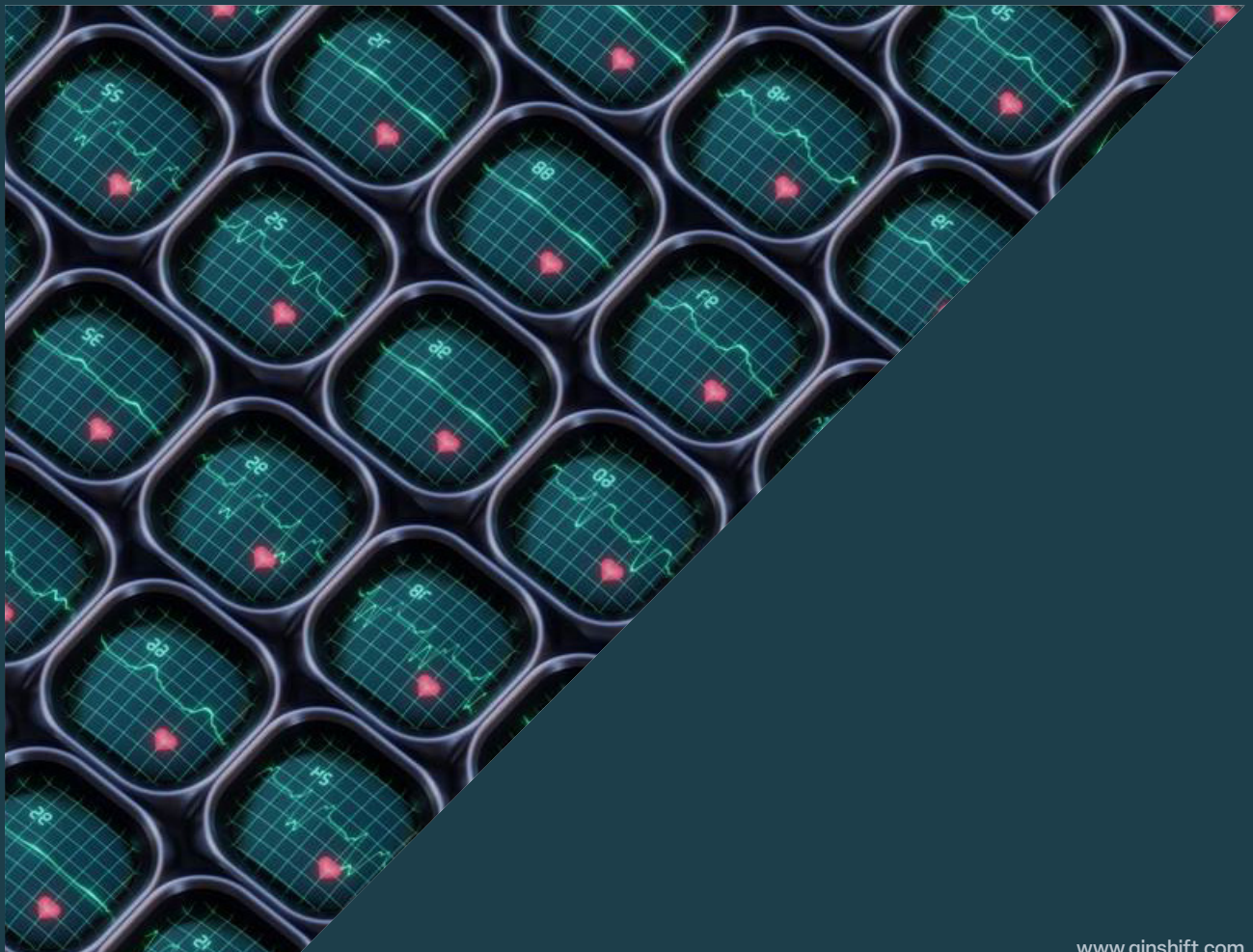


White paper

Healthcare reimaged: The transformative power of OpenEHR in e-Health

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Abstract

The landscape of healthcare is evolving, and at the forefront of this transformation is the innovative potential of OpenEHR. Traditional medical record systems have long been plagued by proprietary data models and vendor lock-in scenarios, creating barriers to seamless data interchange among healthcare entities. In this white paper, we delve into the strategic value of OpenEHR in the future development of e-health solutions, exploring its significance, real-world applications, and the imperative need for industry standards.

