



U.S. Chamber of Commerce
Foundation



Business Solves Roundtable:

Building Toward Healthcare Supply Chain Resilience



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About the Co-Authoring Organizations

The U.S. Chamber of Commerce Foundation harnesses the power of business to create solutions for the good of America and the world. We anticipate, develop, and deploy solutions to challenges facing communities—today and tomorrow. For more than 50 years, we have convened and coordinated with businesses and public leaders to take immediate action in moments of unanticipated crisis. We mobilize businesses of all sizes, government agencies, nonprofits, and local chambers of commerce to proactively solve problems and build relationships to improve resilience and response to disasters and humanitarian crises around the globe.

The Healthcare Distribution Alliance (HDA) represents primary pharmaceutical distributors—the vital link between the nation’s pharmaceutical manufacturers and pharmacies, hospitals, long-term care facilities, clinics, and others nationwide. Since 1876, HDA has helped members navigate regulations and innovations to get the right medicines safely and efficiently to patients at the right time. The HDA Research Foundation, HDA’s nonprofit charitable foundation, serves the healthcare industry by providing research and education focused on priority healthcare supply chain issues.



Preface

The Healthcare Distribution Alliance (HDA) partnered with the U.S. Chamber of Commerce Foundation to convene a small group of subject matter experts who are involved daily in delivering healthcare resources and services to assess how the private sector can drive national resilience of materials distribution to care for those in need.

America's resilience is evident through our ability to face the pandemic. We know the human toll, the impact on the workforce, and the strain on supply chains across sectors—not just those serving healthcare throughout the global shock of the COVID-19 pandemic. This requires both introspection and action to meet new realities as we prepare for the next pandemic, the next disruption, the next hurricane season, and the next normal.

This document serves not only as a record of a meaningful conversation among experts but as a way to prepare the nation, an industry, and our society to provide healthcare resources before, during, and after disasters and how we can enhance supply chain resilience.

In times like these, it is conventional to prepare for the next COVID-19. The next pandemic, the next large-scale extreme weather event, the next localized disruption won't necessarily look like the most recent crisis. Still, lessons learned should be applied to developing a consistent understanding of what drives healthcare supply chains, the decision-making support across a decentralized system, and the nuances of government and private sector stakeholders.

Many reports about the COVID-19 pandemic have been written and will be written. This is not that report. This report is about building upon the strength of a resilient system providing healthcare resources in the future and the changes to consider to be ready for what's next to strengthen the resilience of our communities.

While the national public health emergency for COVID-19 has expired, we still live with COVID-19. Other threats and hazards may challenge the healthcare supply chain as demand shifts and surges, we navigate destabilized geopolitical conditions, and face economic factors. Each is linked to long-term resource resilience. We hope the robust dialogue started throughout the pandemic will continue toward solutions for improved private-public coordination to shape resilience for everyday disruptions and global shocks that can unravel the fabric of communities across America.



Executive Summary

The delivery of healthcare resources in the U.S. is critical to ensuring the health and well-being of the American public. Supply chain disruptions, regardless of cause but most pronounced in disasters, can threaten the availability of these resources, with public health implications. This report aims to provide an overview of the tenets of healthcare supply chain resilience, the stakeholder landscape, and lessons learned from the COVID-19 pandemic to identify key challenges for ensuring resilient delivery of healthcare resources in the coming decade.

The Healthcare Distribution Alliance (HDA), in partnership with the U.S. Chamber of Commerce Foundation, facilitated a roundtable on November 15 as part of the 2022 Business Solves Conference to discuss the resilience of healthcare supply chains. Experts participating in the roundtable addressed multiple topics, including the following:

- Exploring solutions to product shortages and other supply chain issues in the disaster life cycle.
- Incorporating the expertise of both the public and private sectors to ensure and improve supply chain resilience.
- Identifying the best strategies to reduce risk and improve all-hazards resilience.

While the effects of COVID-19 continue to be felt in everyday life, the opportunity for enhancing supply chain resilience each day, moving forward, and adapting to the new operational realities to improve lives is essential.

A clear takeaway from the roundtable is that while supply chain conversations were ubiquitous around the pandemic, the rigor of understanding the realities facing those managing global supply chain networks has eluded some stakeholders that serve or are served by these supply chains. This conversation, which included several private sector companies, led to developing tenets for healthcare supply chain resiliency every day—not just during a disruption or crisis. If adaptative capacity is built into the supply chains guided by these tenets, the need for extraordinary policy, regulatory, or other solutions becomes less necessary to activate private sector networks fully. Although the market is mature, the pandemic uncovered fragilities and disconnects across the supply chains that enable its existence, creating the opportunity for action now instead of waiting for the next shock.

Tenets for Building Resilience in Healthcare Supply Chains

1 Diversify Suppliers

2 Leverage Commercial Capacity

3 Anticipate Risk

4 Build Agility

5 Collaborate Consistently

6 Prepare for All-Hazards

7 Plan Inclusively

¹ See Building Resilient HealthCare Supply Chains Roundtable – Participating Organizations section for the complete list of attendees.



Roundtable participants agreed that common challenges to healthcare resilience include:

- Raw materials and prioritization challenges.
- Issues with access to data, data and information sharing, and balancing burdens of reporting.
- An uneven adoption of blockchain, machine learning, and artificial intelligence.
- More frequent crisis events compound to be greater than preparedness capacity.
- Communication barriers among healthcare supply chain stakeholders.
- Inequitable hoarding of medical supplies. Anticipation of crises and impediments in the global supply chain.

During the COVID-19 pandemic, healthcare resources were tightly controlled and managed centrally to ensure efficient and equitable allocation. However, the evolving healthcare landscape is embracing decentralization, where a variety of stakeholders, including hospitals, clinics, public health agencies, and private providers, have gained more autonomy and control. This shift creates a need for visibility for all relevant stakeholders to the process. Centralized healthcare systems were often slow and inefficient at responding to the pandemic. Additionally, centralized healthcare systems are more vulnerable to cyberattacks and other disruptions. Anticipated operating realities include competing cross-industries with unaligned priorities and the need for candid collaboration between the government and private sector.

