Care that connects

Interoperability and collaboration are essential to today’s healthcare IT ecosystems
Abstract: a healthcare revolution in the making

Data is powerful in any industry. In healthcare, data has the power to change lives – to enable essential collaboration, to transform clinical workflows, and, most importantly, to improve the health of the patients we serve. Compared with other industries, however, healthcare has lagged significantly in making data accessible to the very people who can put it to such worthwhile use.

Harnessing data depends on a collaborative culture. This means that traditional keepers of data – those who have spent years hosting, storing, and managing data – now need to make data, long stored in their own silos, available to the community. These data keepers have spent considerable time, effort, and resources building data repositories; hence, there may be trepidation in sharing the data. At the very least, there is a fear of leakage and a lingering sense that the model is inequitable, at least for incumbents.

Incumbents also perceive themselves to be on top of the data pyramid, making it almost impossible to relinquish access to data lest they devalue their own position. This inertia makes the healthcare industry ripe – and right – for disruption.

Surely it is only a matter of time before the tsunami that hit the mobile (iPhone), ride-share (Uber), and retail (Amazon) industries also hits healthcare. Many in healthcare know this is coming, but are they fully prepared?

A healthcare revolution will come from a powerful combination of technology that is truly multivendor interoperable and specialized experts who collaborate as a starting point.

At Philips, we earnestly believe that seamless interoperability and multidisciplinary collaboration are essential to the future, and we are fully invested in making them possible.
A brief look back at technology’s evolving role

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
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<tbody>
<tr>
<td>1959</td>
<td>An early start to healthcare IT</td>
<td>A 1959 Science article, “Reasoning foundations in medical diagnosis,” explored the use of Bayesian statistics in diagnosis. This, according to Dr. Edward Shortliffe, a pioneer in the field, was the first mention of computer use of healthcare data, marking an early start to a now burgeoning healthcare IT industry.</td>
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<tr>
<td>1960s</td>
<td>Paper records give way to computers</td>
<td>There was an increased use of computer systems to manage patient data and the development of hospital information systems. Paper-based records were the norm with healthcare records stacked, organized, labeled, and kept in dust-proof vaults. Hospitals had designated medical record rooms with filing cabinets stacked high with color-coded reams of paper files.</td>
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<td>1980s</td>
<td>Digital imaging emerges</td>
<td>The late 1980s saw the introduction of digital imaging first in dentistry and then moving into healthcare more broadly. Prior to this, imaging films were carried from one care setting to the next. Later, images were transferred via CDs. Digital imaging continues to transform the healthcare industry.</td>
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<tr>
<td>1990s</td>
<td>Genomics data demands technology solutions</td>
<td>Genomics and the Human Genome Project brought biology to the forefront of healthcare. In 1991, it became clear that computer-based patient records would be essential to healthcare’s future.</td>
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As with other data-intensive industries, data in healthcare was always bigger than constraints imposed by the technology of the time.

History – and other industries – have a lot to teach us

The healthcare industry has a chance to mimic the record industry – an industry that had talent, a huge subscriber base, and monopolistic positions. Record companies once were fighting many battles until Steve Jobs’ proposition – the iPod – digitized, monetized, and expanded the industry. However, Jobs also knew that the iPod was insufficient on its own. He understood that for the device to have value, other music player innovators needed to align. In late 2001, when Apple announced the iPod, both mp3s and broadband were finally widely available, but music accessibility was still uncontrolled. In 2003, Apple hit a high note with iTunes, legitimizing online music accessibility and revolutionizing the industry. Historically, healthcare has been constrained by the availability of technology. Now that technology has advanced significantly, we need to foster collaboration among key players to revolutionize our industry.
A complexity challenge

A simple, but powerful goal – to improve healthcare – is made all the more complex by the myriad, often overlapping systems that comprise it. A closer look at the many hospital systems demonstrates this challenge. Hospitals today are structured much the same as they were in the 1960s with departmentalized views of:

