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Meat, Masks, and Medicine: COVID-19's Impact on Supply Chains

Autumn Robinson
Eastern Kentucky University, autumn_robinson92@mymail.eku.edu

Eastern Kentucky University

Meat, Masks, and Medicine: COVID-19's Impact on Supply Chains

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Autumn Raelia Robinson

Faculty Mentor

Dr. James Kirby Easterling

Department of Marketing, Management, and International Business

Abstract

Meat, Masks, and Medicine: COVID-19's Impact on Supply Chains

Autumn Raelia Robinson, Author

Dr. James Kirby Easterling, Mentor

Department of Marketing, Management, and International Business

Over the past year, the novel Coronavirus (COVID-19) has impacted every aspect of our lives. The entire world saw mass shortages and shutdowns all through 2020. While 2021 has seen an exponential increase in vaccine distribution, the new variants of COVID have been running rampant through the United Kingdom and the United States. How does all of this impact our supply chains across all industries? This thesis will explore the basic foundations of supply chain management and the year-long history of COVID-19. Additionally, this thesis will discuss the current scholarly opinions regarding COVID-19's impact on supply chains for products such as meat, personal protective equipment (PPE), and hand sanitizer, as well as ways to overcome these problems organizations have faced. Using the aforementioned current scholarly opinions as well as the primary research collected, this thesis will argue that the most effective way to avoid mass shutdowns of supply chains and shortages of essential goods is to limit the federal government's regulatory overreach and to allow state and local governments the power to oversee supply chains for items such as meat and hand sanitizer.

Keywords: Honors thesis, undergraduate research, supply chain management, SCM, COVID-19, Coronavirus

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Key Terms and Abbreviations

1. Supply Chain – the sequence of organizations – their facilities, functions, and activities – that are involved in producing a product or providing a service
2. Supply Chain Operating Reference Framework – (SCOR Framework) Management tool used to address, improve, and communicate supply chain management decisions within a company and with suppliers and customers of a company.
3. First-mover Principle - Notion from game theory that the first to enter a market can obtain a massive advantage such as brand name recognition, customer loyalty, market share, etc
4. Processing Revival and Intrastate Meat Exemption Act (PRIME Act) – Introduced by Congressman Thomas Massie (R-KY) to expand exemptions of custom slaughtering of animals from federal inspection requirements.
5. Kaizen – Japanese word for “continuous improvement”

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Finally, I would like to thank my parents, professors, coworkers, and friends for providing me with continuous encouragement and support throughout the duration of my undergraduate career at Eastern Kentucky University. If it were not for these entities, I would not have become the scholar and person I am today.

My goal during my time at Eastern Kentucky University was to challenge myself academically and learn from diverse voices. I can say with utmost confidence that Eastern Kentucky University has helped me reach this goal.

Introduction

The Coronavirus, or COVID-19, pandemic has changed the world as we know it. From face coverings to social distancing to online learning, the pandemic has made an impact on everyone's lives. Supply chains are no exception to this rule. Ever since the first report of toilet paper and sanitizing shortages, we were made aware of the scope of this pandemic. Since March 2020, the United States has seen numerous shortages of various essentials such as toilet paper, hand sanitizer, face masks, and other medical supplies (Ranney, Griffeth and Jha, 2021). Now, we are witness to the logistics of Pfizer, Moderna and Johnson & Johnson vaccines on both the macro and micro levels.

Throughout the course of this thesis, the history and major concepts of supply chain will be explored, as well as the year long history of COVID-19 and its current status in the United States and across the world, plus the response from the United States government. In addition, secondary scholarly sources will provide additional information regarding supply chains, COVID-19, and the United States government response. Primary research into this thesis will include information regarding vaccine distribution at the national, state, and local levels, as well as information from a personal interview with Congressman Thomas Massie (R-KY). Based on these sources of information, the best course of action is to allow the natural ebb and flow of supply and demand to take its course, without government intervention or other outside forces.

