



HEALTHCARE DATA INTEGRATION

Seamless EHR Integration with FHIR Data Models



In the ever-evolving healthcare landscape, integrating diverse data sources into EHR systems is a complex imperative. Challenges span from patient scheduling apps to wearable health devices and critical care equipment. Standardizing formats, real-time updates, and HL7/FHIR interoperability are key hurdles requiring innovative resolutions. Solving these challenges optimizes patient care, streamlines workflows, and maximizes EHR potential for delivering superior healthcare services.

Understanding User Struggles with EHR

EHR users encounter significant challenges when integrating a variety of healthcare technologies, including patient scheduling apps, mobile health platforms, imaging and radiology datasets, wearable health devices, public health immunization registries, critical care medical equipment, remote patient monitoring tools, lab order and results interfaces, and genetic and genomic information. These complications include issues with interoperability, data integrity, cybersecurity, standardization, and the seamless integration of EHR platforms. Addressing these complexities becomes crucial to ensuring efficient and effective healthcare providing while maximizing operational effectiveness and business outcomes.



Patient Encounter Scheduling App Integration

Appointment scheduling, patient data management, and tracking are all made easier by a patient encounter scheduling app. Due to the variety of data sources and formats, it can be difficult to integrate patient and medical data from the scheduling app into the EHR system.

Mobile Health Application Integration

Patients have access to self-monitoring, health tracking, and remote consultation tools through mobile health applications (mHealth apps). Data security, data accuracy, and data exchange standards are problematic when integrating mHealth app data with the EHR system.

Imaging and Radiology Integration

External facilities provide imaging and radiology reports to healthcare organizations, but it can be difficult to incorporate these reports into the EHR system. It can be challenging to combine and access crucial radiology findings in an efficient manner because different imaging and radiology systems may use disparate data formats.

Wearable Health Devices Integration

Smartwatches and other wearable health gadgets, like fitness trackers, produce useful patient health data, such as heart rate, activity levels, sleep patterns, and more. However, due to varying data formats and the requirement for real-time data updates, integrating this varied and continuous streaming data from wearables into the EHR system presents difficulties.

Public Health Immunization Registries Integration

For disease surveillance and public health monitoring, healthcare organizations must report immunization data to public health immunization registries. However, due to different data structures and reporting requirements across different jurisdictions, integrating immunization data into the EHR system presents difficulties.

Medical Device Integration for Critical Care

Real-time data integration from various medical devices, such as ventilators, monitors, and infusion pumps, is necessary for healthcare organizations that provide critical care services. Because of the variety of device manufacturers and communication protocols, it is difficult to integrate data from these devices into the EHR system.

Remote Patient Monitoring Devices Integration

Devices for remote patient monitoring (RPM), such as continuous glucose monitors, glucose meters, and home blood pressure monitors, offer useful information about patient health. The need for seamless data transmission, data accuracy, and data standardization makes it difficult to integrate RPM data into the EHR system.

Lab Order and Results Integration with EHR System

By connecting their EHR with the laboratory system, a clinic seeks to improve the placement of test orders and the retrieval of results. Key aspects include ensuring efficient order transmission, easy result import, data synchronisation, security, and speedy updates.

Use Case 1: Patient Encounter Scheduling App Integration with EHR System

Challenge

A patient appointment scheduling app is responsible for managing appointment statuses and patient information. However, integrating this data into the EHR system can be tricky due to differences in data sources and formats. This can make it challenging to smoothly combine the patient and medical information from the scheduling app into the EHR system.

Data Sources

Patient Demographics: This includes information like the patient's name, birthdate, gender, contact info, and insurance.

Provider information: It keeps track of healthcare providers and their specializations, along with when they're available.

Location Data: The app stores information about the hospital or clinic where appointments are made.

Data Format and Alignment with HL7/FHIR Standards

In order to ensure a seamless fit within the EHR, patient information is seamlessly integrated into "Patient" business object. Additionally, the "Practitioner" business object in FHIR model integrates healthcare provider data effectively, making it simple to access vital expert insights.

Additionally, utilizing "Location" business object effectively improves how locations are depicted in apps, improving facility information's accessibility and clarity within the EHR platform. The scheduling app and EHR system are seamlessly integrated by these strategic data synergies, promoting improved patient care and streamlining workflow management for healthcare organizations.

Integration Process

API acts like a bridge, gathering important patient, provider, and location details from your scheduling app. This connection integrates up all this data with your EHR system smoothly. And guess what?

eZintegrations tool steps in to transform and organize this data into the right format (HL7/FHIR) and business object, so it fits perfectly into your EHR system using the API.



Use Case2: Mobile Health Application Integration with EHR System

Challenge

People use health apps on their phones for self-checking, tracking health, and talking to doctors from far away. But getting these app details integrated into Aprima EHR is challenging. We need to keep info safe, maintain data accuracy, and data interchange standards.

