

How Healthcare Caught FHIR

The exchange of patient information is a crucial aspect of healthcare delivery, enabling clinicians and other healthcare professionals to access critical information about a patient's health status and medical history. However, exchanging patient information between different electronic medical records (EMR) and healthcare information technology systems has traditionally been a complex and challenging process, often requiring extensive manual intervention and data conversion.

In response, the healthcare industry has developed a new standard for exchanging patient information, the Fast Healthcare Interoperability Resources (FHIR).

Evolution of the FHIR Standard

Health Level Seven International (HL7), a not-for-profit ANSI-accredited standards-developing organization, developed FHIR to provide a framework and standards for exchanging, integrating, sharing, and retrieving electronic health information. Several factors influenced the development of FHIR, including the limitations of previous healthcare information standards, such as Health Level Seven Version 2 (HL7 V2) and Clinical Document Architecture (CDA), which were often complex and challenging to implement. First released in 2014, FHIR has undergone several updates and improvements to address emerging healthcare challenges. These updates include new features, improvements to existing functionality, bug fixes, and other enhancements.

The flexible and adaptable FHIR standard allows for exchanging health information in various contexts, including mobile devices, web-based applications, and EMRs. The FHIR standard build follows three fundamental principles: simplicity, flexibility, and extensibility. Unlike previous health information exchange standards, FHIR uses modern web standards such as Representational State Transfer (REST) and JavaScript Object Notation (JSON), which enables more efficient and scalable health information exchange. Finally, FHIR is extensible and easily extended to support new use cases and data elements.



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Navigating the Code

The healthcare industry, unlike many others, runs on time-tested ways to practice excellence in medicine. But does that mean adherence to practices and processes that are fifty, seventy, even a hundred years old?

Dr. Barry P. Chaiken thinks not. His 25+ years of experience as a physician and an informaticist, he believes information technology is healthcare's greatest problem-solving tool for resolving the greatest medical and business problems of the 21st century.

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Acceptance of the FHIR Standard

The FHIR standard has gained widespread acceptance in the healthcare industry. To accelerate acceptance, HL7 makes available a broad array of tools and resources to support its implementation, including documentation, sample code, and testing tools. In addition, many technology vendors offer FHIR-based solutions and services, making it easier for healthcare organizations to adopt and implement the standard.

Since its release, many major healthcare technology vendors, including Epic, Cerner, and Allscripts, have adopted FHIR in their products to facilitate interoperability and improve health information exchange between healthcare organizations.

FHIR's acceptance and use are also driven by regulatory and industry initiatives to promote interoperability and data exchange in healthcare. For example, the Office of the National Coordinator for Health Information Technology (ONC) has developed the Trusted Exchange Framework and Common Agreement (TEFCA) to promote interoperability and data exchange between healthcare organizations using standards such as FHIR.

Healthcare providers and organizations are increasingly recognizing the benefits of FHIR for improving healthcare delivery. For example, FHIR can enable clinicians to access critical patient information more quickly and easily, reducing the risk of errors and improving patient outcomes. FHIR can also help healthcare organizations to share data more effectively, enabling them to coordinate care better and improve population health.

Use of the FHIR Standard

The FHIR standard has been used in various healthcare settings to facilitate health information exchange between different systems. One example is the SMART on FHIR platform, a web-based platform that enables the integration of third-party applications with EMRs. SMART on FHIR uses FHIR to facilitate the exchange of health information between different systems, allowing healthcare providers to access patient data from various sources within their EMR.

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FHIR allows healthcare providers to access and share up-to-date patient data, such as health status, medications, and allergies, more easily and quickly. Sharing clinical data among providers improves medical decision-making, reduces errors, and improves outcomes by ensuring that healthcare providers have accurate and complete patient information.

The FHIR standard also helps develop mobile health (mHealth) applications. FHIR enables the exchange of health information between mobile applications and EMRs, allowing patients to access their health information from their mobile devices. This information exchange can improve patient engagement and enable patients to be more active in managing their health.

FHIR can also improve care coordination and collaboration between healthcare providers, leading to better patient outcomes. For example, FHIR enables care teams to share care plans, track patient progress, and coordinate follow-up care. Helping care teams can reduce hospital readmissions, improve patient satisfaction, and lower healthcare costs.

FHIR supports population health management by enabling healthcare providers to analyze and share health data at a population level. Sharing data helps to identify trends and patterns in health outcomes, and develop targeted interventions.

