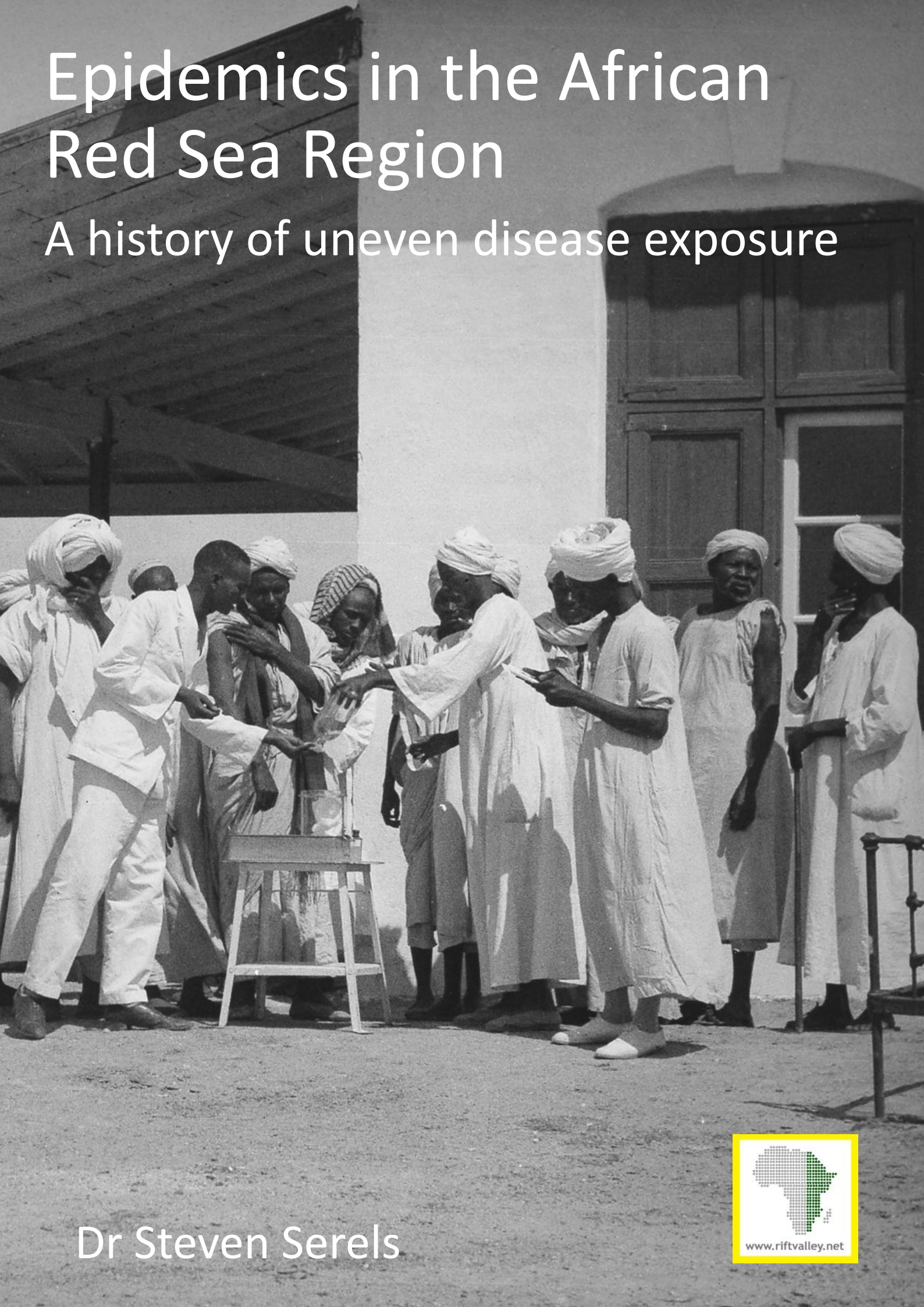


Epidemics in the African Red Sea Region

A history of uneven disease exposure



Dr Steven Serels



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Cover image: Vaccination of pilgrims leaving for Mecca from Suakin Port, Sudan © C.J.F.E. Bloss

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Summary

- The sustained movement of people, goods and ideas across the African Red Sea Region has been and continues to be so intense that it binds together communities throughout the region in a unified multifaceted socio-economic system that transcends ethnic, linguistic and political divides.
- Where people went, viruses, bacteria and parasites followed. As a result, this region—comprised of present-day Sudan, Eritrea, Ethiopia, South Sudan, Djibouti and Somaliland—should be treated as a single disease environment.
- This report examines the history of epidemic disease in this region in order to shed light on the current COVID-19 pandemic and its likely course. Rather than attempt to be comprehensive, this study focuses on three diseases that have caused at least one serious regional epidemic over the past two hundred years: Cholera, smallpox and syphilis.
- The courses of these epidemics have been shaped by political violence and structural poverty. These two forces combined have led to an intensification of human migration across the region and to the growth of cities, creating new patterns of disease transmission and potential nodes of infection.
- Over the last two centuries, the regional disease burden has shifted. Previously, risk was shared across various segments of society. At present, however, there are new social classes that are uniquely exposed to contagious infectious diseases, including refugees and internally displaced people living in camps and settlements, and the urban poor.
- This uneven disease exposure will likely structure the course of the current COVID-19 pandemic. High-risk groups also tend to suffer from malnutrition or undernutrition and other previously under-control diseases rendering them even more vulnerable as COVID-19 spreads through the region.

