Health Level 7, Fast Healthcare Information Resources; Electronic Medical Record

11 August 2024

Introduction

The Health Level 7, Fast Healthcare Information Resources; Electronic Medical Record software has been developed based on the published FHIR Resources at https://build.fhir.org/ig/HL7/fhir-ipa/. The product comes with experience dating back to 2002, when one of the directors was first employed in the healthcare sector's Information Technology department working on similar EMR software.

About the Project

As a patient your medical data is collected on many systems, and at different national and international locations. The IPA specification is designed to help patients access their data regardless of the system on which it was captured or the location of the patient. This is particularly useful in several scenarios such as;

- when you are travelling out of your home country and need your medical data while away
- when you are unconscious and cannot provide your medical history
- when you are at a local health facility using a different system than that of your regular facility

The system's main purpose is to be able to consolidate and share a person's health data. This is achieved by the system being implemented in FHIR IPA standards. These allow for compatible FHIR systems to exchange data with the system.

IPA is not meant to be a complete Electronic Medical Record system, instead it captures the most crucial elements of the EMR and pulls or pushes the required data from/to other systems in a standard format.

System Overview

ADMINISTRATION

The Administration module contains;

- User Management
- Update Procedure CPT Codes by uploading them from a CSV file
- Update ICD10 or other codes according to the ICD10-MIT file format

RECEPTION

The receptionist view has limited functionality available but allows the job function to be executed in an easy manner and processes flow onto other departments and back seamlessly. One of the main functions is to manage the actual Patient records here, and the IPA specification provided a comprehensive set of resources for that. In this section we shall focus on only the Appointments as the other functions are covered in a more detailed section later.

Appointments

Appointments are created while capturing a comprehensive set of indicators.

APPOINTMENT DETAILS

Patient Email Address	patient@machuzu.com
Title *	Bhekiwe Dlamini
From:	10/08/2024 00:00
To:	10/08/2024 01:00
All Day (see #1164):	☐
Status *	planned
Class *	observation encounter
Type	Outpatient Kenacort injection
Service Type	Planned Activity Groups
Priority	timing critical
Reason	Alcohol user
Diagnosis Use	Chief complaint
Diagnosis Rank	0
Admition Source	Select
ReAdmission	Select
Diet Preference	Select
Special Courtesy	normal courtesy
Special Arrangement	Wheelchair
Discharge Disposition	Home

Reset   Save

Once created, an Appointment appears on the Schedule as shown below, and is now accessible by nurses or doctors during consultation, procedures etc.
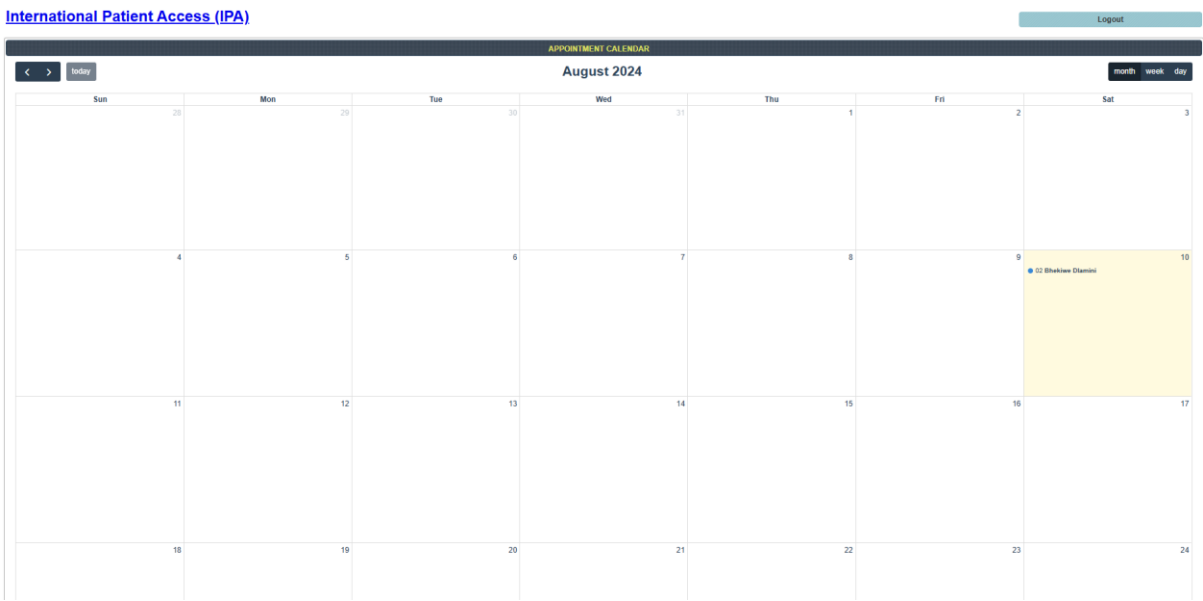
NURSE VIEW