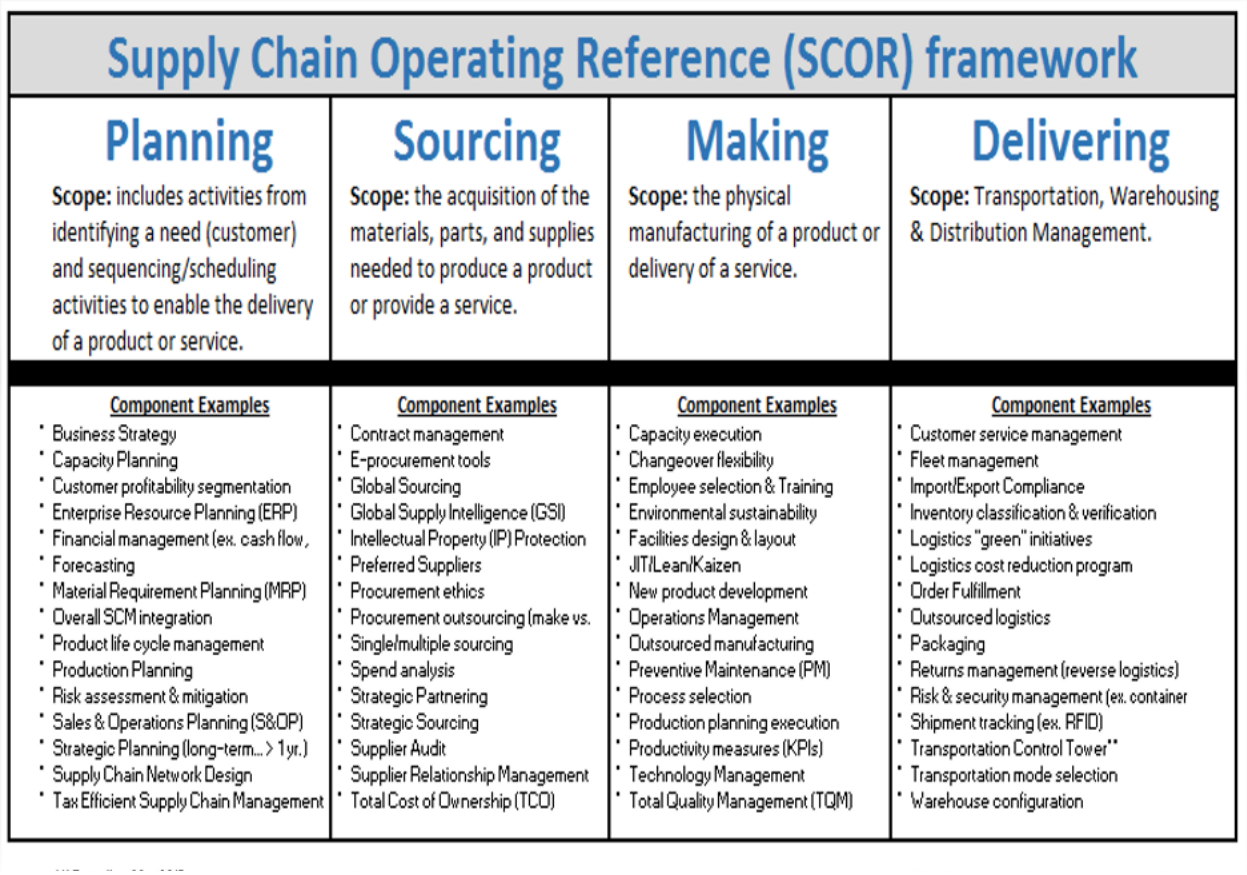
Introduction to Supply Chain

Supply chain is best defined as the sequence of organizations – their facilities, functions, and activities – that are involved in producing a product or providing a service (Supply Chain - Overview, Importance, and Examples, n.d.). This sequence extends upstream from the initial

suppliers (raw materials) to the final customer(s) (retail stores or even further downstream to the shoppers).

Supply chains are involved in essentially every product bought and every service provided. From the meal bought at McDonald's to the newest roller coaster at Disneyland, supply chains are needed to keep these processes functioning. More recently, supply chains are the reason that the vaccines are able to travel from the east coast to the west coast through integrated supply chain management (Pfizer and Moderna using UPS and DHL) ("DHL plays vital role in COVID-19 vaccine logistics in the Americas", 2021). They are also the driving force behind getting hospitals more than enough face masks, ventilators, and ICU beds needed to combat this pandemic.

Key Aspects of Supply Chain



Supply Chain Operating Reference (SCOR) framework

Planning	Sourcing	Making	Delivering
Scope: includes activities from identifying a need (customer) and sequencing/scheduling activities to enable the delivery of a product or service.	**Scope:** the acquisition of the materials, parts, and supplies needed to produce a product or provide a service.	**Scope:** the physical manufacturing of a product or delivery of a service.	**Scope:** Transportation, Warehousing & Distribution Management.
Component Examples * Business Strategy * Capacity Planning * Customer profitability segmentation * Enterprise Resource Planning (ERP) * Financial management (ex. cash flow, * Forecasting * Material Requirement Planning (MRP) * Overall SCM integration * Product life cycle management * Production Planning * Risk assessment & mitigation * Sales & Operations Planning (S&OP) * Strategic Planning (long-term... > 1yr.) * Supply Chain Network Design * Tax Efficient Supply Chain Management	**Component Examples** * Contract management * E-procurement tools * Global Sourcing * Global Supply Intelligence (GSI) * Intellectual Property (IP) Protection * Preferred Suppliers * Procurement ethics * Procurement outsourcing (make vs. * Single/multiple sourcing * Spend analysis * Strategic Partnering * Strategic Sourcing * Supplier Audit * Supplier Relationship Management * Total Cost of Ownership (TCO)	**Component Examples** * Capacity execution * Changeover flexibility * Employee selection & Training * Environmental sustainability * Facilities design & layout * JIT/Lean/Kaizen * New product development * Operations Management * Outsourced manufacturing * Preventive Maintenance (PM) * Process selection * Production planning execution * Productivity measures (KPIs) * Technology Management * Total Quality Management (TQM)	**Component Examples** * Customer service management * Fleet management * Import/Export Compliance * Inventory classification & verification * Logistics "green" initiatives * Logistics cost reduction program * Order Fulfillment * Outsourced logistics * Packaging * Returns management (reverse logistics) * Risk & security management (ex. container * Shipment tracking (ex. RFID) * Transportation Control Tower** * Transportation mode selection * Warehouse configuration

Figure 1 SCOR model

Most, if not all, supply chain firms follow the original Supply Chain Operating Reference (SCOR) Framework. This framework – provided above in Figure 1 (Easterling, 2015) – outlines the four foundational aspects of supply chain; planning, sourcing, making, and delivering.

The planning aspect of supply chain starts before anything is made. This process involves identifying the customer and their need as well as scheduling any activities that will enable the eventual delivery of a product or service. These activities could include network design, forecasting, production planning, and risk assessment/mitigation (Easterling, 2015).

Sourcing is the acquisition of all materials, parts, and other supplies needed to either produce a product or provide a service. Activities in this category can include contract management, global sourcing, procurement outsourcing, and spend analysis (Easterling, 2015).

Making includes the actual manufacturing of a product or the delivery of a service. This step can include employee selection/training, operations management, process selection, and outsourced manufacturing (Easterling, 2015).

The final pillar of the SCOR framework is delivering. Delivering is the transportation of the finished product or service – however, it also entails the warehousing and distribution management of the finished goods. This pillar includes activities such as customer service management, packaging, fleet management, and order fulfillment (Easterling, 2015).

