



GP at hand: a digital revolution for health care provision?

Babylon's health app has certainly changed the way its users consume health care. But a chorus of supporters and detractors struggle to agree on whether it is for better or worse. Talha Burki reports.

Babylon Health cannot be accused of lacking ambition. "Babylon's mission is to put an accessible and affordable health service in the hands of every person on Earth", reads a statement emblazoned on the company's website. The name is taken from the ancient city in Mesopotamia where, also according to the company's website, "...citizens needing medical advice often gathered in the town square to share thoughts on treatments for common illnesses... [in] one of the earliest examples of democratising health care...".

In any event, the hanging gardens provide the theme for Babylon's sprawling headquarters in the well heeled London district of South Kensington. There are flower baskets and strips of astroturf lining the floor. Overflowing fruit bowls dot the table tops. It is not a bad effort, but the character is still more Silicon Valley than Euphrates river bank. The office is open-plan. MacBooks abound. There are a couple of table tennis tables and a juice bar. The glass-fronted meeting rooms have staccato slogans inscribed on them: "tenacity", "dream big", and "build fast".

This Babylon is all about digitisation and artificial intelligence. "Why do we need to do consultations like we have done for the past 70 years?" asks Chief Medical Officer Mobasher Butt. "We can re-engineer the whole process—make sure the doctor only does the bit they need to do and the technology does the rest, without compromising the patient's experience." Last year, the UK primary care journal *Pulse* named Butt the most influential general practitioner (GP) in the country.

Ali Parsa, formerly of Goldman Sachs, founded Babylon in 2013. Its services are organised through its app (figure 1). In the UK, these include a chatbot to assess symptoms, access

to Babylon's private general practice services, and a health-checker which creates a digital twin of the user (that advised your correspondent to cut down on his caffeine). The flagship programme is GP at Hand, which

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provides National Health Service care to more than 55 000 people in England. The programme works on a digital-first basis. Users can book a video appointment with one of Babylon's GPs usually within 2 h, 24 h a day. Consultations are recorded and can be reviewed later. Those who require an in-person service, typically around 15–20% of patients, can subsequently arrange a face-to-face consultation at one of GP at Hand's clinics; there are five in London and, since June, 2019, one in Birmingham (figure 2).

One satisfied user is Matt Hancock, the UK Secretary of State for Health and Social Care. "GP at Hand is revolutionary", Hancock told *The Telegraph* last September; "it works brilliantly for so many patients and goes with the grain of how people access modern services." Others are less enthusiastic. Richard Vautrey, chair of the British Medical Association GPs Committee, notes that "GPs are concerned about a large private company working in the NHS as they rightly believe this will undermine the stability of community-based services on which the wider NHS depends".

Andy Slaughter, Labour Member of Parliament for Hammersmith, the London borough that hosts GP at

Hand, has called for an enquiry into the service. "If Babylon continues to expand without any review or intervention from the NHS, they will become a dominant force in primary care", Slaughter told *The Lancet*. He has raised his concerns in Parliament. "Given the health secretary is Babylon's biggest cheerleader, why should my constituents trust this Government to keep the NHS public?", he asked during Prime Minister's Questions earlier this year.

There is no doubt that GP at Hand has been disruptive. It has used the Patient Choice Scheme, which was rolled out across England in 2015 and permits GP practices to register patients from outside their traditional boundaries—commuters, for example. GP at Hand launched in November, 2017, in partnership with a clinic in Lillie Road, in west London. At the time, 4700 patients were listed with the Lillie Road clinic. New registrations soared. By this year, patient numbers had exceeded 50 000 (the average general practice in England has around 8300 patients). GP at Hand is open to anyone who lives or works within 40 min of its clinics, a catchment area that covers millions of people.

But patients have to de-register from their current practice, which is typically local. "It is a demographic who prioritise



Ali Parsa at the Babylon headquarters, London, UK

quick access over place-based care", explains Betsy Baird, of health thinktank The King's Fund.

