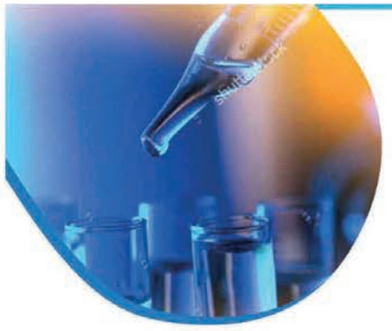
Fast pharma: Balancing risk & quality with time to market

Vivek Kumar, biopharma market development manager, and **Matt Szap**, technical communications manager, at **Spectrum Chemical** discuss how risk and quality work together to influence speed to market

Drug discovery is the riskiest journey in science," said Wolters Kluwer. "It is also one of the most important."[1] The complex journey of pharmaceutical discovery and development ideally leads to successful product commercialisation that will address patients' medicinal needs worldwide.

Introducing a novel, innovative drug to the market will often benefit the pharmaceutical manufacturer with a first-mover advantage, resulting in higher market share, market leadership and ultimately higher revenue. However, the path from discovery to launch often requires a careful calculation involving risk and the standardisation of quality in a global environment.



TOP TEN CHALLENGES FACING PHARMACEUTICAL INDUSTRY IN 2023

1. Regulatory risk
2. Safeguarding patients
3. Supply chain disruptions
4. Staffing shortages
5. Digitalization and data management
6. Risk mitigation
7. Clinical trials catchup post-COVID
8. Transparency and accountability
9. Resistance to change
10. Adoption of emerging technologies/new science

Figure 1 - Pharmaceutical industry top ten challenges

Uncertainty of risk

The worldwide pharmaceutical market was worth an estimated $1.2 trillion in 2020.[2] The market is expected to grow at 3–6% CAGR through 2025, reaching about $1.6 trillion in 2025, according to IQVIA, a major multinational life sciences firm and the world's largest CRO.[3] With increasing focus on medication value, pharmaceutical manufacturers are even more concentrated on strategic R&D into viable targets to meet patient needs and protect the bottom line.[4]

The pharmaceutical industry is one of the most heavily regulated industries in the world, with numerous known and evolving risks and challenges to address. Manufacturers must contend with: the development of new diseases; lingering post-COVID supply chain issues; ever-changing regulations; new technology costs; advanced training and implementation; patent expirations; and greater customer expectations.

The nature of risk is uncertainty. For pharmaceutical manufacturing, there is the uncertainty in decision-making regarding target selection for R&D. There is also investment and cost uncertainty, not only because of lengthy drug product development times but also the risk that competitors may win the race to market. Ultimately, regulatory uncertainty is part of the journey to commercialisation because new drug approval may not be granted or because of the long delays to market introduction due to the time required for approval.

Drug discovery and development require managing the uncertainty of risk. Despite the speed of COVID-19 vaccine development, new drug development has a history of a long and costly journey that can take ten to 15 years with an average cost of $1-$2 billion for each new drug to be approved for clinical use.[5] 90% of clinical drug development fails.[6]

Lessons have been learned from the speed of COVID vaccine development. However, widespread and exact implementation of those lessons may be slow.

Patent cliff impact

Another challenge for major manufacturers that impacts pharmaceutical development is the 'patent cliff'. A company has exclusive rights to sales during the drug's patent life, although increased regulation has led to greater costs and longer development times, resulting in a reduction to patent expiry.

