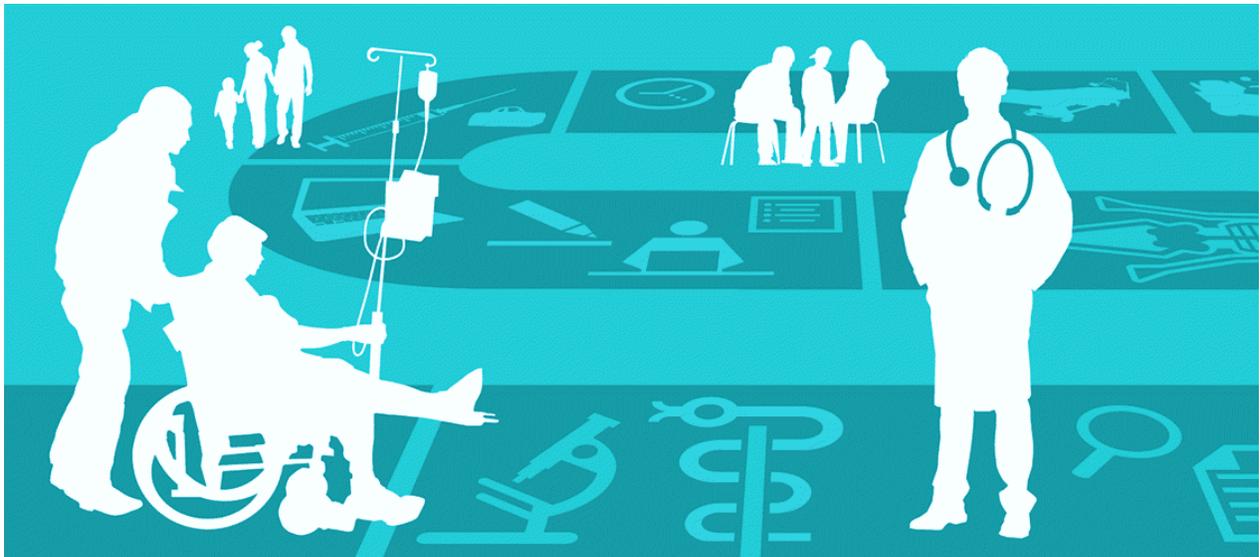


The long and winding road

Reimagining the chronic disease patient journey

In spite of its specific characteristics, chronic disease has typically been managed based on traditional medical frameworks that were designed to deal with acute conditions. But times are changing. AI, algorithms and digital therapeutics are generating new paradigms for the physician, enabling them to amplify their focus and to help their patients lead healthier, fuller lives.



Do you remember the last time you went to the doctor? It probably went a bit like this: after initial pleasantries, you described the symptoms that you'd been experiencing. The doctor probably carried out some kind of check-up in the consulting room. They may have sent you for more specialist studies. With results in hand, they no doubt then prescribed you a course of

action: antibiotics, physiotherapy, wait and see. And rounded it off with, "Come back and see me again in two weeks / a month / two months". If the problem didn't clear up - and you didn't get too busy at work - you probably did go back, maybe to go through a very similar process, another check-up, and another course of action prescribed.



The drugs may have got more sophisticated, but the patient journey itself is more or less the same as your parents or even grandparents would have experienced. For a long time, this has been the only available option, and it works well for acute conditions. However, these sporadic interventions are generally not well aligned with the realities of chronic diseases that represent not a one-time malfunction, but rather a permanent or semi-permanent imbalance that requires a complex shift in lifestyle rather than a single correction.

Consider all the possible fault points of this approach for the chronic disease sufferer. While they may have been experiencing their symptoms for days, weeks, months or even years, the only firm data point on which to base the diagnosis is the one measured at a single point of time in the consulting room or diagnostic center - the briefest of "photos" when perhaps the condition can only be understood through a detailed "movie" of its development over time. Moreover, that photo has been taken in a completely artificial environment, under artificial conditions that don't replicate the patient's day to day life. Doctor-patient communication consists primarily of a brief appointment, that tends to be centered purely on data-gathering, with no time left for discussing options or offering support. Once the patient has been

prescribed a course of treatment, there's no guarantee of adherence, other than goodwill on both sides. Detection of a worsening of symptoms is dependent on the patient making the decision, and having the time, to return for another visit. If and when they return, the only firm data point on which to assess progress is another "photo" in the consulting room. Given the scarcity of data, it can be easy for important symptoms to be missed until the patient finds themselves in the emergency room. The traditional patient journey could perhaps be summed up as: Plan, hope, appointment, plan, hope... and so it goes on. While for a generally healthy person confronting a flu, this is a suboptimal but acceptable solution, for a chronic disease sufferer it can mean the difference between the ability to lead a full and healthy life, and a vicious circle of emergency visits and recovery.

Now imagine how it could be: the doctor of a chronic disease sufferer receives, on a regular basis, personal health data that has been collected automatically, through the use of wearable devices and applications. They receive it pre-analyzed, with significant values highlighted, and suggested courses of action. They are in regular contact with the patient, sending motivational messages when they're sticking to their treatment as agreed, gently nudging when they're not, and getting in touch early when something



unexpected happens that needs to be corrected. Multiple data points allow the doctor to make a holistic assessment of the patient's condition. Appointments are used to provide support, and if necessary, to discuss alternative treatment options. Treatment is decided between the doctor and the patient, who will generally feel pretty committed since they were involved in the discussion and understand the implications. As they embark on the treatment program, the doctor receives regular updates on their progress, and motivates and nudges as required. A virtuous circle develops. Just imagine the likely difference in terms of accuracy of diagnosis, adherence, clinical outcomes - and so quality of life.

