

# ERIC Notebook

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## Health Care Epidemiology, Part I: Population Perspectives

This notebook on Population Perspectives will be the first in a series focusing on the many concepts in the field of Health Care Epidemiology. Future topics will include Health Outcomes and Evidence Based Medicine.

### What is Health Care Epidemiology?

Before we look at the specific areas of health care epidemiology, we need to present the general concept. Health Care Epidemiology can be defined as "the study of health care variables, together with biological, social, behavioral, and environmental factors, that influence the health states of populations." Data from this area of inquiry have implications for public policy and clinical decision making.

Many health care epidemiologists are interested in defining what types of health variables affect population health states and which ones can we control or prevent. They may want to address such questions as "What defines a population in which to conduct research?" and "How does clinical decision making fit into this type of research?" Although these appear to be straightforward questions, it is not always clear under which research field of study they fall. Thus, understanding how health care epidemiology is distinct from the areas of biomedical, health services, and biostatistical research, as well as understanding how these sciences overlap allow us to fully answer these integrative types of questions.

Health Care Epidemiology encompasses this integrative style of research. Rather than focusing on any one area, Health Care Epidemiology incorporates individual research fields to affect the health of a population and thus requires working comprehension of all research areas involved. The following table summarizes the parameters and focus of each area of research:

Research Discipline	Major Orientation	Theory / Model
Clinical/ Biomedical	Diagnostic and Therapeutic	Biological
Health Services	Care Process and Economics	Behavioral and Economic
Biostatistical	Quantitative	Probabilistic
Epidemiological	Population Health Perspectives	Biological, Behavioral, and Probabilistic

Clinical research focuses on biological factors and mechanisms, both internal and external, that lead to the development of a disease state in an individual. Clinical research can also encompass the diagnosis and study of therapeutic factors that alter the onset and course of disease. Biomedical research data are often the basis for decision making by clinicians. Health Services research focuses on the process by which a population, rather than an individual, accesses and receives health care. This area of study includes utilization research. Health Services research also serves as the impetus for policy making and health services allotment. The third area of research is biostatistics, which creates mathematical models to summarize data and test hypotheses based on health and disease states. Epidemiology looks at the combination of all these areas of research. We will discuss the important underlying perspectives of epidemiology, specifically health care epidemiology, to better understand how this type of research is conducted. The focus of this ERIC notebook is the Population Perspective.

### Population Perspective:

Epidemiologists consider data on groups, which involves understanding what defines a population and its health states. There are four main areas that have been regarded as determinants of population health states. These areas are host factors, environmental determinants, biological agents, and medical care.

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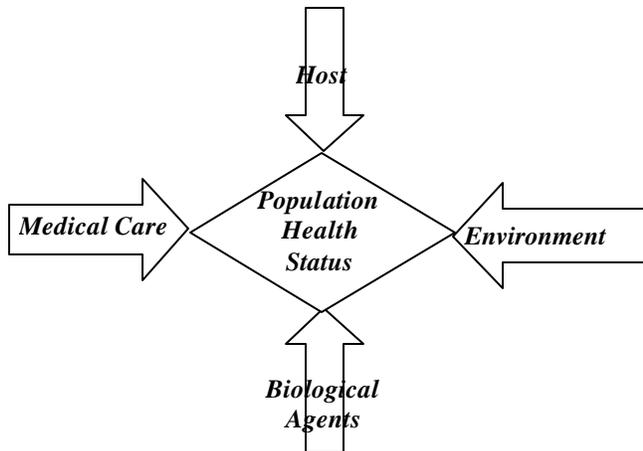


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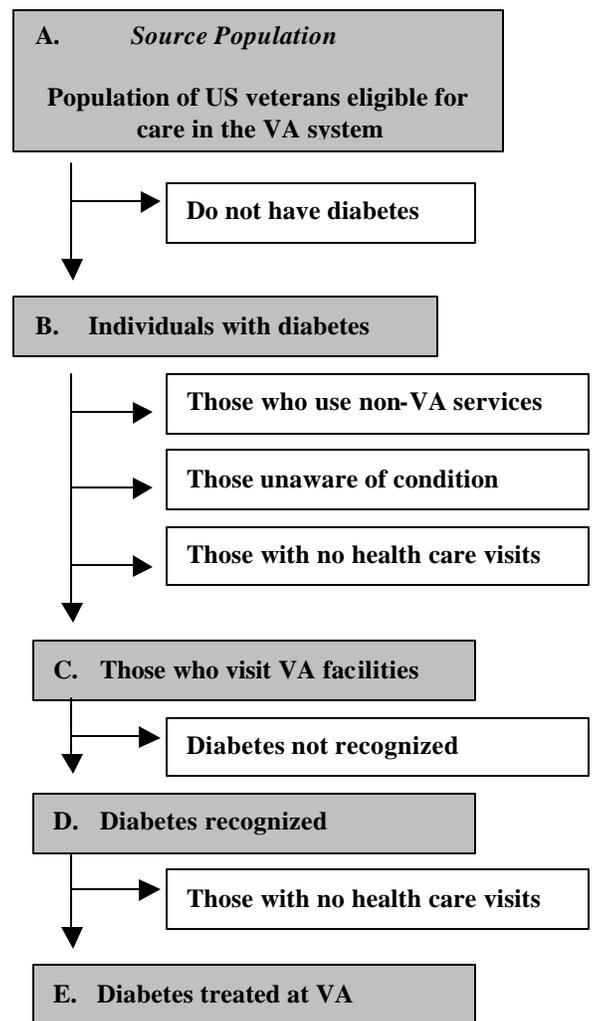
*Host factors* are biological factors inherent to the individual or groups. These characteristics can affect the acquisition and progression of a given disease, as well dictate specific responses to therapy. Biological factors might include genetic susceptibility, age, gender, or immune status. For instance, a population immune to a specific disease will display a very different set of health care needs than a susceptible population. *Environmental factors* are exogenous to the host and can be classified as physical, chemical, or social. Examples of these include housing structure, water purity, and family support, respectively. The third influence on population health states is *biological agents*. This category would include bacterial and viral agents, vaccinations, and toxins individuals might come in contact with. Again, examples include the polio vaccine, or *streptococcus bacillus*. The fourth component, *medical care* combines with these other factors to influence population health states. Medical care can encompass everything from prevention and diagnosis to therapeutic intervention and rehabilitation.

