The race to regulatory approval

Delivering critical therapies with speed and safety

The race to therapeutic approval is intensifying. As global health needs grow and investors demand faster timelines, developers are striving to help deliver innovative therapies at unprecedented speed while navigating increasingly rigorous regulatory expectations.

Traditional development processes cannot keep place alone. To succeed, developers should consider moving away from treating regulatory strategy as a final hurdle and instead embrace it as a design principle. To deliver critical therapies to patients faster, this shift suggests proactive planning, end-to-end quality frameworks, and collaborations that support scalability.

Accelerated development is enabled by organizations that integrate science, compliance, and operational agility into a unified workflow.

The current regulatory landscape

At a glance

The journey to market for new drugs and biologics can be lengthy, but regulatory approval is vital to protect public health. This carefully controlled, multi-layer process is an opportunity for developers to demonstrate the safety and efficacy of new therapeutics before they are licensed for use:

- Candidate therapies undergo extensive pre-clinical research. This data, along with manufacturing information and clinical trial protocols, is submitted as part of the Investigational New Drug (IND) application
- If successful, the IND proceeds to human trials (Phases I to III) to assess safety, efficacy, therapeutic dose, long-term side-effects, and comparative performance against existing treatments
- Favorable candidates are submitted under a New Drug Application (NDA) or Biologics License Application (BLA), with Phase III data forming the bulk of the submission dossier

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Expedited pathways

In the United States, the Food and Drug Administration (FDA) supports expedited approval pathways, such as Fast Track, Breakthrough Therapy, Accelerated Approval, and Priority Review, that can be requested at final submission to facilitate shorter timelines [1]. Eligibility is determined by the FDA, and not all investigational drugs or marketing applications qualify.

To qualify for these designations, developers must make the argument that their therapy meets an unmet medical need—either as a new therapy for conditions with limited treatment options, or by supporting substantial improvement over available therapies. Additionally, Accelerated Approval allows regulators to base approval on reasonable predictions about clinical benefits.

Expedited pathways are available in other global regions outside of the United States. However, their processes and eligibility requirements may differ, so additional tailoring of the submission dossier may be necessary.

The cost of oversight

Only 25–30% of tested candidates pass all three clinical trial phases [2], often due to lack of efficacy, unexpected safety concerns, or inadequate trial data. Of these, only 30–40% transition to NDA or BLA submission [3]. Cessation at or after human trials becomes increasingly costly, as investment of time, resource, and funding accumulates with successive testing stages. Rejection at NDA or BLA submission also incurs further expense should developers choose to rectify the regulatory findings needed for resubmission.

Some reasons for failure can be difficult to predict and are even harder to plan for, such as poor efficacy, unexpected toxicity, or a lack of commercial viability. The industry is working towards utilizing artificial intelligence (AI) and machine learning to support viability assessment, optimization of trial design, and simplification of data collection and analysis in the future, which will be an exciting and welcome addition. However, with careful planning, the path to timely success can be taken today.

Preventable areas of oversight include poor risk management, inconsistent manufacturing protocols, incomplete documentation, and overlooking agency submission guidance. These often cause costly delays and discourage innovation—particularly in smaller biotechnology companies that often focus on specialist or rare diseases—further delaying patient access to new and better treatments. Proactive planning can help avoid these pitfalls, maximizing opportunities for success from preclinical research through Phase III trials and beyond.

Regulatory readiness: Improving the likelihood of success

Early investment in scalable, flexible workflows can support development and enhance submission quality.

Adaptability in design

Adaptive clinical trials allow for planned modifications and data-driven adjustments to be made, such as cancellation of an under-achieving study arm. This style of clinical trial is often preferable, as it can help reduce cost, produce results faster, and may require fewer participants. However, adaptive trials are complex and require careful planning. There is little room for logistical error, and delays in material management can compromise the design.

Flexibility is often considered when designing supply chain and manufacturing processes, with resources adjusted as appropriate in response to preliminary data and evolving conditions.

Planning for scalability

Success at bench scale may not translate to viability at commercial scale. When choosing platforms and products, such as cell culture media, it is important to select those that are cGMP ready, well-established, and available at commercial-scale quantity. Suppliers using well-characterized cGMP or compendial materials will have reliable operational processes, robust quality management systems to support scalability, and appropriate compliance documentation to speed up dossier assembly. Collaborating with suppliers who offer media analytics, prototyping, and predictive tools can also further strengthen scalability.

Risk mitigation strategies

Developers can help streamline dossier submission by increasing the confidence of regulatory agencies. This can include providing clear evidence of risk mitigation frameworks that demonstrate resilience in the supply chain and therefore help maintain patient access.

