

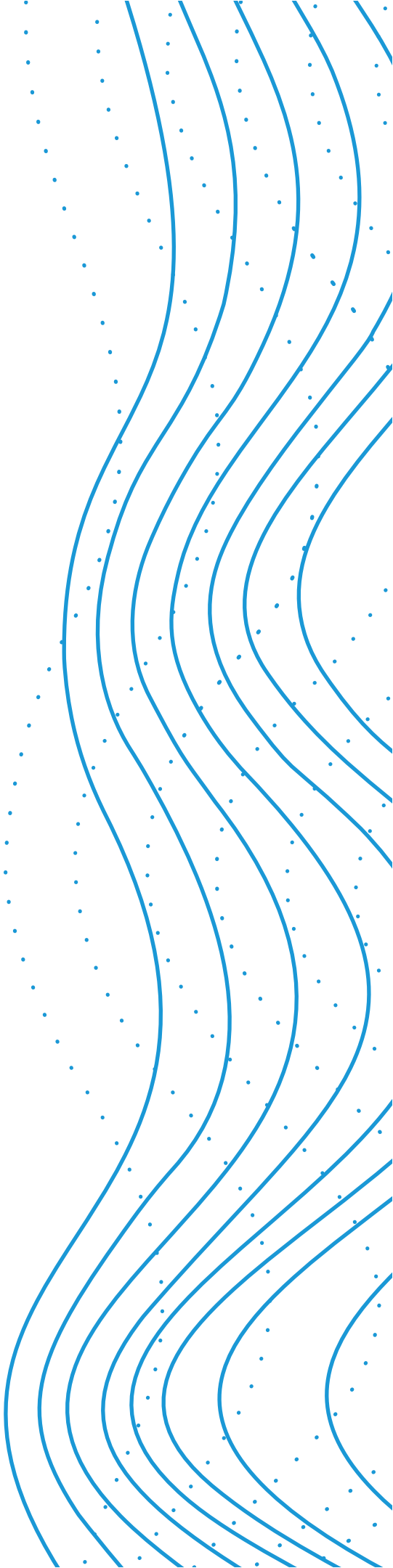
WHITE PAPER  
MEDICAL MANUFACTURING

# Supply chain resilience

Supply chain resilience is more important than ever, especially when it comes to developing and manufacturing complex medical products. Can outsourcing actually be the safest route in these changing times?

# Table of Contents

- The power of scope and scale ..... 3
- The new normal..... 4
- Healthy partnership ..... 4
- Pillars of success ..... 5
- Moving from reactive to predictive..... 7
- End-to-end..... 7
- COVID-19 ..... 8
- Moving forward ..... 9



## The power of scope and scale: Managing a global supply chain

Outsourcing has traditionally been viewed in the medical space as a potential risk, with many companies preferring to control every aspect of the critical product build themselves. But today, supply chain resilience – a built-in benefit to partnering strategically with a leader in global manufacturing – may actually be the safer, more reliable, approach. A powerful example of this new perspective on outsourcing can be found in Flex's response during the COVID-19 pandemic.



## Flex has one of the world's most complex supply chains, with massive global scale across regions and industries:

- 1,000 customers across six segments
- 30+ countries
- 16,000 direct suppliers
- 1 million parts managed
- 10,000 Flex supply chain professionals

In the Flex Health Solutions sector alone, the company manages 150 unique customer supply chains with 4,000 suppliers across 100,000 SKUs and 17 countries. This global scale, along with the supply chain expertise required to manage it, embeds a level of resilience into Flex's operation. This is especially important to consider in a quality-focused industry like medical products, which traditionally have been produced and sourced close to the brand's home base – where a local production and supply chain can be particularly vulnerable to disruption.

Whether or not an organization has moved to an outsourcing model, there are significant best-practice insights to be gained from a global industry leader like Flex.

## The new normal: Assume supply chain disruptions and prepare accordingly

Growing pressures due to the complexity of the world we live in – natural disasters, social unrest, volatile market conditions, changing regulations, increased customer expectations, and more product customization and complexity – have companies all over the world recognizing just how vulnerable their supply chains are to demand fluctuations and supply disruptions.

This is especially true in the world of complex medical products, where quality, reliability and availability are paramount. There is a growing urgency to proactively prepare and manage for a resilient supply chain to ensure success in the market. Of course, there have always been unfortunate and unforeseen events that can disrupt supply chains, but over the past decade such events have become more frequent and more severe. When the COVID-19 pandemic struck, it was the perfect storm, a true black swan event.

