Building a resilient drug supply chain

Minimize disruptions with Cortellis Product Intelligence™

Clarivate™

Emergency situations and increased demand can reveal gaps in the supply chain

Supply chain resilience and drug shortages are hardly a new challenge for the pharmaceutical industry (Fischer, 2020). Increased demand for a drug can stretch manufacturing capabilities, especially when manufacturing is complex or requires specialized equipment, and limit the availability of drug delivery devices such as needles, glass vials and auto-injectors. In the event of system-wide shutdowns, a workforce unable or reluctant to return to work, or a disruption of transportation networks, drugs cannot be manufactured or transported.

Given the potentially dangerous impact on a population's health if a drug is suddenly unavailable, governments have historically acted to determine the underlying reasons and correct for them. Drug companies have a vested interest in ensuring they can deliver treatments to patients, as failure to do so risks lost sales, a competitor taking market share and/or reputational damage. Building a resilient supply chain is therefore a vital early step in any drug development lifecycle. Successful marketing of a drug requires that it be produced and delivered in sufficient supply to meet demand.

According to the U.S. Department of Health and Human Services, 'a resilient supply chain is one that prevents disruption where possible, is prepared for disruption risks, and recovers quickly from unexpected events that could lead to shortages (U.S. Department of Health and Human Services, n.d.).'

In this report, we describe strategies to avoid shortages and review how Cortellis Product Intelligence™ provides the insights needed to build a resilient supply chain by finding the best partners and planning for the unexpected.

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U.S. Department of Health and Human Services.

Vulnerabilities in the supply chain

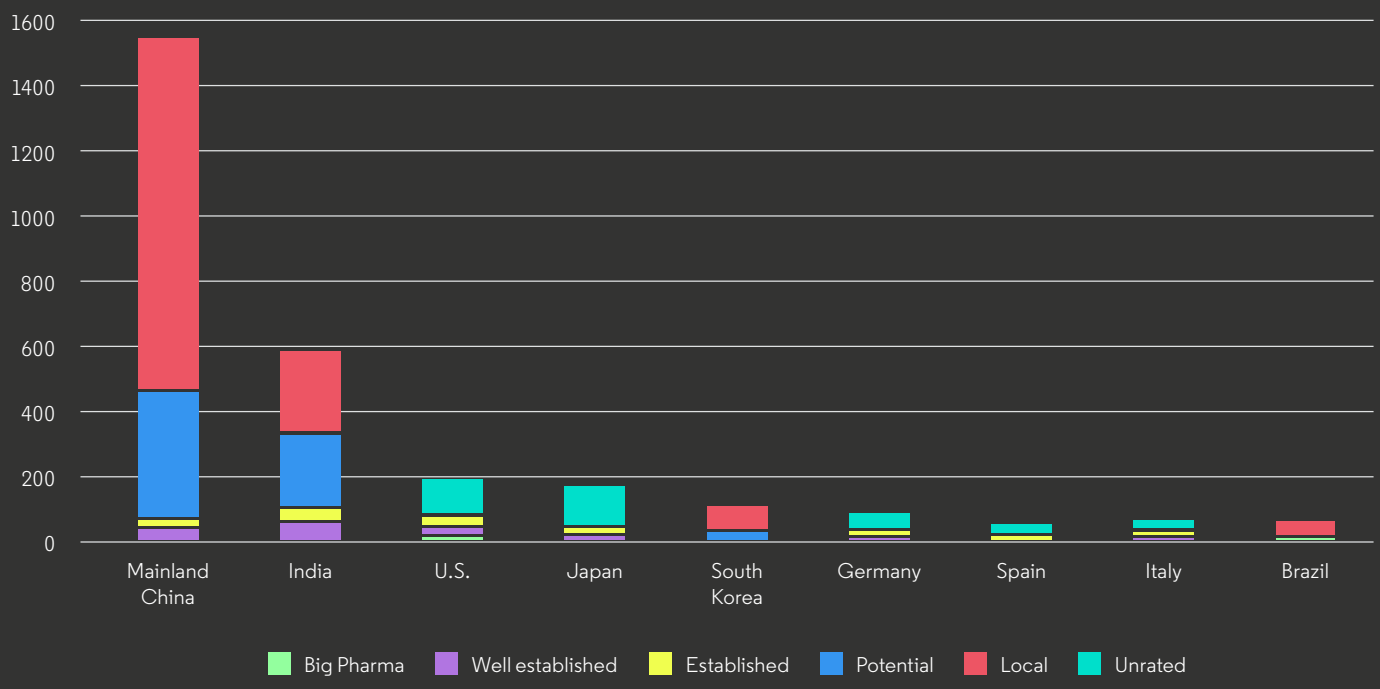
Sources of failure within the supply chain include the active pharmaceutical ingredients (APIs) and other ingredients, drug delivery devices, other supplies and equipment; manufacturing, storage and distribution facilities and equipment; and data infrastructure (Duke-Margolis Center for Health Policy, 2021).

