

Cholera in the Middle East and North Africa

Karen Wellner, Biology, Chandler-Gilbert Community College

Earlier in the Bio 205 (Introductory Microbiology) course, my students were introduced to *Vibrio cholera*, the causative agent of cholera. The pathogenicity, laboratory diagnosis, vaccinology, and importance of John Snow's epidemiological work with cholera are presented. In textbooks, the story of cholera usually ends with Snow's work, as if all one had to do was eliminate contaminated water and the problem of cholera is solved.

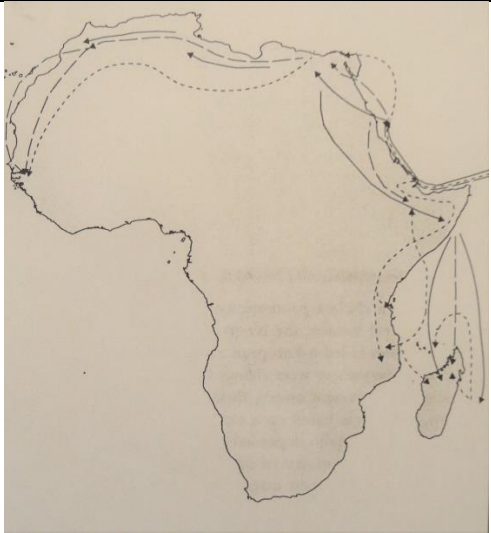
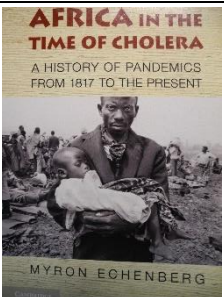

Rarely is there much discussion of why cholera is still a major disease in Africa and the Middle East. At the end of Snow's work, I asked students to answer this question: Here we are in 2020 and all kinds of medical technology and infectious disease prevention tools available to us. Why then do we still have so many people around the world dying from infectious disease? While I do not specifically state anything about cholera, this disease is one that many people around the world die from on a daily basis.


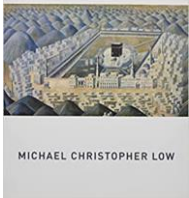

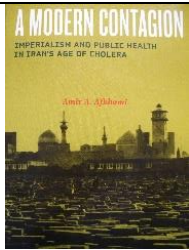
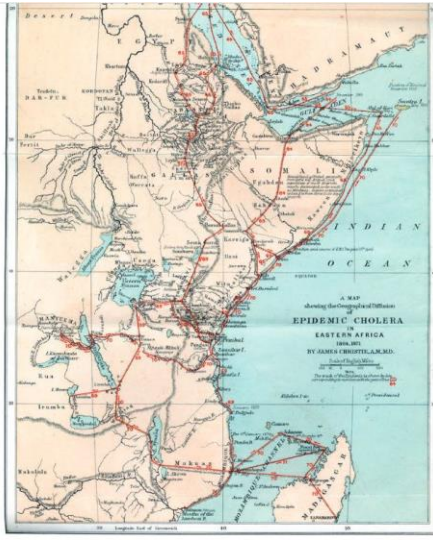
Ranked responses (some responders gave more than one answer)

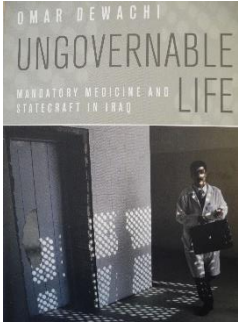
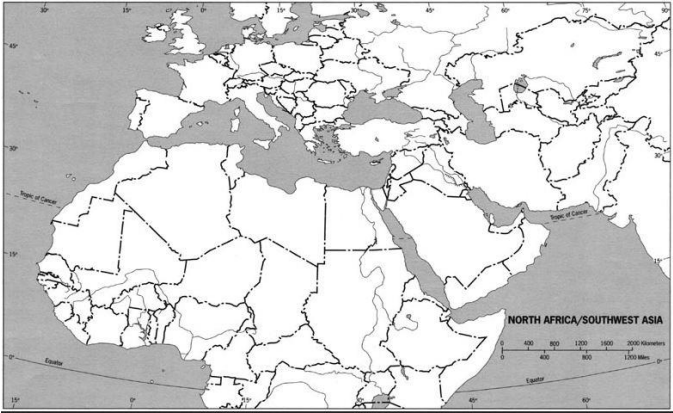
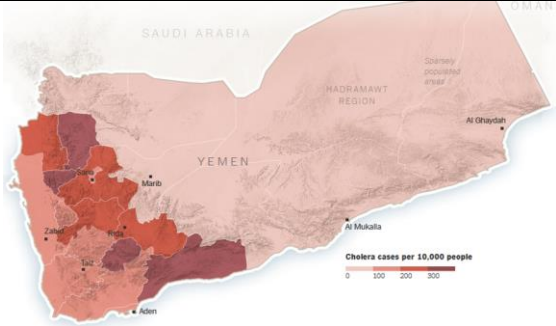
1. Low income/isolated areas/lack of infrastructure: 50
2. organisms mutate or "get stronger": 21
3. uneducated/unawareness/ignorance: 11
4. lack of proper precautions/personal hygiene: 10
5. not enough research/no cure found yet: 7
6. anti-vaxxers: 6
7. availability of drugs: 7
8. people with poor physiological/immune responses: 5
9. no political will: 5
10. religious beliefs: 4
11. lack of clean water/poor nutrition: 3
12. overpopulation: 2
13. simply hard to control: 2
14. antibiotic resistance: 2
15. lack of imagination: 1

Not only do my students think of the Middle East as an ecologically marginal environment with little improvement to human life, they also have no perception of microbial diseases endemic to the region, or public health campaigns that have been put in place to tackle infectious disease. Simply put, there is an intellectual void in contemporary public health and infectious disease in North Africa and the Middle East.