Data Sources

Health Tracking Data: mHealth apps gather information on patients' exercise habits, sleep schedules, dietary habits, and other health-related parameters.

Medication Adherence Data: A few mHealth apps offer tracking and reminders for taking your medications.

Data Format and Alignment with HL7/FHIR Standards

We seamlessly align it with FHIR model "Observation" business objects to seamlessly link mHealth app health tracking data with EHR. This guarantees a consistent representation in the EHR.

The accuracy and completeness of medication information in the EHR platform is improved by our accurate mapping of mHealth app medication adherence data to FHIR model "Medication Statement" business objects. The combination of mHealth apps and the EHR system becomes a dependable synergy thanks to this seamless integration, enabling improved patient care and simplified healthcare workflows.

Integration Process

An interface or API is developed to safely transfer data from the mHealth app to the EHR system. Using eZintegrations, the data is then converted and mapped to the proper HL7/FHIR business objects or segments for seamless integration.



Use Case4- Wearable Health Devices Integration with EHR System

Challenge

Smartwatches and other wearable health gadgets, like fitness trackers, produce useful patient health data, such as heart rate, activity levels, sleep patterns, and more. However, due to variable data formats and the requirement for real-time data updates, integrating this varied and continuous streaming data from wearables into the EHR system causes difficulties.

Data Sources

Vital Signs Data: Vital signs including heart rate, blood pressure, and oxygen saturation are captured by wearable health devices, providing important real-time health information.

Activity and Fitness Data: To track patients' fitness levels and compliance with physical activity goals, wearables capture information on physical activity, step count, and workout regimens.

Sleep Monitoring Data: To evaluate patients' sleep health, wearables monitor patients' sleep patterns, duration, and quality.

Data from Blood Glucose Monitoring: Some wearables are made to track a user's blood sugar levels if they have diabetes.

Data Format and Alignment with HL7/FHIR Standards

Although wearable medical devices might not directly conform to HL7/FHIR standards, we bridge the gap for seamless EHR integration. This involves accurately converting and mapping the data to make sure that the wearables' priceless insights seamlessly enhance your EHR system.

The FHIR "Observation" business object successfully records data from wearables such as blood glucose levels, activity metrics, sleep tracking, and vital signs while ensuring uniformity and interoperability. This strategy provides complete access to wearable data in the EHR platform for healthcare clinicians, enabling proficient clinical decisions, improved patient monitoring, and effective care delivery. Improved patient outcomes are made possible by this simplified method, which also powers a data-driven healthcare management strategy.

Integration Process

An API helps to pull data from various health wearables. This data gets transformed, combined, and mapped with the right HL7/FHIR business objects. With real-time data integration using eZIntegrations, patient health updates flow seamlessly into EHR system. This makes sure you're always up to date and in control.



Use Cases- Public Health Immunization Registries Integration with EHR System

Challenge

Integrating public health immunization registries with the EHR system poses challenges related to data privacy, data exchange protocols, and maintaining up-to-date immunization records.

Data Sources

Immunization Records: Public health registries keep track of patients' immunizations, including dates of vaccination and the vaccines they have received.

Data Format and Alignment with HL7/FHIR Standards

Public health immunization registries must be integrated into the EHR system for there to be seamless interoperability. We enable effective integration despite the different data formats used by these registries by quickly converting and mapping the data to conform to HL7/FHIR standards and business objects. This alignment guarantees easy access and communication between immunization registries and the EHR, improving the efficiency of healthcare operations.

We accurately represent immunization data using the "Immunization" business object in FHIR. This standardized process ensures that immunization information can be shared and accessed easily in the EHR system.

This extensive data can be used by healthcare professionals for proactive patient care, effective vaccine management, and effective public health initiatives. The EHR system's improved tracking of vaccinations and public health reporting are both made possible by this streamlined integration between public health registries.

Integration Process

With the help of eZintegrations, data is mapped to the right HL7/FHIR business objects using an API to integrate immunization data from the public health registry to Aprima EHR securely, making sure it's shown accurately and the same way each time. Your immunization data is smoothly integrated into your EHR system for a seamless experience.



Use Case6- Medical Device Integration for Critical Care with EHR System

Challenge

The EHR system's integration with medical equipment used in critical care settings presents issues with real-time data transfer, data accuracy, and data standardization.

Data Sources

Patient monitors: Critical care medical equipment like bedside monitors that continuously record vital signs including heart rate, blood pressure, and oxygen saturation are utilized to treat patients.

Ventilators: Patients using mechanical ventilation are provided with respiratory data from ventilator settings to tidal volume.

