

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Introductory Chapter: International Health Security Expanded and Re-Defined

*Stanislaw P. Stawicki, Thomas J. Papadimos,
Sagar Galwankar, Ricardo Izurieta
and Michael S. Firstenberg*

1. Background

International health security (IHS) is a complex and highly heterogeneous area under the broader umbrella of health sciences. Within that general context, IHS encompasses all domains that potentially influence (and more specifically - potentially endanger) the well-being of human health and wellness, from natural disasters to outbreaks and pandemics, including rapid urbanization, population growth, various environmental matters, critical supply chain vulnerabilities, misuse of antibiotics leading to unpredictable microbial resistance patterns, and even social media (SM) misinformation. The need for this expanded definition of health security came about with the realization that topics such as emerging infectious diseases (EID), food, water, and pharmaceutical supply chain safety, medical and health information cybersecurity, and bioterrorism – although clearly dominant factors within the overall realm of health security – constitute only a small proportion of forces able to actively modulate the wellness and health of human populations [1–7].

2. Why did we embark on this project?

There are ample resources for IHS experts, and many available literature sources are characterized by very high content quality. Why then, one might ask, embark on another book project on the topic? There are several important reasons. The first, and most relevant reason, is the narrow focus on the previously published scholarly literature on this increasingly complex subject. Today's IHS is a much broader and diverse discipline, with highly nuanced and rapidly evolving new areas and subdomains (**Table 1**). Some authorities on this topic even go as far as referring to Planetary Health as the next conceptual development [8, 9]. The authors and Editors of this collection of chapters believe that the broadly defined IHS inherently encompasses the plurality of concepts that include “public health,” “global health security,” and “planetary health” while ensuring that the overall context of its implementation maintains the compatibility with the modern understanding of the world constituting a collection of independent countries and states that operate within a well-defined set of international conventions, organizations and frameworks [10–12]. By covering new topics and providing varied solutions and

Access to health care
Biological and chemical warfare
Chronic health conditions
Emerging infectious diseases
Food/agricultural security
Globalization, including trade and travel
Health informatics/cyber health
Industrialization/robotization and related topics
Natural disasters, including volcanic/tectonic activity and natural fires
Nuclear security, both civilian and military
Pharmaceutical production and supply chains
Environmental pollution water/air/soil
Planetary changes/global warming/invasive species
Social determinants of health
Social media platforms
Systemic racism and other forms of discrimination
Terrorism/bioterrorism and related topics

Table 1.
New areas and subdomains included within the redefined and expanded International Health Security (IHS) paradigm.

approaches on rapidly emerging infectious, social, environmental, and biopolitical dilemmas, etc., the authors hope to enlighten and energize readers to become more aware and active in matters related to health security at local, regional, national, international, as well as global scales.

3. Expanding the definition and the scope of health security

The traditional definition of what was generally known as “global health security” or GHS is somewhat limited, including primarily bioterrorism and EIDs [13]. In essence, and in a much broader sense, we are dealing with human security. The world is interdependent and we must manage our activities jointly, find common ground, and together deal with the threats with which we are confronted. As Ebola Virus, Zika Virus, and Coronavirus Disease 2019 (COVID-19) have demonstrated, a threat to one (person, region, country, continent) can easily evolve into a threat to all [14–16]. Herein we present facts, experiences and perspectives regarding important currents that affect all societies. Fundamentally, the Editors would like the readers to recognize health security vulnerabilities that they may have not previously considered and to realize opportunities that the readers themselves can create or support across their own communities, countries, and continents [17]. The current book expands on the more traditional and restricted view of IHS to incorporate new and important components of climate change, global health, cyber security, social determinants of health, technology/information management, and several other closely related areas.

4. Bridging health security and human sustainability

Health security requires a “360-degree approach” because health problems tend to have a “360-degree impact” and therefore the solutions also have to address various associated facets and intricacies in a comprehensive and inclusive fashion. The current COVID-19 pandemic exposed vulnerabilities in various critical supply chains, including those involving things we all take for granted, such as basic medications, home oxygen availability, personal protective equipment (PPE)

and the tremendous speed of evolving science that made us all vulnerable to both misunderstanding and misinformation [18]. COVID-19 also demonstrated that the term “health security” is inextricably tied to how we as humans can effectively respond to such a tremendous global challenge [19, 20].

