SHEA WHITE PAPER

Research Methods in Healthcare Epidemiology and Antimicrobial Stewardship

Daniel J. Morgan, MD, MS;[1,2] Nasia Safdar, MD, PhD;[3,4,5] Aaron M. Milstone, MD, MHS;[6] Deverick J. Anderson, MD, MPH[7]

Research in Healthcare Epidemiology and Antimicrobial Stewardship (HE&AS) is rapidly expanding with the involvement of researchers from varied countries and backgrounds. Researchers must use scientific methods that will provide the strongest evidence to advance healthcare epidemiology, but there are limited resources for information on specific aspects of HE&AS research or easy ways to access examples of studies using specific methods with HE&AS. In response to this need, the SHEA Research Committee has developed a series of white papers on research methods in HE&AS. The objective of this series is to promote rigorous healthcare epidemiology research by summarizing critical components, practical considerations, and pitfalls of commonly used research methods.

Infect Control Hosp Epidemiol 2016;37:627–628

"Science Guiding Prevention" is a central tenet of the Society of Healthcare Epidemiology of America (SHEA) mission. Research in Healthcare Epidemiology and Antimicrobial Stewardship (HE&AS) is rapidly expanding with the involvement of researchers from varied countries and backgrounds.[1] The field continues to be informed by new evidence, yet much of our day-to-day activities and interventions are not evidence based. For example, of the 127 Basic Practices recommended in the 2014 SHEA/IDSA Compendium of Strategies to Prevent HAIs in Acute Care Hospitals, only 16% received a high grade for quality of evidence.[2] Research in HE&AS must investigate important and timely topics.[3] Researchers must use scientific methods that will provide the strongest evidence to advance healthcare epidemiology.

Excellent texts and articles exist for general research methods, but there are limited resources for information on specific aspects of HE&AS research or easy ways to access examples of studies using specific methods with HE&AS. In response to this need, the SHEA Research Committee has developed a series of white papers on research methods in HE&AS. The objective of this series is to promote rigorous HE&AS research by summarizing critical components, practical considerations, and pitfalls of commonly used research methods. The series will include documents on the following 6 priority topics: randomized controlled trials, quasi-experimental studies, use of administrative and surveillance data, observational and retrospective study designs, survey research/mixed methods, and mathematical modeling (see Table 1 for a list of white papers).

The white papers are designed to be basic and practical and provide examples of HE&AS manuscripts while discussing strengths and weaknesses of key HE&AS studies. Authors for each paper were chosen from those with expertise on the SHEA Research Committee with additional experts invited to participate. Each white paper will be presented using a common format. Of particular importance, each manuscript will include 2 tables for researchers to reference. Table 1 in each manuscript will provide advantages, disadvantages, and pitfalls for the research method being summarized. Table 2 in each manuscript will provide a checklist of key considerations when developing a study. Because of length limitations, manuscripts will not include extensive discussions of finer points or alternative approaches to common methods.

These SHEA methods papers are being written as practical documents for day-to-day use. Beyond providing background on HE&AS research methods, each paper can be used to guide investigators to avoid common problems when designing and performing HE&AS studies. The checklists are designed to help investigators ensure they have prepared adequately. In addition, these white papers can be used as a guide to

Affiliations: 1. VA Maryland Healthcare System and University of Maryland School of Medicine, Baltimore, Maryland; 2. Centers for Disease Dynamics, Economics and Policy, Washington, DC; 3. Department of Medicine, University of Wisconsin School of Medicine and Public Health, Madison, Wisconsin; 4. Department of Infectious Disease, University of Wisconsin Hospital and Clinics, Madison, Wisconsin; 5. William S. Middleton Memorial Veterans Hospital, Madison, Wisconsin; 6. Johns Hopkins University, Department of Pediatrics, Division of Infectious Diseases, Baltimore, Maryland; 7. Duke University Medical Center, Division of Infectious Diseases, Durham, North Carolina.

PREVIOUS PRESENTATION. This information was presented in part at the Meet the Professor Session of IDWeek 2015 on October 9, 2015, in San Diego, California.

Received March 23, 2016; accepted March 23, 2016; electronically published April 14, 2016

 0899-823X/2016/3706-0001. DOI: 10.1017/ice.2016.91

TABLE 1. Topics to be Covered in SHEA White Papers on Research Methods in Healthcare Epidemiology and Antimicrobial Stewardship (HE&AS)

White Paper Title	Subjects Covered
Randomized controlled trials	Patient-level and Cluster randomized controlled trials
Quasi-experimental studies	Retrospective and prospective designs and considerations for control group selection and crossover designs
Administrative and surveillance data	Studies using billing data and other large databases including CDC and VA datasets
Observational studies	Case-control and cohort studies. Advanced considerations such as propensity scores
Survey research & mixed methods	Use of surveys and qualitative research in HE&AS
Mathematical modeling	Agent-based simulation models and decision analysis methods

NOTE. CDC, Centers for Disease Control and Prevention (in particular National Healthcare Safety Network, NHSN); VA, Department of Veterans' Affairs.

standardize review of HE&AS research by journals and funding agencies.

In the last decade, we have seen a large increase in research in healthcare epidemiology and antimicrobial stewardship. We believe that these SHEA Research Committee White Papers on Research Methodology can be used by both new and experienced researchers to improve HE&AS research and ultimately improve patient care.

ACKNOWLEDGMENTS

Financial support. D.J.A. was supported by a grant from the National Insitutes of Health (NIH)/ National Institute of Allergy and Infectious Diseases (NIAID) (grant no. K23AI095357).

Potential conflicts of interest. All authors report no conflicts of interest relevant to this article.

Address correspondence to Deverick J. Anderson, MD, MPH, Associate Professor of Medicine, Duke University Medical Center, DUMC Box 102359, Durham, NC 27710 (deverick.anderson@duke.edu).

REFERENCES

1. Morgan DJ, Deloney VM, Bartlett A, et al. The expanding role of the hospital epidemiologist in 2014: a survey of the Society for Hospital Epidemiology of America (SHEA) Research Network. *Infect Control Hosp Epidemiol* 2015;36:605–608.
2. Yokoe DS, Anderson DJ, Berenholtz SM, et al. A compendium of strategies to prevent healthcare-associated infections in acute care hospitals: 2014 updates. *Infect Control Hosp Epidemiol* 2014;35:967.
3. Safdar N, Anderson DJ, Braun BI, et al. The evolving landscape of healthare-associated infections: recent advances in prevention and a road map for research. *Infect Control Hosp Epidemiol* 2014;35:480–493.