Data Format and Alignment with HL7/FHIR Standards

The use of various data formats makes it difficult to integrate medical devices into the healthcare ecosystem. However, we can ensure a seamless integration by using strategic data mapping and transformation to match with HL7/FHIR protocols and business objects.

The precise alignment of the FHIR "Observation" business objects with the vital sign data from these devices is required for efficient integration of medical devices into the healthcare system, ensuring seamless consistency and interoperability.

Similarly, by utilizing the FHIR "Device" business object, the communication of ventilator information can be improved. By providing comprehensive, standardized device data to healthcare professionals through this strategic integration, the EHR system improves real-time monitoring capabilities, informed decision-making, and efficient patient care coordination.

Integration Process

Using an API lets medical device data flow directly into EHR system in real-time. And with eZintegrations, this data gets transformed and mapped up perfectly with the right HL7/FHIR business objects and making sure medical device info works smoothly with any EHR system.



Use Case7- Remote Patient Monitoring Devices Integration with EHR System

Challenge

Remote patient monitoring (RPM) gadgets like glucose monitors and blood pressure devices provide important health data. But getting this info integrated into EHR smoothly, while keeping it accurate and consistent, can be a challenge.

Data Sources

Blood Pressure Monitoring Data: RPM devices track patients' blood pressure readings, allowing continuous monitoring of hypertension management.

Glucose Monitoring Data: RPM devices capture blood glucose levels for patients with diabetes, providing insights into glycaemic control.

Weight and Body Composition Data: Some RPM devices measure weight, body fat, and other body composition metrics to monitor patients' overall health.

Medication Adherence Data: Some RPM devices can track patients' medication adherence through sensors or connected pill dispensers.

Data Format and Alignment with HL7/FHIR Standards

It can be challenging to enable the integration of Remote Patient Monitoring (RPM) devices into an Electronic Health Record (EHR) system because these devices require a variety of data formats. Starting data mapping and transformation, which seamlessly incorporates RPM data into standardized HL7/FHIR formats, is a solution. By ensuring a seamless and effective data exchange, this alignment enhances interoperability between RPM devices and the EHR system.

In actual use, blood pressure readings are accommodated within the "Observation" resource of FHIR, and measurements of body weight and composition are also seamlessly integrated into the same resource. Additionally, the essential component of medication adherence data is successfully mapped to the EHR system's "Medication Statement" resource in FHIR. This method ensures an effortless integration of Remote Patient Monitoring (RPM) data into the EHR system, providing healthcare professionals with an in-depth understanding of the patient's data. This comprehensive knowledge enables wise decision-making and raises the standard of patient care.

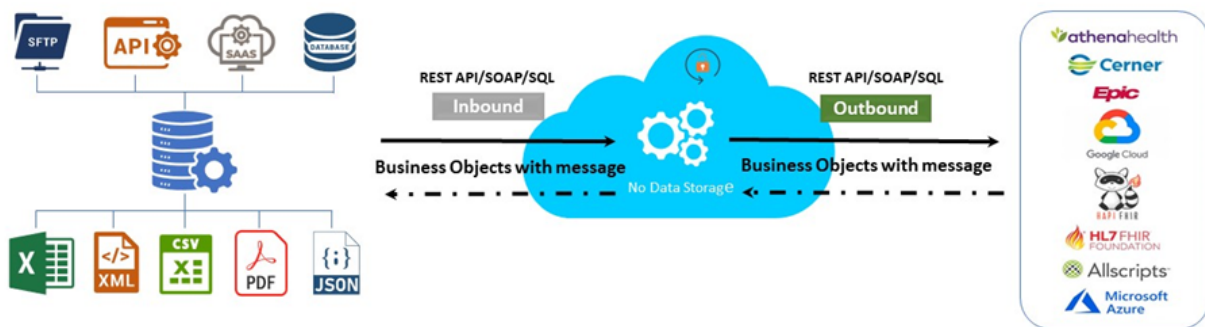
Integration Process

Data from RPM devices is extracted using an API and in order to ensure correct and consistent representation, the data is subsequently converted and mapped using eZintegrations to the proper HL7/FHIR business objects through integration.



