

The Healthcare Ecosystem
Empowers Patients
With Their Health Data



HL7[®] FHIR

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Although the COVID pandemic may have stressed many organizations and industries, the health tech industry grew at its fastest rate. Funding, investing, inventing, launching and growth are at an all-time high and interoperability challenges are becoming a thing of the past.

Case in Point

As an example, in 2020, Microsoft committed to interoperability, targeting the patient - consumer and health data (PHI). MS Azure became the first cloud with a fully managed, first-party, enterprise-grade service to ingest, persist, and manage healthcare data in the native FHIR format. Data management becomes fool-proofed, protected health information (PHI) by using the MS Azure API for FHIR as it brings together health data from disparate systems. The data model standardizes semantics and data exchange so all systems using FHIR work together.

Case in Point



UPMC (University of Pittsburgh Medical Center) is using the Microsoft technology and it's a one-click deployment on a "FHIR Server as a Managed Service" (FSMS), gives the technology a backseat to prioritize customer needs. In just slightly over one decade, hospital IT management finally becomes a valued utility rather than a customized, untested, and expensive pipedream and all through the open-sourced standard named FHIR.

In just slightly over one decade,
hospital IT management finally becomes a valued utility.

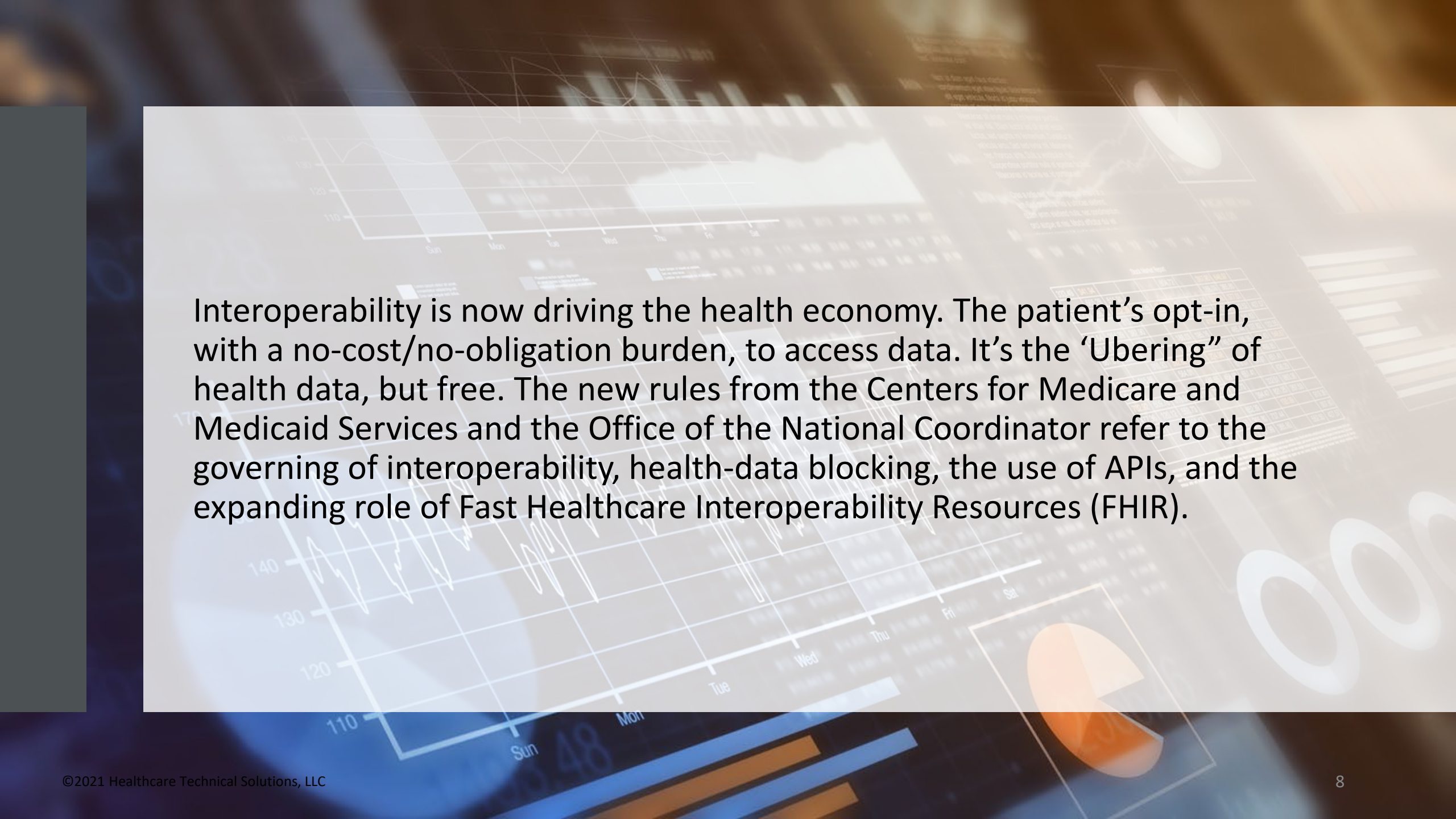
An app library will be available for clinicians and patients to improve clinical care, research, and public health. However, it may have its challenges regarding data analytics and technical infrastructure.