Opportunities for improving the healthcare supply chain include talent sourcing and cross-training, flexible scheduling, defining shared objectives, reducing carbon footprint, and addressing international trade politics and regulatory requirements. Concerns about labor and the efficient bridging of federal and local systems were discussed. It was also noted that there is a need for technology and simplification of tools, as well as the promotion of digestible information through social media platforms and local chambers of commerce. Healthcare businesses of all sizes can better prepare for disasters by examining operational resilience capabilities. Overall, there is a need for patience with policy; understanding interdependency, visibility, and data accuracy; and defining roles and responsibilities within the healthcare supply chain.



The task ahead will require us to balance those persistent challenges that existed before the pandemic with the latent fragilities exacerbated by the strain on healthcare systems—upstream and downstream. Cross-functional coordination within the industry and between the public and private sectors proved essential throughout the pandemic, with the opportunity to use that momentum for daily disruptions in the future. As long-term endeavors for supply chain reform move forward, there are factors impacting resilience, such as supply chain alignment, workforce capacity, support, and emerging technologies. Ensuring the availability of critical medical products and services and adapting to supply chain disruptions helps the supply chain reduce the risk to patients, minimize the financial impact of these disruptions, and demonstrate commitment to the whole community.



Framing Questions for Resilience

To move beyond the pandemic, the Healthcare Distribution Alliance (HDA), in partnership with the U.S. Chamber of Commerce Foundation, facilitated a roundtable discussing the operational resilience of healthcare supply chains. Experts participating in the roundtable addressed multiple topics, including exploring solutions to product shortages and other supply chain issues in the disaster life cycle, incorporating the expertise of the public and private sectors to ensure and improve operational resilience, and identifying the best strategies to reduce risk and enhance all-hazards resilience.

As enterprises shift toward integrating resilience into their operations, assessing how adjustments made during the height of the COVID-19 pandemic can be sustained or refined is essential. To address those challenges, three fundamental questions emerged as considerations for building and maintaining supply chain resilience beyond the next pandemic:

Where do we go from here strategically?

What can we do to improve preparedness?

How do we seize and create opportunities to build tangible resilience?



Where Do We Go from Here *Strategically*?

Building resilience is an ongoing process that requires attention and intention with diverse stakeholders focused on delivering care through healthcare resources across the United States.

While objectives to diversify supply chains through relocation of manufacturing in the United States will take time, there are open issues for navigating post-pandemic potential enhancement to healthcare supply chains. If these falter, severe consequences on patient outcomes, especially during crises and disasters, can more easily occur.

Questions about strategy:

- What is the biggest challenge to healthcare resilience in the next decade?
- What are the foreseeable challenges to address?
- What are the most pressing topics the healthcare supply chain and the public sector should explore?

What Can We Do to Improve *Preparedness*?

Improving preparedness for disruptions to healthcare supply chains requires a comprehensive approach that addresses both short- and long-term challenges. Assessing emerging risks, developing contingency plans for business disruptions, building reasonable buffers, and employing planning and exercises can improve businesses' ability to respond to crises and ensure that patients receive the care they need.

Questions about preparedness:

- How can the public sector best support industry during times of crisis?
- What does effective collaboration with downstream partners and the non-Federal public sector look like during steady state?
- Are there preparedness benchmarks useful for responding during a crisis?
- How can readiness for disasters be assessed?

How Do We Seize and Create Opportunities to *Build Tangible Resilience*?

Overall, improving resilience to disruptions in healthcare supply chains requires a multifaceted approach that addresses both short- and long-term challenges. By diversifying suppliers, building stockpiles, improving supply chain visibility, investing in local production, and collaborating with stakeholders, healthcare providers can improve their ability to respond to crises and ensure that patients receive the care they need.

Questions about resilience:

- What kind of resilience do we need?
- How has COVID-19 impacted how stakeholders view and think about the health supply chain?
- What is driving positive change to the effective and efficient distribution of healthcare resources?
- How can healthcare supply chain partners educate and inform government officials to ensure that effective information flows? What parameters should be in place?

During the roundtable, these questions and others were confronted to shape a common view of focus areas for healthcare supply chain resilience. These are the questions stakeholders across the healthcare supply chains will encounter in manufacturing, distributing, and delivering healthcare resources.



Realities of Operational Engagement-Crisis is Now Normal

The pace of operations, the demands on the workforce, and the uncertainties impacting global supply chains are all expected to increase in the foreseeable future. Supply chains are adapting to the new normal, different from before the global pandemic. Shortly after the roundtable, the World Economic Forum (WEF) confirmed this with “polycrisis,” referring to near-simultaneous events that compound complexity for the global economy, security, and society, including healthcare supply chains.² The WEF’s annual Global Risks Report acknowledges the failure of nonfood supply chains as one of the top 10 global risks.³

The effects of climate change policies are increasing, which is putting pressure on various modes of transportation. Geopolitical tensions in different parts of the world are creating or worsening humanitarian crises, while the number of disasters globally is also on the rise. These factors are making it difficult for supply chains to adapt. Healthcare distributors are constantly improving their organizations and leveraging their expertise to support the healthcare sector and supply chains. They also assist other supply chain organizations in developing or adopting strategies for climate adaptation and disaster preparedness, which ultimately enhance operational resilience.⁴

The healthcare supply chain leaders agreed that most public sector members must better understand the operating realities for them and, in some cases, within supply chains. The complexities of healthcare supply chains make it difficult for third-party stakeholders to see the whole picture. It is essential to provide stakeholders with context on how the interplay of global purchasing, global brands, and globally interconnected supply chains are meeting post-pandemic needs at the community level.