Among challenges to sustainability, we must recognize the presence of “response exhaustion” or a phenomenon where the responders’ ability to address the ongoing health crisis at a population level becomes ineffective due to the overwhelming nature of the task at hand, especially when dealing with long and protracted time-frames that require sustained, high-intensity effort. Excellent planning, both conceptual and logistical, is required to mitigate such “response exhaustion.” Prematurely “letting our guard down” predisposes all to significant downstream effects of a long-lasting and dangerous threat – much like not adequately extinguishing a campfire only to realize that it becomes the source for a uncontrollable forest fire. Securing health is an effort which definitely translates to sustaining health and thus human well-being, and the loss of either leads to loss of the other.

The current collection of chapters takes on a comprehensive and integrative approach toward a truly global problem, highlighting the interconnectedness of the various components of the proposed IHS framework (**Table 1**). For example, a natural disaster, despite best preparatory efforts, may cause significant disruptions across multiple IHS domains, resulting not only in the destruction of essential infrastructure, but also directly and indirectly affecting human health within the affected region [21], as well as various potential downstream effects on other areas such as food security (e.g., if the disaster-stricken country is a major agricultural exporter). Humans have learned to design plans and take proactive steps to mitigate damage and save lives. However, such plans and steps must also be kept in the context of the reality of the constantly evolving geopolitical and socio-economic global landscape. In the highly interconnected world, events have the potential to evolve as rapidly as a click of a computer mouse button, or perhaps one’s ability to enter a commercial airliner on one continent and arrive on another within half-a-day [22, 23]. Be it “health security” or “cyber security,” sustainability depends on our expanded definition and understanding of “comprehensive health security”.

5. Integrative synthesis and synergy creation

As we embark on the journey across the much more diverse and heterogeneous landscape of IHS, both reimagined and redesigned, each chapter introduces a new and unique perspective on interrelated topics that blend into a comprehensive repository of synergistic experiences, knowledge, and approaches. The ultimate goal is to create an authoritative, open access source of the most important insights available to-date within the expanded IHS domain. The current collection is therefore intended to include discussions on some of the most pressing topics within the broader context of public health and health security. Starting with a summative assessment by the IHS Working Group of the American College of Academic International Medicine, the discussion then moves on to incorporate a variety of contemporary topics such as refugee crises, cyber security, social media, big data analytics, scientist training, and point-of-care diagnostics. Also important to the overall IHS discussion, the authors touch upon the importance and impact of organized systems of care on health security, focusing on the tremendous value of such systems to human wellness and the continuous focus on care quality and improving clinical outcomes [24–28].

More recently, a new set of insidious threats to health security emerged with the advent of Internet and social media (SM). This general theme includes the now all-too-common phenomenon of ransomware that increasingly plagues our healthcare systems and various critical supply chain components. In addition, it is important to emphasize the benefits, while also highlighting the dangers of modern SM technology, including some of the approaches to mitigate the negative aspects. Of special concern is the emerging evidence regarding the very design of SM platforms, with key element of the business model being the ability to fractionate individuals and groups into self-reinforcing, opinion-based camps [1, 29–32].

We would be remiss not to discuss herein the critically important and emerging topics of refugee crisis and refugee healthcare. Relevant to this context, careful considerations must be given to human, economic, and healthcare aspects of the ongoing global refugee crisis, including dilemmas created for governments and refugees regarding manipulation, displacement, rights, sexual exploitation, and the need for legal options. Serious global efforts must be made on behalf of the refugees by the host governments to provide the necessary resources to ensure the well-being of the 15 million+ refugees around the world [33], along with the 214 million international migrants and 740 million internal migrants [34]. Comprehensive examinations of the problem must also consider refugees in relation to the political, social and moral perspectives of the topic.

