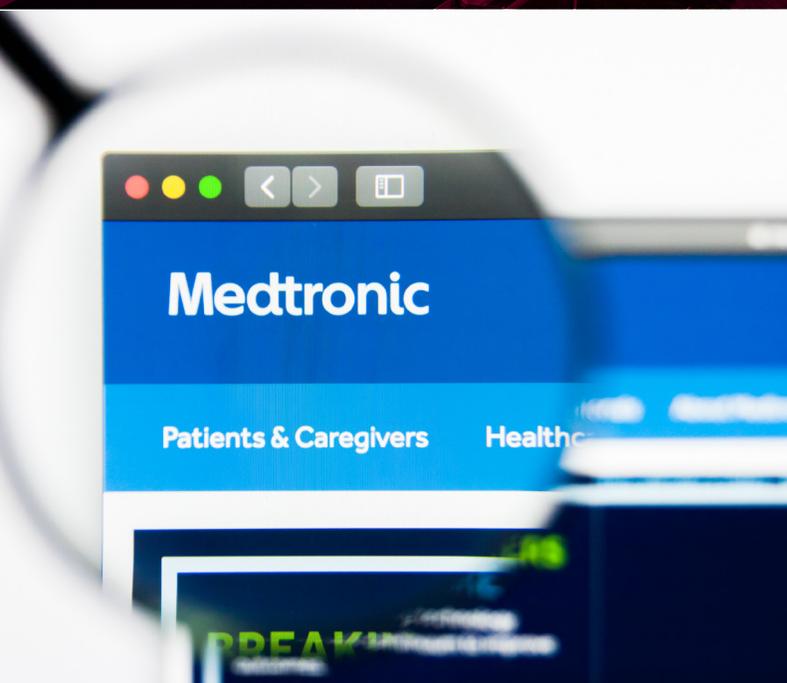




**TPEC** TRANSPORTATION POLICY AND ECONOMIC COMPETITIVENESS

**Sustaining Minnesota's Medical Device Industry Cluster:  
A Vital Role for Multimodal Transportation**



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# A Major Asset for Minnesota's Economy

The medical device industry cluster (MDIC) in Minnesota is a global center of innovation and production. Industry leaders suggest there is plenty of room for further growth. What will it take to sustain this success?

This report synthesizes University of Minnesota research into the importance of multimodal transportation in sustaining the medical device industry cluster. It incorporates perspectives from industry leaders, state policymakers, and other stakeholders. It also looks at challenges and opportunities stemming from the pandemic and offers recommendations for policymakers.

Minnesota has a long track record of medical and health care innovation. Actions today can support the industry cluster's growth and position the state for new global health and wellness initiatives. This report provides a foundation of knowledge and offers ideas to sharpen Minnesota's competitive edge.



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The TPEC research findings in this report are synthesized from the following papers:

- *Spatial Location and Air Transport Connections: The Case of Minnesota's Medical Device Industry Cluster*, Lee Munnich, Travis Fried, Joanne Cho, Thomas Horan, 2020
- *Minnesota Medical Device Supply Chain and Transportation Implications*, Kim Napoline, Erika Shepard, Lee Munnich, Thomas Horan, 2020

# Setting the Stage: TPEC Research Findings

## Twin Cities focus, statewide impact

The medical device industry is essential to Minnesota's economic health. While most medical device companies are located in the seven-county Minneapolis–St. Paul region, suppliers and related industries are dispersed in 80 counties throughout the state. Nine industries are linked to the medical device cluster in Minnesota, including biopharmaceuticals, electrical wiring, and plastics.

Given this broad geographic span, a well-planned transportation network is essential for punctual production timelines. Production can and will be delayed if parts do not arrive on time.

Companies need a multimodal transportation system that supports supply chains statewide as well as the end delivery of medical devices to consumers throughout the world. This broad reach highlights why transportation is an integral part of the industry cluster's economic growth and development.

## Air transport is vital

Minneapolis–St. Paul International Airport (MSP) plays a vital role for the medical device industry supply chain. Air cargo operations allow Minnesota companies to access the global, high-value economy that drives regional economic competitiveness.

Medical device products, which are often low volume and low weight, constitute some of the highest-value shipments into and out of MSP. Hospitals aim to maintain a small inventory of medical devices and order supplies only as needed. As such, customers often choose suppliers based on how fast they can deliver. Any delays are absorbed by businesses, harming their competitive advantage and the medical device cluster as whole.

