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WHITE PAPER

Geopolitical Instability in the Gulf:

Implications for Global Pharmaceutical Supply Chains and Strategic Responses

MARCH 2026

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About the Authors

This white paper is authored by a group of specialists who bring together academic expertise, industry experience and global supply-chain leadership. Their combined perspectives ensure that the analysis reflects both rigorous research and the realities faced by pharmaceutical logistics professionals around the world.

Frank Van Gelder

Secretary General, Pharma.Aero
Lecturer, University of Antwerp and Antwerp Management School

Frank Van Gelder is a leading voice in global pharmaceutical logistics and a long-standing advocate for stronger, more resilient healthcare supply chains. As Secretary General of Pharma.Aero, he has played a central role in fostering international collaboration between airports, airlines, manufacturers and logistics partners. His work focuses on improving end-to-end quality, strengthening cold-chain standards and supporting the industry through periods of disruption. Frank's strategic vision and hands-on experience make him a key contributor to this white paper.

Prof. Dr. Wouter Dewulf

Professor of Air Transport Management and Economics, University of Antwerp

Prof. Dewulf is internationally recognised for his research on air cargo networks, hub dynamics and the economics of aviation. His analysis of global air-cargo flows and the structural role of Middle Eastern hubs provides the academic foundation for this paper.
His insights into the current crisis, including the observation that "this is primarily a reliability crisis, not just a cost crisis" help frame the broader implications for the pharmaceutical sector.

Academic & Industry Contributors

This white paper also incorporates insights from senior logistics and supply-chain leaders representing global pharmaceutical manufacturers and life-science organisations. In accordance with the confidentiality statement, these contributors are referred to in general terms as industry experts.

Their operational experience, from clinical trial logistics to commercial distribution, ensures that the recommendations presented here are grounded in real-world practice.

Pharma.Aero and the University of Antwerp's Faculty of Business and Economics maintain an ongoing strategic partnership to deliver rigorous, evidence-based scientific research and high-quality teaching.

University of Antwerp

About Pharma.Aero

Pharma.Aero is a global, cross-industry collaboration platform dedicated to advancing reliable, safe and efficient air transport for pharmaceutical products.

Founded to bring together airports, airlines, freight forwarders, ground handlers and pharmaceutical manufacturers, the organisation works to raise global standards in cold-chain management, digital visibility and end-to-end quality.

Pharma.Aero's mission is to ensure that life-saving medicines reach patients safely, efficiently and predictably, even in times of geopolitical instability or operational disruption.

Through research programmes, industry working groups and international partnerships, the organisation supports the development of validated corridors, innovative technologies and best-practice frameworks that strengthen the resilience of global healthcare logistics.

This white paper reflects Pharma.Aero's commitment to evidence-based insight, international collaboration and continuous improvement across the global pharmaceutical supply chain.