About us

Qinshift is a global technology company with a strong European presence, aiming to solve business problems for forward-leaning companies worldwide. Our team of over 3500 genuine tech experts builds and designs software and delivers end-to-end enterprise solutions, visionary UX and UI design, reliable managed services, and innovative product development offerings. Qinshift also provides cutting-edge tech consultancy services and caters to a diverse clientele, supporting their digital transformation journey.

Strategic value of openEHR in future e-Health development

Traditional challenges in medical records systems

Traditionally, medical records systems have been developed with proprietary data models and interfaces, leading to vendor lock-in scenarios. These systems, often inaccessible to healthcare organizations, create dependencies and impede data interchange between different systems.

The significance of openEHR

OpenEHR presents a transformative approach in e-health development, distinctively positioned as a platform-centric solution rather than a mere set of standards or a rigid specification. Its technical foundation is designed to support a wide range of applications and services, offering **unparalleled flexibility and adaptability** to solve the pivotal challenge of interoperability in healthcare.

Reality of lock-in business models in Healthcare

OpenEHR stands not merely as a technical standard but as a medical professional-centric framework. It offers robust tooling support and a global network of medical experts collaborating on a shared knowledge database. Established in 1994, openEHR is not a fleeting trend but a foundational element in healthcare, championing the vision of a universally accessible EHR.



The necessity of industry standards

The openEHR initiative

Unlike many other industries that demonstrate the efficiency of universal standards allowing for service differentiation based on factors like customer service or interface usability, healthcare has been characterized by constraint practices with lock-ins and barriers for service differentiations.

The openEHR initiative, as outlined on openehr.org, is a collaborative initiative aimed at **transitioning health data from physical to electronic formats while ensuring universal interoperability**. Its focus is predominantly on Electronic Health Records (EHR) and associated systems.

Envisioning a unified EHR system

A globally unified EHR system would enable universal access to medical data, transcending geographical constraints. However, this ideal scenario contrasts sharply with the current state, where interoperability remains a significant challenge.

OpenEHR integrates an extensive semantic framework, which is unparalleled in e-health. This framework encompasses formal clinical modeling, terminology, and a robust services infrastructure, providing a rich and adaptable environment for e-health applications. The platform is uniquely equipped to tackle the complex and evolving challenges in e-health, where it adeptly manages intricate and ever-changing clinical information and workflows, ensuring sustainability in the long term.

Economic ecosystem and customer data control

OpenEHR fosters a platform-based economic ecosystem. In this ecosystem, customers maintain purchasing control at the component level. The platform's specifications, including information models, APIs, and clinical models, serve as conformance benchmarks for procurement, effectively preventing vendor lock-in based on data format or other technical aspects.

A key feature of openEHR is the assurance that **customers retain control and ownership of their data**. This approach safeguards against unforeseen costs associated with long-term data utilization, ensuring economic efficiency and data sovereignty.

Clinical ecosystem of experts

OpenEHR enables direct involvement of clinical experts in the specification and ongoing development of the system. This ensures that the platform evolves in alignment with the real-world needs and insights of healthcare professionals.

The increasing number of openEHR suppliers, alongside government-led initiatives like those in Australia, Finland, the UK, Brazil, Norway, contribute to a robust and diverse ecosystem. These entities are producing clinical models and terminology artifacts for openEHR, ensuring a rich pool of products, services, and expertise. This ecosystem is further strengthened by compliance with international standards such as IHE, HL7, and ISO, guaranteeing interoperability and versatility. OpenEHR stands as a pivotal and strategic asset in the realm of e-health, offering a comprehensive, scalable, and economically viable platform. Its approach not only addresses current e-health challenges but also sets a strong foundation for future innovations and developments in this domain.

