



# FHIR BOTS



## **Problem**

Lack of actionable  
data at point of  
care



## **Problem**

Limited health  
history at point of  
care



## **Problem**

Underutilization of  
available claims  
and clinical data  
sources

## FHIR or API

The Fast Healthcare Interoperability Resources (FHIR) standard is a set of rules and specifications for exchanging electronic health care data. It is designed to be flexible and adaptable, so that it can be used in a wide range of settings and with different health care information systems.

EHR Application Program Interfaces (API) may achieve the same purpose.

## BOT

Software program that performs automated, repetitive, pre-defined tasks by interaction with systems and users. Bots typically imitate or replace human user behavior.



- Claims Data
  - Medicare
  - Medicaid
  - Medicare Advantage
  - Commercial
  - Self-Insured Employer
  - TPA
- Device Data
- Consumer Input
- EHR Clinical
  - QRDA
  - FHIR
  - HL7 Lab
  - ADT

## Data Sources



# FHIR BOTS

## EHR Notifications



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

### Benchmark Leakage

Code	Code Description	HCC Value	Action
I2720	Pulmonary hypertension, unspecified	\$4,187.05	<a href="#">Confirm</a>   <a href="#">Dismiss</a>
I472	Ventricular Tachycardia	\$2,454.15	<a href="#">Confirm</a>   <a href="#">Dismiss</a>

## FHIR Health History

**Jennifer (Jennys) Smith**  
 Add Updated Last Name  
 Single | Female | Born 04/26/1942  
 Mobile: 661-555-5555 | MHARLOW@HARLOW.com  
 PO BOX 0000, RICHMOND MO, 232980257  
 Emergency Contact: MICHAEL HARLOW | 661-555-1111 | Neighbor  
 Log Out

**Health Encounters (Last 60 months of claims data)**

Details	Encounter Type	Rendering Provider Name	Servicing Provider Name
Primary Care			

Encounter Date: 07/07/2021  
 Visit Details: CPT: 99213-OFFICE O/P EST LOW 20-29 MIN DX: C679-Malignant neoplasm of bladder, unspecified.Z87891-Personal history of nicotine dependence

Primary Care





# FHIR BOTS

EHR Notifications



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

ICD-10 Code	Description
-------------	-------------

D559	Anemia due to enzyme disorder, unspecified
------	--

V28 Retired Value \$1,997.24

HCC48 Coagulation Defects and Other Specified Hematological Disorders

Dismiss

Take Action



Provider team searches in **EHR** for patient

**MATCH** to patient occurs which triggers the CDS Hook

A card pops up in the EHR workflow using CDS Hooks



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

ICD-10 Code	Description
I495	Sick sinus syndrome
HCC96	Specified Heart Arrhythmias HCC Value \$2,454.15

Dismiss

Take Action

**Problem List** + Care Coordination Note

+ Add DxReference Show: ☒ Past Problems

Diagnosis	Sort Priority	Resolved
Sick sinus syndrome	Unprioritized	<input checked="" type="checkbox"/>
Hypertension	Unprioritized	<input checked="" type="checkbox"/>
Generalized anxiety disorder	Unprioritized	<input checked="" type="checkbox"/>

☒ Mark as Reviewed Never Reviewed

[Advanced View](#)

If confirmed, the diagnosis is added to the EHR problem list

## Cost Reduction

SNFs  
Avoidable Emergency  
Room Use

## HCC Coding

Recapture Rate  
V28  
Suspect  
Medication NO Diagnosis

## Medications

Not picked up  
Medication NO Diagnosis  
All prescriptions/all  
providers

## Customizable



## Quality Measures

Completely automate  
HEDIS and Medicare  
quality data collection.

## Health Equity


Prompts to notify team of  
a health equity concern  
such as transportation  
for a patient.



