

A Global History of Health: The Evolution of a Research Agenda

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The National Science Foundation recently funded a large collaborative project on “A History of Health in Europe from the Late Paleolithic Era to the Present,” which measures and analyzes the evolution of skeletal health by combining data from human remains with information gathered from sources in archaeology, climate history, geography, and history (Richard H. Steckel, principal investigator, with co-principal investigators Clark Spencer Larsen, Paul W. Sciulli and Phillip L. Walker). This report describes the historical background to this project, discusses its major features, and considers extensions. Additional information can be found on the project’s web page (global.sbs.ohio-state.edu), which includes an application form for graduate students who may want to participate in the project as part of their theses or dissertations.

The Western Hemisphere Project

From a practical point of view, the origins of the global project stem from the 1988 Economic History Association meetings held in Detroit, at which there was a session on bioarchaeology featuring papers by George Armelagos, Alan Goodman, Debra Martin, and Jerome Rose. Familiar with the research on stature by economic historians, Rose had contacted Richard Steckel prior to the meetings to arrange for discussion of common interests in the health and nutrition of the black population. Over coffee, they agreed that the fields of economic history and physical anthropology had much to learn from each other, but they also lamented the impediments to communication. Although

using data of interest to historians, physical anthropology journals published rather technical articles, which often focused on skeletons from small geographic sites of excavation and which assumed considerable training in human and skeletal biology. Ordinary historians could not read, much less contribute, to this vehicle of publication. Similarly, physical anthropologists were largely untrained in issues and methods of interest to historians and were unfamiliar with the conventions of publication in that field.

Nevertheless, Steckel and Rose sensed that an important research opportunity was available. The quincentennial of 1492 was just around the corner, which would help focus research interests in both fields. The issue was how to bring the groups together for interdisciplinary research, in the spirit of the project leading to Paleopathology at the Origins of Agriculture, edited by Mark Nathan Cohen and George J. Armelagos.

Steckel and Rose organized a small planning conference, funded by Ohio State University and by the Wenner-Gren Foundation, at Ohio State University in the fall of 1990. The historians and physical anthropologists who came recognized that a truly comparative project would require: (1) introductory training of historians in methods of physical anthropology, focusing on the meaning of skeletal lesions; (2) pooling of skeletal data from numerous physical anthropologists to obtain sample sizes of sufficient analytical interest; (3) a common data reporting format was required because working for an entire career on, at most, a score of skeletal collections, physical anthropologists often devised their own, sometimes idiosyncratic reporting schemes, which hindered true comparability of results across time, space, and ethnic groups; (4) a methodology for integrating information and assessing health using skeletal data; (5) interdisciplinary research teams, each headed by an historian and a physical anthropologist, that would

reinterpret the prehistory/history of a particular region, time period, and ethnic group based in the new skeletal data base (and other relevant sources); (6) a publication vehicle, such as a conference volume, which defined and illustrated concepts in ways that made results accessible to a larger audience.

This approach to studying the past coalesced with a sequence of grant proposals by Steckel, Rose and Paul Sciulli. The National Science Foundation and Ohio State University together sponsored a much larger second meeting of nearly 40 participants at Columbus, Ohio in September of 1993. The conference featured training for historians in methods of physical anthropology; a session devoted to a common data reporting format; a session on methodology in interpreting skeletal data; organization of research teams; and time devoted to administrative matters. The grants also paid for assistance in coding data in the format devised at the conference.

Researchers at Ohio State University cleaned and assembled the data sent by 16 physical anthropologists and additional co-workers in the Western Hemisphere. The combined database of 12,520 individuals, who had lived at 65 localities, was ready for analysis in the late summer of 1995. This development was an essential prelude to the second major conference sponsored by the National Science Foundation and held March 7-10, 1996 in Columbus, Ohio. This gathering featured presentation and discussion of papers on topics as diverse as nineteenth century poorhouse populations of the Northeast and the transition to settled agriculture in the Mississippi valley. The skeletal materials underlying these papers provide not only age at death and stature, but also numerous aspects of chronic conditions such as osteoarthritis, dental health, infections, linear enamel hypoplasias, and trauma. Moreover, skeletal evidence is widely available for

historic periods from cemetery excavations, which enabled scholars to compare and contrast health as seen through skeletons with that from written sources. Pooling the evidence collected in numerous local studies allowed investigators to compare skeletal health not only within, but also across widely disparate populations. For comparative analysis, Steckel worked with Rose and Sciulli to devise a health index that ranked sites based on age-specific rates of the number and severity of skeletal lesions. Cambridge University Press will publish the resulting volume edited by Richard H. Steckel and Jerome C. Rose, The Backbone is History: Health and Nutrition in the Western Hemisphere, in the summer of 2002. For a table of contents and list of participants see the project's web site, global.sbs.ohio-state.edu. The skeletal data used in the book will be downloadable from the project's web site later this year. Research plans are now underway to use the database in a study of the history of various skeletal lesions in the Western Hemisphere.