- Administrative departments
- Clinical departments

In integrated care delivery, both administrative and clinical departments have data flowing between them that they must share. Auxiliary sections are also required to sustain them. In our industry, there is no shortage of systems to manage, and each system has its own inherent complexities and challenges. Management of these many systems is also complicated when care settings – even those within a single health system – are silos that are unable to easily share essential information. To deliver value in healthcare, we must find ways to both simplify and integrate them. Much stands to be gained when we do.
A complexity challenge (continued)

We can also look at a departmental breakdown of administrative and clinical systems. In this view:

- **The hospital information system/EHR is the overarching system.** It facilitates integrated care delivery, including billing. A component of this system manages patient medical records – namely the computer-based patient record system with emphasis on patient history.

- **Each department also has its own system:** laboratory, pharmacy, nursing information, patient monitoring in the ICU and general ward, and medical specialties.

This is further complicated when we consider moving from episodic to value-based care.

- Now we need to track patients across a care delivery network inside and outside the hospital and at home.

- Outpatient and ambulatory care have become even more critical, and additional systems like patient portals are needed.

- Complexity only multiplies when we add public and population health management systems.

But that isn’t everything. Most of these systems were conceived 3 decades ago and, from a system engineering and architecture point of view, have been evolutionary not revolutionary.

The figure below depicts a view of the complexity and represents the dilemma facing hospital CIOs and CTOs.

**Hospital CIOs/CTOs face complexity amidst an ever-changing healthcare landscape**

We cannot avoid the fact that healthcare is complex – from the many departments in a hospital to the complex data they must exchange to treat patients.
Finding the right strategy

With a complex ecosystem, healthcare is a multiplayer game. As such, it is naive to assume there is a single, cohesive solution to the complexity – that it is possible to rip up and replace existing infrastructure to implement a new solution. Rules of engagement will define how the ecosystem will evolve.

At Philips, with our more than 100-year history, we have a proven track record of building systems, acquiring businesses, and collaborating with partners.

As an industry leader in healthcare IT and interoperability, we believe the future will be formed by multiple parties sharing data across programs, practitioners, and patients.

All stakeholders will need to collaborate on solutions to seamlessly exchange information throughout the care delivery network. We have a strategy for moving toward this future, building upon our proven track record of understanding industry trends and standards, promoting industry collaboration, and partnering with customers to achieve success. Step by step, we can build upon the industry's current investment and extend to a collaborative network for data exchange.

Taking a step-by-step approach

| Step 1 | Semantic interoperability: building on the foundation |
| Step 2 | Fragmented to federated: making relevant data available to everyone |
| Step 3 | High tech to high touch: creating collaboration |
Finding the right strategy (continued)

Semantic interoperability: building on the foundation

Meaningful use and HITECH (Health Information Technology for Economic and Clinical Health) Act drove EHR adoption and digitalization in healthcare from less than 20% to more than 90% in a decade.

This also means that EHRs, while important, are no longer the hospital’s central data repository. Rather, the care delivery network is an ecosystem with multiple systems of truth, including EHRs. Systems need to be wired together so data can be shared seamlessly and so the whole is bigger than the sum of its parts. Establishing standards and frameworks like HL7, DICOM, FHIR, XDS, and XDW enables the flexibility to exchange data with other vendors, but doing so semantically through frameworks like IHE avoids lock-ins.

Rather than standards becoming a way to ingest information into EHRs, they become the foundation for information exchange through a collaborative network.

The carrot-and-stick policy seemed to work for a while. In 2019, it seems the carrots are drying up, and it may be time for new sticks. The focus has shifted from EHR adoption to realizing the full benefits of digitization through healthcare’s quadruple aim:

- Improving health outcomes
- Improving patient experience
- Improving staff satisfaction
- Lowering the cost of care

It is clear that technology can improve healthcare and that systematic interoperability is only the first step.
Finding the right strategy (continued)

Fragmented to federated: making relevant data available to everyone

Currently, EHR is the hospital’s primary data warehouse. There have been attempts to convert EHR to a decision support system, but the vast majority of the clinical workforce does not buy that argument. In addition to EHR, there are a variety of other clinical sources of truth within the hospital, and these federated structures need to work together. Data, especially their quality, timeliness, and context, are key to the emerging fields of healthcare-related artificial intelligence and predictive analytics. The quantity and scope of data models to be used in both current and projected applications demand a much more flexible approach to sourcing than traditional record-keeping. To get to that view, we must design systems with the intent to share.

