

PHARMA INSIGHTS

Pfizer's Breakthrough Story: **Leveraging mRNA and AI for Advanced Vaccine Innovation**

By: Dr June Choon

Artificial intelligence (AI) has seamlessly integrated into our daily routines, powering personalised recommendations, virtual assistants, and smart devices so effortlessly that we hardly take notice. However, what often goes unnoticed is how AI is revolutionising healthcare. By speeding up drug discovery and enhancing disease detection, AI is reshaping how we approach and manage health.

In the race against time to develop a COVID-19 vaccine, Pfizer's scientists not only relied on cutting-edge mRNA technology but also turned to artificial intelligence (AI) to accelerate the process. Amid the urgency of the pandemic at that time, these technological advancements enabled Pfizer to achieve unprecedented speed and precision in their clinical trials.

Typically, the data-cleaning process for clinical trials—a critical step that ensures accuracy before analysis—takes over a month. It involves manually checking vast datasets for errors and inconsistencies. However, Pfizer's integration of a new machine-learning tool, Smart Data Query (SDQ), revolutionised this process. In a remarkable feat, the COVID-19 vaccine trial data was prepared for review just 22 hours after reaching primary efficacy case counts.

"It saved us an entire month," explained Demetris Zambas, Vice President and Head of Data Monitoring and Management at Pfizer. "It really has had a significant impact on the first-pass quality of our clinical data and the speed through which we can move things along and make decisions."

Innovation Through Collaboration

The rapid development of SDQ was made possible by Pfizer's Breakthrough Change Accelerator, an innovative platform designed to address complex challenges through collaboration. Acting as an "incubation sandbox," it invites startups, tech companies, and institutions to propose solutions for specific research problems. The Breakthrough Change Accelerator is managed by Pfizer's Digital Innovation Lab. The Lab oversees various initiatives applying digital capabilities to better enable drug discovery, accelerate clinical development, augment patient and provider engagement, and improve patient outcomes on a global scale.

In its inaugural challenge, Pfizer sought a tool that could quickly and accurately clean clinical trial data. Saama Technologies, a California-based software company, emerged as the winner, delivering a viable prototype in just six weeks. Zamba also added how this type of development usually takes a lot longer, but their approach and agility helped Pfizer meet all the needs quickly. The collaborative model eliminated traditional barriers to partnership. Instead of lengthy contractual negotiations, Pfizer provided instant access to anonymised data on a secure cloud server. Winning participants were then offered opportunities to refine their solutions into fully integrated systems.

The Ripple Effect: Beyond Clinical Trials

Building on the success of the SDQ tool, Pfizer plans to expand the Breakthrough Change Accelerator to other areas, such as improving drug labels. One upcoming challenge focuses on using AI to create patient-friendly drug labels from physician-oriented versions.

Creating patient-friendly labels is typically labor-intensive and requires translating complex scientific language into terms laypeople can understand. With thousands of label updates annually, AI could streamline this process, freeing experts to concentrate on patient-focused innovation.

Moreover, digital advancements like this could enhance health literacy by integrating information from electronic health records and telemedicine resources. By making labels more intuitive, Pfizer is not just improving adherence but empowering patients with better understanding and outcomes.



The introduction of AI tools like SDQ has shifted the focus of Pfizer's teams from labor-intensive tasks to creative problem-solving. "The same people who were once searching for errors are now innovating ways to improve how we capture data in clinical trials," Pfizer remarked.

The Future of AI in Healthcare

As AI and machine learning become increasingly central to healthcare innovation, Pfizer's success with these technologies serves as a powerful example of how digital transformation can drive efficiency, improve patient care, and pave the way for breakthroughs.

With tools like mRNA and AI working in tandem, Pfizer has not only transformed vaccine development but also set a new standard for what is possible in modern medicine.

Source: *Pfizer news – Technology.*
https://www.pfizer.com/news/articles/how_a_novel_incubation_sandbox_helped_speed_up_data_analysis_in_pfizer_s_covid_19_vaccine_trial

About the Main Author

Dr. Choon is an academic and health economics researcher. She serves on various advisory boards for multinational pharmaceutical companies and Ministry of Health. Her passion lies on improving patient access to life-saving innovative medicines in Malaysia.