Medtronic, for example, one of Minnesota's largest companies and a global supplier of medical

## Minnesota's MDIC at a glance

In 2020 Minnesota had **234** medical device companies, up from **21** in 1983.

Companies related to the industry were dispersed in the **80** counties of Greater Minnesota.

Out of Minnesota's **\$22.7 billion** in exports in 2018, the medical device and pharmaceutical industry represented the single largest export in terms of value—approximately **23%** of the total.

An estimated **14,000** people worked in the medical industry cluster and linked clusters across Minnesota in 2017—third highest in the US.

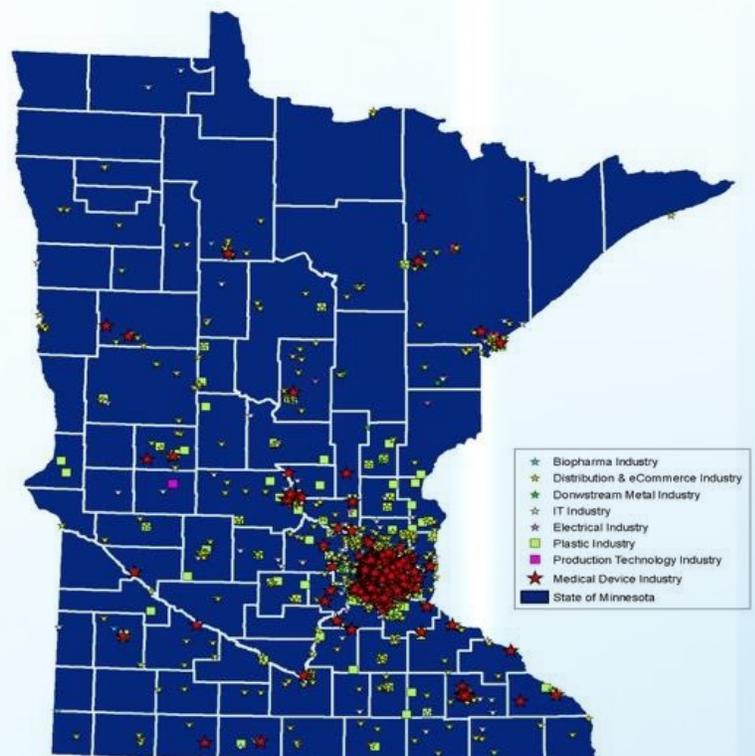


Figure 1: Medical Device and Linked Industries, 2019

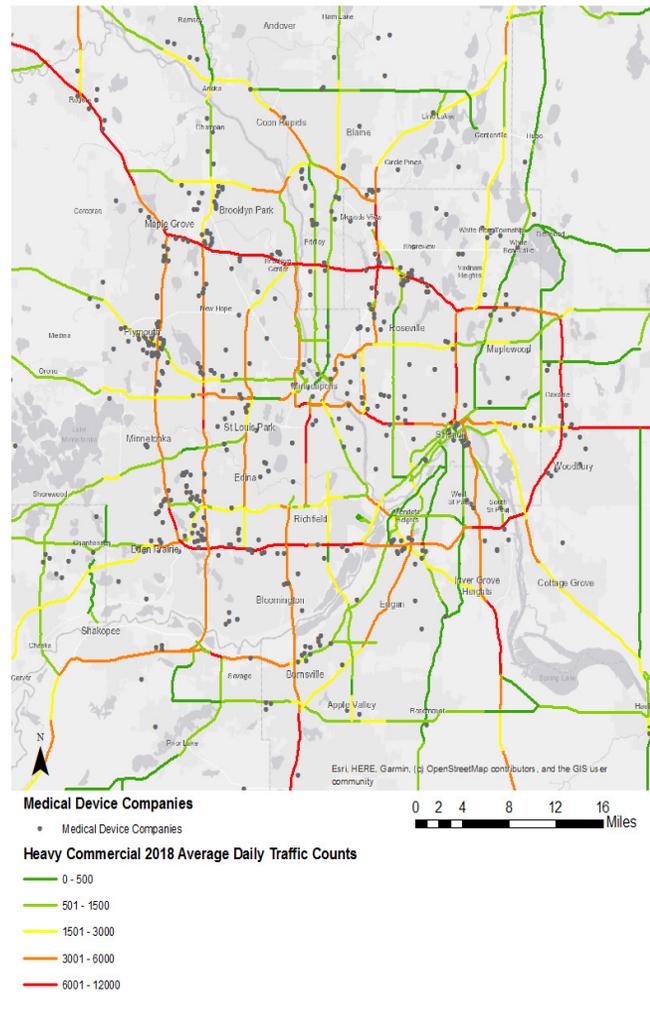


Figure 2: Medical Device Companies and Freight Traffic Counts, Twin Cities Metro, 2020

devices, relies primarily on air freight from major distribution sites and uses trucks for local distribution from manufacturing centers. During inclement weather and traffic congestion, shipments may spend as much time on freeways as in the air. These delays are not simply a matter of company profit or customer satisfaction—they may affect patient health outcomes as well.

