INTEROPERABILITY AND THE CLOUD IN CONNECTED HEALTH

Reducing Risk and Improving Patient Outcomes

cloudmine

Executive Summary

In the effort to improve patient experience and drive positive health outcomes, healthcare enterprises are beginning to widely adopt connected health technologies and mobile application interfaces. Interoperability among these systems is key to meeting healthcare's triple aim goals and to deliver insights that can accelerate healthcare innovation where it is needed the most: Mobile Apps, Internet of Things (IoT), Research, and Cognitive Analytics. However, healthcare has lagged behind other sectors in the adoption of open Application Interfaces (API) for the exchange of data between different systems.

The rapid growth of cloud technologies is empowering healthcare leaders to develop truly innovative and impactful applications and solutions in a HIPAA-compliant, scalable and flexible environment at much lower costs. When looking at cloud providers for HIPAA compliant development infrastructure, CTO's and C-suite executives have to look beyond just the server hosting environment. Many technology providers are beginning to invest in building out robust development environments that are much further along in compliance readiness.

By removing challenges such as compliance, security, and interoperability, innovators across Healthcare, Pharmaceuticals, and Biotechnology can leverage cloud platforms to develop applications that bring together data and help the healthcare sector to truly focus on improving the patient experience, reducing re-admissions, and creating better population health outcomes.

Reducing Risk and
Improving Patient Outcomes

The demand for interoperability in healthcare technology is certainly not new. But it can be helpful to look at the reasons behind this demand to understand why the issue of interoperability is so important.

PROVIDERS

Providers face shrinking reimbursements and demand for better patient care. Healthcare data collected from electronic health records (EHR), and increasingly from connected devices, "smart" drugs, and the Internet of Things (IoT), can be used for comprehensive analytics that enable great strides in population health. That, in turn, can reduce chronic illness rates, cut hospital readmissions and enable compliance with the latest initiatives within value-based care initiatives such as pay for performance and bundled payments programs. However, to be effective, data must move seamlessly between systems to enhance visibility and drive greater capabilities into population health measures—making interoperability essential.

PAYERS

Payers face spiraling healthcare costs and an increased margin pressures today and are shifting steadily towards accountable care models in healthcare delivery. In value-based care, reimbursements are linked to health outcomes. By working closely with their provider networks, payers can integrate EHR and claims data to develop population health management (PHM) programs that improve outcomes while controlling costs.
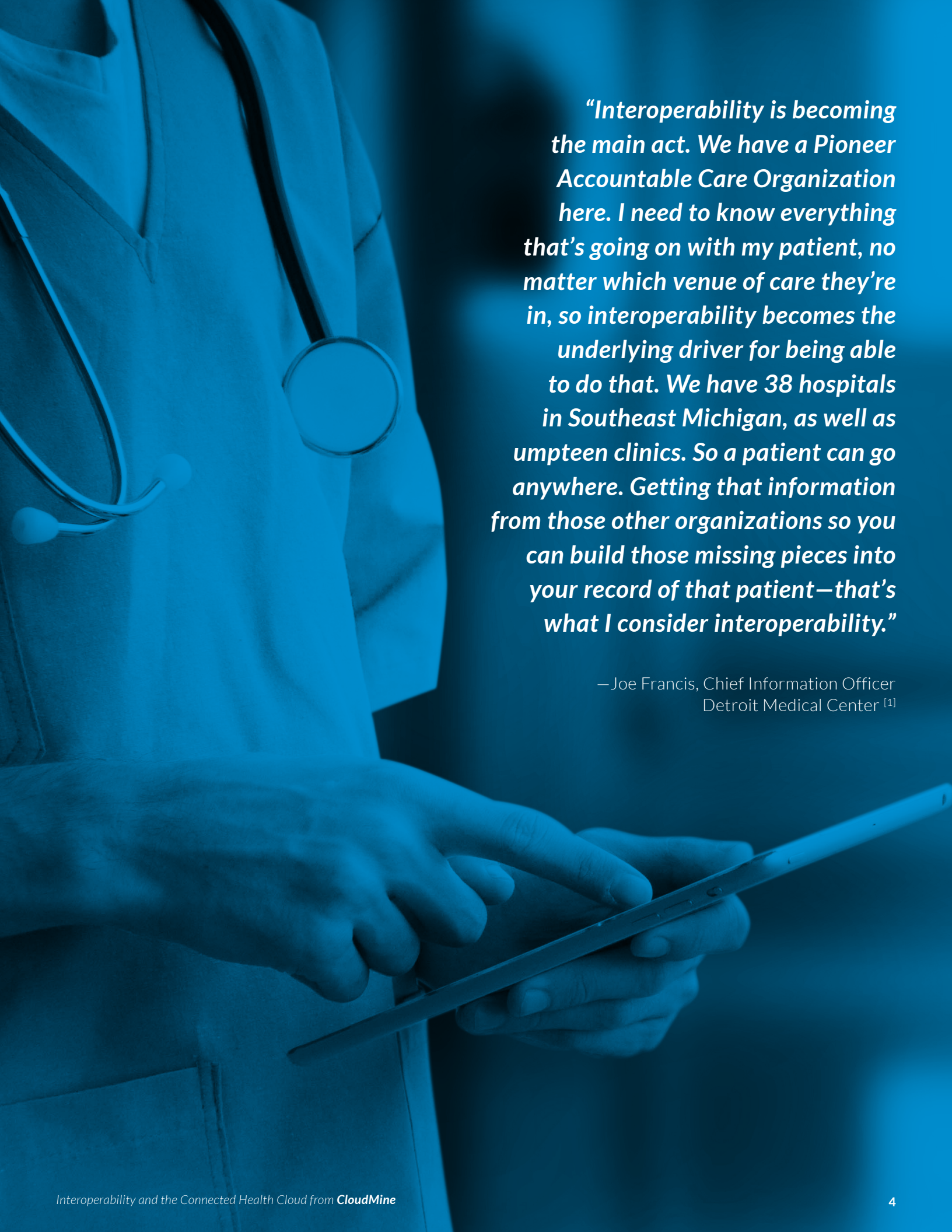
PHARMACEUTICAL FIRMS

