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WHITE PAPER

How clinical interoperability improves the healthcare experience

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How clinical interoperability improves the healthcare experience

The scope of healthcare interoperability has dramatically expanded over the past 20 years, evolving from basic data exchange between hospital systems to a comprehensive integration spanning numerous healthcare applications and services. This white paper explores the transformative role of clinical interoperability in enhancing patient and provider experiences and details how Infor Cloverleaf® facilitates this transition with advanced, pre-packaged solutions.

The evolution of healthcare interoperability

Originally developed in the late 1970s, interoperability standards enabled the integration of specialty systems like Laboratory and Radiology with patient registration systems within hospitals. This integration was achieved through protocols such as HL7® ADT and ORU messages, allowing for synchronized patient records across different systems. Cloverleaf®, a pioneer in this field, has always been at the forefront of clinical interoperability, trusted by over one-third of US healthcare organizations and recognized as the interoperability leader by Black Book Market Research.

Rising expectations for access to data

Today, both healthcare providers and patients hold elevated expectations for clinical interoperability, especially in the age of abundant mobile technologies.

Immediate access anywhere: The advent of mobile technology has heightened expectations for access to clinical data. Both providers and patients now demand the ability to view medical records on mobile devices, irrespective of their location, moving well beyond the confines of traditional access points.

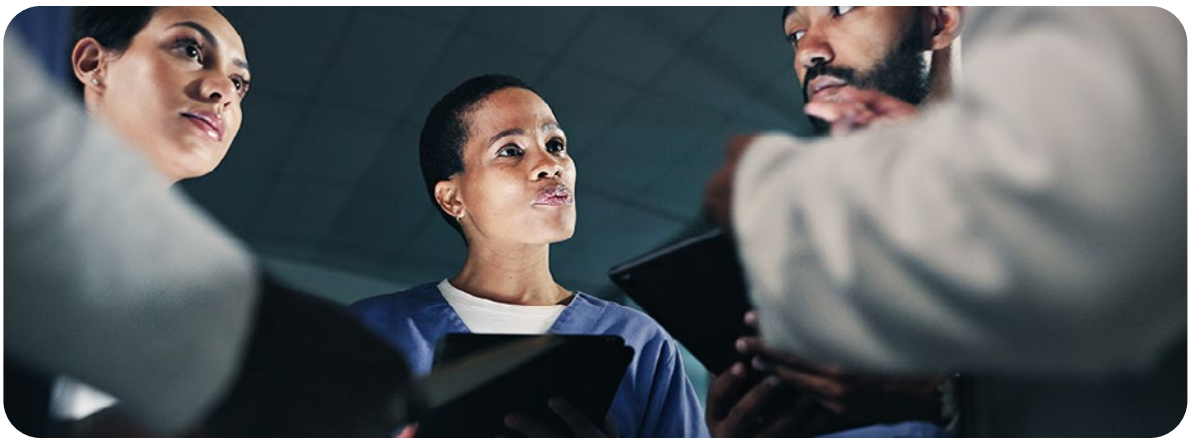
Workflow flexibility: Healthcare providers increasingly seek the flexibility to integrate various applications into their workflows. These may include non-traditional healthcare applications, illustrating a shift towards a more inclusive and versatile approach to patient care management.

Intelligent medical devices: Modern medical devices are expected to be "smart"—capable of processing more than just basic patient information. These devices now offer substantial value through tailored, real-time clinical decision support.

Advanced biometric monitoring: The scope of biometric monitoring has expanded dramatically, encompassing not only basic metrics like heart rate and oxygen saturation but also providing intricate, real-time insights into other vital parameters. This extensive data collection enables a range of preventive care strategies through sophisticated predictive analytics.

Conquering data silos: A path to integrated care

One of the fundamental challenges in realizing the full potential of clinical interoperability is the prevalent issue of data silos. Isolated pools of data within healthcare systems severely limit the effectiveness of collective insights that could dramatically enhance patient care. By creating a cohesive, real-time responsive information infrastructure, organizations can significantly improve outcomes for both healthcare providers and their patients.

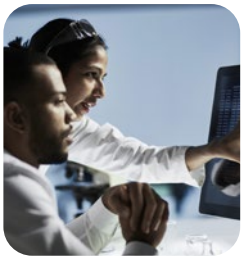


Interoperability advances workflows, analytics, and outcomes

Isolated data within healthcare systems impede the effectiveness of collective insights, which are essential for enhancing patient care. By bridging these data silos, modern clinical interoperability solutions like Cloverleaf create a cohesive, real-time responsive information infrastructure, significantly improving healthcare outcomes.