After a patient is registered at Reception, they can be searched and their encountered started by a Nurse; who has access to all medical data and functions, unless specifically requested for limitations.
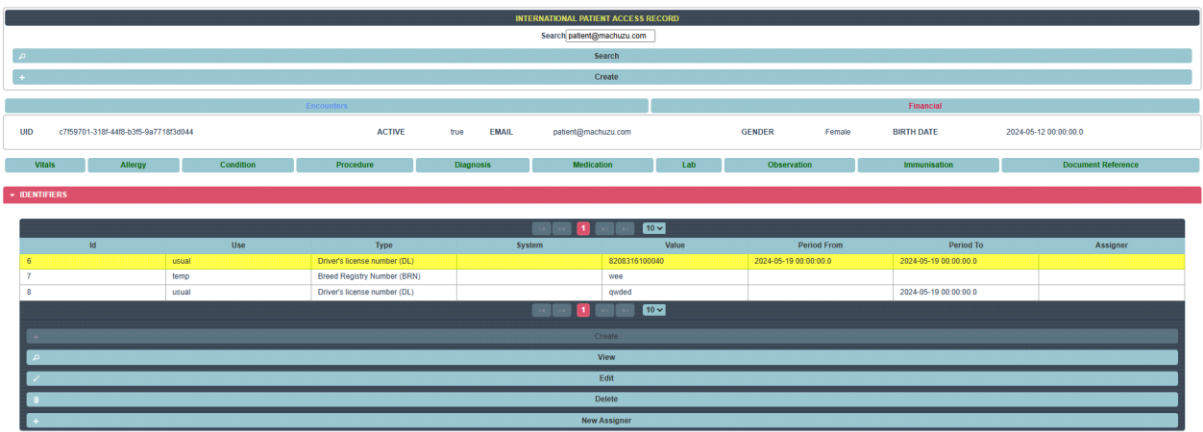
The Vitals, Allergies/Reactions and Immunisations are captured by the Nurse.

Vitals captured include BP, Temp, Pulse, Respiratory, Weight, Height, Spo2, BMI and BSA.

The Allergy management screen is shown below;

Allergies

							IDENTIFIER										
ID	6	USE		usual	VALUE		8208316100040			TYPE		Driver's license number (DL)					

								ALLERGIES									

Description	Clinical Status	Verification Status	Type	Category	Criticality	Code	Onset Date	Age	Period From	Period To	Onset Range	Onset String	Recorded Date	Last Occurrence
Asthma		confirmed	allergy	environment	low		2024-08-01 00:00:00.0	2	2024-08-01 00:00:00.0	2024-08-02 00:00:00.0	2			

+	Create
	View
	Edit
	Delete

			REACTIONS			
Substance	Manifestation	Description	Onset	Severity	Route	Note
No records found.						

	Create
	View
	Edit
	Delete

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The Create New Immunisation screen is shown below;

CREATE IMMUNISATION

Status	completed
Status Reason	medical precaution
Vaccine Code	Adenovirus types 4 and 7
Occurence Date	2024/08/10
Occurence String	
Recorded	2024/08/10
Primary Source	✓
Report Origin	Parent/Guardian/Patient Recall
Lot Number	34
Expiration Date	2024/08/31
Site	Right arm
Route	Injection, subcutaneous
Dose Quantity	40
Note	
Reason Code	Travel vaccinations
Subpotent	✓
Subpotent Reason	Select
Program Eligibility	Select
Funding Source	Public
Reaction Date	
Reaction Detail	
Reaction Reported	

Save
Cancel

DOCTOR VIEW

In addition to functions that the Nurse performs, the Doctor works with additional modules.

The Create Condition screen is shown below;

CREATE CONDITION

Clinical Status *	Active
Verification Status *	Unconfirmed
Category *	Encounter Diagnosis
Severity *	Severe
Code *	Anxiety disorder of childhood OR adolescenc
Body Site *	Posterior carpal region
Onset Date	2024/08/10
Onset Age	0
Onset From	2024/08/01
Onset To	2024/08/17
Onset Range	
Onset String	
Abatement Date	
Abatement Age	0
Abatement From	
Abatement To	
Abatement Range	
Abatement String	
Recorded Date	2024/08/10
Note	

Save

Cancel

Each Condition can have Evidence associated with it as in the screen below;

CREATE EVIDENCE

Code *	Posterior carpal region
Note	Not too bad

Save

Cancel

The Create Procedure screen is shown below;

The Diagnosis screen is shown below. In the system and IPA, a Diagnosis is a type of Observation.