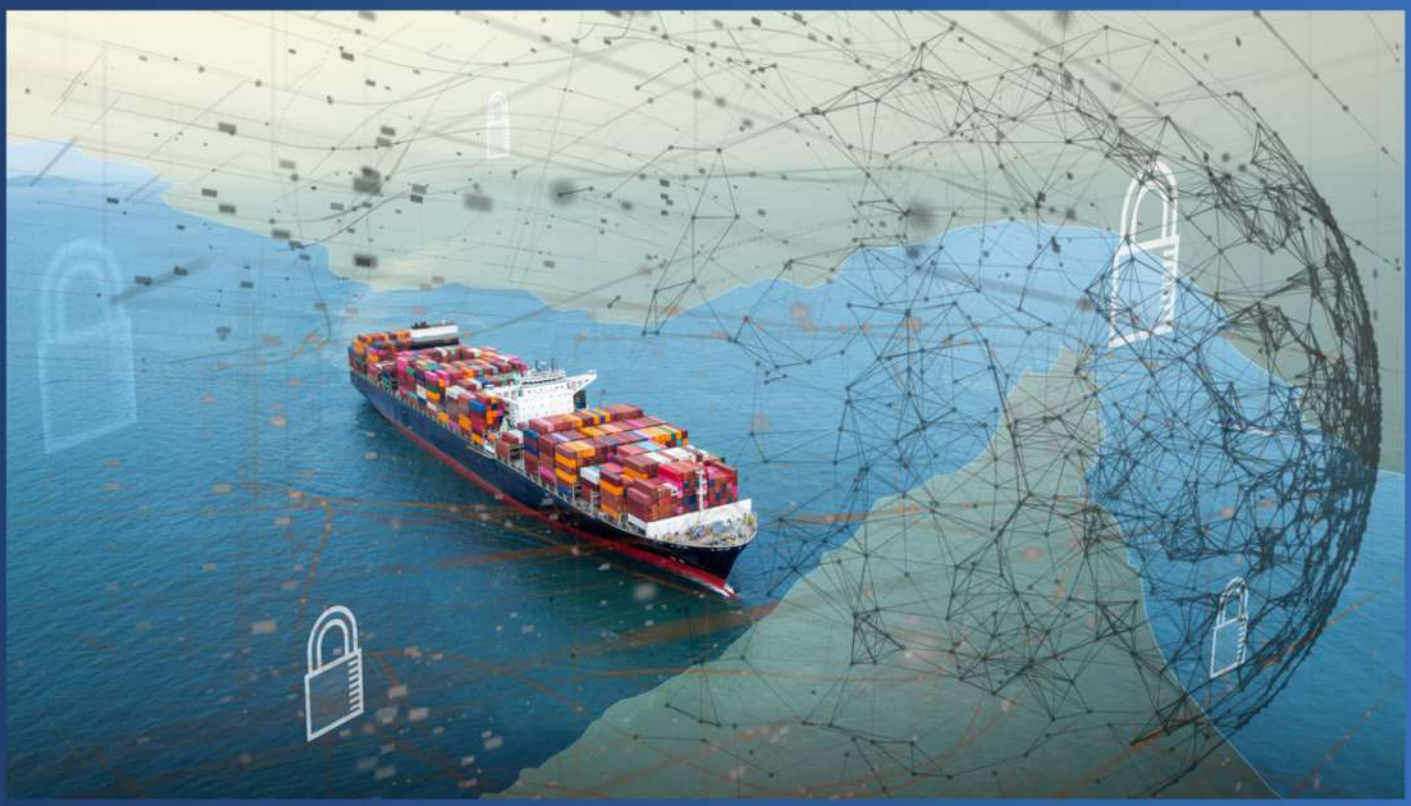
Executive Summary

The Gulf region has become one of the world's most important transit points for pharmaceutical cargo. The recent geopolitical crisis has shown how vulnerable this system has become.

In response to the unfolding situation, Pharma.Aero organised a dedicated industry webinar bringing together industry and academic expertise to assess the implications for life science supply chains. Attended by more than 100 professionals, and executives from across the global pharma logistics ecosystem, the special briefing examined how rising geopolitical tensions in the Gulf region and the resulting uncertainty across key global transport corridors may affect pharmaceutical logistics worldwide, where reliability and product integrity are critical.

As highlighted in the webinar, "21.7% of all global cargo is impacted" by the disruption, a reminder that the effects extend far beyond the region itself.

This white paper explains the nature of the disruption, why pharmaceutical supply chains are particularly exposed, and what steps the global community can take to strengthen resilience. It draws on the webinar materials and peer-reviewed research to provide a balanced and accessible overview for an international audience.



01. Introduction:
From "What If" to "What Now?"

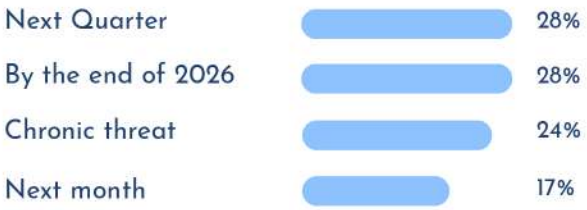
For years, the industry has discussed the risks of relying heavily on the Gulf as a logistics hub. Those concerns have now become reality. As the briefing notes, *"Middle East airspace and maritime routes are disrupted amid ongoing Gulf instability."* This has created delays, congestion and uncertainty across global transport networks.

The Gulf's importance is the result of decades of investment in aviation, infrastructure and connectivity. Dubai, Doha and Abu Dhabi together handle **2-2.5 million tonnes of cargo each year**, acting as major transfer points between Europe, Asia, Africa and North America.

For pharmaceuticals, which depend on speed, temperature control and predictable routing, this concentration of activity brings both efficiency and risk.

Industry Outlook Poll

When do you estimate that the conflict will be over?



Total respondents: 69 industry participants

Industry Preparedness Poll

Did your company already have crisis scenario plans in place prior to the conflict?

Total respondents: 69 industry participants

Industry Perception Poll

Which carriers do you think are currently benefiting from the situation?