Reimagine appointment scheduling: Empower patient convenience

Patient appointment scheduling remains a critical yet often cumbersome aspect of healthcare operations, commonly marred by inefficiencies such as long wait times for booking appointments via phone and cumbersome processes for appointment modifications. This falls short of the consumer experience expected in other service sectors, where online scheduling is swift and convenient. Addressing the challenges to the “digital front door” is imperative to improving the overall experience for the patient.



Enhancing patient experience with user-friendly scheduling

Legacy systems can be adapted to support online appointment scheduling by designating specific time blocks in the system for this purpose, which could include certain days, times, or slots that become available due to cancellations. These time blocks are managed as FHIR® resources and accessed through the API Gateway. This access allows applications to empower patients to view, cancel, or book appointments seamlessly.

Streamlined API orchestration for improved service coordination

API orchestration enhances the interaction between multiple APIs, facilitating efficient data exchange and process initiation. For example, if a scheduled appointment is changed via an appointment scheduling API, this update can prompt the corresponding transportation API to adjust the pickup time accordingly. By leveraging API orchestration in conjunction with the robust support of the FHIR Server and FHIR Bridge, legacy systems can be integrated with modern, responsive processes that significantly improve the experience for both patients and providers.

This comprehensive approach not only modernizes outdated systems but also ensures that healthcare providers can deliver more responsive, patient-centered care through advanced technology solutions.

Integrating Social Determinants of Health (SDOH)

The influence of Social Determinants of Health (SDOH) on health outcomes and re-admission rates is profound, affecting more than 50% of cases according to some experts. The integration of SDOH data poses unique challenges due to its often unstructured and uncoded nature, including details on mental health, housing, or food insecurity. Leveraging Natural Language Processing (NLP) to decode this data will be discussed in the “Analytics” section. Additionally, automating workflows by incorporating non-healthcare APIs, such as those for transportation or nutritional support, into healthcare processes will be elaborated in the “Workflow” section.

Leveraging IoT for healthcare insights

The proliferation of cost-effective devices for collecting real-time biometric data has revolutionized data availability. AI and ML technologies enhance the capability to analyze this data for early signs of health deterioration. Despite these advancements, the integration and management of this data within healthcare workflows remain complex, often leaving both patients and providers frustrated. This whitepaper will address these issues in both the “Analytics” and “Workflow” sections, focusing on how data can be effectively utilized without overwhelming healthcare providers.

Advanced analytics for population health

The scope of data analytics extends significantly within value-based care and population health management. While Electronic Medical Records (EMR) support episode documentation and clinical decision-making, advanced analytics are crucial for identifying care gaps and early signs of condition exacerbation that may not be evident during routine healthcare delivery. For example, IoT data collected from wearable devices can signal the need for proactive intervention, with specialized algorithms distinguishing critical data from routine noise. Infor Cloverleaf facilitates this through secure data collection and integration, ensuring that actionable insights are seamlessly incorporated into EMRs for timely clinical review and intervention.

Supporting population health with quality measures

Defining and monitoring clinical quality measures is vital for assessing population health management effectively. For instance, annual screenings for diabetic retinopathy are recommended for diabetes patients. Such measures require data aggregation from multiple EMRs to ensure comprehensive population health monitoring. Infor Cloverleaf excels in this arena by collecting and normalizing data, which is then analyzed to identify and address care gaps, enhancing patient outcomes through targeted interventions.