# Target: HCC Coding

HCC Recapture Rate 85%

V28 Impact


**Sally Smart**      **DOB: 11/15/1972**      **AGE: 51**

ICD-10 Code	Description
D559	Anemia due to enzyme disorder, unspecified

V28 Retired Value \$1,997.24  
HCC48 Coagulation Defects and Other Specified Hematological Disorders

Dismiss

Take Action

**Sally Smart**      **DOB: 11/15/1972**      **AGE: 51**

Benchmark Leakage

Code	Code Description	HCC Value	Action
I2720	Pulmonary hypertension, unspecified	\$4,187.05	<a href="#">Confirm</a>   <a href="#">Dismiss</a>
I472	Ventricular Tachycardia	\$2,454.15	<a href="#">Confirm</a>   <a href="#">Dismiss</a>



# V28 Impact

## PY2023

### Not Recoded in 2023

Total Diagnosis Value: 4,814.24

HCC18 Diabetes with Chronic Complications

E1169 Type 2 diabetes mellitus with other specified complication

PY2023 V24 Status: HCC18 No Change | CMS Blend Value:\$2,670.28

PY2024 V28 Status: HCC37 Change | CMS Blend Value: \$2,198.01

HCC59 Major Depressive, Bipolar, and Paranoid Disorders

F338 Other Recurrent Depressive Disorders

PY2024 V23 Status: HCC59 No Change | CMS Blend Value: \$2,143.96

PY2024 V28 Status: Removed | CMS Blend Value:1,071.44

### Legend

PY2023 (V24) = 66.67%

PY2024 (V24) = 33.33%

PY2023 (V28) = 33.33%

PY2024 (V28) = 66.67%



# Target: Cost Reduction

Avoidable Emergency Room Visits



## The patient has an avoidable emergency room visit








Jane Doe went to the emergency room or urgent care on 1/4/2023 for an avoidable emergency room visit. Visit reason for R42 -dizziness and giddiness at a cost of \$867.93 at St. Johns Medical Center.

[Acknowledge](#)



# Target: Care Gaps

Quality Measures

Quality Care Gaps  - Not All Questions Answered		
DM-2 DM with HbA1c > 9 percent (poor control)		Action Required
HTN-2 Controlling High BP		Action Required
MH-1 Depression Remission		Not Applicable
PREV-5 Breast Cancer Screening		Not Applicable
PREV-6 Colorectal Cancer Screening		Not Applicable
PREV-7P1 Influenza Immunization		Done
PREV-7P2 Influenza Immunization (Flu Season 2023-2024)		Action Required
PREV-10 Tobacco Use: Screening and Cessation Intervention		Action Required
PREV-12 Screening for Depression and Follow-up Plan		Action Required
PREV-13 Statin Therapy		Done
Care-2 Falls: Screening for Future Fall Risk		Not Applicable
Wellness Exam		Action Required



# Target: Care Gaps

Prescription Not Picked Up

Prescription NO Diagnosis



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

## Prescription Not Picked Up


Sally Smart was prescribed Lisinopril on January 1, 2023, however it has been removed from her medication list as she has not picked up the prescription since.





# Target: Health Equity

Social Determinants of Health

**Sally Smart**    **DOB: 11/15/1972**    **AGE: 51**

Social Determinants of Health

Z-Code	Description
Z5900	Homelessness unspecified


Dismiss

Take Action



# Target: Health Equity

Social Determinants of Health



**Sally Smart****DOB: 11/15/1972****AGE: 51**

Social Determinants of Health

Z-Code	Description
Z5900	Homelessness unspecified

Dismiss

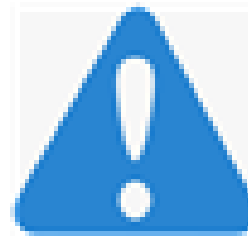
Take Action



# Target: Network

Treated by Specialist

Out-of-Network



**The patient was treated by a specialist**

Jane Doe was treated by specialist Jacob Anderson, MD on 2/28/2023 for Acute Pulmonary Edema.

[Acknowledge](#)





## Target: ACP

Advance Care Planning (ACP)

Palliative Care



Notify the EHR end user if the patient has a terminal condition and is using the emergency room or hospitalizations for their care source.




# Types of FHIR BOT Notifications

## Cost Reduction



**The patient has an avoidable emergency room visit**

Jane Doe went to the emergency room for an avoidable emergency room visit with dizziness at a cost of \$867.




**The patient was treated by a specialist**

Jane Doe was treated by specialist Jacob Anderson, MD on 2/28/2023 for Acute Pulmonary Edema.