“Adopting openEHR allows NHS Wales to start the transition from the siloed and document bound approach to the emerging open platform”

John Meredith
NHS Wales Informatics Service

The imperative of data standardization

Understanding openEHR

OpenEHR is a standardized framework for EHR data, based on archetypes and templates. Archetypes define broad medical concepts, collaboratively developed by specialists to ensure comprehensive data representation. The use of a common openEHR reference model facilitates consistency and interoperability.

Software developers utilize openEHR by creating user-friendly templates derived from archetypes. Compliance with the openEHR framework ensures **data validation and interoperability across different systems and liberates data models from proprietary control**, promoting innovation and competition among software providers based on user interface and additional services.

Since its inception in 1994, openEHR has seen international adoption in countries like Australia, Finland, the UK, Brazil, Norway, and others. It has been instrumental in various academic and industrial projects worldwide.

Overcoming IT challenges in e-Health

The realm of e-health presents a unique set of semantic challenges for information technology, which have persisted for decades despite a seemingly straightforward set of needs.

Interoperability within and across enterprises:

Achieving semantic interoperability, not only within a single healthcare entity but also across different enterprises, is a fundamental challenge. This goes beyond sharing lab results or patient records; it encompasses the aggregation of a patient's data from various sources for advanced analytics in personalized and preventative medicine.

Inter-system functionality:

Another aspect of semantic complexity is ensuring interoperability between different layers of functionality within a healthcare system. This includes intelligent data computation and the capability to support team-based, long-term clinical processes effectively.

Diverse and evolving data:

The massive diversity of data and the high rate of change in workflows, clinical protocols, and data definitions make conventional IT approaches inadequate.

“Interoperability is the ability of different information systems, devices or applications to connect, in a coordinated manner, within and across organizational boundaries to access, exchange and cooperatively use data amongst stakeholders, with the goal of optimizing the health of individuals and populations.”

HIMSS Definition 2022

Unregulated clinical data repositories:

The phenomenon of ‘Access Database problem’, where hospitals host numerous unofficial specialist databases, arises due to the inadequacy of main Electronic Medical Records (EMR) systems in meeting clinicians’ needs for data richness.

Changeover and integration costs:

The incoherence of current systems, coupled with high data volumes and the need for constant availability, leads to prohibitive changeover costs. Similarly, ‘best-of-breed’ solutions, while appealing, often result in unmanageable integration expenses.

Procurement and deployment challenges:

The logistics of deploying new, monolithic solutions are daunting and often lead to cyclical failures due to the impracticality of implementing such systems in a single phase.

Data lock-in:

Large vendors often do not disclose their data models, making it difficult for healthcare providers to reuse data generated within their systems, leading to a situation of data lock-in.

In summary, the dual challenge in e-health IT lies in managing the semantic complexity of healthcare data and processes, and the logistical complexities of implementing and maintaining effective IT solutions within this dynamic and critical sector. Addressing these issues is crucial for the successful integration of IT in healthcare, paving the way for more efficient, effective, and patient-centered care.

Why OpenEHR when we have FHIR?

Key Differences Between FHIR and openEHR

Looking at the key differences between FHIR and openEHR, two prominent frameworks in e-health, we must clarify the concrete distinctions and alleviate confusion often caused by the widespread hype around FHIR.

FHIR (Fast Healthcare Interoperability Resources) is designed primarily to enable data extraction from proprietary healthcare systems for applications and inter-system messaging. Its modeling approach involves creating profiles based on resources, which are essentially fragment definitions. These fragments, like blood pressure data, are retrieved through a REST API from various systems. However, FHIR's fragment models are not a coherent model of semantics but isolated lumps of information designed for ad hoc data retrieval. FHIR lacks a core library of clinical models, despite profiles tailoring resources for domain needs.

On the other hand, openEHR offers an architecture for a comprehensive health information platform. This includes a REST API, an information model, a domain modeling layer with archetypes and templates, portable querying, and interoperability resources. The openEHR Reference Model is designed to represent health information content, context, audit, and versioning, enabling the management of longitudinal EHRs. Unlike FHIR, openEHR's methodology starts with clinically and informatically designed archetypes, with templates used to define data sets for messaging and new applications. In terms of data representation, openEHR's Reference Model allows for stable software and database schemas. Its separation of clinical and domain level models from information models ensures interoperability at both the information and domain levels, given the shared use of archetypes. FHIR, however, lacks a clear data model, and its resources encompass various ontological levels, leading to volatility and open-endedness in its model, which requires continual maintenance.