Optimizing workflows through advanced API integration

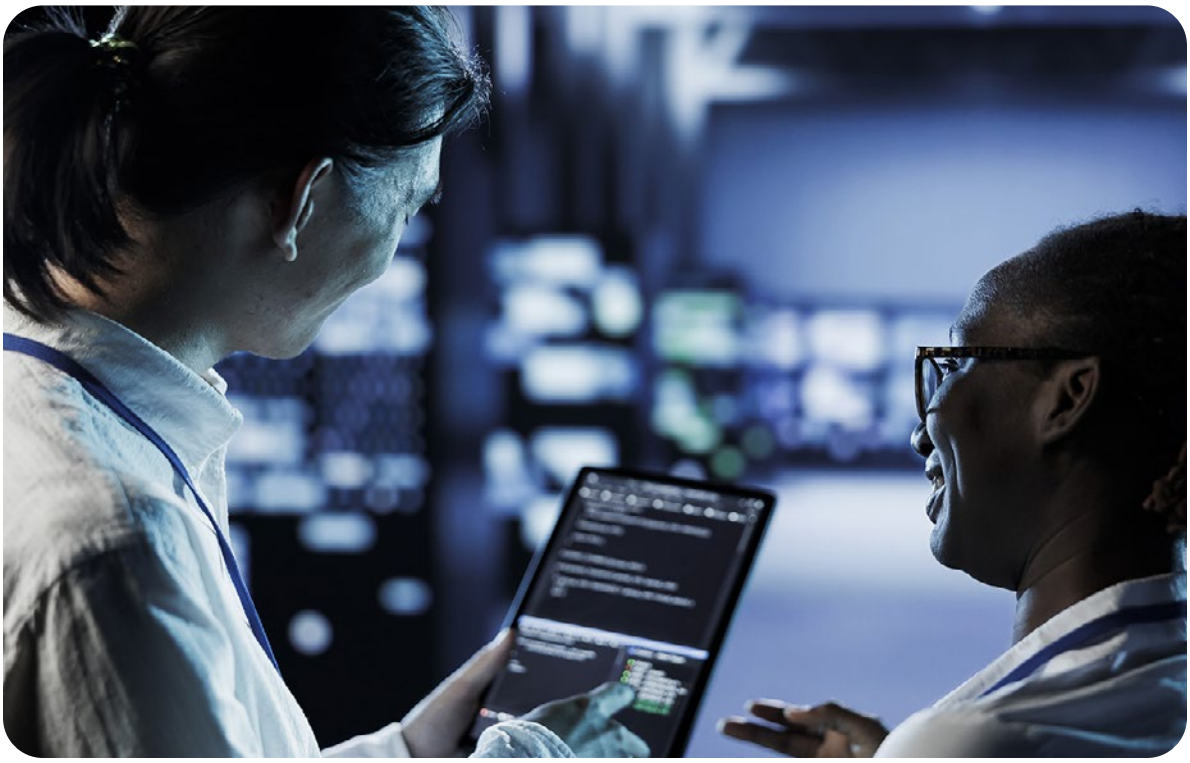
Legacy healthcare infrastructures often rely on HL7 v2 protocols, which are adept at transmitting messages in real time but lack the responsiveness needed for modern healthcare demands, such as retrieving specific data elements on demand. Many of these older systems do not fully expose their stored clinical data through APIs, and those that do often offer only a limited subset of the data.

The Infor FHIR Bridge, in collaboration with the Infor FHIR Server and the InforOS API Gateway, addresses these limitations by enabling more dynamic and comprehensive API workflows. This setup enhances the utility of legacy systems by providing a richer dataset accessible via API than is typically available from native legacy application APIs.

Facilitating modern healthcare needs with FHIR technology

The Infor FHIR Bridge serves as a crucial link by translating data between legacy formats and the modern HL7 FHIR standard, supporting all FHIR resources aligned with the USCDI. This data is then stored on the Infor FHIR Server, which also facilitates data management through subscription services, and made accessible through the API Gateway.

For instance, in the Social Determinants of Health (SDOH) scenarios, this architecture makes it feasible to integrate industry-standard APIs for services like food delivery or transportation directly within healthcare workflows. A discharge workflow, for example, could automatically provide patient address and appointment details to a transportation service or nutritional information to a food delivery service. Updates to the system of record that affect the FHIR resources in the FHIR Server trigger notifications to subscribed APIs about relevant changes, such as appointment adjustments.



Accelerating interoperability value with pre-packaged solutions

Pre-packaged solutions in clinical interoperability offer a distinct advantage by significantly reducing the time-to-value for healthcare IT projects. These solutions contrast with the traditional approach where organizations select from a wide array of components, requiring extensive time to design, evaluate, and implement a tailored system. Instead, pre-packed solutions provide all necessary components and instructions for quick assembly, ensuring swift deployment and immediate functionality.