1. Introduction

On 12 March 2020, a Sudanese man who had just returned from the United Arab Emirates died of COVID-19. He was the first confirmed case of the novel coronavirus in Sudan.¹ The following day, the government of Ethiopia announced the first COVID case in the country, an elderly Japanese tourist.² The day after that, a member of the Spanish special forces arrived in Djibouti, sick with the virus. He would later be identified as the first confirmed case of the novel disease in the country.³

At 7 a.m. on 21 March 2020, an Eritrean national with permanent residence in Norway arrived on a Fly Dubai flight already exhibiting symptoms. The Eritrean government immediately declared him the first confirmed case.⁴ Ten days later, the government of Somaliland identified two individuals—a Chinese man and a Somali who had recently returned from the United Kingdom—as the first corona cases there.⁵ A few days later, a woman who had arrived from Ethiopia in early February was declared the first confirmed case of COVID-19 in South Sudan.⁶

These may not have been the first cases in the region. No one can know for certain when the virus arrived because testing was slow to get started.⁷ Nonetheless, it is clear that as the first cases were being identified in March 2020, community transmission was already occurring. As a result, the quarantine, isolation and social distancing protocols that were subsequently implemented were too late and incomplete to prevent further spreading of the virus. By the beginning of September 2020, there were more

1 'Sudan Reports First Coronavirus Case', *The East African*, 13 March 2020. Accessed 20 June 2020, <https://www.theeastafrican.co.ke/scienceandhealth/Sudan-reports-first-coronavirus-case/3073694-5489948-j7ya0lz/index.html>.

2 'Ethiopia Confirms its First Case of Coronavirus', *Reuters*, 13 March 2020. Accessed 20 June 2020, <https://www.reuters.com/article/us-health-coronavirus-ethiopia/ethiopia-confirms-its-first-case-of-coronavirus-idUSKBN2101KF>.

3 'Djibouti Confirms its First Case of Coronavirus—Health Ministry', *Reuters*, 18 March 2020. Accessed 20 June 2020, <https://www.reuters.com/article/health-coronavirus-djibouti/djibouti-confirms-its-first-case-of-coronavirus-health-ministry-idUJL8N2BB4MA>.

4 'Eritrea Confirms First Coronavirus Case, in Arrival from Norway', *Reuters*, 21 March 2020. Accessed 20 June 2020, <https://www.reuters.com/article/us-health-coronavirus-eritrea/eritrea-confirms-first-coronavirus-case-in-arrival-from-norway-idUSKBN2180XU>.

5 Harun Maruf, 'Somaliland Reports First COVID-19 Case', *Voice of America News*, 31 March 2020. Accessed 20 June 2020, <https://www.voanews.com/science-health/coronavirus-outbreak/somaliland-reports-first-covid-19-cases>.

6 'South Sudan Confirms First Case of Coronavirus' *Reuters*, 5 April 2020. Accessed 20 June 2020, <https://www.reuters.com/article/us-health-coronavirus-southsudan/south-sudan-confirms-first-case-of-coronavirus-idUSKBN21NOEA>.

7 Francis Kobia and Jesse Gitaka, 'COVID-19: Are Africa's Diagnostic Challenges Blunting Response Effectiveness.' *AAS Open Research* 3:4 (17 April 2020) doi:10.12688/aasopenres.13061.1 [Accessed 1 September 2020]

than 74,720 confirmed cases in total in these six countries.⁸ This number only partially captures the extent of the spread of the disease throughout the region, as the testing rate has been low.⁹

This is not the first time that a pandemic has spread across Sudan, Eritrea, Ethiopia, South Sudan, Djibouti and Somaliland (Somalia).¹⁰ HIV spread to the region around 1984.¹¹ Cholera has come in waves in a series of pandemics since 1817, with the current one still ongoing.¹² Smallpox, a disease that had made its way to every corner of the globe before being eradicated in the 1970s, likely originated in Ethiopia.¹³

Other diseases have also spread across vast distances into these countries. Syphilis and sleeping sickness were unknown to Somaliland and South Sudan before they caused devastating twentieth century epidemics. There are other diseases that are now endemic to the region that originated in distant lands, including malaria, meningitis, measles and relapsing fever, to name just a few.

Disease causing viruses, bacteria and parasites often travelled into and out of this region in human hosts. The history of these diseases is, therefore, a history of human movement. Migration into and within the African Red Sea Region is not a novel present-day phenomenon. In fact, it predates all written historical records. Long before the invention of motorized transport in the nineteenth century, communities in the region had developed an extensive network of ports, roads and markets that connected the Sudanese Nile, the Ethiopian highlands, the Awash River Valley, the Red Sea Hills and the Somali Ogaden Plateau to one another and to far flung trading partners across the Indian Ocean World.

Historically, there were a number of reasons why people moved along this network. Many people migrated for trade. For some, this movement was just over a short distance, for example from a farm to a market. For others, this was over very long distances. For example, for centuries local merchants have been travelling by caravan from the Ethio-

8 For countrywide data COVID-19 incidence data, see: <https://www.worldometers.info/coronavirus/>. Accessed 2 September 2020. This database does not disaggregate Somaliland data from that of Somalia. Therefore, the number of cases for Somaliland has been left out of this figure. As of 2 September 2020, Somalia, including Somaliland, had had 3310 confirmed COVID-19 cases.

9 Pascale Ondo et al. 'COVID-19 Testing in Africa: Lessons Learnt,' *Lancet Microbe*, 1:3 (July 2020) e103-e104.

10 On 18 May 1991, Somaliland unilaterally declared independence from Somalia. Its independence is not recognized by most countries and it is not a member of the United Nations. As a result of this status, statistics for Somaliland are often aggregated with that of Somalia.

11 John Iliffe, *The African AIDS Epidemic: A History*, Oxford: James Currey, 2006, 30.

12 Paul A Blake, 'Historical Perspectives on Pandemic Cholera' in *Vibrio Cholerae and Cholera: Molecular to Global Perspectives*, I Kaye Wachsmuth, Paul A Blake and Ørjan Olsvik, eds., Washington DC: American Society for Microbiology, 1994, 294.

13 Igor V. Babkin and Irina N. Babkina, 'The Origin of the Variola Virus,' *Viruses* 7/3 (March 2015): 1100-1112.

pian highlands and the Sudanese Nile to ports along the African Red Sea littoral, where they traded with merchants arriving from India.

Trade was not the only motivation for human migration. Pastoralists moved from winter pastures in the lowlands to summer pastures along the slopes of the Ethiopian plateau and in the Red Sea Hills. Religion also inspired many to go on pilgrimages to Christian holy sites in Ethiopia or across the Red Sea to the Muslim holy cities of Mecca and Medina.

