

BOOK REVIEW

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Review of: *Paleoepidemiology: The Epidemiology of Human Remains*

REFERENCE: Waldron T. *Paleoepidemiology: the epidemiology of human remains*. Walnut Creek, CA: Left Coast Press, 2007, 148 pp.

This is a revised version of Waldron's 1994 publication "Counting the Dead," which addresses many of the same issues surrounding the application of epidemiological methods to the study of disease in the past. The centerpiece is an effort to develop statistics that define prevalence in a manner that is amenable to cross-group comparisons.

Following an introductory chapter, Waldron (Chapter 1) provides a brief history of theories of disease, epidemiology, and paleoepidemiology. In considering the last-mentioned, he critiques the early efforts of Hooton, while also lamenting what he characterizes as "interpretative paleopathology," which lacks the quantitative rigor of his epidemiological approach.

Chapter 2 makes important points about the nature of skeletal collections, arguing that they are neither "populations" nor "samples," according to definitions used in epidemiology. While collections may themselves be sampled, such measures do not overcome biases inherent in selective burial customs, preservation, and recovery. Waldron also emphasizes the difference between a death assemblage and a living population, as well as issues relating to sample size. This is, of course, a familiar refrain, published in many other contexts, but a compelling reminder to each new generation is always appropriate.

In Chapter 3, Waldron addresses the issues of outcome variations, which in epidemiological studies would be the prevalence (*not* incidence) of specific diseases. The nature of disease diagnosis in clinical practice is contrasted with approaches in paleopathology. Waldron urges a conservative methodology, emphasizing the development of standard definitions and rigorous and accurate "operational definitions" of diseases. The following chapter (Chapter 4) reviews a number of concepts drawn from epidemiology, noting that many cannot be measured in archaeological contexts. Prevalence can be measured, while incidence cannot. Age- and sex-specific prevalence is more informative than simple prevalence. The proportion of teeth with caries to those observable is preferred to the composite DMFT (caries-missing-filled-total examined) index. Waldron also argues that one can infer prevalence in the

living population from observed proportions of diseases that do *not* materially contribute to death, while one cannot in the case of diseases that do.

Chapter 5 considers methods for comparing prevalence figures in ancient groups. Waldron favors the common odds ratio, which sums over odds ratios for age-specific prevalence. A brief, following chapter (Chapter 6) describes methods for examining mortality and morbidity, arguing that methods drawn from epidemiology that require knowledge of numbers of deaths are inappropriate for paleoepidemiology, while those that compare morbidity (relative prevalence of conditions) may be tractable. This suggestion is, however, followed by an extended critique that leaves the reader confused as to Waldron's position on the matter. Ranking prevalence figures for conditions expressed throughout the body, such as osteoarthritis, and then generating inter-group comparisons through standard nonparametric tests is also considered.

Chapter 8 describes case control studies, first in epidemiology, then in paleoepidemiological samples. The goal is to identify associations between conditions, which may lead to inferences concerning risk factors, as for example, a privileged lifestyle and DISH (diffuse idiopathic skeletal hyperostosis). Appropriate distinctions between the odds ratio and risk ratio are drawn, along with discussions of sample size and power functions.

To illustrate key limitations in inferring occupation from joint disease, Chapter 9 examines the multi-causal nature of osteoarthritis. If any such claims are to be made, Waldron advocates a multi-joint consideration of patterning across the body. The final, closing chapter (Chapter 10) explicitly addresses the steps to be taken in rigorous paleoepidemiological study, including cross-sectional, ranking, and case control approaches. Emphasis is placed upon clear definitions of outcome variables, operational definitions of conditions that will guide data recording, and statistical rigor. Consulting a statistician prior to embarking on the study is also recommended.

There is considerable good advice in this volume, though the disparaging expository style may be off-putting. It would also appear that considerably more epidemiological detail is presented than necessary, if the focus were explicitly upon adapting epidemiological approaches to develop a rigorous paleoepidemiology. Extensive reviews of what *cannot* be accomplished in studies of ancient groups thus appear overlong.

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