

# Hasta la vista, maybe?

## Terminating the Hollywood view of AI in pharma

**R**umours that robots will eventually wipe out humans are the futuristic stuff of Hollywood blockbusters. The real-world story arc is much more uplifting but no less dramatic. When a homeless man in central England was crushed to death by a compaction unit as he slept in a dustbin in 2013, it triggered a response from the UK waste management industry that now sees many refuse trucks fitted with sensor technology to detect people in bins. It's an early example of how AI can literally save lives. Fast forward six years and we've now got 'robot doctors' detecting cancers, smart remote monitoring systems managing patients miles from their homes and algorithm-led technologies predicting long-term health based on individuals' DNA. The application of AI in health isn't science fiction, it's happening fast – and it's positively disrupting patient care.

Global investment in healthcare AI is predicted to reach \$6.6bn by 2021, with Accenture forecasting its use will drive annual savings of \$150bn by 2026. McKinsey aims even higher, suggesting the value AI creates could save global healthcare an eye-watering \$269.4bn a year. Major health providers are investing in IoT, machine learning and predictive analytics to replace the ageing cost structures and processes that obstruct efficient care. The range of innovation is dizzying; robot-assisted surgery, virtual consultations and diagnostic algorithms that trigger and escalate care are the tip of the iceberg. Technology giants are partnering with specialist health providers to deep mine data, interpret scans and reduce the workload on HCPs. AI is also being used to create virtual nursing assistants, improve administrative workflow and reduce dosing errors. Developers are even working on technology that provides 3D holographic representations of patients' anatomies for people that cannot be present with a doctor, and combines it with their physiological data and full medical history to inform an accurate diagnosis. The wider goal is to transfer time-consuming tasks from humans to machines, accelerating pathways, freeing resource and helping clinicians make faster, more accurate decisions that enhance patient care. Far from replacing humans, it's helping us do more and do better.

But what of pharma? How is the industry using AI to improve processes and transform the treatment of disease? There are signs of advancement right across the product life cycle.

### AI in drug development

Certainly, real progress has been made in drug discovery and clinical development, with AI being used to identify patterns in data that create a better understanding of disease. "We're continually looking at opportunities to employ AI in clinical trials, in particular the gathering of data from patients," said Tom O'Leary, Chief Information Officer at ICON. "Today, that translates into the use of wearables and sensory technologies which, when placed on the patient or in the patient's home, can measure a whole series of parameters. Those technologies feed data through to us in the context of the clinical trials we're conducting, and as they do that, they can detect things that might require an intervention that the patient might not otherwise be aware of. For instance, in cardiovascular studies, we can detect if a blood clot is developing and alert the care team to prevent a stroke. In dermatology studies, AI can detect skin lesions earlier than might be observed by a patient or physician. These are great examples of how, in clinical trial settings, wearable technology and AI can combine to improve outcomes."

### 'The most successful companies don't wait for the perfect solution, they pilot innovation, test it, iterate and go again'

Wearable tech is also being used to support real-world studies. "With regulatory authorities increasingly giving drugs conditional approval, post monitoring studies are essential to measuring their real-world impact," said Tom. "Wearables present a huge opportunity to capture better data over longer periods of time, helping us improve observational research and develop better real-world evidence. This is driving deeper insight into patients, co-conditions and co-morbidities so that we do a better job of observing and managing correlations. AI offers rich potential for post monitoring studies. Ultimately, it will become the mainstay."

Between 20-30% of drug development is now being enabled by AI, virtual technologies and the

better use of data and analytics. "We only see that continuing as industry battles to drive down the cost of drug development and get medicines to patients faster," said Tom. "Fundamentally, it's all about the data. The success of AI depends on gathering the right data and being able to prove its authenticity when an application is subject to regulatory scrutiny. Our experience is that, despite the important debate around data privacy, patients are willing to share their data if they know it's being used to advance the understanding of disease. In the clinical trial setting, patients can see the value of sharing data and we share the outcomes with them too."

