**FUTURISTRIC TRENDS IN PHARMACY**

The global rate of the pharmaceutical market is 1.2 trillion dollars. With such a huge capital at stake hold and with the ease of technological disruption, the pharma industry has to embrace new technologies, patient design, and innovations and put a greater focus on prevention and digital health. The pharmaceutical industry is facing huge challenges from ethical issues to financial ones. By embracing disruptive technology like 3D printed drugs, artificial intelligence guided therapies and preventive medicine while working with regulatory agencies to make all this safe for patients, they can benefit from the digital revolution. In our research, "[**Technologies Shaping the Future of Pharma**](https://leanpub.com/thefutureofpharma)" we analyzed 11 of the major digital health technologies and practices with the greatest impact in the pharmaceutical sector. From including patients in decision-making through personalized care and artificial intelligence to automating pharmaceutical processes, we compiled the most important findings of the future of pharma.

The system of drug regulation is obsolete. To keep patients around the world safe, authorities like the FDA must step up and deal with disruptive trends – without suffocating innovation.Innovation in medicine is getting faster while the processes the US [Food and Drug Administration](http://www.fda.gov/) (FDA) uses are sometimes decades old.

The rapid development of medical technology affects every aspect of medicine and healthcare. Even the seemingly most remote and ivory-tower-like institution isn’t impervious to digital health disruption. We are, of course, talking about the pharmacy.

Although these institutions play a crucial role in the healing process, the impression about pharmacists and their drug store is often that they offer a type of commercial/business-like service. The doctor prescribes the appropriate medicine with the appropriate instructions, and the pharmacist provides it in exchange for money. In short, a clear business.

However, with the medical technological revolution, traditional, clear-cut roles become a thing of the past. Empowered patients have more agency over their health, while new technologies support the democratisation of care; shifting the hierarchical doctor-patient relationship to a partnership level. As patients of the 21st century evolve, so must pharmacies and pharmacists in the age of digital health. They have to redefine their place in medicine as well. A simple drug dispenser will not be enough in a shared and community-based economy.

Exponential change is accelerating disruption across the health care value chain and transforming the future of pharmacy. Clinical and technology breakthroughs are occurring at a record pace, building on the power of artificial intelligence (AI), robotics, and insights derived from radically interoperable data. As “imprecision medicine”1 shifts to precision treatments, the role of the pharmacist and the delivery channels we know today are likely to change. This combination may bring about a move from a fee-for-service reimbursement model to a value-based model, aligning pharmacy with the broader payer shifts underway.

Innovation is happening across the life sciences:

* Researchers are developing**smart mirrors** that use advanced cameras and your breath to detect health variations.2
* Multiple companies are testing and working on **home health care bots**that can perform basic services, while elderly workers in Japan are using **exoskeletons** to extend their ability to perform manual labor.3
* Smartphones are evolving to allow them to act as point-of-care and **home health diagnostic tools** for conditions such as urinary tract infections4 or diabetic eye disease.5
* Labs have produced an **ingestible origami robot** that can be swallowed and controlledto patch a wound.6
* Companies are using the gut microbiome to create a **food-as-medicine approach**to manage glucose levels and improve overall health.7

When these innovations are combined with the growing influence of consumers focused on their well-being, the future of pharmacy will be radically different. These dynamics create exciting tension for pharmacy companies and pharmacists as they debate how to win in today’s market while planning, adapting, and investing for the future.

The effects of the COVID-19 pandemic has been disastrous for economies and industries worldwide. However, one sector that witnessed a surge in growth amid the crisis is the pharmaceutical industry. Challenges posed by the pandemic gave rise to new opportunities especially for the pharmaceutical sector which is now living through the impact of the COVID-19 pandemic and evolving under changing circumstances. From hi-tech implementations to growing investments to the refinement of the product life-cycle through digitisation, the pharmaceutical industry has adapted, innovated and is expected to undergo a sea of change in the years to come. Here’s a look at the upcoming trends that will play a major role in reshaping the future of the pharma industry.

**Artificial Intelligence**

Artificial Intelligence (AI) and Machine Learning are revolutionising industries and leading to the invention of chatbots, smart homes, self-driving cars, surgical bots and much more. According to reports, the global artificial intelligence software market is forecast to grow from $10.1 billion in 2018 to $126 billion by 2025. AI can present a myriad of opportunities for the pharmaceutical industry bringing about a radical shift in the innovation paradigm of the pharma sector. Pharmaceutical companies around the world are leveraging advanced ML algorithms and AI-powered tools to streamline the drug discovery process. Adoption of AI can improve the success rates of new drugs, create more affordable drugs ad therapies, and, most importantly, reduce operational costs. Pharma companies can also implement AI in the manufacturing process for higher productivity, improved efficiency, and faster production of life-saving drugs.

**E-Pharmacy**

In the battle against the pandemic, e-pharmacies turned out to be a crucial tool for making life-saving drugs available in every nook and corner of our country. For e-pharmacies in India, it has been non-stop operations on the ground since the COVID-19. They have been at the forefront of providing lifesaving medicines and all healthcare needs at doorsteps. During the pandemic, e-pharmacies had delivered medicines to 3.5 million households across the country. The sector received $700 million of investments during the FY20 and employed 30 thousand plus skilled professionals. With the rise in popularity, it is expected that the growth of e-pharmacies will continue strongly, and the overall number of households served is set to cross the 70 million mark by 2025. The impact of e-pharmacies is being felt in the area of streamlining chronic disease management through tech-driven pharmacy delivery.

**Precision Medicine**

Personalised or precision medicine is produced depending on a specific patient diagnosis. The primary aim is to make sure that the drug is customised for optimal effectiveness and patient outcomes. The use of precision medicines has demonstrated a higher level of effectiveness than other options. The production of precision medication requires facilities that are specialized and smaller than most factories. Even though it has posed problems for pharmaceutical manufacturers, this is a trend that’s anticipated to continue as methods used are refined.

**Clinical Trials**

Digitisation is expected to change the future of clinical trials in the years to come. From matching trials to patients by analysing their health records to improving medication adherence, the trials will become more global and remotely led. With the Internet of Things (IoT) technologies and self-monitoring tools, researchers are already boosting patient well-being by leveraging critical data. The transition to similar technologies for clinical trials is expected to become relatively seamless with the fast adoption of such technologies. In the near future, new technologies like digital pills will increase the accuracy of monitoring and reporting. Trackable drugs, containing ingestible sensors and cameras that enable medical researchers and healthcare providers to monitor patient progress remotely, are already in development.

**Research and Development**

The crisis that emerged out of the pandemic has certainly shifted the attention towards the value of medications. Pharmaceutical companies around the world are more concerned than ever about ensuring research and development hits the intended target. There is an ongoing effort to achieve greater efficiency and effectiveness to meet patients’ needs while also maintaining the bottom line. For example, there is research designed to identify medicines that can improve the experience and quality of life for patients in a way that’s more meaningful. This requires pharmaceutical companies to examine their research and development practices to ensure they are refined and focused.

**Concluding Thoughts**

In 2022, there will be significant changes across every area of innovation in the pharmaceutical industry – from discovery, clinical trials and development to treatment approaches. While the pandemic didn’t cause a revolution in the pharma industry, it definitely accelerated rapid change and spurred a sense of urgency in healthcare and pharma professionals, making the entire landscape conducive to change and digital transformation.