At Philips, we design solutions with the intent to liberate information. We are striving to do this for our legacy solutions as well.

Federation of data by design makes the exchange of information easier between clinical systems where the data seeker is aware not only of the data but also of where to get the data. At Philips, we are taking every step in our design to ensure a federated system that can interoperate with clinical ecosystems and, at the same time, enable dynamic clinical workflows and pathways across traditional clinical systems and propositions.

High tech to high touch: creating collaboration

Need for the right partner

Healthcare is a highly regulated industry in which there:

- Is movement from fee-for-service to value-based care
- Are complexities within its many systems that create both duplication and, all too often, a suboptimal experience

Despite the complexities, the right people with the right expertise can navigate adeptly together. At Philips, we believe data liquidity is a collaborative effort in which the right players come together to provide the right solution.

To do so, we must skillfully design systems using open standards so we can liberate and exchange data across the continuum of care. It is essential to find the right healthcare integration partner, one who:

- Understands your ecosystem well
- Is multivendor positive – namely one who has the right tools, expertise, and attitude to collaborate with other vendors

Our solution designers, integrators, and interoperability consultants work with health systems along their journey to interoperability, enabling the right solutions along the way.
Cocreation of solutions

Enabling a connected healthcare ecosystem means designing it around the patients, clinicians, and administrators it serves. We advocate for placing human-centered design practice at the heart of delivery systems. In today’s complex and ever-changing world, it is impossible to innovate alone. Transforming the delivery of healthcare in this challenging context calls for a different, more human-centered approach to innovation. At Philips, we call this Cocreate.

Cocreate helps you build smart, value-creating solutions

Cocreate allows you to gain an in-depth understanding of people-specific context. It helps you sharply articulate people’s challenges and what they really value. You discover new and unexpected solutions, make these solutions tangible, and test them to understand how they improve people’s lives. It’s about doing, learning, and adjusting as you go.

This philosophy is operationalized by methodology, people, places, and tools that enable:

1. Customers and users to get involved in the solution
2. A multidisciplinary team of people to bring a wide variety of skills and insights to the solution
3. An iterative process encouraging breakthrough thinking and collaboration

The elements of Cocreate

Our approach has 5 key elements. Each supports you in implementing human-centered innovation.

The Cocreate methodology
The Cocreate methodology encourages empathy and understanding, enables continuous learning through experience, and creates speed to market as well as differentiation.

Cocreate leads
A successful Cocreate project requires teamwork. Our Cocreate leads will partner with you to deliver a successful project from start to finish.

Inspirational spaces
We have 5 inspirational spaces around the world that are designed to stimulate original thought, creativity, and collaboration.

Specialized tools
We use a range of specialized tools and techniques that support the process. Each is designed to help solve problems and stimulate new thinking.

Design expertise
We bring in design experts who provide fresh perspectives. They help you better understand people in their control and articulate ideas and solutions.
Bringing it all together

Interoperability does not have to be cumbersome. At Philips, we have a sustained and substantial commitment to healthcare interoperability, and fostering collaboration from the start is essential to this effort. Our priority is to provide both the right technology and the right experts to help you with your interoperability strategy. In our journey toward impacting 3 billion lives by 2025, we are focused on cocreating and delivering solutions that exceed our customers’ expectations and meet our goal of transforming care across the health continuum.

As we move from transactional care to value-based care, patient outcomes, interoperability, and usability will continue to push the industry forward. It is exciting to think of what is possible when care providers have the right tools and technologies to lead the way to a fully integrated and transformed healthcare system. Philips has both the technology and the expertise to help and would welcome the opportunity to be your partner on your journey to interoperability.
Reading list

