Kingdom of Cambodia

Nation Religion King

EMR Clinical Data Integration Specification

V 1.4

National Payment Certification Agency
Prepared by Department of Data Management and Information Technology

CONTENTS

1

1 OVERVIEW 1

1.1 PURPOSE 1
1.2 SCOPE 1
1.3 INTENDED AUDIENCE 1
1.4 IMPLEMENTATION STANDARDS 1

2 INTEGRATION ARCHITECTURE & DATA FLOW 1

2.1 ENDPOINT SEQUENCE & DEPENDENCIES 1
2.2 HOW EMR INTEGRATION WORKS 3
2.3 COMPONENT ARCHITECTURE 6
2.4 DATA MODEL RELATIONSHIPS 6
2.5 IMPLEMENTATION CONSIDERATIONS 7
2.6 KEY FEATURES 7

3 SECURITY & AUTHENTICATION 7

4 API ENDPOINTS 7

4.1 AUTHENTICATION ENDPOINT 7
4.2 SEARCH BENEFICIARY 8
4.3 SUBMISSION ENDPOINT 9
4.4 PROCESSING ENDPOINT 11
4.5 TRACKING PROCESSING RESULT 12
4.6 SUBMISSION RESPONSE HANDLING 13

5 BASE COMPONENTS 15

5.1 ENCOUNTER 15
5.2 OBSERVATIONS 16

6 CORE COMPONENTS 19

6.1 PATIENT 19
6.2 VISIT 21
6.3 TRIAGE 22
6.4 VITAL SIGNS 23
6.5 MEDICAL HISTORIES 25
6.6 PHYSICAL EXAMINATIONS 27
6.7 LABORATORIES 29
6.8 IMAGERIES 35
6.9 DIAGNOSIS 37
6.10 SOAPS 38
6.11 PRESCRIPTIONS 39
6.12 REFERRAL 41
6.13 CONSULTATIONS 43
6.14 INVOICES 43

7 SPECIFIC ENCOUNTERS 45

7.1 INPATIENT ADMISSION 45
7.2 OUTPATIENT 46
7.3 EMERGENCY 48
7.4 SURGERY 49
7.5 PROGRESS NOTES 51

8 SPECIFIC CLINICAL DATA FORM COMPONENTS 52

8.1 INTRODUCTION TO CLINICAL DATA FORM 52
8.2 DELIVERY FORM ..... **ERROR! BOOKMARK NOT DEFINED.**
8.3 OPD ANC FORM ..... **ERROR! BOOKMARK NOT DEFINED.**
8.4 OPD PNC FORM ..... **ERROR! BOOKMARK NOT DEFINED.**
8.5 ABORTION FORM ..... **ERROR! BOOKMARK NOT DEFINED.**
8.6 BIRTH CONTROL FORM ..... **ERROR! BOOKMARK NOT DEFINED.**
8.7 CHILD PHYSICAL EXAMINATION (0-28 DAYS) FORM ..... **ERROR! BOOKMARK NOT DEFINED.**
8.8 CHILD PHYSICAL EXAMINATION (1MONTH-5YEARS) FORM ..... **ERROR! BOOKMARK NOT DEFINED.**

9 STANDARD DATA REFERENCE GLOSSARY ..... ERROR! BOOKMARK NOT DEFINED.

9.1 PATIENT DEMOGRAPHIC ..... **ERROR! BOOKMARK NOT DEFINED.**
9.2 VITAL SIGNS OBSERVATIONS ..... **ERROR! BOOKMARK NOT DEFINED.**
9.3 VISIT & ADMINISTRATIVE DATA ..... **ERROR! BOOKMARK NOT DEFINED.**
9.4 MEDICAL HISTORY COMPONENTS ..... **ERROR! BOOKMARK NOT DEFINED.**
9.5 PHYSICAL EXAMINATION COMPONENTS ..... **ERROR! BOOKMARK NOT DEFINED.**
9.6 FORM DATA ..... **ERROR! BOOKMARK NOT DEFINED.**

10 RELATED DOCUMENTS 53

1 Overview

1.1 Purpose

This document defines the technical specification for submitting clinical visit data from **external EMR systems** to the **Digital Payment Certification System**. It ensures standardized, secure, and interoperable data exchange.

