

## **FHIR, the time is now!**

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While the vast majority of patient health records are digital, exchange of these records with other healthcare providers and their patients is rather limited. Fortunately, global adoption of Fast Healthcare Interoperability Resources ([FHIR](#)), a modern standard for seamlessly exchanging healthcare information electronically, is accelerating. FHIR offers a rich set of components and features that can be applied in a variety of contexts - mobile phone apps, cloud communications, EHR-based data sharing, server communication in large institutional healthcare providers, and much more. Public policy in the US has been a strong driver for electronic medical records (EMR) interoperability and streamlined secure exchange and access to electronic health information. The Office of the National Coordinator for Health Information Technology (ONC) [recently proposed rule](#) for supporting the seamless electronic information exchange provisions of the [21st Century Cures Act](#). This rule calls on the healthcare industry to adopt standardized application programming interfaces (APIs) using FHIR, for patient level access to EMR data, which will help facilitate care coordination and enable individuals to access their personal health information using smartphone applications.

The industry responded to the call and tech giants, major EMR companies, and leading healthcare provider organizations joined forces to elevate their support for FHIR and build standards that help applications to communicate with each other. A notable example is [Apple](#) creating a FHIR based protocol that enables the [connection](#) between a hospital's EMR and the patient's iPhone. The [Da Vinci](#) and the [Argonaut project](#) are two significant FHIR promoting collaborations of leading technology vendors and provider organizations to accelerate the use of FHIR and health data interoperability. The Argonaut project was established to address the criticisms on the state of US healthcare interoperability of the [JASON report](#). FHIR is also gaining attention around the globe as a key component in many national strategies to digitize healthcare.

In Ontario, adoption of FHIR has been slow despite the work of [Canada Health Infoway](#) and [eHealth Ontario](#). HL7 v2 is still the de-facto preference for electronic health information exchange in vendor products and prevalent in the provincial connectivity and hospital technology infrastructures. Fortunately, this is likely to change for the following reasons. First, the formation of the [Ontario Health Teams](#) (OHT) encourages an integrated care delivery model that requires higher degree of interoperability and data exchange between information systems owned or operated by multiple service providers. Related to OHTs, FHIR was noted as the preferred standard in the [Ministry's digital health policy guidance](#) and [digital health playbook](#) documents as an enabler to connect digital assets using APIs and meaningful data exchange. During the OHT application development phase, there has been significant discussions and co-design sessions between software innovators and health service providers on integration of their applications to enhance patient and provider workflows, specifically via API access to read and update patient data in hospital EHRs. Such use cases are prime candidates for FHIR. The second reason in favor of FHIR adoption is the wave of ongoing hospital information system (HIS)

upgrade projects to newer and modern systems with builtin support for FHIR, that can ultimately become the foundation for more straightforward interoperability implementations.

As momentum for FHIR continues to build, there is a need for both health IT practitioners and executives to acquire an understanding, beyond the surface, on what FHIR is, its benefits, and its practical use. More published “how-to” examples, libraries of detailed examples of applying FHIR over a set of [common use cases](#) will help health IT practitioners to get on board. Practitioners will benefit from access to toolkits, [sandbox environments](#), and frameworks they can use to implement their FHIR projects. The intent here is not to provide exhaustive references to FHIR educational resources, but instead offer some pointers and invite the community and members of the Ontario Chapter of HIMSS to engage in active knowledge sharing.

At its core FHIR is an object model of healthcare business objects such as a patient, a procedure, an observation or an order, called resources, and a collection of well-defined, web-based APIs to create and manipulate healthcare object within an application or exchange them between applications. FHIR resources define a healthcare information model or conceptual schema that was created collaboratively by the FHIR community. The specification also allows to combine resources into components, to extend resources, to represent clinical terminologies, and to constrain data elements values to clinical ontologies and code sets. This makes FHIR’s object model ideal for representing clinical database schemas, building clinical data repositories, and creating portable datasets for data exchange in XML or JSON syntax.

FHIR can and will be used in a wide variety of circumstances, but primarily is designed to support [data exchange](#) between applications, and how exchange is managed and implemented. FHIR is commonly known for its support of REST APIs, a method to push and pull data between FHIR enabled applications using web-service calls over the internet.

The [FHIR RESTful API](#) defines a set of standard operations for each resource type expressed as HTTP request/responses and returning back resource instances in XML or JSON syntax. For example, the statement “GET https://fhir.example.ca/Patient/1” returns the patient resource with id=1, and it clearly demonstrates the ease by which an application, a patient portal for example, can access patient data from an EMR that exposes a FHIR server (leaving out the security and authentication part). One of the ONC proposed rules for improving interoperability in the US is for health IT vendors to support API based access to a set of core EMR data classes and data elements ([USCDI](#)). Several EMR vendors have already implemented support for USCDI data via FHIR APIs, offering third parties read access to patient data but are less open to allowing them to write back to the EMR.

Different data exchange use cases lend themselves to different methods. Bulk data exchange from system to system can be implemented through a messaging or document-based exchange where FHIR serves as the standards based data exchange format. Another way to use FHIR for application interoperability is to present them a native FHIR database or persistent store, where different applications or modules write and read the resources as part of their implementation. Lately platforms

such as [SmileCDR](#), and health cloud providers such as [Google GCP](#) and [Microsoft Azure](#) offer cloud managed services for FHIR enabled databases and APIs that remove the burden of FHIR database maintenance and API authentication, and allow organizations to focus on their use case implementation and healthcare workflows including prediction and analytics.

Is the time for FHIR now? If it is, are we ready? The answer to the first question is yes. The answer to the second: we have to be. In this document I covered some of the reasons and the benefits to accelerate adoption of FHIR in Ontario, and I provided a few pointers to example use cases and resources to help health IT practitioners and executives participate in the FHIR journey. The pace of any technology adoption is shaped by an established need for it, appropriate policies that mandate its use, and a community of prospective buyers and technology providers that are able to apply it and supported at scale. In the case of FHIR, the need is well established, the international, federal, and provincial policy environment is supportive, but use is not yet mandated at least in Canada, which puts the health IT community and vendors in the driver's seat. The call for action for Canadian healthcare organizations as buyers of digital health technologies is to insist that they support the latest FHIR-based interoperability standards and enhanced with terminologies that are ready for Canadian use.

### List of links and references

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