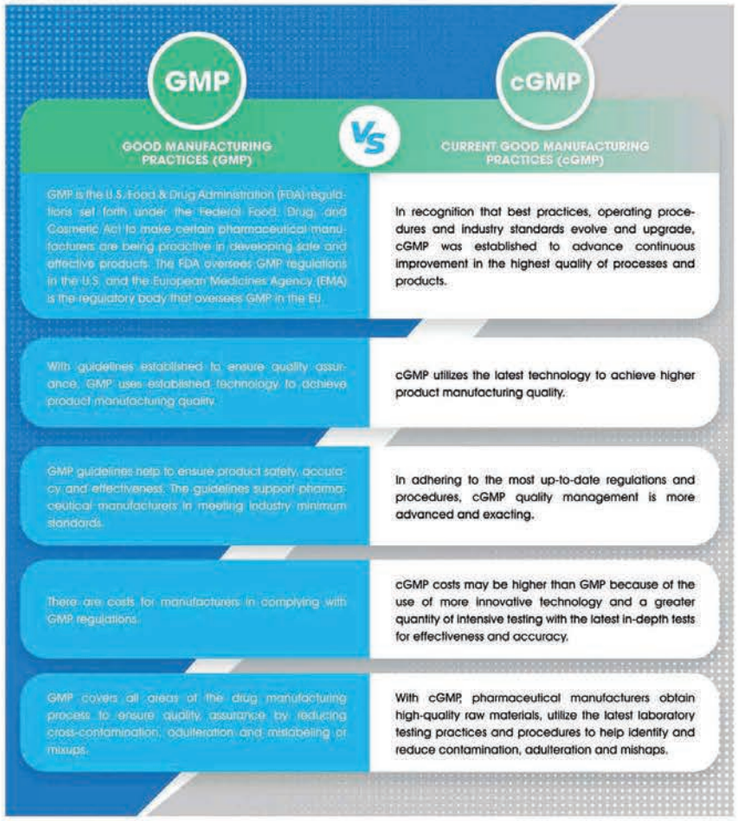


Figure 2 - Differences between GMP & cGMP

In the US, new patents have a 20-year term from the filing date except when other factors affect patent duration, such as orphan drug and new chemical exclusivity. Since the United States Patent & Trademark Office (USPTO) takes about two years on average to approve applications, that truncates the market life of the patent.[7]

Market research firm Statista reported that in 2022 the pharmaceutical industry is expected to have almost $50 billion prescription drug sales worldwide at risk due to patent expiration.[8]

As more patents expire and market penetration of generics continues, putting pressure on pharma profit margins, pharmaceutical company executives have to assess the level of risk tolerance for the commitment, investment and time necessary to develop new pharmaceuticals in-house. Some Big Pharma companies are looking to outside biopharmaceutical drug pipelines for possible future blockbusters.

According to McKinsey & Co., biopharmaceuticals generate $163 billion/year, about 20% of the total pharmaceutical market. This is the fastest growing part of the industry. Biopharma's current annual growth rate is more than 8%, double that of conventional pharma and this is expected to continue for the foreseeable future.[9]

Orphan drugs upsurge

In 2022, 54% of FDA approvals for new medicines were for drugs to treat rare diseases, as compared to 34% for orphan drugs in 2018. This trend is expected to continue in 2023. GlobalData predicts that at least 35 US regulatory decisions on drugs for rare diseases are on the horizon this year.[10]

Big Pharma is actively pursuing orphan drug development, in part because the pool of patents for rare disease medicines is much smaller and the pathway to FDA approval can be expedited. Since these drugs may launch faster, patient safety and risk have to be considered at the early discovery/clinical development stages, not just during Phase II and III clinical trials.

Traditionally, therapies for rare diseases have been small molecules or biologics. Moving into the future therapies will include tissue and cell-based therapies, gene therapy and other innovative routes, resulting in additional safety risks. Going forward, even greater collaboration between clinical pharmacovigilance and manufacturing will be necessary to ensure the safety of medicines."

Patient safety risks

Ensuring patient safety is the highest priority and responsibility during the development and clinical testing of new drug candidates. Even the smallest amount of impurities and side products can compromise safety. New pharmaceutical agents must pass a battery of preclinical tests, as well as numerous safety hurdles.

Patient safety risk and protection outcomes need to be built in from the early decisions in R&D. Early clinical trials monitor patients to start proving the safety, efficacy and tolerability of new pharmaceuticals. This patient health monitoring continues throughout the later clinical testing phases and beyond.[12]

Testing for impurities and other contaminants is crucial to drug development, not only to meet regulatory requirements but also to minimise the risk of development failures and adverse events. Designing comprehensive testing plans for all process phases is critical to success, as is selecting the highest-purity raw materials, reagents and excipients. An experienced industry supplier that offers customised testing and

multiple testing approaches can provide further support.

Supply chain conundrums

Global supply chain disruptions continue to be significant challenges that affect product development and impact speed to market. Longer delivery times and the difficulties obtaining high-quality raw materials have impacted pharma manufacturing operations. Supply chain costs and operating costs have increased.