Global supply chains play a major role in supply chain, now more so than ever. For instance, some product designs might use supplies and materials that are sourced from all over the world. In some cases, firms will choose to outsource manufacturing and other service activities to other countries because labor and productions costs are lower. However, this comes with the risk of lower quality, higher transportation costs, and longer lead-times. Global supply chains do not come without their share of complications. As we have seen in the past few years,

political instability can cause global supply chains to be delayed or even break entirely. There is also an increased need for trust among the global supply chain partners, since it is not easy to simply visit the manufacturing facility at any given point.

History of COVID-19

COVID-19 started as an outbreak in Wuhan, China, in December of 2019. The origin of the disease is still being debated. Manufacturing facilities in the area such as PepsiCo, Siemens, Peugeot Citroen all shut down their facilities in early January 2020. By March 2020, COVID-19 had made its way to the United States and at that point, had been officially labeled by the CDC and WHO as a pandemic (Adhanom, 2020).

As the COVID-19 pandemic raged through the world, especially the United States, many countries began to lock down – shutting down businesses such as restaurants and retail stores. While only essential businesses, such as grocery stores, fast food restaurants, take-out restaurants and banks remained open, the rest of the world was shut down. Meanwhile, the United States allowed individual states to make the decision to shut down or remain open. Many states decided to follow the suit of other countries and shut down nonessential travel and businesses. Unemployment in the United States skyrocketed to as high as 14.7%, levels not seen since the Great Depression nearly a century ago ("Unemployment rate rises to record high 14.7 percent in April 2020", 2020). As factories across the United States and across the world shut down, supply chains essentially came to a halt. With the factories not producing, logistics teams could not deliver goods to the stores, creating mass shortages in items such as masks, hand sanitizer, and even toilet paper.

Current Status of COVID-19

COVID-19 cases continue to rise in the United States and across the world. There are 141 million cases worldwide, 37.1 million of those coming from the United States. There have been 3.01 million deaths worldwide, 567K deaths in the United States ("Coronavirus Update (Live), 2021). The map below highlights the countries with the highest COVID cases.

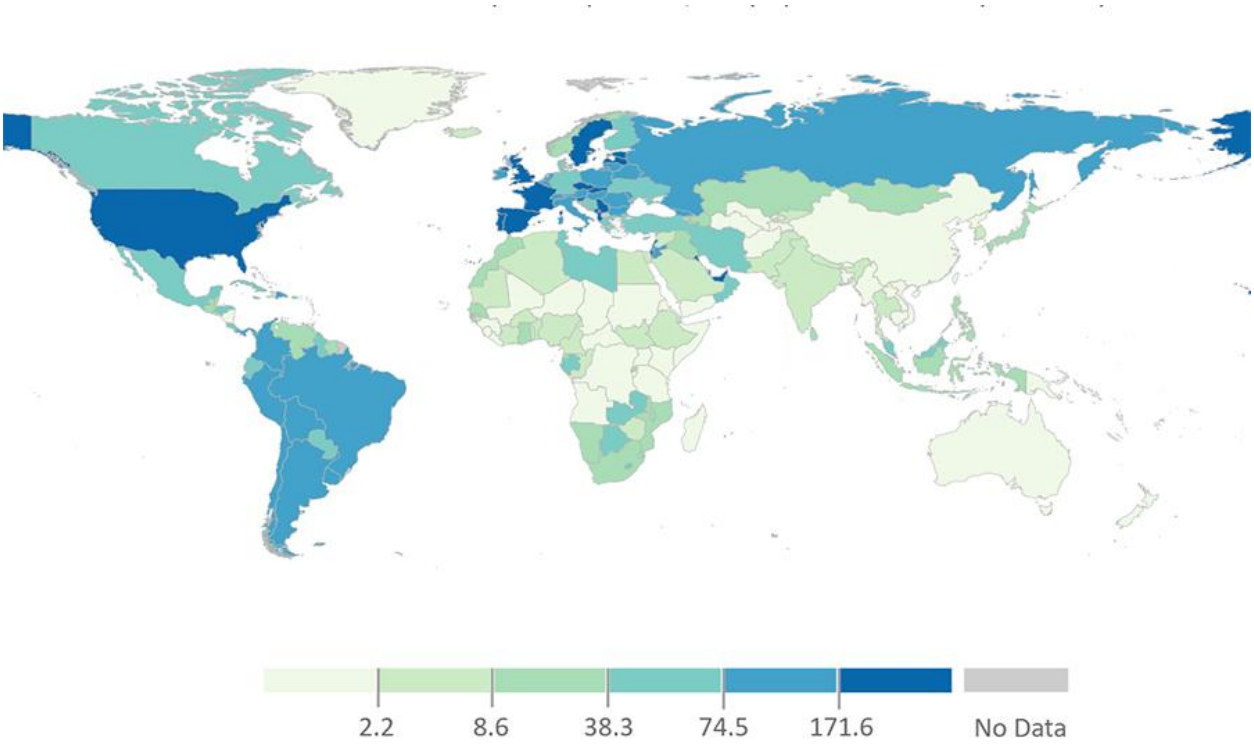


Figure 2 Data collected from covid.cdc.gov

In late November/early December 2020, the FDA approved of both the Pfizer and Moderna vaccines for emergency use, meaning that at large, the vaccines are unapproved for general use, but is allowed to be used for emergency purposes to help curb the spread of COVID-19 ("FDA Takes Key Action in Fight Against COVID-19 By Issuing Emergency Use Authorization for First COVID-19 Vaccine", 2020). Both companies immediately got to work on shipping out the vaccines all across the United States, using FedEx and UPS as the major forms of transportation. All vaccine shipments had to pass through facilities in Kentucky (Otts, 2020)

in order to reach the west coast as quickly as possible, as both the Pfizer and Moderna vaccines must be refrigerated at -160 degrees Fahrenheit. Health care workers and other essential workers are eligible for the vaccine. As it stands, all individuals 16 years old and older are eligible for the vaccine. This level of vaccine distribution would not be possible without supply chain and distribution management.