The movement of people, goods and ideas along this network was so intense that it bound communities throughout the African Red Sea Region to one another in a unified multifaceted socio-economic system that transcended ethnic, linguistic and political divides. In the twentieth century, while the region was being carved up into territorially bound states with fixed borders, intra-regional links actually increased as a result of modern communications technologies. The construction of train lines, the development of ferry networks, the adoption of motorized trucks and the building of paved highways has accelerated and, therefore, intensified movement within this region.¹⁴

Where people went, viruses, bacteria and parasites followed. While planes, cars, trucks, buses and trains were allowing viruses and diseases to move faster over larger distances, increased political instability and worsening poverty were creating new nodes for disease transmission. These social, political and economic conditions have produced patterns of uneven exposure to contagious diseases that can be seen playing out during the continuing COVID-19 pandemic.

Late twentieth century wars among newly established states and non-state militias have precipitated a regional refugee crisis, as well as sparked large-scale internal displacement in some countries. Though some people have sought to escape the violence by migrating to Europe, many refugees move across state borders within the African Red Sea Region and settle in crowded camps with poor sanitation.¹⁵

Similarly, millions of increasingly impoverished men, women and youths have migrated from the countryside, often moving to dense improvised settlements in growing cities. Limited economic opportunities there have pushed many into the informal economy, making them financially dependent on physical contact with numerous people.

This study uses a regional perspective to examine the history of epidemic diseases in Sudan, South Sudan, Eritrea, Ethiopia, Djibouti and Somaliland (Somalia). Understanding this history offers crucial insights into the possible short, medium and long-term consequences of the continuing COVID-19 outbreak in the African Red Sea Region. Rather than provide a sweeping overview, this study focuses on three diseases: Cholera, smallpox

14 Steven Serels, *The Impoverishment of the African Red Sea Littoral, 1640–1945*, New York: Palgrave Macmillan, 2018a, 3–6.

15 Sandile Lukhele, 'East Africa Copes with a Refugee Burden', *Africa Conflict Monitor* 2015/5 (May 2015): 44–50; Iván Martín and Sara Bonfanti, 'Migration and Asylum Challenges in Eastern Africa: Mixed Migration Flows Require Dual Policy Approaches', Policy Brief, Florence: Migration Policy Centre, European University Institute, 2015.

and syphilis. Each of these diseases has been epidemic in the region at least once over the past two centuries.

Over this time period, a relatively small number of state-connected elites have gained access to modern sanitation technologies to protect themselves from falling ill. They also have gained access to state-of-the-art healthcare when they are sick. The majority of the population has not been able to benefit from these life saving measures.

For many people, growing structural poverty, the expansion of cities and the persistence of state-sponsored violence have increased their susceptibility to epidemics when they have broken out. A number of new high-risk groups for contagious diseases have emerged over the past century, including female sex workers, the urban poor, refugees and internally displaced persons. This uneven pattern of disease exposure to past epidemics is repeating itself during the current COVID-19 pandemic.

2. Cholera: A disease of mobility and poverty

Cholera is now a disease endemic to the African Red Sea Region. Each year there are more than 380,000 cases of the disease there, resulting in 14,000 deaths per annum (see Table 1).¹⁶ This has not always been the case. Cholera only became endemic to the region at the turn of the twenty-first century. Previously, the disease spread to the region in waves as part of global pandemics.

Table 1. Average annual cases of cholera between 2008 and 2012

Country	Cases per annum	Deaths per annum
Djibouti	684	22
Eritrea	21,816	829
Ethiopia	275,221	10,458
Somalia	12,169	389
South Sudan	29,425	1,118
Sudan	43,267	1,385

Source: M Ali, et al., 'Updated Global Burden of Cholera in Endemic Countries'. The authors of this study did not disaggregate the data for Somaliland from that of Somalia.

The first of these pandemics began in 1817, although there is some debate as to how many subsequent pandemics there have been and how long each one has lasted. Most scholars identify seven global cholera pandemics: 1817–1826, 1828–1836, 1839–1861, 1863–1879, 1881–1896, 1899–1847 and 1970 to the present.¹⁷ There is reason to believe, however, that this periodization is flawed. The bacteria that causes cholera, *Vibrio cholerae*, can live indefinitely in the environment, under specific conditions, without a human host. As a result, it is not clear that the breaks in cases reflect end points in pandemics.

Recently, a number of scholars have proposed that there have been just three cholera pandemics. Each of these pandemics corresponds to the spread of a different biotype of *V. cholerae*. The first began in 1817, when *V. cholerae* 01 spread from India. The beginning of the second one is less clear. *V. cholerae* El Tor likely first emerged in Asia, though it was initially identified in Egypt in 1905 and caused its first significant outbreak in Indonesia in 1961. The third was caused by *V. cholerae* 0139, which arose in India and Bangladesh in 1992 and has subsequently spread worldwide.¹⁸

16 Mohammad Ali, et al., 'Updated Global Burden of Cholera in Endemic Countries', *Public Library of Science: Neglected Tropical Disease* 9/6 (2015). Accessed 22 June 2020, <https://journals.plos.org/plosntds/article?id=10.1371/journal.pntd.0003832>.

17 Myron Echenberg, *Africa in the Time of Cholera: A History of Pandemics from 1815 to the Present*, Cambridge: Cambridge University Press, 2011, 18–25.

18 Blake, 'Historical Perspectives on Pandemic Cholera,' 1994, 294.

No matter how the pandemics are divided, it is clear that cholera spread across the African Red Sea Region in waves. There were outbreaks in the region recorded in 1830–1831, 1834, 1835–1839, 1846–1850, 1855–1857, 1865–1867, 1870–1872, 1889–1892, 1893, 1902 and 1906.¹⁹ After remaining cholera free for decades, the disease returned to the area in the 1970s. Though this mild outbreak quickly died down, there was another regional outbreak in the 1990s. This one has not yet ended.²⁰



Image 1. These women brought water to the archaeological excavation at Jebel Moya run by the British pharmaceutical tycoon and philanthropist Henry Wellcome from 1911 to 1914. Wellcome was as dependent on women such as these for water as were the Sudanese men who worked for him on this dig. As a result, they equally shared the risk of contracting cholera from contaminated drinking water. *Water carriers in Soudan (Jebel Moya)*. Credit: [Wellcome Collection](#). Attribution 4.0 International (CC BY 4.0)

At present, cholera is considered a disease of poverty because it is linked to poor sanitation. It is a faecal-oral transmitted disease. That is, its main mode of transmission is

¹⁹ Echenberg, *Africa in the Time of Cholera*, 49; Ahmed Bayoumi, *The History of Sudan Health Services*, Nairobi: Kenya Literature Bureau, 1979, 52.

