial or full autopsy was performed. Otherwise enter "No."

•34 - Enter "Yes" if autopsy findings were available to complete the cause of death, otherwise enter "No". Leave item blank if no autopsy was performed.

ITEM 35 - DID TOBACCO USE CONTRIBUTE TO DEATH?

Check "yes" if, in your opinion, the use of tobacco contributed to death. Tobacco use may contribute to deaths due to a wide variety of diseases; for example, tobacco use contributes to many deaths due to emphysema or lung cancer and some heart disease and cancers of the head and neck. Check "no" if, in your clinical judgment, tobacco use did not contribute to this particular death.

ITEM 36 - IF FEMALE, WAS DECEDENT PREGNANT AT TIME OF DEATH OR WITHIN PAST YEAR?

This information is important in determining pregnancy-related mortality.

ITEM 37 - MANNER OF DEATH

•Always check Manner of Death, which is important: 1) in determining accurate causes of death; 2) in processing insurance claims; and 3) in statistical studies of injuries and death.

•Indicate "Pending investigation" if the manner of death cannot be determined whether due to an accident, suicide, or homicide within the statutory time limit for filing the death certificate. This should be changed later to one of the other terms.

•Indicate "Could not be Determined" **ONLY** when it is impossible to determine the manner of death.

ITEMS 38-44 - ACCIDENT OR INJURY – to be filled out in all cases of deaths due to injury or poisoning.

•38 - Enter the exact month, day, and year of injury. Spell out the name of the month. **DO NOT** use a number for the month. (Remember, the date of injury may differ from the date of death.) Estimates may be provided with "Approx." placed before the date.

•39 - Enter the exact hour and minutes of injury or use your best estimate. Use a 24-hour clock.

•40 - Enter the general place (such as restaurant, vacant lot, or home) where the injury occurred. **DO NOT** enter firm or organization names. (For example, enter "factory", not "Standard Manufacturing, Inc.")

•41 - Complete if anything other than natural disease is mentioned in Part I or Part II of the medical certification, including homicides, suicides, and accidents. This includes all motor vehicle deaths. The item must be completed for decedents ages 14 years or over and may be completed for those less than 14 years of age if warranted. Enter "Yes" if the injury occurred at work. Otherwise enter "No". An injury may occur at work regardless of whether the injury occurred in the course of the decedent's "usual" occupation. Examples of injury at work and injury not at work follow.

Injury at work

Injury while working or in vocational training on job premises

Injury while on break or at lunch or in parking lot on job premises

Injury while working for pay or compensation, including at home

Injury while working as a volunteer law enforcement official etc.

Injury while traveling on business, including to/from business contacts

Injury not at work

Injury while engaged in personal recreational activity on job premises

Injury while a visitor (not on official work business) to job premises

Homemaker working at homemaking activities

Student in school

Working for self for no profit (mowing yard, repairing own roof, hobby)

Commuting to or from work

•42 - Enter the complete address where the injury occurred including zip code.

•43 - Enter a brief but specific and clear description of how the injury occurred. Explain the circumstances or cause of the injury. Specify type of gun or type of vehicle (e.g., car, bulldozer, train, etc.) when relevant to circumstances. Indicate if more than one vehicle involved; specify type of vehicle decedent was in.

•44 - Specify role of decedent (e.g. driver, passenger). Driver/operator and passenger should be designated for modes other than motor vehicles such as bicycles. Other applies to watercraft, aircraft, animal, or people attached to outside of vehicles (e.g. surfers).

Rationale: Motor vehicle accidents are a major cause of unintentional deaths; details will help determine effectiveness of current safety features and laws.

REFERENCES

For more information on how to complete the medical certification section of the death certificate, refer to tutorial at <http://www.TheNAME.org> and resources including instructions and handbooks available by request from NCHS, Room 7318, 3311 Toledo Road, Hyattsville, Maryland 20782-2003 or at www.cdc.gov/nchs/about/major/dvs/handbk.htm

Cause-of-death – Background, Examples, and Common Problems

Accurate cause of death information is important
to the public health community in evaluating and improving the health of all citizens, and
often to the family, now and in the future, and to the person setting the decedent's estate.

The cause-of-death section consists of two parts. **Part I** is for reporting a chain of events leading directly to death, with the **immediate cause** of death (the final disease, injury, or complication directly causing death) on line a and the **underlying cause** of death (the disease or injury that initiated the chain of events that led directly and inevitably to death) on the lowest line. **Part II** is for reporting all other significant diseases, conditions, or injuries that contributed to death but which did not result in the underlying cause of death given in **Part I**. The **cause-of-death information should be YOUR best medical OPINION**. A condition can be listed as "probable" even if it has not been as formally diagnosed.

