Public Health Impact: How Medicolegal Death Investigation Data Help the Living

Margaret Warner PhD, Paula A. Brown

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For many sudden, unexpected, or violent deaths, the data collected by medical examiners and coroners are the best source of information on the cause of death. This information is documented on the death certificate, which answers questions about what happened. In aggregate, death certificates tell a larger story about the health of our communities and the nation as a whole. Epidemiologists and others use the data for many purposes, such as identifying new cases of diseases and injury, tracking known health threats, and evaluating response efforts.

Medical examiners and coroners are often the first to see trends in traumatic deaths as well as the other causes of death. Data generated during investigations can be used to confirm hunches and provide evidence needed to inspire change. For instance, the decrease in the motor vehicle traffic death rate, which has been reported as one of the greatest public health achievements of the 20th century (1), was driven in part by information provided by medical examiners and coroners. In 1979, while Susan Baker was working as an autopsy technician, she had a hunch that infants had higher death rates in crashes than older children (2). In her own words,

[Using death certificate data from the National Center for Health Statistics] it took me about 10 minutes to discover that my hunch had been correct. I remember my excitement, and it turned out that my simple analysis had far-reaching results.

She published her findings in a short paper that was widely read (3), and eventually laws were enacted requiring the use of infant car seats. This is just one of many examples of how the insights she gained while

working in a medical examiner's office, combined with information compiled from death certificates, informed her research in injury epidemiology. Later, the National Association of Medical Examiners founded the Susan P. Baker Public Health Impact Award to honor her work, acknowledge the importance of medicolegal death investigation on public health, and recognize medical examiners' leadership in this area (4).

Over the past two decades, death certificate mortality data, collected by the states and compiled by the National Center for Health Statistics, have been used to track the rapid increases in drug overdose deaths. Medical examiners and coroners are the harbingers of emerging and evolving health threats and help ensure the accuracy and completeness of drug overdose death data (5-8). The information gathered during routine medicolegal death investigations is used to help measure the effectiveness of public health and public safety responses and ultimately inform where and how best to invest resources to help save lives.

Beyond drug overdoses, medical examiners and coroners contribute to the overall understanding of death in the US. They investigate deaths, determine cause and manner, and distill the most pertinent information on death certificates. This information is reported to the state and ultimately to National Center for Health Statistics through the National Vital Statistics System. The state and national-level data are used to better understand the characteristics of those dying, determine life expectancy, and compare mortality trends.

More than 40 Federal agency programs—across the Departments of Health and Human Services, Justice, Labor, Transportation, Commerce, Homeland Security, Defense, Veteran Affairs, and Interior along with

the Consumer Product Safety Commission, National Transportation Safety Board, and the Executive Office of the President—rely on vital statistics and other data provided by medical examiner and coroner offices to support their research, policies, and regulations (9). For example:

- Centers for Disease Control and Prevention uses mortality data to monitor trends in unintentional injury, homicides, suicides, and sudden unexpected deaths; to understand sudden unexpected infant deaths; track infectious diseases and public health emergencies; and for many other purposes (10-13);
- Food and Drug Administration uses mortality data to conduct post-market surveillance of drugs and therapeutic biologics (14);
- Office of National Drug Control Policy relies on mortality data to monitor illicit drug use, including the nonmedical use of prescription drugs, and its consequences (15);
- National Highway Traffic Safety Administration monitors trends in traffic-related fatalities (16);
- Federal Aviation Administration utilizes autopsy reports to identify and mitigate aeromedical hazards in aerospace accidents (17); and
- Consumer Product Safety Commission uses mortality data to identify problematic products for investigation and potential recall (18).

In recent years, nationwide increases in fatal drug overdoses, homicides, suicides, and other unintentional injuries have prompted new questions and demands for mortality data at the local, state, and federal levels (19-20). These demands require innovative and coordinated solutions wherein data from medical examiner and coroner case management systems, state-based electronic death registration systems, and the National Vital Statistics System can provide more timely, accurate, and useful data. Adoption of standardized and interoperable reporting systems would make mortality data streams more timely and available during public

health emergencies and ultimately enable a coordinated response to multistate, high-priority health threats.