IFOR: A comprehensive interoperability bundle

Introduced at HIMSS'23, Infor FHIR On-Ramp (IFOR) exemplifies this innovative approach by bundling essential tools into a comprehensive package designed to enhance both analytics and API workflows atop any existing healthcare IT infrastructure. Key components include:

Cloverleaf Secure Couriers (CSC): These couriers collect and securely transmit real-time healthcare data—ranging from HL7 v2.x messages to CSV files—across encrypted internet connections to designated cloud collection points. CSCs are scalable, accommodating anything from a few dozen to thousands of endpoints.

Infor FHIR Bridge (IFB): This pivotal element converts incoming data into the FHIR R4 format, supporting a vast array of FHIR resources. Built on the robust Cloverleaf Web services adapter, IFB allows for easy customization to meet specific healthcare needs.

Data integration into repositories: IFB effectively packages and channels FHIR resources into structured repositories or data lakes, such as Amazon HealthLake or the Infor FHIR Server (IFS), facilitating advanced data utilization and analytics.

Amazon HealthLake: This platform leverages over 100 HITRUST-certified tools to analyze and utilize clinical data comprehensively. It enables the extraction and contextualization of medical information from diverse unstructured texts, linking to recognized medical ontologies.

Customization with advanced components

While IFOR provides a ready-to-deploy solution, Infor continues to offer individual components for organizations preferring a tailored approach. These include:

Global monitor: Monitors the health status of extensive data connections and streams.

Secure messenger: Ensures encrypted data transmissions, with sophisticated header decryption for accurate routing.

Web-services adapter: Facilitates the creation of RESTful web services, enhancing integration and interoperability.

This dual offering ensures that whether organizations need rapid deployment or detailed customization, Infor's solutions enable the development of state-of-the-art clinical interoperability infrastructures without the need to replace existing systems.

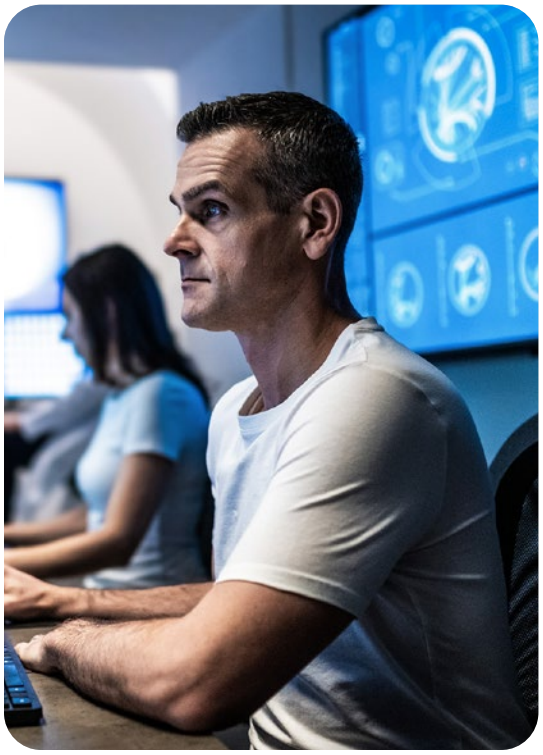
Conclusion: Broadening the horizons of clinical interoperability

Infor's vision of clinical interoperability extends beyond the conventional, enveloping everything from acute care to complex integrations with non-traditional healthcare providers via cutting-edge APIs. This expansive approach is vital for powering effective population health management and crafting flexible, user-centric workflows that significantly enhance both patient and provider experiences.

With our pioneering technology, we streamline the integration and normalization of diverse data types into the HL7 FHIR standard, enabling secure and dynamic APIs that facilitate responsive and adaptable workflows. These solutions not only meet today's healthcare demands but are designed to scale effortlessly across various settings—from traditional hospitals to innovative long-term care facilities.

Join us at the forefront of healthcare innovation: Infor offers a spectrum of solutions tailored to your needs. Whether you seek bespoke components for in-depth customization or ready-to-deploy packages for swift implementation, our systems are built to amplify your existing infrastructure without disruption.

Discover how Infor's Cloverleaf interoperability solutions will elevate your healthcare organization—using data as the bridge and care as the destination- we're building pathways to wellness.



About Infor

Infor is a global leader in business cloud software products for companies in industry-specific markets. Infor builds complete industry suites in the cloud and efficiently deploys technology that puts the user experience first, leverages data science, and integrates easily into existing systems. Over 67,000 organizations worldwide rely on Infor to help overcome market disruptions and achieve business-wide digital transformation.

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