Total respondents: 73 industry participants

Source: Pharma.Aero Industry Briefing Webinar
Geopolitical Crisis in the Gulf & Impact on Life Science Supply Chains

02.

The Gulf as a Global Pharma Bridge

2.1 A REGION CONNECTING CONTINENTS

Middle Eastern carriers represent around **10.7% of global air cargo capacity**, yet disruptions in the region affect more than double that share of global flows. This is because the Gulf acts as a bridge between continents, especially for Europe–Asia trade.

The figures presented in the webinar show the scale of this dependence:

In simple terms: more than half of the cargo moving between Europe and Asia normally passes through Middle Eastern hubs.

2.2 WHY PHARMACEUTICALS ARE ESPECIALLY AFFECTED

Pharmaceutical products are not like other goods. They are:

- Time-Critical
- Temperature-Sensitive
- Highly Regulated
- Often Life-Saving

This emphasises that *"temperature-sensitive pharma is especially vulnerable because time loss quickly becomes product risk."* Even short delays or additional handling can compromise product quality.

Research supports this. Studies on medicine shortages show that geopolitical shocks can quickly disrupt access to essential medicines, particularly in countries that rely heavily on imports.

2.3 FACTS AND FIGURES

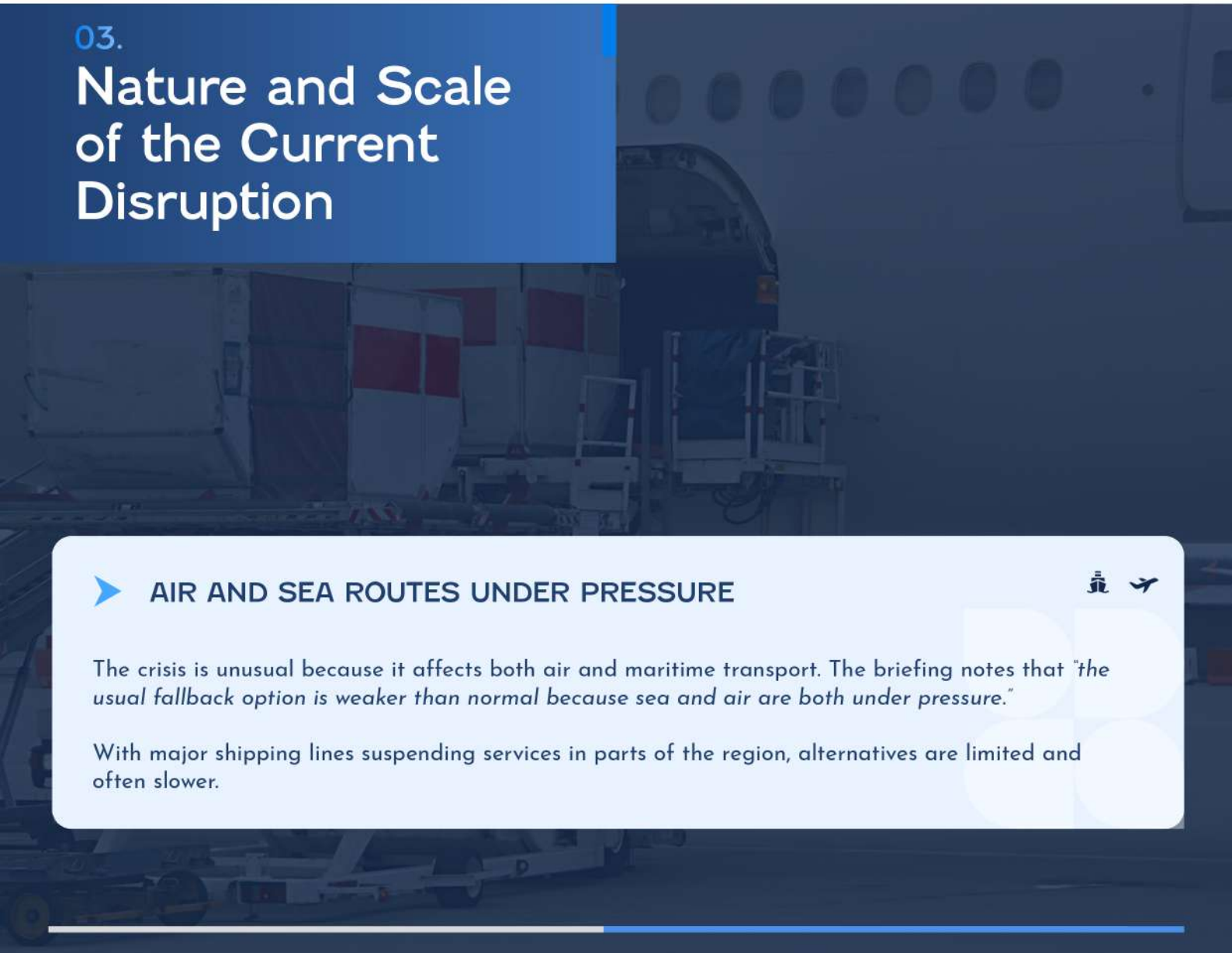
Although air transport plays a critical role in pharmaceutical logistics, the actual volumes involved remain relatively small within the broader context of global air cargo. In 2025, approximately 300,000 tonnes of pharmaceuticals were transported by air, compared with about 20 million tonnes of total international air cargo, highlighting that pharma represents only a small share of global tonnage.