²⁰ Echenberg, *Africa in the Time of Cholera*, 112–123.

through the ingestion of water contaminated with the faeces of the sick. Only the global poor, with few notable exceptions, still lack access to safe sources of water. This uneven access is, however, a new phenomenon.

Historically, all members of a community depended on the same limited set of water sources, especially in areas where settlements were small and water was scarce. For example, the estimated 400 huts that comprised the entire village of Hargeisa in the Somaliland interior was dependent on just a single well for its water supply when cholera hit in 1892.²¹ As a result, members of every segment of society in the African Red Sea Region died from cholera in the nineteenth century.

State elites were just as susceptible to cholera as anyone else. Cholera repeatedly struck the camp of successive Ethiopian emperors over the course of the nineteenth century.²² European colonial officials were also not immune. The 1893 outbreak in Djibouti killed many, including the colonial governor and the chief medical officer.²³

In the nineteenth century, cholera was a disease of mobility and global connection. *V. cholerae* repeatedly came to the African Red Sea Region in the bodies of people on the move. Often, they caught the disease in western Arabia, an area particularly susceptible to cholera outbreaks because it is home to the Muslim holy cities of Mecca and Medina. Every Muslim is required, if able, to go on the *Hajj* (pilgrimage to Mecca) at least once over the course of their lifetime. As a result, tens of thousands of pilgrims from all over the Muslim world travelled to Arabia every year. Between 1831 and 1896 there were at least 16 severe cholera outbreaks in Mecca. During severe ones, as many as one-third of all pilgrims died from the disease.²⁴

Jeddah, the port that serves Mecca, has also historically been an important emporium for international trade. Boats loaded with trade goods and passengers left Jeddah daily for smaller Red Sea ports, such as Sawakin in Sudan and Massawa in Eritrea. The short ride across the sea could be completed before the onset of symptoms, which can appear up to five days after exposure. A returning pilgrim or merchant could already be on a caravan route hundreds of kilometres into the African interior before he or she felt sick.

Cholera was also a disease of war and famine. Moving troops and fleeing refugees spread the disease. For example, the British-led force that conquered Sudan from 1895 to 1898 spread cholera to villages along the Sudanese Nile.²⁵ Similarly, the 1892 outbreak in Hargeisa began in the camp of the Ethiopian force sent to raid cattle from Somaliland.

21 H G C Swayne, *Seventeen Trips through Somaliland: A Record of Exploration and Big Game Shooting, 1885 to 1893*, London: Rowland Ward and Co., 1895, 7; Jama Mohamed, 'Epidemics and Public Health in Early Colonial Somaliland', *Social Science & Medicine* 48/4 (1999): 509.

22 Echenberg, *Africa in the Time of Cholera*, 49–50.

23 Richard Pankhurst, 'The History of Cholera in Ethiopia', *Medical History* 23/3 (July 1968): 268.

24 William Ochsenwald, *Religion, Society and the State in Arabia: The Hijaz under Ottoman Control, 1840–1908*, Columbus: Ohio State University Press, 1984, 65–71.

25 Tarik Elhadd, 'Medicine and Medical Practices during the Mahdiyya (1881–1898)', *Sudan Medical Journal* 50/2 (August 2015): 25.

Ethiopian soldiers spread the disease to the Somalis who fled to Hargeisa, who in turn spread it to the people of the town.²⁶

The 1892 outbreak was not limited to Hargeisa. Every part of the African Red Sea Region experienced this disease. It was able to spread so widely because it occurred amidst a devastating regional famine that had begun in 1888. Studies of more recent famines have shown that few people die of starvation during these food crises. Rather, malnutrition caused by the famine increase susceptibility to diseases such as cholera. At the same time, famine victims typically migrate in search of food. They often congregate in makeshift camps, where increased density makes the spread of disease likely.²⁷



Image 2. A Hadendowa militia standing behind an Egyptian military police officer after the Battle of Attbara in 1897. During the campaign to conquer Sudan, the British-led Egyptian army spread cholera as it marched south. © IWM HU 93854

Since the 1990s, cholera in the African Red Sea Region has been delinked from mobility. The disease no longer needs to be imported. There are persistent natural reservoirs

26 Echenberg, *Africa in the Time of Cholera*, 49.

27 Alex de Waal, 'Famine Mortality: A Case Study of Darfur 1984–1985', *Population Studies* 33/1 (March 1989): 5–24; Center for Disease Control, United States Government, 'Mortality During a Famine—Gode District, Ethiopia, July 2000', *Morbidity and Mortality Weekly Report* 50/15 (2001): 285–288.

of cholera throughout area. At present, climate change induced water crises, such as floods and droughts, create the conditions for localized outbreaks.²⁸

Susceptibility to cholera is no longer shared evenly across all segments of society in the African Red Sea Region. Refugees and internally displaced people are at a particularly elevated risk because they tend to lack access to the medical care that would render cholera survivable. As a result, at times the case fatality rate of the disease in refugee camps in Sudan and Ethiopia has been up to three times that in the general population.²⁹

Further, proper water and sewage management infrastructure protect the wealthier neighbourhoods in larger cities. Generally, this infrastructure does not extend to improvised neighbourhoods, crowded slums or camps and settlements for refugees and internally displaced people. Consequently, these areas are now imported foci of cholera infection.³⁰

28 Stanislas Rebaudet, et al., 'Environmental Determinants of Cholera Outbreaks in Inland Africa: A Systematic Review of Main Transmission Foci and Propagation Routes', *The Journal of Infectious Diseases* 208/1 (1 November 2013): S46–S54.

29 David L Swerdlow and Margaretha Isaäcson, 'The Epidemiology of Cholera in Africa' in *Vibrio Cholerae and Cholera: Molecular to Global Perspectives*, I Kaye Wachsmuth, Paul A Blake and Ørjan Olsvik, eds., Washington DC: American Society for Microbiology, 1994: 303–305.

