MEDICOM

INTEROPERABILITY PLAYBOOK

Modernizing the Infrastructure of Image Exchange

A Guide to SMART on FHIR® Capabilities and Proven Real-World Workflows

Table of Contents

Medicom's Approach To Interoperability

At Medicom, we believe critical patient data should never be locked in isolated silos. In an industry where information is often fragmented, we are dedicated to ensuring every individual has equal access to information-driven healthcare.

To solve the "last mile" of interoperability, we follow a strategic, three-pronged approach:

Standardize Point Solutions: We replace the complexity of managing dozens of separate imaging vendors with one unified platform. By consolidating teleradiology, image sharing, and research, we eliminate redundant costs and integration headaches.

Meet the User Where They Are: We bring imaging data directly into the physician's existing EHR environment. By integrating with FHIR endpoints, we eliminate the need for clinicians to switch between multiple portals or logins.

Automate As Much As Possible: We use AI-driven, intelligent automation to eliminate the "search and find" mission for prior studies. Our platform retrieves and categorizes relevant data automatically, ensuring it is actionable at the point of care.

Strategy in Action: SMART on FHIR®

Medicom leverages SMART on FHIR® as the essential framework to execute these pillars. It serves as the secure, intelligent "on-ramp" that connects our decentralized network to the clinician's primary workspace.

How SMART on FHIR® Delivers the Strategy:

- **It Standardizes Access:** Instead of a patchwork of custom VPNs, SMART on FHIR® allows disparate systems to communicate through a single framework.
- **It Meets the User in the EHR**: By embedding our applications directly into the EHR, we reduce clinician burnout and keep the focus on the patient, not the software.
- **It Automates the Workflow:** We utilize FHIR® endpoints to automate the flow of imaging history, ensuring a complete patient record is accessible without manual staff intervention.

Understanding FHIR® for Enterprise Imaging

FHIR® (Fast Healthcare Interoperability Resources) and SMART on FHIR® are interoperability standards designed to facilitate interaction with Electronic Health Records and provide deep workflow integrations. FHIR® acts as a modern blueprint for exchanging health data, functioning as a RESTful application programming interface (API) that uses web technologies like HTTP and data formats such as JSON or XML.

It organizes healthcare data into "resources" like patients, appointments, and encounters, which can be linked to form a complete clinical story. FHIR® has seen widespread adoption and is mandated by regulation in the US, partly due to the 21st Century Cures Act and the Interoperability Rule requiring EHRs to implement FHIR® R4.

Why FHIR® isn’t Enough for Enterprise Imaging

While FHIR® provides the data model and blueprint for exchanging health data, it addresses the "what" and "how" of data exchange but lacks two crucial components for comprehensive application integration:

01 Standardized Security

FHIR® alone doesn't define how an application securely proves a user's identity to gain permission to access data.

02 Standardized Application Launch

An application, once launched from an EHR, needs to know the relevant information about what the user was doing in the EHR.

The Evolution of Interoperability: From FHIR® to SMART on FHIR®

SMART on FHIR® defines a workflow for applications to securely request, receive, and use health data. It serves as a complete ecosystem that combines FHIR® for data with security and launch protocols. **SMART on FHIR® can be understood through three core capabilities:**

- **Identity and Access Management:** It enables applications to securely request access to data using industry standards like OAuth 2.0 and OpenID Connect, similar to a "Sign in with Google" process.
- **Access to Data:** SMART utilizes FHIR® to actually retrieve or update health data.
- **Launch:** It provides a mechanism for launching web-based applications with a specific context. This context includes critical information about the user, patient, and encounter.

Why Launch Context Matters

The SMART Launch Context is vital for seamless integration because it allows applications to automatically load the necessary information without the user having to manually search or re-enter data.

- **For clinicians:** When a clinician launches an application (e.g., a growth chart), the application instantly knows the patient's ID, age, and gender, loading the correct chart without any re-typing or errors.
- **For patients:** If a patient uses a diabetes management app, it establishes context after launch, securely connecting to their glucose readings and medication list from their patient chart, providing a personalized and secure experience.

→ CLINICAL TESTIMONIAL

DR. KENNETH BUCKWALTER

ACMIO for Radiology at Michigan Medicine

"We did an internal IT mini-retreat to determine what an ideal image exchange system would look like. Automation, ease of use, speed, and security were top priorities for us. Medicom had the most comprehensive automation tools."

Title provided for identification purposes only. The views and opinions expressed are those of the individual only and do not necessarily reflect the positions of the University of Michigan.

→ INFORMATION TECHNOLOGY TESTIMONIAL

AJ BRAGA

Vice President of IT at Southwest Medical Imaging

"Medicom has been a catalyst for operational excellence... The result: improved financial performance and an even higher standard of care."

