In-Person Health Care as Option B

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What if health care were designed so that in-person visits were the second, third, or even last option for meeting routine patient needs, rather than the first? This question seems to elicit two basic responses — sometimes expressed in the same breath: "The idea will upset many physicians, who are already under duress" and "I wish my health care worked that way."

Face-to-face interactions will certainly always have a central role in health care, and many patients prefer to see their physician in person. But a system focused on high-quality nonvisit care would work better for many others — and quite possibly for physicians as well. Virtually all physicians already use nonvisit interactions to some extent, but their improvised approaches could be vastly improved if health systems were designed with such care as the explicit goal.

Progress in this direction is already under way. At Kaiser Permanente, for example, 52% of the more than 100 million patient encounters each year are now "virtual visits."[1] The organization has been able to innovate in this area in part because it spends about 25% of its annual $3.8 billion capital budget on information technology. Nevertheless, these virtual visits only scratch the surface of what's possible with today's technology.

Virtual visits involve secure email and video engagement, and the patient–clinician interaction time required is similar to that of an in-person visit. Virtual visits are more convenient, but there's a difference between recreating an in-person approach with digital tools and designing the safest and most efficient way to achieve an optimal outcome. Consider Kaiser Permanente's teledermatology program,[2] in which pictures of skin lesions are sent to designated dermatologists. Contrast this system with what most physicians do: encourage some patients to send them photos of rashes and then forward the images to dermatologist friends, hoping they won't mind the request for help.

Payment models are an obvious barrier to deemphasizing in-person visits, but every provider's business success depends on market share. The best way to win market share is to design and deliver better care, then modify the payment system to support it. Moreover, payment systems are already evolving to support nonvisit care. For example, use of bundled payment programs and accountable care organizations — which reward nontraditional care delivery models that reduce spending and meet patients' needs — is growing.

If payment systems are changing slowly, opportunities to change care models are increasing at lightning speed. Smartphone penetration of the mobile-phone market increased from 17% to 81% between 2009 and 2016.[3] Even these figures don't capture the change in consumers' expectations for how they engage with the world, including health care. Patients are increasingly asking, "Isn't there a way to do this without my having to drive to your office?" Many physicians have responded by letting individual patients check their own blood pressure or send in photos of a wound. To make nonvisit care excellent and equitable, however, it needs to be a matter of routine.

It's not hard to envision how such a system might work. Take, for instance, a patient with an acute condition that may not require laboratory tests, such as a urinary tract infection or pharyngitis. Simple pathways already exist for deciding when empirical therapy is appropriate and when a watch-and-wait approach is reasonable.[4] The question is whether that watching and waiting can require less of the patient's and clinician's time.

Today, these clinical issues are often handled over the phone or by email, but in the future, care management could resemble an information-technology ticket system inside an advanced corporation. A patient could open an app, file a "need," answer a few tailored questions, and receive immediate guidance. The case would be "closed" only when the patient's need was resolved — which would be an improvement on the traditional model of care. The provider system would be rewarded for solving the problem, not simply documenting activity.

This approach could be extended to acute care when a specimen is needed (e.g., a throat swab in a patient with possible streptococcal pharyngitis). After answering questions in the app,

the patient would be guided to the nearest collection center. Antibiotics could be prescribed by the clinician when necessary, with additional follow-up arranged only if the patient needed or requested it.

Some provider systems are already moving in this direction. Providence–St. Joseph Health's Express Care system, now deployed in 33 clinics in four states, allows patients to participate in virtual visits using their phone, tablet, or computer. Patients can schedule visits at any site for in-person evaluations or laboratory testing. If they want to be seen face-to-face but can't make it to a clinic, a clinician will come to their home or workplace. Patients can also use apps to manage their conditions and symptoms.

Patients with chronic health needs stand to benefit dramatically from this type of system redesign. Their health systems' digital interfaces might have an "ongoing needs" section. Here, patients could toggle on and off the shipping of medicines and view insights on various measures that their smartphone might pick up (e.g., data on total hours spent in high-allergen zones for a patient with asthma). A case manager or coach could schedule a quick video check-in, when needed, to ensure that the patient's condition was being well managed, determine what barriers might be limiting treatment success, and decide whether any adjustments to the medication regimen or care plan were required. At Omada Health, where one of us is the chief executive officer, online tools are used in conjunction with professional health coaches to deliver intensive behavioral counseling for people at high risk for obesity-related disease.