Pharmaceutical manufacturers must adapt and innovate to meet the challenge. Seeking partnership with a supplier who can provide technical support, regulatory standards compliance, supply chain transparency and guidance, and a global distribution network, can help mitigate the risk and alleviate problems. Most importantly, suppliers must take steps to ensure quality throughout their own operations to meet the increasing global compliance requirements of pharmaceutical manufacturers.

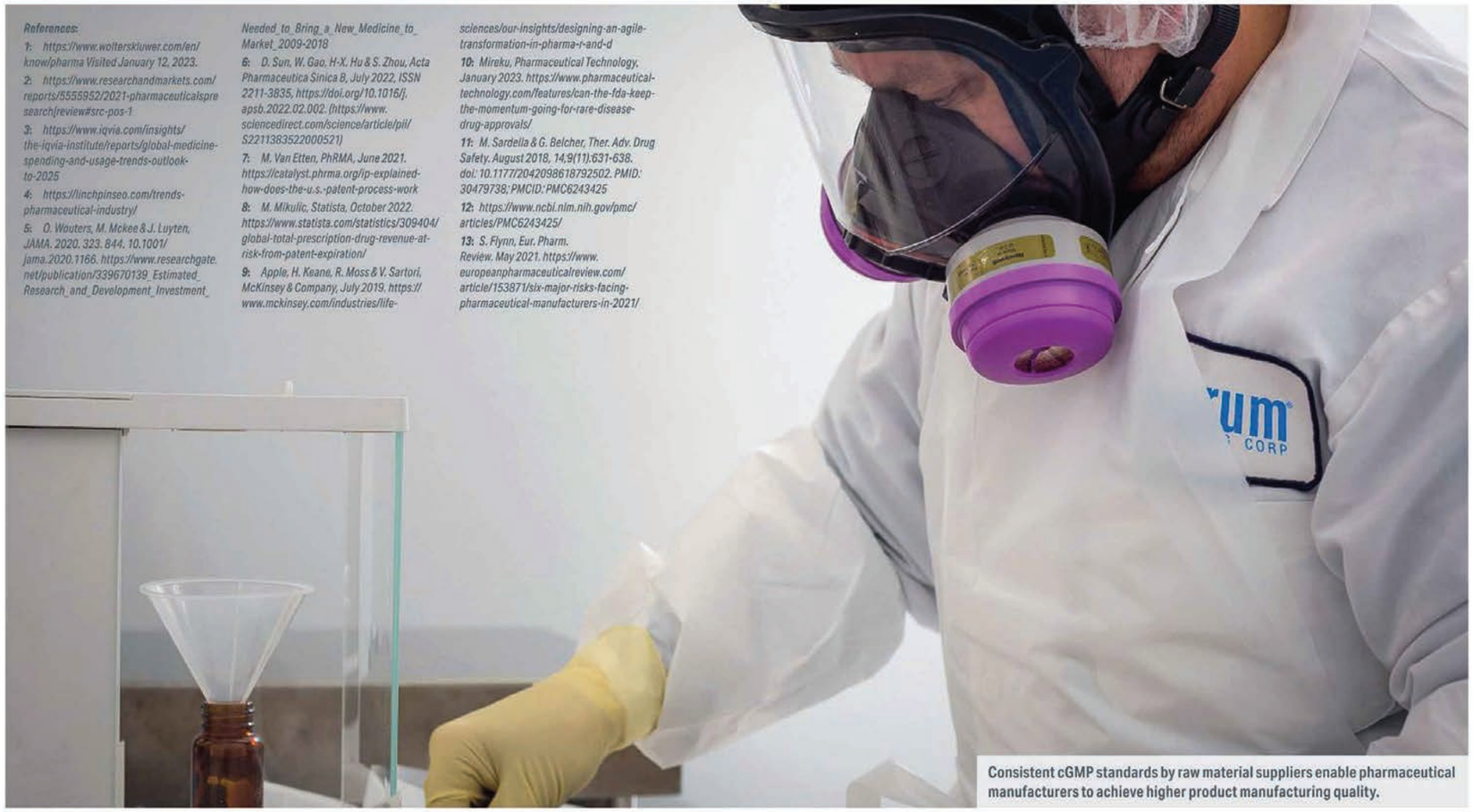
For example, at Spectrum Chemical all raw materials and finished goods are subject to in-house testing in our cGMP-compliant facilities to ensure that chemicals and ingredients meet stringent quality standards for various locations of multinational drug developers. In addition, documented change controls and sourcing to confirm transparency aid acceleration to market, while ensuring a consistent pipeline of raw materials.

