

Public Health and Disasters: An Emerging Translational and Implementation Science, Not “Lessons Learned”

Kristi L. Koenig, MD; Carl H. Schultz, MD; Miryha Gould Runnerstrom, PhD; Oladele A. Ogunseitan, PhD, MPH

ABSTRACT

Disaster Medicine is a relatively new multidisciplinary field of science with clear public health implications as it focuses on improving outcomes for populations rather than for individual patients. As with any other scientific discipline, the goal of public health and disaster research is to create new knowledge and transfer evidence-based data to improve public health. The phrase “lessons learned” has crept into the disaster lexicon but must be permanently erased as it has no place in the scientific method. The second edition of *Koenig and Schultz's Disaster Medicine: Comprehensive Principles & Practice* adds to the growing knowledge base of this emerging specialty and explains why “lessons learned” should be discarded from the associated vocabulary. (*Disaster Med Public Health Preparedness*. 2017;11:610-611)

Key Words: disaster medicine, public health, translational science, knowledge transfer and management

Disasters are frequently at the forefront of breaking news in modern societies, yet there is little acknowledgement that they represent “wicked problems”¹ with complex interdependencies that require application of public health approaches and tools for effective management. A cutting-edge second edition of a Cambridge University Press reference by Koenig and Schultz emphasizes the public health aspects of Disaster Medicine and highlights the importance of application of science to this emerging field.² Each chapter of the textbook is authored by international experts and contains a concluding section on “recommendations for future research,” with the goal of laying the groundwork for the research agenda for the future.³

Despite this lofty goal, disaster research is challenging and still evolving. The majority of studies to date have been descriptive reports, cross-sectional studies, surveys and interviews, and other observational-type studies. These common methodologic choices for disaster research stem from the nature of disasters. Specifically, scientists have difficulty determining the timing of events, variables are difficult to interpret, environments and populations differ between disaster events, and models (drills) are difficult to construct realistically. Because the gold standard of a randomized controlled trial is the exception rather than the rule with disaster research, most data do not show causal links.

DISCUSSION

Prior to the biological terrorist attacks following September 11, 2001, public health agencies paid little attention to rapid management of “disasters” and

more typically performed rigorous, methodical, but not rapid epidemiologic investigations of evolving public health emergencies. Few data were therefore immediately available for widespread dissemination to decision-makers. Once the anthrax (Amerithrax) attacks⁴ in the fall of 2001 were identified as being deliberate acts of terrorism, it became clear that public health agencies needed to develop systems based on classic disaster management principles in order to rapidly synthesize and respond to emerging challenges. The US Centers for Disease Control and Prevention (CDC) and other public health authorities quickly developed robust emergency management capabilities that persist today.

A challenge remains, however, in the use of outdated terminology that detracts from the goal of applying scientific standards to disaster medicine and public health. A key phrase that has crept into the disaster lexicon and remains a sticky but misguided term is “lessons learned.” The lists of lessons provided are typically the same after each event and may include declarations such as “communications were challenging” and “convergent volunteers contributed to management difficulties.” As such, either no novel knowledge is gained or, if it is, only those directly involved in managing the event acquire it and systematic dissemination of the data does not occur.⁵ Rather than a “lesson learned” by a single individual, we need to create new *knowledge* that can be imparted to future generations as is customary for every other scientific specialty. The translational sciences, “knowledge management”⁶ and “knowledge transfer,”⁷ do not depend on “lessons.” Rather, knowledge is

acquired by application of the scientific method and based on systematically gathering observations and measurements that are subject to rigorous experimental principles.⁸ Other established fields with unique bodies of knowledge do not describe new scientific discoveries as “lessons learned” and neither should disaster medicine and public health.

Without a system for knowledge transfer, individual “lessons learned” would be lost when that person no longer functions in a disaster management position. The specialty requires acquisition and dissemination of a systematic body of knowledge in a consolidated, easily accessible manner, rather than being spread over multiple existing disciplines.^{9–11} Scientific inquiry, standardized evidence-based curricula, fellowships, and textbooks are all elements of establishing the existence of a unique body of knowledge.¹² Only through application of scientific principles can the science of disaster medicine be codified. To quote Sir Francis Bacon, “Science is the process used every day to logically complete thoughts through inference of facts determined by calculated experiments.”¹³

PUBLIC HEALTH IMPLICATIONS

As Richard H. Carmona, MD, MPH, FACS, 17th Surgeon General of the United States, explains in the foreword to the first edition of *Koenig and Schultz’s Disaster Medicine: Comprehensive Principles & Practices*, the editors are “moving the science of disaster medicine forward by describing its essential concepts and laying the academic foundation for this emerging specialty....There is a focus on science and outcomes rather than opinions and anecdotes.”¹⁴

Whether the event is an emerging infectious disease public health emergency such as Ebola or Zika, a major earthquake as in Haiti or Japan, a radiation emergency, or a terrorist attack, the public health implications of the science of disaster medicine are clear. Just as knowledge must be transferred to future populations of scientists and practitioners rather than “lessons learned” maintained by an individual, disaster sciences must focus on improving outcomes for *populations* and not merely *individuals*. Indeed public health, by definition, involves protecting the health of *populations*.