Medicom's Suite of SMART on FHIR® Applications

To recap, while FHIR® defines what data is exchanged and how it's formatted, SMART adds the crucial layers of "who" can access that data and "under what context," enabling deep workflow integrations and better user experiences in healthcare.

Available Now

Checkpoint

A comprehensive toolset to import, validate, and reconcile external studies against open orders, ensuring data quality and accelerating intake from referring sites and patient walk-ins.

Patient Match

An automated process to identify patients and apply the correct Medical Record Number (MRN) to incoming data, maintaining data integrity and enhancing patient safety.

Patient Upload

A secure application for patient-driven imaging upload, embedded directly into an organization's patient portal to streamline intake for second opinions and pre-appointment planning.

API Connector

A flexible integration component to power custom workflows, enabling connections with a wide range of third-party systems, applications, and data sources.

Data Import

A streamlined workflow for staff to ingest imaging studies from physical media like CDs and DVDs, simplifying the intake process for patient walk-ins.

Append

A backend application that supplements outgoing imaging sends with relevant EHR data, ensuring providers receive a complete clinical picture, reducing the need for manual follow-up.

Requesting Medicom SMART on FHIR Applications from the Epic Showroom

For Epic users: To deploy Medicom's SMART on FHIR® applications, an administrator with 'Epic Purchase Apps' security clearance can request the download in Connection Hub on Epic's Showroom.

Patient Upload

Patient Upload is a SMART on FHIR® application that allows patients to securely upload their own medical imaging studies (from discs, USB drives, or folders) through their existing patient portal account (e.g., Epic MyChart). The application uses the launch context to open with the patient's information, eliminating the need for them to sign in again or manually create an account. It automatically updates the imaging studies' demographics to match the EHR demographics before uploading the studies to the organization's configured health information systems.

Key Benefits

- **Patient Empowerment:** Patients can easily share their imaging history, skipping a visit to medical records.
- **Enhanced Workflow:** Once received, the studies are automatically filed to the configured health information systems.
- **Data Integrity:** The application ensures data accuracy by updating study demographics to reflect the patient's EHR demographics.
- **Customizable Experience:** The application provides a seamless, customizable, and inclusive experience, featuring mobile accessibility, multilingual support, and the ability to edit default patient-facing text.

Data Import

The Data Import application is a tool designed to streamline the ingestion of external medical imaging studies (DICOM media) directly into a provider's Electronic Health Record using a contextual launch. This application simplifies the intake of studies from discs, drives, or folders by automatically validating patient demographics against the EHR before routing them for review.

Key Benefits

- **Image Study Import and Reconciliation:** Imports imaging studies for workflows like Checkpoint Store and Accession Update.
- **EHR Integration:** Launches from the patient's EMR, linking studies to the patient's identity.
- **Media and Data Handling:** Allows uploading DICOM files from external media and optional configuration for attaching PDF reports.
- **Patient Safety and Verification:** Enhances safety by matching studies and detecting Date of Birth mismatches, which require Admin Review.
- **Workflow Automation and Storage:** Configures automated routing rules for orders, pushing images to archives, and stores studies after order approval.

Patient Match

The Patient Match backend application automatically reconciles patient demographics from external data to a high-confidence match in the EHR. If a match is found, the demographics are updated and processed based on configured workflows.

Key Benefits

- **Automated Patient Matching:** Enables automatic patient matching by using Epic as the system for matching.
- **Configurable Actions:** Allows configuration of selected actions for studies based on match results: unique match, multiple matches, or no matches.
- **Workflow Control:** Supports updating or creating routing rules and patient matching exclusions as needed.
- **Auditable Web Service Calls:** Requires mapping the client ID to an Epic user account for auditing web service calls made by the backend application.

Checkpoint

Checkpoint serves as the backbone of managing incoming studies within Medicom's SMART on FHIR® framework. It is crucial for facilitating various workflows, particularly for overseeing studies that are directed to Checkpoint for evaluation. Frequently utilized for processing external imaging studies, it allows for matching with internal orders and enables updates and secure storage of data. Studies in Checkpoint can also be displayed in the EHR's External Images table and managed entirely from the patient's chart.

Key Benefits

- **Order and Study Reconciliation:** Enables the matching of external imaging studies to internal orderables, updating them, and storing them in the organization's archive based on configured reconciliation policies.
- **Flexible Workflows:** Supports multiple reconciliation workflows.
- **EHR Integration:** Optionally populates the Epic External Images table via a FHIR® request against Medicom's API endpoint, allowing users to place an order for an external exam without launching the Checkpoint app.
- **Organization and Access Control:** Allows for the creation of Checkpoint Inboxes (like an "All" inbox tied to all data sources) to organize studies and restrict access to specific user groups. Additionally, users are created through launch permissions can be set based on Epic departments.