Compliance & quality issues

To be in compliance in manufacturing quality drug products, pharmaceutical companies must comply with all applicable regulations as outlined in the FDA GMP guidelines and cGMP. Major challenges include maintaining quality control and staying current in compliance with changing regulations.

Compliance with FDA regulations and requirements is of the greatest importance. Pharmaceutical manufacturers must ensure the quality of their pharmaceutical products. With cGMP guidelines, pharma companies can guarantee the safety and effectiveness of their products that may be manufactured in multiple locations in different countries. This helps to avoid non-compliance with quality standards, product recalls and failures.

Meeting quality standards demands ensuring that every component of a pharmaceutical product is of the highest and purest quality, starting with raw materials and through all ingredients and substances. Another challenge is the difficulty of tracking and maintaining thoroughly detailed records of all production activities, materials used, and manufacturing processes and procedures.



Consistent cGMP standards by raw material suppliers enable pharmaceutical manufacturers to achieve higher product manufacturing quality.

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Global compliance variations

With both GMP and cGMP, strict attention to regulatory compliance is required. However, around the world how each manufacturer approaches and achieves compliance may have variations, depending on factors such as follow-through on modernising facilities and processes, employee training and leadership decisions on safety, risk and strategies for the best ways to ensure efficiency and business sustainability.

There also can be different interpretations of GMP and cGMP as to what constitutes acceptable levels of quality and effectiveness, especially between mature and new emerging markets (Figure 2). These variations have consequences that impact pharmaceutical discovery, development and manufacturing, and constitute compliance and quality challenges for pharmaceutical companies.

To mitigate these variations, pharmaceutical manufacturers can ally with a global partner who knows the lay of the land, a supplier with experience and knowledge of international quality standards and the global supply chain, who can provide global network advantages to deal with compliance variations worldwide.

No compromise with quality

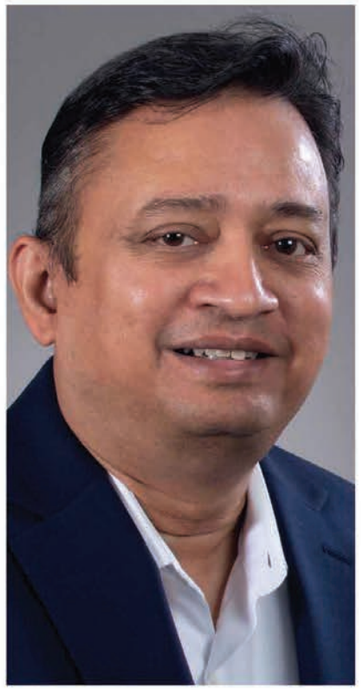
The emphasis on quality in pharmaceutical manufacturing is not only due to regulations but is paramount because the quality and purity of drugs protect patients, who rely on the medicines they are prescribed to be both safe and effective. It also protects manufacturers from costly financial losses, failures, recalls and damage to reputation and credibility.

For example, pharmaceutical companies must choose very carefully when selecting a raw materials supplier. The supplier needs to provide testing, validation and documentation with the materials. The raw materials must be of the highest quality, purity and potency. This not only provides a likely greater degree of success in R&D, it can shorten the time it takes to bring a drug to market.

Using the same, standardised raw materials used in R&D during the development process and the production process can accelerate time to market. Thus, manufacturers are mitigating risk throughout both the development and the production process, and ensuring quality with the same materials that are standardised, thus eliminating variation. This speeds time-to-market by eliminating the need to validate certain raw materials all over again.

Conclusion

Pharma and biopharma companies face many challenges in moving drug products through discovery and development to market. In meeting these challenges solutions that can facilitate faster time to market include ensuring regulatory compliance and quality at every stage at each of their manufacturing locations, consolidating process improvements, and selecting a drug development services partner that can provide expertise and customisation to accelerate pharmaceutical production. ●



Dr Vivek Kumar
BIOPHARMA MARKET DEVELOPMENT MANAGER
SPECTRUM CHEMICAL MFG. CORP.
+1 732 214 1300 x 4655
vkumar@spectrumchemical.com
www.spectrumchemical.com