Windeye Partners

Clinical Trial Timelines in the U.S. Pharmaceutical Industry

The pharmaceutical industry is the most research- and development-intensive sector in the United States. On average, this industry spends six times more on research and development (R&D) than any other manufacturing industry. According to a 2020 study published by JAMA Network,[1] the average cost associated with the process is $1.3 billion (median $985 million).

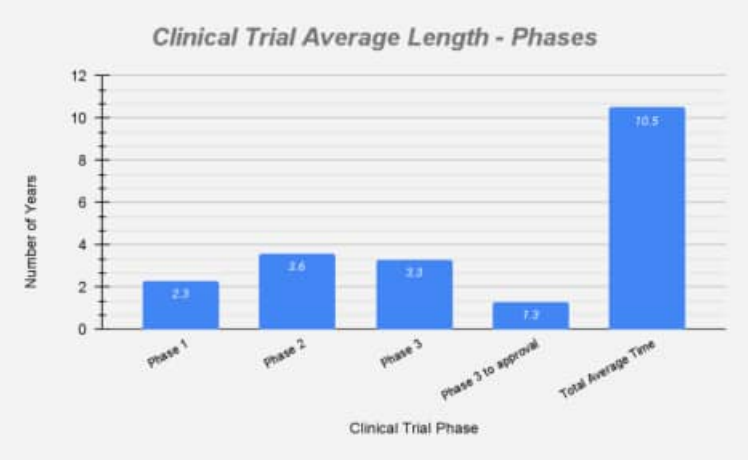
The number of drugs under development nearly doubled between 2012 and 2022, growing from 3,200 to 6,100 candidates in the clinical trial pipeline. During this period, industry R&D spending grew to $250 billion, an increase of nearly 50%.[2] Despite this growth, only 5% of the 7,000 known rare diseases have treatments available currently.[3] This has increased the focus on increasing the productivity of the industry, especially in terms of the success rates and length of clinical trial cycles.

Clinical Trial Timelines

The typical clinical trial length for a new drug ranges from 10 to 15 years, from the start of Phase 1 through FDA approval. Most drugs do not complete the clinical trial process, given the approximately 10% overall success rate for drug candidates that start Phase 1 trials.[4]

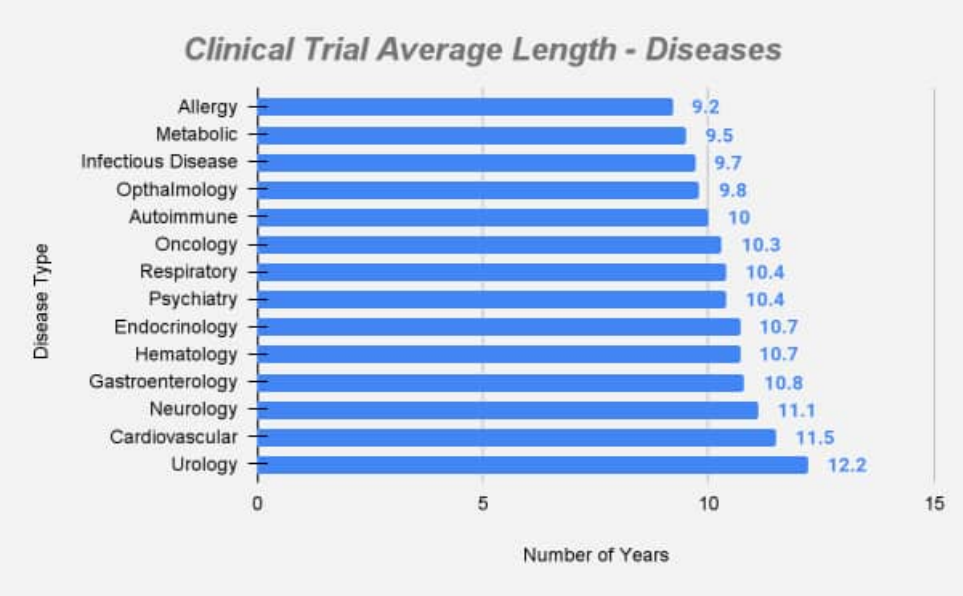
Average clinical trial times vary by phase:

- **Phase 1**: 2.3 years
- **Phase 2**: 3.6 years
- **Phase 3**: 1.3 years



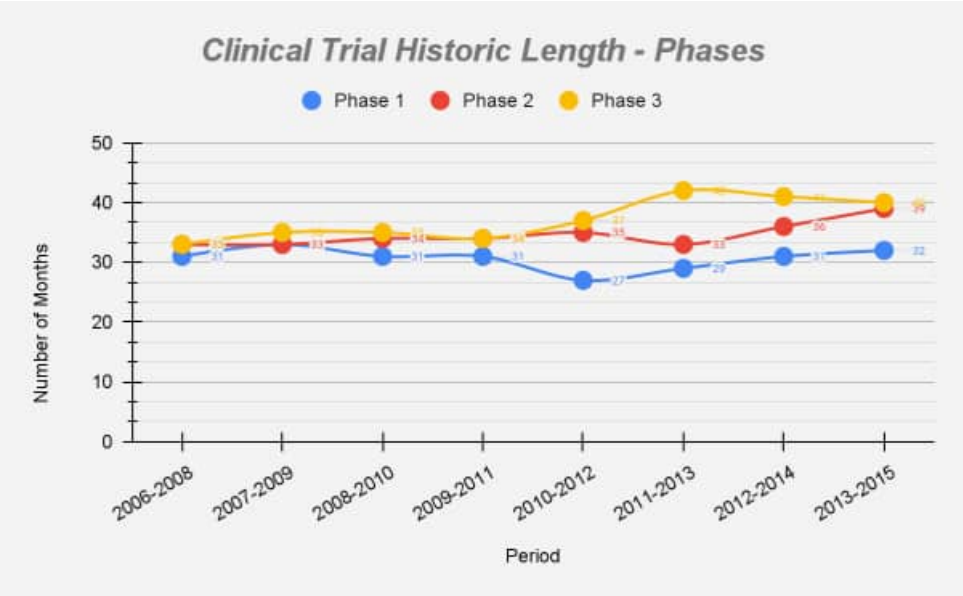
[1] Estimated Research and Development Investment Needed to Bring a New Medicine to Market, 2009-2018
[2] Accelerating clinical trials to improve biopharma R&D productivity, McKinsey & Company, 2024
[3] PhRMA, 2024
[4] Biotechnology Innovation Organization (BIO), 2021

Clinical trial times also vary significantly by type of disease, from 9.2 to 12.2 years:



Clinical Trial Times Are Getting Longer

Meanwhile, clinical trial times are getting longer. Results from KMR Group's *Clinical Trial Cycle Time Study* show that Phase 1, 2, and 3 trial lengths were similar in the early 2000's but increased across all phases from 2010 onwards.[5]

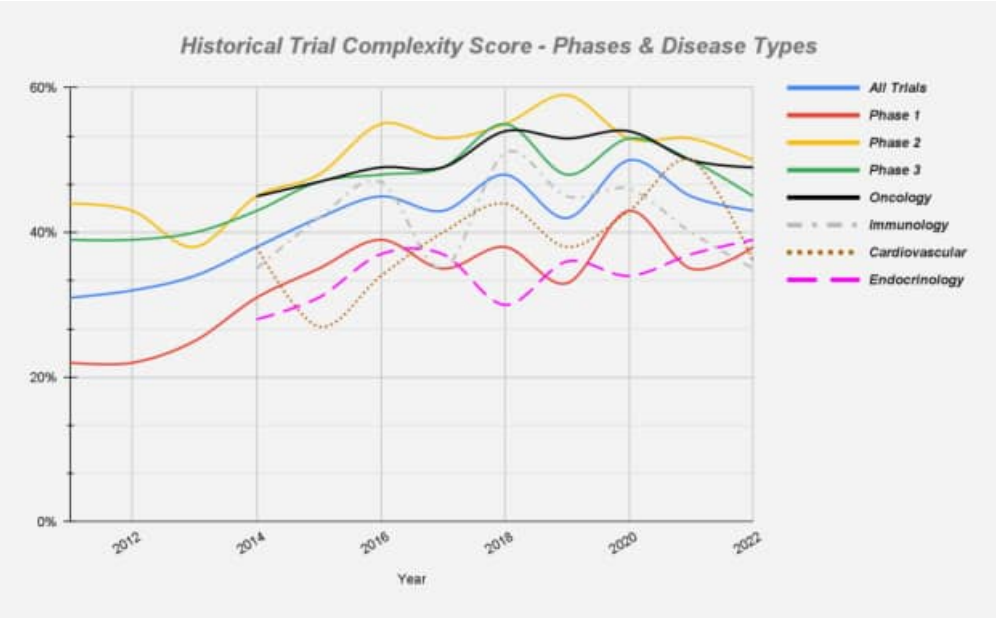


[5] Martin, L., Hutchens, M. & Hawkins, C. Clinical trial cycle times continue to increase despite industry efforts, 2017

Several factors have contributed to these increased timelines:

- **COVID-19 Pandemic:** While the drug development community developed and approved COVID-19 vaccines over a very short period of time, the increased focus on one treatment affected the timeline for all other drug trials in the pipeline. Many trials were halted, and new trial starts were delayed. What's more, the pandemic affected clinical trial enrollment, which dropped significantly. Only 57% of the anticipated trials were activated during this period.
- **Increased Trial Complexity:** Trial protocols, especially in Phase 2 and Phase 3, have become more complex. The Trial Complexity Score (TCS), a machine-learning metric that assesses overall trial duration, noted an increase of more than 10% across all trials.[6] Oncology trials, especially, have grown more complex, but even endocrinology and Phase 1 trials, which have historically had shorter clinical trial timelines, have seen an increase in their TCS scores.
- **More Endpoints and Procedures:** As trial complexity increases, so do endpoints and procedures, making it more challenging to find willing and qualified participants. In 2020, Phase 2 or Phase 3 protocols averaged 21 endpoints, up from 17 in 2016. The number of procedures also increased by 44% over the same period.
- **Larger Trial Sizes:** Even as eligibility criteria become more restrictive, the number of participants per trial has increased. In Phase 2, the average number of participants grew from a median of 88 in 2007 to 108 in 2015.
- **Large Molecule Trials:** Trials for large molecules, such as monoclonal antibodies, have approval rates nearly triple those of small molecules, but require more complex trial processes, extending the average across timelines.

[6] Markey, N., Howitt, B., El-Mansouri, I. et al. Clinical trials are becoming more complex, 2024

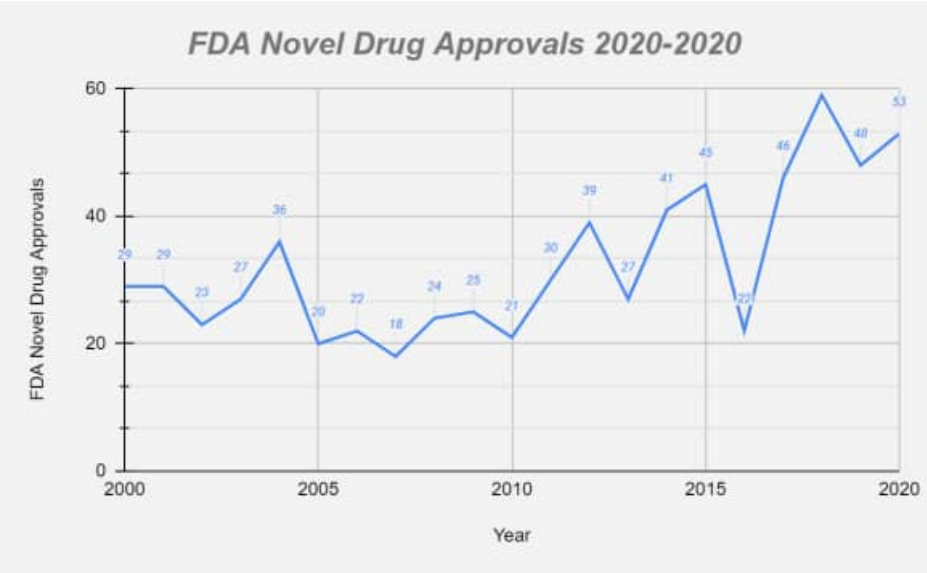


FDA Approvals and Expedited Pathways

The good news? FDA approval rates have been increasing. Approximately 700 prescription drugs were approved between 2000 and 2020, with approval numbers reaching record highs from 2014 to 2020.[7]

- **Approval Timelines are Decreasing:** The average time required for FDA approval has decreased from 13.6 months to 11.7 months, largely due to an increase in drugs targeting rare diseases. These drugs often qualify for the FDA's Expedited Timeline Programs.
- **FDA's Expedited Timeline Programs:** In 2023, nearly two-thirds (65%) of FDA-approved drugs were processed under expedited programs like Fast Track, Breakthrough Therapy, and Accelerated Approval.
- **Precision Medicines Are Increasing:** Precision medicines, which target specific DNA or environmental factors, reach the market about two years sooner than non-precision drugs.

[7] PhRMA, Innovation in Biopharmaceuticals, 2021



Summary

The pharmaceutical industry is currently focused on finding new ways to conduct clinical trials to enable shorter overall cycles without compromising on quality. Shorter cycles present both societal and commercial opportunities as patients get access to the drugs they need faster, while time and cost reductions can potentially allow companies to achieve greater revenue benefits and longer periods of patent-protected sales.

The clinical trial timelines are an important consideration for investors in privately held biotechnology companies, in particular if they are getting longer, as this increases the time to a potential exit or liquidity in the form of milestone income and royalties and reduces present values. When analyzing the potential value of a drug or a company, we should also consider the variability in clinical trial lengths and the impact of delays in the process.