Consensus was clear that even a few years after the outbreak of COVID-19 there were continued repetitive conversations and gaps in understanding between private and public sectors. The sentiment was framed as reducing friction in supply chains by increasing insight into how they work by non-supply chain professionals influencing the supply chains. As one participant put it—“policy friction leads to supply chain friction” due to governments at all levels not comprehending the operational effects of strategies placed in policy. Another participant shared that while public-private partnerships are essential, private-sector leadership is indispensable to national healthcare supply chain vigor and competitiveness.

The biggest challenges to healthcare resilience include raw materials and prioritization challenges, issues with access to data, data alignment and data security, uneven adoption of blockchain, lack of preparation for layered crisis events, communication barriers, inequitable hoarding of medical supplies, and predicting crises and impediments in the global supply chain. Concerns about labor and efficient bridging of federal and local systems exist.

² See Global Risks Report 2023. <https://www.weforum.org/reports/global-risks-report-2023/in-full>

³ See Global Risks Report 2023. <https://www.weforum.org/reports/global-risks-report-2023/in-full>

⁴ See “Bolstering Disaster Preparedness and Operational Resilience in the Healthcare Supply Chain”, Healthcare Distribution Alliance, 2023.





In addition, the roundtable participants identified ongoing operational realities impacting the healthcare supply chain resilience to consider. Planning for priorities through candid collaboration between the government and private sector were also discussed as realities for those involved with healthcare supply chains.⁵ Opportunities for improving the healthcare supply chain include talent sourcing and cross-training, flexible scheduling, defining shared objectives, reducing carbon footprint, and addressing international trade politics and regulatory requirements. It was also noted that there is a need for technology and simplification of tools, as well as the promotion of digestible information through social media platforms and local chambers of commerce. Also, the participants suggested that small business owners should have at a minimum a disaster preparedness plan to help ensure their operational resilience.

Distributors participating in the discussion envisioned future resilience, including shifts such as diversifying manufacturing locations, bolstering infrastructure against extreme weather, and participating in data visibility initiatives during public health emergencies. Additionally, strengthening systems that are already in place, like the Strategic National Stockpile and vendor-managed inventory, allows distributors to support other sectors in the supply chain.⁶

Overall, there is a need for patience with policy; understanding interdependency, visibility, and data accuracy; and defining roles and responsibilities within the healthcare supply chain. Managing complex, interdependent supply chains in healthcare is extremely difficult, and the calibration of these is performed by industry in times of tranquility or pandemic. The systems are nearly always managing some disruption, creating the need for daily resilience so that, in the aggregate, stresses and strains do not cumulate into shocks that have far-ranging negative effects.

⁵ Ibid

⁶ See "Bolstering Disaster Preparedness and Operational Resilience in the Healthcare Supply Chain", Healthcare Distribution Alliance, 2023.





Assessing What's Next

Throughout the pandemic, global supply chains have been stressed, shocked, and strained but not broken—including those serving the healthcare system in the U.S. Healthcare supply chains include the procurement and manufacturing of raw materials and goods, logistics and transportation, inventory management and supply chain planning, distribution and delivery, and analytics and decision making. The healthcare supply chain also includes IT infrastructure and digitalization, compliance and regulatory management, risk management, and sustainability.

The healthcare supply chain is a vast network of stakeholders that ensure safe production, distribution, and dispensation of medical products. Healthcare distributors play a critical but often invisible role.



Increasing Threats

Before the COVID-19 pandemic, the healthcare supply chain faced unprecedented short- and long-term disruptions caused by increasing extreme weather events, geopolitical and economic events, and multiple disease outbreaks. These disasters have stressed and tested the capacities and capabilities of the healthcare supply chain as well as partnerships between private sector organizations and relevant governmental actors.⁷

In addition to the threats mentioned, the HDA Research Foundation predicts that cyberattacks and their associated impacts will become 30% more frequent each year until 2025, and 41% of responding private sector organizations identified them as a cause for concern.⁸ Meanwhile, extreme weather events are projected to be two to four times more common in the future than they are today.⁹ Previous extreme weather events highlighted critical vulnerabilities in the healthcare supply chain. For example, the aftermath of Hurricane Maria underscored the supply-side risks associated with relying on several localized manufacturing facilities to produce medical products for continuity of care.¹⁰

In the coming years, more frequent and severe natural disasters and disruptions to global supply chains will likely occur. These events, however, have prompted both public and private sector stakeholders to prioritize enhancing the resilience of supply chains and anticipating and preparing for future risks.

A Need for Resilience

As the COVID-19 pandemic gripped America, the [Office of the Assistant Secretary of Preparedness and Response of Health and Human Services](#) asked the National Academies to assess how to build resilience into medical product supply chains. The 2022 report *Building Resilience into the Nation's Medical Product Supply Chains* refers to the flow of medical products, from raw materials to production facilities to the “last mile” of getting products to providers and patients. Natural disasters, infectious disease outbreaks, geopolitical conflicts, and quality issues at manufacturing facilities are all examples of events that could lead to supply chain disruptions.¹¹ Supply chain resilience is crucial for businesses to prepare for, respond to, and recover from any expected or unexpected disruptions.¹²

Medical product demand spikes and supply shortages have long been a problem, but the COVID-19 pandemic put the effects in critical view for many roundtable participants. Hospitals, nursing homes, and all levels of government increased their purchases of products such as ventilators, gloves, masks, and other personal protective equipment (PPE) throughout the pandemic. Companies creating diagnostics, therapeutics, and vaccines had to compete for raw materials and supplies while the pandemic disrupted or degraded manufacturing outputs regardless of the location.

Based on the discussion, supply chain disruptions have cost the U.S. healthcare system millions of dollars per year, affected research and development, and risked the health and lives of patients. The main effort for healthcare stakeholders is to build resilience and decrease the fragility of the U.S. medical supply chain to prevent and mitigate the impacts of shortages on public health, national security, and patient care across communities

⁷ See “Bolstering Disaster Preparedness and Operational Resilience in the Healthcare Supply Chain”, Healthcare Distribution Alliance, 2023.