Especially relevant in the context of the current novel coronavirus (SARS-CoV-2) crisis, pandemics and plagues must be addressed as mankind's socio-political constructs that – at some point in the history – either require or outright force a major paradigm shift. Historically, the known plagues have decimated the young children and the elderly; but emerging pathogens (inclusive of SARS-CoV-2) have changed the paradigm sparing the young and primarily preying on those over 50 years of age [18, 35, 36]. And it is precisely such low-frequency, high-impact, largely unexpected events that produce generational fear, collective memory, and subsequent durable change among populations [18, 37]. In addition, as has been seen during the COVID-19 pandemic, such changes can occur very quickly regardless of whether communities, industry, governments, or society are prepared or able to efficiently or peacefully adapt. Currently, the world is reacting to the reality of an ongoing crisis of multi-generational proportions, with limited means to remedy or mitigate the impact. The evidence and lessons learned to-date from the COVID-19 pandemic indicate that the “Pasteurian paradigm” – which establishes that health security is primarily determined by a singular factor: the pathogen – has to be abandoned. Instead, the evidence seems to show that the health-disease continuum is considerably more likely to be affected by a plethora of political, social, economic, environmental and individual factors [18]. Therefore, when forming a more mature understanding of the construction of a more complex causal framework, the world will need to respond with a more holistic approach addressing social inequities, environmental pollution, protecting biodiversity, strengthening local health systems, prioritizing public and preventive health interventions, reducing non-communicable co-morbidities and promoting healthy behaviors [38]. Within the expanded IHS framework, the repose to the current pandemic has been a kind of one-size-fits-all public health policy without a strategic assessment of the local and regional situation. The undercapacity of our existing surveillance and control systems has forced local governments to “copy and paste” control strategies from abroad [18, 38]. Also, in the last few decades, there has been a dramatic disinvestment in the area of public health. Moreover, the concept that investment in the workforce's health positively impacts productivity seems to have been abandoned. Nevertheless, the immense costs for the global economy of the COVID-19 pandemic have changed this paradigm and forced stakeholders to re-emphasize the need for robust public health funding. As a matter of fact, no other pandemic has affected the U.S. and the global economy with such historical precedent [39, 40], at least in absolute terms.

responders [50, 51]. The world needs to learn from these catastrophic industrial events and strive to ensure that dangerous chemicals are not allowed near large population centers in quantities sufficient to cause mass destruction and loss of life.

Likewise, there is growing recognition of the profound effects brought about by the early manifestations of climate change, such as the realization that sea-level rise is here to stay, and that phenomena including invasive species, zoonotic-to-human disease transmission, and regional hunger due to disruption in food supplies, are not only real but also likely to worsen in the foreseeable future [21]. The increasingly apparent frequency of both natural forest fires and wind disasters are among additional, more obvious manifestations of the ongoing planetary change [21, 52]. The immediate and evolving risks are only now slowly coming into focus with an impact and magnitude that will only be understood over time. What is becoming more obvious is the potential global implications of what might have been previously minor events in remote places of the world. While it is well-established that certain local events may have geo-political implications on local, regional, and often global economies (i.e., a local act of terrorism in an oil-rich country potentially impacting the complex economics of oil), it is quickly becoming clear that such events also create significant impact on global health [53, 54].

In another example, supply chain factors are beginning to endanger the availability of entire classes of life-saving pharmaceuticals [55]. Within this subdomain, relatively recent concerns of potentially carcinogenic impurities in commonly prescribed antihypertensive medications made international headlines [56], but unfortunately were pushed to the back pages with an evolving – and at the time, highly controversial, politically charged, and poorly understood novel viral pandemic [36, 57]. Nevertheless, the concept of the “butterfly effect” – especially as applied to international health security – becomes, tragically, easier to understand [58]. Smaller events, in themselves, potential perceived as trivial at the time, have the potential to slowly evolve into events with global catastrophic implications [18]. Such events, superimposed with fluctuations in political agendas, economic disparities, budgetary constraints, and a perceived abandonment of the mistakes of the past and government safety nets unfortunately might become more common. The growing role of SM in giving credence to conspiracy theories, radicalism, and so called “fake news” only compounds the problems especially with regards to leaders being able to establish creditable action plans to manage such threats [29, 31]. As the population of the world grows to potentially unsustainable sizes [59], combined with concerns of climate change, simmering socio-economic and political conflicts will all play a role in the growing concerns for the “safety” and sustainability of humanity. Such events, must be taken seriously at all levels – but there are no easy solutions to the problems that frequently start on a small and often difficult-to-notice scale.

