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# FHIR: Simplifying healthcare information exchange

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**While FHIR offers a promising approach, it's important to acknowledge that interoperability challenges are multifaceted**

The modern healthcare system holds immense potential for improved patient care and groundbreaking research. However, the reality is different. Health care systems often encounter fragmented data buried in silos.

Different healthcare providers and institutions operate with disparate Electronic Health Records (EHRs) that struggle to "talk" to each other. Fragmented Electronic Health Records (EHRs) make patient care difficult, frustrate the care providers, and even stifle research progress.

Imagine a patient rushing to a new emergency room, their medical history scattered across different systems (across multiple organizations). Crucial information – allergies, medications, past procedures – remain inaccessible. Delays ensue, potentially jeopardizing care. This scenario, sadly, isn't uncommon. Fragmented data creates a human cost, putting patients at risk and hindering timely, informed clinical decisions.

**Healthcare Interoperability: A Pressing Need**

Healthcare interoperability refers to the seamless exchange of data between different healthcare information systems. This

encompasses various aspects, including exchanging clinical data (diagnoses, medications), administrative data (billing, insurance), and public health data (immunization records, disease surveillance).

Standards are crucial for achieving interoperability. They act as a common language, a set of rules for how data is structured and transmitted. Widespread adoption of a common standard is key. However, the burden of implementing complex and inflexible standards often falls on healthcare system administrators and IT professionals (implementers). This can be a costly and time-consuming endeavour.

To promote interoperability the need was to have a standard, which is modern, easy to understand and fast to implement, and flexible enough to accommodate healthcare needs.

**Fast Healthcare Interoperability Resources**

**FHIR®** – Fast Healthcare Interoperability Resources (hl7.org/fhir) – is a next generation standards framework created by HL7, a leading healthcare standards development organization. FHIR combines the best features of HL7's v2 , HL7 v3, and CDA product lines while leveraging the latest web standards and applying a tight focus on implementability. This focus on implementability makes FHIR easier and faster to use than older options.

**Building Block Approach**: FHIR solutions are built from a set of modular components called "Resources". These resources can easily be assembled into working systems that solve real-world clinical and administrative problems at a fraction of the price of existing alternatives.

**FHIR's Versatility**: FHIR is suitable for use in a wide variety of contexts – mobile phone apps, cloud communications, EHR-based data sharing, server communication in large institutional healthcare providers, and much more.

**Balancing Simplicity and Accuracy**: FHIR aims to simplify implementation without sacrificing information integrity. It leverages existing logical and theoretical models to provide a consistent, easy to implement, and rigorous mechanism for exchanging data between healthcare applications.

**Complementary, not Competitive**: FHIR can be used as a stand-alone data exchange standard, but can and will also be used in partnership with existing widely used standards.

**Open Source and Agile**: FHIR's open-source and agile development approach fosters rapid improvement based on user needs. This ensures FHIR stays relevant and adaptable in the ever-evolving healthcare landscape.

**Community**: FHIR creators understood the role of community in ensuring widespread adoption and keeping the standard relevant. Hence, FHIR is more than just a technical specification. It's also a vibrant community. This community is crucial for the ongoing development and refinement of the standards. The FHIR community is the engine that drives the standard forward.

**The emerging de facto health data exchange standard**

As someone who has spent a significant amount of time in the healthcare data interoperability space, I believe that FHIR could potentially be the health data exchange standard of choice. It is already being used globally with many national health initiatives mandating use of FHIR, including India, where ABDM (Ayushman Bharat Digital Mission) and NHCX (National Health Claims Exchange) have prescribed the use of HL7 FHIR.

Following are the key design principles which make FHIR the standard of choice among the implementers:

1. **Focus on implementability**: The core FHIR standard is designed to be straightforward to implement, reducing the complexity faced by healthcare providers and developers when exchanging data. There are several reference implementations available for implementers to choose from.
2. **Focus on simplicity & flexibility**: Healthcare needs are diverse, and FHIR acknowledges that. It provides a core set of resources (data building blocks) for common healthcare entities like patients, medications, and allergies. However, FHIR allows for extensions. These are like "add-on" features for the building blocks, allowing customization for specific needs without altering the core standard.
3. **Open Source & free**: FHIR is completely free and open-source. This means anyone can access the specifications, develop FHIR-compliant applications, and contribute to its ongoing development. The open-source nature fosters a vibrant community of developers and healthcare professionals who collaborate on improving and expanding FHIR's

capabilities.