⁸ See “Healthcare Supply Chain After Acton Report”, Healthcare Distribution Alliance Research Foundation, 2022.

⁹ See “Healthcare Supply Chain After Acton Report”, Healthcare Distribution Alliance Research Foundation, 2022.

¹⁰ See “Strengthening Post-Hurricane Supply Chain Resilience: Observations from Hurricanes Harvey, Irma, and Maria” The National Academies Press, 2020.

¹¹ See “Building Resilience into the Nation's Medical Product Supply Chains,” The National Academies Press, 2022.

¹² See “Insights and Recommendations From the National Academies’ Report on Building Resilience in the Nation's Medical Product Supply Chain”, Healthcare Distribution Alliance, 2023.



In addition, the roundtable participants identified factors to consider that impact the resilience of America's healthcare supply chains over the next decade.

Aging Population: As the population ages, an increased demand for healthcare services will strain healthcare systems daily. During disasters, taking care of the more vulnerable will increase requirements at the community level.

Collaboration: Partnerships between public and private sector organizations will continue to be important for coordination and collaboration in healthcare supply chain management.

Education: Supply chain literacy and education will continue to be critical for improving healthcare supply chain resilience.

Equitable Access to Healthcare: Many people may not have robust access to healthcare services, especially those in rural and low-income areas or those who are economically or historically underserved, which can lead to community fragility worsened in a disaster. Poverty, education, and access to healthcare are just a few social factors that influence the demand for healthcare.

Global Supply Chain Context: The geopolitical environment will likely be more volatile, with upstream and downstream effects on manufacturing sites and key node selection for supply chains. Also, the greater interconnected nature of systems fosters the dynamic where disasters locally may have global effects.

Healthcare System Delivery: Shifting to preventative care may improve overall healthcare supply chain resilience through reduced demand for acute care resources, while digital health, a refocus on primary care, and community social systems increase the demand for other resource categories.

Technology: Advancements in technology, such as AI and machine learning, will play a greater role in supply chain visibility and decision-making.

Visibility: The desire to improve supply chain visibility without compromising sensitive, proprietary information will continue influencing healthcare outcomes.

Workforce: Health professionals are projected to be in short supply, negatively affecting the ability to provide quality healthcare to all patients. This is particularly true during public health emergencies where there is an increase in the demand for healthcare resources.



Stakeholder Cohesion—The Importance of Effective Public-Private Collaboration

Healthcare supply chains can be complex, multistage global systems that involve people, processes, technologies, and policies made up of stakeholders with diverse interests but one goal—delivering care when needed most.

The COVID-19 pandemic brought the healthcare sector closer, resulting in tighter connections within healthcare supply chains. Public-private partnerships (PPPs) played a significant role in this effort, allowing both sectors to collaborate and improve their capabilities while coordinating their approaches to meet the needs of communities struggling with the increased demand on the healthcare system. The private sector has specialized knowledge, experience, manufacturing facilities, infrastructure, logistics, and the ability to engage with nontraditional partners. On the contrary, the public sector excels in coordinating and managing different agencies and bringing about change through policies and regulations. Effective partnership requires sustainable funding, local support, successful communication, flexible leadership, shared vision, and scalability. Collaboration, trust, and shared accountability are crucial for success.¹³

Stakeholders in the supply chain have redoubled their efforts to work together to improve the operational resilience of the supply chain, including addressing the root causes of problems that could make the healthcare supply chain more vulnerable. The roles that the public and private sectors are best suited to support are being determined by stakeholders throughout the healthcare supply chain.

A Need for Cross-Sector Alignment in Ensuring Supply Chain Stability

While there is a strong understanding of the need and desire to cooperate, public and private sector actors must be better aligned on improving operational resilience. A recent report from the HDA Foundation found that respondents from the public sector rated supply chain transparency as the most important factor for improving resilience. Less than half of the private sector participants believed that it would be helpful.¹⁴ Instead, the private sector prioritized measures that increased supply chain flexibility, such as enhancing safety stock, mitigating transportation disruptions, and improving information sharing between actors on the supply chain.¹⁵

Additionally, private sector organizations agreed that while coordination during crisis response is important, it can be done without government facilitation, especially as many distributors and manufacturers have expertise that allows them to operate effectively as independent partners.¹⁶ Many stakeholders in the healthcare supply chain have noted the preference for a single point of coordination for federal agencies to manage disaster coordination more efficiently.¹⁷

There are several barriers to public-private alignment in the U.S., and the mechanisms to meet these challenges have varied outcomes for the effective and efficient distribution of healthcare resources. While the National Response Framework Update of 2019 included the Health and Medical Lifeline as part of the Community Lifeline construct and created Emergency Support Function #14—Cross-Sector Business and Infrastructure¹⁸, those new concepts potentially did not have enough maturity to scale to the whole of society supply chain challenges posed by COVID-19. The Federal Emergency Management Agency (FEMA) assessed that these coordination mechanisms needed to “articulate a cohesive approach for industry engagement and operational integration for clarity across the operational enterprise through the [National Business Emergency Operations Center \(NBEOC\)](#) during National Response Coordination Center for larger scale emergencies and disasters.¹⁹

¹³ See “The Importance of Public-Private Partnerships”, Healthcare Distribution Alliance, 2023.

¹⁴ See “Healthcare Supply Chain After Acton Report”, Healthcare Distribution Alliance Research Foundation, 2022.

¹⁵ See “Healthcare Supply Chain After Acton Report”, Healthcare Distribution Alliance Research Foundation, 2022.

¹⁶ See “Supply Chain Resilient Assessment”, Healthcare Distribution Alliance, 2022.

¹⁷ See “Supply Chain Resilient Assessment”, Healthcare Distribution Alliance, 2022.

¹⁸ See “National Response Framework, Webpage, 2021, <https://www.fema.gov/emergency-managers/national-preparedness/frameworks/response>.

¹⁹ See, “Pandemic Response to Coronavirus Disease 2019 (COVID-19): Initial Assessment Report FEMA Operations January through September 2020, Recommendation, 1.4.C., January 2021.