7. Summary and conclusion

The expanded and redefined scope of International Health Security provides a unique opportunity for the public health community to embrace a more holistic approach to an area that was traditionally much more narrow in scope. As we tackle one of the greatest challenges to IHS in recent decades – the novel coronavirus 2019 (COVID-19) pandemic – it becomes increasingly important to shift our focus to a more global, yet significantly more granular, perspective on IHS threats and emergencies. We hope that the foundation created by this Editorial team will provide a solid springboard for an insightful and captivating discussion in this rapidly developing and important area of academic medicine and public health.

IntechOpen

Author details

Stanislaw P. Stawicki^{1*}, Thomas J. Papadimos², Sagar Galwankar³, Ricardo Izurieta⁴ and Michael S. Firstenberg⁵

1 Department of Research and Innovation, St. Luke's University Health Network, Bethlehem, Pennsylvania, USA

2 Department of Anesthesiology, The Ohio State University College of Medicine, Columbus, Ohio, USA

3 Emergency Medicine Residency Program, Sarasota Memorial Hospital, Florida State University, Florida, USA

4 Global Communicable Diseases, College of Public Health, University of South Florida, Tampa, Florida, USA

5 Department of Cardiothoracic Surgery, The Medical Center or Aurora, Aurora, Colorado, USA

*Address all correspondence to: stawicki.ace@gmail.com

IntechOpen

© 2020 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] Stawicki, S.P., M.S. Firstenberg, and T.J. Papadimos, *The Growing Role of Social Media in International Health Security: The Good, the Bad, and the Ugly*, in *Global Health Security*. 2020, Springer. p. 341-357.
- [2] Sahni H, Sharma H. *Role of social media during the COVID-19 pandemic: Beneficial, destructive, or reconstructive?* International Journal of Academic Medicine. 2020;**6**(2):70
- [3] Liu F-K. *Human security in the Asia Pacific: perspective of food and health security*. Asia Pacific Journal of Clinical Nutrition. 2009;**18**(4):669
- [4] Quinn SC, Kumar S. *Health inequalities and infectious disease epidemics: a challenge for global health security*. Biosecurity and bioterrorism: biodefense strategy, practice, and science. 2014;**12**(5):263-273
- [5] Heymann DL et al. *Global health security: the wider lessons from the west African Ebola virus disease epidemic*. The Lancet. 2015;**385**(9980):1884-1901
- [6] Stanely, N., et al. *Global Health Security and Disaster Forensics: A solution oriented approach to mapping public health vulnerabilities through predictive analytics*. in *E-Proceedings of the 38th IAHR World Congress*. 2019.
- [7] Giorgadze T et al. *Disasters and their consequences for public health*. Georgian Medical News. 2011;**194**:59-63
- [8] Whitmee S et al. *Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation–Lancet Commission on planetary health*. The Lancet. 2015;**386**(10007):1973-2028
- [9] Horton R et al. *From public to planetary health: a manifesto*. The Lancet. 2014;**383**(9920):847
- [10] Bernstein S, Cashore B. *Can non-state global governance be legitimate? An analytical framework*. Regulation & Governance. 2007;**1**(4):347-371
- [11] Nayyar, D., *Towards global governance*. Governing Globalization: issues and institutions. Oxford: Oxford UP, 2002: p. 3-18.
- [12] Schrijver, N.J. and F. Weiss, *International law and sustainable development: principles and practice*. Vol. 51. 2004: Martinus Nijhoff Publishers.
- [13] Andrus JK et al. *Global health security and the International Health Regulations*. BMC Public Health. 2010;**10**(1):1-4
- [14] McRae, R. and D. Hubert, *Human security and the new diplomacy: Protecting people, promoting peace*. 2001: McGill-Queen's Press-MQUP.
- [15] Kalra S et al. *The emergence of ebola as a global health security threat: from 'lessons learned' to coordinated multilateral containment efforts*. Journal of Global Infectious Diseases. 2014;**6**(4):164
- [16] Sikka V et al. *The emergence of Zika virus as a global health security threat: a review and a consensus statement of the INDUSEM Joint Working Group (JWG)*. Journal of Global Infectious Diseases. 2016;**8**(1):3
- [17] Masys, A.J., R. Izurieta, and M.R. Ortiz, *Global Health Security*. 2020: Springer.
- [18] Stawicki SP et al. *The 2019-2020 novel coronavirus (severe acute respiratory syndrome coronavirus 2) pandemic: A joint american college of academic international medicine-world academic council of emergency medicine multidisciplinary COVID-19 working group consensus paper*. Journal of Global Infectious Diseases. 2020;**12**(2):47

