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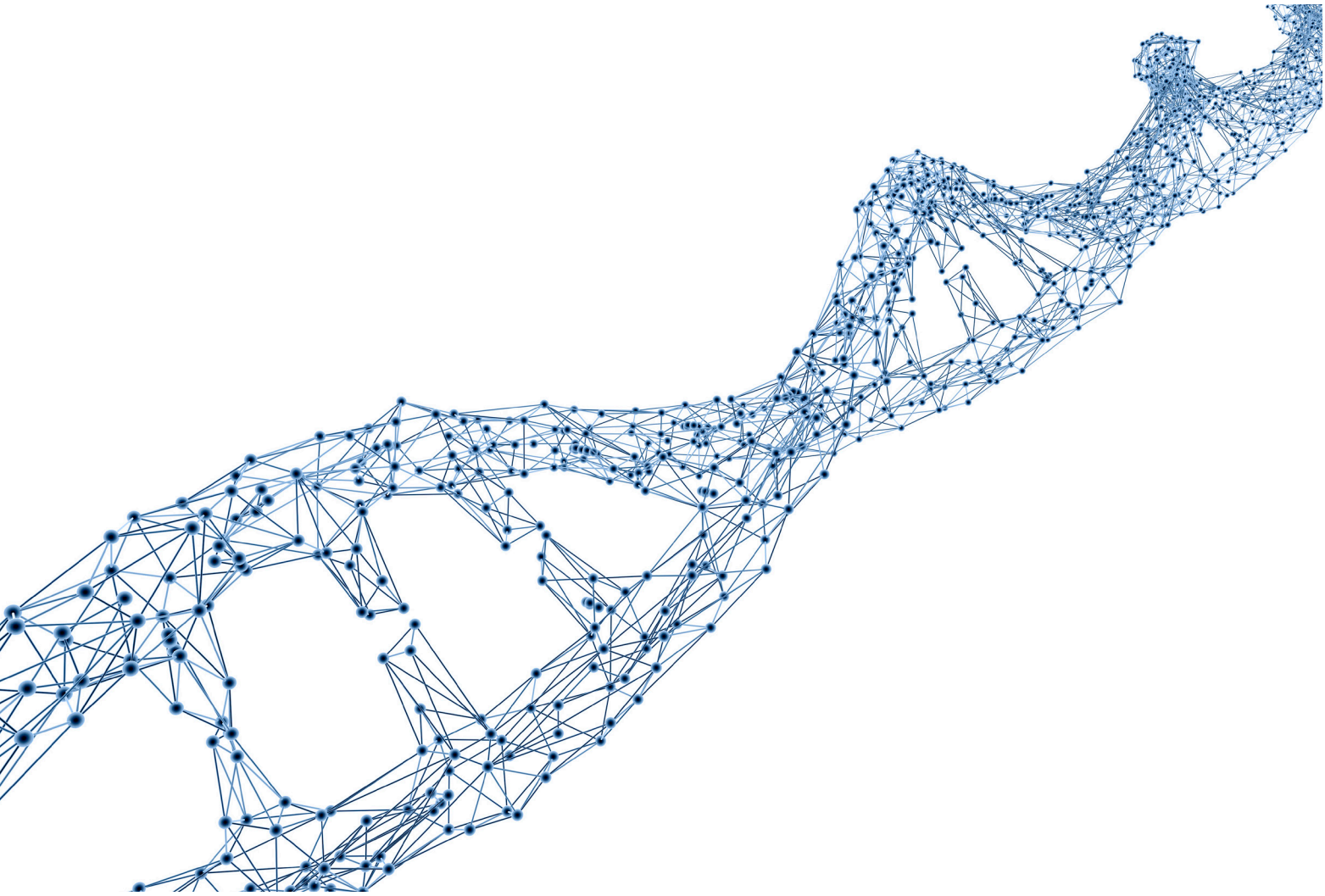

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WHITEPAPER

Implications of inaccurate forecasting on biologics drug substance manufacturing

An independent executive research study by ORC International

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Abstract

Large molecule drug substance manufacturing and demand forecasting is riddled with complexity. The long cycle time and short shelf life of a biologic drug substance makes it difficult to adapt the supply chain with agility, even at the earliest stages of development. As a result, inaccurate demand forecasts can have significant implications for companies developing biologics. And with less industry-wide available capacity for biologic production, it is increasingly difficult to locate capacity to respond to demand changes and ensure products achieve commercial goals. Biopharma companies and their partner CDMOs are now implementing various measures to instill more flexibility into their manufacturing processes, including single-use parts, dual sourcing, and modular design.

To better understand the issues that biopharmaceutical companies face when planning for clinical and commercial biologic drug substance manufacturing and supply needs, ORC International conducted interviews with biopharmaceutical executives in North America and Europe who consistently utilize forecasts for drug substance and commercial manufacturing planning for biologics. This research explored the causes, consequences, and potential solutions to forecasting challenges specifically related to biologic drug substance manufacturing.

This report addresses key themes that emerged from these discussions, highlighting approaches to demand forecasting, implications of inaccurate forecasting, and practices and strategies in place to optimize drug substance development planning and minimize risks.