30 Stanislas Rebaudet, et al., 'Environmental Determinants of Cholera Outbreaks in Inland Africa,' S50-S51.

3. Smallpox: A disease of violence

Unlike cholera, smallpox likely has been present in the African Red Sea Region for as long as it has existed as a human disease. There is a growing scientific consensus that smallpox emerged in Ethiopia sometime after the introduction of camels 3,500 to 4,500 years ago. Camels played a crucial role in the emergence of the disease. They acted as intermediary hosts, allowing an *Orthopoxvirus* common to a species of native naked-soled gerbil to evolve into the virus that causes camel pox. That virus then evolved into *Variola major*, the virus that causes smallpox.³¹

Variola major is very infectious in humans, spreading as an airborne aerosol, through direct contact with an infected person and via contaminated surfaces. As a result, smallpox almost immediately began spreading out of Ethiopia along already established regional trade routes. By at least 1350 BCE it was present in Egypt. Three Egyptian mummies, including that of Ramses V, show evidence of smallpox lesions. This physical evidence is more than one thousand years older than any written description of the disease located elsewhere in the world. The disease then spread across Asia, reaching India before the Common Era and China around the fourth century.³²

The symptoms of smallpox include fevers, vomiting and skin rashes that scab over and permanently scar survivors. Approximately one-third of all people who contract the virus die from the disease.³³ Those that survive acquire a lifelong immunity. These unique characteristics produce two kinds of outbreaks.

In virgin populations (those that have not been exposed to a specific pathogen), the disease spreads quickly and rapidly kills many people of all ages. When upwards of 80 per cent of the population has developed an acquired immunity by contracting and surviving smallpox, community transmission becomes unlikely. Probabilistically, the sick will primarily encounter people with acquired immunity, who can neither become re-infected nor pass the disease on to the vulnerable. Referred to as ‘herd immunity’, this breaks the chain of transmission and allows the outbreak to end on its own.³⁴

Densely populated regions that already have experienced the disease can have a second type of outbreak, often referred to as ‘epidemic years’. These occur when the vulnerable population grows to such an extent that herd immunity is broken and community

31 Babkin and Babkina, ‘The Origin of the Variola Virus,’ 1100-1112.

32 Babkin and Babkina, ‘The Origin of the Variola Virus,’ 1100–1112.

33 Institute of Medicine of the National Academies, Board on Health promotion and Disease Prevention, *Scientific Policy Considerations in Developing Smallpox Vaccination Options: A Workshop Report*. Washington DC: The National Academies Press, 2002, 4.

34 Tae Hyong Kim, et al., ‘Vaccine Herd Effect’, *Scandinavian Journal of Infectious Diseases* 43/9 (September 2011): 683–689.

spread again becomes possible. This can happen through migration or natural population growth. Historically, herd immunity was lost to natural population growth every 7 to 12 years, barring other complicating factors such as war. During these epidemic years, infections were limited primarily to children, with some spread to those adults who did not catch the disease during previous outbreaks.³⁵

Prior to the twentieth century, outbreaks of smallpox in agricultural zones in Sudan and Ethiopia occurred in waves of epidemic years. Records are clearest for the nineteenth century. There were outbreaks in 1815, 1824–1825, 1838–1839, 1850–1851, 1865, 1878–1879, 1885–1887 and 1889–1890. The disease predominantly affected children, with a case fatality rate of around 30 per cent.³⁶

Though smallpox has long been endemic to these parts of the African Red Sea Region, there remained immunologically naïve populations in neighbouring areas. Well into the nineteenth century, there were large non-immune adult populations in the territories that would become present-day South Sudan, Somaliland and Djibouti, as well as in the lowlands around the Ethiopian plateau. It is likely that there were epidemics in these areas in the past; however, the disease had not become endemic to these territories. South Sudan had been protected by the Sudd, an impenetrable swamp that prevented easy communication with more northern communities.³⁷ The other territories were protected by low population density and an arid environment that could only support transhumant pastoralism.³⁸

This situation changed in the nineteenth century. Smallpox was introduced to these immunologically naïve populations, causing devastating epidemics that killed many. These epidemics can be tied directly to the intensification of cattle and slave raiding. Both of these activities were central to the extension and consolidation of state power in the region.

Intensive slave raiding began in South Sudan in the first third of the nineteenth century. Initially, these raids were led by the Egyptian Army. Egypt had conquered Sudan in 1821 and used its base along the main Nile channel to launch raids southward. The goal was to capture men to build up the slave army. In the middle of the nineteenth century, colonial officials eased the government monopoly on slave raiding. Private mercenary armies began kidnapping people and forcing them to march north, to Sudan and Egypt.³⁹

The communities that were raided were generally not immune to smallpox. They had not suffered from repeated smallpox outbreaks, as had communities further north along

35 F Fenner, et al., 'Smallpox and its Eradication', Geneva: World Health Organization, 1988, 224.

36 Fenner, et al., 'Smallpox and its Eradication', 235.

37 Robert Collins, *The Waters of the Nile: Hydropolitics and the Jonglei Canal 1900-1988*, Princeton: Markus Wiener Publishers, 1990, 66-87.

38 Serels, *The Impoverishment of the African Red Sea Littoral, 1640-1945*, 1-23.

39 P M Holt and M W Daly, *A History of the Sudan from the Coming of Islam to the Present Day*, 4th edition, London and New York: Longman, 1988, 70-72.

the Nile. As is evident from the high case fatality rate of smallpox among South Sudanese slaves, adults in this region did not have an acquired immunity. For example, all slave soldiers stationed in Khartoum died during the 1838–1839 outbreak.⁴⁰ Mortality from smallpox was so great among slave soldiers from South Sudan that in 1851 the Egyptian government required every slave brought to Cairo to be vaccinated upon arrival.⁴¹

Predatory raiding by the Ethiopian Empire was responsible for outbreaks along its southern and south-western frontiers. These raids increased in the wake of the devastating 1888–1892 famine that effected every part of the African Red Sea Region. In the Ethiopian highlands, starving men, women and children migrated in large numbers in search of food. These famine refugees became the vectors for the spread of a number of infectious diseases, including smallpox.

