Title Page:

Title: All for One and One for All: The COVID-19 Experience and Global Pandemic Preparedness

Titilope Olanipekun MD, MPH

Author's information and correspondence address

Titilope Olanipekun MD, MPH

Department of Hospital Medicine,

Covenant Health System,

Knoxville, Tennessee, USA, 37922

Article type: Viewpoint

Conflict of interest: The author does not have any conflict of interests regarding this article

Funding source: None

Keywords: COVID-19; globalization; health systems; pandemic; preparedness

Manuscript word count: 1,891

Running head: All for one and One for All

Abstract

The socio-economic benefits of globalization cannot be overemphasized. However, the global spread of infectious diseases has so followed a parallel course. The recent wave of pandemics with emerging new diseases has shown that no part of the world is immune from the spread of infectious diseases. COVID-19 like previous pandemics has exposed inadequacies of our healthcare systems and global capacity for prevention, early detection, and response in pandemic outbreaks. Given the highly interconnected global economy and the high potential for passim spread of infections, every nation must not only come up with concerted efforts to prevent and better prepare for pandemics, international solidarity and engagements will also be critical to ensure a long-lasting and sustainable solution. We are only as strong as our weakest health system, global support to strengthen all health systems around the world is the most effective way to be pandemic – ready. ‘All for one and one for all’.

Introduction

The socio-economic benefits of globalization cannot be overemphasized. However, the global spread of infectious diseases has also followed a parallel course[1]. The current age of globalization can be described as a culmination of modernization trends that have occurred throughout history as world trade routes effectively connect countries and continents in an unprecedented magnitude. The world continues to experience constant flux of people, animals, and wealth either by force or choice across social and geo-political borders. Interestingly, the unforeseen and therefore unplanned for adverse consequence was the opportunity for infectious agents to hitch the global rides[2].

Despite significant medical advances that have been recorded, a substantial proportion of the population continue to experience significant morbidity and mortality from infectious diseases[3,4]. Although the burden is greatest for the developing world, recent wave of pandemics with emerging new diseases has blown the historical concept of regional immunity[5]. As the world continues to learn from the ongoing coronavirus (COVID-19) pandemic, a universal lesson that cannot be ignored is that there is nowhere in the world from which we are remote and globalization could be a double-edged sword of economic prosperity on one end and adversity on the other[6]. More importantly, COVID-19 like previous pandemics has exposed inadequacies of our healthcare systems and global capacity for prevention, early detection and response in pandemic outbreaks[7,8].

Given the highly interconnected global economy and the high potential for passim spread of infections, every nation must not only come up with concerted efforts to prevent and better prepare for pandemics, international solidarity and engagements will also be critical to ensure a long-lasting and sustainable solutions. This review will explore pandemic prevention, preparedness and how to improve population health outcomes during pandemics by drawing insights from past and current collaborative initiatives.

The COVID 19 Pandemic

The COVID-19 outbreak is an ongoing pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [6]. The outbreak was first identified in Wuhan, China, in December 2019 and was declared a Public Health Emergency of International Concern on 30 January 2020 by the World Health Organization. Its status was escalated to pandemic on March 11, 2020 after the disease had spread to more than 100 countries with tens of thousands of cases within a few weeks. As of August 2020, more than 17 million cases of COVID-19 have been reported in more than 180 countries and territories, resulting in more than 650,000 deaths (Figures 1 and 2)[9]. The pandemic has practically thrown the world into an economic recession and according to the united nations, it will most likely increase inequality and poverty on a global scale[10].

Global Pandemic Preparedness

The Global Health Security (GHS) index assessed the readiness of 195 countries and their health systems to combat epidemics and pandemics by exploring 6 main categories: prevention of emerging infections with potential for pandemics; detection and reporting; rapid response to mitigate pandemics; strength of health systems; compliance with global norms and; risk environment.

The GHS index scoring revealed an average score of 40.2 out of 100 across the 195 countries which highlights a disturbing insight that global preparedness for both epidemics and pandemics is weak. An estimated 50% of the countries lacked basic health systems capabilities critical for an effective epidemic and pandemic response. Though the GHS index has been criticized due to the discordance in the ranking and how the countries practically fared during the ongoing COVID-19 pandemic[11], it is important to point out that capacity is insufficient if it is not fully leveraged and the gaps in health systems are not adequately addressed. For instance, the United States may have led other countries with a GHS index score of 80.5 out of a possible 100, the significant inadequacies in the health system

category where the US ranked 175 out of 195 countries in healthcare assess and scored 60.4 of 100 in human resources and health care facilities may have impacted the overall pandemic response in the US[12].