Operational risks stemming from price volatility, fluctuations in demand, equipment failures and quality issues can affect one or more of these areas. In addition, disruptions due to emergency situations such as natural disasters, geopolitical disruptions or a global health crisis (Health Canada, n.d.; U.S. Food and Drug Administration, 2024). can surface vulnerabilities in the supply chain (U.S. Food and Drug Administration, 2019). Recent global events such as the COVID-19 pandemic, geopolitical tensions, and more severe, more frequent climate events have prompted governments to refresh their crisis aversion plans to ensure their populations can reliably and consistently access treatments (The White House, 2021).

For example, a recent pilot study about drug shortages conducted by the European Commission Health Emergency Preparedness and Response Authority identified the root causes of drug shortages in Europe as mostly manufacturing and quality issues, as well as an unexpected increase in demand (European Commission, 2024). At the same time, countries are drawing a line in the sand about relationships they view as harmful to national security. In the United States, the Biosecure Act, introduced in early 2024, has introduced uncertainty regarding manufacturing relationships with companies based in Mainland China (BioWorld, 2024). Owing to their reliance on contract development and manufacturing organizations (CDMOs) in Mainland China, small biotechs could feel the effects of this the most, because of the cost and complexity of changing vendors.

Of concern here are a dependency on sourcing raw materials and APIs from a small number of countries (e.g., India, Mainland China; Figure 1) and the concentration of manufacturing in one or a few vulnerable geographic areas (European Medicines Agency, 2020; European Commission, 2024). Manufacturers reliant on single sources of key components risk the inability to shift production to other sites in emergency situations or expand production sufficiently to meet unexpectedly high demand.

Figure 1: Raw materials and APIs are primarily sourced from only a few countries



Source: Cortellis Product Intelligence

Table 1: Explanation of the Cortellis Product Intelligence corporate API rating used in Figure 1

Rating	Description
Well established	Have years of experience supplying active ingredients to regulated markets
Established	Less of a track record in supplying to regulated markets, either in terms of years of history or number of products supplied; still capable of supplying regulated markets
Potential	Interest in supplying regulated markets but with limited history of performance
Local	Supplying only to the local and other less-regulated markets; do not currently have the capability of passing inspections by bodies like the U.S. FDA
Big Pharma	Innovative companies with at least U.S. $1bn in annual R&D expenditures
Unrated	Companies for which Cortellis Product Intelligence has not assigned a rating; normally specialty manufacturers with a limited focus on API manufacturing but have submitted U.S. DMFs or undergone FDA inspections that are captured in the database

Source: Cortellis Product Intelligence

The effects of natural disasters have also rippled across the industry.

When Pfizer's Rocky Mount manufacturing facility in North Carolina, which is responsible for nearly 25% of the company's sterile injectables (e.g., anesthesia, analgesia, therapeutics, anti-infectives, neuromuscular blockers) (Pfizer, 2023), was severely damaged by a tornado, the recovery took months. Hurricanes Harvey, Irma and Maria highlighted the vulnerability of national and regional supply chains in Texas, Florida, the U.S. Virgin Islands and Puerto Rico. Puerto Rico, in particular, is home to 49 FDA-approved facilities for producing pharmaceuticals and medical devices (Lawrence, 2020), and the reliance on this manufacturing hub is of concern as the hurricane season lengthens and intensifies.

