

Letter to the Editor

Cite this article: Bechtold HD, Cruz AT, Kaziny BD (2022) From World War II to COVID-19: A historical perspective on the American medical supply chain. *Disaster Med Public Health Prep* 16: 1719–1720. doi: <https://doi.org/10.1017/dmp.2021.94>.

First published online: 25 March 2021


Keywords:

COVID-19; disaster planning; hurricane Maria; World War II

Corresponding author:

Brent Kaziny,
Email: kaziny@bcm.edu.

From World War II to COVID-19: A Historical Perspective on the American Medical Supply Chain

Hunter D Bechtold BSA, BA , Andrea T Cruz MD, MPH and Brent D Kaziny MD, MA

Baylor College of Medicine, Houston, TX, USA

Abstract

COVID-19 is the latest episode of shortages of critical medical supplies. Historically and to the present day, medical supplies have been sourced from single regions in the world, thus rendering the supply chain vulnerable to a myriad of harmful circumstances. We argue that shortages in medications related and unrelated to COVID have illustrated the need for the United States to diversify its medical supply sources before future pandemics, political crises, or natural disasters occur.

Introduction

COVID-19 is the latest episode of shortages of critical medical supplies. Historically, and to the present day, medical supplies have been sourced from single regions in the world, thus rendering the supply chain vulnerable to a myriad of harmful circumstances. We argue that shortages in medications related and unrelated to COVID have illustrated the need for the United States to diversify its medical supply sources before future pandemics, political crises, or natural disasters occur.

March 1942: The Japanese Empire occupies the East Indies, eliminating 90% of the world's supply of quinine, the most effective antimalarial drug of the era.¹ Cases of malaria constantly haunted the United States (U.S.) military throughout the war, impacting all theaters.

September 2017: Hurricane Maria devastates the territory of Puerto Rico, resulting in a shortage of intravenous (IV) saline across the United States. About 50% of U.S. hospitals relying on IV fluid from Baxter International scramble to find alternative supplies.²

January-March 2020: SARS-CoV-2 emerges from China and rapidly evolves into a pandemic, resulting in disrupted production and exportation of medications and personal protective equipment (PPE) around the world. The ensuing shortages hamper the U.S. pandemic response.

Despite the separation in time and space, all 3 scenarios share 1 common mistake: a lack of diversity in sourcing essential medical supplies. As World War II erupted, Japan quickly captured Java, the epicenter for the world's quinine production. The United States, caught off-guard, suddenly found itself facing malaria across the globe without sufficient treatment. This unpreparedness resulted in major hospitalizations from malarial infections throughout different battles and theaters.¹ If the U.S. had invested into diversifying its quinine source well before World War II, the military would not have faced such a drastic shortage. Hurricane Maria devastated U.S. hospitals' small-volume IV saline supply 80 years after World War II. 50% of America's supply came from Puerto Rico, which enabled a single storm to catapult hospitals nationwide into a shortage. As was true for quinine and Java, this saline shortage highlighted that depending on 1 geographical region is rife with risk. Moreover, this risk is clearly higher for medications already in low supply, which is unfortunately a common scenario.² Action must be taken quickly, starting with healthcare leaders identifying which medications are mostly sourced from 1 area or country and then quickly diversifying them.

SARS-CoV-2 again highlighted how quickly an event around the world can rupture America's healthcare supply. At the start of the pandemic, China supplied active ingredients for most medications in the US.³ Such dependence left the American healthcare system extremely vulnerable, and within a few weeks of viral spread in America, the demand on the medical system out-paced supply.³ Importantly, PPE shortages contributed to the chaos as well. Approximately 66% of the global glove supply was sourced from Malaysia.⁴ Yet, a disrupted workforce, and the desire to provide for its own country's needs led to a global shortage that reverberated in America. The lack of source diversification created a perilous scenario for the U.S. and forced hospitals into impossible situations.

Conclusion

Diversifying supply sources may be the most effective way to prevent shortages. Healthcare leaders must examine which supplies are largely gathered from 1 region or nation, and then diversify. For almost 80 years, the U.S. has failed to effectively address seemingly perpetual supply shortages. Although the situation is undoubtedly complicated, source diversification is a vital first step. Soldiers, patients, and practitioners cannot keep waiting.

Author Contributions. Mr. Bechtold conceptualized the study, drafted the initial manuscript, and reviewed and revised the manuscript. Dr. Cruz critically reviewed and modified the manuscript, and Dr. Kaziny conceptualized the study, reviewed, and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

References

1. **Worthen DB.** The national quinine pool: When quinine went to war. *Pharm Hist.* 1996;38(3):143-147.
2. **Mazer-Amirshahi M, Fox ER.** Saline shortages – many causes, no simple solution. *N Engl J Med.* 2018;378(16):1472-1474.
3. **Choo E, Rajkumar V.** Coronavirus medication shortages will be felt by patients with COVID-19 - and some without. NBC News website. <https://www.nbcnews.com/think/opinion/coronavirus-medication-shortages-will-be-felt-patients-covid-19-some-ncna1172371>. Published March 30, 2020. Accessed April 2, 2020.
4. **Oanh Ha K, Raghu A.** The world's hospitals are running out of vital rubber gloves. Time website. <https://time.com/5810448/malaysia-rubber-glove-shortage-covid-19/>. Published March 26, 2020. Accessed April 2, 2020.