[Acknowledge](#)

## Health Equity



**Sally Smart**    **DOB: 11/15/1972**    **AGE: 51**


Social Determinants of Health

Z-Code	Description
Z5900	Homelessness unspecified

Dismiss

Take Action

## HCC Coding



**Sally Smart**    **DOB: 11/15/1972**    **AGE: 51**

ICD-10 Code	Description
I495	Sick sinus syndrome
HCC96 Specified Heart Arrhythmias Benchmark Leakage \$2,454.15	

Dismiss

Take Action

## Quality

Quality Care Gaps - Not All Questions Answered		
DM-2 DM with HbA1c > 9 percent (poor control)	⊗	Action Required
HTN-2 Controlling High BP	⊗	Action Required
MH-1 Depression Remission		Not Applicable
PREV-5 Breast Cancer Screening		Not Applicable
PREV-6 Colorectal Cancer Screening		Not Applicable
PREV-7P1 Influenza Immunization		Done
PREV-7P2 Influenza Immunization (Flu Season 2023-2024)	⊗	Action Required
PREV-10 Tobacco Use: Screening and Cessation Intervention	⊗	Action Required
PREV-12 Screening for Depression and Follow-up Plan	⊗	Action Required
PREV-13 Statin Therapy		Done
Care-2 Falls: Screening for Future Fall Risk		Not Applicable
Wellness Exam	⊗	Action Required



# Phases to Launch



## Explore

EXPLORE EHR  
CAPABILITIES

## Plan

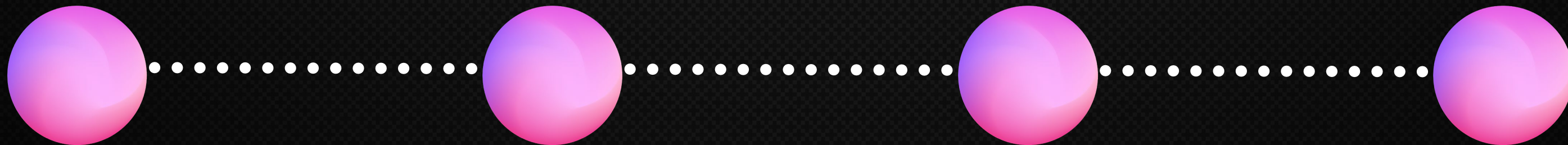
PLAN THE  
NOTIFICATIONS

## Installation

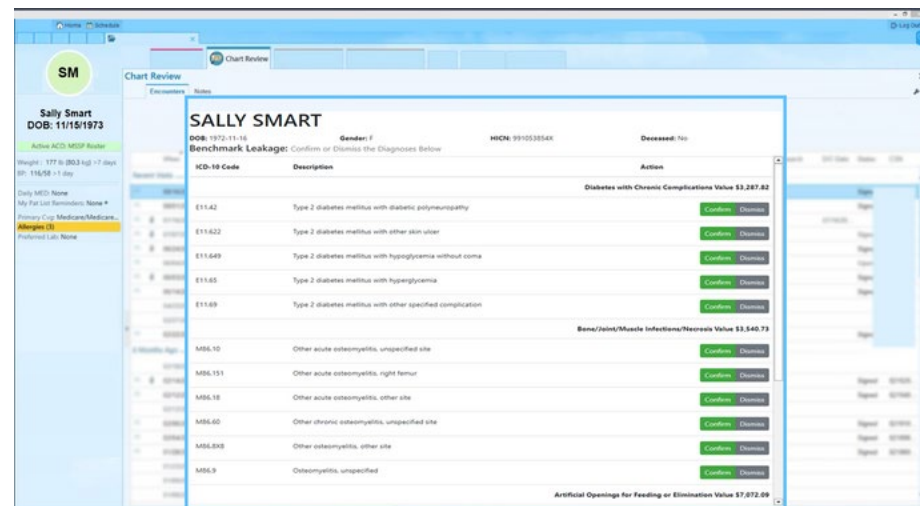
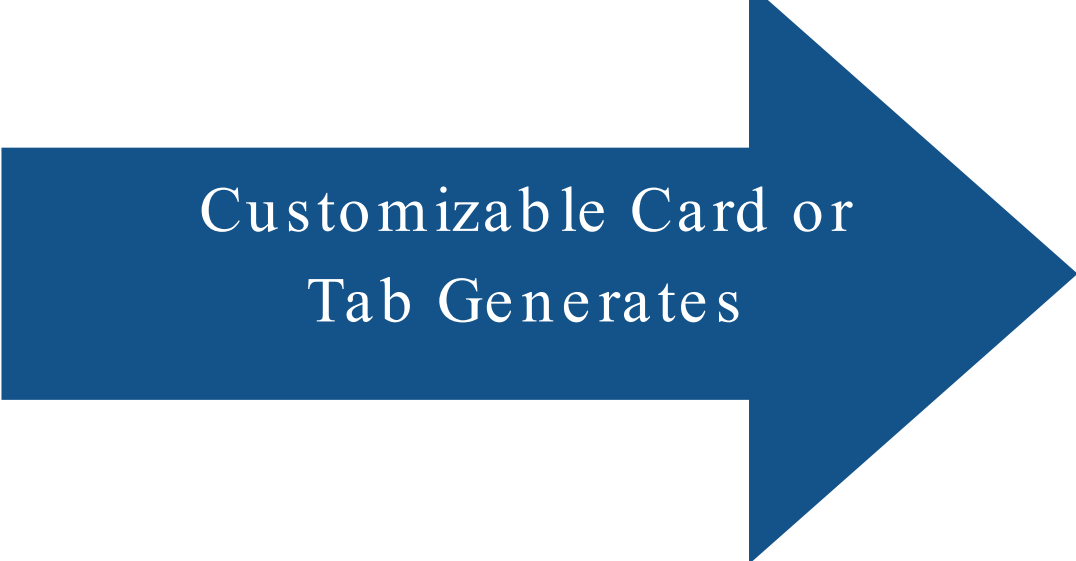
INSTALL FHIR BOTS  
SOLUTION IN EHR