Integrating Data, Capabilities, and Capacities

The federal government attempted to close gaps in information sharing with the private sector across a fragmented variety of mechanisms, such as the supply chain control tower that companies have contributed to but not consistently received insights from as part of a data sharing agreement with the Department of Health and Human Services (HHS), through the [Administration for Strategic Preparedness and Response \(ASPR\)](#).

During the discussion, there was consensus that while the pandemic forged relationships across government, opportunity remains for consistent, cohesive, and effective integration with the private sector. This included voluntary data sharing, planning, exercises, and a shared view of supply chains that would allow the government to be measured in its approaches during public health emergencies when the industry has a significant portion of the solution set.

The roundtable participants also identified areas focused on collaboration, specifically private-public coordination and engagement. PPP collaboration in an emergency response is vital for effective disaster management, and as learned from the pandemic, early warning of and sensitivity to industry capabilities and capacities can contribute to the robustness of a response. To strengthen data sharing between the private and public sectors, clear incentives and data-request parameters including protections should be provided in a framework that balances interests across stakeholders. Reducing technological barriers and adopting automation should be leveraged to streamline the process. The routing of data requests to appropriate stakeholders and mutually beneficial data-sharing frameworks should be established for long-term resilience.²⁰ Therefore, facilitating a voluntary approach to data sharing with the appropriate safeguards in a framework to foster trust for both insight and action will be mutually beneficial.

Common barriers to public-private healthcare supply chain cohesion:

Gaps of Trust and Constructive Dialog: Ambiguity in clear lines of consistent communication between the public and private sectors can impede effective coordination during a supply chain disruption.

Standardization Gaps

Format inconsistencies across systems make it difficult to share information and coordinate with the government.

Limited Data Sharing

Due to regulatory and legal restrictions, companies may be hesitant to share sensitive business information with the government.

Complexity

The healthcare supply chain is complex with multiple layers of suppliers, manufacturers, distributors, and retailers, making it difficult to identify and address vulnerabilities and root causes of problems.

Shared Vision

Public and private entities may have different goals and priorities, which can lead to conflicts and difficulties in aligning plans and supply chains.

Finite Resources

All entities have limited resources. The government needs to understand the limitations of industry goodwill as well as commercial capacity. No magic wands or pixie dust exists to effectively coordinate.

Legal and Regulatory Issues

Supply chain coordination may be hampered by legal and regulatory requirements, such as procurement laws, data privacy regulations, intellectual property laws, and antitrust concerns.



The supply chain control tower can serve as the foundation for future efforts. While initially confusing in the immediate phase of the pandemic, a control tower with voluntarily supplied data can provide current visibility into supply chains, facilitating better decision-making and resource allocation during emergencies across both the private and public sectors. A private sector reality is the need for more information-sharing reciprocity within the [Critical Sector model](#) employed by HHS and the Cybersecurity and Infrastructure Security Agency (CISA) and direct engagement by other executive branch elements requesting information on an ad hoc basis based on emerging threats or requests for information based on incidents.

Using this data to develop shared foresight across the public and private sectors would enable a cross-sector approach of industry and the government to plan for contingencies of anticipated challenges holistically. Building relationships and awareness of coordination processes to improve supply chain resilience through a consistent planning approach without anticompetitive effects seems prudent and appropriate, given that the cross-sector supply chain disruptions caused by the pandemic went beyond the health and public health sectors. Developing an annual forecasting that companies and the government could jointly incorporate into plans, including data management, would reduce uncertainty and complexity while building trust. Beginning with a narrow scope could refine the process and establish best practices.

While the Health and Public Health Sector approach engagement was helpful, the evolution of FEMA's role is noteworthy. The National Response Framework Update of 2019 recognized the importance of nongovernmental capabilities to meet community needs nationally and locally in disaster operations.²¹ FEMA should continue to aim for a well-orchestrated response that includes a strong connection with the private sector. Although not flawless, the knowledge acquired from FEMA's operations can be a significant foundation for emergency response initiatives of various scales. The National Response Framework Update aimed to promote proactive interdependency planning by implementing the new Emergency Support Function #14—Cross-Sector Business and Infrastructure. However, this plan faced challenges in maturing during the pandemic. The industry desired a more consistent and cohesive pathway for industry engagement.

FEMA's National Business Emergency Operations Center was engaged early in the pandemic and is an example to follow, as it demonstrates the importance of government agencies collaborating with the private sector for effective disaster response and recovery. This model can be adapted and scaled to suit different regions and contexts, promoting resilience and preparedness in various emergencies. The roundtable participants recognized Healthcare Ready as a unique entity to cultivate awareness of supply chain realities and help the government understand supply chain risk and risk to the healthcare system for all hazards.

During the pandemic, the addition of the Defense Production Act Section 708 Pandemic Voluntary Agreement and six Plans of Action at FEMA contributed to additional engagement complexity for the private sector while enabling connections spanning several federal government departments and agencies previously unavailable.²² This was the first time a civilian federal agency had carried out this authority intended to bring “unity of effort” between the private sector and the federal government to ensure that critical health and medical supplies and resources reach the American public during a pandemic.²³ The authority creates collaborative discussion in the industry while also preserving competition.

In the broadest sense, this agreement, called the Voluntary Agreement for the Manufacture and Distribution of Critical Healthcare Resources Necessary to Respond to a Pandemic, brings together the government and the private sector to voluntarily focus on solving specific problems. It allows communication within and across industries and federal government agencies and throughout all phases of supply chains to benefit the nation's response to COVID-19 or any future pandemic. Despite these conversations and plans of action, the central role of the federal government in developing, manufacturing, buying, distributing, and ensuring equitable access to COVID-19 vaccines, treatments, and tests persisted for most of the pandemic, creating artificial and alternative pathways that frequently stress institutional relationships and the capacities of commercial supply chains.