The Medication Administration module provides a comprehensive way to record medication administration. The following steps occur during medication administration.

General information is captured as in the screen below;

MEDICATION ADMINISTRATION

Status *	In Progress
Status Reason *	In Progress
Category *	Outpatient
Title	Demo Med Admin
Description	Good Med
Period From	2024/08/10
periodTo	2024/08/31
Reason Code *	Given As Ordered
Note	

Save

Cancel

After saving the previous screen, the following screen is displayed. This screen captures the actual medication administered.

CREATE MEDICATION

Code	Codeine phosphate
Status	active
Form	tablets
Amount	3
Batch Lot Number	23423423
Batch Expiration Date *	2024/08/10

Save

Cancel

Medication Dosages are then captured as in the below two screens that are captured respectively;

CREATE DOSAGE

Sequence	1
Text	
Additional Instruction	Half to one hour before food
As Needed	✓
Site	
Route	
Method	
Max Dose Per Period Numerator	
Max Dose Per Period Denominator	
Max Dose Per Lifetime	

Save

Cancel

CREATE DOSE AND RATE

Type	Calculated
Dose Range Low	1
Dose Range High	10
Dose Quantity	2
Rate Ratio Numerator	1
Rate Ratio Denominator	20
Rate Range Low	20
Rate Range High	30
Rate Range Qty	21

Save

Cancel

The Create Lab screen is shown below;

Lab Results are captured when available as in the screen below;

ADD RESULT

Date	2024/08/10
Status *	Registered
Code *	R wave duration in lead V2
Category *	Blood Bank
Confirm Test Description	Demo Blood Test
Lab Result	Looks good
Reference	ABC424
Issued	2024/08/10
Conclusion	Good
Conclusion Code *	Lucio phenomenon

Save

Cancel

The Create Observation screen is shown below. If the Observation is not a Diagnosis the ICD10 diagnosis does not need to be selected with note that a Diagnosis specific Observation capture screen is provided.

CREATE OBSERVATION

Status	Preliminary	▾
Category	Survey	▾
Diagnosis	WHO_Full_Desc	⌄
Code	R wave duration in lead I	▾
Effective Date	08/10/2024	📅
Issued	08/10/2024	📅
Interpretation	GeneticObservationInterpretation	▾
Body Site	Coronoid process of mandible	▾
Method	Provocation technique	▾
Note	Demo	

Save

Cancel

The Document Management module allows for the uploading and management of any related documents to a Patient or Encounter.

The Financial Management module screen is displayed below;

Accounts

				IDENTIFIER			
ID	6	USE	usual	VALUE	8208316100040	TYPE	Driver's license number (DL)

LIST ACCOUNTS

Id	Status	Billing Status	Type	Name	Service From	Service To	Description
11	open		DN	Demo Account	05/18/2024	05/18/2024	IPA Card Holder

Create

View

Edit

Delete

Charge Selected Item

Generate Invoice

View Invoices

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Here the Health Facility's administration is able to monitor all financial activities and further capture data including Charge Items and Invoices. These are captured based on a selected Account.

Below the Create Charge Item screen is displayed;

CREATE CHARGE ITEM ✖

Definition Uri	
Definition Canonical	
Status	Billable
Code	Unvorhergesehene Inanspruchnahme
Charge From	2024/08/10
Charge To	2024/08/10
Quantity	5
Body Site	Distal phalanx of third toe
Unit Price	100
Total Price	500
Override Reason	MEDICINE PICKUP ONLY
Entered Date	2024/08/10
Reason	Certain infectious and parasitic disease
Service	Routine Refill of ABCD
Product	Blood Pressure Cuff
Note		

Save

Cancel

For an Invoice, the user is requested to confirm generation of the Invoice based on the items linked to the Encounter.

GENERATE INVOICES ✖

Generate a new Invoice for the current Encounter?

Yes

No

General details are then captured are as displayed below;

CREATE INVOICE		
Status	Issued	▼
Cancelled Reason		
Date	08/10/2024	📅
Creation Date	08/10/2024	📅
Period From	08/01/2024	📅
Period To	08/10/2024	📅
Total Price Component	1300	
Total Net	1300	
Total Gross	1300	
Payment Terms	Cash	
Note	None	

Save

Cancel

Telemedicine

The system includes a Patient only view on which interactions with Doctors are managed and can be initiated. Messages are sent to Doctor and Patient when required.

Smart Health Card

Patients with EMR's that are within the system can optionally export their EMR to a Smart Health Card. We develop custom secure smart cards, containing the patient's health records.

For more information please contact Wandile Nxumalo, +268 7820 0737, wandile@machuzu.com