Implications of inaccurate forecasting for biologics

There are substantial costs associated with producing and storing biologics. When companies are forced to throw away a full batch of a biologic, they are faced with considerable losses in investment and delays in the product development timeline.

"Because of the capacity constraints, you are unlikely to be able to fill [an] empty [biologic] pipeline for eight to 10 months." Former VP— Biotechnology Firm, North America

With such high stakes in the biologics market, the implications are severe when demand is overestimated and companies face unanticipated difficulties upon launch. Take, for instance, the unforeseen healthcare industry response to Zaltrap®[1] pricing ($11,063/patient/month): Sanofi and Regeneron discovered, after launch, that oncologists at Memorial Sloan Kettering Cancer Center refused to prescribe the drug when there were far more affordable alternatives available. Demand dwindled and the companies had to cut the price of Zaltrap by half[2].

There's also a lot on the line when companies underestimate demand. In the case of Abbott's Humira®[3], demand was continuously underestimated as a result of new indications and increasing popularity among prescribing physicians. Humira exceeded its first-year sales estimates, reaching $1 billion by year three, and the firm had to rapidly develop capacity to meet demand. The drug is now approved for nine indications, with worldwide sales of over $10 billion[4]. When demand is underestimated in cases such as this, it's very challenging to modify an existing production process or locate the additional capacity. Many companies tend to overestimate their demand, viewing excess inventory as a lesser risk than falling short of demand and missing growth opportunities.

"[Misestimating] creates a huge ripple effect... The forecasting process is not accurate and that generates a lot of reactionary operational modes. It's very stressful for the teams. It's something we're constantly trying to be better at." Director— Biotechnology Company, North America

Capacity constraints are expected to continue into the future. The industry is expected to operate at a 73% utilization rate by 20205, which is viewed as full utilization. Available capacity is often held by CDMOs to respond to demand increases and additional indication approvals for a product. For that reason, many biopharmaceutical companies choose to keep all manufacturing in one CDMO to build stronger relationships and build better processes to enable them to adjust to demand changes. Biopharmaceutical companies are increasingly relying on CDMOs to manage production and help mitigate risks. In fact, $2.6 billion is currently being spent on biologics outsourcing in this space[6]. Today's biopharmaceutical companies are developing strategies to anticipate demand and minimize capacity constraints.

Clinical development timelines for biologics last, on average, between 60 and 80 months, and only 11% of preclinical biologic products are ultimately approved[7].

Forecasts integrated early in planning process

Given the implications of under- or overestimating biologic demand, developing realistic forecasts is critical. Because capacity must be reserved well in advance of biologic production, forecasts are developed to inform manufacturing commercialization plans early in development.

Clinical development timelines for biologics last, on average, between 60 and 80 months, and only 11% of preclinical biologic products are ultimately approved[7]. This study found that biologic drug substance manufacturing decisions are primarily made between Phase II and Phase III clinical trials, which builds in risk for the innovator companies because of the high clinical failure rates.

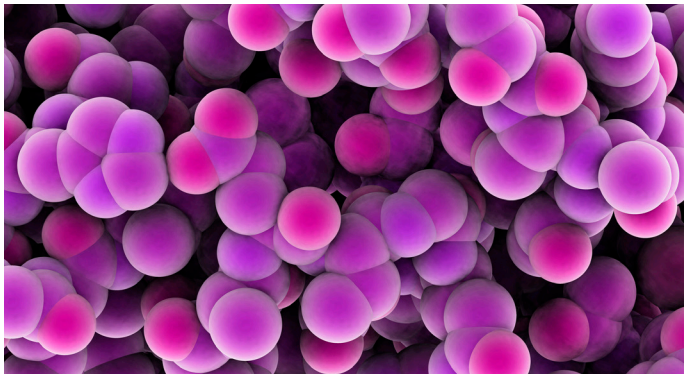
For some therapeutic areas such as oncology, demand estimates are modeled at the end of Phase II in order to be prepared for accelerated approval.

"If you're contracting out in a Phase III facility, companies that are on tight budgets like to lock in commercial pricing at the Phase III stage. That can be challenging, because if you don't know your demand, you may be negotiating something that's totally moot or not to your advantage." Vice President —Biotechnology Company, North America

Difficulties in forecasting for clinical trials

Forecasting demand for clinical trials has unique challenges relative to forecasting for commercialization. Because clinical trial designs often change and evolve, companies struggle to gain early insight into factors such as the appropriate dosage, frequency of administration, and number of patients. One biotechnology company director notes that changes in clinical plans have "a big impact on inventory and product availability, and that puts a lot of pressure on the operation side to adjust very quickly." Another common challenge arises when new indications come to light during clinical development, increasing the need for clinical drug supply. Additional trials to test new indications are common and very complicated from an operations perspective.

