Preface

Historical aspects of infectious diseases, part II

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Guest Editor

Medical history teaches us where we came from, where we stand in medicine at the present time, and in what direction we are marching. It is the compass that guides us into the future. If our work is not to be haphazard but to follow a well-laid plan, we need the guidance of history, and it is not by accident that all great medical leaders were fully aware of the value of historical studies.

Henry E. Sigerist

The history of infectious diseases is fascinating. The history of mankind may be viewed and analyzed through the lens of infectious disease. Human history has been very much affected by infectious diseases since the dawn of history. The rationale for this issue of the *Infectious Disease Clinics of North America* is based on the premise that there has been an ongoing interaction between the human and the microbial world. This issue is not a monograph on the history of infectious disease, per se; rather it is a concise overview of selected aspects of infectious diseases in history.

Herodotus and Plutarch believed that history is made by individuals and is not the result of geographic, political, or economic cycles. This is certainly true when looking at infectious diseases. The history of infectious disease is also the history of individuals who have either described infections, differentiated one infection from another, isolated or characterized the pathogenic microorganisms, developed diagnostic tests, pioneered treatments,
developed preventative public health measures, or vaccines/chemoprophylaxis to prevent infections. The history of infectious disease is a saga of the exploits of the great clinicians and microbiologists of the past who have worked on bacterial toxins, parasite life cycles, bacteria, fungi, rickettsia, Chlamydia, Mycoplasma, and protozoa. Great advances have been made in public health, prevention, and control measures, as well as the chemotherapy of infectious diseases.

Infectious disease may also be viewed from its impact on human populations. Infectious diseases have had a profound effect on migrating human populations and vice versa. Conflicts have been affected by infectious diseases from ancient times continuing to the present time. It is not overstating the point to say that civilizations and subsequent history have been altered profoundly by infectious diseases. The Plague of Athens changed the balance of power between Athens and Sparta, ending the golden age of Pericles and Athenian predominance in the ancient world. The downfall of Greece and subsequently of ancient Rome, in large part due to the Plague of Justinian, once again changed history forever. Invaders have exposed immune populations to virulent infections, decimating native populations and changing history as a result (eg, Europeans during the age of exploration in Latin America, Asia, India, and Africa). Invasions by explorers, conquerors, and invading armies bring with them insect and rodent vectors that can introduce or sustain infectious diseases in nonendemic areas. Geographically defined disease pools are precariously interrelated and interact with human populations.

Infectious diseases may be analyzed historically with regard to evolutionary biology. The complex interactions between primary and secondary hosts and human infectious diseases are another basis for analysis. The symbiotic or parasitic interactions between humankind and the microbial world are intriguing. Both microorganisms and macroorganisms share the need to survive with the accompanying implications for food and reproduction. Successful parasitism depends on human-to-human transmission or transmission by way of an intermediate host. The microorganism must not affect the intermediate host significantly; otherwise, the intermediate host is not able to carry the parasite to the definitive human host. Typhus, trypanosomiasis, and plague are examples of infectious diseases that have an intermediate host critical to the pathogen/parasite for leaving the infected host and perpetuating its life cycle and infection in the next host. Infectious diseases that are characterized by direct human-to-human (ie, host-to-host) transmission include typhoid fever, measles, chickenpox, and tuberculosis. Symbiotic relationships between microbe and host are even more complex. The bacteria of the gastrointestinal tract (Bacteroides fragilis) prevent other enteric organisms from infecting the host, degrade bile salts, and synthesize vitamin K. During the process of evolution, as hosts have developed a protective armamentarium consisting of a highly evolved immune system, so have the microbes developed a bewildering variety of countermeasures that
allows them to persist or proliferate in spite of host defense mechanisms. Population patterns in Africa depended largely on the distribution of water, mosquitoes, and malaria. In addition, the evolutionary significance of blood types has an effect on immunity to malaria in African populations, as does sickle cell anemia. The evolution of humans and their host defenses and microorganisms and their countermeasures are fundamental to the expression and effects of infectious diseases.