While MSP handles the lion’s share of the state’s air trade, the Rochester airport (which serves the Mayo Clinic) handles roughly 8 percent of air-traded medical value. Four other airports in the state offering regular schedules are involved in the domestic import and export of medical commodities.

## Industry hot spots and trucking times in the Twin Cities

Surface transportation linkages to MSP are crucial in light of the industry’s reliance on air transport. Using geographic information systems (GIS) analysis, TPEC researchers identified medical device industry “hot spots” in the Twin Cities metro and conducted a case study of one of them: the City of Plymouth. They then overlaid hot spots onto maps of major freight corridors and assessed trucking times to MSP for key companies.

Plymouth, a northwest suburb, stands out as a significant hot spot in terms of the number of medical device companies, though not necessarily for the size of a company or its number of employees. Plymouth is also a hot spot for production technology companies, which are key suppliers of medical device companies.

Two other key locations are Maplewood, home of 3M headquarters, and Fridley, home to Medtronic. The two companies are the largest medical device employers in the Twin Cities metropolitan area.

The most heavily used freight corridors are the I-494/I-694 loop, parts of I-94, and parts of I-35W and I-35E. The trucking distance for the typical route between Plymouth and MSP is approximately 24.8 miles, compared to 21.3 miles between Fridley (Medtronic) and MSP, and 16.8 miles between Maplewood (3M) and MSP.

Travel times spike during the morning and afternoon peak periods while midday travel times remain relatively consistent. The trucking times between both Plymouth and MSP and Fridley and MSP are relatively comparable, with a morning peak trucking time of approximately 34 minutes. The trucking time between Maplewood and MSP takes the least amount of time, likely due to the shorter distance.

Under 5:00 p.m. weekday traffic conditions, the Plymouth hot spot has higher trucking times than the other medical device companies across the metropolitan area. Perhaps most notably, the trucking time from Plymouth to MSP grows worse during the

afternoon peak compared to cities where other major medical device companies are headquartered. I-494, a key part of the Plymouth route, has heavy freight traffic, which likely contributes to the delays.

may be easier to target transportation investments where they would be most useful for freight routes.

Hot spots can be especially vulnerable to travel time delays on key freight corridors and can contribute to heavier traffic on them. By identifying hot spots, it