For consumers, this enables the choice of applications to retrieve their complete health records and coverage information from any provider or plan in the country via APIs.

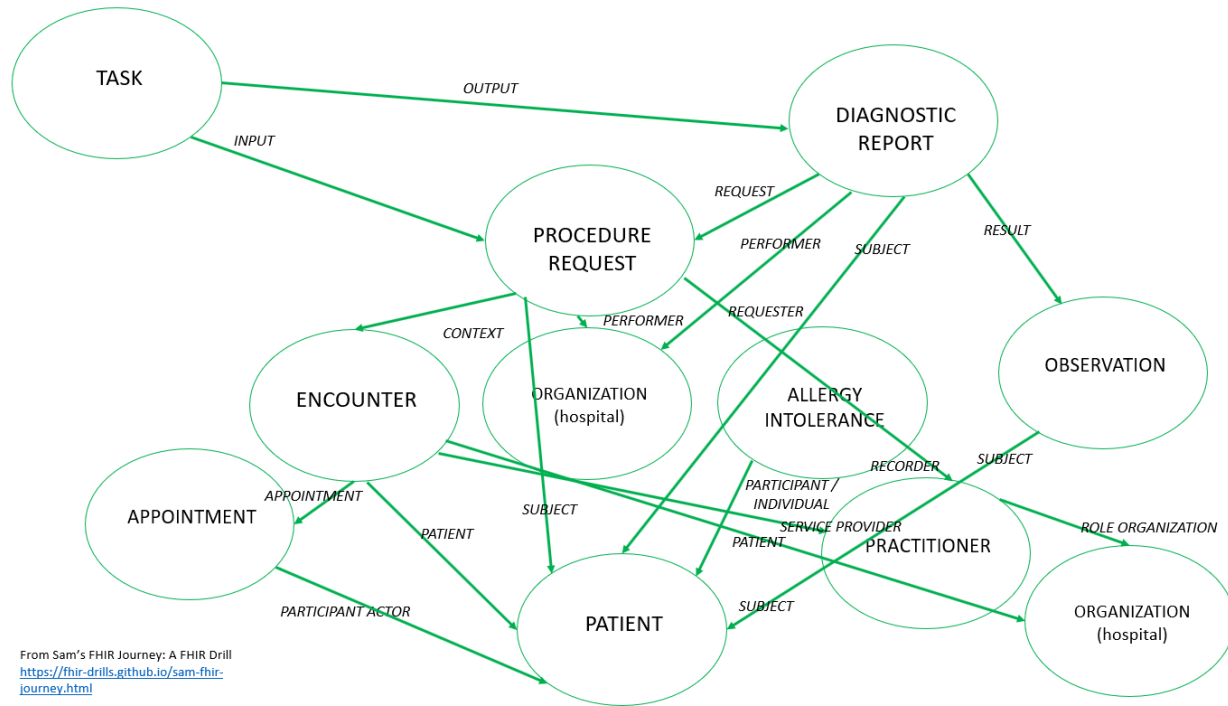
As standards are set, innovation technology companies should be able to tap into health data without the need for Business Associates Agreement (BAAs), data use agreements, etc., because the individual consumer will have the right to pull the data out of a HIPAA covered entity, i.e., hospital or physician practice and move it into a trusted (and secure) application to use however they choose.