Much has been written over the years highlighting best practices in maintaining strong global supply chains. Data analytics, real-time information, strong partnerships and leadership, collaboration, risk planning, and a total-cost-of-ownership model are seen as key attributes of a robust supply chain management program. The COVID-19 pandemic underscores how vital these characteristics are and how they all need to work together to truly make a resilient supply chain capable of performing in these unprecedented times – and in the times yet to come.



## Healthy partnership: The marriage between product and supply chain

A product's success is not only measured by the demand it generates, but also by the assurance of reliable availability throughout its lifecycle. For this reason, it is crucial to strategically design a resilient supply chain early in the product's manufacturing planning and development. This helps to reduce the effort and cost required to deal with it on the back end when a problem arises. And in today's world, it is much more likely to be when than if.

Whether in the design and development of the product or in the transfer and ramp to production, addressing supply chain resilience is a best practice. A key factor is determining and weighting demand expectations as well as illuminating potential weak spots in the supply chain. The goal is to identify and model alternatives to sourcing and logistics.

For medical companies, this early approach helps ensure that critical products are reliably available where and when they're needed, which is essential to success in the industry. Perhaps even more importantly, designing supply chain resilience can provide a competitive advantage by allowing proactive medtech companies to better withstand market challenges, i.e., spikes in demand or disruptive world events, which can result in loss and liability.

## Pillars of success: Building a strong supply chain

There are three key grounding principles to consider in designing a supply chain for maximum resilience:

### 1. Flexibility – create options and do it early

Having ready alternatives is imperative to a successful supply chain. That means sourcing options for materials as well as engineering support and services. Any strategy should include geographic alternatives, and, increasingly important, freight logistics options. For example, when much of the world's freight travels by commercial aircraft, what happens when flights are grounded? How is inventory and production managed when suppliers or production facilities are not able to staff their operations or move inventory? It's better to consider these questions and have the answers before a product is in mass production. This avoids being locked into a single location with a key component in the hands of a single supplier. The COVID-19 pandemic clearly illustrates the value of having production facilities and suppliers in different regions of the world and being able to pivot rapidly between them as needed.

Another component of flexibility is having a smart inventory strategy. Build supply buffers of mission-critical parts by stocking extra inventory. For other critical parts in short supply, try a standing approved alternative. For instance, engineers could identify and test viable substitution parts during the pre-production design and tooling phase. Taking this extra step means you can readily source the substitute parts during shortages.

### 2. Visibility – you can't fix what you can't see

Visibility into all aspects of the supply chain for planning and ongoing management is key to supply chain resilience. Not only the “above the waterline” risks that can easily be seen, such as technical capabilities, supplier competitiveness and responsiveness, but also the more hidden risks: financial stability, market volatility, disaster recovery plans, potential for geopolitical instability, low-priority service level, end-of-life components and tier N suppliers.

This kind of visibility requires a level of investment, expertise and focus afforded by a category-leading supply chain organization. For instance, Flex has invested for years in real-time supply chain visibility tools – and the proprietary Flex Pulse® methodology brings them together to drive an unparalleled depth of visibility throughout the company's global operations. Real-time data is readily available to more than 5,000 internal users and 100+ manufacturing sites through desktop and mobile applications, as well as nine Pulse Centers strategically located at Flex sites around the world. Users make faster, smarter decisions, improving service levels and profitability for all involved.

Holding inventory is a major expense, so real-time visibility and the ability to move inventory helps eliminate the need to carry extra. For a company the size of Flex, where releasing a single day's worth of inventory frees up tens of millions in cash flow, speed is extremely important. The Flex supply chain philosophy is heavily invested in increasing asset velocity by decreasing friction – the enemy of speed. Flex Pulse, for example, pinpoints friction in the supply chain at any given time, down to an individual part, individual purchase order and individual inventory location level. Through more than 120 visualization dashboards, users can quickly identify an issue and trigger an action, which follows a workflow tailored to every key operating indicator being monitored. In short, an issue is resolved before it ever becomes a problem.



### 3. Collaboration – maintain strong relationships

Building sound strategic relationships with key suppliers is critical. It's a win-win situation: the organization remains competitive while suppliers gain long-term viability. A strong relationship can ensure front-of-the-line status should an opportunity arise.

