

Preface

Historical aspects of infectious diseases, part I



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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 disease is fascinating! The history of mankind may be viewed and analyzed through the lens of infectious disease. Human history has been 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 much can be learned by studying the past to better understand the infectious disease challenges of the present. This issue written by scholars and clinicians is not a monograph on the history of infectious disease, per se, but rather it is a concise overview of selected infectious disease topics in history.

Herodotus and Plutarch believed that history is made by individuals and is not the result of geographic, political, or economic cycles. This belief is also true with infectious diseases. The history of infectious disease is also the history of individuals who have described infections, differentiated one infection from another, isolated or characterized the pathogenic microorganisms, developed diagnostic tests, pioneered treatments, developed preventative public health measures, or developed vaccines or 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 lifecycles, bacteria, fungi, rickettsia, *Chlamydia*, *Mycoplasma*, and protozoa. As a result, great advances have been made in public health, prevention, control measures, and chemotherapy for infectious diseases.

Infectious disease also may 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. 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. With the downfall of Greece and subsequently of ancient Rome, once again in large part caused by the plague of Justinian, history again was changed forever. Immune populations exposed to virulent infections from invaders, decimated native populations and changed history as a result. During the age of exploration, the invasion of Europeans in Latin America, Asia, India, and Africa had important consequences. Explorers, conquerors, and invading armies brought with them insect and rodent vectors that can introduce or sustain infectious diseases in nonendemic areas. Geographically defined disease pools are interrelated precariously and interact with human populations.

Infectious diseases also may be analyzed historically in terms of 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 humans and the microbial world are intriguing. Micro- and macro-organisms strive for survival, with its attendant 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, or 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 that is critical to the pathogen or parasite for leaving the infected host and perpetuating its lifecycle and infection in the next host. Infectious diseases that are characterized by direct human-to-human transmission (ie, direct transmission from host to host) include typhoid fever, measles, chickenpox, and tuberculosis. Symbiotic relationships between microbe and host are even more complex. The bacteria of the gastrointestinal tract (eg, *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 microbes have developed a bewildering variety of countermeasures that allow 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. The evolutionary significance of blood types has its effect on immunity to malaria in African populations, as does sickle cell anemia. The evolution of humans and their host defenses and that of microorganisms and their countermeasures are fundamental to the expression and effects of infectious diseases.

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

This issue on the historical aspects of infectious diseases is divided into two sections. The first section is an overview of the effect of infectious diseases on important events in history. The second section is concerned with the role of individuals in discovering infectious diseases or the effects of infectious diseases on individuals. Because this monograph is not a textbook on the history of infectious diseases, it must necessarily be selective in its topical content. Chapter topics were chosen because of their interest to historians and/or their effect on human history. Part I of the *Historical Aspects of Infectious Diseases* deals with the effects of infectious diseases on the course of history. Dr. Paul Ewald from the University of Kentucky, an evolutionary biologist, has contributed a chapter on the evolution of virulence in infectious diseases. Professor Brier from Long Island University reviews the infectious maladies that affected ancient Egypt. The profound effect of the great plague of Athens on ancient Greek history is contributed by Professor Soupios of Long Island University. Professor Fears, a classics scholar from the University of Oklahoma, relates the plague of Rome to the decline of the Roman Empire. Dr. Tramont discusses the impact of syphilis on civilization, and Dr. Daniel reviews the effects of tuberculosis in human history. Drs. Dumler, Raoult, and Woodward provide an interesting overview of typhus in human history. Part I also includes chapters on influenza, reviewing the great pandemics of the past in historical perspective. The devastating effect of smallpox in the past is also reviewed. An article evaluating the various causes of the great plague of Athens, which remains controversial to this day, is included. Lastly, Part I contains an interesting article on Alexander the Great, one of the greatest figures in history whose demise certainly had an infectious basis. His premature death from an infectious disease changed forever the course of human history.

This issue of the *Infectious Disease Clinics of North America* on historical aspects of infectious diseases reminds readers that investigators stand on the

shoulders of giants in the understanding of infectious diseases, both clinically and at the basic science level. The issue also is intended to spark interest in infectious disease clinicians and to motivate them to read and study in depth 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 one's knowledge. It is hoped the information in this issue serves as a stimulus to pursue further study of infectious disease from a historical perspective.

Many people would like to think that the current society is advanced and sophisticated and is relatively immune from the devastating effect of infectious diseases experienced by the people in the ancient world. No such comfort should be taken in the present situation. The emergence of retroviruses as a worldwide pandemic should leave little reason for comfort. The new infectious diseases always are lurking, as attested to by recent outbreaks of plague in India, Ebola in Africa, and severe acute respiratory syndrome in China. With the advent of international air travel and extensive intercontinental interchanges of animals, insects, and humans, there is always the potential for the emergence of new and devastating infectious diseases. Hans Zinsser warned decades ago about the tenuous interrelationship between the microbes and their human hosts. The following excerpt is 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 on historical aspects of infectious diseases of the *Infectious Disease Clinics of North America* that is of historical and clinical value. Infectious disease clinicians should enjoy reading this historical issue and classic clinical reference. One can benefit from the lessons of the past and be inspired by the great individuals whose insight, dedication, and hard work have brought us to our current state of understanding.

Further readings

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