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Health systems: Improving and sustaining quality through digital transformation

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As the price of healthcare rises and safety lapses persist, developed countries are seeking ways to lower costs and improve quality. Many are finding the solution in digital innovation.

Health systems in developed countries face a twofold challenge: ensuring financial sustainability and improving quality. Digitization can help health systems achieve both these objectives and unlock substantial value through lower spending and superior healthcare delivery.

Rising costs, uneven quality

Healthcare is claiming an ever-increasing share of national wealth. In recent years, healthcare expenditure in Organization for European Cooperation and Development (OECD) countries has been rising at a rate one to two percentage points faster than GDP. If this trend were to continue, healthcare would represent more than 25 percent of France's GDP—and more than 35 percent of the US's—by 2050. Clearly, action is needed to bring costs under control.

Moreover, medical errors and other safety lapses persist even in the strongest health systems and are often caused by inconsistencies in care and lack of adherence to good practices. Outcomes vary enormously across healthcare systems and among the care providers within them. For instance, maternal mortality is four per 100,000 births in Italy, but more than three times higher in the US, at 14.[1] Postoperative pulmonary embolisms and thrombosis affect 865 of every 100,000 patients leaving a hospital in France, but just 107 in Belgium, a difference of 706 percent.[2] Regular albumin screening to prevent complications is provided annually for 88 percent of diabetics in the Netherlands, but for fewer than 30 percent of those in France.[3]

A recent study revealed that medical errors are the third-most-common cause of death in the US after cancer and heart disease, accounting for more than 250,000 deaths every year.[4] Addressing these issues and the variations in care practices and quality that cause them is another priority for all countries.

[1] OECD health statistics 2013, Institute for Health Metrics and Evaluation, WHO Neonatal and Perinatal Mortality, Country, Regional and Global Estimates, 2006.

[2] OECD health statistics 2013.

[3] CNAMTS; J. N. Struijs, J. T. van Til, and C. A. Baan, "Experimenting with a bundled payment system for diabetes care in the Netherlands," Institute for Public Health and the Environment (RIVM), October 29, 2010.

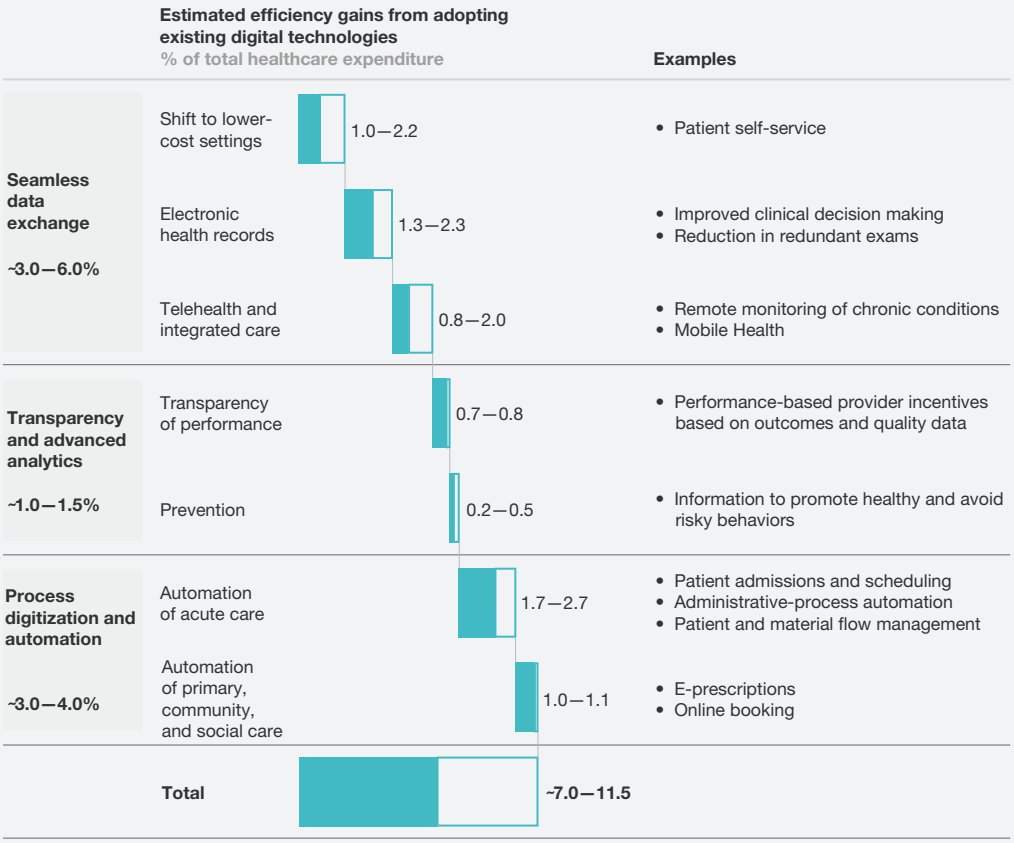
[4] Martin A. Makary and Michael Daniel, "Medical error—the third leading cause of death in the US," *British Medical Journal*, May 3, 2016.