Choosing materials for supply chain resilience

In an ever-changing socio-political landscape, pricing and availability may be dynamic, and rapid scale-up may mean material shortage forecasts become inaccurate quickly. The use of animal origin-free (AOF) and chemically defined formulations can help to manage risk.

Validating secondary and even tertiary suppliers where possible can also strengthen supply assurance and flexibility in production. Collaborating with suppliers capable of helping to maintain safety stocks further improves inventory management and helps reduce disruption. The pressure from increased demand and the need for faster timelines may impact material quality assurance standards, so materials and suppliers must be audited regularly to prevent compliance issues later.

Choosing reliable partners

A reliable supply chain is crucial to support consistent product quality and mitigating risk. Developers should collaborate with suppliers and, if needed, contract development and manufacturing organizations (CDMO) with standardized raw material strategies, documented quality assurance processes, and robust change notification agreements. This includes the ability to provide key documentation, including appropriate Chemistry, Manufacturing, and Controls (CMC) and traceability documentation, such as Drug Master Files (DMF), Regulatory Support Files (RSF), and Certificates of Analysis (COA).

Beyond technical infrastructure, developers must also consider how their organization's operational model influences their regulatory readiness.

Suppliers should also be able to demonstrate site-to-site equivalency with harmonized production systems. Site redundancy provides backup systems and processes, to safeguard against operational failure and minimize impact on production, supporting manufacturing continuity and robustness of supply.

Beyond technical infrastructure, developers must also consider how their organization's operational model influences their regulatory readiness. Having an experienced, collaborative supplier that understands your unique needs can help a developer thrive. No two companies operate in the same way, and so different types of support will be needed to help navigate operational challenges and deliver innovative therapeutics to market. Large biopharmaceutical companies, for example, may have more experience to leverage, but slower internal processes. Whereas smaller biotechnology companies would be better suited to adapting workflows for expedited pathways quickly but may lack the resources to do so.

Communication as a strategic tool

Keeping on top of evolving industry requirements is essential for developers to prepare a robust submission. However, this is often difficult to achieve. Developers should leverage available resources and follow applicable regulatory agency guidance to support effective submissions.

To maximize benefit from expedited regulatory pathways, knowledge of which pathway is best suited to the product is vital. Meeting with the regulatory agency is recommended, as this can impact the pathway chosen, and regular open communication will help set clear expectations and build rational timelines into the strategy.

Agency-informed submissions also provide a springboard for gaining regulatory approval in wider global markets with agencies such as the European Medical Agency (EMA) and Japanese Pharmaceuticals and Medical Devices Agency (PMDA). Submission requirements may differ between regions, and so tailored regulatory support from suppliers, manufacturers, or the agency itself can be helpful. International collaboration and knowledge-sharing between global regulatory agencies is becoming more frequent, and successful approval in one market can be leveraged to speed up regulatory review elsewhere.

Navigating regulatory approval effectively

Regulatory approval is increasingly viewed as an ongoing consideration rather than a final milestone, helping inform decisions from discovery through scale-up. For companies that are developing critical therapies, it is important to consider regulatory requirements as well as aligning quality resources and processes early.

By designing adaptable trials, choosing reliable suppliers for scalable materials, and embedding flexibility into the supply chain, developers can mitigate risk, prevent costly redevelopment, and strengthen their dossier submission.

The message is clear—organizations must invest in regulatory readiness today to help confidently deliver faster, safer, and more globally impactful therapies tomorrow.

Help facilitate your journey to regulatory approval

At Thermo Fisher Scientific, we are committed to supporting your innovation by helping to:

- Support access to a consistent supply of high-quality cell culture solutions across a wide range of platforms, formats, and scales
- Support analytical capabilities to optimize yield and commercial viability
- Reduce risk with strict raw material controls and comprehensive quality control (QC) testing for all cGMP media products
- Facilitate supply through our global network with built-in manufacturing equivalency and redundancy
- Maintain production with harmonized, ISO-compliant facilities designed to support your timelines at a range of scales

With experienced global teams and established regulatory document readiness to support your submission, our in-depth support and technical experience can help streamline your success throughout development and beyond.

Find out how Thermo Fisher can support you at thermofisher.com/bioprocessing

References

1. U.S. Food and Drug Administration (FDA), Fast Track, Breakthrough Therapy, Accelerated Approval, Priority Review.
2. U.S. Food and Drug Administration (FDA), The Drug Development Process. Step 3: Clinical Research.
3. Feijoo, F et al. (2020) Key indicators of phase transition for clinical trials through machine learning, Drug Discovery Today, 25: 414–421. Available at: doi.org/10.1016/j.drudis.2019.12.014

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