Strong Connection Between Cohesion and Trust

A combination of these different authorities, agencies, and programs into a cohesive approach from the U.S. government to the industry would improve overall engagement and streamline coordination at the outset of a disruption before escalation with clarity around roles, responsibilities, limits to information sharing, and the optimal point of coordination for engagement. Trust is a cornerstone of this entire process. Public sector agencies must be willing to share information, be open to vulnerability, and protect sensitive and proprietary data. Accordingly, these authorities and structures may be better suited to developing proactive pandemic planning to utilize commercial supply chains that deliver daily instead of additional federal government augmentation.

To ensure that essential healthcare resources are always available to the public, it is important to build a resilient supply chain in healthcare. This requires trust, regulatory measures, and interagency collaboration. It is critical to identify the roles and expectations of each stakeholder and promote trust between the private and public sectors. A well-coordinated partnership is essential to protect public health in steady state and crises.

While complete centralization of engagement among public and private healthcare stakeholders may be daunting, even as the global pandemic fades into recent history, the fact remains that there needs to be an effective approach for supply chain calibration and coordination from the private sector perspective.





Opportunities and Innovations

The healthcare supply chains in the U.S. are highly resilient and hold immense promise, provided the willingness to embrace change and seize opportunities for improvement. The healthcare supply chains must be ready for a global pandemic as well as other hazards that could degrade operations. The stability and resiliency of healthcare supply chains is dependent upon effective collaboration across the healthcare ecosystem and those other stakeholders supporting it. Only then will the totality of the supply chain be oriented to moving resources toward the effective care of patients regardless of the scale of the disruption or disaster.

Opportunities exist to deepen and clarify constructive partnerships between the public and private sectors to appreciate and anticipate risk and work through scenarios involving scarce or constrained healthcare resources during disruption or a global crisis. Surging trust or resilience will not be possible during future complex, compounded events requiring resilient healthcare supply chains. Acting on these opportunities and innovations now can make a difference.



Taking Care of Talent: Build the New Workforce for Supply Chains

Opportunity: Invest in training programs and educational initiatives to develop a skilled workforce capable of effectively managing complex healthcare supply chains.

Action: Collaborate with educational institutions and industry partners to create specialized supply chain training programs and certifications for healthcare professionals in the supply chain.

Update: The COVID-19 experience has set in motion initiatives across the U.S. government, the private sector, and healthcare organizations to ensure that the U.S. healthcare supply chain is strong, resilient, and meets the needs of patients and providers. In general, the U.S. government has developed initiatives that are workforce development oriented.

Several federal departments are expanding education and training opportunities for manufacturing and supply chains. The Department of Labor's Employment and Training Administration (ETA) provides grants to support the development of training programs for supply chain workers. The Department of Education's Career and Technical Education (CTE) program provides funding to states to support CTE programs in manufacturing, including those related to supply chain management. Likewise, the Department of Health and Human Services (HHS) started both a National Health Supply Chain Training Program and a National Health Supply Chain Workforce Development Program.²⁴

A Balanced Approach: Systemic Resilience to Deliver Healthcare Resources

Opportunity: Focus on business-led solutions and initiatives prioritizing the resilience and efficiency of healthcare supply chains, bridging diverse perspectives and geographies.

Action: Engage pragmatically and on a functional basis to build consensus on key supply chain reforms and investments for improving national readiness through systemic resilience.

Update: The Food and Drug Administration (FDA) issued new guidance to require pharmaceutical manufacturers to report annual volumes, providing data that will enhance an understanding of supply chains and shortages.²⁵ The Health Industry Supply Chain Resilience Initiative (HISCRI) is a private-public partnership that brings together health industry leaders, government agencies, and other stakeholders to improve the resilience of the U.S. health supply chain. HISCRI is working to develop and implement several initiatives to boost supply chain competency and workforce. These programs include both a national health supply chain training program and a national health supply chain workforce development program.



Manufacturing Resilience: Continuity of Capacity Enables National Competitiveness

Opportunity: Reevaluate the operational resilience of domestic and international manufacturing in the healthcare sector to ensure that business continuity reflects threats and vulnerabilities across the system.

Action: Collaborate with partners throughout the supply chain to reduce risk.

Update: Manufacturing resilience has become a significant investment by the U.S. government and industry to expand the industrial base toward a more resilient healthcare supply chain. The Department of Health and Human Services has invested over \$500 million toward developing innovative domestic manufacturing for active pharmaceutical ingredients. Another \$40 million will be invested to expand biomanufacturing for several active pharmaceutical ingredients and materials.

The National Science Foundation's Regional Innovation Engines program has invested in developing bioengineering, including the manufacturing of lifesaving medicines. The Economic Development Administration invested more than \$200 million to expand the bioeconomy by advancing regional biotechnology and biomanufacturing programs.

Furthermore, the Center for Drug Evaluation and Research (CDER) is developing new guidance and resources to help pharmaceutical manufacturers improve their supply chain management practices. The Center for Biologics Evaluation and Research (CBER) is developing new guidance and resources to help biologics manufacturers improve their supply chain management practices.

Defining and Sharing Objectives: Develop a Common Vision for Robust Healthcare Supply Chains

Opportunity: Establish clear and shared objectives for the healthcare supply chain system, ensuring stakeholder alignment.

Action: Facilitate industrywide discussions to define common objectives prioritizing patient outcomes, all-hazards resilience, and distribution efficiency in humanitarian crises and disasters.