1.2 Scope

This specification covers:

- Authentication and Security: Secure communication protocols and authentication methods
- Data Submission: Complete the visit data submission process
- Data Coverage: Clinical, administrative, and billing-related information
- Response Handling: Acknowledgement (ACK) and processing behavior
- Error Management: Validation rules and error handling procedures

1.3 Intended Audience

- EMR Vendors: External system developers and implementers
- Integration Developers: Backend and API integration specialists
- Technical Architects: System designers and solution architects
- Quality Assurance Teams: Testing and interoperability validators

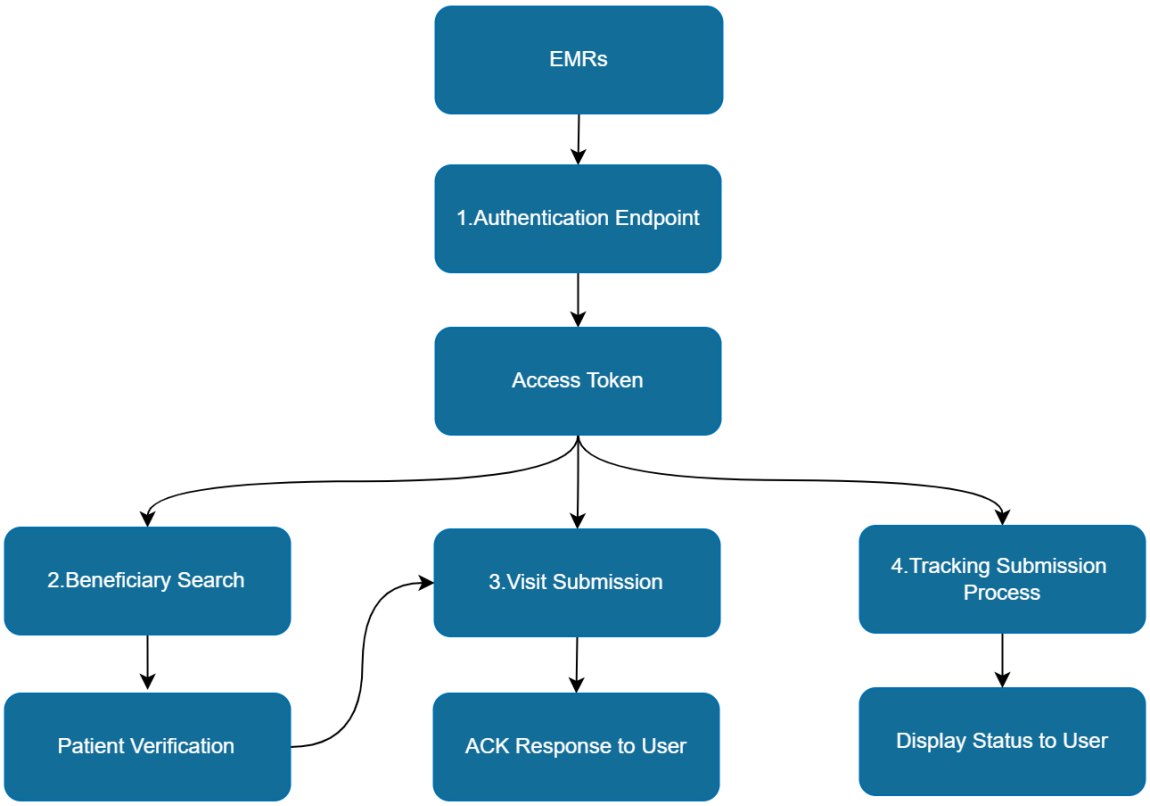
1.4 Implementation Standards

- **API Protocol**: RESTful JSON over HTTPS
- **Diagnostic Coding**: ICD-10 (Category/Subcategory codes)
- **NPCA Data Dictionary**
- **Date/Time Format**: ISO-8601 with Cambodia time zone (+07:00)
    - *Example:* 2025-11-26T11:32:00.000+07:00
- **Demographic Standards**: National Committee for Demography and Development (NCDD) standards
    - *Reference data: https://data.mef.gov.kh/*

2 Integration Architecture & Data Flow

2.1 Endpoint sequence & Dependencies

The integration involves three primary API endpoints that work together to manage patient visits:



Endpoint 1: Authentication

- **Purpose:** Obtain a secure OAuth 2.0 access token (Bearer token) for authenticating all subsequent API calls.
- **When to Use:** Before any API call; upon token expiration (via 401 Unauthorized response); or as part of a scheduled refresh cycle.
- **Frequency:** Initial setup and periodic refresh (tokens are typically valid for 2 hours).
- **Dependencies:** None. This is the entry point.