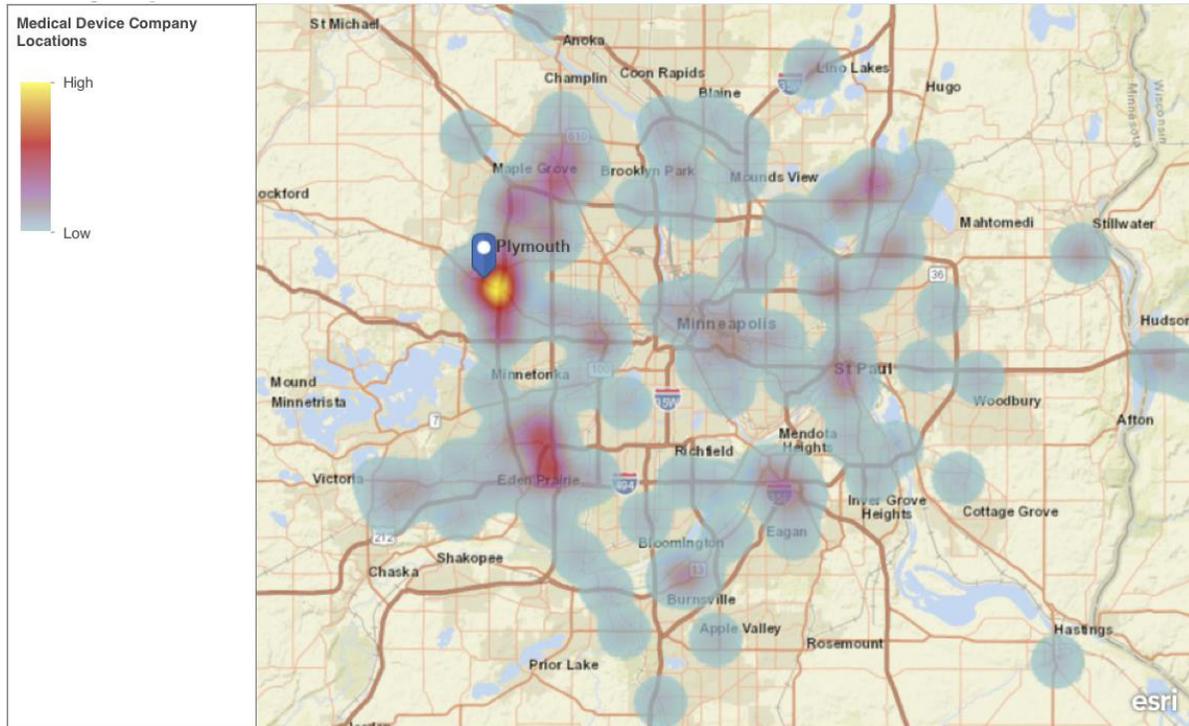


Figure 3: Plymouth Hot Spot Map – Medical Device Companies, 2020





## Ensuring Minnesota's Competitiveness: Pandemic-Influenced Priorities

On October 1, 2021, the TPEC Program held a forum titled “Ensuring Minnesota’s Competitiveness: Pandemic-Influenced Priorities for Infrastructure.” Highlights follow.

### Delta's cargo business: A lifeline



*Jeff Davidman*

As COVID-19 closures swept through the country in March 2020, MSP was all but deserted. According to Delta’s Vice President of State and Local Government Affairs Jeff Davidman, the company put the airline “to sleep” for nearly six weeks while quickly pivoting to make a game plan

for navigating through the COVID and post-COVID experience.

In the forum’s keynote address, Davidman explained how Delta’s close ties with Minnesota and its growing cargo business provided a way forward during a challenging time for the airline industry.

“Overnight, the world stopped flying. In April traffic was down 95 percent across the board—in Minneapolis we quickly grounded about 600 aircraft and shut down an entire concourse,” Davidman said. “We’ve seen 9-11, SARS, the Great Recession, and so we really thought we’d been through it all and had

built a business model that could withstand anything, and then COVID happened. It is all those things added together on steroids.”

Despite the difficult circumstances, Davidman said Delta remained focused on supporting its hub at MSP throughout the pandemic because of its importance to the airline.

“As our second-largest hub, Minneapolis is critical to Delta for three main reasons,” Davidman said. “First, geographically it connects our east-west traffic and our north-south traffic with its central location in our hub-and-spoke model. Second, the corporate community is extremely strong and corporate travel is our main focal point. The third piece is our partnership with the Metropolitan Airports Commission—they are wonderful partners and they operate the best airport in the system.”

The bright spot in the pandemic for Delta was its air cargo business, a lesser-known arm of the airline. The air cargo business partners with businesses and delivery services—including UPS and FedEx—to ship mail, time-sensitive packages, and perishable cargo



in the belly of Delta planes. During COVID-related closures, the cargo business delivered positive revenue for the airline at a time when losses were adding up; this period marked the first time Delta operated cargo-only flights.

“When you think about Delta airlines, you don’t always think of us as a cargo carrier, but we’ve actually been doing it for about 74 years and it played an extremely important role in our recovery,” Davidman said. “Delta operated 3,000 cargo-only flights during the COVID period, so suddenly cargo got a seat at the table when we were making network decisions. We were shipping masks, ventilators, personal protective equipment, and later vaccines—there was a real immediate need to move these items quickly through the global supply chains.”

As Delta transitions to a new COVID reality, it expects some continued turbulence for the airline industry as life finds its way back to a new normal.

“Slowly but surely as we got the vaccine, air travel started to come back,” Davidman said. “We’re seeing most demand from leisure travelers, while the corporate and international pieces have been slower to come back. However, we’re encouraged by the trends we are seeing and expect to be back near pre-COVID passenger loads in summer 2022.”

*“Cargo will definitely be a component when we are making big network decisions. It still won’t be the driving factor, but it will have more of a voice at the table...”*

—Jeff Davidman, Vice President of State and Local Government Affairs, Delta

As Delta looks toward the future, Davidman expects that cargo will have a bigger role in the company. “We’ll be looking at the things we learned and did differently during COVID and using that to go forward,” he said. “Cargo will definitely be a component when we are making big network decisions. It still won’t be the driving factor, but it will have more of a voice at the table, which maybe it didn’t have in the past.”