NHS general practice has traditionally worked on the principle of community-based care. GP at Hand is focused on convenience. Users can see their doctor at a time that suits them.

"Switching the model around so that the first contact is by video consultation gives us the flexibility of being able to open for much longer hours and to spread the demand", said Matthew Noble, UK Medical Director at Babylon. Your correspondent used the NHS app to investigate appointments at his traditional GP practice: a fixed-time slot was available in 8 days, another in 12 days, and a couple in 13 days. There are usually a few same-day appointments available for those who telephone at 0830h, but they go quickly. It is hard to deny that GP at Hand offers an easier way of doing things.

GP at Hand is not the only large for-profit company that supplies primary care in the UK. General practice services in England are commissioned by the NHS but are provided by private organisations. Nonetheless, GP at Hand has brought some practices that the public health-care sector is not

used to. They have run advertising campaigns, something that GPs have historically declined to do. "The whole nature of general practice is one of

"Babylon has announced plans to expand to 11 countries in southeast Asia, and is due to launch in the USA."

collaboration", said Vautrey. "It is unfortunate to see overt competition." 's response to criticism has sometimes been combative. In an article in the *Health Service Journal* last year, the company recommended that "vested interests, including senior GPs, should consider the shortcomings of their own practices that lead so many people to switch to GP at Hand...".

In 2017, Babylon attempted to obtain a High Court injunction to prevent the publication of an inspection report by the Care Quality Commission (CQC), the UK regulator, on Babylon's private GP services. The judge ruled in favour of the CQC and an amended version of the report was published in December, 2017. The published report was broadly favourable, though it criticised some prescribing practices at Babylon.

An Ipsos MORI review commissioned by Hammersmith and Fulham Clinical Commissioning Group (CCG), which is responsible for the Lillie Road practice (figure 3), stated that GP at Hand's patients tend to be satisfied. But the report also noted that the proportion of patients de-registering stood at 28%, with around half of such patients returning to their original practice. According to Babylon's current estimates, the de-registration rate is 16%, roughly in line with the London average.

Ipsos MORI found that the doctors employed by GP at Hand were highly satisfied with their working conditions. "We want to make care sustainable for GPs, that fits around their lifestyle", said Noble. They can choose their hours and work from home, providing both NHS and private consultations. In England, the number of GPs per

100 000 population has gone from 66 in 2009 to 58 in 2018. The Ipsos MORI evaluation stated that "the digital-first model provided by GP at Hand could have a positive impact on the recruitment and retention of a group of GPs who may not remain in or enter into general practice otherwise", although it questioned whether this might come at the cost of deterring GPs from working in traditional practices. Noble stresses that GP at Hand offers a full range of services, as well as a care coordination team that can provide additional support to patients outside of consultations. Their clinics are designed to accommodate people with physical disabilities and dementia. Nonetheless, the practice has been accused of cherry-picking patients. "The nature of the model is discriminatory", explains Vautrey. "It targets and attracts predominately young, healthy patients; you see a very different demographic compared to mainstream general practice and that is not sustainable across the country. The risk is that you end up with digital-first providers offering services to relatively healthy and affluent patients, who are not that expensive to look after, and that leaves the rest of the health service picking up more expensive patients who are sicker or have chronic needs." 94% of GP at Hand's patients are aged under 45 years, and two-thirds live in affluent areas.

The GP at Hand website states that it provides services for "people of all ages, and whether in good health or not". But NHS England describes GP at Hand as "designed to benefit people with episodic, well defined needs, those who are digitally confident, and those who find it difficult to access services near where they live".

