



Black Book

Global Growth Opportunities for openEHR Adoption in 2025-2026

Black Book
Research Insights



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openEHR: A Catalyst for Global Health Data Transformation

The global healthcare landscape is undergoing a profound shift from application-centric to data-centric models, driven by the urgent need to address challenges in interoperability, clinical data quality, and AI readiness. At the forefront of this transformation is openEHR, a cutting-edge framework that provides the foundational infrastructure for scalable, longitudinal, and vendor-neutral health data ecosystems.

In its Q1 2025 Global Market Insight Report, Black Book Research highlights openEHR as the architecture of choice for nations seeking to modernize their healthcare systems. As digital transformation accelerates worldwide, openEHR offers a strategic pathway for governments and healthcare organizations to decouple clinical data from legacy applications, enabling the creation of flexible, composable systems designed to adapt to evolving technological and patient care demands.

The report evaluates 30 countries based on key criteria such as government policy alignment, digital health infrastructure maturity, interoperability mandates, and investment in sustainable transformation. Nations like the United Kingdom, Catalonia, and the Nordic countries are leading the charge, demonstrating how openEHR can drive patient-centered innovation, operational agility, and long-term resilience.



The strategic benefits of openEHR extend far beyond traditional interoperability. Its dual-model architecture—combining standardized clinical archetypes with adaptable templates—enables the creation of structured, computable health records. These records not only ensure semantic consistency but also unlock advanced capabilities in analytics, decision support, population health management, and AI integration.

By fostering seamless data exchange, long-term data persistence, and vendor neutrality, openEHR is more than a technical standard—it is a transformational enabler for healthcare systems of all sizes. As nations adopt openEHR, they are building the foundation for a new era of integrated, efficient, and patient-centered healthcare delivery, while positioning themselves to lead in the next wave of clinical intelligence and digital health innovation.



Key Findings

openEHR as a Catalyst for Health Data Transformation



The global healthcare landscape is undergoing a significant transformation, shifting from application-centric to data-centric models. This evolution addresses critical challenges in interoperability, clinical data quality, and readiness for artificial intelligence (AI) applications. At the heart of this transformation is openEHR, providing the essential infrastructure to meet these challenges effectively.

The Paradigm Shift to Data-Centric Models

Traditional healthcare systems have often been constrained by application-centric architectures, where data is tightly coupled with specific software applications. This design leads to fragmented data silos, hindering seamless data exchange and integration across diverse healthcare platforms. In contrast, a data-centric approach emphasizes the centrality of data, ensuring it is stored independently of applications. This separation allows for greater flexibility, scalability, and interoperability, enabling healthcare organizations to adapt more readily to evolving technological advancements and patient care needs.

openEHR: A Foundational Architecture for Modern Healthcare

Doug Brown, Founder of Black Book Research, underscores the transformative potential of openEHR, stating, "openEHR is not merely an open standard—it's a foundational architecture for clinical data that delivers future-proof flexibility, computational semantics, and true vendor neutrality." This perspective highlights openEHR's role in redefining how health systems conceptualize and manage their data assets.

Core Advantages of openEHR

- **Persistent and Reusable Health Records:** openEHR facilitates the creation of enduring health records that remain consistent and accessible over time, irrespective of changes in application software. This persistence ensures that patient data is not lost or rendered obsolete due to system upgrades or vendor changes.
- **Cross-System Interoperability:** Through its modular and composable data modeling, openEHR enables seamless interoperability across various systems and vendors. This capability is crucial for integrated care delivery, allowing different healthcare providers to access and share patient information effortlessly.

- **Semantic Consistency:** By empowering clinical domain experts to define archetypes—standardized, reusable models for clinical concepts such as medications, allergies, and procedures—openEHR ensures uniform understanding and usage of clinical data across systems. This semantic consistency enhances data quality and supports accurate clinical decision-making.
- **Acceleration of AI and Analytics Initiatives:** openEHR's structured, longitudinal data framework is inherently designed for machine readability and computational reasoning. This design accelerates the development and deployment of AI-driven applications and advanced analytics, facilitating innovations in predictive modeling, personalized medicine, and population health management.

Global Adoption and Impact

The adoption of openEHR is gaining momentum worldwide, with several countries recognizing its strategic value:

- **United Kingdom:** The National Health Service (NHS) has implemented openEHR to develop shared care platforms across multiple regions, enhancing data interoperability and supporting the UK's commitment to universal healthcare. This approach facilitates standardized, patient-centric information storage in a vendor-neutral format, fostering innovation within the healthcare ecosystem.
- **Catalonia, Spain:** Catalonia has implemented a large-scale, open-source, openEHR-powered longitudinal health record for over 8 million residents. This initiative serves as a model for national-level transformation across Europe, demonstrating how openEHR's semantic architecture can precisely define health and care information, thereby improving data quality and accessibility.
- **Nordic Countries (Norway, Sweden, Finland):** Healthcare systems in the Nordic countries have integrated openEHR through their national EHR vendors, adopting structured clinical models and open data platforms at scale. This integration positions them among the most mature openEHR markets globally, showcasing the benefits of a robust modeling framework where domain models are created by domain experts and separated from technical layers, leading to greater agility and reuse.