API Connector

The API Connector application (for the patient intake SDE integration) is a SMART on FHIR® backend service integration. Its purpose is to support a specific workflow, which in this context is the patient intake SmartData Element (SDE) integration. As a backend service, the client ID must be mapped to a user in the EHR for auditing web service calls.

Key Benefits

- **Backend Integration:** Seamlessly integrates with Epic's backend for specific workflows, such as the Patient Upload SDE integration.
- **Audited Operations:** Web service calls made by the backend application are mapped to an Epic user account for auditing purposes.
- **Integration Management:** Configuration involves setting the Web Services API base URL in Medicom's Integrations application (Misc APIs -> Epic Web Services) and a SmartData Element integration in the Org Admin application for Patient Upload.

Append

Medicom's Append application is a SMART on FHIR® backend service that adds additional patient demographics to imaging studies being sent to external recipients through Medicom. Optionally, it can bundle the diagnostic report from the EHR/RIS as a DICOM SR object within the study.

Append ensures receiving care teams have the necessary clinical context for timely and informed decision-making by delivering a complete data package.

Key Benefits

- **Improves Patient Matching:** Increases accuracy by automatically providing more comprehensive patient demographics with the imaging study.
- **Saves Staff Time:** Removes the need for manual efforts to send reports.
- **Reduces Follow-up:** Minimizes the need for additional communication to clarify clinical context for the receiving care team.
- **Ensures Necessary Clinical Context:** Streamlines health information exchange by automatically bundling relevant EHR data (demographics and diagnostic reports) with external imaging sends for timely and informed decision-making.

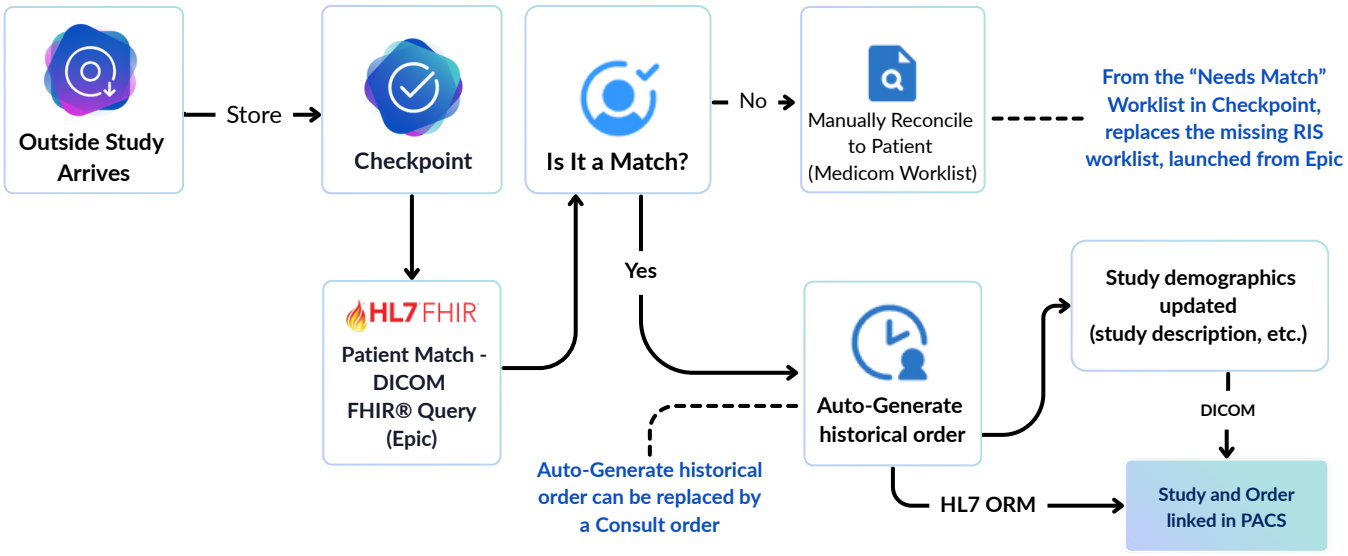
SMART on FHIR® Snapshot

Blueprint for Automated Image Integration & Patient Matching API Workflow

Medicom handles high volumes of outside studies using two key applications, Data Import and Checkpoint, embedded directly within the EHR. This native integration solves for external image ingestion and patient matching while keeping users in their familiar environment—ensuring data integrity and eliminating the safety risks of unreconciled external data.

Checkpoint (Automated Reconciliation): This SMART on FHIR® application manages incoming external studies, automating the process of "auto-ordering" and using dedicated Worklists to efficiently resolve unmatched studies and those requiring "Admin Review."