Helen Stokes-Lampard, chair of the Royal College of General Practitioners, worries that the digital revolution could leave chunks of the population behind. "New technology needs to be fair and accessible to everyone, not just people who have the latest 4G-enabled smartphones", she said. "The digital

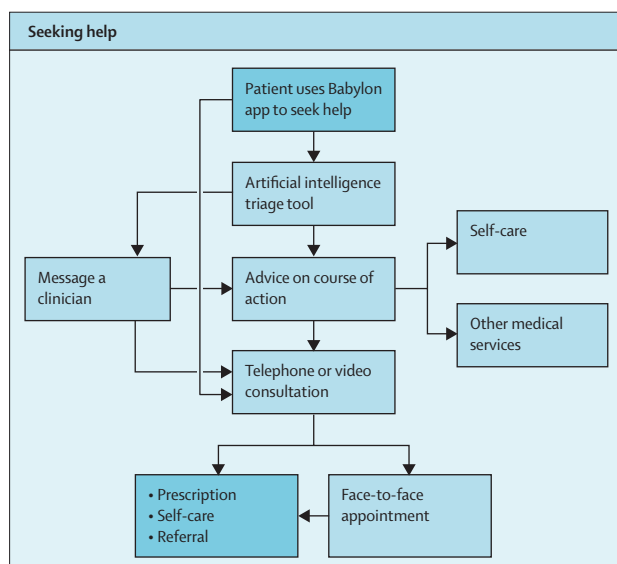


Figure 1: Patient journey for seeking help

Adapted from Ipsos MORI and based on conversations with Babylon GP at Hand.

divide is a profound concern; those who are able to access exciting new technology are fitter, healthier, and more affluent." She points out that around 8 million Britons do not even have access to email. "If we move to a digital-first NHS without having a digital-first population or a digital infrastructure, then we are doing a disservice to our rural population, our frail population, and our deprived population", she said.

There is also the knotty question of supply-induced demand. GP at Hand's patients access the service more heavily than a similarly aged population would be expected to access primary care services. "We have seen this before in services which have pressed people to use them; it is very quick for people to get reassurance from the doctor at the end of the video chat, and it does not come at any cost to the individual", explains Vautrey. "What it ultimately does is fuel a different way of health-seeking behaviour, which ends up creating an unsustainable demand."

Noble counters that notions on how often a particular demographic would be expected to access primary health care are based on how often they access such health care under the traditional model. But the patients at GP at Hand did not have their needs met by this model. "They were not able to consult because of lifestyle, business, or accessibility", said Noble. "These are people who feel that they need to see a GP; they have significant health issues they want to deal with, and once you open up access, they want to consult." It will take prospective studies to disentangle unmet need from supply-induced demand.

GP services in England are funded by a complex calculation known as the Carr-Hill formula. Practices receive a certain sum of money for each individual on their list, with more money provided for older patients. In 2017–18, GP practices in England received an average £152 per patient. According to Butt, GP at Hand receives around £90 per patient, which

reflects its young patient population. Depleting traditional general practices of such individuals, under the current system, is problematic since they subsidise the care for those people with higher needs. But forcing them to stay would be incompatible with the Patient Choice Scheme.

It is not the only funding issue. Hammersmith and Fulham is one of the most indebted CCGs in the country. The influx of new patients has substantially added to the burden. NHS England is careful not to blame Babylon for this—after all, the funding should follow the patients around the

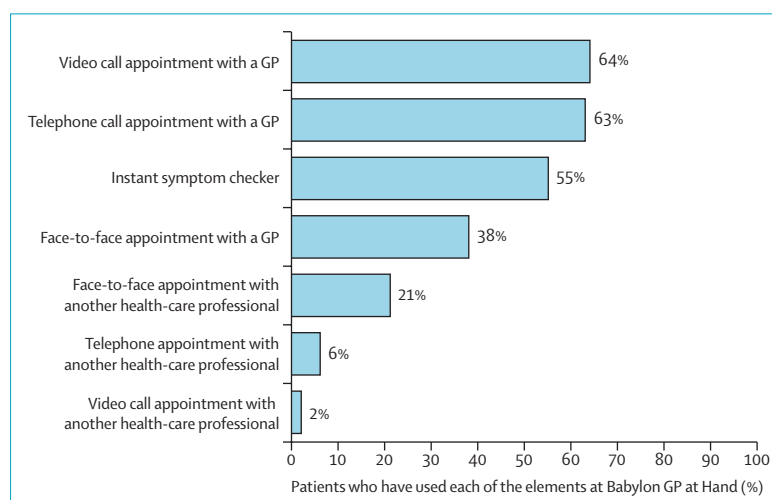


Figure 2: Answer to the survey question "Since you registered at [Babylon GP at Hand], in which of the following ways have you used the service?"