"We have one project that's just one indication and in a very, very small population. We saw good results … then after Phase I, we see more popular [indications] that had a good ISO testing in Phase I – colon cancer and oral cancer. These have many more patients. We have to expand it, and now all of a sudden all of our drug supply is an issue. Right now, it's basically a bottleneck." Associate Director — Pharmaceutical/Biotechnology Company, North America



For global approvals, clinical trial design and approval rates vary greatly among countries. Estimating distribution needs by geography poses challenges, even if the total demand estimate is accurate. This directly affects work flow departments such as supply chain management, and can have serious cost and timing implications.

"We found that in Eastern Europe, the drug is consumed much faster than we can supply it … we planned for a certain enrollment rate in each region. The drug had already been labeled for North America. [It will] take months to take the label off and repurpose it for use in Eastern Europe, where the demand is. So we're doing a very good job of overall forecasting, but we are doing a very poor job of forecasting where it's going to be used." Vice President—Biotechnology Company, North America

Difficulties in forecasting for commercialization

In planning for biologic drug product needs post-launch, executives indicated that their greatest challenge is predicting market reception during early commercialization. Not only is sales volume upon launch unpredictable, so is the ultimate rate of acceleration and uptake.

Biologics production requires the coordination of many departments to manage the supply chain and quality controls. Every adjustment of demand has immediate consequences on each of these functions and alters the potential for timely execution. While management can control some of the risks internally by implementing flexible processes to respond to demand changes, there are many external factors beyond sales volume that impact demand for a biologic and are challenging to predict, including pricing and insurance coverage, off-label usage, and competitor strategies.

"[Misestimating] creates a huge ripple effect. First, it can actually push out other projects that we're trying to provide support to or produce material for. It also impacts a number of functional groups. The forecasting process is not accurate and that generates a lot of reactionary operational modes for the different functions. It's very stressful for the teams. It's something we're constantly trying to be better at." Director —Biotechnology Company, North America

Influence of demand forecasting on production plans

For companies that insource biologic production, demand forecasts greatly influence process design. Given the relatively inflexible nature of biologic production processes, having an early and accurate forecast can be critical, as it influences decisions that executives make about their biologic process design and manufacturing strategy.

For companies that outsource, there is often significant risk of penalties written into the CDMO contract associated with overestimating demand. As highly in-demand businesses, CDMOs look for advanced planning with precise estimates. Many also require a deposit when the capacity is reserved, which may often be one to two years out, if not more. Financial penalties are often imposed for batches that are canceled, and significant money can be lost when trials go awry or demand changes, or other unexpected circumstances arise.

"You've got your forecast, you're planning multiple years out, you've got penalties with the contract manufacturers if you cancel a batch, and as you get closer to the batch date the penalties increase, potentially up to 100% of the batch cost. That makes it very complicated if that forecast shifts. So I would say really working with the CDMOs, being able to adapt the schedule, in a cost-effective way is probably the biggest variable and biggest challenge." Consultant —Biotechnology Companies, North America

For companies that outsource or operate virtually, demand estimates greatly influence the decision of the size CDMO they work with. Initial volumes for pre-clinical work are generally low for biologics, so there is often a need to convert from small to larger CDMOs when transitioning to commercial production. While most companies prefer to work with one CDMO throughout the entire development process, it often isn't feasible to find capacity in one that would be able to scale to meet commercial needs. Therefore, most companies find themselves taking on additional manufacturing risks in transferring technology and expertise between CDMOs.

"We're trying to find capacity for the pre-clinical work, so volumes are going to be fairly low. Thousand liter reactor. We will have to transition from the smaller contract manufacturing organizations to larger manufacturing organizations for commercialization. And so the big challenge there will be the tech transfer from the small organization to the larger organization." C-Level Executive —Biotechnology Company, North America

Companies must anticipate commercial production needs over two years in advance, particularly when working with a CDMO.

Key challenges in production planning

Regardless of whether companies decide to insource or outsource, they face common challenges in planning for biologic drug substance manufacturing. Limited industry capacity makes projecting timelines difficult, as the time that the team will be ready to begin producing the drug substance does not always align with when a manufacturing slot is available.

One C-level executive notes that the limited capacity in the industry "completely impacts, in a very negative manner, our ability to forecast when these other critical activities are going to start, when we can sign on the contract research organizations, and when we're going to need the funding to start those trials."

Further exacerbating the issue, companies must anticipate commercial production needs over two years in advance, particularly when working with a CDMO.

"With long lead times, it really gets compounded … you've got a two-plus-year lead on your orders, that right away creates a very unique challenge in terms of adapting to future demand that isn't what you thought it would be." Consultant — Biotechnology Companies, North America

Small companies especially struggle with the financial commitment of biologic development. Much can change over the development period that can result in significant financial loss—clinical delays, market or regulatory changes, or increases in raw material pricing. Companies can mitigate this financial risk by analyzing the pros and cons of outsourcing for each biologic drug substance, ensuring that there is a clear return on investment from using a certain CDMO versus another provider or in-house production.

Many biopharmaceutical companies also need to plan for adjusted timelines for early approval. This is an important part of the planning process currently not executed well.

"In oncology, there is often an opportunity to go into shortened development timelines because of the patient population and ability to get early approval. That puts a lot of pressure on both process development and manufacturing to be able to do more development, more process characterization early on, and have a process that is actually commercially capable." Director —Biotechnology Company, North America

More than half of respondents noted that their companies tend to overestimate their biologics demand forecasts by about 25%.