OpenEHR separates clinical/domain models and information models, ensuring interoperability at both levels.

Finally, regarding domain coverage, openEHR outpaces FHIR significantly. openEHR's CKM and similar repositories cover about **10,000 domain data points**, while FHIR's resources and profiles, though increasing, offer limited coverage in comparison. This substantial difference in domain coverage underscores the challenges FHIR faces in achieving comprehensive interoperability across the vast array of clinical information needed in healthcare.

In summary, while FHIR is focused on data extraction from existing systems and offers a flexible but less structured approach, openEHR provides a more comprehensive, clinically grounded framework for health information management, with greater potential for standardization and interoperability in the global e-health domain.

Accelerated research – a momentous opportunity

The unparalleled potential of OpenEHR data utilization

OpenEHR, with its extensive ecosystem of medical archetypes, constitutes a globally significant resource. These datasets encompass detailed information from a vast and ethnically diverse demographic, involving tens of millions of individuals. Such diversity in data is instrumental in generating analytic insights with the potential to save lives internationally.

The depth and potential of OpenEHR concepts archetypes, representing the medical histories of millions, are immense. In the realm of healthcare, data forms the backbone of progress and innovation. It guides the determination of the most effective treatments for diverse patient groups and has been pivotal in shaping the global response to challenges like the COVID-19 pandemic. Furthermore, it offers critical insights for addressing post-pandemic backlogs. The life sciences sector benefits immensely from these archetypes and data models, utilizing them to assess and refine medications and foster the development of new medical technologies. Through comprehensive monitoring of activities and outcomes, these archetypes are positioned to uncover novel ways to enhance the quality, safety, and cost-effectiveness of healthcare services.

The role of data platforms for research

Even though the medical world is full of world-class researchers and a wealth of data, this raw data alone is insufficient for impactful research. Effective data utilization requires meticulous curation, management, and preparation, which are then complemented by well-designed data platforms. These platforms must gain public trust through robust security measures and transparency, facilitating the sharing and reuse of data.

Currently, the system is fragmented, characterized by numerous small-scale data projects with limited integration. This leads to redundant distribution of patient records across various projects, escalating costs related to data management, governance, and security. Such systems are prone to monopolization and hinder the transfer of knowledge and analysis between different research environments. This decentralized approach, born out of necessity, is not scalable to meet the demands of a leader in data science.

“The ability to develop and iterate on solutions alongside frontline colleagues over days rather than months, is key to ensuring optimised workflows, engaged clinical teams and improved patient outcomes”.

Andrew Forrest
Chief information officer at Taunton
and Somerset NHS Foundation Trust

Strategic approach to future data utilization

By committing to a unified strategy for data curation and developing a select number of secure platforms, the untapped potential in OpenEHR can be fully realized.

A focused effort on developing the OpenEHR platforms, and creating dedicated teams or institutions for analytic facilitation, can lead to significant advancements. The investment required for this initiative is minimal compared to the costs of digitizing a single hospital. Such investment will enable the creation of secure data platforms and a skilled workforce capable of unlocking the full potential of OpenEHR data. This is crucial not only for enhancing research and healthcare services but also for driving innovation. The urgency introduced by the COVID-19 pandemic underscores the need for this advancement, with future challenges likely to be more demanding. There is an immediate and ongoing need for improved, expansive, and secure utilization of OpenEHR data for the betterment of global health and e-Health as a delivery model.

Qinshift – empowering healthcare providers

Introduction to Qinshift

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Data-centric solutions

We design data-centric solutions that not only foster innovation but also establish a robust data architecture capable of collecting, storing, analyzing, and developing applications and services. Our collaborative approach ensures tailored solutions that align with the specific needs of our clients, enabling them to stay ahead of the curve.

**Ready to transform your healthcare IT landscape?
Reach out to Qinshift today.**

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