### AI in marketing and market research

Although much of pharma's attention has focused on drug discovery and clinical delivery, AI has a much broader utility. Companies therefore need to look at their entire value chain to see where value can be added across their products and services. "AI can be especially valuable to marketers, helping them better understand patient journeys, support physicians and other stakeholders in the delivery of healthcare and consequently improve patient experience," said Julie Denny, Marketing Director, Research Partnership. "To this end, marketers need to recognise the benefits and uses of AI technology in the development, enhancement and implementation of marketing strategy. They have access to a wealth of data, but need to work out how they can use AI to make sense of it. For example, AI programmes can identify patterns to help marketers target groups of people with common characteristics, or make predictions about behaviour. In implementation, AI can provide automated services such as chatbots for interaction and communication. In all cases, attention must be paid to the quality of the data and the strength of the algorithm; AI can only provide insight when it uses data which is appropriate for the application and interprets it with an understanding of the statistical assumptions behind the model."

AI can be particularly helpful in market research. "It can be used to improve analysis of quantitative studies such as forecasting, so that more accurate predictions can be given on likely demand and uptake over different points in time. AI platforms are built to integrate primary and secondary data sources and apply various modelling techniques to predict likely future behaviour.



Where insufficient data is available, for example, a new product launch, historical analogues or 'Monte Carlo simulations' (which conduct risk assessments) can help predict likely outcomes. In more qualitative settings, we've also used facial analysis – which leverages AI to understand people's reactions to visual stimulus – to enhance evaluations of communications materials. 'Artificial Emotional Intelligence' technology can help detect emotional and cognitive states from faces and voices. It's been widely adopted by the consumer industry as a means of testing static and moving advertising materials and can, with some adaptation, work well in the healthcare environment to evaluate communications materials aimed at physicians.

### The rise of the chatbot

Pharma's use of AI in marketing is perhaps not as mature as in other sectors. It's a real opportunity that's likely to fuel the next big advancement for the industry. "Pharma's use of chatbots is really beginning to take off," said Chris Finch, Managing Director, Earthware. "We're already seeing progressive companies dipping their toes in the water and using chatbots on branded websites for both HCPs and patients. It's a great thing. Traditionally, the industry has been cautious in its use of AI, with many companies swayed by the 'Hollywood view' of machines taking over the world and destroying their human masters! For risk-averse pharma, this has driven a misguided

fear of chatbots. In fact, far from being risky, chatbots are actually very contained environments. Essentially, the AI in a chatbot is simply natural language processing – interpreting what's been typed into a search engine, figuring out the user intention and then fetching the correct answer for that intent. Responses are all pre-programmed, based on working out the questions users are likely to ask and establishing pre-approved answers. If a question crops up that doesn't fit the bill, users are issued a generic apology and redirected to medical information. Similarly, if it looks like someone wants to report an adverse event, they can be signposted to the correct channel right from the start of the interaction.



**Pharma must promote the value of sharing data and show how the responsible use of patient data can help maximise resources and drive better care. Without good data, AI won't work. In China, where leveraging data is considered essential to meeting huge health challenges of access and demand, nine out of ten patients consent to sharing their data to inform healthcare R&D. We must achieve the same levels in the West.**

Ultimately, chatbots are safe environments; unlike human interactions, which can easily wander off-script, chatbot engagement is tightly controlled, available 24/7 and gives users quick access to the information they want. They're perfectly aligned with modern consumer expectations."

Pharma's use of chatbots is not only growing, it's proving increasingly effective. Braltusbot – Teva's HCP chatbot, is embedded in its online adverts – where HCP interactions significantly outperform industry benchmarks. Norgine's patient chatbot, Ava, has been used by 28% of all visitors to its 'Experts in Colonoscopy' patient website.

Given their clear benefits, it's no surprise that chatbots are increasingly being used not only to support brands but also to help self-management of disease. "A good example," said Chris, "is in mental health, where AI and cognitive behaviour therapy techniques are being used to help patients manage symptoms of anxiety and depression. Evidence suggests the approach is driving positive outcomes; a recent study showed that young adults who conversed with Woebot enjoyed better outcomes than a control group that was given support leaflets and other materials. This illustrates the potential for pharma to use AI to develop more advanced services around their medicines that help patients better manage disease – allowing them to add value to the services they provide for patients and HCPs."

### AI for personalised communications

Although pharma's use of AI in marketing is still in its infancy, there are green shoots of progress. "One of AI's best applications – and arguably one of our biggest opportunities – is the ability to personalise communications," said Houda Kamoun Follot, Chief Strategy and Marketing Officer, Aptus Health. "As an industry, we routinely capture massive sets of data. AI allows us to put sophisticated analytics over the top of that data and use it to inform how a brand engages with its audiences at key points in their journey. We're now able to build detailed customer personae based not on guesswork or assumption but on real observational data. Better still, AI technology makes that scalable so digital education to physicians, or communications with patients, can be tailored according to known patterns of how different customers behave. We can now better predict the content an individual will find compelling and what they're most likely to do with that information. That's powerful."