## Go Live

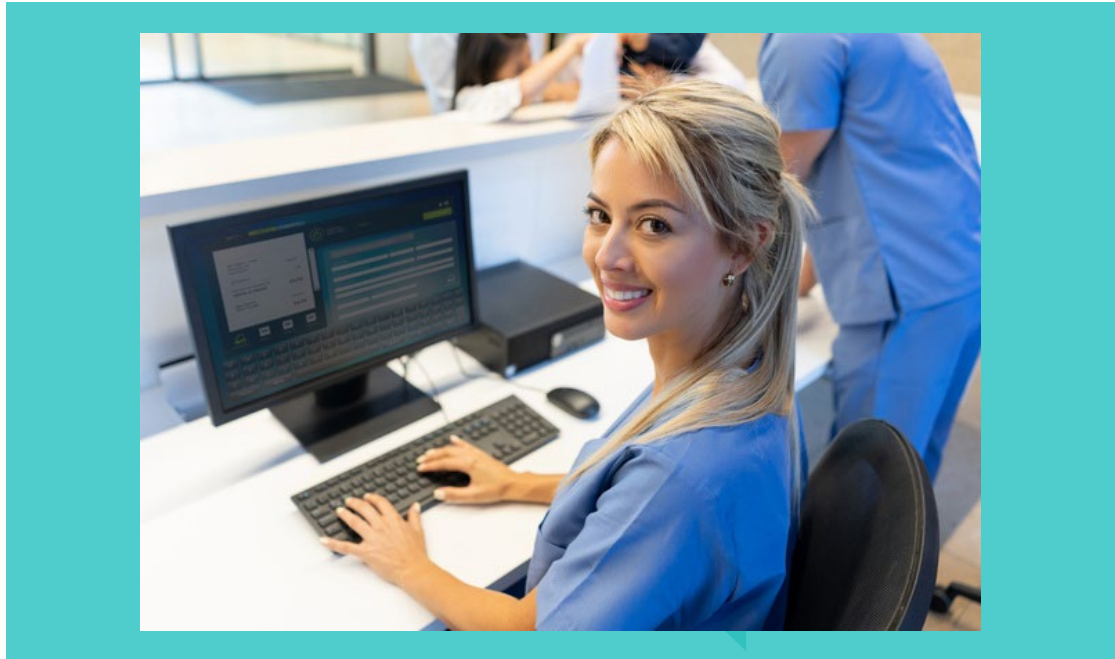
- SELECT GO LIVE  
DATE
- CONDUCT TRAINING








EHR User Searches for Patient



EHR Connects to FHIR BOTS  
Application to locate patient

**Sally Smart**    **DOB: 11/15/1972**    **AGE: 51**

**Benchmark Leakage**

Code	Code Description	HCC Value	Action
I2720	Pulmonary hypertension, unspecified	\$4,187.05	<a href="#">Confirm</a>   <a href="#">Dismiss</a>
I472	Ventricular Tachycardia	\$2,454.15	<a href="#">Confirm</a>   <a href="#">Dismiss</a>