4. **Technologically agnostic**: FHIR is not tied to a specific technology. It uses common web standards (RESTful APIs, JSON, XML, Oauth etc.) that are widely supported across different platforms and programming languages. This makes FHIR adaptable to future technological advancements. As new technologies emerge in healthcare IT, FHIR should remain compatible, ensuring its continued relevance.

**FHIR Example** :

With FHIR, any lab can confidently share data with any PHR (Personal Health Records) app. The lab creates a diagnostic report resource, bundling test results, interpretations, text, and image references. This resource is then sent via FHIR's RESTful APIs to the PHR app, ensuring all necessary information reaches the patient.

**Is FHIR Simple?**

For those new to healthcare data exchange standards, FHIR offers a gentler introduction compared to its predecessors. Its focus on human-readable resources and RESTful APIs makes initial understanding easier. Setting up a FHIR server, crafting a simple resource, exchanging it can be done in a few hours by anyone with basic understanding of healthcare and technology.

However, working with FHIR effectively requires some technical knowledge. Building FHIR-compliant applications involves understanding data structures, APIs, and potentially coding.

Overall, FHIR is a significant improvement in simplicity compared to older healthcare data exchange standards. But it's not a plug-and-play solution. The ease of use increases with your technical expertise and experience with FHIR. The supportive FHIR community and available learning resources can help bridge the gap.

**India: shaping the future of FHIR**

Interest and adoption of FHIR in India is on the rise. National digital health initiatives like Ayushman Bharat Digital Mission (ABDM) and National Health Claims Exchange (NHCE) mandate the use of FHIR. India has one of the largest talent pools of FHIR developers and implementers in the world. This talent today is catering to the increasing demand from FHIR implementation across the world.

In the Indian context, adopting FHIR makes a lot of sense. Following are some of the reasons why I find FHIR a natural fit for India

- FHIR Standard is free and open, hence no licensing cost. Multiple open source implementations to choose from.
- A large talent pool is already available. In-fact since FHIR makes use of common and well known web standards, anyone working on web or mobile apps can be a FHIR implementer.
- Standard is flexible and adaptable, which provides flexibility to adapt it to our local needs in a compliant and interoperable way.
- Defacto healthcare exchange standard for the internet and mobile era.

India's diverse and vast healthcare landscape positions it as a key player in shaping the future of FHIR. Here's how you can contribute:

**India's Unique Advantage:**

- Data Rich Environment: India's immense and diverse patient population generates massive amounts of healthcare data. This real-world data can be invaluable for refining FHIR to handle complex scenarios and diverse healthcare practices.
- Multiple Medical Systems: The presence of Ayurveda, Homeopathy, and Allopathy alongside traditional medicine creates a unique data landscape. Addressing these complexities in FHIR implementation can strengthen the standard for global use.

**Shaping the Future of FHIR:**

By actively participating in the FHIR community, India can significantly impact the development and adoption of FHIR:

- **Contribute to Standard Development:** Share your experiences and insights on how FHIR can be adapted to handle the nuances of the Indian healthcare system. This can inform future revisions and improvements to the standard.
- **Refine Interoperability Solutions:** India's diverse healthcare landscape presents a valuable testing ground for interoperability solutions built on FHIR. By actively implementing and refining FHIR-based solutions, India can contribute to robust interoperability standards for the global healthcare community.

We are at a unique position to impact the overall direction of development of healthcare information technology including but not limited to FHIR and interoperability.

**FHIR: Not a Silver Bullet for Interoperability**

While FHIR offers a promising approach, it's important to acknowledge that interoperability challenges are multifaceted. Technical hurdles coexist with cultural and societal issues. FHIR's strength lies in its focus on both technology (the standard) and the people who implement and use it (the community). By fostering collaboration and providing a flexible framework, FHIR paves the way for a more connected and efficient healthcare ecosystem, ultimately benefiting patients and providers alike.

FHIR lays the foundation, but building a truly connected healthcare ecosystem requires a collective effort from all stakeholders.

*About the Author:*

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