## **Air cargo projected to grow—and Amazon needs space**

There are opportunities for air cargo growth in Minnesota, according to a new study of the air cargo market at MSP conducted for the Metropolitan Airports Commission (MAC). Study findings were shared at the TPEC forum by the study’s author, Kevin Hoffman, a senior managing consultant at Landrum & Brown.

The study’s key conclusion was that MSP can expect to see solid air cargo growth of 3.6 percent through 2040, and that the existing Amazon facility is not sufficient to accommodate projected Amazon growth—representing an opportunity for facility development. In addition, the study found that the biggest untapped cargo opportunity is belly cargo to Germany.

“Securing regular, widebody, year-round passenger service to Germany would allow MSP to take advantage of this opportunity for international cargo growth,” Hoffman said.

TPEC research helped spur and inform the MAC study.

## **Minnesota's medical and health industry cluster**

### **Transportation infrastructure key to industry cluster in Plymouth**

According to TPEC researchers, Minnesota’s medical and health industry cluster is one of the biggest driving economic forces in the state. For local leaders like Plymouth mayor Jeff Wosje, ensuring their communities have what medical device companies (and their suppliers) are looking for is essential for their local economy. During a panel discussion, Wosje

shared his strategies for positioning Plymouth as a hot spot for medical device industry clusters.

Transportation infrastructure has played an important role in the continued growth of the medical and health industry cluster in Plymouth. “It comes down to location, location, location,” Wosje said. “We have the largest industrial park in the state of Minnesota located right on I-494 that allows companies to easily move raw materials onto the interstate system, provides quick access to the airport, and lets employees get to work.”

Medical device companies need access to their target workforce, especially engineers, and Wosje said high-quality school systems have played a key role in attracting them to the Plymouth area. “Engineers value education and want their kids to get the best education possible,” he said. “If you look at this holistically, it shows just how important a role the excellent schools in the western suburbs have played in creating this cluster.”

Plymouth has also established a reputation for being helpful and friendly to its business community. For example, the city has the flexibility to make modifications to its bus system to help its businesses, such as establishing a reverse-commuting route that brings in employees from Minneapolis and helps them reach jobs in Plymouth.

#### **Minnesota’s brand: Global authority in medicine**

Health care is dominant and looms large in Minnesota. “I think we have a great opportunity to take advantage of those assets, more than ever,” said Lisa Clarke, former executive director of Destination Medical Center in Rochester. Digital health, artificial intelligence, and data science will transform patient

### **Forum takeaways**

- COVID-19 pointed out the importance—and weaknesses—of medical supply chains.
- Concerns about the availability of medical devices and other supplies could lead to increased onshoring and altered supply chains—and opportunities for Minnesota to capture some of this business.

care delivery. “We are experts...at finding solutions in the health care arena,” she said. “All the old business models have become obsolete in the blink of an eye.”

The linchpin in Minnesota is trust: “In health care, you can’t succeed without trust,” Clarke said. “We have it—we have trust in our brands, our organizations, our research, our education.”

Our challenge is that Minnesotans are nice—“like that ‘Aw shucks’ feel,” Clarke said, “but we need to be forward-thinking and bold and aggressive. Minnesota is the global authority in medicine and we should discourage this ‘Aw shucks’ mentality and really move forward.”

One opportunity could be the 2027 World Fair Expo, said Mark Richie, president of Global Minnesota and leader of Minnesota USA Expo. Minnesota is competing to host the expo, and organizers chose health and wellness—including addiction treatment, alternative medicine, and mental health—as the theme. “You can imagine what bringing the world’s attention to our region could do,” he said.

### **Infrastructure supports economic development**

Andrew Andrusko, MnDOT freight planning director, gave the surface transportation perspective on economic competitiveness. The state’s freight plan calls for investments of approximately \$1 billion per year over the next four years. MnDOT is also looking at ways to optimize infrastructure for electric vehicles, he said, including medium- and heavy-duty trucks.



In addition, MnDOT received a legislative appropriation to procure a free network optimization tool that will help site potential new business and understand commodity flows. This could help the agency plan investments and address freight bottlenecks and other performance issues, Andrusko said.