Source Ipsos MORI, based on Babylon GP at Hand patient survey data.

Towards an artificial intelligence (AI) mediated triage

Last September, Babylon announced plans to invest \$100 million "to develop the next generation of artificial intelligence (AI) powered health-care technology". The aim is to get to a point where machine-learning models can effectively triage and diagnose patients. No small task. It requires the model to understand the kind of language used by patients, separate causation from correlation, and quantify uncertainty.

In the UK, the Babylon app contains a chatbot, which functions as a symptom checker. As with the NHS app, patients are given the option of trying it before booking a consultation. An ongoing trial in Rwanda is examining whether Babylon's software can be put in the hands of community health workers to diagnose patients. "The system asks very natural doctor-like questions; patients feel it is a full experience", said Saurabh Johri, Chief Scientist at Babylon. He emphasised that such a system would only be released for use on the public after rigorous in-house testing.

Still, Babylon has faced criticism for the suggestion, which still appears on their website, that their AI had "achieved equivalent accuracy and safety with human doctors" in diagnosing patients from a section of the Royal College of General Practitioners exam. "That is a very big claim to make and you would normally back it up with a clinical trial", said Hamish Fraser (Brown Center for Biomedical Informatics, USA). Babylon did publish the study from which they drew their conclusion, but it was an internal evaluation study and it was not peer reviewed. Johri stresses that Babylon stands by the science, though a letter to *The Lancet*, co-authored by Fraser, expressed misgivings over some of the methods.

The disagreement highlights some of the potential pitfalls of digital medicine. "The concern is that symptom-checkers can have a significant impact on whether patients seek appropriate care in a timely manner—that can translate into serious risk", said Fraser. Johri agrees. "We need some independent mechanism for evaluating symptom-checkers", he told *The Lancet*. In computer sciences, researchers scramble to publish their papers at conferences (although they are still peer reviewed). But in medicine, the journals are the gold-standard. Health informatics falls somewhere in between. As with so much in the burgeoning digital era, regulators, scientists, and the general public are going to have to come to grips with new and unfamiliar ways of doing things.

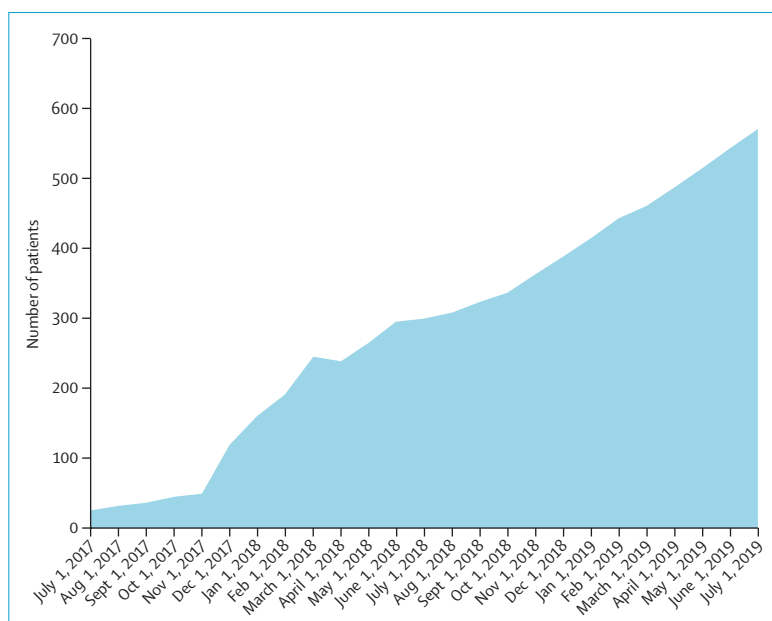


Figure 3: Total number of patients registered at the GP at Hand
Source: National Health Service data.