United States Government Response to COVID-19

The United States government's response to COVID-19 was slow and practically nonexistent in the first few months of the pandemic (Haffajee & Mello, 2020), before it reached American soil. Then on March 27, 2020, the government passed into law the CARES Act, providing $1,200 stimulus checks to qualifying citizens, PPP loans for small businesses, among other protections. The CARES Act totaled roughly $2 trillion.

As the months went on, however, conditions worsened. Daily cases were beating records day after day, workers were going on and off unemployment as states opened and shut down their businesses, and ICU bed capacities were back on the rise. It was not until late December, that the HEROES Act was passed. This $1.13 trillion package provided more relief to state governments and small businesses, as well as a $600 stimulus check to qualifying Americans.

The difference between the United States government's response to COVID compared to local government responses has been drastic. While the federal government decided to leave state governments in charge of the COVID-19 response, each state has handled it differently. For instance, California has been in intense lockdowns for nearly a year while Florida reversed mask mandates, allowed Walt Disney World and other theme parks to reopen at 33% capacity, and allowed restaurants and bars to reopen. There are also some states, like South Dakota, that never

issued a statewide lockdown, while states like Kentucky have had cycles of lockdowns (started reopening in the summer of 2020, then closing and reopening as cases rose and fell).

Central Argument

Based on secondary research conducted, as well as creating supply and demand curves for specific products pre and during COVID-19, the natural flow of supply and demand was interrupted due to the COVID-19 pandemic; however, this shift was greatly exacerbated by questionable and unnecessary government intervention as well as decreased international trade.

As international trade and day to day operations come back to normal due to increased vaccine distribution, supply and demand for most needed products will naturally fall back into equilibrium, as we have seen in the past few months with hand sanitizer and face masks. These products have been able to return back to equilibrium because the government did not regulate or legislate these products. The best course of action would be to apply this same standard to all products, beyond hand sanitizer and face masks.

Current Scholarly Opinions

Even though the COVID-19 Pandemic has been in the United States for only a year, experts in the field of supply chain have been quick to research and publish peer reviewed articles, discussing various aspects of this pandemic – from how the political atmosphere has impacted supply and demand, to safety measures within food logistics, to rethinking our medical supply chains, both local and global. More than just these three instances will be discussed in further detail.

Atkinson, C., McCue, Prier, and Atkinson, A. (2020) study deeper than just the surface level of logistics during the pandemic in their article “Supply Chain Manipulation, Misrepresentation, and Magical Thinking During the COVID-19 Pandemic” featured in *The*

American Review of Public Administration; they also critique how politics in the United States has impacted both global and local supply chains for essentials such as PPE, ventilators, and even hydroxychloroquine. The authors explicitly study and critique any and all public failures of the former federal administration and question how those failures provide a deeper understanding of the impact the United States' COVID-19 response has on supply chains – global, national, and local.

In their discussion of the lack of preparedness in regards to PPE, Atkinson et., al claim that Governors were willing to do anything necessary to get the equipment they needed (masks, ventilators, pop-up hospitals, etc.), and state that "Given the first-mover principle, those with later outbreaks may pay more yet become more uncertain about the source of their supplies" (pg. 630). The first-mover principle is defined as the "notion from game theory that the first to enter a market can obtain a massive advantage such as brand name recognition, customer loyalty, market share, etc" (https://marketbusinessnews.com/financial-glossary/first-mover-advantage-definition-meaning/). In this instance with governors fighting for necessary supplies, the first-mover advantage at play is the control of resources. Those governors who make the first move are more likely to gain access to better quality products and services, such as higher quality masks, longer lasting ventilators, and more state funding under the HEROES and CARES Acts. This first mover practice also allowed for governors to make questionable executive decisions. Take for instance, New York Governor Andrew Cuomo. In March of 2021, it was revealed that Governor Cuomo had his top aides manipulate the number of COVID-19 deaths in New York nursing homes, as early as July 2020. According to an article from the New York Times (2021), authors J. David Goodman and Danny Hakim elaborate, "After the state attorney general revealed earlier this year the thousands of deaths of nursing home residents had been

undercounted, Gov. Cuomo finally released the complete data, saying that he had withheld it out of concern that the Trump administration might pursue a politically motivated inquiry into the state's handling of the outbreak in nursing homes" (2021). According to investigations, the aide's report put the actual number of deaths 50 percent higher than the reported number of deaths. Governor Cuomo is still under investigation for this scandal, and there have been calls from both parties to impeach the governor if found guilty.

When the markets are manipulated by political rhetoric, especially during national crises and worse, supply chains tend to suffer the most damage, which results in shortages of essential goods. For the instance of hydroxychloroquine, when political rhetoric and misinformation spread throughout the media, demand for the drug rose exponentially, causing mass shortages for patients with lupus or other illnesses where the drug was scientifically proven effective (pg. 628). Atkinson et., al ultimately conclude that "…when procurement works, needed supplies are received and the people who save others' lives can do their jobs. When supply chains break down, or worse, have been the subject of tampering given political communications and personal relationships, there is no guarantee that necessary materials will be available" (pg. 632). There is no clear answer for how to prevent political rhetoric from impacting supply chains; however, we can reduce the likelihood of misinformation spreading and impacting supply chains through fact-checking systems for all aspects of the political spectrum.