Enhancing Continuity of Care and Resource Optimization

In the face of mounting pressures to enhance continuity of care and optimize resource utilization, openEHR offers a scalable pathway to build health data systems that are durable, vendor-neutral, and adaptable to evolving digital needs. By minimizing the cost and complexity of point-to-point integrations and eliminating data silos, openEHR enables health systems to achieve a level of semantic consistency that is often unattainable with traditional EHR platforms.



Conclusion

The transition to data-centric health IT models, underpinned by openEHR, represents a fundamental shift in healthcare data management. By providing a robust, flexible, and interoperable framework, openEHR addresses critical challenges in data persistence, interoperability, semantic consistency, and AI readiness. Its global adoption underscores its effectiveness as a catalyst for health data transformation, paving the way for more integrated, efficient, and patient-centered healthcare delivery systems.



Leaders

Global Leaders in openEHR Implementation



United Kingdom

The United Kingdom's National Health Service (NHS) has been a pioneer in adopting openEHR standards to enhance interoperability and patient care across its healthcare system. A significant initiative in this endeavor is the NHS England Shared Care Records program, which aims to develop a comprehensive, integrated digital care record accessible across various health and social care settings. By March 2023, all Integrated Care Systems (ICS) were expected to have systems enabling information exchange across collaborative networks, facilitating comprehensive patient data access for healthcare professionals.

Technical Implementation and Infrastructure

The NHS's approach involves creating a standardized data model that can be adopted across various healthcare institutions. This model focuses on separating clinical data from application logic, allowing for greater flexibility and adaptability in the face of evolving healthcare needs. The implementation of shared care records has significantly enhanced clinical decision-making. Clinicians now have improved access to patient health and social care information across multiple providers, leading to better and faster clinical decisions based on complete and current information. For instance, medication safety has improved, with reconciled medication lists available within 24 hours of patient admission, reducing the risk of discrepancies.

Cultural and Organizational Transformation

Beyond technical infrastructure, openEHR has facilitated cultural and organizational transformation within the NHS. It supports innovations in population health management, analytics, and patient engagement by providing a reliable foundation for consistent data capture and longitudinal record-building. The NHS's adoption of openEHR has also reduced reliance on legacy vendors, fostering a more open environment for digital health entrepreneurship.

Estonia

Estonia is globally recognized for its comprehensive e-government services, and its healthcare system reflects this digital sophistication. The nationwide Electronic Health Record (EHR) system, launched in 2008, provides secure, centralized access to medical data for patients and providers. Integrated into Estonia's e-government infrastructure, the EHR system utilizes international standards like HL7 CDA, DICOM, LOINC, ICD-10, and SNOMED-CT to standardize health-related data.

Technical Implementation and Infrastructure

The system's integration with the national e-government framework allows for seamless data exchange across various healthcare providers. In emergency situations, doctors can access critical information such as blood group, allergies, recent treatments, and ongoing medication. Additionally, the system compiles data for national statistics, enabling health authorities to measure health trends, track epidemics, and ensure efficient allocation of health resources.

Patient Empowerment and Data Accessibility

Estonia's EHR system empowers citizens by providing them with access to their own health data, fostering transparency and patient engagement. Patients can review their medical records, track treatments, and even grant or restrict access to their data, ensuring a patient-centric approach to healthcare. This level of accessibility and control has contributed to high levels of public trust and participation in the digital health system.



Brazil

Brazil has embraced openEHR as part of a strategic national agenda to standardize clinical data, improve health information exchange, and enable integrated care delivery across its vast public healthcare system. The Ministry of Health has endorsed openEHR for use in public institutions, with regional projects incorporating archetype-based modeling to standardize clinical documentation practices.

Technical Implementation and Infrastructure

The adoption of openEHR in Brazil addresses challenges related to interoperability within the Unified Health System (SUS), a decentralized network of health services across federal, state, and municipal levels. Efforts to enhance interoperability include the implementation of standards like the National Health Card System and the Supplementary Health Information Exchange Standard (TISS).

Challenges and Optimization

Despite significant progress, Brazil faces challenges in achieving full interoperability due to the complexity of its healthcare system and regulatory environment. The fragmentation of health data across various locations and services poses a barrier to seamless information exchange. Addressing these challenges requires continuous efforts in standardization, stakeholder engagement, and investment in digital health infrastructure. [International Bar Association](#)

Future Directions

By decoupling data from software, Brazil is establishing a health data infrastructure capable of evolving with future reforms and innovations. This approach also bridges regional disparities in health IT maturity, providing even remote clinics with a consistent and interoperable platform for clinical data capture. The country's commitment to openEHR reflects its dedication to creating a more integrated and efficient healthcare system.