Generics are of particular concern as they constitute a large portion of the essential medicines lists for the World Health Organization and many countries (Persaud, 2019; World Health Organization, n.d.). A recent study of the U.S. supply of generic drugs using data from Cortellis Product Intelligence showed that one-third of APIs were manufactured by a single facility, with another one-thirdmanufactured by only two or three facilities (Socal, 2023). In addition, >20% of the APIs were manufactured by three companies supplying to at least four manufacturers of finished generic drugs, meaning any disruption to those few companies has the potential to spread across several brands simultaneously.

Drug shortages also affect more than generics. A worldwide shortage of different doses of the growth hormone somatropin has persisted for years, driving prescribers to switch patients to other options and governments to issue recommendations that available supply be reserved for higher-need conditions (Austrailian Government Department of Health and Aged Care, 2023). In addition, the global shortage of GLP-1 receptor agonists such as semaglutide (Ozempic® and Wegovy®) and tirzepatide (Zepbound® and Mounjaro®) to treat type 2 diabetes and, in some cases, obesity has been attributed to a number of causes including off-label prescribing that has driven up demand and complex manufacturing that is challenging to scale (Australian Government Department of Health and Aged Care, 2024).

The alarm is already being sounded for novel therapeutic modalities such as cell and gene therapies, which are expected to face supply constraints due to a lack of suitable resources (CPHI, 2023), and radiopharmaceuticals, which are limited by the short window from manufacturing to delivery to its intended patient due to the product's half-life (BioWorld, 2023).

Building supply chain resilience

Building resilience into the supply chain relies on diversification, including a balance of domestic and foreign sourcing; redundancy of manufacturing capacity; and establishing reliable and sustainable manufacturing practices across API, drug delivery devices, and fill and finish.

Robust supplier networks, diverse partnerships, and the ability to monitor regional situations and assess their impact are key for pharma and biotech companies to confidently withstand and mitigate the impact of disruptions.

One strategy is to develop manufacturing infrastructure in-house. For example, in response to the Wegovy shortage, Novo Holdings A/S, the controlling stakeholder of Novo Nordisk A/S, acquired the global CDMO Catalent Inc and its more than 50 global sites (BioWorld, 2024). Similarly, Eli Lilly committed another $5.3bn to its Lebanon, Indiana, manufacturing site for APIs for Zepbound and Mounjaro, bringing the company's total investment in its U.S. and European facilities to $18bn since 2020 (Lilly, 2024).

Another strategy relies on partnerships, especially for smaller biotechs that do not have the capital to invest in their own manufacturing infrastructure. However, challenges remain for smaller companies that do not have the volume and deal value that are typically attractive to many larger manufacturers. For large pharma, partnerships can complement their capacity, serving as additional or even buffer supply if something happens at one of their primary facilities or if demand for a drug spikes.

All supply plans should consider both local supply operations for regional movement between suppliers (e.g., API to fit and finish) or finished product directly to the healthcare system as well as a holistic, global view that ensures the flexibility needed to manage risk and respond in an agile manner.

Make informed sourcing and supply decisions

However, pharma and biotech companies must often rely on incomplete data sources and resource-intensive searches through multiple data sources for appropriate planning. This can result in critical gaps and blind spots about the risks of their supply chains.

A more streamlined approach is needed for companies to identify API suppliers with the specific characteristics, set of capabilities and experience they need; assess supply chain risk; and establish a sound supply chain — including alternatives — for all existing and new products. Because of the rapidly changing manufacturing landscape, a comprehensive evaluation of all manufacturing, market performance and patent data have the power to enable data-driven supply decisions.