For patients with the most health care needs — the 5% that account for 50% of costs — an "in-person as last resort" system should aim to bring as much of the necessary care and social support into the patient's home as possible. Automated medication dispensers could be outfitted and refilled during visits from care teams. Web and mobile apps could allow families to stay informed about the patient's care. Patient data could be integrated with the systems of the latest generation of home health aide organizations, such as Honor, a company oriented toward helping patients live independently at home. Such systems would need to be easy to use; the burden would be on the provider to design an intuitive solution that aligned with the patient's needs and technical abilities.

So how do we get there? The technologies to enable these care pathways already exist, and progress is being made — just not at the pace that's possible. The first steps are to start placing greater emphasis on the value of patients' time and to find clinical areas or populations that could be used for prototypes.

We might begin by building on the foundational work underlying integrated practice units — teams or organizations that focus on patients with similar needs, such as people with Parkinson's disease, diabetes, or heart failure. The depth of expertise inherent in this model would help determine what could — or could not — be solved without an in-person visit. From there, innovation could expand to cover primary care and more complex care. Meanwhile, the necessary technology will continue to improve, enhancing this model's attraction.

Some physicians are unnerved by the movement in this direction, worrying that patients may get trapped in endless "phone menus" and that physicians will be marginalized in the process. Others accept that "it's already happening." And some see such a model as a way to let doctors spend more time doing "what only we can do."

We believe that the clinicians and systems that lean in toward this change rather than resist it may find that it deepens their partnerships with patients. Patients who find their needs being addressed simply, quickly, and efficiently will know that if the system requires an in-person visit, it's doing so because of clinical necessity. Ultimately, we believe such a model will result in a level of trust that furthers collaborative, honest, supportive care. Organizations that adopt this mindset may gain a competitive advantage, since the required investments should lead to opera-

tional efficiencies and increased patient loyalty. Viewing in-person physician visits as a last resort sounds radical, but it just represents a deepened commitment to patient-centered care.

An audio interview with Mr. Duffy is available at NEJM.org

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

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DOI: 10.1056/NEJMp1710735

Plague in Madagascar — A Tragic Opportunity for Improving Public Health

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When plague first arrived in Madagascar in November 1898, its appearance mirrored events in port cities around the world. Alexandria, Bombay, Buenos Aires, San Francisco, Saigon, and Sydney were all affected as part of the "third pandemic," a global event that began in China but spread widely with the aid of long-distance steamships. Like the Justinian Plague of 542 C.E. and the Black Death of 1346 C.E., the third pandemic took millions of lives and disrupted societies. Although the disease eventually died out in some regions, enzootic foci established during the third pandemic persist in many areas, including the western United States and the central highlands of Madagascar.

Plague is caused by *Yersinia pestis*, a gram-negative bacillus that is believed to have evolved relatively recently from *Y. pseudotuberculosis*. The organism cycles in nature among rodents and their fleas, and it is generally susceptible to aminoglycosides, tetracyclines, and fluoroquinolones. Most human plague is of the bubonic form, characterized by fever and regional lymphadenitis, and results from percutaneous exposure through the bite of infected rodent fleas. Without treatment, infection can spread from regional lymph nodes to the lungs, causing a secondary pneumonia. Patients with secondary pneumonic plague can transmit the infection to others through respiratory droplets. Inhalation of these droplets produces a primary pneumonic infection. Primary pneumonic plague has a typical incubation period of 1 to 4 days, is rapidly progressive, and is nearly always fatal in the absence of prompt antimicrobial treatment.

Although many patients with pneumonic plague do not transmit the disease to anyone, one patient can — under the right circumstances — infect many people and thus initiate an outbreak. The current epidemic in Madagascar appears to have been triggered by such an event. In late August 2017, an ill 31-year-old man boarded a bush taxi in the central highlands, bound for the eastern city of Toamasina (also called Tamatave), by way of the capital city, Antananarivo. Details of his illness are not publicly available, but his symptoms worsened quickly, and he died in transit. Dozens of persons who had direct contact with the man or his contacts subsequently became ill.[1]

Since notice of this first cluster, cases of suspected plague have been reported from many areas of Madagascar. According to the World Health Organization (WHO), 2417 total cases had been identified between August 1 and November 26, including 1854 (77%) that were clinically identified as pneumonic plague. Among pneumonic cases, 390 (21%) have been classified as confirmed, 618 (33%) as probable, and the remaining 846 (46%) as suspect.[1] In most instances, laboratory confirmation is based on detection of fraction 1 (F1) capsular antigen in specimens by a locally produced rapid diagnostic test, combined with detection of *Y. pestis* by polymerase chain reaction.[2] Unfortunately, information on the sensitivity and specificity of these assays for testing sputum is limited.[3] Cases in which samples test positive by only one of these two