In summary, the United Kingdom, Estonia, and Brazil exemplify diverse and effective implementations of openEHR standards, each tailored to their unique healthcare landscapes. Their experiences highlight the transformative potential of openEHR in enhancing interoperability, patient care, and system efficiency on a global scale.

Countries Driving the Next Wave of openEHR Expansion

The global adoption of openEHR—an open standard for electronic health records—has been transformative for healthcare systems across various regions. The following sections provide an in-depth exploration of how different countries have leveraged openEHR to enhance their healthcare infrastructures.

Spain (Catalonia)

Catalonia, an autonomous community in northeastern Spain with a population exceeding 8 million, has embarked on a transformative digital health initiative by implementing a large-scale, open-source, openEHR-powered longitudinal health record system. This ambitious project aims to unify and standardize electronic health records (EHRs) across the region, enhancing data quality, accessibility, and interoperability among diverse healthcare providers.

Strategic Vision and Objectives

The core objective of Catalonia's digital health strategy is to establish a vendor-neutral health data platform that ensures seamless integration and management of clinical information across various healthcare settings. By adopting the openEHR standard, the Catalan Health Service (CatSalut) seeks to create a unified, patient-centric EHR system that supports coordinated care and facilitates data-driven decision-making.

Implementation and Infrastructure

The implementation process involves the development of a Clinical Data Repository (CDR) based on the openEHR standard. This repository serves as the backbone for the new EHR system, enabling the consolidation of fragmented health data into a cohesive and standardized format. The project encompasses the migration of billions of historical health records and compositions from various IT silos into the new infrastructure. As of recent reports, over 13 million EHRs have been successfully migrated, marking a significant step toward data consolidation.



To support this extensive data integration, Catalonia has established on-premises data centers in collaboration with the Centre de Telecomunicacions i Tecnologies de la Informació (CTTI). These data centers are equipped with infrastructure provided by Kyndryl, including necessary hardware, security settings, and network components, ensuring high availability and robust data processing capabilities.

Medication Management System

A pivotal component of this digital transformation is the implementation of a standardized medication management system across more than 60 hospitals in Catalonia. In partnership with T-Systems and Better, CatSalut is deploying Better Meds, an electronic prescribing and medication administration solution built on the openEHR standard. This system aims to provide healthcare professionals with an integrated therapeutic and clinical view centered on the patient, minimizing medication-related safety issues and reducing administrative burdens. The initial rollout includes hospitals such as Hospital del Mar and Consorci Hospitalari de Vic.

Challenges and Optimization

The scale of this initiative presents challenges in optimizing infrastructure to efficiently handle extensive data. Efforts are underway to enhance data processing speed and efficiency through the implementation of EHRbase 2.0 and Yugabyte's high-performance scalable database solutions. These technological advancements are designed to support the seamless integration and management of health data across the region.

Future Directions

While the current focus is on building and optimizing the digital infrastructure, the overarching goal is to utilize this platform to improve clinical care. Future stages involve integrating care delivery systems with digital records, facilitating real-time access to patient information, and enabling innovative healthcare solutions. The Virtual EHR Sync Service, for example, aims to connect different hospitals' health record systems to a central system, ensuring that a patient's medical information is accessible and up-to-date across all healthcare organizations.

Conclusion

Catalonia's digital health initiative represents a transformative step toward an integrated, efficient, and patient-centric healthcare system. By leveraging openEHR standards and fostering strategic partnerships, the region is setting a precedent for large-scale digital health transformations, emphasizing interoperability, data quality, and patient-centered care.

Nordic Countries: Norway, Sweden, Finland

The Nordic region, encompassing Norway, Sweden, and Finland, has demonstrated a profound commitment to data transparency, patient empowerment, and semantic interoperability—principles that resonate with openEHR's philosophy. These countries have integrated openEHR into their national and regional EHR platforms, establishing it as the standard for building structured clinical content and ensuring consistency across various health IT systems.

In Norway, the adoption of openEHR has facilitated cross-organizational data sharing, enabling healthcare providers to access and exchange patient information seamlessly. Sweden has focused on creating open ecosystems that promote interoperability and data reuse, while Finland's national repository has been instrumental in standardizing EHR data storage and retrieval.

A key aspect of openEHR adoption in the Nordics is the emphasis on empowering clinical experts to design domain-specific models, effectively separating the clinical layer from the technical infrastructure. This strategy has enabled the reuse of standardized data elements across institutions and applications, significantly improving development efficiency and system agility. As a result, Nordic countries are among the most mature openEHR adopters globally, with their implementations serving as international benchmarks.



Netherlands

The Netherlands, renowned for its advanced digital health infrastructure, is actively advancing its healthcare system by integrating openEHR standards into regional procurements. This strategic move underscores the nation's commitment to achieving semantic interoperability, ensuring that healthcare data can be seamlessly exchanged and understood across various systems and providers.