Because pharmaceuticals require specialized handling and strict temperature control, they are generally considered higher-yield cargo. Overall, around 35% of pharmaceutical shipments move by air. However, for critical medicines and vaccines, reliance on air transport is significantly higher, with roughly 90% shipped by air.

From the airline perspective, pharmaceuticals account for around 10% of specialized cargo products, yet they typically represent only about 4% of the total cargo carried in the belly or main deck of aircraft.

03.

Nature and Scale of the Current Disruption



AIR AND SEA ROUTES UNDER PRESSURE

The crisis is unusual because it affects both air and maritime transport. The briefing notes that *"the usual fallback option is weaker than normal because sea and air are both under pressure."*

With major shipping lines suspending services in parts of the region, alternatives are limited and often slower.

REDUCED CAPACITY AND LONGER ROUTES

At the start of March 2026, global air cargo capacity fell by **22%**. Although this later improved to **-13%** and then **-8%**, the recovery has relied heavily on airlines adding direct Europe–Asia flights. This growth has been driven by *"direct flying, CN carriers and charter airlines."*

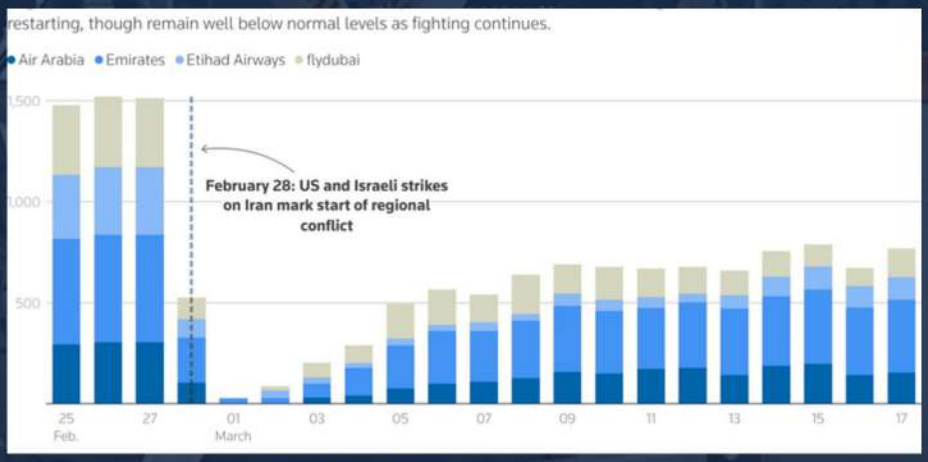
Chinese carriers, in particular, have been able to use Russian airspace, giving them an advantage at a time when many Western airlines face restrictions due to the Russian-Ukrainian war.

A CRISIS OF RELIABILITY

While higher freight rates are a concern, the more serious issue is the loss of reliability.

The crisis is seen as "primarily a reliability crisis, not just a cost crisis." Longer routes, more handovers and increased storage time all raise the risk of temperature excursions and product degradation.

This reflects a broader trend identified in academic research: medicine shortages increasingly result from disruptions in manufacturing, distribution and transport rather than from demand spikes alone.



Infographic: Reuters, Middle East war disrupts pharma air routes, risks cancer drugs supply

04.

Strategic and Economic Implications

HIDDEN COSTS BEYOND FREIGHT RATES

The financial impact of the crisis goes far beyond transport costs. The key warning states that *"working capital and service risk are the larger strategic issues."* Delays increase the amount of inventory tied up in transit, extend replenishment cycles and heighten the risk of stockouts, all of which place pressure on healthcare systems.