The strategic use of AI has the potential to help pharma build dynamic customer journeys – personalised digital experiences based on predictions of how particular customers interact

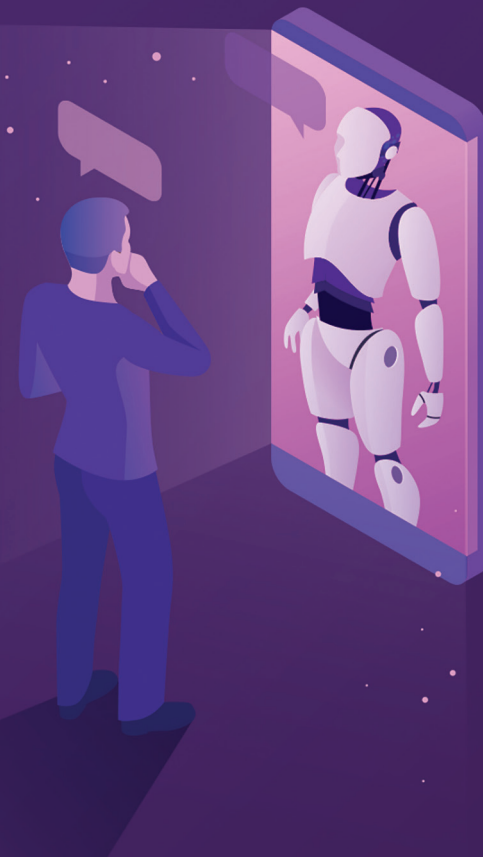
with content and how their journeys are likely to progress. "A great example of this is a brand campaign in the US that, in the absence of a dedicated field force, created a 'virtual sales force' to increase formulary pull-through," said Houda. "The aim was to promote the brand's positive formulary position to both HCP and consumer audiences based on insurance coverage across the US – thereby influencing uptake. Through sophisticated use of data, the campaign targeted only the top five plans specific to individual HCPs – and intuitively adapted formulary content, style and messaging according to individual patient populations' needs and behaviours. It yielded a prescribing uplift of 4.12% across a four-month promotional period and, despite the loss of the sales force, had a 51% impact on overall 'new to brand' prescribing rates. The example is obviously specific to the US, but the rationale for personalised journey marketing – and the AI methodology behind it – really does translate. There's a direct relationship between dynamic personalisation and brand lift."

### 'Pharma companies need to increase their education around AI so that everyone understands its strengths and limitations'

Personalisation is the zeitgeist for modern-day pharma, but despite its mega-buzzword status, it's massively important. "There's much debate about the ideal balance between personalisation and intrusion, but in a healthcare environment that's saturated with information, personalised communications can be hugely beneficial for both HCPs and patients," said Houda. "There's so much content out there, but only a small percentage is relevant to a given individual. Consumer brands like Amazon personalise content brilliantly. When it's done seamlessly and respectfully, it's almost magical. AI makes it possible to create higher-value experiences and further enhance healthcare communications."

### Leveraging the opportunity

The AI opportunity for pharma is wide-ranging. So how can companies make the most of it? Success will depend on courage, understanding and forging expert partnerships to co-create disruptive innovation. One of the biggest challenges is around data privacy. Data sharing is at the heart of AI and key to designing disruptive healthcare models.



Beyond it, pharma companies must be brave in their pursuit of AI innovation – and collaborate with experts to identify needs, understand what's possible and develop the solutions that can transform care. The most successful companies don't wait for the perfect solution, they pilot innovation, test it, iterate and go again. Agile thinking is key. Finally, education is all important. "Many people are still largely unaware of how AI could benefit them," said Julie Denny. "Pharma companies need to increase their education around AI so that everyone understands its strengths and limitations – and teams can integrate it into their workflow and strategies to improve health outcomes."

Ultimately, AI in healthcare is happening and its application will only increase. To make the most of it, companies must terminate the Hollywood view of robots conquering humans – and combine human and artificial intelligence to transform global health.

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