Pandemic Prophylaxis

Current global infectious disease control strategies focus almost exclusively on responding to pandemics after they have already occurred and spread to multiple regions[13,14]. Given the challenging nature of combating pandemics, there is no other situation where the timeless adage, 'prevention is better than cure' is more apt. Furthermore, the lack of an HIV vaccine 40 years into the pandemic underscores the fact that we cannot afford to rely on the wait and respond approach.

Most of the human infectious disease pandemics have their origins in the interface between humans and animals[15]. Studies have suggested that the ongoing COVID-19 pandemic started from probable bat-to-human infection among people processing bat carcasses in Wuhan, China[16]. In situations and populations where humans and animals are in close contact, focused behavioral change approaches may be a preventative step to reducing the risk of zoonotic transmission. These interventions should be targeted towards at-risk populations based on previous outbreaks and focus on education on potential routes of transmission of diseases, preventive practices and techniques, safe handling and disposal of animal carcasses, symptoms recognition and reporting. These strategies have previously been used successfully in combating outbreaks of Ebola and Lassa Fever in endemic African countries[15].

Global monitoring and surveillance of emerging infectious diseases and potential pandemics have been an important strategy in curtailing spread and averting global pandemics. However, the unwillingness of some regions to report concerning public health events or trends to the appropriate authorities often due to economic and political reasons has always been a challenge[17]. The WHO's International

Health Regulations (IHR) is an "international legal instrument that is binding on its 194 member countries to help the world prevent and respond to acute public health risks from infectious disease, chemical, or nuclear origins that have the potential to cross borders. The IHR became active in 2007 and mandates member countries to optimize their public health surveillance systems, track and report diseases that can potentially spread globally and cause world health and economic devastation [18].

The IHR is supposed to leverage global mutual trust and shared responsibility among countries to combat public health crisis of global proportions as a global unit. However, we have seen the reverse play out with the abysmal response to and outcomes of recent pandemics. One of the reasons for this is that the world has significantly changed from 15 years ago when disease threats were viewed as collective problems that required a global approach. Now, there are varying populist beliefs and an increasing distrust of global organizations which motivate countries to respond in ways that are perceived to protect their citizens first [19,20]. Another barrier to the effective implementation of the IHR is the inadequate capacity of LMICs to effectively provide surveillance and reporting of emerging infectious diseases. These countries also lack the strong healthcare and economic systems often needed to appropriately respond to epidemics and pandemics[21].

Pandemics will be harder to prevent when countries act independently. Though previous global health emergencies have questioned WHO leadership in providing a united and effective front, the world still needs to trust WHO and WHO in turn needs to earn the trust. The disconnect between WHO's recommendations and member countries' actions during pandemics is alarming[22]. The WHO and its member countries must come back to the table to review the IHR by drawing insights from current pandemics and addressing the unwillingness of countries to report pandemics in the early stages[23,24]. There needs to be a program that rewards early reporting of potential global threats and countries that

fall in this situation should be supported economically during the early stages. The WHO needs to be financially supported to carry out its responsibilities and in turn, financially and technical support LMICs to strengthen their surveillance and reporting systems.

Politics and Policy

Political investments in policies and interests that prevent and combat pandemics as well as mitigate its after-effects are imperative in the pandemic response. Different political leaders and governments have different approaches to public health preparedness and strategies related to infectious diseases and pandemics. In a study conducted by Healy *et al.*[25] on how governments prepare for and respond to natural disasters including pandemics, investing in prevention was highly effective at mitigating future disasters. They found that an estimated $1 spent on preparedness was worth approximately $15 in terms of the imminent damage it mitigates. Ironically, the study also showed that disaster relief spending in form of checks increased over the decades relative to prevention spending because government leaders who delivered relief spending after a disaster were more popular with voters in the subsequent election and received a larger share of the votes. Thus, it appears that the population and electorate may be shortsighted and prefer individual benefits like checks in the mail to the shared collective public health benefits of prevention[26]. Evidently, political leaders from LMICs and developed countries and the people they serve must discard the notion of 'individualism' and adopt the concept of 'collectivism'. Priority should be given to investments in preventive public health policies on infectious diseases over curative medical services.