Rizou, Galanakis, I., Aldawoud, and Galanakis, C. (2020) discuss solely the food supply chains and food safety within the environment during COVID-19 in their article "Safety of Foods, Food Supply Chain, and Environment Within the COVID-19 Pandemic" in the journal *Trends in Food Science & Technology*. At the time of publication, scientists believed that COVID-19 originated from the ingestion of raw bat in an unsanitary portion of the Wuhan

Marketplace, therefore it is valid to question the safety of all foods and possible transmission levels during the pandemic. Rizou, et, al, explore the possibility of COVID-19 transmission through the food supply chain, then research the development of detection tools for food and environmental applications.

Rizou et., al first describe a few vital safety measures enacted during the pandemic – such as disinfecting surfaces, washing hands, social distancing, wearing face coverings, etc. – and place those safety measures into seven distinct categories – be healthy, wash hands, disinfect surfaces, working environment, food preparation, delivery, and social distance – then outline which measures are most critical for each stage of the food supply chain, from agricultural production all the way up to distribution and consumption. For instance, in the agricultural production stage, general healthy hygiene (staying home if sick, covering your mouth when coughing or sneezing) and washing hands often are the two most important safety measures. Meanwhile in the consumption stage, all seven categories of safety measures are equally important (pg. 294).

Rizou et., al then discuss the shutdown of some of the largest beef-packing and meat processing companies in the United States, and how these closures had a negative impact on the food supply chain. With processing plants being shut down, farmers could not get their slaughtered meat to the processing plants to be butchered and processed. This not only created a major bottleneck, but also created tons of animal waste on the farmers' behalf. In light of this problem, Kentucky Representative Thomas Massie reintroduced his bill, the Processing Revival and Intrastate Meat Exemption Act, or the PRIME Act. Under the PRIME Act, exemptions for custom slaughtering of animals from federal inspection requirements would be expanded. Under the current law, the exemption is only in place for meat that is slaughtered for personal,

household, guest, and employee use. With the PRIME Act, the exemptions would expand to the following:

- "slaughtered and prepared at a custom slaughter facility in accordance with the laws of the state where the facility is located; and
- "prepared exclusively for distribution to household consumers in the state or restaurants, hotels, boarding houses, grocery stores, or other establishments in the state that either prepare meals served directly to consumers or offer meat and food products for sale directly to consumers in the state" (*PRIME Act*, 2020).

This act would allow farmers to sell slaughtered meat directly to the end customer (the retail stores or restaurants in this instance), eliminating the potential of a bottleneck in regards to processing plants and thus reducing the potential for meat shortages in the future.

Rizou, et. al, conclude from their extensive research that as supply chains move into their final stages (Distribution and Consumption), more and more safety measures are needed due to more people becoming involved with the process (Logistical drivers during distribution and consumers during consumption). The authors also note that as supply chains more into post-lockdown routines, public health surveillance will increase its dependency on the development of bioanalytic tools created specifically for food safety, food supply chains, and environmental safety. Food safety and sustainability are vital to food supply chains, even more so during a global health crisis. If there are steps we can take to make these supply chains safer, we should do so as efficiently and effectively as possible.

Klemeš, Fan, and Jiang (2020) describe the energy and environmental impact of the basic COVID-19 fighting measures such as PPE, disinfectants, and the supply chains for those items in their article "The Energy and Environmental Footprints of COVID-19 Fighting Measures – PPE,

Disinfection, Supply Chain" in the international journal, *Energy*. The authors provide an overview of the extra energy consumption that potentially increases the environmental footprint during COVID-19. Not only that, they also raise awareness to additional production and subsequent waste of PPE and their supply chains.

Due to COVID, hospitals saw an increase of hospitalization, working shift, and hygiene requirements and thus triggered the increase of energy, food packaging, and disinfectants demands. Klemeš et., al highlight that more studies are needed to come to a conclusion regarding the efficiency of masks as well as improving the standard guideline for production and usage. They state that "with a proper design standard, material selection, and user guideline, reusable PPE could be an effective option with lower energy consumption/environmental footprint" (pg. 1).

In the end, Klemeš et., al discussed six measures for future sustainability for PPE:

- Develop a more resilient supply chain and consider the environmental footprint as much as possible
- Diversify the solutions (especially the reusable options)
- Assess the burdening footprint of reusing (washing, sterilization)
- Reduce the energy consumption of hospital building
- Improve the waste sorting and enhance the technology development in handling medical waste sustainably, and
- Improve the response of waste management systems under a change in amount, composition, and disseminated location.

These measures will take time to implement, but if implemented in an efficient and effective manner, they can help reduce the amount of waste we have seen due to COVID.

Meredith Broadbert with the Center for Strategic and International Studies (CSIS) discusses in her 2020 article, “COVID-19 Demand Shock and Preparedness Response: Securing Medical Supply Chains: The Trusted Trade Network”, how COVID-19 exposes vulnerability in global medical supply chains in the United States and how the United States government can move forward regarding strengthening the resiliency of our medical supply chains through imports and exports.

Broadbert explains that as the United States nears one year since the COVID-19 outbreak, “manufacturers in the medical supply sector, the United States government, and foreign governments are likely to embrace new policies aimed at readjusting global supply chains to address vulnerabilities that have come to light” (pg. 1). COVID-19 brought attention to many weak points in the medical supply chains and proved that no one country can fight this battle against COVID-19 alone. Broadbert recommends that Congress pass legislation that would essentially exempt global medical supply chains from import and export restrictions in the face of a global crisis, such as COVID-19, stating “trusted supplier partners would keep general medical supply lines open and work together to provide vaccines, therapies, and medical supplies during disruptions caused by a pandemic or other emergency” (pg. 2). These partners in the network would be expected to maintain open and honest communications to minimize potential for bottlenecks and other disruptions.