**SALLY SMART** [Quick Learn](#)

**DOB: 11-15-1972**    **Gender: F**    **HICN: 991053854X**    **MBI:**    **Deceased: NO**

**Benchmark Leakage:** Confirm or Dismiss the Diagnoses Below:

ICD-10 Code	Description
I495	Sick sinus syndrome

**HCC96 Specified Heart Arrhythmias Value**    **\$2,454.15**

F0150    Vascular dementia, unsp severity, without beh/psych/mood/anx

F0280    Dem in oth dis classd elswhr, unsp sev, w/o beh/psych/mood/anx

F0390    Unsp dementia, unsp severity, without beh/psych/mood/anx

G309    Alzheimer's disease, unspecified

G301    Alzheimer's disease with late onset

**HCC52 Dementia Without Complications Value**    **\$2,098.21**

E1151    Type 2 diabetes w diabetic peripheral angiopath w/o gangrene

I7389    Other specified peripheral vascular diseases

I739    Peripheral vascular disease, unspecified

**HCC108 Vascular Disease Value**    **\$2,819.47**



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

ICD-10 Code	Description
-------------	-------------

D559	Anemia due to enzyme disorder, unspecified
------	--

V28 Retired Value \$1,997.24

HCC48 Coagulation Defects and Other Specified Hematological Disorders

Dismiss

Take Action

# Pop-Up Card

Customizable pop-up card in the EHR using CDS hooks and SMART on FHIR.

Clinical Decision Support (CDS) Hooks: configurable data cards that may popup in EHR workflow.

Fast Healthcare Interoperability Resources (FHIR): platform to push/pull data from or to the EHR and other data repositories.

vPOP card (CDS Hook) is an EHR notification. Upon locating and opening a patient chart, the notification will “pop-up” to notify your clinical team when a data point needs attention or action.



# Tab in EHR

Customizable tab in the EHR proprietary Application Program Interface (API).

Proprietary Application Program Interface (API) to populate a tab on the patient chart with configurable data points.

vPOP Tab are a list of notifications on a tab that are applicable to a patient. Upon locating and opening a patient chart, the notifications applicable to the patient will display on a clickable tab to notify your clinical team when a data point needs attention or action.

SALLY SMART

[Quick Learn](#)

DOB: 11-15-1972   Gender: F   HICN: 991053854X   MBI:   Deceased: NO

**Benchmark Leakage:** Confirm or Dismiss the Diagnoses Below:

ICD-10 Code	Description
I495	Sick sinus syndrome
HCC96 Specified Heart Arrhythmias Value \$2,454.15	
F0150	Vascular dementia, unsp severity, without beh/psych/mood/anx
F0280	Dem in oth dis classd elswhr, unsp sev, w/o beh/psych/mood/anx
F0390	Unsp dementia, unsp severity, without beh/psych/mood/anx
G309	Alzheimer's disease, unspecified
G301	Alzheimer's disease with late onset
HCC52 Dementia Without Complications Value \$2,098.21	
E1151	Type 2 diabetes w diabetic peripheral angiopath w/o gangrene
I7389	Other specified peripheral vascular diseases
I739	Peripheral vascular disease, unspecified
HCC108 Vascular Disease Value \$2,819.47	

## SALLY SMART

DOB: 1972-11-16

Gender: F

HICN: 991053854X

Deceased: No

Benchmark Leakage: Confirm or Dismiss the Diagnoses Below

ICD-10 Code	Description	Action												
Diabetes with Chronic Complications Value \$3,287.82														
E11.42	Type 2 diabetes mellitus with diabetic polyneuropathy	<div>ConfirmDismiss</div>												
E11.622	<div><div><div>Problem List</div><div><div><div>Search for new problem</div><div>+ Add</div></div><div><div>DxReference</div><div>Show: <input checked="" type="checkbox"/> Past Problems</div></div><table><tr><th>Diagnosis</th><th>Sort Priority</th><th>Resolved</th></tr><tr><td>Type II Diabetes Mellitus</td><td>Unprioritized</td><td>X +</td></tr><tr><td>Hypertension</td><td>Unprioritized</td><td>X +</td></tr><tr><td>Generalized anxiety disorder</td><td>Unprioritized</td><td>X +</td></tr></table><div><div><input checked="" type="checkbox"/> Mark as Reviewed</div><div>Never Reviewed</div></div><div>Advanced View</div></div></div></div>		Diagnosis	Sort Priority	Resolved	Type II Diabetes Mellitus	Unprioritized	X +	Hypertension	Unprioritized	X +	Generalized anxiety disorder	Unprioritized	X +
Diagnosis	Sort Priority	Resolved												
Type II Diabetes Mellitus	Unprioritized	X +												
Hypertension	Unprioritized	X +												
Generalized anxiety disorder	Unprioritized	X +												
E11.649														
E11.65														
E11.69														
M86.10														
M86.151														
M86.18														
M86.60														
M86.8X8														
M86.9	Osteomyelitis, unspecified	<div>ConfirmDismiss</div>												
Artificial Openings for Feeding or Elimination Value \$7,072.09														