Update: The Biden administration recently announced the creation of the Office of Pandemic Preparedness and Response Policy (OPPR). This is a permanent office in the Executive Office of the President (EOP) charged with leading, coordinating, and implementing actions related to preparedness for, and response to, known and unknown biological threats or pathogens that could lead to a pandemic or to significant public health-related disruptions in the U.S. OPPR will be responsible for the following:

- Coordinating the administration's domestic response to public health threats that have pandemic potential, or may cause significant disruption, and strengthening domestic pandemic preparedness.
- Driving and coordinating federal science and technology efforts related to pandemic preparedness. Specifically, OPPR will oversee efforts to develop, manufacture, and procure the next generation of medical countermeasures, including leveraging emerging technologies and working with HHS on next generation vaccines and treatments for COVID-19 and other public health threats.
- Developing and providing periodic reports to Congress.²⁶

²⁶The White House. FACT SHEET: White House Launches Office of Pandemic Preparedness and Response Policy. July 21, 2023. <https://www.whitehouse.gov/briefing-room/statements-releases/2023/07/21/fact-sheet-white-house-launches-office-of-pandemic-preparedness-and-response-policy/>



Global Supply Chain Visibility: Incentivize Global Supply Chain Visibility and Domestic Stockpiling

Opportunity: Recognize the value of a global supply chain while maintaining strategic reserves for essential items without unsynchronized local stockpiles.

Action: Collaborate with international partners to ensure secure and efficient cross-border supply chain operations while building domestic stockpiles for emergencies.

Update: The Strategic National Stockpile (SNS) is a stockpile of medical supplies and equipment that can be used to respond to public health emergencies. In 2023, the administration for Strategic Preparedness and Response at HHS invested in replenishing the SNS and making it more responsive to the needs of state and local governments. These efforts include a new rapid deployment team to help states and local governments access SNS supplies quicker.

Another way that the U.S. government is recognizing the value of a global supply chain for healthcare supplies and resources is through its work with international partners. In October 2023, for example, the U.S. Agency for International Development (USAID) launched the Global Health Supply Chain Resilience Initiative to improve the coordination and efficiency of the global supply chain for healthcare supplies and resources.

The U.S. government is also investing in domestic production of healthcare supplies and resources. For instance, a proposed \$400 million investment in domestic production of personal protective equipment (PPE) would help reduce reliance on foreign suppliers of PPE and other critical healthcare supplies.

Moreover, the Health Resources and Services Administration (HRSA) established a national distribution network for COVID-19 vaccines and treatments to ensure that local stockpiles of COVID-19 vaccines and treatments are used efficiently, effectively, and equitably.



Cultivate Supply Chain Competency: Build Interdependence Awareness as a Capability

Opportunity: Cultivate supply chain competency by encouraging continuous learning and knowledge sharing within the private sector and with key governmental partners at all levels.

Action: Establish structured forums and mechanisms enabling supply chain leaders to exchange best practices, innovations, and lessons learned.

Update: There are several organizations that are working to build awareness of cross-sector interdependence in the healthcare supply chain including HDA, which released a report earlier in 2003 focused on the important role of data transparency and illumination in bolstering the integrity and resilience of the healthcare supply chain, especially during public health emergencies. Bringing harmony to measures taken by the public and private sectors to increase data transparency with care to avoid redundancy and unnecessary reporting burdens while ensuring the value and usability of the data exchanged.

In addition, the U.S. government is working to build awareness of cross-sector interdependence. For example, the Department of Health and Human Services HISCRI has several workgroups, including one that is focused on cross-sector interdependence.

There are several organizations and initiatives that are working to establish mechanisms to exchange best practices and lessons learned from COVID-19 and other disasters to improve the resiliency of the healthcare supply chain.

Further, HHS established the HISCRI National Health Supply Chain Information System, a system that provides healthcare organizations with real-time data on the supply chain for healthcare supplies and resources. This data helps healthcare organizations identify and mitigate risks, make better decisions, and improve the overall resilience of the health supply chain.

HHS also established the HISCRI National Health Supply Chain Network, a network that connects supply chain leaders from the public and private sectors. The network provides a platform for supply chain leaders to share information, best practices, and lessons learned.

Likewise, HHS is developing an HISCRI National Health Supply Chain Training Program to provide training on supply chain management to public and private sector partners. The training will cover topics such as supply chain risk management, supply chain resilience, and supply chain continuity of operations.



Patient-Centric Supply Chain: Right Product, Right Patient, Right Time

Opportunity: Shift the focus of the supply chain from product-centric to patient-centric, emphasizing the entire care journey.

Action: Collaborate with healthcare providers to develop supply chain strategies prioritizing patient outcomes and satisfaction.



Update: There is evidence that healthcare providers are increasingly developing supply chain strategies prioritizing patient outcomes and satisfaction. The growth of direct-to-patient (DTP) shipping allows patients to receive medications and other healthcare supplies directly at home, which can improve convenience and access to care. In 2021, the global DTP market was valued at \$10.2 billion, and it is expected to reach \$27.5 billion by 2027.²⁷

Healthcare providers are also working with suppliers to develop more patient-centric supply chains. Some suppliers, for instance, are developing new packaging solutions that make it easier for patients to use their products. Others are developing new programs to help patients manage their medications and other healthcare supplies.

Here are two examples of healthcare providers that are developing supply chain strategies prioritizing patient outcomes and satisfaction that were underway before the pandemic and offered additional resilience beyond the pandemic:

- **Mayo Clinic:** The Mayo Clinic has developed several initiatives to improve the patient experience, including a DTP program and a data-driven approach to supply chain management.²⁸
- **Cleveland Clinic:** The Cleveland Clinic has partnered with several suppliers to develop new packaging solutions and programs that make it easier for patients to use their products and manage their medications.²⁹

Many healthcare organizations have developed supply chain strategies focused on reducing costs and improving patient outcomes. Providers are increasingly developing supply chain strategies that prioritize patient outcomes and satisfaction reflecting not only changes driven by the pandemic but also proactive measures. These strategies typically include initiatives to improve inventory management, reduce waste, and negotiate better prices with suppliers.

²⁷ Global Direct-to-Patient (DTP) Drug Delivery Market-Industry Analysis and Forecast (2022-2027), Market Research Future <https://www.theinsightpartners.com/reports/drug-delivery-market> Drug Delivery Market-Industry Analysis and Forecast (2022-2027)

²⁸ Mayo Clinic DTP program: <https://www.mayoclinichealthsystem.org/services-and-treatments/pharmacy>

²⁹ Cleveland Clinic partnership with ScriptSave: <https://www.fiercehealthcare.com/finance/how-cleveland-clinic-saved-90-million-drug-cots>



Bridging the Gap: Economies of Scale: Align Public-Private Information Sharing Needs

Opportunity: Foster collaboration and standardization to achieve economies of scale and a shared language across the healthcare supply chain.