The end of the medicolegal death investigation marks the beginning of a new lifecycle for the data. Mortality data compiled at the national level have been a foundation of public health surveillance for centuries, dating back to the bills of mortality in the times of the plague (21-22). The uses of data have exploded in the past century, and are growing continuously with the trend toward more evidenced-based and data-driven solutions (23-24). The importance of complete, timely, and accurate representation of the cause of death cannot be understated. This is said so eloquently as written on the wall of the Office of the Chief Medical Examiner in New York City (translated) (25):

*Let conversation cease, Let laughter flee.
This is the place where death delights in helping
the living.*

REFERENCES

- 1) Centers for Disease Control and Prevention (CDC). Ten great public health achievements—United States, 1900-1999. *MMWR Morb Mortal Wkly Rep.* 1999 Apr 2; 48(12):241-3. PMID: 10220250.
- 2) Baker SP. 50 Favorites from the works of Susan P. Baker [Internet]. Baltimore: Johns Hopkins Bloomberg School of Public Health; 2012 [cited 2017 Oct 24]. 64 p. Available from: https://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-injury-research-and-policy/_docs/_homepage/50Favs_FINAL-100512.pdf.
- 3) Baker SP. Motor vehicle occupant deaths in young children. *Pediatrics.* 1979 Dec; 64(6):860-1. PMID: 514715.
- 4) National Association of Medical Examiners [Internet]. Walnut Shade (MO): National Association of Medical Examiners; c2017. Rules for the Susan P. Baker Public Health Impact Award; [cited 2017 Oct 24]. 2 p. Available from: <https://netforum.avectra.com/public/temp/ClientImages/NAME/7cd1452b-be54-42c7-bfeb-6f2082ce463f.pdf>.
- 5) Peterson AB, Gladden RM, Delcher C, et al. Increases in fentanyl-related overdose deaths - Florida and Ohio, 2013-2015. *MMWR Morb Mortal Wkly Rep.* 2016 Aug 26; 65(33):844-9. PMID: 27560948. <https://doi.org/10.15585/mmwr.mm6533a3>.
- 6) Alexander RT, Hedrick CW, Alexander SD, et al. Epidemic fentanyl deaths in Maryland: a public health intervention involving geographic information systems and collaboration with the Drug Enforcement Administration. *Acad Forensic Pathol.* 2016 Jun; 6(2):301-14. <https://doi.org/10.23907/2016.031>.
- 7) Schueler HE. Emerging Synthetic Fentanyl Analogs. *Acad Forensic Pathol.* 2017 Mar; 7(1):36-40. <https://doi.org/10.23907/2017.004>.
- 8) Gilson TP, Shannon H, Freiburger J. The evolution of the opiate/opioid crisis in Cuyahoga County. *Acad Forensic Pathol.* 2017 Mar; 7(1):41-9. <https://doi.org/10.23907/2017.005>.