Strategic Vision and Objectives

Dutch health authorities have recognized the imperative for a unified approach to health data management. By mandating openEHR compliance in regional procurements, the Netherlands aims to standardize data modeling, storage, and sharing practices. This approach not only facilitates seamless data exchange but also preserves local innovation and vendor diversity, allowing for a competitive and dynamic healthcare IT landscape.

Implementation and Infrastructure

The implementation of openEHR in the Netherlands is characterized by a federated health data architecture. Instead of imposing a monolithic EHR system nationwide, the focus is on standardizing data structures and ensuring that disparate systems can communicate effectively. This strategy enables healthcare providers to select best-of-breed solutions tailored to their specific needs while maintaining interoperability at the national level.

Challenges and Optimization

Transitioning to a standardized framework like openEHR presents challenges, including aligning existing systems with new standards, ensuring stakeholder buy-in, and investing in workforce training. However, the long-term benefits, such as improved data quality, enhanced patient care, and reduced integration costs, are anticipated to outweigh these initial hurdles.

Future Directions

The Netherlands is poised to leverage its standardized data infrastructure to support advanced healthcare initiatives. With a solid foundation in place, the country is well-positioned to embrace future healthcare innovations and maintain its status as a leader in digital health transformation.

Germany

Germany's ambitious digital health reform initiatives, particularly the national electronic patient record (ePA), have spotlighted the potential of openEHR to unify the country's fragmented health data landscape. Currently, health information is dispersed across various siloed systems, hindering effective care coordination and comprehensive analytics. By prioritizing semantically consistent and shareable clinical data through openEHR, Germany aims to create a cohesive framework that enhances interoperability and data liquidity.

Strategic Vision and Objectives

German health authorities are increasingly recognizing the limitations of proprietary systems and the need for open platforms that offer scalability and maintainability. The integration of openEHR is seen as a strategic move to facilitate better patient outcomes and more efficient healthcare delivery by ensuring that data can flow seamlessly across different care settings.

Implementation and Infrastructure

The implementation strategy involves creating a standardized data model that can be adopted across various healthcare institutions. This model focuses on separating clinical data from application logic, allowing for greater flexibility and adaptability in the face of evolving healthcare needs.

Challenges and Optimization

Germany faces challenges related to integrating openEHR with existing systems and ensuring compliance with national regulations. However, with government incentives and increased investment in interoperability infrastructure, these challenges are being addressed to pave the way for a more unified digital health environment.

Future Directions

With openEHR as a foundational component, Germany aims to enhance its eHealth strategy by enabling more personalized and efficient patient care. The standardized data framework will support advanced analytics, AI applications, and other innovations that rely on high-quality, interoperable data.



Australia & New Zealand

Australia and New Zealand have both incorporated openEHR principles into their national interoperability frameworks, reflecting a commitment to building robust, future-proof digital health infrastructures. Australia's "Core Data for Interoperability" (ACDI) initiative aligns closely with openEHR's approach to archetype modeling and data separation, while New Zealand is exploring structured clinical repositories to support patient-centered care and public health analytics.

Strategic Vision and Objectives

Both countries emphasize the creation of long-lived, computable health records that transcend individual applications. By adopting openEHR standards, they aim to ensure that their digital infrastructures can adapt to complex care models and support innovations in AI and personalized medicine.

Implementation and Infrastructure

The focus is on developing standardized data repositories that facilitate interoperability across various healthcare providers and systems. This involves defining and implementing archetypes that accurately represent clinical concepts and workflows.

Challenges and Optimization

Challenges include aligning diverse stakeholders, managing the transition from legacy systems, and ensuring that the workforce is equipped to utilize the new standards effectively. Continuous engagement with clinicians and IT professionals is essential to address these challenges.

Future Directions

Both nations are poised to leverage their standardized data infrastructures to support advanced healthcare initiatives, including population health management and precision medicine. The adoption of openEHR positions them to integrate emerging technologies seamlessly into their healthcare ecosystems.

Slovenia

Slovenia has been a forerunner in adopting openEHR standards, utilizing them for nearly 13 years to enhance its healthcare system's interoperability and data management. The nation's commitment is evident in its strategic emphasis on eHealth infrastructure, as outlined in the "Slovenia – eHealth for a Healthier Society" strategy.

Strategic Vision and Objectives

The Slovenian Ministry of Health has prioritized the establishment of a cohesive digital health ecosystem. By integrating openEHR standards, the aim is to create a unified patient record system that ensures data consistency, enhances patient care, and facilitates seamless information exchange across healthcare providers.

Implementation and Infrastructure

A significant milestone in Slovenia's digital health journey is the development of the Central Registry of Patient Data (CRPD), which stores health data for 98% of the population. This centralized repository leverages openEHR standards to provide secure access and real-time reporting capabilities. Additionally, the Institute of Oncology Ljubljana is implementing a postmodern Electronic Health Record (EHR) system based on the Better Platform, utilizing openEHR and FHIR standards to build a future-proof, interoperable framework.