The science of Disaster Medicine remains relatively new with multifactorial and complex influences on its continuing development. These include evolving work by the psychosocial, political, economic, and engineering communities, as well as the impact generated by mass media and social media. Collaborations between disaster medicine and public health researchers will significantly enhance the science of both specialties, benefiting population health in ways neither group could achieve in isolation. We must advocate for outcomes-based research and scientific inquiry to inform policy decisions with a focus on patients and protecting the public health. Public health and disaster researchers must apply science and public health principles to the wicked problem of disaster

event management. Only then can the term “lessons learned” be appropriately and definitively relegated to the history books.

About the Authors

Department of Emergency Medicine and Public Health, Center for Disaster Medical Sciences, University of California, Irvine (Drs Koenig and Schultz); Program in Public Health, University of California, Irvine (Drs Runnerstrom and Ogunseitian).

Correspondence and reprint requests to Kristi L. Koenig, MD, Director, Center for Disaster Medical Sciences, Professor, Emergency Medicine and Public Health, University of California, Irvine, Department of Emergency Medicine, 333 The City Boulevard West, Suite 640, Rt 128-01, Orange, CA 92868 (e-mail: kkoenig@uci.edu).

Published online: March 23, 2017.

REFERENCES

1. Churchman CW. Guest editorial: Wicked problems. *Manag Sci.* 1967; 14:B-141-B-146. <http://www.jstor.org/stable/2628678>. Accessed July 7, 2016.
2. Koenig KL, Schultz CH, eds. *Koenig and Schultz’s Disaster Medicine: Comprehensive Principles and Practices*. 2nd ed. New York, NY: Cambridge University Press; 2016.
3. Lillibridge SR. New textbook announced and reviewed: *Disaster Medicine - Comprehensive Principles and Practices*. 2nd Edition. Kristi L. Koenig & Carl H. Schultz. 2016 - Cambridge University Press *Prehosp Disaster Med.* 2017;32(1): 112–113. doi: 10.1017/S1049023X16001138. Accessed January 19, 2017.
4. Jernigan DB, Raghunathan PL, Bell BP, et al. Investigation of bioterrorism-related anthrax, United States, 2001: Epidemiologic findings. *Emerg Infect Dis.* 2002;8:1019-1028. doi: 0.3201/eid0810.020353. Accessed July 7, 2016.
5. der Heide EA. Disaster response: principles of preparation and coordination. Atlanta: Erik Auf der Heide; 1989. <http://library.ndmctsg.edu.tw/milmed/avitation/file-med/DisasterResponse.pdf>. Accessed October 10, 2016.
6. Serenko A, Bontis N. Meta-review of knowledge management and intellectual capital literature: Citation impact and research productivity rankings [published online August 9, 2004]. *Knowl Process Manag.* doi: 10.1002/kpm.203. Accessed July 7, 2016.
7. Argote L, Ingram P. Knowledge transfer: a basis for competitive advantage in firms [published online May 25, 2002]. *Organ Behav Hum Dec.* doi: 10.1006/obhd.2000.2893. Accessed July 7, 2016.
8. Koenig KL. Disaster medical sciences: towards defining a new discipline. *Health Affairs Blog.* <http://healthaffairs.org/blog/2013/12/19/disaster-medical-sciences-towards-defining-a-new-discipline/>. Published December 19, 2013. Accessed July 6, 2016.
9. der Heide EA. The importance of evidence-based disaster planning [published online September 19, 2005]. *Ann Emerg Med.* doi: 10.1016/j.annemergmed.2005.05.009. Accessed October 10, 2016.
10. Yeager VA, Menachemi N, McCormick LC, et al. The nature of the public health emergency preparedness literature 2000-2008: A quantitative analysis. *J Public Health Manag Pract.* 2010;16(5):441-449. doi: 10.1097/PHH.0b013e3181c33de4. Accessed October 10, 2016.
11. Abramson DM, Morse SS, Garrett AL, et al. Public health disaster research: surveying the field, defining its future [published online April 1, 2013]. *Disaster Med Public Health Prep.* doi: 10.1097/DMP.0b013e318065b7e1. Accessed October 10, 2016.
12. Salama P, Spiegel P, Talley L, et al. Lessons learned from complex emergencies over past decade [published online November 12, 2004]. *Lancet.* doi: 10.1016/S0140-6736(04)17405-9. Accessed October 10, 2016.
13. Bacon F. *Meditationes Sacrae and Human Philosophy*. Whitefish, MT: Kessinger Publishing; 1996.
14. Koenig KL, Schultz CH, eds. *Koenig and Schultz’s Disaster Medicine: Comprehensive Principles and Practices*. 1st ed. New York, NY: Cambridge University Press; 2009.