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Impact of forecasting inaccuracies

Biopharmaceutical companies face serious consequences when biologic forecasts are inaccurate. Today, many are managing their manufacturing in a way that limits their exposure to severe effects of incorrect forecasts. More than half of respondents noted that their companies tend to overestimate their biologics demand forecasts by about 25% of the actual need.

The main business risks that companies hedge against are the potential of reputational damage of underproducing and running out of supply, which can inturn impact market share.

"If we've underestimated or under-produced, it has huge ramifications for the public in that patients go untreated. And even if it's a drug that is not approved yet, but has compassionate use because it's so effective, if we haven't produced enough for compassionate use, those patients are likely to go in the lottery. Trying to explain to someone that their life can only be saved by a lottery is a very difficult conversation." Vice President—Biotechnology Company, North America.

Companies also consider the impact on share price, which can be impacted by lack of supply.

"What will have a dramatic impact on the share price is if you have a drug that is viewed to be very successful and there's huge demand, but you're unable to meet that demand because you've underestimated the production needs. That's particularly important for a small company such as ours that typically right before you start commercial introduction is when you would IPO." C-level Executive—Biotechnology Company, North America

Orphan drug designations increased substantially to 291 in the US and 201 in the EU in 2014. Record numbers of new orphan drugs are being approved—20 in the US in 2015—and projected sales growth of the overall orphan drug market to 2020 (11.7%) is more than double that of the overall prescription market (5.9%)[8]. The continued health of the orphan market stands in stark contrast to recent turbulence seen in the overall drug market.

In some instances, underestimation and the resulting underproduction of orphan drug products can result in the revocation of orphan status. This loss of first-mover advantage opens a door for competition to move in.

Outsourcing allows companies to be flexible and discerning with their product development plans by using best-in-class CDMOs for certain techniques and technologies.

While overproduction is rare, destruction of inventory is an issue that arises on occasion in clinical trials. With trials, a number of unforeseen challenges delay work and result in expired materials that need to be destroyed, leaving the company to absorb the cost. Some of these challenges may include difficult recruitment or improper execution of the trial design.

Inventory also may need to be destroyed in commercial production as a result of a product's short shelf life. Companies cannot run down inventory to zero before producing the next batch, so there's always an overlap, which may extend beyond the shelf life of the product. Operations teams need to plan carefully to manage their inventories and limit the amount of product that remains on the shelves near its expiration date.

Strategies to minimize risk

Large biopharmaceutical companies can often withstand the impact of manufacturing risks that threaten smaller companies, and often prefer to keep production in-house, so that they can control costs and achieve efficiencies of scale. Large companies will outsource when they either don't have a specialized technology in-house or lack the capacity to add a product to their manufacturing cycles. In contrast, many small biologics companies view outsourcing as a strategy to mitigate risks, and are increasingly choosing to outsource manufacturing.

"If you're a small company I strongly believe you buy rather than build. As you begin to get bigger and you start to cross in that transition of being a midsize company, then you would begin to add your internal capacity. And if you become really big, then you would have more internal capacity, although many large pharma companies still use contract manufacturing organizations to smooth out the waves of production." C-level Executive — Biotechnology Company, North America

Outsourcing can provide more flexibility and cost-efficiency for companies that have no or little existing manufacturing capacity of their own. Many executives share the sentiment of an associate director who said: "The CDMO is the more flexible [option] in terms of sizing of the scale and in terms of stage-wise readiness, so outsourcing just gives us more flexibility."

The capacity constraints among CDMOs indicates the high demand for their flexible services and cost-efficiency. Part of the job of senior biotechnology executives is now to prioritize building strong relationships with CDMOs to ensure that they will be able to use trusted organizations from development through commercialization for multiple products in the portfolio. By entering into such arrangements, companies can reduce the risk of timing delays that may result from an inability to find available capacity for a new product in the portfolio.

"If you've got a strategic relationship working with a big enough CDMO that you could put two, three, four products there, if one of my products is delayed maybe I could plug in the other one, assuming the platform is similar and not have to pay those cancellation fees." Consultant — Biotechnology Company, North America

With strategic CDMO partnerships, processes can be streamlined to facilitate knowledge transfers and the CDMO will be able to leverage insights from past projects to ensure consistent processes are in place to communicate with the sponsor company and resolve issues expeditiously.

"We choose a CDMO that already has capability for commercial production and has experience with stage prioritization, and we want to partner with them early on, even from Phase I. We establish a long-term relationship so that we can work closely to go through the Phase I, II, III, and launch, and we borrow a lot of their expertise in terms of authorization and validation. We try to build up that kind of a strategy, rather than working with different CDMOs, where there's a longer timeline and also a much higher cost to transfer." Associate Director— Pharmaceutical/ Biotechnology Company, North America

For each product in the pipeline, many companies implement a hybrid strategy that considers both in-house production and outsourcing benefits. They make a case-by-case manufacturing evaluation, to mitigate the financial risk with building a facility, yet still harnessing process knowledge. This decision to outsource most often occurs when no in-house capacity remains.