In the midst of this smallpox outbreak, Emperor Menelik sent a force of 4,000 men led by Ras Makonnen, the governor of Harrar, to raid cattle from neighbouring Somaliland.⁴² The advancing Ethiopian force spread smallpox to the Somalis they sought to raid. Fleeing Somali refugees spread the disease throughout the countryside and to the port of Berbera. By the end of the outbreak, 2,000 people had died at Berbera and untold more in the countryside.⁴³

This raid marks a turning point in the history of smallpox in Somaliland. Previously, outbreaks had been confined to seasonal coastal ports. In the nineteenth century, travellers passing through the interior of the country did not report seeing tell-tale smallpox scars on the local population. Subsequent to this raid, there were outbreaks in Somaliland in 1901, 1904–1905, 1910–1912, 1919–1920 and 1935–1936. Each of these outbreaks can be linked to military campaigns by either the Ethiopian, British or Italian armies.⁴⁴

The 1920s marked another transition in the history of smallpox in the African Red Sea Region. The case fatality rate for smallpox infections dropped dramatically. The disease became less deadly. This change had little to do with advances in medical treatment. The only known effective treatment continued to be prevention through immunization; however, this was not available to communities in the region. Though the local population readily volunteered to be immunized when these state-run programmes began in the twentieth century, the vaccines that were administered were largely ineffective. Until the adoption of freeze-dried vaccines in the 1960s, vaccines needed to be refrigerated before use, a task that was impossible for the mobile vaccination programmes. In

40 Clive A Spinage, *African Ecology—Benchmarks and Historical Perspectives*, New York: Springer, 2012, 1239.

41 Spinage, *African Ecology*, 1236.

42 Steven Serels, 'Famine and Slavery in Africa's Red Sea World, 1887–1914' in *Bondage and the Environment in the Indian Ocean World*, Gwyn Campbell, ed., New York: Palgrave Macmillan, 2018b, 234–235.

43 Mohamed, 'Epidemics and Public Health', 510.

44 Mohamed, 'Epidemics and Public Health', 508–510.

1951, the Sudan Medical Service had to admit that only 40 per cent of all administered vaccines had been successful.⁴⁵ Other programmes in neighbouring countries likely had similar results.



Image 3. Muhammad Ahmad al-Mahdi died in 1885, likely of smallpox, shortly after leading a successful rebellion that forced Egypt to withdraw its colonial administration of Sudan. Smallpox spread easily in Sudan during the Mahdist Rebellion (1881-98) as persistent fighting and a policy of forced migration broke communities' limited acquired immunity. © Wikipedia

⁴⁵ Gerald W Hartwig, 'Smallpox in the Sudan', *The International Journal of African Historical Studies* 14/1 (1981): 23.

The decline in the virulence of smallpox can be explained by the spread of a new virus—*Variola minor*—that evolved from *V. major* sometime in the early sixteenth century in West Africa. Infection with this virus produced the same symptoms as that of *V. major* but with a case fatality rate of just 1 per cent. Those who recover from a *V. minor* infection acquire immunity to further infections from that virus, as well as from *V. major*. During the middle third of the twentieth century, *V. minor* replaced *V. major* as the prevailing type of smallpox throughout the African Red Sea Region.

The first clear case of *V. minor* in the region can be tied directly to West African pilgrims. From the middle of the nineteenth century, increasing numbers of West African Muslims would make their way by foot across the Sahel to the Red Sea coast en route to Mecca. Many of them earned the money for their *Hajj* by stopping and working on the way. In 1927, a number of these pilgrims arrived in Darfur from Chad infected with *V. minor*. The disease then spread along the pilgrimage route through Kordofan to the Blue Nile. Though thousands of people became infected, there were few reported deaths. Similar outbreaks spread east to west or west to east along this pilgrimage route in 1932–1934, 1936–1940, 1943–1944, 1947–1949, 1951–1955 and 1957–1960.⁴⁶

By the 1960s, *V. minor* had completely displaced *V. major* in the African Red Sea Region.⁴⁷ *V. minor* was, in turn, finally eradicated in the 1977, with the completion of the World Health Organization decades-long smallpox eradication programme.

46 Bayoumi, *The History of Sudan Health Services, 195–200*.

47 World Health Organization, 'The Eradication of Smallpox in Sudan', Geneva: World Health Organization, 1978, 10.

4. Syphilis: A disease of urbanization

Many of the communities in the African Red Sea Region that were smallpox naïve at the start of the nineteenth century were also syphilis free. The long-standing patterns of human settlement, social interaction and trade that had kept smallpox out of South Sudan and Somaliland also protected these areas from the global spread of syphilis. The breakdown of these patterns left communities vulnerable to this disease.

At the turn of the twentieth century, epidemics of venereal syphilis spread through South Sudan and Somaliland before becoming endemic to these countries. Contemporary statistics for the prevalence of sexually transmitted infections in South Sudan and Somaliland are incomplete. A 2007 study of female sex workers in Hargeisa, Somaliland found that 3.1 per cent had syphilis, although a 1990 study from Somalia found that nearly a quarter of the adult population tested positive for syphilis antibodies.⁴⁸ Similarly, a survey of pregnant women seeking antenatal care in South Sudan found that 9.9 per cent had syphilis.⁴⁹ By contrast, only 1.1 per cent of people worldwide have syphilis.⁵⁰

Reconstructing the historical epidemiology of syphilis is complicated by the existence of three other widespread similar diseases—pinta, yaws and bejel. The latter two, as with venereal syphilis, are caused by subspecies of the bacterium *Treponema palladium*. Pinta, in contrast, is caused by *Treponema crateum*, which is morphologically indistinguishable from *T. palladium*—the two appear identical when viewed under a microscope.

Scientists continue to debate when and where these diseases first arose. Some have argued that all four developed in Eurasia, with syphilis being the last to develop around the year 3000 BCE in south-western Asia. Others argue that syphilis, unlike the other three diseases, arose in the Americas and was brought to Europe by Christopher Columbus and his crew at the end of the fifteenth century.