system. Slaughter is concerned that the NHS is ill-prepared. “We have to look at the financial regulations and how efficiently the money moves, so that we can prevent CCGs from going into enormous deficits”, he said.

NHS England has announced a review of the Carr-Hill formula. Vautrey worries that it may not be enough. “A change to the funding formula will not necessarily solve the problem if

you have a company that is backed by significant extra investment and is picking off particular patients”, he said. Butt responds that GP at Hand is not cross-subsidised by its parent company; it relies solely on its money from the NHS, although Babylon supplies the technology. But the technology is no trifling matter, particularly when practices elsewhere are reliant on the NHS to provide their information

technology services. Vautrey reckons it could take up to 18 months before there is the capacity for video consultations across the country.

The Ipsos MORI report was unable to draw any conclusions on the affordability or sustainability of digital-first general practice, were it to be rolled out more widely. But it did comment that such a roll-out may necessitate “fundamental large-scale redesign of primary care services”, which in turn may require a new funding model. “There are issues around data sharing and transparency”, adds Baird. “It is very hard to know what the costs are of running a service like GP at Hand because...the information is commercially protected. So we cannot know if it is replicable because we do not know how much it costs”. Butt has no doubt as to the viability of the model. “I absolutely think this is sustainable, and it is probably the only sustainable way we can look at general practice over the coming years”, he told *The Lancet*.

Babylon gives every impression of being sustainable. Share offerings in 2016 and 2017 raised US\$85 million, and partnerships have been struck with Samsung and Tencent. Backers include the founders of Google’s DeepMind. As *The Lancet* went to press, a fresh round of investment garnered \$550 million, mostly from Saudi Arabia’s sovereign wealth fund. Babylon is now valued at more than \$2 billion, catapulting it to the coveted unicorn status. Babylon has announced plans to expand to 11 countries in southeast Asia, and is due to launch in the USA. It has made no secret of its plans to expand GP at Hand.

“Whenever you introduce a new service and innovation, there are going to be challenges and resistance; that is not a reason not to do it; patients want this; they have elected to join the service”, said Butt. He urges policy makers to take heed. “Politicians have to listen to patients; that would help us ensure we preserve an NHS that is free at the point of care and is being taken into the digital age”, concluded Butt.

Talha Burki

“Babyl” in Rwanda

The Babylon app has 3 million users worldwide. 2 million of them are in Rwanda. In the small African nation, Babylon is known as Babyl. It has been in the country since 2016 and is partnered with the Bill & Melinda Gates Foundation and the national government. Users register with their mobile phones, for a one-off fee of around US\$0-20.

Babyl provides nurse and General Practitioner appointments, prescriptions, and referrals to laboratory tests and specialists. It is all done over the telephone. Patients dial *811# and ask for an appointment. A time is arranged, and a triage nurse telephones. Staff can refer the patient to a GP, who will call later, or a health facility. Prescriptions can be issued digitally and a code sent to the patient’s mobile phone; the patient attends the pharmacy and collect the medicines. The national insurance provider pays.

Babyl provides over 13 000 consultations to Rwandans every week. The country of 12 million people only has around 1200 doctors. “We are seeing the benefits digital technology can bring to Rwanda”, said Mobasher Butt. The country is well placed to take advantage of telemedicine. It is one of the fastest growing economies in Africa, it has extensive mobile broadband coverage and a government with a long-standing commitment to health. Whether digital health can be rolled out to more chaotic parts of the region, such as neighbouring Democratic Republic of Congo, remains to be seen.