Beyond financial and capacity risks, companies also consider risks associated with lack of expertise, choosing CDMOs who are viewed as established and reputable partners with expertise in operational areas such as quality control and product fulfillment.

"[Smaller CDMOs] are less experienced. I now have to teach them how to run the process, how to do a lot of technical stuff, and then when things come up, they don't know how to handle it. That delays our timelines." Associate Director — Pharmaceutical/Biotechnology Companies, North America

There is a significant industry-wide need to increase capacity to produce both clinical and commercial biologic drug substances.

Key benefits of outsourcing biologic drug substance development

Outsourcing drug substance development is particularly appealing to companies with early-stage biologics, who can take advantage of the expertise and experience with biologics manufacturing offered by CDMOs to reduce their timelines and costs while limiting their liabilities.

"We have the ability to access higher-quality, more experienced talent than we would be able to build internally, and we gain access to better equipment and capabilities at a lower fixed cost than if we tried to build it ourselves." C-level Executive—Biotechnology Company, North America

Outsourcing allows companies to be flexible and discerning with their product development plans by using best-in-class CDMOs for certain techniques and technologies. Rather than employing different specialists and tools in-house, they can access these resources through the CDMO for a given project and learn from them.

"Whether it's re-folding, or using the e-coli process which has particularly challenging downstream steps, sometimes you don't have the internal capabilities or technology." Vice President—Biotechnology Company, North America

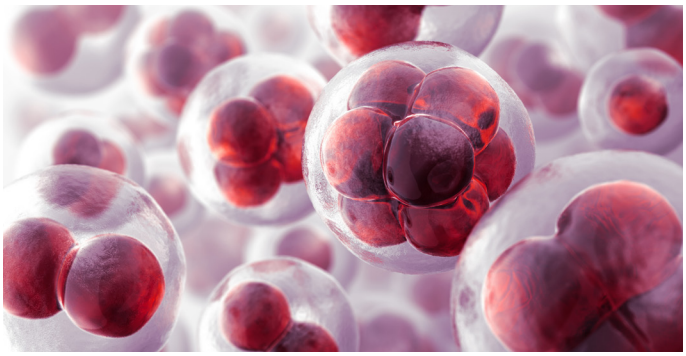
Concerns with outsourcing biologic drug substance development

Some biopharmaceutical companies are hesitant to outsource because they fear that they will lose control over and/or have less flexibility with their processes. Many find it challenging to keep track of project benchmarks without someone on site. Particularly in late-stage development, it is important to be entrenched in the everyday details to ensure that there are no delays or hurdles that emerge from operational issues at the CDMO.

"If you have internal production capabilities, you can more easily allocate resources to ramp up or cut down. When you contract out you have less control. Most contract manufacturers' flexibility to move people from one program to another is limited because of contractual obligations to their clients. And so there is somewhat of a decrease in the flexibility that you have if you outsource." C-level Executive—Biotechnology Company, North America

Unmet needs

There is a significant industry-wide need to increase capacity to produce both clinical and commercial biologic drug substances. Companies are becoming frustrated with the current environment in which they may have everything in place to begin production but are delayed because of the lack of manufacturing capacity.



"The biggest challenge for us is the inability to lock down on a contract manufacturing slot, which impacts the timelines for our entire development program through commercialization. That inability to accurately project those timelines has a tremendous negative impact upon our ability to raise the capital we need when we need it because we can't project when certain things are going to start." C-level Executive—Biotechnology Company, North America

There is also an unmet need for CDMO facilities with the specialized abilities to produce very large and very small batches, and gaining capacity in these sites is often a competitive and long process.

"When you look at large-scale capacity, 2,000L and above, there's only a handful of players out there that can make biologics at these large scales and they're all backed up.... So there's a real need to service the current market." Consultant—Biotechnology Companies, North America

Companies expressed another pervasive need: more flexibility from CDMOs. Without greater ability to adapt to changes in timelines or batch sizes, companies will continue to face financial consequences in response to the demand changes that CDMOs are unable or unwilling to meet.

"Within a specific facility there's very little flexibility and you just have to hope that everything works out, and sometimes it does but even with the biggest and the best, there are issues." Director—Biotechnology Company, North America

Companies are employing various strategies, either at CDMOs or internally, to gain more flexibility in their manufacturing processes.

Strategies that allow for more flexible manufacturing

Companies are employing various strategies, either at CDMOs or internally, to gain more flexibility in their manufacturing processes. The most commonly mentioned strategy that appealed to biotechnology executives was single-use parts.

Single-use parts for product contact components

Using disposables for all the product contact components is a straightforward and quick process that eliminates the need for cleaning validation. These single-use components have successfully increased flexibility in recent years, allowing companies to turn around their suites faster.

"Anything with single use for us is important....Our vaccines can have up to four components. If you're trying to make four different components, it's a lot of cleaning. Single-use vaccine and single-use buffers and things like that are a huge help." C-level Executive —Biotechnology Company, North America

Dual sourcing

Dual sourcing is a popular process that can effectively mitigate risks by improving flexibility, especially for commercial products.