Action: Encourage initiatives that promote common supply chain practices, terminology, and technologies that enable unity of effort every day.

Update: The pandemic highlighted the need for improved information sharing between public and private sector partners in the healthcare supply chain. In response, several initiatives have been launched to improve collaboration and coordination and are underway within the Health and Public Health Sector led by HHS ASPR.

HDA is also working with its members to develop and implement best practices for supply chain resilience.

Assess Failure and Fragility: Anticipate Challenges and Adapt Supply Chains to Reduce Risk

Opportunity: Collaboratively identify and address failure modes and vulnerabilities in the healthcare supply chain.

Action: Establish industrywide inclusive of public and private sectors to assess and mitigate fragility, ensuring national preparedness for disruptive events, including deliberate planning across sectors.

Update: In July 2023, the Mapping America's Pharmaceutical Supply (MAPS) Act was introduced as a way for the federal government to better prepare for future public health threats by creating a database to map vulnerabilities in the pharmaceutical supply chain. The legislation proposed a database including the country of origin, quantity, and other key information about critical drug products to identify supply chain weaknesses that could lead to shortages or other challenges in a future public health emergency. Under the proposal, HHS would then use this information to make data-driven decisions on supply chain threats and how to increase resiliency through strategic investments in domestic manufacturing. If passed, the bill would require HHS to report to Congress how it is using the database to predict and prevent vulnerabilities for critical drug supply chains and what gaps in data remain.³⁰

³⁰<https://www.hsgac.senate.gov/media/dems/peters-lankford-braun-introduce-bipartisan-bill-to-identify-and-address-vulnerabilities-in-the-pharmaceutical-supply-chain/#:~:text=The%20Mapping%20America's%20Pharmaceutical%20Supply, strategic%20investments%20in%20domestic%20manufacturing.>



Tenets for Moving Forward

Supply chain resiliency is multifaceted, and a comprehensive approach often involves a combination of interdependent elements. The relative importance of each can vary depending on the specific industry, organization size, and the nature of potential disruptions.

The pace of operations, the demands on the workforce, and the expectations of supply chains will all increase over the foreseeable future.

Based on the roundtable discussion, several strongly held tenets emerged from the group that may contribute to future adaptation capacity, preparedness, and resilience building to help ensure that the people in need receive treatment and resources for care from an all-hazards perspective.

After the roundtable discussion, the following principles were found to be consistent for the efficient, effective, and resilient flow of healthcare resources.

1 Diversify of Suppliers: Having multiple suppliers for critical resources can help ensure continuity of supply in case of disruptions from a single source or geography.

2 Leverage Commercial Capacity: Maintaining replenishable strategic stockpiles of critical resources can help mitigate the effects of initial supply chain disruptions, allowing the commercial capacity to catch up to meet the new demand to reduce additional disruption.

3 Anticipate Risk: Identifying and assessing potential risks to the supply chain, such as natural disasters and pandemics, can help organizations prepare for and respond to disruptions.

4 Build Agility: Building flexibility into the supply chain, such as quickly shifting production to different products or suppliers, can help organizations adapt to changing circumstances.

5 Collaborate Consistently: Collaborating with other organizations and stakeholders can help share information, resources, and expertise to manage supply chain disruptions better and build supply chain competence.

6 Prepare for All-Hazards: Conducting regular testing and exercises to simulate different disruption scenarios will help organizations prepare and respond to inevitable disruptions.

7 Plan Inclusively: Involving a diverse group of stakeholders, including representatives from marginalized communities, in the planning and decision-making process can help ensure that the needs of all groups are considered.



Conclusion

“Where do we go from here?” This question is asked in the healthcare supply chain as we evaluate lessons learned and partnerships built and recognize the adaptive capacity of the infrastructure supporting our healthcare systems. The recognition of the role of the healthcare supply chain has never been more prominent—especially its role in healthcare delivery for providing accessible, equitable, and effective healthcare to the U.S. population.

A lesson learned from the global pandemic is the importance of partnerships, resilient systems, and adapting. Additionally, we learned that the healthcare market has not fully grasped the supply chains that enable its existence. The discussion in the roundtable and across the marketplace revealed a gap in understanding essential functions supporting supply chains across sectors and at all levels during a crisis and when certain categories appear to be critically important.

The pandemic reinforced the importance of cross-functional coordination within the industry and between the public and private sectors. By implementing the principles described in this report, we can capitalize on the momentum gained during the pandemic to prepare ourselves for future disruptions. As we continue to work toward long-term supply chain reform, it is crucial to have structured, ongoing dialogue to address resilient supply chain alignment, workforce capacity, and emerging technologies in the evolving landscape.

The public and private sectors must work together to address the challenges faced by the healthcare industry. This collaborative approach can help build resilience and ensure sustainable healthcare system performance during everyday disruptions and global shocks. It’s important to note that the next challenge the healthcare industry faces may not necessarily be a pandemic or public health emergency. Nevertheless, regardless of the challenge, those needing assistance expect the healthcare system to perform effectively.

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Building Resilient HealthCare Supply Chains Roundtable— Participating Organizations

Private Sector	Non-Profits	Federal Government
Abbott	AdvaMED	White House COVID-19 Supply Coordinator
Cencora, Inc. (formerly AmerisourceBergen)	Healthcare Ready	
BD	Milken Institute	
Boyle Transportation/Andlauer Healthcare Group (AH)	Healthcare Distribution Alliance	
Cardinal Health	US Chamber of Commerce Foundation	
EY		
Johnson & Johnson		
McKesson		
Morris and Dickson		
Regeneron		
UPS		
Viatis		
Vizient		





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