With a risk factor sheet, each student is given one article pertaining to one country and one cholera epidemic time period. There is also a map of the country or city to give the reading more context. From the reading, students identify key risk factors for their particular epidemic. In class, students who were assigned the same reading will work together and compare their risk factor sheets, making adjustments if necessary or adding risk factors not on the risk factor sheet. Group conclusions are compared and a whole class conclusion about cholera is generated; The readings and maps for the assignment are shown in this table:

Epidemic	Duration	Country Targets	Reading	Map
1	1817–1826	African coast Baghdad Tehran		
2	1828–1836	Egypt	 <p data-bbox="591 1346 837 1801">Parts of chapter 1 <i>In Quest of Justice: Islamic Law and Forensic Medicine in Modern Egypt</i> by Khaled Famy and parts of <i>Africa in the Time of Cholera. A History of Pandemics from 1817 to the Present</i> by Myron Echenberg (2011)</p>	

<p>3</p>	<p>1839–1861 John Snow's work</p>	<p>Egypt</p>	<p>Parts of “Cholera, Colonialism, and Pilgrimage: Exploring Global/ Local Exchange in the Central Egyptian Delta, 1848–1907.” By Stephanie Boyle. <i>Journal of World History</i> 26(3) 581-604. 2015.</p>	 <p>A detailed map of the Nile Valley region, showing the Mediterranean Sea to the north, the Nile River flowing through Egypt and Sudan, and the Red Sea to the east. Major cities like Cairo, Khartoum, and Addis Ababa are marked. The map includes a scale and a legend for various symbols.</p>
<p>4</p>	<p>1863–1879</p>	<p>Saudi Arabia (Hijaz)</p>	<p>IMPERIAL MECCA Ottoman Arabia and the Indian Ocean Hajj</p>  <p>MICHAEL CHRISTOPHER LOW</p> <p>“Microbial Mecca and the Global Crisis of Cholera,” 141-148. In <i>Imperial Mecca. Ottoman Arabia and the Indian Ocean Hajj</i> by Michael Low. 2020.</p>	 <p>A world map with arrows indicating global trade routes and the diffusion of cholera. Key locations like London, Paris, Milan, Istanbul, Baghdad, and New Delhi are highlighted. The map shows the spread of the disease from the Middle East to other parts of the world.</p>
<p>5</p>	<p>1881–1896 Koch's work</p>	<p>Iran</p>	<p>A MODERN CONTAGION IMPERIALISM AND PUBLIC HEALTH IN IRAN'S AGE OF CHOLERA</p>  <p>“The 1889-1893 Cholera Epidemic” in, <i>A Modern Contagion. Imperialism and Public Health in Iran's Age of Cholera</i> by Amir A. Afkhami (2019) and “History of Cholera Outbreaks in Iran during the 19th and</p>	 <p>Figure 79 Christie's map of cholera diffusion in East Africa. Sequential numbers are used in the text to describe the diffusion of the disease by caravan, religious pilgrimage, and sea routes. Source: Christie (1878).</p>

			20 th Centuries” by M. H. Azizi, <i>Middle East Jour. of Digestive Diseases</i> Vol 2(1):51-55. 2010	
U.S. Incidence of Cholera Drops Drastically				
6	1899–1923	Iraq	 <p><i>Ungovernable Life. Mandatory Medicine and Statecraft in Iraq</i> by Omar Dewachi (2017)</p>	
7	1961–2022	Yemen	<p>“It’s a Slow Death: The World’s Worst Humanitarian Crisis.” <i>NYT</i>. 23, 2017 and “Mystery of Yemen Cholera Epidemic Solved.” <i>Science Daily</i> Jan. 2, 2019</p>	

I hope to help students see why the United States has become relatively cholera-free since the Civil War. Since then, with adoption of the Germ Theory of Disease, Federal and State Public Health systems, and engineering focused on clean water and sanitation has resulted in a tremendous drop and maintained drop in cholera. Since medicine and microbiology are so focused on what has happened in the U.S. and Europe, it is not a surprise that students think cholera is “no big deal”.

In the student readings, some of the countries the readings examine also took action just like the United States. But those countries have suffered from Civil Wars and ineffective public health systems which has disrupted the infrastructure and health care systems. The United States has not had a war on American soil since 1865. It’s not that *Vibrio cholera* has disappeared in the United States; it’s just that we have had far fewer risk factors that we must contend with.

After completing the assignment, we returned to the questionnaire results to see how students felt about their answers once investigating cholera epidemics and to get a better explanation of why the U.S. remained cholera free since 1866. The classes agreed that epidemics are described differently, depending on who is telling the story and that epidemics like cholera and COVID-19 are more complex than complicated.