# SMART on FHIR

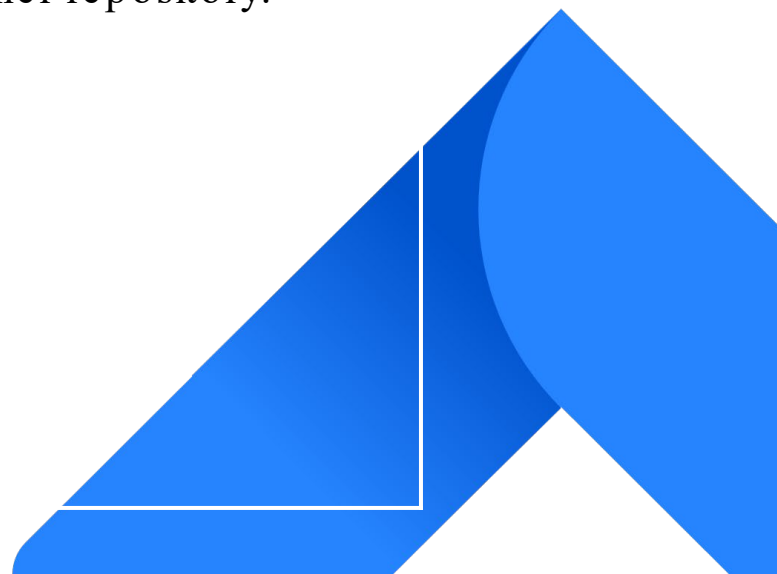
SMART on FHIR or Fast Healthcare Interoperability Resources (FHIR) enable data to be pushed/pulled to or from the EHR and other data repositories.

For example, with FHIR, a diagnosis may be pushed with a simple click of a button to the patient's problem list.

# EHR Notifications Connectivity Integration Options








Different EHRs will have different capabilities. EHRs with Clinical Decision Support (CDS) Hooks allow cards to pop up in the EHR patient workflow while other EHRs rely on their Application Program Interface (API) functionality to display data in the EHR on a tab in the patient chart that may or may not pop up. Both capabilities offer the ability for actionable data in the EHR workflow.

CDS Hooks (HL7) Card (pop up) on Patient Chart	EHR API Tab or Pop Up on Patient Chart	SMART on FHIR
<p>Decision support in the form of cards may display as part of the provider workflow. Cards may be informational or allow the user to accept or reject the prompted action.</p> <p>Cards or CDS Hooks may be customizable if installed as distinct products or the practice is identifiable by an id number.</p> <p>An event, such as the loading of a patient's chart triggers the CDS service logic to serve up a card or cards in the EHR workflow with actionable information for the provider team.</p>	<p>Proprietary EHR Application Program Interface (API) facilitates selected data elements to render on a tab on the patient chart.</p> <p>If your EHR has an API then a tab on the patient chart in the EHR renders with the actionable data. The EHR may have the option to popup the tab into the workflow.</p> <p>Depending on the EHR API without SMART on FHIR it may have either:</p> <ul style="list-style-type: none"><li>• Read capabilities</li><li>• Read/Write capabilities</li></ul> <p>Most EHR APIs only have the ability to read and not write. Tabs can be customized as the Practice ID of the EHR is identifiable and is passed back to Health Endeavors in the API process.</p>	<p>SMART on FHIR capabilities means data has read or write capabilities. SMART on FHIR defines a workflow that an application can use to securely request access to data, and then receive and use that data.</p> <p>Read means the ability to pull or extract EHR data or claims data and display on the card.</p> <p>Write means the ability to push or import EHR data from the card to the EHR or another repository.</p>