Pharmaceutical firms need to deal with the wave of patients that do not stay on critical medication or use it correctly. Mobile Apps help improve patient medication adherence, but they only work effectively if they integrate back into the patient record, improving outcomes as a result. Interoperability can thus be an agent for improvements in population health and higher levels of patient satisfaction. Patients that stay on their medication also improve the financial performance of pharma companies whose drugs they are prescribed.

PATIENTS

Perhaps the most interested constituency in the case for increased interoperability are the patients themselves. Providers and caregivers need to have real-time access to patient medical information in a wide range of settings across facilities and systems, and patients, in turn, are expecting increased access to their medical records so that they can understand their own medical history and make informed healthcare choices.

A final, important constituency in the adoption of interoperability standards is the research community that can enable advances in personalized medicine and public health programs by gaining access to data through open, standardized API's.

"Interoperability is becoming the main act. We have a Pioneer Accountable Care Organization here. I need to know everything that's going on with my patient, no matter which venue of care they're in, so interoperability becomes the underlying driver for being able to do that. We have 38 hospitals in Southeast Michigan, as well as umpteen clinics. So a patient can go anywhere. Getting that information from those other organizations so you can build those missing pieces into your record of that patient—that's what I consider interoperability."

—Joe Francis, Chief Information Officer
Detroit Medical Center [1]

Why Interoperability continues to be a challenge?
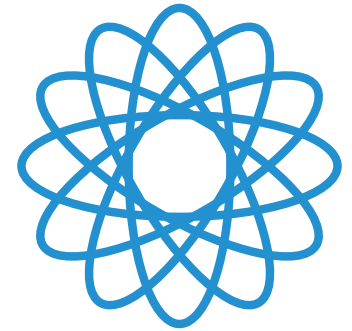
For healthcare IT to work, systems must be interoperable. However, data sits in silos today and this is a barrier to the advancement of healthcare. Unlike other sectors such as retailing and financial services, healthcare lacks a set of common, open API's that can unlock value and accelerate innovation.

With the benefits of interoperability so obvious, why does the adoption of common standards continue to move so slowly? The Government Accounting Office was tasked by Congress to answer this exact question. They identified five barriers to interoperability [2]:

- Insufficiencies in health data standards
- Variation in state privacy rules
- Difficulty in accurately matching all the right records to the right patient
- The costs involved in achieving the goals
- The need for governance and trust among entities to facilitate sharing health information

The Office of the National Coordinator for Health Information technology (ONC) also released a report in early 2015[3] that cited "health information blocking", as a cause behind the lack on interoperability in healthcare.