Access industry intelligence and expertise

85K+

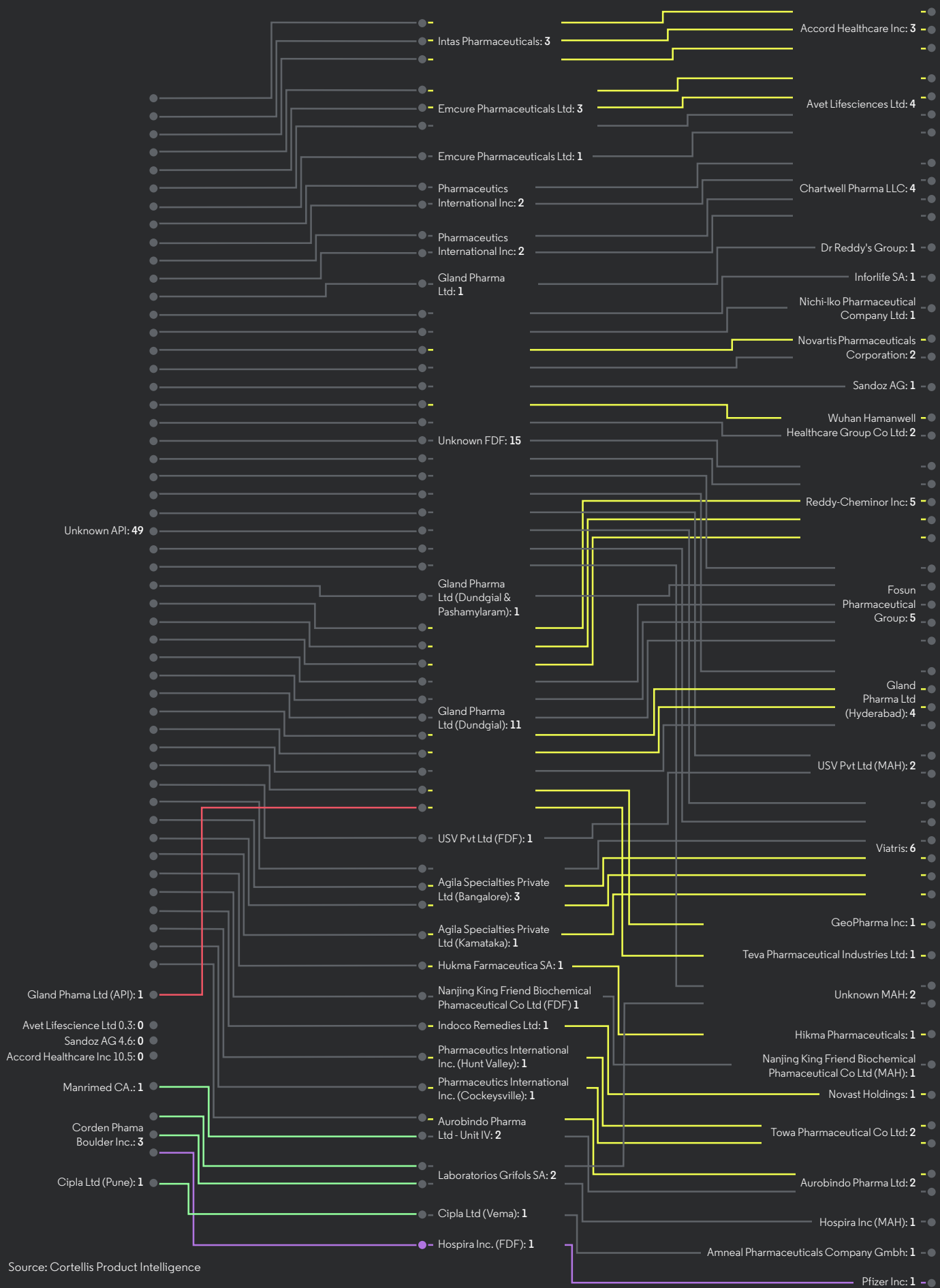
manufacturers and marketers in 77 countries.

Cortellis Product Intelligence is a single source of reliable and integrated API manufacturing and market performance data curated by a team of experts, each with 20+ years of industry experience. The data cover more than 63,000 small molecules and biologics, 18,000 synthesis schemes and 85,000 manufacturers and marketers in 77 countries as well as more than 1,400,000 worldwide patents and 68,000 regulatory documents in at least 25 countries.

Comprehensive data from this product and the industry experience from Clarivate™ expert analysts help teams establish a secure supply chain and suitable alternatives (Figure 2), by:

- identifying qualified suppliers based on location and manufacturing capabilities,
- finding suppliers and manufacturers that can supply a specific market,
- locating alternative and backup supply sources and
- identifying sources of intermediates and reagents and negotiating with suppliers throughout the supply chain network (API, intermediates, reagents, excipients).

