

Preface

As we place our thoughts together to write the Preface of this book on “Cholera Outbreaks,” we are constantly reminded through all forms of media of the impending outbreak of cholera in Sudan. The country is in the midst of armed conflict resulting in the formation of temporary camps of thousands of displaced people living in poor sanitary conditions and overcrowding; the perfect recipe to initiate an outbreak of cholera. The World Health Organization has dipped into the newly launched stockpile of cholera vaccine and is creating history of sorts in attempting to preempt the outbreak by vaccinating people in these camps using the WHO prequalified bivalent oral cholera vaccine. In many ways this is not “new” news, instead this is news that is retold with remarkable regularity with the only difference being that the name of the country differs each time. Cholera has been exceptionally pervasive during the past three decades, particularly since the beginning of this millennium. The Sudan outbreak was preceded by the Haiti outbreak, which stupefied the world just by its scale, its enormity, and the disputes that arose in its wake. Cholera has this penchant of being in the forefront of news.

What remains a continuing enigma, however, is that we allow it to happen time and again despite the enormous body of knowledge on the pathogen *Vibrio cholerae* and on the disease cholera. Yet we are unable to accurately predict and preempt outbreaks of cholera. The complete genome sequence of more than 150 strains of *Vibrio cholerae* are available in international databases, which have been thoroughly analyzed, explored, teased, and interpreted, we know the epidemiology of the disease through decades of painstaking work; the ecology of the pathogen and the impact of climate change has been thoroughly investigated. We are also aware of simple ways to treat the disease. However, we have not been able to decipher the reason for the ferocious spread of the pathogen during outbreaks of cholera nor have we been able to predict accurately where an outbreak will occur. Ironically, what is most predictable about cholera is its unpredictability.

The genesis of this book is the reaction to a lecture on cholera at the 85th Annual Meeting of Japanese Society of Bacteriology held in Nagasaki from March 27 to 29, 2012. Professor Dr. Klaus Aktories of the Albert-Ludwigs-Universitat Freiburg was in the audience. The lecture evoked his interest and he requested us whether we would be interested to edit a volume on Cholera in the series Current Topics in Microbiology and Immunology. We accepted the offer and are grateful

to Professor Aktories for having initiated our thoughts to edit this book. We chose the topic of cholera outbreaks as the theme because we felt that there is a hiatus in information in the area of cholera outbreaks. Besides, for those who have worked on cholera and were involved in cholera outbreaks in any capacity, it is a life-changing experience.

The book starts with a chapter on cholera outbreaks in the times when classical biotype of *Vibrio cholerae* O1, acknowledged as the more virulent biotype, prevailed. To bring about the contrast between biotypes in relation to cholera outbreaks, “[Cholera Outbreaks in the El Tor Biotype Era and the Impact of the New El Tor Variants](#)” focuses on the El Tor biotype and its recent variants including O139, the altered El Tor and the hybrid El Tor, all of which are a testimony to the subtle changes taking place in the rapidly evolving genome of El Tor *Vibrio cholerae*. We have then focused on an overview of outbreaks of cholera in India, Southeast Asia, Africa, and America to give a continent-wise flavor. There is increasing evidence that the incidence of cholera and the factors that cause cholera outbreaks vary between Asia and Africa. An analysis of a huge outbreak of cholera in Haiti in “[The Cholera Outbreak in Haiti: Where and How did it Begin?](#)” provides an insight into how an outbreak of cholera can overwhelm a country and the controversies that it can generate. The role lytic phages play in modulating cholera epidemics and enhance *Vibrio cholerae* evolution through a bactericidal selection process is highlighted in “[Role of Phages in the Epidemiology of Cholera](#)”. The fate of circulating clones of *Vibrio cholerae* during cholera outbreaks including genetic changes as a result of mutations or acquisition of new genetic sequences is discussed in detail in “[Circulation and Transmission of Clones of *Vibrio cholerae* During Cholera Outbreaks](#)”. Of late, there has been concerted efforts to use mathematical models to synthesize knowledge on cholera into a quantitative framework with an effort to predict and manage cholera, which is discussed in “[Modelling Cholera Outbreaks](#).” The past two decades have seen a quantum leap in Genomic sciences and “[Genomic Science in Understanding Cholera Outbreaks and Evolution of *Vibrio cholerae* as a Human Pathogen](#)” collates this information and extols how this information could be useful from a cholera control viewpoint or from the way clones of the pathogen spread across the globe. The precision of SNP analysis across the whole genome in tracking the spread of the clones of the pathogen is highlighted in great detail. The last chapter analyzes circumstances of when the available cholera vaccines can be used to interrupt cholera outbreaks.

We hope the information provided by domain experts will give you a comprehensive overview on cholera outbreaks and their consequences. It is also in a way to remind the readership that cholera is not an antiquated disease; it is still very much there and will be there in places where hygiene and sanitation is compromised. Putting this book together has been a delightful assignment. We are indebted to all the authors and coauthors of the 11 chapters for their cooperation and for all the effort to prepare the chapter. Without their contribution, this book would not exist. We applaud their expertise and acknowledge their efforts.

Finally, the book is a celebration of collaboration between the two Editors for more than three decades—a collaboration bonded by research on cholera. The 30-

plus years have been humbling and a learning experience. Cholera continues to persist and devastate especially among the marginalized section of the world. It is like a fire that cannot be put off.

G. Balakrish Nair
Yoshifumi Takeda

Cholera Outbreaks

Nair, G.B.; Takeda, Y. (Eds.)

2014, X, 263 p. 25 illus., 21 illus. in color., Hardcover

ISBN: 978-3-642-55403-2