- [19] Casale, M., COVID-19: *Can this crisis be transformative for global health?* Global Public Health, 2020: p. 1-13.
- [20] McBain, A., *Pandemic: The inextricable link between human, animal and ecosystem health and the emergence of communicable disease.* 2020.
- [21] Le NK et al. *International Health Security: A Summative Assessment by ACAIM Consensus Group, in Contemporary Developments and Perspectives in International Health Security-Volume 1.* 2020. IntechOpen.
- [22] Kulczyński M et al. *Air transport and the spread of infectious diseases.* World Scientific News. 2017;**76**:123-135
- [23] O'Connor, C. and M. Murphy, *Going viral: doctors must tackle fake news in the covid-19 pandemic.* *bmj*, 2020. **24**(369): p. m1587.
- [24] Stawicki, S.P., et al., *Introductory Chapter: Patient Safety is the Cornerstone of Modern Health-Care Delivery Systems, in Vignettes in Patient Safety-Volume 4.* 2019, IntechOpen.
- [25] Stawicki SP, Firstenberg MS. *Introductory chapter: The decades long quest continues toward better, safer healthcare systems.* *Vignettes in Patient Safety.* 2017;**1**:1
- [26] Saeed, M., et al., *Fact versus conjecture: Exploring levels of evidence in the context of patient safety and care quality, in Vignettes in Patient Safety-Volume 3.* 2018, IntechOpen.
- [27] Pal R et al. *The 2014 Academic College of Emergency Experts in India's INDO-US Joint Working Group (JWG) white paper on "developing trauma sciences and injury care in India".* International Journal of Critical Illness and Injury Science. 2014;**4**(2):114
- [28] Joshi, A., et al., *Academic College of Emergency Experts in India's INDO-US joint working group (JWG) white paper on the integrated emergency communication response Service in India: much more than just a number!* Journal of Emergencies, Trauma, and Shock, 2013. **6**(3): p. 216.
- [29] Korta, S.M., *Fake news, conspiracy theories, and lies: an information laundering model for homeland security.* 2018, Naval Postgraduate School Monterey United States.
- [30] Analytica, O., *Distortion by social media bots will become targeted.* Emerald Expert Briefings, (oxan-db).
- [31] Walters RM. *How to Tell a Fake: Fighting Back against Fake News on the Front Lines of Social Media.* Tex. Rev. L. & Pol. 2018;**23**:111
- [32] Plaza M et al. *The use of distributed consensus algorithms to curtail the spread of medical misinformation.* International Journal of Academic Medicine. 2019;**5**(2):93
- [33] Mercy_Corps. The world's 5 biggest refugee crises. 2020 July 30, 2020; Available from: <https://www.mercycorps.org/blog/worlds-5-biggest-refugee-crises>.
- [34] WHO. *Health of Migrants - The Way Forward.* 2020 July 30, 2020; Available from: https://www.who.int/migrants/publications/mh-way-forward_consultation-report.pdf?ua=1.
- [35] Kivela P. *Paradigm Shift for COVID-19 Response: Identifying High-risk Individuals and Treating Inflammation.* Western Journal of Emergency Medicine. 2020;**21**(3):473
- [36] Chauhan V et al. *State of the globe: The trials and tribulations of the COVID-19 pandemic: Separated but together, telemedicine revolution, frontline struggle against "Silent Hypoxia," the relentless search for novel therapeutics and vaccines, and the daunting prospect of "COVIFLU".* Journal of Global Infectious Diseases. 2020;**12**(2):39