The ONC took a major step to overcoming interoperability challenges with the release of their Interoperability Roadmap[5] in the fall of 2015. This roadmap has three key themes:

- Giving consumers the ability to access and share their health data
- Ceasing all intentional or inadvertent information blocking
- Adopting federally-recognized national interoperability standards

This roadmap is broken out in 3, 6, and 10-year goals and milestones, with nationwide interoperability discussed in 2024. The ONC recognizes that the interoperability efforts underway are currently work in progress.

"I am stating this as an uber-conservative, but we are losing lives due to our inability to implement meaningful (interoperability) standards."

—Marc Probst, Chief Information Officer
Intermountain Healthcare [4]

Interoperability in 2016: The Promise of the Future

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There has been significant movement in the last year to make comprehensive healthcare interoperability happen, with initiatives such as the Commonwell Health Alliance and Continua Health Alliance trying to develop interoperability standards. But how can an organization realize the benefits of interoperability right now, in 2016? While true interoperability is some distance away, developers and technology firms are utilizing an API-led approach to integrating data from multiple source systems.

There is also increased interest in an emerging web services based data exchange technology known as FHIR [6] (pronounced "fire"). FHIR, or Fast Health Interoperability Resources, is a proposed interoperability standard developed by the health care IT standards body known as HL7. In addition, open source platforms such as Apple's Researchkit, allow researchers and developers to create powerful apps for medical research.

For researchers, in particular, there is significant potential for "citizen science" [7] that utilizes anonymized, aggregated personal medical information. An example is the Stanford Children's Health system in the San Francisco Bay Area which has developed an analytics platform for diabetes management, leveraging its EHR's API and Apple's Healthkit.

INTEROPERABILITY, CLOUD, AND CONNECTED HEALTH

In the past few years, we have seen significant advances in the adoption of cloud-based technologies that now provide flexibility and scalability in a secure infrastructure environment. Cloud environments are also HIPAA compliant, providing the foundation on which it is possible now to build native or web applications for healthcare. It is important to note that in terms of HIPAA compliance, there is a lot more that goes into building and architecting applications, such as load balancers, firewalls, data storage, API access and management, to name just a few. All this requires significant investments of time, money, and other resources, and is often a lengthy process.

By utilizing an open-standards API as a layer on top of existing legacy technologies, and moving all data through the cloud, newly developed applications can communicate efficiently with a wide range of technologies including:

- EHRs (HL7), including Epic, Cerner, GE Health, McKesson, Allscripts and others
- X12 Payer Systems
- Business Systems and SAP, Salesforce Health Cloud, Teradata
- Medical sensors
- Consumer wearables, such as Fitbit, Apple iWatch, Jawbone, Garmin and Samsung
- Mobile apps, including iOS, Android, Windows and Xamarin
- SOAP, REST, popular ESBs

Patient-centric mobile apps, deployed with cloud-enabled interoperability, can access patient data, financial data, and community data—integrated into one holistic view—in order to motivate positive patient behavior, improve the health of the population and cut time and costs from payment processing. The result is increased patient satisfaction and improved health outcomes.

The types of mobile apps that can be developed with full interoperability to patient records, population health data and analytics include:

- Remote Patient Monitoring
- Medication Adherence Monitoring
- Connected Therapy
- Smart Delivery Systems
- Patient Engagement Apps
- Wellness Programs Apps
- Fitness Trackers and Apps
- Clinical Research Apps

Through cloud-based interoperability, an organization can also leverage the full power of patient data, backend systems, and analytics, directly through front-end patient applications. This type of interoperability empowers visibility into the entire healthcare value chain through comprehensive, cloud-based cognitive computing and predictive analytics.
The bottom line is that utilizing a cloud-based approach can result in a fully scalable and flexible application development environment that speeds time-to-market while maintaining full compliance with HIPAA and other existing regulations.

THE CONNECTED HEALTH CLOUD IN ACTION

The CloudMine Connected Health Cloud solves the technical complexities of healthcare innovation and empowers leaders to bring truly impactful solutions to market significantly faster than ever imagined. CloudMine's Connected Health Cloud is accelerating healthcare innovation where it's needed most: Mobile Apps, Internet of Things, Research, and Cognitive Analytics.

Visit us at https://cloudmineinc.com

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[3] "Report on Health Information Blocking", The Office of the National Coordinator for Health Information Technology, (April 2015), https://www.healthit.gov/sites/default/files/reports/info_blocking_040915.pdf

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