Figure 2: Finished dose manufacturers of zoledronic acid that have been disclosed for specific approvals and aligned with the approval holders



Source: Cortellis Product Intelligence

Identify qualified suppliers based on region and API

With Cortellis Product Intelligence, you can evaluate API sources and market insights in a single place, including customizable data views, filters, exporting and alerts to monitor changes in the market.

It is also possible to identify and quickly screen all suitable (e.g., reliable, experienced and capable) global manufacturers and their location for the API of interest to:

- Determine each supplier's level of experience in manufacturing the API.
- Identify which regulatory filings the supplier holds for the API in the markets of interest.
- Understand if there have been quality issues in the past, including voluntary recalls due to potential product issues.
- Determine the manufacturer's ability to export in bulk to regulated markets.
- Understand and monitor the manufacturing facilities, including whether multiple products are produced using the same equipment.

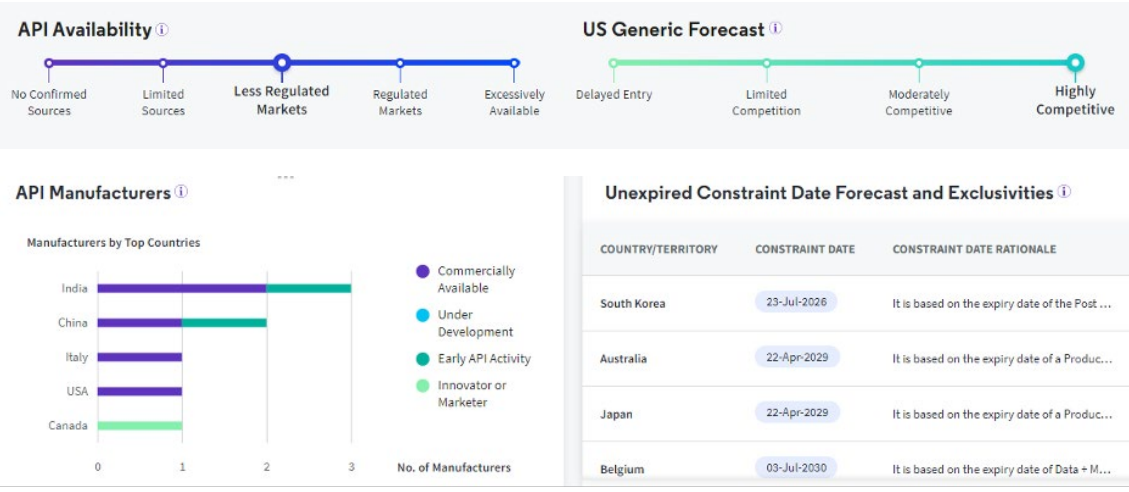
Find and negotiate with alternative and backup supply sources

Supply chains with a single point of failure or limited suppliers are particularly vulnerable to disruption.

Therefore, having multiple and backup supply sources across geographies can diversify your supply chain and help minimize interruptions during increased demand or an emergency (Figure 3). A robust contingency plan includes early identification and negotiations with alternative suppliers, avoiding the need to reactively locate supply.

Understanding the route of synthesis and evaluating the entire supply chain for intermediates and reagents will also help to identify whether they are likely to be at risk of shortage. In addition, you can ensure your manufacturers' suppliers have a robust supply chain to produce the API of interest.

Figure 3: API availability and generic forecast for remdesivir



Source: Cortellis Product Intelligence

Remain prepared using robust, integrated sources of API supply data

A resilient supply chain relies on timely, data-driven decisions about how to diversify and find the best-fit partners throughout the API supply chain and across geographic locations. Comprehensive, timely data can inform strategies appropriate for your organization's drug, patient population and location.

Minimize the risk of shortages and establish successful partnerships using key intelligence from Cortellis Product Intelligence.

Want to learn more?

To find out how you can grow your business and build robust supply chains, visit us at: clarivate.com/cortellisproductintelligence

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