The promise of value-based care successes will rely on the success of the **app library**, in part.



Interoperability is now driving the health economy. The patient's opt-in, with a no-cost/no-obligation burden, to access data. It's the "Ubering" of health data, but free. The new rules from the Centers for Medicare and Medicaid Services and the Office of the National Coordinator refer to the governing of interoperability, health-data blocking, the use of APIs, and the expanding role of Fast Healthcare Interoperability Resources (FHIR).



From Sam's FHIR Journey: A FHIR Drill
<https://fhir-drills.github.io/sam-fhir-journey.html>

The health ecosystem needs talented people

The health ecosystem needs talented people to operate these tools to drive common goals. The expansive, disjointed and silo'd health ecosystems of the recent past, now include a closer-knit group of collaborators like big pharma, drug developers and science, health care and hospitals, diagnostics and clinicians, payers, government, data and the technology.

The common goal: to mine through the data isolating the golden nuggets that give way to future solutions.

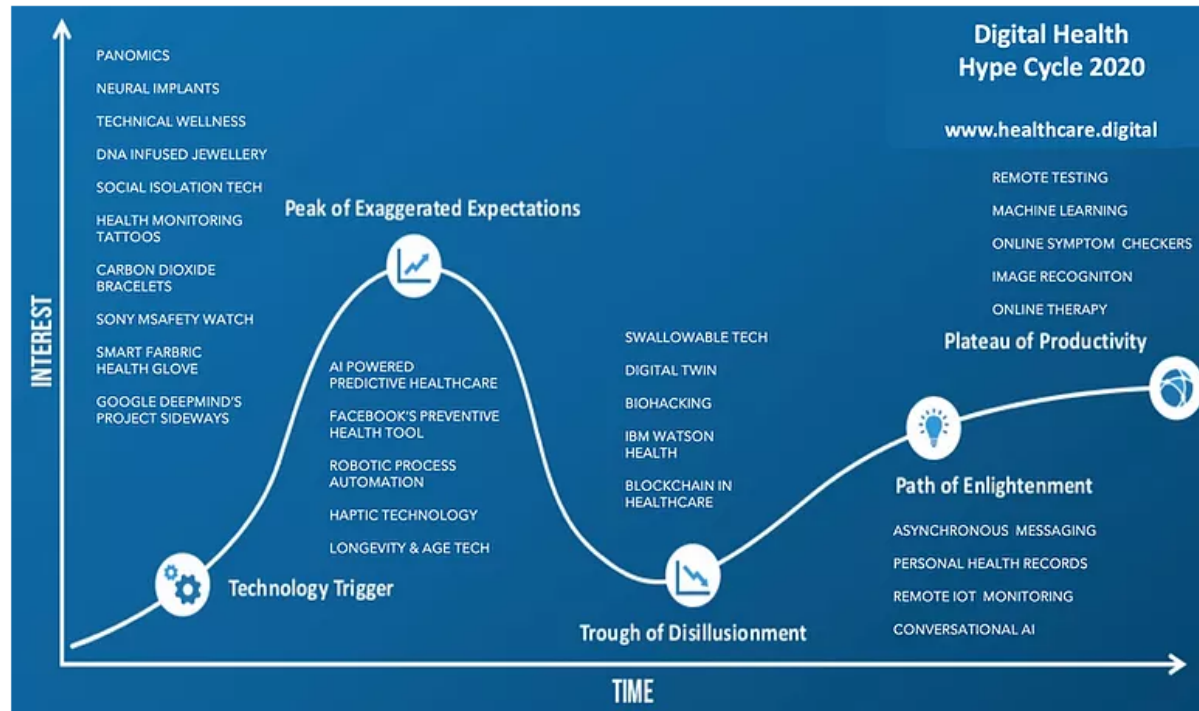
Sam's FHIR Journey

The diagram is an exercise to practice technical FHIR skills by creating resources needed for the healthcare system journey. Sam the Patient, has a known allergy (AllergyIntolerance). Sam has an Appointment at a hospital (Organization) which results in a hospital (Encounter). The doctor (Practitioner), who previously recorded Sam's allergy, examines Sam and notices an allergy to fish, so he orders a test to be done (ProcedureRequest) at the pathology lab (Organization). The hospital's system tracks this request using a (Task), so the doctor can check the task at any time to see if there's been any progress made. When the pathology lab performs its analysis, it records 'Hemoglobin' result as an (Observation) in its 'Complete blood count' (DiagnosticReport) which is sent to the FHIR server of the hospital. The pathology lab system updates the (Task) with the (DiagnosticReport) and notifies the doctor that results are available.