Supply chain flexibility is best achieved by developing relationships early on and then taking the time and effort to strengthen them. Invest in qualification of solutions: understanding your suppliers, making sure their processes fit your needs, that they have the right capacity, and that your data allows for accurate forecasting. Confirm that suppliers have alternatives themselves; many companies have limited visibility into which of their tier 1 suppliers have risk and exposure stemming from tier N suppliers down the line.

Investing in expertise also helps to strengthen collaboration. Tremendous organizational value can be gained from hiring, developing, and engaging experts in every aspect of your product – from engineering, manufacturing and logistics, to regulatory, legal issues, sustainability and more. Involve the entire organization in product and supply chain planning from the beginning. A fast-moving solution to unanticipated events, such as a market upside or a major supply chain disruption, depends on everyone being up to speed and prepared to add immediate value. It is vital to remember that at the end of the day, it is people, not data, making decisions.

**Case in point:** An alert shows a tropical storm heading toward Japan. The Flex supply chain team can instantly see all suppliers in the affected area, based on geographic codes embedded in the system. In this case, one Flex partner is identified. The supply chain team then instantly drills down further to see all the POs in process from this supplier and triggers a request to the appropriate Flex buyer to determine if those POs are still viable or if they are affected by the weather event. This capability was especially important during the COVID-19 pandemic, when suppliers from areas affected by shut-downs needed to be quickly identified and addressed.

“I think we actually came out of this as even stronger partners with our suppliers because we were very diligent in validating demand with our customers.”

**Lynn Torrel**  
Chief Procurement and Supply Chain Officer for Flex



## Moving from reactive to predictive

While quickly solving problems that arise (reactive management) is important to any organization, preventing problems from happening in the first place (predictive management) is even more vital. State-of-the-art supply chain management promotes mastery of both sides of this key equation.

Immediate insight into potential disruptions anywhere in the world provides the proper perspective for rapid supply chain problem solving. Tools such as Flex Pulse – which provides a digital infrastructure composed of more than 200 data streams, 120+ processes and 5,000+ supply chain professionals – deliver a constant flow of critical information. This enables early contingency planning and informed reaction to potential disruption, creating an otherwise unachievable level of supply chain security.

In addition to these powerful real-time risk management capabilities, Flex is moving toward more robust predictive management.

## End-to-end: Tackling all portions of the supply chain

Risk is just one aspect of robust supply chain management. Partnering with a global manufacturing expert helps manage processes across the continuum: design and build, quotations, demand, risk and issue management, procurement, inbound transportation, inventory management, people and resources, manufacture and factory performance, quality and outbound transportation.

**Case in point:** SimFlex is a predictive modeling tool for supply chain design and part of the Flex Pulse toolkit. For instance, a medical company partners with Flex to build a small electronic component to fulfill demand in Asia, Europe and North America. One of the first questions that needs to be asked: Where is the most cost-effective place to build that component? SimFlex determines which criteria are most important in the equation and models the best solution(s) for producing the product. This effective tool for developing supply chain resilience works equally well early in a product's development or for mature products looking to mitigate risk within an existing supply chain infrastructure.



“Because supply disruptions are inevitable, increasing in frequency and greater in severity, it is more critical than ever to work with trusted partners to evaluate risk and proactively design for resiliency.”

**Erik Larsen**

VP Supply Chain Management, Flex Health Solutions

## COVID-19: The ultimate test

The COVID-19 pandemic presented sourcing and logistics challenges never before faced by any industry. This was especially true within the health care sector. Normal supply chains were interrupted while soaring demand for medical devices – such as ventilators, critical care and diagnostic equipment – outpaced supply in a contracting and constrained market.

With massive global scale across regions and industries, including one of the world’s most complex supply chains, Flex was able to swiftly respond to the repercussions of COVID-19. This experience provides an appropriate case study for managing risk by outsourcing.