Neal Young, director of economic analysis at the Minnesota Department of Employment and Economic Development (DEED), said COVID is “tweaking the formula for freight infrastructure.” Minnesota broadband infrastructure has been critical to enabling a sizable share of workers to work from home, reducing traffic congestion. “How do we best take advantage of this to improve Minnesota’s economy? Less traffic allows workers to commute farther, allowing better job matches for workers and employers, and that makes the economy more competitive,” Young said. Less congestion also makes it easier to get freight in and out of the state, improving competitiveness.

## Minnesota: A bioinnovation economy

Amanda Taylor, vice president of GREATER MSP, and Joe Parilla, a Brookings Institution fellow, discussed

how the region’s strengths position it to compete for federal funding opportunities.

A recent grant application, Taylor said, defined the state’s medical industry cluster as a bioinnovation economy. The state’s existing cluster includes Mayo Clinic, United Health Group, and a supply chain of medical technology companies; Minnesota also has strength in food and agriculture. “This cross-sector opportunity with bio—bringing in medical tech and human health with food and ag—is a novel way to consider our cluster,” she explained.

Parilla added that federal funds would be an opportunity to address long-standing social inequities. “By doing that, we’re bringing to bear all the assets of a region, all the people, all the talent—that’s a competitive strategy in a rapidly diversifying region. If you don’t do that, you’re putting all of these competitive advantages at risk.”



**Watch the forum**

The forum is available for viewing on the TPEC website: [tpec.umn.edu/events](https://tpec.umn.edu/events)





## Sustaining Our Advantage: Policy Recommendations

The strength of Minnesota’s medical device industry is apparent on a national and global scale. However, it is not guaranteed, and the industry is increasingly more susceptible to global competition. TPEC researchers recommend the following policies and actions.

### Multimodal linkages and targeted investments

To sustain the state’s competitive advantage, multimodal transportation linkages that ensure a fast and reliable flow of goods are vital. In particular, MSP airport and its connections to a strong and reliable freight highway network play a significant role.

Greater focus on freight is needed in transportation planning and economic development. One successful model is the Corridors of Commerce program, enacted by the legislature in 2013. The legislation authorizes the sale of bonds for trunk highway projects not already in the State Transportation Improvement Program. The Corridors program aims to improve the movement of freight, reduce barriers to commerce, and add highway capacity on segments where there are bottlenecks.

MnDOT solicited ideas and selected about \$400 million of projects for the 2018 Corridors of



Commerce program, including a mix of projects in the Twin Cities metro and Greater Minnesota. One of the metro projects is the addition of MnPASS lanes on I-494 and at the I-494/I-35W interchange. Plans are for a 2022 letting. Users and businesses alike would likely experience the benefits of lessened traffic congestion and regional economic vitality from these investments.

## More freight data

TPEC research demonstrates a need for better understanding of the medical device supply chain. More information can help target investment to improve freight mobility, maximize Minnesota’s medical device economy, and expand the state’s role as a global player in the medical device industry.

Collecting air cargo data at MSP is critical. The industry relies on air transportation, yet unlike passenger travel, there is a dearth of detailed information on air cargo. This information is largely sensitive company data and unavailable for public study or use.

Further, there is very little available data on what cargo is in the bellies of passenger planes. These cargo spaces could be better utilized through shared information, and routes could potentially be expanded—options that became urgent in light of pandemic bottlenecks.

## A working group and partnerships

To gain a better sense of the freight supply chain issues for the medical device industry cluster, it is essential for practitioners to engage with the private sector. This collaboration should also extend to linked industries, which are a vital aspect of the supply chain.

One specific recommendation is to convene an advisory working group of companies and agencies from across the state. The group’s purpose would be to better understand how to direct transportation investment to support the multimodal linkages needed for a thriving medical device industry cluster.

*“The TPEC air cargo report was used to support MnPASS along the I-494 corridor from US 169 to MSP airport. MnPASS will greatly improve travel time and reliability for small package carriers traveling to the airport during rush hour.”*

*—John Tompkins, Multimodal & Intermodal Planning Director, MnDOT Metro District*

This working group would engage members in information sharing on topics related to medical device hot spots and freight cargo needs for medical device companies, including data on the movement of medical devices to and from MSP airport. Members would include transportation practitioners, governmental agencies such as MnDOT, for-profit medical device companies located in Minnesota, and economic development agencies such as GREATER MSP and Minnesota DEED.

In 2017, a partnership was formed between GREATER MSP and the Metropolitan Airports Commission to add new direct MSP passenger routes. A similar effort could be replicated for air cargo, provided a suitable environment could be set for businesses to share information in a beneficial and non-threatening way.



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## For further information:

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