SHIFTING INFLUENCE IN GLOBAL LOGISTICS

As the disruption continues, influence shifts towards carriers and corridors that can offer stable alternatives. Due to the geopolitical crisis in the Middle East, *"network power shifts to alternative carriers and corridors"* when Gulf hubs are compromised. Research shows that geopolitical strain can reshape long-term investment decisions and alter access to medicines.

UNEQUAL IMPACT ACROSS COUNTRIES

Peer-reviewed modelling based on previous global supply chain disruption may suggest that, while high-income countries may experience shortages of 3–4%, low-income countries could face shortages of 95–99% under severe geopolitical strain. This highlights the need for coordinated international action.

05.

Strengthening Resilience: Practical Steps for the Global Community

There is one clear point: *"Pharma supply chains will have to shift from efficiency to resilience."* The following strategies reflect both industry insights and academic evidence.

Diversifying Routes and Hubs

- Reduce reliance on single transfer points
- Strengthen connections with European, African and Central Asian gateways
- Expand direct long-haul freighter operations where possible

Building Regional Buffer Stocks

- Hold additional inventory in strategically located regional hubs
- Use risk-based modelling to determine optimal stock levels

Validating Alternative Cold-Chain Corridor

- Pre-approve routings outside the Gulf to avoid delays during crises
- Work closely with carriers to ensure temperature integrity

Improving Digital Visibility

- Deploy real-time tracking for temperature and location
- Integrate geopolitical risk monitoring into planning systems

Strengthening Collaboration

- Build stronger public-private partnerships
- Participate in cross-border initiatives to harmonise emergency logistics protocols

06.

Policy Recommendations

For Governments

Governments must take a proactive and systemic role in strengthening pharmaceutical supply chain resilience. This begins with actively supporting the geographic diversification of pharmaceutical manufacturing, reducing overreliance on single regions or suppliers. Strategic investment in robust, multimodal transport infrastructure, including air cargo capacity, cold-chain corridors, and last-mile distribution networks, is essential to ensure continuity under stress conditions.

Regulatory authorities should implement agile and harmonised frameworks that enable rapid decision-making, including expedited approvals for emergency rerouting, alternative sourcing, and cross-border movements. In parallel, governments should establish advanced early-warning systems, leveraging real-time data and predictive analytics to detect and mitigate supply chain disruptions before they escalate into critical shortages.

For Industry

Pharmaceutical manufacturers, logistics providers, and supply chain stakeholders must shift from efficiency-driven models toward resilience-centric operating strategies. This entails embedding redundancy, flexibility, and risk mitigation into network design, even where this introduces higher short-term costs.

Companies should secure long-term, strategic capacity agreements with logistics partners, particularly in air freight and temperature-controlled transport, to safeguard access during periods of volatility. Investment in scenario planning, stress testing, and digital twin technologies is critical to anticipate disruptions and evaluate response strategies in complex, high-stakes environments.

Furthermore, industry must expand cold-chain and specialised handling capabilities beyond primary hubs, strengthening secondary and regional nodes to enable decentralised, patient-centric distribution models, especially for advanced and precision therapies.

For International Organisations

International organisations play a pivotal role in orchestrating a coherent global response to pharmaceutical supply chain risks. They should lead the development of coordinated emergency logistics frameworks, ensuring alignment across countries, regulators, and industry actors during crises.

A key priority is to support low- and middle-income countries and vulnerable regions, which are disproportionately affected by supply disruptions, through targeted capacity-building, funding mechanisms, and equitable allocation strategies. In addition, international bodies should facilitate transparent, real-time global data-sharing platforms, enabling early visibility of disruptions, demand surges, and bottlenecks across the supply chain ecosystem.

07. Conclusion

The Gulf crisis has exposed how fragile the global pharmaceutical logistics system has become when it relies on speed, central hubs, and predictable transit routes. What once offered efficiency now magnifies risk, threatening the timely delivery of life-saving medicines worldwide.

This event is part of a larger pattern of geopolitical instability that disproportionately affects vulnerable, import-dependent countries. The lesson is clear: the global pharmaceutical community cannot rely solely on efficiency, it must build resilience into every layer of the supply chain.

Achieving this means diversifying routes and hubs, creating redundancies in storage and transport, investing in real-time visibility and predictive monitoring, and strengthening international collaboration. By taking these steps, stakeholders can ensure that medicines reach patients safely and reliably, even when the unexpected strikes. The Gulf crisis should serve as a wake-up call: resilience is not optional, it is essential for protecting health worldwide.

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