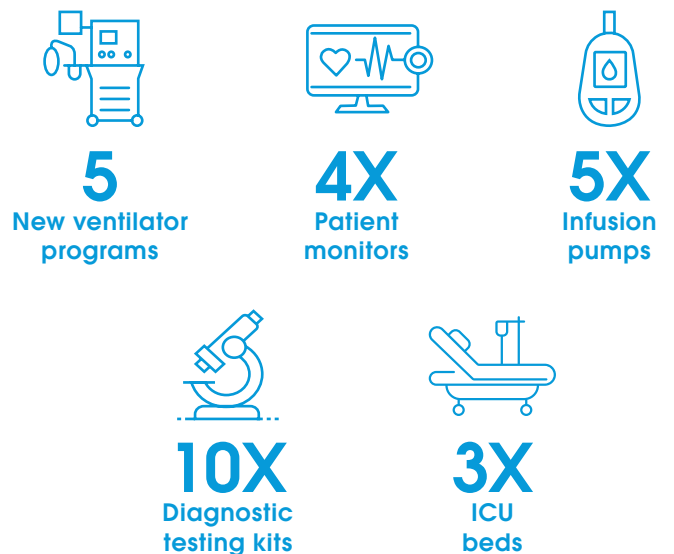
In the acute period of the pandemic beginning in early 2020, Flex assembled a cross-functional global task force that met daily, with visibility to evolving supply chain events through the robust Flex Pulse platform. The team quickly executed internal changes and worked with supplier partners to manage weak spots in their supply chains.

Localized disruptions required real-time analysis and mitigation. Over the course of the pandemic’s changing trajectory, the company had to carefully, strictly and strategically manage closing and re-opening of various sites worldwide. Operations pivoted to ramp up production of priority medical devices. Collaborating with suppliers and customers, Flex was able to analyze demand and balance the need for supply against the risk of creating an artificially constrained market.

**Case in point:** Early in the pandemic, Flex contacted all its customers to confirm POs and forecasts to ascertain true demand before approaching suppliers. Therefore, when escalation was needed, the suppliers trusted Flex’s projections and provided the necessary support. The impact of freight logistics was another significant factor. The crisis required close collaboration with freight logistics partners to secure allocation.



### Infusing resilience into its supply chain helped Flex dramatically increase production of critical-care equipment:





## Moving forward: Lessons learned

Throughout the crisis, Flex learned more about effectively responding to customer needs and is working to develop even better tools and processes to support supply chain resilience in the future. Several key areas to improve from the pandemic experience were identified – areas that Flex encourages others to consider in adding resilience to their supply chains:

### Ensuring all supplier contact information is available and up to date

When the pandemic first hit, Flex had an emergency contact person listed only for its larger strategic suppliers, not all 16,000 of them. That issue was recognized as critical and the company quickly identified emergency contacts for all suppliers. Measures were implemented to keep that information current to ensure the fastest possible emergency response when needed.

### Enhancing geographic location data

Components flagged with “country of origin China” didn’t provide enough information to make key decisions. During the beginning of the pandemic, it became apparent that a more detailed geographic location was needed to identify what was coming out of Wuhan, specifically. As the pandemic spread, that same geographic location data methodology was used to understand the shifting impact on the Flex supply chain.

### Enhancing visibility into tier N suppliers

Perhaps the most challenging issue to address was improving visibility into tier 2 and 3 suppliers. Flex needed to understand the financial risk to suppliers during the pandemic. Gaining that visibility into sub-tier suppliers has been complicated and costly, but necessary. Today, Flex continues to make ongoing investments by partnering with companies that can help drive greater visibility and mitigate both potential manufacturing risks and financial risks.

“The COVID-19 pandemic is unlike anything we’ve experienced. We came together with our partners and pushed through barriers. Now, we’re taking the learnings and applying them to build a more resilient future.”

**Lynn Torrel**

Chief Procurement and Supply Chain Officer for Flex



Supply chain resilience is clearly a sound business practice, one that is critical to supply and demand efficiencies, and one that may be secured more practically by aligning with a partner that offers global scope and scale. The current pandemic has demonstrated that this level of security is more important than ever. Ensuring uninterrupted and timely access to medical supplies including devices, drug delivery platforms and other critical products during crises – whenever and wherever they may happen – is just one link in the shared goal of contributing to a healthier world.

Flex (Reg. No. 199002645H) is the manufacturing partner of choice that helps a diverse customer base design and build products that improve the world. Through the collective strength of a global workforce across 30 countries and responsible, sustainable operations, Flex delivers technology innovation, supply chain, and manufacturing solutions to various industries and end markets.

Contact us at [healthsolutions@flex.com](mailto:healthsolutions@flex.com) For more information, visit [www.flex.com/health](http://www.flex.com/health)

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