Broadbert cites that according to the McKinsey Global Institute (MGI), COVID-19 not only exacerbated these bottlenecks and disruptions, the pandemic also brought to light that these disruptions have been occurring long before COVID. According to MGI, “companies can now expect supply chain disruptions lasting a month or longer to occur every 3.7 years and the most severe events exact huge financial costs” (pg. 5). While pharmaceutical and other medical

companies are not completely immune to these disruptions, they are the least likely to experience them.

It's not just medicinal supply chains that are facing bottlenecks; Broadbert explains that "supply chains for PPE have been unable to keep up with demand over the course of the pandemic, magnifying the public health crisis" (pg 10). With PPE demand high and supply low,

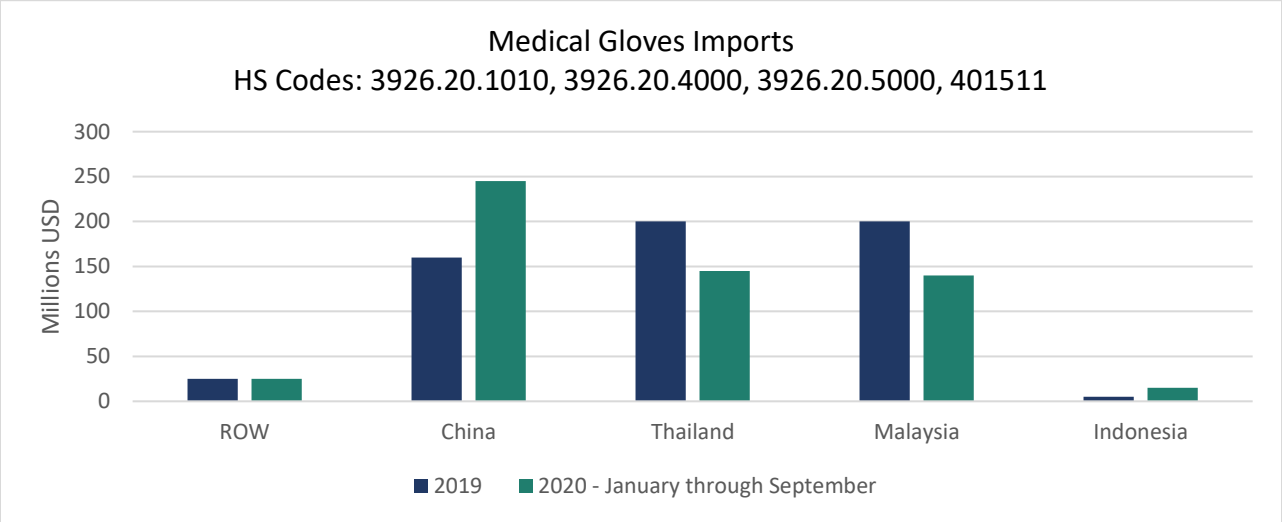


Figure 3 All data generated from U.S. Census Bureau , "USA Trade Online", Database, https://usatrade.census.gov/

this allow for counterfeit manufacturers to come in and sell counterfeit and ineffective PPE to health care workers. To make matters worse, China was the leading supplier of PPE to the United States prior to the pandemic. Below are two charts from the United States Census Bureau's Trade Database, outlining two personal protection equipment tools, gloves and goggles. As you will see, an overwhelming majority of these supplies are imported from China, despite the decreases from 2019 to 2020.

The chart above depicts the importation of medical gloves into the United States from five different countries, and compares the numbers from 2019 to the first nine months of 2020. As you can tell from the chart, medical glove imports from China and Indonesia both rose from

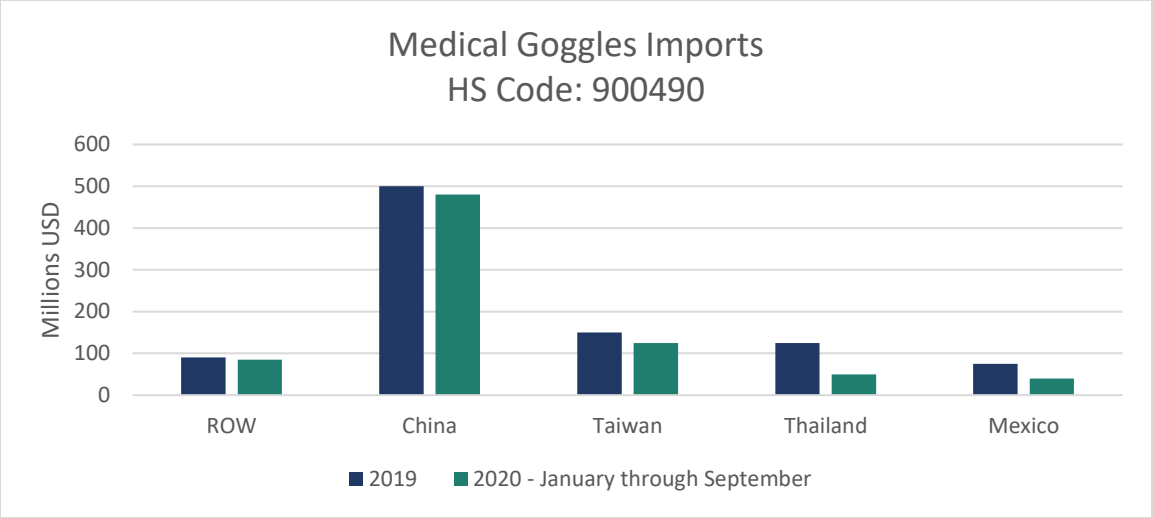


Figure 4 All data generated from U.S. Census Bureau, "USA Trade Online", Database, https://usatrade.census.gov/

2019 to 2020 while the other three countries decreased. This data shows that even during the pandemic, the United States relies on foreign countries to import necessary goods.

The chart above depicts United States importation of medical goggles, another form of PPE. In this case, while imports from all five countries decreases from 2019 to 2020, China still remains the single largest supplier to the United States for imported supplies.