"Most companies have a threshold limit of where they transition from single-source to dual-source. Sometimes it's for capacity reasons, sometimes it's risk reduction, or it's both," said a vice president of a North American biotechnology company.

Multiplexing

Multiplexing allows for reproducible, scalable progress from smaller to larger capacities. Reactors are added or removed to accommodate demand without the need to revalidate the process because of leveraging single-use technologies. Multiplexing allows for a single-solution provider, site, and suite to scale as needed.

The stakes in the biopharmaceutical industry are high and misalignment of demand forecasts can threaten product success and even company reputation.

"[Before,] the smallest [cGMP bioreactor] we could do was way more than we needed. [It's] changed where CDMOs now have a wider range of bioreactor sizes, which has been really helpful." VP Manufacturing—Pre-clinical Vaccine Biotechnology Company

Modular design

Modular designs are also popular, as they do not have a large footprint. "I think modular design for facilities, at least for small and medium-sized, not super-large facilities, is probably the way to go and the way of the future," said a C-level executive from a North American biotechnology company.

Conclusion

Companies developing biologics are faced with many challenges in planning for their clinical and commercial drug supply needs—challenges that stem from the long product lead times that require companies to plan up to two years in advance and an industry-wide lack of capacity. The stakes in the biopharmaceutical industry are high and misalignment of demand forecasts can threaten product success and even company reputation. Among the key unmet needs expressed by executives interviewed is for greater capacity among CDMOs and greater flexibility in manufacturing processes. Both sponsor companies and their partner CDMOs are now implementing various measures to instill more flexibility into their manufacturing processes, including single-use parts, dual sourcing, and modular design. Sponsor companies are turning to CDMOs for their deep expertise in biologic production and their use of specialized technologies and human resources, with expectations that CDMOs can help them manage their development timelines and costs, while limiting their liabilities.

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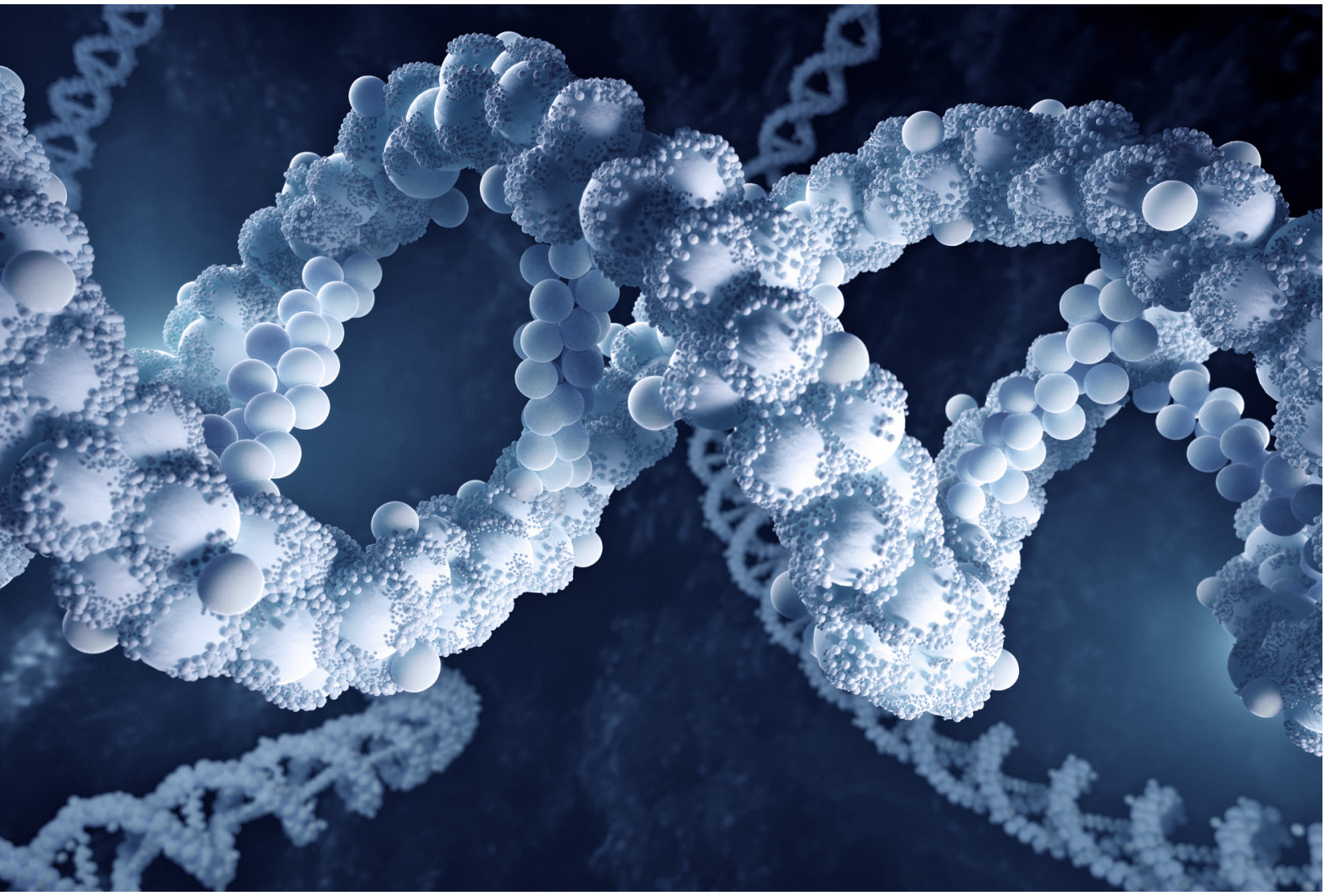