Examples of properly completed medical certifications

CAUSE OF DEATH (See instructions and examples)		Approximate interval Onset to death
32. PART I. Enter the <u>chain of events</u> —diseases, injuries, or complications—that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.		
IMMEDIATE CAUSE (Final disease or condition resulting in death)	a. <u>Rupture of myocardium</u>	<u>Minutes</u>
Due to (or as a consequence of)		
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the	b. <u>Acute myocardial infarction</u>	<u>6 days</u>
Due to (or as a consequence of)		
UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	c. <u>Coronary artery thrombosis</u>	<u>5 years</u>
Due to (or as a consequence of)		
	d. <u>Atherosclerotic coronary artery disease</u>	<u>7 years</u>
PART II. Enter other <u>significant conditions contributing to death</u> , but not resulting in the underlying cause given in PART I		33. WAS AN AUTOPSY PERFORMED? ■ Yes ☐ No ☐
Diabetes, Chronic obstructive pulmonary disease, smoking		34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? ■ Yes ☐ No ☐
35. DID TOBACCO USE CONTRIBUTE TO DEATH? ■ Yes ☐ Probably ☐ No ☐ Unknown ☐	36. IF FEMALE ■ Not pregnant within past year ☐ Pregnant at time of death ☐ Not pregnant, but pregnant within 42 days of death ☐ Not pregnant, but pregnant 43 days to 1 year before death ☐ Unknown if pregnant within the past year ☐	37. MANNER OF DEATH ■ Natural ☐ Homicide ☐ Accident ☐ Pending investigation ☐ Suicide ☐ Could not be determined ☐

CAUSE OF DEATH (See instructions and examples)				Approximate interval Onset to death
32. PART I. Enter the <u>chain of events</u> —diseases, injuries, or complications—that directly caused the death. DO NOT enter terminal events such as cardiac arrest, respiratory arrest, or ventricular fibrillation without showing the etiology. DO NOT ABBREVIATE. Enter only one cause on a line. Add additional lines if necessary.				
IMMEDIATE CAUSE (Final disease or condition resulting in death)	a. <u>Aspiration pneumonia</u>	<u>2 Days</u>		
Due to (or as a consequence of)				
Sequentially list conditions, if any, leading to the cause listed on line a. Enter the	b. <u>Complications of coma</u>	<u>7 weeks</u>		
Due to (or as a consequence of)				
UNDERLYING CAUSE (disease or injury that initiated the events resulting in death) LAST	c. <u>Blunt force injuries</u>	<u>7 weeks</u>		
Due to (or as a consequence of)				
	d. <u>Motor vehicle accident</u>	<u>7 weeks</u>		
PART II. Enter other <u>significant conditions contributing to death</u> , but not resulting in the underlying cause given in PART I				33. WAS AN AUTOPSY PERFORMED? ■ Yes ☐ No ☐
35. DID TOBACCO USE CONTRIBUTE TO DEATH? ☐ Yes ☐ Probably ☐ No ☐ Unknown ☐				36. IF FEMALE ☐ Not pregnant within past year ☐ Pregnant at time of death ☐ Not pregnant, but pregnant within 42 days of death ☐ Not pregnant, but pregnant 43 days to 1 year before death ☐ Unknown if pregnant within the past year ☐
37. MANNER OF DEATH ☐ Natural ☐ Homicide ☐ Accident ☐ Pending investigation ☐ Suicide ☐ Could not be determined ☐				34. WERE AUTOPSY FINDINGS AVAILABLE TO COMPLETE THE CAUSE OF DEATH? ■ Yes ☐ No ☐
38. DATE OF INJURY (Mo/Day/Yr) (Specify Month) August 15, 2003	39. TIME OF INJURY Approx. 2320	40. PLACE OF INJURY (e.g., Decedent's home, construction site, restaurant, wooded area) road side near state highway	41. INJURY AT WORK? ☐ Yes ☐ No ☐	
42. LOCATION OF INJURY: State: Missouri		City or Town: near Alexandria		
43. DESCRIBE HOW INJURY OCCURRED Decedent driver of van, ran off road into tree		44. IF TRANSPORTATION INJURY, SPECIFY ■ Driver/Operator ☐ Passenger ☐ Pedestrian ☐ Other (Specify) ☐		

Common problems in death certification

The **elderly decedent** should have a clear and distinct etiological sequence for cause of death, if possible. Terms such as senescence, infirmity, old age, and advanced age have little value for public health or medical research. Age is recorded elsewhere on the certificate. When a number of conditions resulted in death, the physician should choose the single sequence that, in his or her opinion, best describes the process leading to death, and place any other pertinent conditions in Part II. If after careful consideration the physician cannot determine a sequence that ends in death, then the medical examiner or coroner should be consulted about conducting an investigation or providing assistance in completing the cause of death.