Addressing the challenges through digital innovation

Digitization offers benefits in both costs and quality. One large OECD country estimated that by implementing existing digital technologies, it could reduce its healthcare expenditure between 7 and 11.5 percent (see exhibit). At the same time, it could improve quality through measures such as monitoring chronic conditions more effectively to avoid acute events, increasing adherence to best practices, improving clinical decisions, and promoting healthier behaviors.

Exhibit

Estimated impact of digital interventions on healthcare in one OECD country



NOTE: Numbers may not sum due to rounding.

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Digital innovation can transform healthcare in three main ways:

By improving care-delivery models through seamless data and information exchange. The rise of chronic conditions is making it more important to integrate patient care pathways across care settings. Digital solutions can greatly facilitate the seamless exchange of patient and other information and data between providers. Telehealth and mobile health solutions can improve the effectiveness and efficiency of maintaining patients at home, thereby avoiding unnecessary hospital stays, improving clinical outcomes, and reducing the costs of care. Finally, the use of digital tools to enhance clinical decision making and the monitoring of treatment protocols—as Kaiser Permanente does through the use of its eHR (electronic medical record) system—can significantly reduce variability and increase adherence to good clinical practice.

By harnessing the power of data through advanced analytics and transparency. More and more applications that rely on healthcare data analytics are available to support patients in understanding and managing their medical condition and influencing their medical care. New data-enriched tools and algorithms are constantly emerging, including decision-support tools, online services, and smartphone apps. Examples are Indigo's Archimedes, which helps care providers influence patients' lifestyle and behavior choices, and www.drugs.com, a website helping patients identify potential contraindications and drug-interaction risks.

Providers making crucial clinical decisions about diagnosis and treatment will increasingly be supported by tools such as algorithms that compare a patient's clinical and other data with large datasets and draw on the full body of scientific literature. As the number of diagnostic tools (such as imaging and "omics" sciences) continues to expand, and as the sum of biomedical scientific literature doubles every five to seven years, more initiatives supporting medical decisions and patient care, such as IBM's Watson, Syapse, and Flatiron Health, will emerge and mature.

Analytics also promises to support drug and device developers in many ways, such as by helping them identify the patients likely to respond best to a particular drug. In addition, the use of medico-administrative databases can in some cases provide a more effective way to address requirements for real-life drug evaluation and monitoring.

Finally, the collection and publishing of data on outcomes and quality of care can also allow healthcare systems to modulate tariffs and orchestrate competition among providers based on their quality of care, and should be a major lever for raising the overall standard of care across healthcare systems.