- [37] Castells-Quintana, D., M.d.P. Lopez-Urbe, and T. McDermott, *Coping with climate risk: the role of institutions, governance and finance in private adaptation decisions of the poor*. 2015.
- [38] Paul E, Brown GW, Ridde V. COVID-19: time for paradigm shift in the nexus between local, national and global health. *BMJ Global Health*. 2020;5(4):e002622
- [39] Baker, S.R., et al., *The unprecedented stock market reaction to COVID-19*. The Review of Asset Pricing Studies, 2020.
- [40] Zaman, K.T., et al., *COVID-19 Pandemic Burden on Global Economy: A Paradigm Shift*. 2020.
- [41] Stawicki SP et al. *Academic college of emergency experts in India's INDO-US Joint Working Group and OPUS12 foundation consensus statement on creating a coordinated, multi-disciplinary, patient-centered, global point-of-care biomarker discovery network*. *International Journal of Critical Illness and Injury Science*. 2014;4(3):200
- [42] Le NK et al. *What's new in Academic International Medicine? International health security agenda—Expanded and re-defined*. *International Journal of Academic Medicine*. 2020;6(3):163
- [43] Tsavoussis A et al. *Child-witnessed domestic violence and its adverse effects on brain development: a call for societal self-examination and awareness*. *Frontiers in Public Health*. 2014;2:178
- [44] Tsavoussis A, Stawicki SP, Papadimos TJ. *Child-witnessed domestic violence: An epidemic in the shadows*. *International Journal of Critical Illness and Injury Science*. 2015;5(1):64
- [45] Hon HH et al. *What's new in critical illness and injury science? Nonaccidental burn injuries, child abuse awareness and prevention, and the critical need for dedicated pediatric emergency specialists: Answering the global call for social justice for our youngest citizens*. *International Journal of Critical Illness and Injury Science*. 2015;5(4):223
- [46] Frist WH. *Overcoming disparities in US health care*. *Health Affairs*. 2005;24(2):445-451
- [47] Patychuk, D., *Health equity and racialized groups: a literature review*. Health Equity Council and Health Nexus. Retrieved from http://www.healthnexus.ca/projects/building_capacity/index.htm, 2011.
- [48] Keeys, M., *The Critical Discussion of Race and Racism Toward Achieving Equity in Health Policy*. Health Equity and Nursing: Achieving Equity Through Policy, Population Health, and Interprofessional Collaboration, 2020: p. 243.
- [49] Schrecker T. *The Political Economy of Public Health: Challenges for Ethics*. The Oxford Handbook of Public Health Ethics; 2019
- [50] Wikipedia. 2020 *Beirut Explosions*. 2020 August 13, 2020; Available from: https://en.wikipedia.org/wiki/2020_Beirut_explosions.
- [51] Wikipedia. 2015 *Tianjin explosions*. 2020 August 13, 2020; Available from: https://en.wikipedia.org/wiki/2015_Tianjin_explosions.
- [52] Marchigiani R et al. *Wind disasters: A comprehensive review of current management strategies*. *International Journal of Critical Illness and Injury Science*. 2013;3(2):130
- [53] Lenain, P., M. Bonturi, and V. Koen, *The economic consequences of terrorism*. 2002.
- [54] Lueddeke, G., *Global population health and well-being in the 21st century: toward new paradigms, policy, and practice*. 2015: Springer Publishing Company.

[55] Ventola CL. *The drug shortage crisis in the United States: causes, impact, and management strategies*. Pharmacy and Therapeutics. 2011;**36**(11):740

[56] Bhandari P. et al. Cancer-causing Chemical Detected in Commonly Prescribed Blood Pressure Medication.

[57] FDA. *Warning Letter: Torrent Pharmaceuticals Limited*. 2019 August 13, 2020; Available from: <https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/warning-letters/torrent-pharmaceuticals-limited-585255-10082019>.

[58] Lorenz EN. *Deterministic nonperiodic flow*. Journal of the Atmospheric Sciences. 1963;**20**(2):130-141

[59] Wikipedia. *Human overpopulation*. 2020 August 13, 2020; Available from: https://en.wikipedia.org/wiki/Human_overpopulation.