Data Import (Manual Import): Launched from the Epic Chart Review Imaging tab, this SMART on FHIR® application streamlines the manual process of importing DICOM studies from local media, performing safety checks like detecting patient mismatches before the study is stored.



Medicom's suite of SMART on FHIR® applications is trusted by leading academic health systems, including NYU Langone Health and Cooper University Health Care, to centralize imaging access and reduce clinical friction.

SMART on FHIR® Readiness Overview

Modern interoperability aims to eliminate data silos and deeply integrate workflows within your EHR. SMART on FHIR® is key to this, creating a secure, app-based ecosystem that boosts clinical efficiency and improves patient outcomes. This guide helps you assess your organization's readiness.

Part 1: Foundational Readiness - Understanding the "Why"

Let's review the strategic value of FHIR® and SMART on FHIR® :

- FHIR® is the foundational data standard, defining "what" health data to exchange and "how" (via RESTful APIs). Mandated by the 21st Century Cures Act, nearly all certified US EHRs now have FHIR® capabilities.
- SMART is the application layer atop FHIR® , adding crucial standardized security and application launch context. It defines "who" can access data and "under what context."

The Impact of Deeply Integrated Applications

For Clinicians

The "magic" of SMART Launch Context provides seamless integration. When an application is launched from the EHR, it instantly receives patient ID, age, and other details, eliminating manual re-typing and errors. This allows clinicians to launch tools quickly and easily from within the EHR, increasing adoption and keeping them within their native workflow for enhanced efficiency.

For Patients

Portal applications powered by SMART on FHIR® offer a personalized and secure experience, automatically connecting to relevant health data like imaging studies, glucose readings or medication lists. This framework also enables powerful patient-directed image sharing, improving patient engagement and access to their health information.

For IT Admins

SMART on FHIR® allows the provisioning of users automatically ("just-in-time") with the correct permissions. Admins can enable an application in their EMR and roll it out to all their users without having to create individual user accounts and permissions in the app.

SMART on FHIR® Readiness Overview

Part 2: Technical Readiness - Your Environment Checklist

Ensure your infrastructure supports a modern, app-driven ecosystem:

EHR FHIR® Capabilities:

- Is your EHR FHIR® R4 enabled (mandated by the Interoperability Rule)?
- Does your FHIR® API support essential search operations for key resources?
- Have you requested FHIR® API documentation from your EHR?

SMART on FHIR® Enablement:

- Is the SMART application Launch protocol enabled within your EHR? This is the technical "how-to" guide for launching third-party applications and passing context from an EHR session.
- Does your organization have a configured Authorization Server that uses industry-standard OAuth 2.0 to manage security? This component acts as the EHR's "security guard," handling user sign-on, asking for consent, and issuing secure, short-lived access tokens.

Modernized Imaging Infrastructure

- Do you have a strategy for bridging legacy systems? If existing systems are not natively compatible, middleware or proxies can make them "FHIR-ready" and "DICOMweb-enabled," preserving your investments while modernizing your capabilities.
- Have you implemented a Vendor-Neutral Archive (VNA)? Though not a non-negotiable requirement, a VNA is helpful for a true Enterprise Imaging strategy, as it liberates imaging data from proprietary PACS vendors and prevents vendor lock-in.
- Are your imaging archives (PACS or VNA) accessible via DICOMweb? SMART on FHIR® applications don't access images directly through FHIR. Instead, they query the FHIR® ImagingStudy resource, which contains a link to a DICOMweb endpoint. The application then uses this link to retrieve the image securely.

SMART on FHIR® Readiness Overview

Part 3: Strategic & Workflow Readiness - Identifying the Opportunities

Successful implementation targets real-world clinical and operational pain points:

- Reconciliation of External Studies: Automate and streamline manual, slow, and costly processes for patient identity matching, order generation for outside studies, and image filing.
- Centralizing Image Management: Drive physicians to use the EHR (e.g., Epic) for all imaging needs, creating a unified, permanent archive (as seen with Cooper University Healthcare and Medicom).
- Future Use Cases: A SMART on FHIR-enabled platform is crucial for optimizing teleradiology, enhancing patient-directed image sharing, and accelerating AI and research workflows.

By going through this checklist, you can gain a clearer perspective on your organization's readiness for healthcare modernization. Medicom offers the robust integration and intelligent workflows necessary to connect your systems, empower clinicians, and enhance patient care. Known for our outstanding implementation and support, we will provide you with vital technical configuration details, project management, and specialized implementation assistance, guiding you toward true Enterprise Imaging Interoperability.

Ready to get started using SMART on FHIR® with Medicom?

Reach out to a Medicom Expert Today →