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WHITEPAPER

Challenges, risks, and strategies for biologic drug substance manufacturing

John Foy

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Thermo Fisher Scientific

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Abstract

Insights from pharmaceutical and biotechnology industry leaders make it clear that demand forecasting is a significant challenge when planning biologic drug substance production. The biologics development and approval process is typically long and complicated, increasing the risk of accurately forecasting demand. Overestimating demand can lead to higher per unit cost and disposal expenses, and underestimating it can result in missed market opportunities and negative reputational consequences for the company. Solutions like flexible capacity, modular and disposable technologies, continuous manufacturing, and options such as multiplexing can help biologics companies derisk and avoid missed opportunities.

The root causes of flawed forecasting

Clinical development of biologics lasts between 60 and 80 months on average with only 11%[1] of preclinical biologic products ultimately being approved. Thermo Fisher Scientific commissioned ORC International to conduct this research, which included phone interviews with 15 biopharmaceutical executives in North America and Europe who consistently utilize forecasts for drug substance and commercial manufacturing planning for biologics. According to the interviewed executives most biologic drug substance manufacturing decisions are made between Phase II and Phase III clinical trials, which builds in risk for the innovator companies because of the high clinical failure rates. The timeframe between the end of Phase II and biologics substance manufacturing can range from one to five years, according to the interviews. One executive noted that contract manufacturers are locking in biologic drug substance business seven years in advance. Moreover, cancellations can be costly. "Depending on how far in advance you cancel, you can lose up to 100 percent of the cost," said one executive.

With these extended timelines, biologics companies must make assumptions about patient populations, and plan years in advance of production to reserve capacity, either at company-owned facilities or with contract manufacturers. "Lack of commercial manufacturing capacity in the biologics industry is the biggest issue we face," said one executive. "It is hard to predict and build the infrastructure and assume the work will still be there in five years." This sentiment was echoed in every interview.

"Being first to market is the primary reason companies are willing to risk making speculative demand forecasts and commit so early to commercial capacity."

Market demand for a biologic is difficult to predict and companies are challenged by having to estimate the pharmaceutical characteristics of the drug when determining capacity requirements. "We look at the titer, and efficiency of the process, to make our decisions about commercial manufacturing," said one executive, adding that, "The clinical indication and the clinical need are very difficult to predict."

Being first to market is the primary reason companies are willing to risk making speculative demand forecasts and commit so early to commercial capacity. "Delaying signing a contract because you do not have the clinical results can delay launching a product," said one executive. Beating the competition maximizes market share, return on capital (ROC), and company valuation, which (in the minds of many managers) offsets the costs and inefficiencies of higher-than-needed plant production and inventory levels.

Indeed, most biologics executives interviewed said they err on the side of overestimating capacity requirements. One company routinely overestimated by about 75-100%. “We do that purposefully,” said the executive. “We will always make double of what we think we’ll need. And in every product situation that I’ve done that in, all the product has been used.”

Not every company has been so fortunate. For example, consider the circuitous and costly route one biotech company took to forecast demand for a new biologic drug. The company began construction of a new manufacturing facility based on an initial demand forecast of $50 million in sales for the first year.

Shortly after construction began, marketing doubled the estimate to $100 million, and within six months, doubled it again to $200 million. The company increased staff and made other moves to accommodate the new forecast. Not long after, marketing doubled the forecast yet again to $400 million a year, so the company expanded the plant.

A few months later, the FDA denied approval. A year after that, following further clinical trials, the FDA approved the drug, and the company ramped up production based on an updated demand forecast of $200 million a year.

Unfortunately, this company’s see-saw experience is all too common. Incorrect estimates for biologics lead to widespread frustration and a yearning among companies for greater flexibility in manufacturing to reduce risk and cost, as well as shorter time to market.

De-risking the biomanufacturing process

Thermo Fisher has developed innovative capabilities, approaches, and business models that address many of the challenges raised by the executives that participated in the research study. Thermo Fisher’s new suite of biomanufacturing solutions provides both flexible and scalable capacity to pharmaceutical and biotech companies that can speed time to market while mitigating the risks and costs that come with uncertain substance manufacturing forecasts. These are customizable solutions that deliver high quality, robust process development and manufacturing, while accommodating capacity and demand fluctuations. The strategy does not solve the forecasting problem; rather, it makes forecast inaccuracies, and their implications for final supply, less painful and material.