Pandemic research

Clinical research during pandemics especially in the ICU contributes significantly to the effectiveness of the pandemic response and the template on how to best prepare for future pandemics[27]. Disease

outbreaks though undesirable provide a unique opportunity for high caliber prospective research due to the availability of real time case data. The high case numbers during pandemics may also be the only breakthrough opportunity to conduct studies with enough statistical power to provide high quality conclusions on the efficacy of experimental or novel treatments, diagnostic procedures, epidemiologic techniques regarding contact tracing and case finding and vaccines to prevent future outbreaks. Empiric observations from the field during pandemics also provide a vast amount of information on diagnosis and treatment of cases to reduce morbidity and mortality[28–34].

Though not all pandemics have a corresponding vaccine to slow or curb its spread, for those that do, vaccination often plays a significant role in the multi-faceted public health response to the pandemic and its future re-emergence[35–37]. Inadequate deployment and uptake of vaccines have been a challenge in both LMICs and high-income countries[35,38]. Studies have demonstrated low uptake of influenza vaccines in minorities who distrust the scientific community and some individuals who deem vaccines to be unnatural corporate products that infringe on freedom of choice and fundamental human rights[39,40]. More culturally sensitive and focused research is needed to evaluate factors that impact acceptance and distribution of vaccination and strategies to improve uptake.

Conclusion

Infectious disease pandemics are a collective threat to global health. The same pathways of globalization have become the transmission vectors for infections. A cough in Rio De Janeiro can become a fever in Sydney with one flight and in one day and go on to become a global pandemic in one month[41]. The ongoing COVID-19 pandemic has proven that no place is immune to the devastating effects of a global pandemic and our health systems may not be strong enough to prevent and combat pandemics even in the developed world.

We are only as strong as our weakest health system, global support to strengthen all health systems around the world is the most effective way to be pandemic – ready. Countries comparing their health systems to others as a yardstick of success during pandemics instead of showing solidarity for one another may be doing more harm than good. ‘All for one and one for all’.

References

1. Jones KE, Patel NG, Levy MA, et al. Global trends in emerging infectious diseases. *Nature*. 2008;451(7181):990-993. doi:10.1038/nature06536

2. Staff B on GH, Staff F on MT, Staff I of M. *The Impact of Globalization on Infectious Disease Emergence and Control*.; 2006. doi:10.17226/11588

3. McArthur DB. Emerging Infectious Diseases. *Nurs Clin North Am*. 2019;54(2):297-311. doi:10.1016/j.cnur.2019.02.006

4. Troeger C, Forouzanfar M, Rao PC, et al. Estimates of global, regional, and national morbidity, mortality, and aetiologies of diarrhoeal diseases: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet Infect Dis*. 2017;17(9):909-948. doi:10.1016/S1473-3099(17)30276-1

5. Jarus O. 20 of the Worst Epidemics and Pandemics in History . *Live Sci*. 2020;(12):1-27. https://www.livescience.com/worst-epidemics-and-pandemics-in-history.html.

6. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Biomed*. 2020;91(1):157-160. doi:10.23750/abm.v91i1.9397

7. Grasselli G, Pesenti A, Cecconi M. Critical Care Utilization for the COVID-19 Outbreak in Lombardy, Italy: Early Experience and Forecast during an Emergency Response. *JAMA - J Am Med Assoc*. 2020;323(16):1545-1546. doi:10.1001/jama.2020.4031

8. Ranney ML, Griffeth V, Jha AK. Critical supply shortages - The need for ventilators and personal protective equipment during the Covid-19 pandemic. *N Engl J Med*. 2020;382(18):E41. doi:10.1056/NEJMp2006141

9. CSSEGISandData /, COVID-19. GitHub - CSSEGISandData/COVID-19: Novel Coronavirus

(COVID-19) Cases, provided by JHU CSSE. https://github.com/CSSEGISandData/COVID-19. https://github.com/CSSEGISandData/COVID-19. Published 2020.