This is a huge shift: from intermittent interventions to continuous care; from a centralized system based around the health care practitioner to a multipoint system with many touch points; from a health system that can be compared to tossing a chronic disease sufferer into a swimming pool and only intervening to throw them a life-ring when necessary, to one that sets out clear swim lanes to help them reach the other side. But it is no idle dream. The so-called third wave of digital health is bringing digital therapeutics: disease-specific applications that use technology like AI, machine learning and biosensors to provide continuous data monitoring

and sophisticated analysis. Digital health ecosystems are developing to connect different healthcare players and services, enabling them to communicate, integrate and analyze complicated data flows, and to produce end-to-end patient care programs.

A digital ecosystem built around a specific chronic disease provides a patient journey that looks nothing like the sick-care model referred to at the start of this article. Instead, it might start with a doctor and patient designing a care plan together. The patient would carry out the plan supported by applications and devices, and constant feedback from the doctor and other care providers. The continual collection and analysis of data from multiple sources would enable the care team to quickly establish the necessity to intervene, should it arise. Appointments between patient and doctor would focus on a discussion of results and progress, backed up by data and AI-generated insights.

This has been slowly becoming a reality for some decades now. Smartbands and smartwatches have allowed patients to track their exercise and movement for the last few years. Home-kits for measuring blood pressure have been in the market for a long time. So have thermometers, applications to track diets, glucose meters, home-care services, Holter monitors and several



other devices. And doctors and patients have enjoyed the improved care they bring.

37% of US adults tracked one or more health metric digitally in 2018. The uptake is still uneven, but the trends are markedly accelerating. In Latin America, where digital services have generally taken longer to gain ground, a vastly lower percentage are tracking their health - in 2018, just 8% of people in Mexico, 6% in Argentina, and 5% in Colombia. Yet data suggest that this could change given the right circumstances. Fully 79% of people in Colombia, and 77% in Argentina, would use a connected health device if it was recommended by their physician. Patients are beginning to change their mindset from paying attention to their health only when something goes wrong, to using technology to proactively monitor and understand their situation. The future will see us relying more and more on expert systems to navigate our health: a kind of turn-by-turn navigation, for life.

But, contrary to what the flood of consumer health apps of recent years may suggest, this new patient journey cannot work without the doctor. In fact, it has the doctor-patient relationship at its heart. For a start, it requires patients to proactively take decisions that are beneficial for their health. This means major behavioral change, difficult at the

best of times. Time after time, a strong connection has been proven between the doctor-patient relationship and treatment adherence, and here, through motivation and clever nudging, the doctor can help the patient make healthy decisions. Furthermore, while the abundance of data from different healthcare tools and applications may offer some information to patients, this is nothing compared to the insights that can be gleaned by a trained professional. And as the statistics from Colombia and Argentina around potential use of a connected health device show, the esteem in which the doctor is held in many cultures means that their buy-in is essential for uptake.

The new patient journey requires an important paradigm shift from the physician. In a world obsessed with big data, medicine still seems to revolve around "small data" - the one-off diagnostic carried out in the consulting room. Technology has sometimes been seen as more of a threat than an enabler to the medical profession. And the healthcare system was patently not designed to deal with big data. Collecting vast quantities of information and making it available to doctors will simply overflow the decision-making process. To make big data a useful addition to the physician's toolkit requires a new kind of platform with the ability to digest data.

This is where AI and algorithms come in handy - but not, as science-fiction may have us believe, as a robotic fantasy in which a computer will tell the patient what to do. AI and algorithms need to integrate patient-generated data and develop clinically relevant metrics that can triage millions of data points for thousands of patients, and alert doctors only to those patients that require a relevant intervention at any given moment. Providing an holistic but simple picture will allow a clinician to quickly and easily view patient-generated data in the context of other

medical information - such as lab tests, genetics or clinical history; the original clinical plan; and his or her medical criteria, to ensure that the system provides the relevant “nudge” a patient needs to stay on course. Similarly, when the patient comes for their periodic check-up, AI and algorithms will transform unstructured data gathered over the previous weeks and months into a coherent outlook, that doctor and patient can use as a base for a richer and more insightful discussion and plan.



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Personalized medicine represents the tailoring of medical approach and treatment to the individual characteristics of each patient and is expected to become the paradigm of future healthcare. It will become a reality not by replacing physicians with

expert systems, but through expanding the doctor-patient relationship and providing powerful data tools that can inform therapeutic decisions and pathways.



A useful analogy comes from an unlikely source: chess. In 1997, when Garry Kasparov famously lost against IBM's Big Blue, many predicted the demise of chess grandmasters. Today, more than 20 years later, as chess engines have become even stronger and more sophisticated in their understanding, there is no human player who can beat the best chess engines, even World Chess Champion Magnus Carlsen. And yet, there are more and better chess grandmasters than ever, empowered by being able to train with these machines.

Computers, partnering with humans, have taken chess to a completely different level. Nowadays, a chess player that didn't take advantage of this technology would simply not be able to compete.

A similar process will take place in medicine. Algorithms, biosensors and AI cannot replace physicians. But doctors that passionately embrace digital technologies will certainly replace those who do not

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