Endpoint 2: Beneficiary Search

- **Purpose:** Verify if the card exists, has a benefit program, and has basic demographic information.
- **When to Use: Strongly recommended** before visit submission to ensure data linkage and avoid errors.
- **Frequency:** Once per patient/visit verification.
- **Dependencies:** Requires a valid **access token** from Endpoint 1.
- **Output:** Critical Eligibility card, SPID used in the Visit Submission payload.

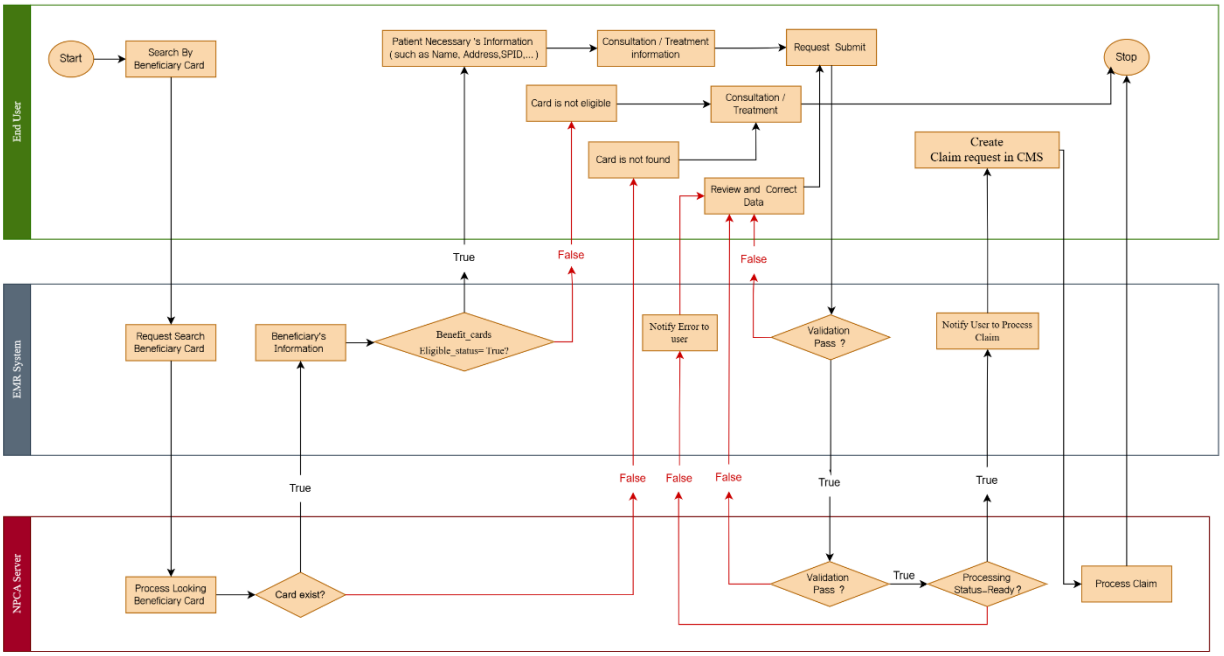
Endpoint 3: Visit Submission

- **Purpose:** Submit complete or partial clinical visit data for processing and storage.
- **When to Use:** After successful patient verification (Endpoint 2) and with a valid access token (Endpoint 1).
- **Frequency:** Once per patient visit event (create/update).
- **Dependencies:** Requires a valid **access token** (Endpoint 1) and a SPID (obtained via Endpoint 2).
- **Response:** Immediate HTTP 200 Accepted with a **status**, **visit_ulid** and **visit_code**.

Endpoint 4: Tracking Processing Result

- **Purpose:** Retrieve the latest processing status and validation result of a previously submitted visit, including whether it has been accepted, rejected, is still processing, or requires user action.
- **When to Use:** After a visit has been submitted to the Integration Platform (Endpoint 3) and with a valid access token (Endpoint 1). The EMR needs to check the current processing status or obtain the final processing result. This is especially useful when processing is asynchronous or when the initial submission response only acknowledges receipt.
- **Frequency:** On demand or periodically until processing is completed. Recommended polling interval: every 8 hours (or according to system guidelines). Stop polling once the status becomes **Completed**, **Rejected**, or **Failed**.
- **Dependencies:** Authorized API credentials and Visit Submission
- **Response:** Returns the **status** (**Processing**, **Pending, Failed**, **Ready**), processed timestamps, Validation or processing failure reason, processing status, and any identifiers such as Visit Code.