FHIR can also reduce healthcare costs by enabling providers to operate more efficiently. For example, FHIR automates administrative tasks, such as scheduling appointments and processing insurance claims, which can reduce administrative costs and improve the patient experience. FHIR also helps reduce duplication of tests and procedures, lowering healthcare costs and improving patient outcomes.

Overall, the evolution, acceptance, and use of the FHIR standard in exchanging patient information between electronic medical records and other healthcare information technology systems represent a significant step forward in improving healthcare delivery. As the industry continues to evolve, the adoption of FHIR is expected to increase, leading to more efficient and effective healthcare delivery.

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Challenges and Future Directions

While FHIR has many benefits and advantages, it has limitations. Some of the main limitations of the FHIR standard include:

1. **Limited adoption:** While FHIR has gained widespread acceptance in the healthcare industry, it is still a relatively new standard and has yet to be adopted universally. Healthcare systems may still use older standards or proprietary formats for exchanging healthcare data.
2. **Data quality:** FHIR relies on the quality of the underlying data to be effective. If the data exchanged is not accurate, complete, or consistent, it can lead to errors and misinterpretations, which can compromise patient safety.
3. **Security and privacy:** FHIR relies on secure and private exchange of healthcare data, but there are still concerns about data breaches, hacking, and unauthorized access. Healthcare providers must take appropriate measures to safeguard patient data and ensure access by authorized personnel.
4. **Interoperability challenges:** FHIR, although designed to be interoperable, still has challenges around integrating data from different systems and ensuring compatibility. Managing multiple systems can be particularly challenging in complex healthcare environments.
5. **Data governance:** FHIR relies on effective data governance, including data quality, management, and stewardship. Healthcare providers must have adequate policies and procedures to ensure accurate, reliable, and up-to-date data.
6. **Implementation complexity:** While FHIR is simpler and more flexible than previous standards, it still requires significant effort and investment to implement effectively. Healthcare providers must have the technical expertise, resources, and infrastructure to implement FHIR effectively.

The healthcare industry is working to promote the widespread adoption of FHIR and to develop best practices for its implementation and use. This includes the development of guide-

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lines and standards for FHIR implementation, as well as developing tools and resources to support FHIR adoption and use.

The Argonaut Project, launched in 2014, was established to accelerate the adoption of FHIR in healthcare. The Argonaut Project is a private sector initiative that brings together healthcare providers, technology companies, and other stakeholders to develop and test FHIR-based solutions for healthcare data exchange. The project has developed a set of implementation guides for FHIR, which guide how to implement FHIR for different healthcare use cases, such as medication management and patient care coordination.

Another initiative is the Office of the National Coordinator for Health Information Technology (ONC) 's Interoperability Standards Advisory (ISA), which provides a list of recommended standards and implementation specifications for healthcare data exchange. FHIR is a recommended standard for healthcare data exchange in the ISA.

Future directions for FHIR include the development of additional data elements and profiles to support more advanced use cases, such as precision medicine and population health management. FHIR is also likely to play an essential role in developing artificial intelligence (AI) and machine learning (ML) applications for healthcare, as it provides a standard data model and data exchange format that can support these applications.

Conclusion

The FHIR standard has emerged as a critical tool for facilitating health information exchange between different healthcare information technology systems. Its flexibility, scalability, and adaptability have made it popular among healthcare technology vendors and organizations. The standard's widespread acceptance and use in healthcare technology systems have the potential to improve care coordination, reduce errors, and improve patient outcomes. As the healthcare industry continues to evolve, the FHIR standard will play an essential role in enabling interoperability and improving health information exchange.

What is Hallucination in AI?

Hallucination in AI refers to the generation of outputs that may sound plausible but are either factually incorrect or unrelated to the given context. These outputs often emerge from the AI model's inherent biases, lack of real-world understanding, or training data limitations. In other words, the AI system "hallucinates" information that it has not been explicitly trained on, leading to unreliable or misleading responses.

Source: <https://bernardmarr.com/chatgpt-what-are-hallucinations-and-why-are-they-a-problem-for-ai-systems/>

Healthcare organizations that still need to adopt FHIR should consider its benefits and explore its potential use in their systems.

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[Author Note](#): I asked ChatGPT (4.0) to write an article on the evolution, acceptance, and use of FHIR in exchanging patient data. By requesting several “regenerations” of the responses, I constructed a more informative article from pieces of each version. This is the finished document.