The claim for an American origin for syphilis is supported by two types of evidence. The first is contemporaneous accounts. Fernandez de Oviedo and Ruy Diaz de Isa, who were doctors working Spain at the time of Columbus’s voyages, recognized the venereal syphilis that had begun to spread within their communities as both novel to Spain and well known to the indigenous Americans brought back in 1493.⁵¹ The second is skeletal

48 Kelsi Kriitmaa, et al., ‘HIV Prevalence and Characteristics of Sex Work among Female Sex Workers in Hargeisa, Somaliland, Somalia’ *AIDS* 24/S2 (2010): S61–S67; S O Ismail, et al., ‘Syphilis, Gonorrhoea and Genital Chlamydial Infection in a Somali Village’, *Genitourinary Medicine*, 66/2 (April 1990): 70–75.

49 Lawrence Gelman, ‘Southern Sudan: HIV Epidemic and Response—Review Report’, Washington DC: World Bank, 2011, 18.

50 Alex Smolak, et al., ‘Trends and Predictors of Syphilis Prevalence in the General Population: Global Pooled Analyses of 1103 Prevalence Measures Including 136 Million Syphilis Tests’, *Clinical Infectious Diseases* 66/8 (15 April 2018): 1184–1191.

51 M Tampa, et al., ‘Brief History of Syphilis’, *Journal of Medicine and Life* 7/1 (15 March 2014): 5–6.

remains. Recent analysis of two-thousand-year old human skeletons from the Caribbean have found the patterns of bone destruction and growth uniquely characteristic of untreated venereal syphilis. Similar patterns have only ever been found in skeletons from Europe, Asia and Africa from people who were buried after the fifteenth century.⁵²



Image 4. Bone and soft tissue erosion, tertiary syphilis. Credit: [Wellcome Collection](#). Attribution 4.0 International (CC BY 4.0)

Syphilis likely spread from the Americas to Spain on Columbus's returning fleet at the end of the fifteenth century and then via regional trade links throughout the Mediterranean and Indian Ocean. By the eighteenth century, syphilis had already become endemic to the Sudanese Nile valley and the Ethiopian plateau. European diplomatic and religious missions to the Sudanese Sultan of Sinnar and the court of the Ethiopian emperor regularly recounted seeing the tell-tale facial lesions associated with untreated tertiary syphilis.⁵³

Evidence of tertiary syphilis in Somaliland does not exist prior to the twentieth century. Descriptions of disfiguring bone lesions are absent from nineteenth century travel accounts of Somaliland.⁵⁴ By the 1920s, however, syphilis had become sufficiently prev-

52 Bruce M Rothschild, 'History of Syphilis', *Clinical Infectious Diseases* 40/10 (15 May 2005): 1454–1463.

53 Tarik Elhadd, 'Early European Medical Encounters in the Sudan in the pre-Turco–Egyptian Period 1503–1820', *Sudan Medical Journal* 50/3 (December 2014): 171–175.

54 Mohamed, 'Epidemics and Public Health', 508.

alent in the country that its treatment becomes the focus of the first major public health campaign by the colonial government.⁵⁵

Syphilis spread as Somalis began to settle. Until the late nineteenth century, there were no permanent settlements in the interior of Somaliland. Somalis practiced nomadic pastoralism, routinely moving with their herds across large distances to find fresh pastures and new trading opportunities. The cycle of warfare, famine and disease that plagued the region in the wake of the rinderpest epizootic⁵⁶ of the 1880s made pastoralism impossible for many. Increasing numbers of Somalis began settling at newly established colonial posts in the interior.

The growth of towns increased contact between men and women that, under traditional practices of sex segregation and nomadism, would have been kept separate. In addition, impoverished women living in these growing towns increasingly turned to sex work to support themselves. By the 1920s, venereal syphilis had become widespread among female sex workers and the urban poor.⁵⁷

The epidemic spread of syphilis in South Sudan happened more recently. In the early 1920s, Nuer men and women reported that syphilis was first introduced to the region by slave raiders coming from Egypt and Sudan in the middle of the nineteenth century.⁵⁸ This is confirmed by reports from British doctors working near the Ugandan–South Sudan border. At the start of the twentieth century, they recorded the widespread prevalence of secondary stage syphilis but no tertiary stage cases. Since the period between the secondary and tertiary stages of syphilis can be up to 20 years, this suggests that the disease was relatively new to the area.⁵⁹

Initially, the disease spread slowly. Unfortunately, historical statistics for syphilis prevalence are unreliable, as yaws and syphilis can be easily confused. Nonetheless, by the 1950s colonial doctors stationed near the Ugandan border claimed that the prevalence rate of syphilis had reached just 3 per cent.⁶⁰

55 Mohamed, 'Epidemics and Public Health', 515.

56 Rinderpest was an infectious viral disease affecting cattle and a number of other ungulates. It has a case fatality rate of 90 percent in immunologically naïve cattle populations. Previously unknown to Africa, it was introduced in 1887 through the importation of infected cattle via Eritrea. The disease quickly spread across the African Red Sea Region and then throughout the continent. Following a global eradication campaign begun in the mid-twentieth century, the last confirmed case of rinderpest was diagnosed in 2001. Steven Serels, 'Famines of War: The Red Sea Grain Market and Famine in Eastern Sudan, 1889-1891,' *Northeast African Studies*, 12/1 (2012): 73-94.

57 Mohamed, 'Epidemics and Public Health', 513.

58 H C Jackson, 'The Nuer of the Upper Nile Province', *Sudan Notes and Records* 6/2 (1923): 186.

59 J N P Davies, 'The History of Syphilis in Uganda', *Bulletin of the World Health Organization* 15 (1956): 1041–1055.

60 H Farrell, 'Dearth of Children Among the Azande: Preliminary Report', *Sudan Notes and Records* 35/1 (June 1954): 14.

This changed dramatically over the next half century. Intractable civil wars drove people out of the countryside and toward growing towns. The percentage of the population that lived in towns in South Sudan increased from less than 2 per cent in 1955 to 17 per cent in 2008.⁶¹

Syphilis prevalence rates are much higher in towns and cities than in the general population. Studies of pregnant women in Juba and Malakal in 2009, for example, found that one-third and one-fifth of the women tested positive for the disease, respectively.⁶² Throughout the African Red Sea Region, syphilis is more prevalent among urban populations. In Ethiopia, the syphilis rate in cities is 50 per cent greater than in the countryside.⁶³

Syphilis is most prevalent in female sex workers. In Djibouti, more than 40 per cent of female sex workers tested positive for syphilis in the early 2000s, at a time when only 4 per cent of all women seeking antenatal care in the country had the disease.⁶⁴

61 Edward Thomas, *South Sudan: A Slow Liberation*, London: Zed Books, 2015, 38, 45.

62 S K Emmanuel, et al., 'Syphilis among Pregnant Women in Juba, Southern Sudan', *East Africa Medical Journal* 87/5 (2010): 192–198; Gelman, 'HIV Epidemic and Response', 18.