- 9) Strengthening the medicolegal-death-investigation system: improving data systems. Washington: National Science and Technology Council; 2016 Sep [cited 2017 Oct 24]. 10 p. Available from: https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/NSTC/strengthening_the_medicolegal_death_investigation_system_final.pdf.
- 10) National Center for Health Statistics, National Vital Statistics System [Internet]. Atlanta: Centers for Disease Control and Prevention; c2017. Mortality data; [updated 2017 Aug 16; cited 2017 Oct 24]. Available from: <https://www.cdc.gov/nchs/nvss/deaths.htm>.
- 11) National Center for Health Statistics [Internet]. Atlanta: Centers for Disease Control and Prevention; c2017. National violent death reporting system; [updated 2017 Sep 18; cited 2017 Oct 24]. Available from: <https://www.cdc.gov/violenceprevention/nvdrs/index.html>.
- 12) National Center for Chronic Disease Prevention and Health Promotion [Internet]. Atlanta: Centers for Disease Control and Prevention; c2017. SUID and SDY case Registries; [updated 2017 Apr 17; cited 2017 Oct 24]. Available from: <https://www.cdc.gov/sids/CaseRegistry.htm>.
- 13) National Center for Emerging and Zoonotic Infectious Diseases [Internet]. Atlanta: Centers for Disease Control and Prevention; c2017. Infectious Diseases Pathology Branch; [updated 2015 Jul 10; cited 2017 Oct 24]. Available from: https://www.cdc.gov/ncezid/dhcpp/infectious_disease/index.html.
- 14) US Food and Drug Administration [Internet]. Silver Spring (MD): US Food and Drug Administration; c2017. FDA adverse event reporting system (FAERS): latest quarterly data files; [cited 2017 Oct 24]. Available from: <https://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Surveillance/AdverseDrugEffects/ucm082193.htm>.
- 15) The White House [Internet]. Washington: Government of the United States; c2017. National drug control strategy, Data Supplement 2015; [cited 2017 Oct 24]. 181 p. Available from: https://obamawhitehouse.archives.gov/sites/default/files/ondcp/policy-and-research/2015_data_supplement_final.pdf.
- 16) National Highway Traffic Safety Administration [Internet]. Washington: US Department of Transportation; c2017. Fatality analysis reporting system (FARS); [cited 2017 Oct 24]. Available from: <https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars>.
- 17) Federal Aviation Administration [Internet]. Washington: US Department of Transportation; c2017. Autopsy program team; [cited 2017 Oct 24]. Available from: https://www.faa.gov/data_research/research/med_humanfacs/aeromedical/autopsy/.
- 18) Consumer Product Safety Commission [Internet]. Bethesda (MD): United States Consumer Product Safety Commission; c2017. Medical examiners and coroners alert program (MECAP); [cited 2017 Oct 24]. Available from: <https://www.cpsc.gov/Research--Statistics/MECAP>.
- 19) Rudd RA, Seth P, David F, Scholl L. Increases in drug and opioid-involved overdose deaths - United States, 2010-2015. *MMWR Morb Mortal Wkly Rep*. 2016 Dec 30; 65(5051):1445-52. PMID: 28033313. <https://doi.org/10.15585/mmwr.mm655051e1>.
- 20) Hedegaard H, Warner M, Miniño AM. Drug overdose deaths in the United States, 1999-2015. *NCHS Data Brief*. 2017 Feb; (273):1-8. PMID: 28256996.
- 21) National Center for Biotechnology Information [Internet]. Bethesda (MD): National Center for Biotechnology Information, US National Library of Medicine; c2017. The US vital statistics system: a national perspective; [cited 2017 Oct 24]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK219884/>.
- 22) Final forms: What death certificates can tell us, and what they can't. *New Yorker* [Internet]. 2014 Apr 7 [cited 2017 Oct 24]. Public health. Available from: <https://www.newyorker.com/magazine/2014/04/07/final-forms>.
- 23) Savel TG, Foldy S; Centers for Disease Control and Prevention. The role of public health informatics in enhancing public health surveillance. *MMWR Suppl*. 2012 Jul 27; 61(3):20-4. PMID: 22832993.
- 24) National Academy of Medicine [Internet]. Washington: National Academy of Medicine; c2017. Information technology interoperability and use for better care and evidence: a vital direction for health and health care; 2016 Sep 19 [cited 2017 Oct 24]. Available from: <https://nam.edu/information-technology-interoperability-and-use-for-better-care-and-evidence-a-vital-direction-for-health-and-health-care/>.
- 25) Death's waiting area. *New York Times* [Internet]. 2009 Feb 18 [cited 2017 Oct 24]. NY/Region. Available from: <http://www.nytimes.com/2009/02/19/nyregion/19rooms.html?mcubz=0>.