Challenges and Optimization

While Slovenia has made significant strides, challenges remain, particularly in aligning existing systems with openEHR standards and ensuring comprehensive stakeholder engagement. Efforts are ongoing to address these challenges through continuous training, policy refinement, and technological upgrades.

Future Directions

Slovenia plans to further enhance its digital health infrastructure by expanding the use of openEHR standards across various healthcare projects. This includes developing new modules for preventive care and integrating additional healthcare institutions into the unified patient record system. These initiatives aim to solidify Slovenia's position as a leader in digital healthcare transformation.



Conclusion

Slovenia's proactive adoption of openEHR standards exemplifies a commitment to creating a sustainable, interoperable, and patient-centric healthcare system. By leveraging open standards and fostering strategic partnerships, Slovenia is setting a benchmark for effective national digital health transformation.

Emerging Regions with Strategic openEHR Potential

While global attention often centers on nations with advanced digital infrastructures, **Black Book Research** has identified several emerging regions where **openEHR** holds exceptional strategic promise. These countries are at various stages of national digital health reform and are leveraging or exploring openEHR as a catalyst for unified, scalable data architectures. By adopting standards-based designs, they aim to circumvent the pitfalls associated with legacy systems and accelerate their digital transformation in healthcare.

South America: Chile, Colombia, and Argentina

In South America, countries such as **Chile**, **Colombia**, and **Argentina** are making significant strides in digital health, recognizing the transformative potential of openEHR to enhance interoperability and patient care.

- **Chile** has been proactive in integrating digital health solutions, focusing on developing interoperable systems that facilitate seamless data exchange across healthcare providers. The government's commitment is evident in initiatives aimed at creating a cohesive digital health ecosystem, positioning Chile as a leader in health IT innovation within the region.
- **Colombia** is leveraging technology to bridge gaps in rural and underserved areas, positioning itself at the forefront of health IT advancement. The country's strategic focus on digital health is expected to drive the wider adoption of EHR systems and innovative digital health solutions, enhancing healthcare delivery nationwide.



- **Argentina** has embarked on various digital health initiatives, including the adoption of telemedicine solutions and electronic prescriptions. The government has also established an interoperability hub to integrate public and private stakeholders, facilitating better patient outcomes through standardized data exchange. Additionally, Argentina is implementing SNOMED CT to standardize medical terminology, further promoting interoperability.

By adopting openEHR, these South American nations aim to create unified, patient-centric health records that support comprehensive care delivery and facilitate advanced clinical research. This strategic approach not only addresses current interoperability challenges but also lays the foundation for future innovations in healthcare.

Africa: South Africa, Kenya, Rwanda, Nigeria, Ghana, and Ethiopia

In Africa, several countries are recognizing the potential of openEHR to revolutionize their healthcare systems by providing scalable, interoperable solutions tailored to their unique needs.

- **South Africa** has been a pioneer in digital health initiatives, implementing systems like the District Health Information System 2 (DHIS2) at the national level since 2012. In 2023, South Africa continued its innovation by integrating Human Resources for Health using DHIS2 and FHIR, enhancing interoperability and data management across the healthcare sector.
- **Kenya** has demonstrated a strong commitment to digital health, with over 600 facilities integrating OpenMRS into their health IT systems. This open-source EHR system has been instrumental in managing patient data, particularly for HIV/AIDS care, showcasing Kenya's dedication to leveraging technology for improved health outcomes.
- **Rwanda** has achieved significant milestones in digital health interoperability. In 2022, the country integrated a vaccine registry and electronic birth systems, exemplifying its commitment to creating a cohesive digital health infrastructure that supports comprehensive patient care and public health initiatives.
- **Nigeria and Ghana** are developing foundational digital health frameworks, such as national health IDs and federated care models. These initiatives aim to unify patient data across diverse healthcare settings, thereby improving accessibility, continuity of care, and health outcomes. By exploring openEHR, these countries seek to establish interoperable systems that can adapt to evolving healthcare needs.
- **Ethiopia** is focusing on enhancing community-based maternal and newborn healthcare delivery through digital solutions. By implementing electronic medical records and mobile health technologies, Ethiopia aims to improve health outcomes in rural and underserved areas, demonstrating the potential of digital health to address critical healthcare challenges.

By embracing openEHR, these African nations are not only addressing immediate interoperability challenges but are also laying the groundwork for future-ready healthcare systems. This strategic move positions them to harness advancements in AI, population health management, and personalized medicine, ultimately leading to improved patient outcomes and more efficient healthcare delivery.

In conclusion, the adoption of openEHR in these emerging regions reflects a strategic commitment to building resilient, interoperable, and patient-centered healthcare systems. By leveraging openEHR's vendor-neutral framework, these countries are well-positioned to overcome legacy system limitations and drive sustainable digital transformation in healthcare.