63 Abate Assefa, 'A Three Year Retrospective Study on Seroprevalence of Syphilis among Pregnant Women at Gondar University Teaching Hospital, Ethiopia', *African Health Sciences* 14/1 (2014): 119–124.

64 Laith J Abu-Raddad, et al., 'Characterizing the HIV/AIDS Epidemic in the Middle East and North Africa: Time for Strategic Action', Washington, DC: The World Bank, 2010, 163–165.

5. Conclusion

The disease environment of the African Red Sea Region transformed dramatically over the course of the nineteenth and twentieth centuries. Changing social, economic and political conditions allowed for the importation of new bacteria and viruses, and caused diseases to spread in novel ways. This was driven by three inter-related processes—the intensification of human migration, the escalation of state-sponsored violence and the growth of cities.

The movement of people within, as well as into and out of, the region enabled the introduction of new disease-causing agents. Often, this movement was peaceful, such as that of merchants taking goods to inland markets or pilgrims making their way to holy sites. At times, the movement of people was violent, as was the case when armed militias marched the recently enslaved away from their homes or when refugees escaped from invading armies. Pilgrims, merchants, soldiers, slaves and refugees brought diseases with them and spread them along their way. They caused outbreaks of cholera, smallpox and syphilis in areas that either had never known these diseases or had only recently recovered from past outbreaks.

Moreover, the migration from the thinly populated countryside to densely populated settlements created new high-risk groups. For a limited few, cities meant access to public health measures, such as modern water management infrastructure that serves as cholera prophylaxis. For most people, however, areas of dense settlement are unhealthy environments. The large numbers of people who live in slums and refugee or internally displaced person camps and settlements have become even more susceptible to airborne and faecal-oral diseases because they live in close proximity to one another and to untreated sewage.

This uneven exposure to disease continues to play out in more recent outbreaks. This has been dramatically demonstrated in Darfur, where there have been large outbreaks of dengue fever, yellow fever and hepatitis E among refugees, displaced persons and impoverished pastoralists since the start of the genocide in 2003.⁶⁵ It is also likely to shape the course of the COVID-19 pandemic throughout the African Red Sea Region.

The state of the current pandemic in the region remains unclear. Testing rates have been too low to provide a complete picture. Nonetheless, the World Bank and various United Nations agencies are warning that the pandemic poses a unique threat to the urban

65 Ayman Ahmed, et al. 'The First Outbreak of Dengue Fever in Greater Darfur, Western Sudan', *Tropical Medicine Infectious Diseases* 4/1 (March 2019): 43; Mohammed A Soghaier, et al., 'Yellow Fever Outbreak in Darfur, Sudan, in October 2012: The Initial Outbreak Investigation Report', *Journal of Infectious Public Health* 6/5 (October 2013): 43; Jean-Paul Guthmann et al., 'A Large Outbreak of Hepatitis E among a Displaced Population in Darfur, Sudan, 2004: The Role of Water Treatment Methods', *Clinical Infectious Diseases* 42/12 (15 June 2006): 1685-1691.

poor and to refugees and internally displaced persons in the African Red Sea Region. These populations lack access to masks and adequate sanitation facilities. Furthermore, they live in crowded conditions that prevent social distancing and the quarantining of the sick.⁶⁶

Efforts to implement meaningful public health measures have been hampered by a lack of funds. NGOs and intergovernmental agencies have been forced to divert resources away from long-standing disease control programmes to address the urgent needs of the continuing COVID-19 pandemic. As a result, the risk of outbreaks of other diseases, such as HIV, tuberculosis and malaria, has increased in parts of the region.⁶⁷

In addition, countrywide lockdowns aimed at slowing the spread of COVID-19 have increased the rate of food insecurity throughout the African Red Sea Region. Disruptions to the food chain have led to increases in food prices. At the same time, nationwide lockdowns have led to a dramatic downturn in the informal economy on which many refugees, internally displaced persons and urban poor depend.⁶⁸ As a result, the Intergovernmental Authority on Development (IGAD), the World Food Programme (WFP) and the Food and Agriculture Organization (FAO) estimate that up to 20 per cent of the population in the region is now food insecure.⁶⁹

The COVID-19 pandemic in the African Red Sea Region is likely to be a compounded disaster; however, its burden will not be evenly shared. Like previous epidemics of cholera, smallpox and syphilis, exposure to this disease will be uneven. The urban poor, refugees and internally displaced persons likely will be disproportionately impacted.

66 United Nations High Commissioner for Refugees, 'Covid-19 External Update #16: East and Horn of Africa and the Great Lakes Region 23 July–5 August 2020', Geneva: United Nations High Commissioner for Refugees, 5 August 2020.

67 United Nations High Commissioner for Refugees. 'Ethiopia: Bi-Monthly Operational Update', Geneva: United Nations High Commissioner for Refugees, 8 August 2020.

68 The World Bank, 'Community Responses to COVID-19: From the Horn of Africa to the Solomon Islands', Feature Story, 19 May 2020. Accessed 13 August 2020, <https://www.worldbank.org/en/news/feature/2020/05/19/community-responses-to-covid-19-from-the-horn-of-africa-to-the-solomon-islands>.

69 Intergovernmental Authority on Development, Food and Agriculture Organization of the United Nations and World Food Programme, 'Urgent Action Required to Prevent A Major Food Crisis in Eastern Africa', IGAD–FAO–WFP Joint Statement, 27 July 2020.

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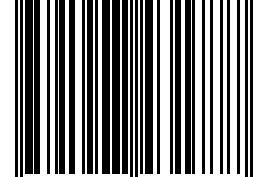
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