“Thermo Fisher’s new suite of biomanufacturing solutions provides both flexible and scalable capacity to pharmaceutical and biotech companies that can speed time to market while mitigating the risks and costs that come with uncertain substance manufacturing forecasts.”

Thermo Fisher’s capabilities encompass a spectrum of production services that span both biologic development production and substance manufacturing. Experience with a drug during its development can help ensure a smoother transition to substance manufacturing, which translates into time and cost savings.

Moreover, the fact that Thermo Fisher has biologics facilities in Australia, Europe, and the U.S. ensures global coverage, and the ability to locate manufacturing to improve service to local markets. (Manufacturing in Australia also includes certain tax advantages.)

Because of the need for flexible capacity, biologics companies increasingly are demanding modular and disposable technologies, and continuous manufacturing. Thermo Fisher's perfusion and single-use technologies, together with the option of multiplexing, offer flexibility in both batch size and cost.

Because multiplexing is modular, reproducible, and scalable, biologics production can progress from smaller to larger capacities—2,000 to 10,000 liters—with lower risk and cost.

Thermo Fisher offers a variety of business models for delivering capabilities and services that accommodate flexible volume and the aggressive product launch schedules essential for success in biopharmaceuticals. These range from a dedicated facility, or line, to fractional ownership of a facility, a flexible network of facilities in local markets, or a fully customized suite of services that includes end-to-end production.

For companies that have production facilities, Thermo Fisher is well positioned to optimize the management of day-to-day operations. (See sidebar: Flexible business models.) Locking in production capacity years in advance of launch is a strategy fraught with risk. Biopharmaceutical companies can mitigate that risk with a flexible and versatile manufacturing solution. In that way, companies can speed time to market without rolling the dice on capacity.

Flexible business models

Thermo Fisher's flexibility extends to offering five customizable biologics manufacturing models, depending on the needs of the company. These five options are points on a spectrum. Thermo Fisher can customize solutions to match specific client needs.

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Dedicated capacity

Companies that have two or more products with similar bioprocessing requirements launching within 18 months, need a dedicated facility, or line, so they can modify their manufacturing schedule until they can understand the exact market demand for each product. Within the dedicated facility, a customer can determine how much is used for each product and can transfer technology in and out of the line without additional fees.

Fractional ownership

For companies that don't have the budget—or volume—for a dedicated facility or manufacturing line, Thermo Fisher builds a single CMO facility or line for two or three clients, providing flexible capacity for each. This model is less expensive than the dedicated line, but still provides flexibility and scalability.

Flexible network access

For regulatory purposes, global companies often need manufacturing capabilities in both North America and Europe. Or they simply may want on-demand access to capacity without preference for location. Flexible network access assures the client anytime access—within a specified period—to a specific type of capacity within Thermo Fisher's global network. Clients can adjust the product mix with the assurance they will have the right type of capacity when they need it.

Condominium capacity

This is a fully customized solution for a company introducing a new product with unique characteristics (for example, unique product types or platforms) that cannot be manufactured on a conventional manufacturing line. Thermo Fisher provides design services, works with equipment suppliers, validates the process, builds the line, and manages operations on behalf of the client. Overhead is shared, and the line can operate as needed to meet demand.

Enterprise

This is a solution for companies that own facilities in need of operational improvements. Some facilities may need to repurpose existing equipment; some should be closed. Thermo Fisher Scientific can manage these facilities to accomplish these goals, allowing companies to focus on their core competencies.

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Patheon commissioned ORC International to conduct this research, which included phone interviews with 15 biopharmaceutical executives in North America and Europe who consistently utilize forecasts for drug substance and commercial manufacturing planning for biologics. This research is an extension of the ORC International research paper “Impact of Incorrect Forecasts on New Product Launches,” published March 14, 2016, which included 50 interviews with biopharmaceutical executives.

About us

Thermo Fisher Scientific provides industry-leading pharma services solutions for drug development, clinical trial logistics and commercial manufacturing to customers through our Patheon brand. With more than 65 locations around the world, we provide integrated, end-to-end capabilities across all phases of development, including API, biologics, viral vectors, cGMP plasmids, formulation, clinical trials solutions, logistics services and commercial manufacturing and packaging. We give pharma and biotech companies of all sizes instant access to a global network of facilities and technical experts across the Americas, Europe, Asia and Australia. Our global leadership is built on a reputation for scientific and technical excellence. We offer integrated drug development and clinical services tailored to fit your drug development journey through our Quick to Care™ program. As a leading pharma services provider, we deliver unrivaled quality, reliability and compliance. Together with our customers, we’re rapidly turning pharmaceutical possibilities into realities.

John Foy

Vice President, Buisness Management, Thermo Fisher Scientific

John Foy is Vice President of Business Management for Thermo Fisher’s Biologics Business. Foy is a senior leader with 27 years’ experience, having worked primarily at Diosynth/ Fujifilm DiosynthBiotechnologies in sales positions ranging from program planning to chief business officer. He earned a Bachelor’s degree in Mechanical Engineering from Lehigh University. Prior to earning his MBA from University of North Carolina at Greensboro, John spent four years in the United States Air Force as an Aircraft Maintenance Officer.

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