10. PWC. Responding to the UK business impacts of coronavirus (COVID-19). *Pwc*. 2020;(March):1-6. doi:2020

11. Razavi A, Erondu N, Okereke E. The Global Health Security Index: What value does it add. *BMJ Glob Heal*. 2020;5(4). doi:10.1136/bmjgh-2020-002477

12. Dalglish SL. COVID-19 gives the lie to global health expertise. *Lancet*. 2020;395(10231):1189. doi:10.1016/S0140-6736(20)30739-X

13. Schuchat A. Public Health Response to the Initiation and Spread of Pandemic COVID-19 in the United States, February 24–April 21, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(18):551-556. doi:10.15585/mmwr.mm6918e2

14. Mills A. Health care systems in low- and middle-income countries. *N Engl J Med*. 2014;370(6):552-557. doi:10.1056/NEJMra1110897

15. Pike BL, Saylors KE, Fair JN, et al. The origin and prevention of pandemics. *Clin Infect Dis*. 2010;50(12):1636-1640. doi:10.1086/652860

16. Wassenaar TM, Zou Y. 2019_nCoV/SARS-CoV-2: rapid classification of betacoronaviruses and identification of Traditional Chinese Medicine as potential origin of zoonotic coronaviruses. *Lett Appl Microbiol*. 2020;70(5):342-348. doi:10.1111/lam.13285

17. Cash RA, Narasimhan V. Impediments to global surveillance of infectious diseases: Consequences of open reporting in a global economy. *Bull World Health Organ*. 2000;78(11):1358-1367. doi:10.1590/S0042-96862000001100012

18. Baker MG, Fidler DP. Global public health surveillance under new International Health

Regulations. *Emerg Infect Dis*. 2006;12(7):1058-1065. doi:10.3201/eid1207.051497

19. Gostin LO, Katz R. The International Health Regulations: The Governing Framework for Global Health Security. *Milbank Q*. 2016. doi:10.1111/1468-0009.12186

20. Klain R. Politics and pandemics. *N Engl J Med*. 2018;379(23):2191-2193. doi:10.1056/NEJMp1813905

21. Mphande FA. *Infectious Diseases and Rural Livelihood in Developing Countries*.; 2016. doi:10.1007/978-981-10-0428-5

22. Hoffman SJ, Røttingen JA. Split WHO in two: Strengthening political decision-making and securing independent scientific advice. *Public Health*. 2014. doi:10.1016/j.puhe.2013.08.021

23. Ebola: What lessons for the International Health Regulations? *Lancet*. 2014;384(9951):1321. doi:10.1016/S0140-6736(14)61697-4

24. Merianos A, Peiris M. International Health Regulations (2005). *Lancet*. 2005;366(9493):1249-1251. doi:10.1016/S0140-6736(05)67508-3

25. Healy A, Malhotra N. Myopic voters and natural disaster policy. *Am Polit Sci Rev*. 2009;103(3):387-406. doi:10.1017/S0003055409990104

26. Schneider S. Whos to blame (mis) perceptions of the intergovernmental response to disasters. *Publius*. 2008;38(4):715-738. doi:10.1093/publius/pjn019

27. Burns KEA, Rizvi L, Tan W, Marshall JC, Pope K. Participation of ICUs in critical care pandemic research: A province wide, cross-sectional survey. *Crit Care Med*. 2013;41(4):1009-1016. doi:10.1097/CCM.0b013e318275d061

28. Badawi O, Liu X, Berman I, Amelung P, Doerfler M, Chandra S. Impact of COVID-19

pandemic on severity of illness and resources required during intensive care in the greater New York City area. *medRxiv*. 2020:2020.04.08.20058180. doi:10.1101/2020.04.08.20058180

29. Eastin C, Eastin T. Characteristics and Outcomes of 21 Critically Ill Patients with COVID-19 in Washington State. *J Emerg Med*. 2020;58(4):710. doi:10.1016/j.jemermed.2020.04.002

30. Fujii Y, Hirota K. Critical care demand and intensive care supply for patients in Japan with COVID-19 at the time of the state of emergency declaration in April 2020: a descriptive analysis. *medRxiv*. 2020:2020.06.20.20136150. doi:10.1101/2020.06.20.20136150

31. Kallet RH, Campbell AR, Alonso JA, Morabito DJ, Mackersie RC. Erratum: The effects of pressure control versus volume control assisted ventilation on patient work of breathing in acute lung injury and the acute respiratory distress syndrome (Respiratory Care (2000) 45:9 (1085-1096)). *Respir Care*. 2000;45(11):1416.