All of these factors, along with behavior, influence the medical status and health care needs of the individual. Health care epidemiology is concerned with not only the needs of the individual, but also the needs of the population served by a health care organization. How do we determine which specific complex agents affect the health of a given population? The process often starts with the physician or health care provider who not only evaluates the health of the individual patient, but also considers how that patient fits into the larger population served by the medical organization. This aspect can be viewed as the community perspective.

Once the population being served is identified, be it HMO enrollees or a geographically defined group, researchers wishing to characterize the needs of that larger population select smaller groups in which it is feasible to conduct research. Selecting an appropriate and representative population is critical to being able to

answer specific questions about diseases and outcomes of interest. Thus it becomes important for the researcher to understand the strengths and limitations of any population that is selected.

One of the major concerns in many research studies is that the study population does not adequately reflect the population which the research initially desired to answer questions about. This often results from multiple compromises we have to make in order to design a study that is both feasible and meets budgetary considerations. Understanding how these choices affect our final study population will ultimately allow for the appropriate interpretation of the results and inference about the correct groups based on our data. The example below will demonstrate how decisions in delineating the study population can cause it to be very different from the population that is served by a given health care organization. Suppose that a VA researcher wishes to conduct a hospital-based study to address the factors contributing to diabetes severity and the utilization of diabetes health care services among the veteran population served by VA hospitals.



This example is designed to illustrate how some decisions will refine a study population, while others may introduce bias. Since the researcher desired to address etiological issues for diabetes severity in veterans, the research population must include those with the disease (B). However, not all of these individuals will be seen in the VA system. If the researcher selects those individuals with diabetes who visit the VA system (C), he will not be able to investigate the factors that lead to increased severity of disease in all veterans. The researcher's population is missing those who utilize other medical services, those unaware of their condition, and those with diabetes who simply do not seek care at all.

A researcher may also wish to address the factors that lead to diabetes severity by selecting from the patients he sees at the VA hospital. However, it is important to understand how hospital-based samples can lead to bias. Those excluded by selecting a hospital-based sample may exhibit important characteristics or risk factors associated with the severity of diabetes or the utilization of related health care. This selected group will not allow you to evaluate the factors that were responsible for their failure to obtain medical care at the VA, which is critical to understand since it is this larger population who is served by the Veterans Administration.

Since a hospital-based sample may lead to biased results when attempting to answer the initial research question, the researcher may want to either further refine the initial question, or alter how the study population is to be chosen. To answer the initial question, the researcher may wish to sample from all veterans (A) who have reported a history of diabetes on a VA survey (B). Or the researcher may wish to refine the question if he wishes to utilize the study population he originally selected (C). The initial question wanted to identify the contributory factors for diabetes in veterans. The population selected should allow us to identify the contributory factors for diabetes severity only in those who seek medical care in VA institutions. This refinement of the research question to coincide with the study population should help to reduce errors in inference and the occurrence of biased results, and thus define the health care status and needs of the community being served.

### Self Evaluation:

**Q1:** True or False: Health care epidemiology is an area of research that focuses solely on medical care availability and provision in populations.

**Q2:** Using the VA population above, a researcher wants to investigate the factors that lead to the utilization of diabetes medical services by those eligible to receive care in the VA system. Which population should the researcher select to adequately address this question and why?

### Suggested Answers:

**A1:** The correct answer is false. Health care epidemiology not only focuses on medical care, but on the biological, environmental, and host factors that combine with it to affect the health of populations.

**A2:** The correct answer is B: Veterans with diabetes. This population includes all of those who are diabetic and eligible to receive care in the VA system. These participants could be identified through a survey of veterans to determine who has diabetes. This population would also include those who seek care elsewhere- and who may be very different from the population who seeks care at the VA. (For example, B may include individuals who have and utilize other forms of health insurance). Population C might be utilized if the researcher wished to identify factors that lead eligible veterans to seek VA medical care.

### References and Suggested Readings:

Eddy DM. (1990). Clinical decision making: From theory to practice, The challenge. *JAMA* 263. 287-290.

Ibrahim MA (1983). Epidemiology: Application to health services. *J Health Admin Education*, 1. 37-69.

Ibrahim MA (1985). Epidemiologic perspectives. In Ibrahim MA Epidemiology and Health Policy (pp. 3-11). Rockville, MD: Aspen Publications.

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### Upcoming Topics

- Health Care Epidemiology
  - Health Outcomes
  - Evidence Based Medicine
- Occupational Epidemiology

**Please let Beth Armstrong know which topics are of special interest to you so that we can include them in future issues:**

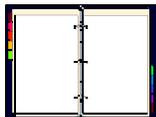
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