Solutions through Integration

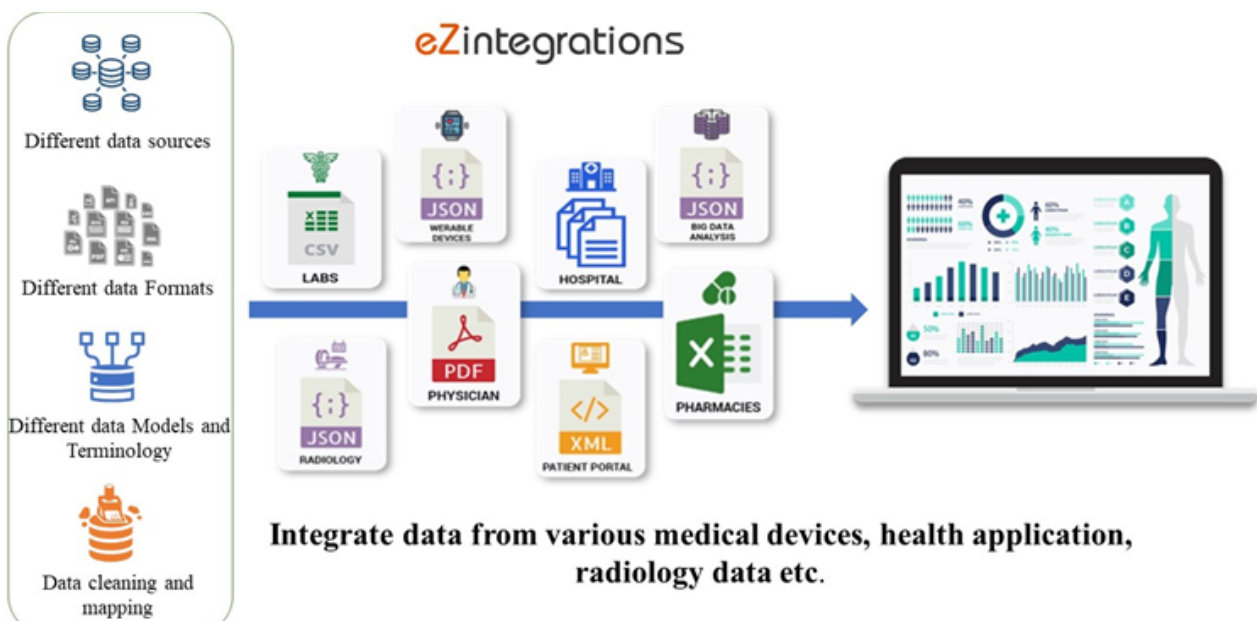
An innovative response to these issues is provided by the seamless integration of healthcare systems and data sources. Through the consolidation of various data streams, EHR system capabilities improve data accuracy, security, and interoperability. Healthcare professionals can access real-time patient information, streamline workflows, and improve patient care with a network of connected data sources. These advantages are enhanced further by the integration solutions provided by eZintegrations, which create a seamless connection between dissimilar systems, standardize data formats, and ensure effective data transmission.



How Bizdata can help?

With eZintegrations:

- Get APIs enabled from various EHR systems to connect with one another via an array of standardized FHIR protocols.
- Ability to connect multiple data sources with different data formats.
- Get real time data.
- Ensure data privacy by encrypting data.
- Get consistent, complete and up-to-date data.



Business Outcomes of Implementing eIntegrations as Integration Solution

Implementing eIntegrations as a robust integration solution alongside EHR system addresses the unique challenges faced by healthcare organizations, resulting in a host of impactful business outcomes:



Simplified Workflows

By seamlessly integrating various data sources, eZintegrations addresses the issue of integrating patient appointment scheduling apps, mobile health applications, and imaging systems. To improve operational efficiency, reduce the need for manual labor, and expedite appointment scheduling, data tracking, and patient monitoring processes, workflows are being streamlined.

Improved Data Accessibility

The integration solution links the EHR system with wearable health devices, public immunization registries, and remote patient monitoring systems. The end result is real-time access to critical patient health data, enabling accurate monitoring, streamlined immunization reporting, and comprehensive remote patient care.

Informed Clinical Decision-Making

eZintegrations avoids the difficulties of medical device integration when integrating critical care data. By enabling real-time data integration from critical care medical devices, healthcare providers can make quick, data-driven clinical decisions and provide more individualized patient care.

Efficient Lab Order and Results

Management

eZintegrations, which addresses the challenges of lab order and results integration, enables seamless communication between EHR and laboratory systems. As a result, ordering lab services is made simpler, precise outcomes are obtained, and data synchronization is enhanced, all of which contribute to effective patient care.

Holistic Patient Insights

By combining data from mHealth apps, imaging and radiology reports, wearable health device data, and genetic/genomic information, eZintegrations provides a comprehensive view of patient health. Healthcare professionals can deliver individualized, effective, and knowledgeable care thanks to this thorough understanding.

Operational Excellence

Through efficient appointment scheduling, billing, and patient care, eZintegrations' seamless integration optimizes practice management, reducing administrative burden. This operational excellence leads to cost savings, increased employee productivity, and higher practice profitability.

In conclusion, eZintegrations with any EHR system overcome challenges and reinvent healthcare management. The combined solution elevates patient care, promotes efficient workflows, ensures data accuracy, and positions healthcare organizations as market leaders in providing patient-centric, advanced healthcare services that are driven by data.



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