32. Phua J, Weng L, Ling L, et al. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations. *Lancet Respir Med*. 2020;8(5):506-517. doi:10.1016/S2213-2600(20)30161-2

33. Viecca M, Radovanovic D, Forleo GB, Santus P. Enhanced platelet inhibition treatment improves hypoxemia in patients with severe Covid-19 and hypercoagulability. A case control, proof of concept study. *Pharmacol Res*. 2020;158(May):104950. doi:10.1016/j.phrs.2020.104950

34. Grasselli G, Zangrillo A, Zanella A, et al. Baseline Characteristics and Outcomes of 1591 Patients Infected with SARS-CoV-2 Admitted to ICUs of the Lombardy Region, Italy. *JAMA - J Am Med Assoc*. 2020;323(16):1574-1581. doi:10.1001/jama.2020.5394

35. Medlock J, Galvani AP. Optimizing influenza vaccine distribution. *Science (80-).*

2009;325(5948):1705-1708. doi:10.1126/science.1175570

36. Dormitzer PR, Suphaphiphat P, Gibson DG, et al. Synthetic generation of influenza vaccine viruses for rapid response to pandemics. *Sci Transl Med*. 2013;5(185). doi:10.1126/scitranslmed.3006368

37. Safrit JT, Fast PE, Gieber L, Kuipers H, Dean HJ, Koff WC. Status of vaccine research and development of vaccines for HIV-1. *Vaccine*. 2016;34(26):2921-2925. doi:10.1016/j.vaccine.2016.02.074

38. Hessel L. Pandemic influenza vaccines: Meeting the supply, distribution and deployment challenges. *Influenza Other Respi Viruses*. 2009;3(4):165-170. doi:10.1111/j.1750-2659.2009.00085.x

39. T. O, V.S. E, O. K-K, R. H, N. B, C. F. Predictors of influenza vaccination in African American patients with coronary artery diseases and heart failure: Findings from a large urban public hospital. *Circulation*. 2018;138. http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L627103329.

40. Olanipekun T, Effoe VS, Olanipekun O, et al. Factors influencing the uptake of influenza vaccination in African American patients with heart failure: Findings from a large urban public hospital. *Hear Lung*. 2020. doi:10.1016/j.hrtlng.2019.12.003

41. De Bengy Puyvallée A, Kittelsen S. “Disease Knows No Borders”: Pandemics and the Politics of Global Health Security. In: *Pandemics, Publics, and Politics: Staging Responses to Public Health Crises.* ; 2018:59-73. doi:10.1007/978-981-13-2802-2_5