Quality Care Gaps  - Not All Questions Answered		
DM-2 DM with HbA1c > 9 percent (poor control)		Action Required
HTN-2 Controlling High BP		Action Required
MH-1 Depression Remission		Not Applicable
PREV-5 Breast Cancer Screening		Not Applicable
PREV-6 Colorectal Cancer Screening		Not Applicable
PREV-7P1 Influenza Immunization		Done
PREV-7P2 Influenza Immunization (Flu Season 2023-2024)		Action Required
PREV-10 Tobacco Use: Screening and Cessation Intervention		Action Required
PREV-12 Screening for Depression and Follow-up Plan		Action Required
PREV-13 Statin Therapy		Done
Care-2 Falls: Screening for Future Fall Risk		Not Applicable
Wellness Exam		Action Required







### The patient has an avoidable emergency room visit

Jane Doe went to the emergency room or urgent care on 1/4/2023 for an avoidable emergency room visit. Visit reason for R42 -dizziness and giddiness at a cost of \$867.93 at St. Johns Medical Center.

[Acknowledge](#)



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

Social Determinants of Health

Z-Code	Description
Z5900	Homelessness unspecified

Dismiss

Take Action



### The patient was treated by a specialist

Jane Doe was treated by specialist Jacob Anderson, MD on 2/28/2023 for Acute Pulmonary Edema.

[Acknowledge](#)



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

ICD-10 Code	Description
-------------	-------------

D559	Anemia due to enzyme disorder, unspecified
------	--

V28 Retired Value \$1,997.24

HCC48 Coagulation Defects and Other Specified Hematological Disorders

Dismiss

Take Action



**Sally Smart**

**DOB: 11/15/1972**

**AGE: 51**

ICD-10 Code	Description
-------------	-------------

I495	Sick sinus syndrome
------	---------------------

HCC96 Specified Heart Arrhythmias Benchmark Leakage \$2,454.15

Dismiss

Take Action



# EHR

- Certified by ONC
- FHIR enabled or API enabled
- SMART on FHIR enabled or API enabled



**FHIR BOTS**



Epic



Cerner



Athena Health



Allscripts



Any FHIR EHRs







Sherman440 Nienow652 10/18/1943 Male

Print Form

Report a Problem

Work: 543-251-3555 | Email: sherman@nonemail.com

3260 KIMBALL AVE , MANHATTAN KS, 665032157

Emergency Contact: RORIE Nienow | 532-325-5555 | Mother

Single

Date Submitted: 06/29/2022

Name: Sherman440 Nienow652

Relationship to Patient: Patient

#### Height, Weight, BMI (EHR Resource)

Last Updated: 07/08/2022

Date Reported	Height	Weight	BMI
07/08/2022	5'11"	185	25.8

#### COVID-19

Last Updated: 06/30/2022

COVID	Date	Details	Source
Vaccine (second dose)	06/02/2022	Pfizer	Consumer Added
Vaccine (first dose)	04/01/2022	Pfizer	Consumer Added
Diagnosis	12/02/2021	Z20822	Claims
Diagnosis	03/16/2020	U071	Claims

#### Health Encounters (Last 60 months of claims data)

Encounter	Rendering	Servicing
-----------	-----------	-----------

#### Past and Current Symptoms (Consumer Added)

Last Updated: 06/29/2022

Date Reported	Symptom Description	First Date Experienced	Last Date Experienced
06/29/2022	left arm pain	06/02/2022	06/04/2022
06/29/2022	left chest pain	05/20/2022	05/21/2022

#### Allergies

Last Updated: 06/20/2022

Type of Allergy	Name and Reaction	Reaction Date	Source
Environment	Seasonal allergies	05/01/2010	Consumer Added
Medication	Penicillin	01/03/2000	Consumer Added

#### Medications (Last 36 Months)



Last Updated: Never

Details	Medication (strength)	Feedback	Last Filled Data
▼	levothyroxine sodium (.05 mg/1)	Not Taking	11/01/2021
▼	ciprofloxacin (500 mg/1)	Taking	09/25/2021



# Height, Weight, and BMI

Height, Weight, BMI (EHR Resource)				Last Updated: 07/08/2022
Date Reported	Height	Weight	BMI	
07/08/2022	5'11"	185	25.8	

Past and Current Symptoms (Consumer Added)				Last Updated: 06/29/2022
Date Reported	Symptom Description	First Date Experienced	Last Date Experienced	
06/29/2022	left arm pain	06/02/2022	06/04/2022	
06/29/2022	left chest pain	05/20/2022	05/21/2022	
<a href="#">+ Add Symptom</a>				



# Contact

KRIS GATES  
HEALTH ENDEAVORS