Broadbart goes into great detail explaining why global medical supply chains still need to remain open, even during a global health crisis. No one country can produce everything needed at a rate needed in order to meet demands, therefore global supply chains are needed. Through open communication, these supply chains can operate just as – if not more – smoothly as they did prior to the global pandemic.

Primary Research

Supply chains can vary from the national, state, and local levels. For instance, at the national level, how the United States allocates vaccines may be different than how the United Kingdom allocates vaccines. Or, the way Michigan allocates vaccines to their counties may be different than the way California allocates vaccines. These vaccine supply chains are vital to

getting the right number of vaccines to the right place at the right time – also known as a "perfect order". Getting the perfect order is crucial, especially because the Pfizer-BioNTech vaccines have to be stored in sub-cold storage units in order to remain useable. Since vaccine supply is so limited, due to the federal government determining how many doses each state gets each week, having the perfect order minimizes the risk for any waste and for doses to be expired. Below is a graphic outlining the generalized concept of vaccine distribution.

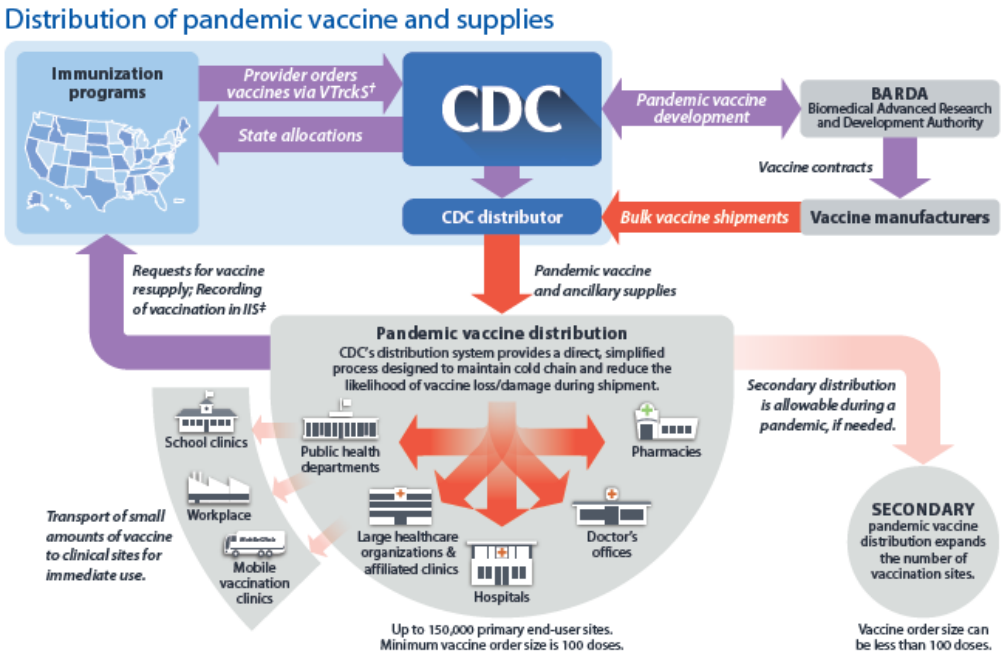


Figure 5 Source: CHFS KY Vaccine Plan

According to the Centers for Disease Control (CDC), the amount of COVID-19 vaccines allocated per state is determined by the number of people 18 years of age or older within the 'state or jurisdiction in proportion to the entire United States population. Every Tuesday, the CDC will post new allocations of doses, then the following Thursday, states can order doses from that week's allocations. For example, the CDC may allocate 50,000 vaccines to Kentucky next week. Then, Kentucky can order up to 50,000 vaccines for that week, dependent on need.

Kentucky plans on using the same technique to allocate vaccines at the local level. Instead of having major vaccine sites in only Lexington, Louisville, and other major cities, Governor Andy Beshear is allowing for all 120 counties to have at least one vaccine site. Each vaccine site then receives a pro-rated allocation of vaccines, based on the population of that county that is eligible to receive the vaccine.