2.2 How EMR Integration Works



Flow of EMR Integration

Step 1: Beneficiary Lookup
This is where the process starts. User swipes or enters the patient's card number into the system.

- **Action:** User swipes or manually enters the patient's benefit card number.
- **Outcomes:**
    1. If the card is **found**, the system retrieves the **Patient's Details** (Home, Address, SPID, etc.). The "Patient's Information" is prepared, and the process moves to step 2.
    2. If the **Card is not found** in the database, the patient would **not be eligible to receive treatment under the benefit**.

Step 2: Eligibility & Card Validity Check

- **Action:** System verifies eligibility status linked to the patient's record.
- **Outcomes:**
    1. **Eligible**: Patient information is confirmed and prepared. The patient may proceed to receive covered treatment.
    2. **Not Eligible**: Benefit does **not apply**; treatment will not be covered.

Step 3: Benefit Request Submission

1. **Submission Initiation**
    - OPD/IPD: Submit after treatment completion
    - IPD-HEF-Poor: Submit after admission (pre-authorization/coverage guarantee)

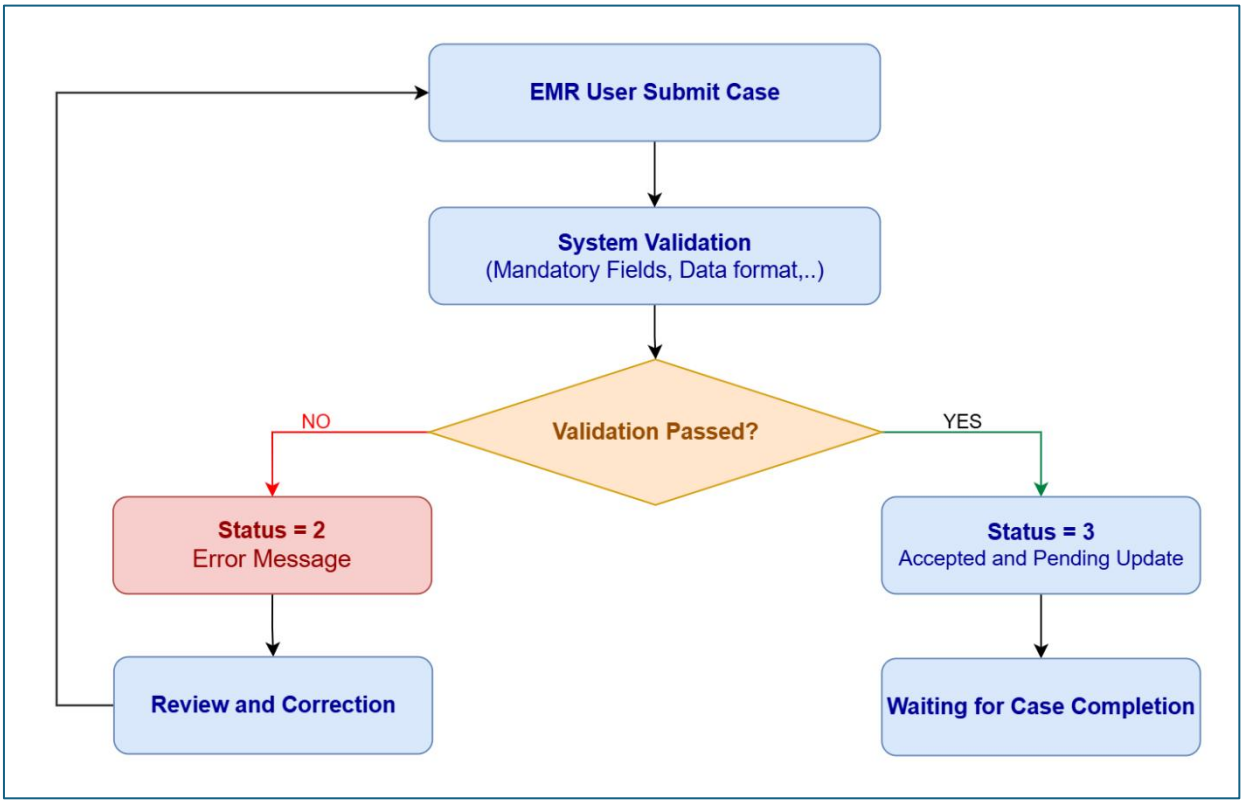
2. **EMR Portal Validation**
    - **Process:** Upon submission, the EMR portal performs local validation and verifies required fields (diagnosis, procedures, etc.).
    - **Outcomes:**
        - **Passed:** Request is queued for **NPCA server validation**.
        - **Failed:** Returns **error message** to user with details (e.g., "Missing diagnosis code"). User must correct and resubmit.