The **infant decedent** should have a clear and distinct etiological sequence for cause of death, if possible. "Perinatal death" should not be entered without explaining the etiology of perinatal death. Maternal conditions may have initiated or affected the sequence that resulted in death, and such maternal causes should be reported in addition to the infant causes on the infant's death certificate (e.g., Hyaline membrane disease due to prematurity, 28 weeks due to placental abruption due to blunt trauma to mother's abdomen).

When **SIDS** is suspected, a complete investigation should be conducted, typically by a medical examiner or coroner. If the infant is under 1 year of age, no cause of death is determined after scene investigation, clinical history is reviewed, and a complete autopsy is performed, then the death can be reported as Sudden Infant Death Syndrome.

When processes such as the following are reported, additional information about the etiology should be reported:

Abcesses	Cerebral aneurysms	Disseminated intra vascular coagulation	Hypoxemia	Pulmonary arrest
Abnormal hemorrhage	Cardiac arrest	Dysrhythmia	Hypotension	Pulmonary edema
Adhesions	Cardiomyopathy	End-stage liver disease	Immunosuppression	Pulmonary embolism
Adult respiratory distress syndrome	Cardiomyopathy	End-stage renal disease	Increased intra cranial pressure	Pulmonary insufficiency
Acute myocardial infarction	Cardiomyopathy	End-stage renal disease	Intra cranial hemorrhage	Renal failure
Altered mental status	Cerebral edema	Exsanguination	Mandibular	Respiratory arrest
Anemia	Cerebrovascular accident	Failure to thrive	Metabolic encephalopathy	Seizures
Anoxia	Cerebellar tumor	Fracture	Multi-organ failure	Sepsis
Alveolar capillary thrombosis	Chronic bedridden state	Gangrene	Multi-system organ failure	Septic shock
Asphyxia	Cerebral infarction	Gastrointestinal hemorrhage	Myocardial infarction	Shock
Aspiration	Cerebral infarction	Heart failure	Neurologic soft-tissue infection	Strabismus
Asphyxia	Cerebral infarction	Hemiparesis	Old age	Subdural hematoma
Asphyxia	Cerebral infarction	Hemiparesis	Open (or closed) head injury	Subarachnoid hemorrhage
Asphyxia	Cerebral infarction	Hemiparesis	Paralysis	Sudden death
Asphyxia	Cerebral infarction	Hemiparesis	Pancreatitis	Thrombocytopenia
Asphyxia	Cerebral infarction	Hemiparesis	Perforated gallbladder	Uteral herniation
Asphyxia	Cerebral infarction	Hemiparesis	Pertussis	Uterine prolapse
Asphyxia	Cerebral infarction	Hemiparesis	Pneumonia	Ventricular fibrillation
Asphyxia	Cerebral infarction	Hemiparesis	Pneumonia	Ventricular tachycardia
Asphyxia	Cerebral infarction	Hemiparesis	Pneumonia	Volume depletion

If the certifier is unable to determine the etiology of a process such as those shown above, the process must be qualified as being of an unknown, undetermined, probable, presumed, or unspecified etiology so it is clear that a distinct etiology was not inadvertently or carelessly omitted.

The following conditions and types of death might seem to be specific or natural but when the medical history is examined further may be found to be complications of an injury or poisoning (possibly occurring long ago). Such cases should be reported to the medical examiner/coroner:

Asphyxia	Hypertension	Pulmonary emboli	Subdural hematoma
Bleeding	Hypertension	Seizure disorder	Surgery
Choking	Hypertension	Sepsis	Thermal burns/chemical burns
Drug or alcohol overdose/drug or alcohol abuse	Hypertension	Subarachnoid hemorrhage	

FUNERAL DIRECTOR INSTRUCTIONS for selected items on U.S.

Standard Certificate of Death (For additional information concerning all items on certificate see Funeral Directors' Handbook on Death Registration)

ITEM 1. DECEDENT'S LEGAL NAME

Include any other names used by decedent, if substantially different from the legal name, after the abbreviation AKA (also known as) e.g. Samuel Langhorne Clemens AKA Mark Twain, **but not** Jonathon Doe AKA John Doe

ITEM 5. DATE OF BIRTH

Enter the full name of the month (January, February, March etc.) Do not use a number or abbreviation to designate the month.

ITEM 7A-G. RESIDENCE OF DECEDENT (information divided into seven categories)

Residence of decedent is the place where the decedent actually resided. The place of residence is not necessarily the same as "home state" or "legal residence". Never enter a temporary residence such as one used during a visit, business trip, or vacation. Place of residence during a tour of military duty or during attendance at college is considered permanent and should be entered as the place of residence. If the decedent had been living in a facility where an individual usually resides for a long period of time, such as a group home, mental institution, nursing home, penitentiary, or hospital for the chronically ill, report the location of that facility in item 7. If the decedent was an infant who never resided at home, the place of residence is that of the parent(s) or legal guardian. **Never** use an acute care hospital's location as the place of residence for any infant. If Canadian residence, please specify Province instead of State.