Strategic Benefits of openEHR

openEHR is increasingly recognized not merely as a technical standard but as a transformative data strategy for healthcare systems worldwide. Its comprehensive framework offers numerous strategic benefits that address longstanding challenges in health information management. The key advantages of adopting openEHR include vendor-neutral, long-term data persistence; archetype-driven clinical modeling; semantic interoperability; readiness for AI and analytics; and cost reduction coupled with innovation enablement.

Vendor-Neutral, Long-Term Data Persistence

Traditional Electronic Health Record (EHR) systems often bind healthcare organizations to proprietary data formats, leading to significant challenges in interoperability and data migration. This vendor lock-in not only restricts flexibility but also inflates costs associated with system upgrades or replacements. In contrast, openEHR introduces a vendor-neutral, application-independent data layer that ensures clinical information remains intact and accessible, regardless of changes in application software. This separation empowers healthcare systems to modernize or replace applications without compromising data integrity. For instance, a study highlighted that openEHR's architecture allows patient-centric information to be stored in a format that is long-lived, versioned, and easily computable, thereby facilitating seamless transitions between different software solutions without data loss or extensive reconfiguration.

Archetype-Driven Clinical Modeling

openEHR employs a dual-model architecture, distinguishing between the reference model (the stable, technical part) and the archetype model (the domain-specific, clinical part). This design enables clinicians and informaticians to collaboratively create domain-specific archetypes that standardize the capture, storage, and interpretation of clinical data. These archetypes are stored in a shared repository and can be reused across various systems and contexts, promoting consistency and reducing redundancy. A study analyzing seven openEHR templates found that 84% of data elements could be directly reused from existing archetypes, demonstrating the efficiency and semantic precision facilitated by this approach.

Semantic Interoperability

Achieving semantic interoperability—the ability of different systems to not only exchange data but also interpret it meaningfully—is a critical goal in healthcare information systems. openEHR's architecture is designed to support this by ensuring that health information can be exchanged and understood across diverse systems. This is particularly vital in multi-vendor, multi-stakeholder environments where consistent data interpretation is essential for effective care coordination, decision support, public health surveillance, and clinical research. By fostering semantic interoperability, openEHR reduces vendor lock-in and enhances adaptability, enabling healthcare organizations to integrate various applications and systems seamlessly.

AI and Analytics Readiness

The future of healthcare is increasingly data-driven, with advanced analytics, population health management, and AI playing pivotal roles. Structured, longitudinal data is a prerequisite for these technologies to function effectively. openEHR's computable data models ensure that healthcare systems can build robust analytical pipelines, support machine learning initiatives, and deliver precision medicine at scale. For example, integrating openEHR with AI-driven business analytics has been shown to enhance the quality of care by providing accurate and comprehensive data for analysis.



Cost Reduction and Innovation Enablement

By minimizing the need for complex point-to-point integrations, enabling modular system design, and decreasing reliance on single vendors, openEHR contributes to lowering the total cost of ownership for healthcare IT systems. Furthermore, it fosters an environment conducive to innovation by allowing health systems to select from a wide ecosystem of compatible tools and applications. Organizations can significantly cut costs by an average of 40-50% compared to other solutions, as openEHR's approach increases productivity, accelerates development, and simplifies maintenance.

In summary, openEHR offers a comprehensive and forward-thinking approach to healthcare data management. Its emphasis on vendor neutrality, standardized clinical modeling, semantic interoperability, and readiness for advanced analytics positions it as a strategic asset for healthcare organizations aiming to enhance efficiency, reduce costs, and improve patient outcomes.

Challenges and Considerations

Implementing openEHR offers numerous advantages for healthcare systems, including enhanced interoperability, data consistency, and long-term adaptability. However, its successful adoption is contingent upon addressing several critical challenges. These challenges encompass governance and change management, the initial investment in archetype modeling, integration with existing standards, and the development of technical capacity and tooling. A comprehensive understanding and strategic approach to these areas are essential for a smooth and effective implementation.

Governance and Change Management

The large-scale implementation of openEHR necessitates robust governance structures and proactive change management strategies. Given the transformative nature of openEHR, which fundamentally alters data management and system interactions, organizations must establish clear leadership and comprehensive frameworks to guide the transition.

Key Considerations:

- **Leadership Commitment:** Strong, visible support from top management is crucial to drive the initiative, allocate necessary resources, and address resistance effectively. Leaders play a pivotal role in articulating the vision and benefits of openEHR, thereby fostering organizational buy-in.
- **Stakeholder Engagement:** Engaging a diverse group of stakeholders—including clinicians, IT professionals, administrators, and patients—ensures that the system meets varied needs and gains widespread acceptance. Regular consultations and feedback loops can identify potential issues early and facilitate collaborative problem-solving.
- **Comprehensive Training Programs:** Transitioning to openEHR requires equipping staff with the requisite skills and knowledge. Tailored training sessions should address both the technical aspects of the system and the workflow changes it introduces, thereby enhancing user competence and confidence.