3. **NPCA Server Validation**

After EMR validation passes, the request is sent to the **Digital Payment Certification System.**

- Validates patient eligibility status.
- Performs policy matching (procedure coverage, etc.).
- Generates a unique reference number(ulid) if processed successfully.

2.2.1 Incomplete Case Workflow

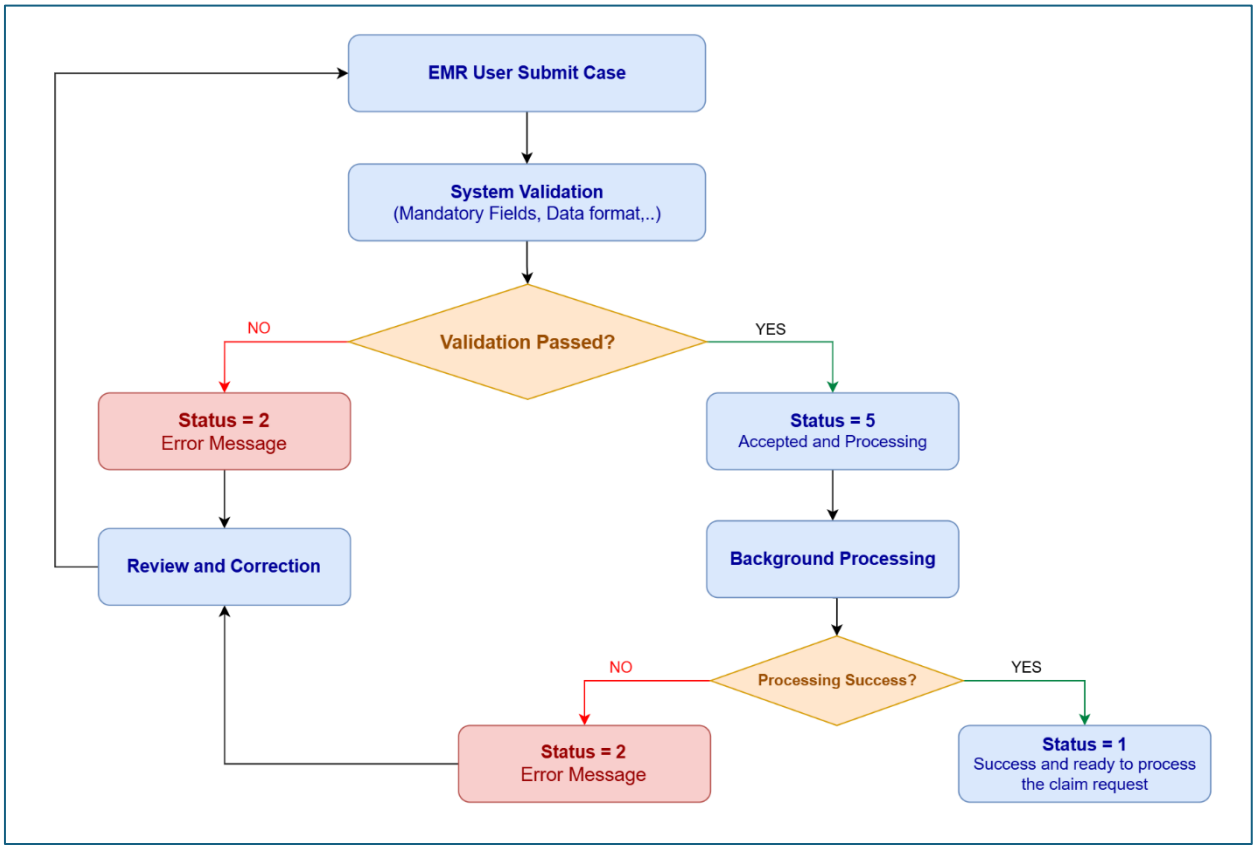


Flow of Incomplete Case

An incomplete case is a visit for which patient care is still in progress. As the treatment has not yet been completed, the visit record remains open and may be updated until the case is finalized.