ITEM 10. SURVIVING SPOUSE'S NAME

If the decedent was married at the time of death, enter the full name of the surviving spouse. If the surviving spouse is the wife, enter her name prior to first marriage. This item is used in establishing proper insurance settlements and other survivor benefits.

ITEM 12. MOTHER'S NAME PRIOR TO FIRST MARRIAGE

Enter the name used prior to first marriage, commonly known as the maiden name. This name is useful because it remains constant throughout life.

ITEM 14. PLACE OF DEATH

The place where death is pronounced should be considered the place where death occurred. If the place of death is unknown but the body is found in your State, the certificate of death should be completed and filed in accordance with the laws of your State. Enter the place where the body is found as the place of death.

ITEM 51. DECEDENT'S EDUCATION (Check appropriate box on death certificate)

Check the box that corresponds to the highest level of education that the decedent completed. Information in this section will not appear on the certified copy of the death certificate. This information is used to study the relationship between mortality and education (which roughly corresponds with socioeconomic status). This information is valuable in medical studies of causes of death and in programs to prevent illness and death.

ITEM 52. WAS DECEDENT OF HISPANIC ORIGIN? (Check "No" or appropriate "Yes" box)

Check "No" or check the "Yes" box that best corresponds with the decedent's ethnic Spanish identity as given by the informant. Note that "Hispanic" is not a race and item 53 must also be completed. Do not leave this item blank. With respect to this item, "Hispanic" refers to people whose origins are from Spain, Mexico, or the Spanish-speaking Caribbean Islands or countries of Central or South America. Origin includes ancestry, nationality, and lineage. There is no set rule about how many generations are to be taken into account in determining Hispanic origin; it may be based on the country of origin of a parent, grandparent, or some far-removed ancestor. Although the prompts include the major Hispanic groups, other groups may be specified under "other". "Other" may also be used for decedents of multiple Hispanic origin (e.g. Mexican-Puerto Rican). Information in this section will not appear on the certified copy of the death certificate. This information is needed to identify health problems in a large minority population in the United States. Identifying health problems will make it possible to target public health resources to this important segment of our population.

ITEM 53. RACE (Check appropriate box or boxes on death certificate)

Enter the race of the decedent as stated by the informant. Hispanic is not a race; information on Hispanic ethnicity is collected separately in item 52. American Indian and Alaska Native refer only to those native to North and South America (including Central America) and does not include Asian Indian. Please specify the name of enrolled or principal tribe (e.g., Navajo, Cheyenne, etc.) for the American Indian or Alaska Native. For Asians check Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, or specify other Asian group; for Pacific Islanders check Guamanian or Chamorro, Samoan, or specify other Pacific Island group. If the decedent was of mixed race, enter each race (e.g., Samoan-Chinese-Filipino or White, American Indian). Information in this section will not appear on the certified copy of the death certificate.

Race is essential for identifying specific mortality patterns and leading causes of death among different racial groups. It is also used to determine if specific health programs are needed in particular areas and to make population estimates.

ITEMS 54 AND 55. OCCUPATION AND INDUSTRY

Questions concerning occupation and industry must be completed for all decedents 14 years of age or older. This information is useful in studying deaths related to jobs and in identifying any new risks. For example, the link between lung disease and lung cancer and asbestos exposure in jobs such as shipbuilding or construction was made possible by this sort of information on death certificates. Information in this section will not appear on the certified copy of the death certificate.

ITEM 54. DECEDENT'S USUAL OCCUPATION

Enter the usual occupation of the decedent. This is not necessarily the last occupation of the decedent. Never enter "retired". Give kind of work decedent did during most of his or her working life, such as claim adjuster, farmhand, coal miner, janitor, store manager, college professor, or civil engineer. If the decedent was a homemaker at the time of death but had worked outside the household during his or her working life, enter that occupation. If the decedent was a homemaker during most of his or her working life, and never worked outside the household, enter "homemaker". Enter "student" if the decedent was a student at the time of death and was never regularly employed or employed full time during his or her working life. Information in this section will not appear on the certified copy of the death certificate.

ITEM 55. KIND OF BUSINESS/INDUSTRY

Kind of business to which occupation in item 54 is related, such as insurance, farming, coal mining, hardware store, retail clothing, university, or government. DO NOT enter firm or organization names. If decedent was a homemaker as indicated in item 54, then enter either "own home" or "someone else's home" as appropriate. If decedent was a student as indicated in item 54, then enter type of school, such as high school or college, in item 55. Information in this section will not appear on the certified copy of the death certificate.

NOTE This recommended standard death certificate is the result of an extensive evaluation process. Information on the process and resulting recommendations as well as plans for future activities is available on the Internet at: http://www.cdc.gov/nchs/vital_certs_rev.htm.