- **Ongoing Support Structures:** Establishing helpdesks, user communities, and continuous learning opportunities can assist staff in adapting to the new system and troubleshooting challenges as they arise.

Neglecting these governance and change management components can lead to significant resistance, suboptimal system utilization, and potential project failure. Therefore, a structured approach that prioritizes clear communication, inclusive participation, and continuous support is imperative.

Upfront Modeling Investment

A distinctive feature of openEHR is its reliance on archetypes and templates to standardize clinical data representation. Developing these models requires a substantial initial investment in terms of time, expertise, and collaboration.

Key Considerations:

- **Expert Collaboration:** Crafting accurate and comprehensive archetypes necessitates the involvement of domain experts, including clinicians and informaticians, to ensure that the models accurately reflect real-world clinical scenarios and terminologies.
- **Resource Allocation:** Organizations must allocate dedicated resources—both human and financial—to support the modeling process. This includes investing in tools, training, and time for iterative development and validation.
- **Quality Assurance:** Rigorous testing and validation processes are essential to ensure that the developed archetypes are robust, interoperable, and aligned with international standards. This may involve peer reviews, pilot implementations, and continuous refinement.

While the upfront investment is considerable, it yields long-term benefits by enhancing system flexibility, ensuring data consistency, and facilitating interoperability. Organizations should view this phase as laying the foundational infrastructure for a resilient and adaptable health information system.

Integration with Existing Standards

Many healthcare organizations have existing infrastructures built around standards such as HL7 FHIR for data exchange. Integrating openEHR with these pre-existing standards requires meticulous planning and strategic design.

Key Considerations:

- **Complementary Utilization:** Recognize that openEHR and HL7 FHIR serve different but complementary purposes—openEHR excels in detailed clinical data modeling and persistence, while FHIR is optimized for data exchange. Leveraging each standard's strengths can enhance overall system functionality.
- **Hybrid Architecture Development:** Designing a hybrid architecture that utilizes FHIR for interoperability and APIs, and openEHR for data storage and modeling, can provide a cohesive solution. This approach necessitates clear delineation of roles and seamless interfacing between components.
- **Interoperability Testing:** Conduct thorough testing to ensure that data flows seamlessly between systems, maintaining integrity and consistency. This includes validating that data transformations between standards do not result in information loss or misinterpretation.
- **Stakeholder Collaboration:** Foster collaboration between different standards communities and vendors to develop shared guidelines, profiles, and implementation guides that facilitate integration.

Addressing these integration challenges proactively ensures that organizations can harness the benefits of both standards, leading to a more robust and interoperable health information ecosystem.

Technical Capacity and Tooling

The successful deployment of openEHR is heavily reliant on the availability of skilled personnel and appropriate tools. Variations in technical expertise and tooling across regions can pose significant challenges.

Key Considerations:

- **Skill Development:** Invest in training programs to develop a workforce proficient in openEHR principles, archetype development, and system implementation. This includes both initial training and ongoing professional development to keep pace with evolving standards and technologies.
- **Tooling Infrastructure:** Acquire and develop tools that support the creation, management, and deployment of archetypes and templates. This includes modeling tools, repositories, and integration platforms.



- **Community Engagement:** Participate actively in the global openEHR community to share knowledge, access resources, and collaborate on tool development. Engaging with the community can provide insights into best practices and emerging solutions.
- **Localization Efforts:** Adapt tools and training materials to local contexts, considering language, clinical practices, and regulatory requirements, to ensure relevance and usability.

Building technical capacity and establishing a robust tooling infrastructure are critical to overcoming implementation challenges and maximizing the benefits of openEHR.

In conclusion, while the adoption of openEHR presents several challenges, a strategic and well-resourced approach that addresses governance, modeling investments, integration, and technical capacity can pave the way for a successful implementation. By proactively managing these areas, healthcare organizations can establish a resilient, interoperable, and future-proof health information system.

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Survey Methodology

In the fourth quarter of 2024, Black Book Research conducted a comprehensive global survey involving 400 current users and stakeholders of openEHR systems. The respondents encompassed a diverse group of professionals, including IT executives, clinical informaticians, representatives from national health authorities, and digital health architects. The primary objectives of this research were to evaluate satisfaction levels, the scope of implementation, perceived benefits, encountered challenges, and the long-term strategic value associated with openEHR adoption. To achieve a thorough assessment, the evaluation framework incorporated several critical factors: policy and regulatory alignment, maturity of interoperability and data exchange, capacity of the informatics workforce, investment levels in digital health infrastructure, and preparedness for future advancements in AI, population health, and analytics. Based on these criteria, countries were ranked according to their readiness to support national or regional-scale adoption of openEHR, with qualitative insights provided to inform regional strategy recommendations.