The European Project

The frequency and severity of skeletal lesions in the Western Hemisphere database correlates with a variety of ecological or environmental variables such as settlement size, elevation, topography, and subsistence patterns. The responsiveness or sensitivity of health to the environment in these data suggested there would be great potential for understanding the long-term evolution of human health by gathering and analyzing skeletal and environmental data from numerous parts of the world. This led the organizers of the Western Hemisphere project, in collaboration with Larsen and Walker, to propose a global project for the NSF Infrastructure competition in 2000.

Although the proposal was not funded, we were encouraged to host a planning conference that would focus efforts on a portion of the globe. A copy of this successful NSF proposal, which includes the current list of collaborators on the European project (the list will likely evolve and expand), is available at global.sbs.ohio-state.edu.

The European project substantially exceeds the Western Hemisphere project in size, scope and complexity. By creating several large databases, investigators will be able to reinterpret the history of human health from the late Paleolithic era to the early twentieth century. During this period, human health and welfare were transformed enormously by the transition from foraging to farming; the rise of cities and complex forms of social and political organization; European colonization; and industrialization. With a trans-Atlantic network of collaborators, the project will undertake large-scale comparative studies of the causes and health consequences of these and other dramatic changes in arrangements for work, living, and human interaction.

Our target is to collect data from approximately 40,000 skeletons that were deposited at roughly 500 localities, an endeavor in which we welcome the participation of graduate students who are working on theses or dissertations. The skeletal variables to be collected have not yet been finalized precisely, but will likely include all those in the Western Hemisphere project plus markers for specific diseases such as TB, rickets and leprosy. Project researchers will also scour the published and the gray literature of site reports that we estimate contain information on the average heights of 100,000 to 150,000 men and women who lived in Europe over the past 10 millennia. Later this year, an illustrated copy of the code book will be available on the project's web page.

The European project is also ambitious in gathering environmental or ecological information from sources commonly used in archaeology, climate history, and history, and geography, all fields that have witnessed substantial expansions of knowledge over the past half century. Climate history, for example, has been greatly enriched by analysis of ice cores, lake sediments, and tree rings. Historians have unearthed an enormous amount of information from parish records, shipping records, wage rates, prices of various commodities, monastic records, censuses, harvest dates, wine yields, tax receipts, military records, royal archives, and so forth. Similarly, geographers and other scientists now make extensive use of GIS (Geographic Information Systems) databases. Skeletal lesions have little comparative value if studied in isolation; their context is essential for exploratory analysis of trends and patterns in health.

The time line for the project has not been firmly defined, but we are working with all collaborators to settle many administrative matters by late summer, including the code book; a sketch of priorities for selecting sites and collections for study; software for data entry; recruiting and support of graduate students; details of project administration; and the cleaning and storage of data. Eventually a large number of publications will emerge, the first wave being articles written by graduate students who code the data and working in collaboration with museum curators and others directly involved in data collection. One outlet for these publications will be the project's new web-based journal entitled Global Bioarchaeology.

Only after all (or nearly all) the skeletal and environmental data have been collected (approximately 4 years from now), will it be feasible to begin the comparative phase of the research agenda. This effort will be built upon the model used in the Western Hemisphere

project, but significantly more elaborate in its use of ecological or environmental data. The goals are to describe and to analyze or otherwise seek explanations for time trends and patterns in health. Book-length projects that will likely emerge are (1) health, climate and habitat; (2) health and the transition to farming; (3) the social and economic causes and consequences of long-term changes in health; and (4) the health of women and children. These data also have enormous potential to address other large problems, several of which we will pursue, including (5) long-term trends in patterns of trauma and violence; (6) biological inequality; (7) aging and health; (8) health during the rise and fall of civilizations; (9) geographic patterns of health; (10) degenerative joint disease and work; (11) analysis of population genetics and migration patterns using ancient DNA, and (12) use of DNA from specific pathogens to study the co-evolution of humans and pathogenic organisms.

Extensions

Scholars understand the great value of comparative research using samples that incorporate diverse behavior. It is very difficult, if not impossible, to measure the importance a variable has had in shaping human action if that variable changes little (or is essentially constant) in the evidence available for study. The greater the diversity of the evidence we have about the past, the easier it is to rule out alternative interpretations that are unlikely to reflect actual events. Using a series of data sources that, standing alone would be open to many different interpretations, it is in this way possible to triangulate on what really happened. On these grounds, this project has great value for understanding the causes and consequences of the evolution of important aspects of health.

The diversity of behavior available for study in Europe and the Western Hemisphere is large but still limited compared with the remainder of the globe on various dimensions such as methods of subsistence, technologies in use, types of social and political organization, and climate. Moreover the impact of truly global phenomena, including widespread climate change or European exploration and colonization, cannot be studied thoroughly without information from the Middle East, Asia and Africa. Even if one's research interests are primarily local or regional rather than broadly comparative, data from the outside can provide valuable perspective on what is interesting or unusual about the specific sites under study. Therefore, we believe that it would be a good idea to incorporate other parts of the world, as feasible given funding opportunities, the availability of collections for study, and the interest of local researchers. Although there are significant synergies from collaborative regional (or continental) projects, some progress could be made on a piecemeal basis within any region, if individual researchers code and analyze skeletal data in the format that is being designed. The project's web page will make the data formats easily available for this purpose, and we are willing to assist anyone who might like to get started in this direction.