OPPORTUNITY 31

SCOPE VISIONARY

UNCERTAINTIES

Systems, Technology

MEGATRENDS

Advanced Health and Nutrition

TRENDS

Artificial Intelligence
Biotechnology
Government Agility
HealthTech
Real-time analytics

SECTORS IMPACTED

Chemicals & Petrochemicals
Government Services
Health & Healthcare
Materials & Biotechnology
Professional Services

What if advanced machine intelligence enhanced public trust in vaccine and drug development?

PHASTER PHARMA

Advanced machine intelligence enhances drug efficacy, discovers new applications for existing vaccines, and streamlines administrative tasks, aiding more efficient and more efficacious vaccines and drug development.

WHY IT MATTERS TODAY

Infectious diseases naturally occur frequently.[664] Some 60% of human infections originate from animals.[665] Fifty years ago, infectious disease deaths had decreased because of better health practices and innovations like vaccines and antibiotics.[666] The eradication of smallpox was announced in 1980 by the World Health Organization, but optimism waned with emerging threats like AIDS and antibiotic resistance, the resurfacing of old diseases like malaria and tuberculosis, and new outbreaks such as avian flu, SARS, Ebola, Zika, and COVID-19.[667]

New and improved drugs are key to healthcare but bringing them to market involves an exhaustive process that includes research, drug discovery, preclinical development, clinical trials, and regulatory approval. The entire process usually requires 10 to 15 years and hundreds of millions of dollars.[668] Once clinical trials are successfully completed and results are submitted for regulatory approval, it usually takes a year or more for a drug to be reviewed,[669] although this was challenged during the COVID-19 pandemic when the Pfizer and Sinopharm vaccines were launched in a record time of nine months[670] using mRNA vaccine technology.[671]

Artificial intelligence (AI) is rapidly transforming the pharmaceutical industry.[672] There is a growing deployment of AI in larger pharmaceutical companies for productivity, speed, and compliance.[673] It also holds promise for the future particularly when it comes to bioengineering.[674] Beyond that, from generative AI to scaling and machine learning operations that ramp up and standardise machine learning development within pharmaceutical settings,[675] future opportunities include natural language processing models that can quickly examine regulatory documents and allow pharmaceutical companies to find information and insights relevant to a given drug.[676] AI can also expedite data analysis within pharmaceutical clinical trials.[677]

OPPORTUNITY

Advanced machine intelligence can uncover new applications for existing vaccines and drugs that have been in use for years, enhance their effectiveness, and discover new vaccines and drugs that may not need to follow traditional clinical trials given extensive historical data. Advanced machine intelligence can also streamline administrative tasks undertaken by both pharmaceutical companies and regulators. Advanced systems can swiftly adapt or even inform the need for new regulations using the latest public health findings and cases that may uncover safety signals and patterns that are often challenging to detect, such as drug interactions and causes of lower efficacy.[678]

On the regulatory side, advanced machine intelligence means that regulatory bodies will transition from concentrating on administrative processes and clinical trials to regulating – and informing the public about – systems that underlie drug discovery, thus enhancing public trust.

BENEFITS

Improved pharmaceuticals align with the latest findings without waiting for new trials. Efficiency in administrative processes free up time and financial and material resources in both public and private sectors, allowing possible reallocation to healthcare initiatives and other priorities.

RISKS

Lack of algorithm transparency may inadvertently reintroduce issues that adversely affect public health and have a negative impact on public trust. The substantial amounts of data required may not be available or accessible. Regulating the AI underlying drug development requires regulators with knowledge and experience in AI.

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