There is no doubt that A.I. will soon be the skeleton of healthcare.

Before we get too far ahead of ourselves ...

For health as an industry, the largest obstacle to progress has been interoperability. Almost a dirty word in some hallways, it has presented itself as the elephant in the room and one needing a new pasture. With time, patience and engineering, healthcare has discovered HL7, cloud technologies, FHIR, APIs and SMART. All are gaining ground.



Many behemoth sized global conglomerates have embarked upon the US health space over the last decade. It wasn't that long ago when ARRA-funded the national movement towards EHRs opening the passage in what was deemed 'the last techno-phobic holdout from using computers.'

The few advancements prior to ARRA were impressive but not entirely disruptive. GE, Siemens, and others concerned with radiology, billing and inventory control were at the top of the list. So began the industrial techno revolution of the wild west known as healthcare.

The tempo and trajectory for The Human Genome Project that started in 1990 and finished in 2003, had most of its accomplishments in the latter five years. The same can be applied here. Gartner, the global research and advisory firm, named this **Gartner's Hype Cycle**. This is when R&D launches into innovation with enthusiasm but experiences an uphill climb of productivity over time until the real-world benefits of innovation are realized after mainstream adoption. This can be applied to the data ecosystem of health tech.

The healthcare market is always evolving. The tech model has typically followed the same path as banking. Providers and patients demand the same kind of access to data, but better.

Digital Health Hype Cycle infographic created by Lloyd Price.



SMART on FHIR

Secure software-to-software interaction occurs when an API is “open.” and gives secure access to other authorized users. API’s (Application Programming Interfaces) perform the heavier lifting to solve the interoperability challenges. FHIR (Fast Healthcare Interoperability Resources) is a standard describing data formats, elements, and an API for exchanging EHRs. The standard was created by the (HL7) Health Level Seven International health-care standards organization. The FHIR format creates the standardization that allows the transfer of data back and forth. SMART on FHIR is an open API. SMART stands for Substitutable Medical Applications, Reusable Technologies. It is an open, standards-based technology platform that enables innovators to create apps that seamlessly and securely run across the healthcare system in real time. Open standards enable developers to build apps to connect to health data systems, such as EHRs and data warehouses, without requiring specialized knowledge about each system. SMART provides the needed layer of authentication.



The future is in the SMART apps

The future is in the SMART apps. Libraries of SMART apps are being designed with the goal of improving clinical care, research, and public health. With SMART on FHIR, applications can be plugged into an EHR system, portal, Health Information Exchange, and other Health IT systems, and feed information directly into the provider workflow, avoiding the pitfalls of document-based exchange, which often requires a provider to access data separately or acquire it in batch format.

Some EHRs are creating a sandbox for developers interested in linking to the EHR using FHIR. This is where the innovation with apps can occur. SMART on FHIR could allow custom user interfaces to be created to improve usability of EHRs. While SMART on FHIR may not affect clinicians directly, they will notice that the EHRs that have SMART on FHIR will facilitate easy sharing of data with physicians and patients and will improve the efficiency of the provider through real-time support.



The world of A.I.

Now, with these data exchange mechanisms of HL7, FHIR DICOM, etc., the world of A.I. is upon the industry emerging as less of a novelty and more as an accessible, unnoticed tool in the backdrop. Intended to be developed as a non-intrusive tool, FHIR is the gateway to healthcare's new world of AI and machine learning. FHIR is the platform for new innovations as it gives access to machine learning for life sciences, health care and the ecosystem, while improving operation efficiency with secure data interaction.

Keep watching for more news at Healthcare Technical Solutions and employing SMART on FHIR.