No place like home

Clinical outcomes for digital health solutions cannot be exported. This may be a good thing.

Unlike drugs, digital health solutions – with outcomes predicated on changing behaviors – need to be trialed locally to allow for the impact of culture on how people act. Upsides of this approach may go far beyond an understanding of local applicability and include greater adherence to treatment protocols – and thus, lower costs, and better outcomes.

Failure to take into account differences in behavior when launching a product or service in a new country has led to costly mistakes in the past, by companies that should have known better. Home Depot spent over USD160m in China before

realizing that customers had no interest in "doing it yourself" and would far prefer to pay somebody else to do the work for them. eBay flopped in the same market, partly because it did not appreciate the importance of guanxi, social connections, and thus didn't offer buyers and sellers the chance to chat while carrying out transactions – a need that was fulfilled by the local competitor Taobao.

But while consumer goods and services need by definition to take into account the habits and behaviors of the person in the street, whether that street be Fifth Avenue, Avenida Paulista or Ginza, in healthcare this generally has not been a worry. In most cases, there is no reason why a drug that works on a person in one country shouldn't work in the same way on another person with the same condition on the other side of the world. Although a few countries, such as Japan and China, insist on bridge studies or even new clinical studies to ensure that there is no influence of ethnicity on the ability of a new drug to work correctly, in most cases the results of clinical studies are translated between regions without too much trouble. The variables are biological, not behavioral.

That changes as we move into the era of digital health. A recent paper found that digital health solutions aimed at chronic diseases correlate with behavioral outcomes at least as much as clinical ones, and that even cases with clinical improvements generally have an important behavioral component. Digital health applications are strongly based on the assumption that they can influence the way people act, whether that be responding to nudges to eat differently or exercise more, or measuring their condition regularly to provide the application, and the doctor, with information to monitor the disease's development. But behavior is heavily based in cultural norms. We can no more assume that somebody will interact in the same way with a health application in Brazil as in the US, than we can assume that a Chinese person will suddenly develop an appreciation for DIY just because a Home Depot has opened down the road.

Until now, the vast majority of research into digital health solutions has been carried out where those solutions were developed – in the US and Europe. This is in line with clinical studies generally: the US National Library of Medicine's database of clinical studies registers 132,692 clinical trials in the US and 98,761 in Europe since 2008, as opposed to just 10,908 in Latin America and 10,300 in Africa. The problem is that there is little or no evidence as to what the drivers and barriers to adoption of digital health applications would be in other regions, and how underlying social dependence on cultural beliefs, obedience and responsibility to self-test might influence outcomes elsewhere. It looks as though

this time, medical technology companies and marketplaces will need to carry out their own, local, research.

This will come as something of a shock for traditional tech-based companies, who are used to easily "globalizable" businesses, and also to a big portion of research-based healthcare, who have for decades trusted that results are easily transported from one geography to another. This approach will undoubtedly increase cost and complexity and will require a number of modifications in business models. It will also attract more scrutiny from regulators, who will likely become tougher on approving product dossiers built on research conducted elsewhere. And it will inevitably make life more difficult for companies that want to get reimbursement from local insurers, who will now require local pharmacoeconomic data, although this has been a trend for some time.

But it's not all bad news. In fact, this situation may have some very positive repercussions on health outcomes, by providing health care professionals with reliable clinical guidelines based on experience in their own countries.

Doctors the world over make decisions based on a combination of evidence, generally translated to treatment protocols or clinical practice guidelines (CPGs), and their own experience. In Latin America, the combination is often weighted towards the latter. There are several good reasons for this. Firstly, with a scarcity of locally developed CPGs, doctors in Latin America find themselves faced with different, sometimes conflicting, guidelines from professional organizations based in other countries. Secondly, where locally or regionally produced guidelines do exist, they often lack quality or trustworthiness. The development of guidelines in the region has historically suffered from poor methodological rigor, a lack of transparency, inaccurate formulation of recommendations and a lack of standardization of process and format. A 2019 study showed a very low use of the gold-standard GRADE methodology for developing guidelines across the region (Colombia was the only exception). Finally, the doctor in Latin America is usually an independent professional, rather than an employee like his or her equivalent in the US. He or she may work for 20 different organizations, which means multiple and overlapping or contradicting protocols. According to one Buenos Aires-based physician, the differences can be such that, "if you tell me what you've been subscribed for your heart condition, I'll tell you what hospital you are being seen at". Safer, perhaps, to rely on experience.

Unfortunately, this fails to take into account research that has repeatedly emphasized the higher quality outcomes that come from evidence-based

approaches. The American psychologist Paul Meehl claimed as far back as 1954 that what he called statistical or actuarial judgement, based purely on empirically established relationships between data and conditions, was far more accurate than clinical judgement, by which experts process data in their heads. There is still some debate around his hypothesis, but enough proof for much of the scientific community to come down firmly on the side of rules and algorithms. Daniel Kahneman refers to "low-validity environments…. Domains [which] entail a significant degree of uncertainty and unpredictability" including "medical variables such as the longevity of cancer patients, the length of hospital stays, the diagnosis of cardiac disease and the susceptibility of babies to sudden infant death syndrome". According to Kahneman, "In every case, the accuracy of experts was matched or exceeded by a simple algorithm". It appears that at least three factors are at play in "clinical" prediction. The first is random fluctuation: fatigue, recent experience or minor changes in ordering or framing, can impact on consistent judgement. In one famous case, experienced radiologists evaluating chest X-rays as normal or abnormal contradicted themselves 20% of the time when they saw the same picture on different occasions. Another is human difficulty in understanding which variables are really important. And finally, there's good old fashioned bias.

Evidence-based, geographically and culturally relevant clinical guidelines, generated through local trials of digital health applications, could be an important incentive to doctors to use a more statistical approach, which if Meehl and Kahneman are to be believed, should in turn improve clinical outcomes. The other benefit of working to CPGs is the impact on costs. Standardizing treatment means increased purchasing power and less waste. So, good news for payers and hospitals too.

Digital health applications can generate mountains of data for doctors, but crucially, through integration and analytics, they can present this data as useable information. These solutions give health care professionals the opportunity to build their own evidence – maybe even their own, evidence-based guidelines.

The hope is that this could become a virtuous circle: the more, local, data that's generated, the more confidence in treatment protocols; the more use of treatment protocols, the better the outcomes, and the lower the costs. For all the players in the system – doctors, clinics, payers and patients – it turns out that there's no place like home.