The importance of infectious disease on individual lives cannot be underestimated. If Pericles had not died of plague, what would have been the course of history? If Alexander the Great did not die at 33 of an infectious disease, all subsequent history would doubtless have been much different. The romantic English poet, John Keats, was cut down in his prime by tuberculosis. Trained as a physician, Keats, when he saw his first episode of hemoptysis, realized that the blood represented his death knell and that he would soon die from tuberculosis. So many famous people throughout history have died from infectious diseases, changing not only their own lives but the destiny of nations.

Part I of this two-issue monograph of the *Infectious Disease Clinics of North America* dealt with specific infectious diseases as they related to their impact on human civilization. Part II deals with the initial discovery or characterization of infectious disease agents that have had the greatest effect on human civilization. Part II also contains articles on the effect of various infectious diseases on specific geographical areas and critical time periods or events in human history. Part I begins with the evolution of virulence in infectious disease, so it is appropriate that part II ends with the evolutionary aspects of HIV.

Because of the overwhelming importance of parasitology in human health worldwide, Professor Cox reviews the history of human parasitology. The history of malaria from antiquity to the present time is reviewed by Dr. Schlagenhauf. Professor Mahmoud reviews the historical aspects of schistosomiasis in his article. Professor Cook reviews the discovery and impact of filariasis in history. Professor Cox has contributed a second article on the history of African trypanosomiasis; Dr. Miles reviews its new world counterpart—American trypanosomiasis—and provides a concise review of Chagas disease in the Americas. Dr. Wallace and Dr. Lim review the impact of acute diarrheal infections on human populations. Professor Bryan and colleagues discuss the impact of yellow fever in the history of the Americas. Dr. Bollet discusses the impact of infectious diseases in the American Civil War. Dr. Rietschel and colleagues provide an interesting overview of famous musicians whose lives were affected by infectious diseases. Dr. Smallman-Raynor and Professor Cliff discuss the profound effect that infectious diseases have had on conflicts in human history. Lastly, Dr. Smith describes the evolution of HIV viruses and associated retroviruses in mammals and humans. Together, parts I and II are a compilation of topics that are diverse in scope but unified by the major infectious diseases affecting humankind. The perspective of both parts varies, and individual articles highlight special aspects that infectious diseases have had on us as humans.
This issue of the *Infectious Disease Clinics of North America* reminds us that we stand on the shoulders of giants in our understanding of infectious diseases, clinically and at the basic science level. It is also intended to spark interest in infectious disease clinicians, to read and study more in depth about the historical aspects of the infectious diseases of interest to them. Reading about the historical aspects of infectious diseases is a worthwhile and interesting pursuit and adds depth to our knowledge. It is hoped the information in this issue will serve as a catalyst to pursue further historical study.

We would like to think that today we are an advanced and sophisticated society, relatively immune from the devastating effect of infectious diseases experienced by the ancients. We should take no such comfort in our present situation; the emergence of retroviruses as a worldwide pandemic leaves little reason for it. The new infectious diseases are always lurking, as attested to by recent outbreaks of plague in India, Ebola in Africa, and SARS in China. With the advent of international air travel and extensive interchanges between continents of animals, insects, and humans, there is always the potential for the emergence of new and devastating infectious diseases. We should remember the admonition of Hans Zinsser, who warned us decades ago about the tenuous interrelationship between microbes and their human hosts. The following is excerpted from his 1935 book *Rats, Lice, and History*:

> However secure and well-regulated civilized life may become, bacteria, Protozoa, viruses, infected fleas, lice, ticks, mosquitoes, bedbugs will always lurk in the shadows ready to pounce when neglect, poverty, famine, or war lets down the defenses. About the only genuine sporting proposition that remains unimpaired by the relentless domestication of a once free-living human species is the war against these ferocious little fellow creatures, which lurk in the dark corners and stalk us in the bodies of rats, mice, and all kinds of domestic animals; which fly and crawl with insects, and waylay us in our food and drink and even in our love.

There is much interesting material in this issue of the *Infectious Disease Clinics of North America* that is not only of historical value, but of clinical value as well. Physicians should keep it as a reference. After all, “what is past is prologue.” We can benefit from the lessons of the past and be inspired by those great individuals whose insight, dedication, and hard work have brought us to our current state of understanding.

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Further readings

Cartwright FF. Disease and history: the influence of disease in shaping the great events of history. New York: Thomas Y. Crowell; 1972.