Through process automation. Many healthcare processes can be digitized, including appointments, logistics, patient records, admissions, human resources and rotation

management, and billing. In addition to providing efficiency gains, automation can also improve patient care: for instance, remote monitoring of intensive-care units via patient sensors and a central control room led in one case to a 22-percent reduction in mortality rates and a 23-percent reduction in the average length of hospital stays. Digitization can also bring significant benefits in the area of clinical trials, such as improving the efficiency and reliability of clinical data collection and trial monitoring and optimizing trial design through the use of modeling tools.

Three ways to accelerate digitization

Although there are clear benefits from extending the digitization of healthcare, obstacles remain. Healthcare systems often struggle with a range of issues including limitations and constraints on data collection, access, and sharing; resistant mind-sets; an excessive focus on risks to the detriment of potential benefits; and misaligned incentives.

To help overcome these obstacles and accelerate digitization, healthcare systems should seek to:

1. *Enhance data and modernize data infrastructure, management, and access.* To capture the full benefits of data analytics, healthcare systems will require ready access to a hugely expanded array of data. They should consider investing both to enhance the data collected (for instance, through the development of patient cohorts and registries and the collection of data on patient-reported outcomes) and to develop their data-analytics capabilities, as value will reside as much in algorithms as in the data itself.

   Legacy systems are unlikely to be able to cope with these demands, so a new, modern data infrastructure will be needed. One possible model could be an open cloud-based platform aggregating data from different sources, with an operator who manages the infrastructure and data access, promotes data collection and quality, and provides a means for patients to manage their informed consent. The operator would have to collaborate closely with regulators, understand healthcare delivery, appreciate the need to protect sensitive patient data, and be trusted by patients. If a national health system or a national payor in each country were to take on this role, a step-change in mind-set and capabilities would be needed, as it involves acting as an ecosystem manager and attracting, certifying, and managing a community of innovators as well as operating a technical platform loaded with sensitive data.

2. *Create incentives to support new practices and mind-sets.* Digitization involves a shift toward a more data-driven culture with continuous and transparent evaluation of professional practices, that in turn requires changes in the mind-sets of healthcare professionals. To achieve such a shift, providers need to develop and communicate a clear change story that outlines the benefits as well as the risks of a digital transformation.

They also need to adopt funding mechanisms that provide incentives to adopt new behaviors, such as episode-based payments, outcomes-driven performance payments, or even capitation-based models as adopted in Alzira, Spain, in which a private provider takes responsibility for providing care for a given population in return for a fixed per-capita payment. Current approaches such as fee-for-service models reward the volume rather than the value or quality of care provided, and seldom provide incentives for robust clinical data collection and collaboration across care settings.

In addition, digitization will require changes in professional training and medical education as well as training, funding, and other forms of support for healthcare professionals and institutions as they implement new digital tools and methods.

3. *Adjust legal and regulatory frameworks to improve data exchange.* The sensitive nature of healthcare data requires its usage to be regulated to protect patients' privacy, but scope remains to enhance data exchange. Today's fragmented country regulations often leave health data in silos, impeding projects that rely on diverse sources of information. For example, one EU country may permit the use of historical clinical data while another prohibits it, and yet another allows it under a specific license—a complex situation that reduces the range of information on which researchers can draw for their studies.

   Establishing a common European framework to harmonize the collection, processing, and use of patient and healthcare data would be an important improvement. Another option would be to move toward a more open approach that relies on a risk/benefit assessment of individual cases and a robust tracking and monitoring of each permitted usage of the data, as at Kaiser Permanente, which provides access internally to clinical and claims data for specific uses, with tight monitoring to flag and address any potential misuses.

Harnessing the full potential of digital innovations in healthcare could have a profound impact on the quality and financial sustainability of health systems. It would also involve profound changes for care providers and healthcare professionals. To shift mind-sets, healthcare authorities will require a clear and compelling vision and ambitious action. But the benefits for both quality and economics will be well worth it. ☐

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