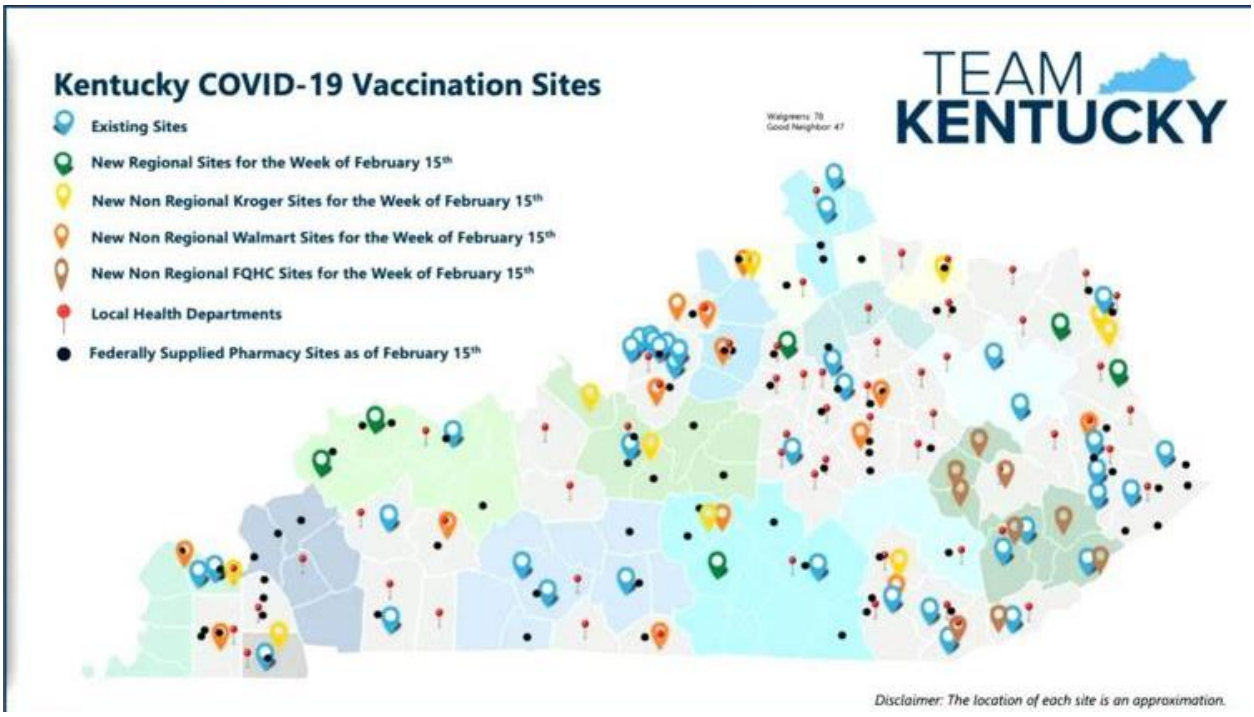


Figure 6 Map of KY COVID-19 Vaccination Sites, data generated from kycovid-19.ky.gov

Madison County has been a part of the vaccine rollout since Kentucky first started receiving vaccines in mid-December. In an interview with the Richmond Register, Kelley McBride, public information officer with the Madison County Health Department (MCHD), "The department received 1,000 vaccines [on December 21, 2020], but did not begin administration until December 29" (2021). As the vaccine phases expand, each county will receive more doses, thus more opportunities for counties to reach 70-100% vaccination.

The PRIME Act, as mentioned above, was a bill that was introduced to reduce and remove bottlenecks within the meat processing industry. I had the opportunity to speak one on one with Representative Thomas Massie, the sponsor of the bill. I first asked him what inspired him to sponsor/write the PRIME Act. He responded, “I first introduced this bill in 2015 in order to help regulate the price of U.S. grown foods and make them the same price as imported foods. I’ve been reintroducing it ever session since then. From 2015 to 2019 legislative sessions, I would get maybe 20-25 co-sponsors. When I introduced it last year, I doubled the number of co-sponsors.” When asked how the PRIME Act would benefit farmers, Massie said, “This act gives them an advantage in the market. It allows them to compete against the four major meat production in the United States”. Massie went on to explain that there are four major companies that control 85% of the meat production in the United States. However, these four companies do not allow farmers to use their facilities without regulation fees. According to Massie, because of this government-regulated monopolies, the meat supply chain has been brittle long before COVID. Supply chain is most brittle for poultry – with poultry only lasting three to four weeks – and least brittle for beef – lasting around two years.

Representative Massie explained that there is really only one loophole for farmers when they can’t afford to go to the four major companies to slaughter their animals. The farmer would sell the live animal to the consumer, then the consumer can butcher the animal. With the PRIME Act, farmers wouldn’t have to worry about using this loophole. COVID further exacerbated the problems with the meat supply chain. COVID caused the major companies to shut down processes, which caused bottlenecks in supply chains, which caused anxiety for farmers and consumers. Because of these bottlenecks, unofficial slaughter houses saw an increase in business. With the PRIME Act, small processing plants would be encouraged to expand. The bill

would reduce the cost and fees while still maintaining safety regulations, thus allowing farmers to make more money by selling butchered meat than live stock. By alleviating the regulations, farmers can drive up the competition and compete with the major monopolies.

Not only would the PRIME Act drive up competition, it would help reduce the risk of contamination. With the four major monopolies, contamination risk is higher because all beef from all farms comingle in these factories. Buying in small batches, directly from the farmers is inherently safer, because there are preventative measures that can be implemented. In addition, farmers have a greater incentive to do the right thing. Corporations have no idea where these cows come from, and the farmers know this, so they will sell off the sick cows without objection.

Representative Massie has said that he plans to reintroduce the PRIME Act this legislative session. The main change he is making is that he is eliminating the grocery and restaurants options from the bill. His thinking is that by removing these options, the bill will be easier to pass.

Conclusion

Even after extensive research, supply chain experts may never have a definitive solution to combat COVID's impact on supply chains. We are still learning new things about COVID-19, including the new variants of the virus found in the United Kingdom and other countries. With vaccine distribution rising exponentially and new vaccines constantly being developed and tested, supply lines need to be prepared for the inevitable increase in demand. With the increase in demand for vaccines, hopefully we will see a decrease in demand for other items such as masks and gloves.

We have also seen beef inventory supply and demand fall back into equilibrium, even with the four major meat processing companies being shut down and slowly reopening. Should the PRIME Act pass this session, this act will only help farmers in the long run, especially should another global health crisis cause factories and businesses to shut down for an extended period of time. With the PRIME Act, farmers would be able to bypass the government regulations of the major monopolies and be able to sell directly to consumer. Even after the pandemic ends and society returns to normalcy, the bill would allow small processing plants to compete with the major monopolies, thus improving quality throughout the systems.

In short, the importance of this thesis is that it provides members of the supply chain world with the argument for stronger free market protection against political rhetoric manipulation and monopolies. Additionally, it provides evidence for a need to strengthen the resiliency of our supply chains, should another global health crisis arise. Firms will now have to incorporate situations like these into either their crisis management plans or their day-to-day operations.

The Japanese word "*Kaizen*" stands for "continuous improvement", meaning that there is always more ways to improve. The last year has shown us why we continuously improve our processes and operations; the world at large will sometimes force us to improve what we believed to be perfect. Remaining stagnant in any industry or firm can be costly. Moving forward and finding new and innovative ways to improve operations and processes can help firms find greater success in the long term.

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