Conclusion and Strategic Discussion

openEHR as a Sovereign Alternative to U.S.-Centric EHR Dominance



Black Book Research's 2025 Global Market Insight Report identifies a distinct and accelerating trend: **openEHR is not just an interoperability enabler—it is a strategic assertion of digital sovereignty**. Particularly in Europe, Latin America, and emerging markets in Africa and Asia-Pacific, governments and national health authorities are turning to openEHR as a **counterweight to the commercial and structural constraints of large U.S.-based EHR vendors** such as Epic Systems, Oracle Health (Cerner), and MEDITECH.

While these American vendors offer deeply integrated platforms with proven track records in hospital digitization, they often come with high implementation costs, rigid data models, proprietary architectures, and long-term vendor lock-in. Countries seeking **national control over their health data assets, increased flexibility in software development, and the ability to foster local digital health ecosystems** are finding these trade-offs increasingly untenable.

openEHR offers an attractive alternative.

A Strategic Shift: From Application Lock-In to Data Independence

The architectural philosophy of openEHR separates clinical data from applications. This is a fundamental divergence from the approach taken by many large EHR vendors, where clinical data is tightly coupled with software logic, interfaces, and workflows. In proprietary systems, switching vendors or even upgrading components can lead to data migration challenges, loss of functionality, or incompatibility with new analytical tools.

In contrast, openEHR provides:

- A persistent, vendor-neutral data layer where clinical content can outlive the applications used to capture or display it.
- An open, composable ecosystem where applications can be built, swapped, or updated without compromising the integrity of the data.
- A globally maintained, shared library of archetypes and templates, allowing for rapid model reuse and localization while adhering to international semantic standards.

For countries aiming to implement health IT strategies that will remain viable for decades, openEHR represents a future-proof approach that minimizes sunk costs, maximizes data reuse, and facilitates agile procurement.



Digital Sovereignty and Local Innovation: openEHR as an Economic Multiplier

Another key reason for the growing interest in openEHR among countries resisting the dominance of U.S. EHR vendors is its ability to **stimulate domestic health tech industries**. Rather than concentrating IT spend into a handful of global corporations, openEHR enables:

- Local companies, universities, and startups to build interoperable applications, APIs, analytics tools, and patient portals.
- National and regional vendor ecosystems to flourish around a common standard.
- Reduced dependence on international vendors for customization, support, and updates, lowering TCO (total cost of ownership) over time.

For example:

- In **Brazil**, regional openEHR implementations are encouraging open-source development and archetype modeling that fits national clinical workflows.
- In **Slovenia**, a coordinated national strategy has empowered local IT providers to build modular systems on top of openEHR platforms.
- In **Spain (Catalonia)**, public-private partnerships are leveraging openEHR to develop digital services aligned with the needs of regional healthcare models.

This shift represents not just a technical realignment but a **policy-level statement of intent**: a desire to reclaim control over the infrastructure that supports national health outcomes, research, and innovation.

Avoiding the "Monoculture" Problem in Health IT

The widespread adoption of a few dominant EHR platforms across hospitals and health systems has created what many stakeholders describe as a **"monoculture" in health IT**—one that limits competition, slows innovation, and places nations at the mercy of foreign roadmaps and pricing models.

Countries embracing openEHR are strategically hedging against this risk. By building **federated but interoperable systems**, they maintain the flexibility to evolve each component of their digital ecosystem without being locked into a single vendor's timeline or commercial model. They can integrate best-of-breed solutions from various suppliers and ensure interoperability through adherence to openEHR's semantic and persistence models.

This is particularly appealing to:

- **National health authorities** that want to retain control over clinical data governance.
- **Payers and ministries** seeking greater accountability and transparency from their health IT investments.
- **Public health agencies** that need unified, high-fidelity data for surveillance, research, and policy design.

Beyond Interoperability: openEHR for AI and the Next Era of Digital Health

The emerging health IT agenda goes far beyond digitization and electronic recordkeeping. It increasingly centers on:

- Real-time decision support
- Predictive analytics
- Personalized medicine
- Value-based care
- Whole-person, longitudinal data integration

openEHR is uniquely positioned to support these needs, as it was **designed from inception to store computable, structured, clinically validated data** that can be used by AI engines, analytics pipelines, and knowledge-based systems.

Large, application-bound EHRs often require additional layers of abstraction or data warehousing to support these emerging use cases. openEHR's architecture **eliminates those barriers by design**, making it not just interoperable but *AI-ready* at its core.

Countries that adopt openEHR today are doing more than solving data-sharing challenges. They are **positioning themselves to lead the next era of clinical intelligence, where data is no longer passively recorded but actively used to improve outcomes, reduce costs, and transform care delivery**.



Final Thought: openEHR as a Long-Term National Asset

Black Book Research concludes that openEHR is **not a trend—it is a foundational investment in health system resilience**. For countries determined to build digital infrastructure that aligns with national values, promotes local capacity, and adapts to decades of technological change, openEHR offers a uniquely compelling pathway.

Rather than being boxed into expensive, inflexible application ecosystems, countries embracing openEHR are **owning their health data future**, promoting economic development through open innovation, and building digital health foundations that are inclusive, scalable, and adaptable for generations to come.