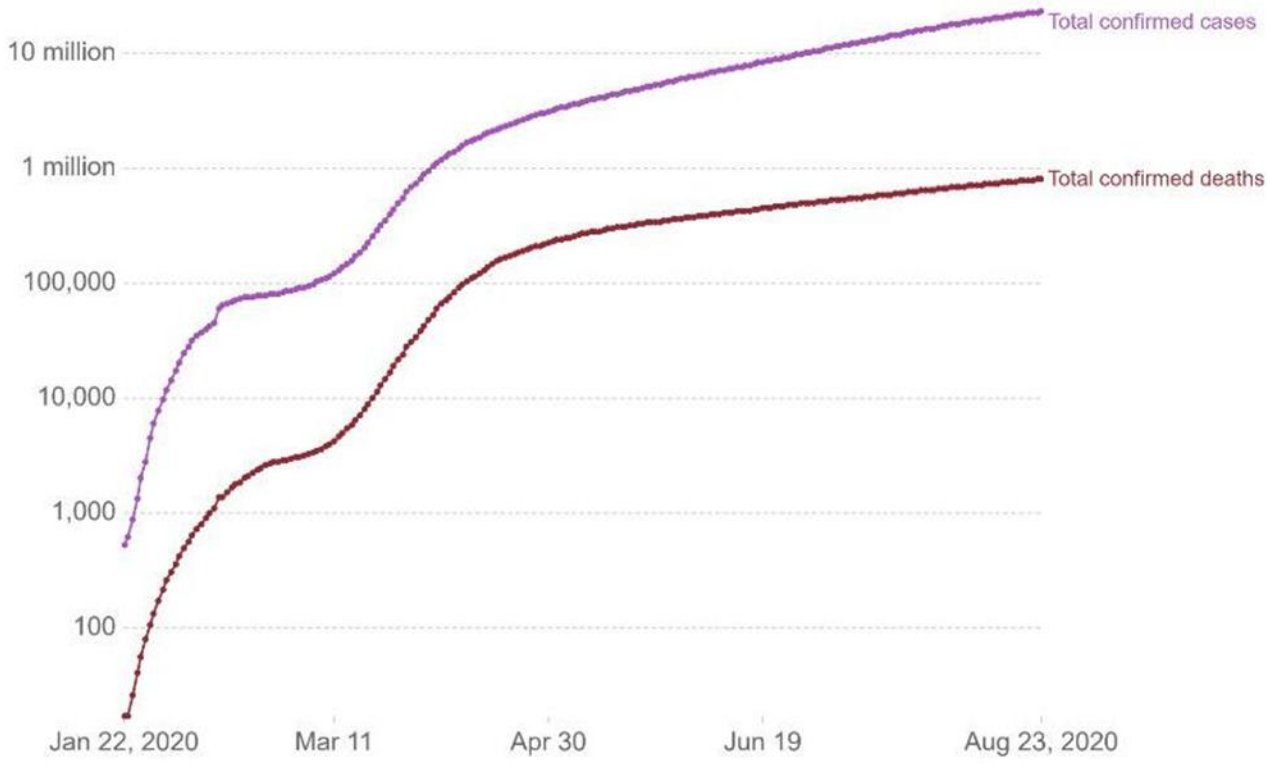

Figure 1: Total number of global confirmed cases and deaths attributed to COVID-19 infection.
Source: https://ourworldindata.org/coronavirus. European CDC daily situation updates. Retrieved on August 23, 2020

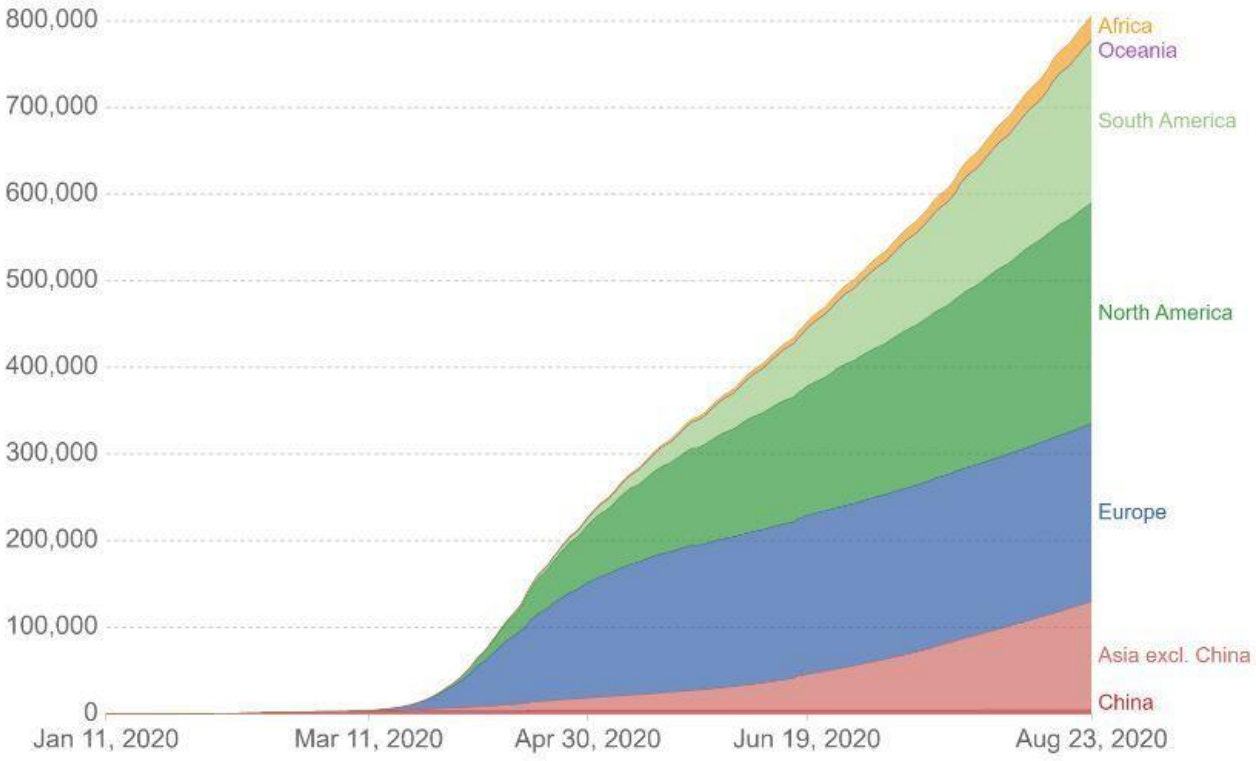

Figure 2: Total number of confirmed deaths attributed to COVID-19 infection by region.
Source: https://ourworldindata.org/coronavirus. European CDC daily situation updates. Retrieved on August 23, 2020