Status	Meaning	User Action
2	Submission failed	Correct the data and resubmit
3	• The visit has been accepted by the Integration Platform. • The case is not yet complete and requires further updates. • For eligible HEF IPD patients, users may process the initial claim, such as food allowance. • Claim requests cannot be submitted until the visit is completed and updated.	After the patient completes treatment, the healthcare provider must update the visit with the final information and resubmit it to complete the processing workflow. **Note**: *Eligible for HEF food allowance → Healthcare provider submits daily food allowance claims through the Claim Management System (CMS).*

2.2.2 Complete Case Workflow



Flow of Complete Case

A complete case refers to a patient visit that has been completed. The patient has finished treatment, and the visit record contains the final information required for processing.

Status	Meaning	User Action
5	Accepted and processing	Wait for the final result
1	Processing completed successfully	The claim request can be initiated
2	Submission failed	Correct the data and resubmit

2.3 Component Architecture

The API follows a modular architecture with interconnected components that represent different aspects of healthcare delivery:

1. **Base Components** - Learn about fundamental structures like Encounters and Observations that serve as building blocks for more complex operations
2. **Core Components** - Essential models such as Patient, Visit, Triage, Treatment, Invoices, and other Clinical that form the core of the healthcare information system
3. **Specific Encounters** - Supporting structures categorized encounters that can easily help identify each case of a patient visit

2.4 Data Model Relationships

The components are interconnected through reference codes:

- Each Patient can have multiple Visits
- Each Visit can include multiple Encounters (Outpatient, Inpatient, Emergency)
- Each Encounter can have associated clinical data (Observations, Diagnoses, Prescriptions, etc.)

2.5 Implementation Considerations

- Designed for interoperability with healthcare standards
- Supports Cambodia-specific requirements (local administrative divisions, facility structures)
- Flexible observation model accommodates various data types

2.6 Key Features

- Flexible and extensible components
- Comprehensive medical history tracking
- Support for different encounter types (outpatient, inpatient, emergency)
- Integrated billing and payment systems
- Referral management between healthcare facilities
- Detailed clinical documentation with SOAP notes

3 Security & Authentication

Parameter	Specification
Protocol	HTTPS (TLS 1.2 or higher)
Authentication	OAuth 2.0 Bearer Token
Required Headers	Authorization: Bearer <access_token> Content-Type: application/json Accept: application/json X-System-Code: *[provided by NPCA]* X-Health-Facility-Code: *[provided by NPCA]*

4 API Endpoints

This API provides endpoints to manage patient visits in the healthcare system. It allows submitting patient visits along with related data such as triage information, encounters, diagnoses, prescriptions, and more.

4.1 Authentication endpoint

The API uses OAuth 2.0 with Password Client for authentication.

URL	/oauth/token
Method	POST

Request Body	Object: • grant_type: String • client_id: String • client_secret: String • username: String • password: String *NPCA Team will provide credential information.*
Response	Object: • token_type: String • access_token: String (base 64) • expires_in: Timestamp • refresh_token: String (base 64)

4.2 SEARCH BENEFICIARY

URL	api/v1/external/beneficiary/search
Method	GET
Params	card_number
Response	Objects (can provide beneficiary people): • spid: String • patient_code: String • surname: String • name: String • sex: String • birthdate: YYYY-mm-dd • phone_number: String • nationality: String • relationship_to_head • dead: Boolean

	• death_date: datetime • created_at: datetime • updated_at: datetime • address: object • benefit_cards: array • identifications: array • occupation: string • disabilities: array

4.3 SUBMISSION ENDPOINT

URL	/api/external/v1/visits
Method	POST
Request Body	*Depending on the case and actual treatment procedure, refer to section **4.3.1** and Sample Json[1]*

Response	{
	"success": true,
	"http_code": 200,
	"message": *message*,
	"data": {
	"status": *status_code*,
	"uuld": "*unique code generated*",
	"visit_code": "*unique code*",
	}
	}

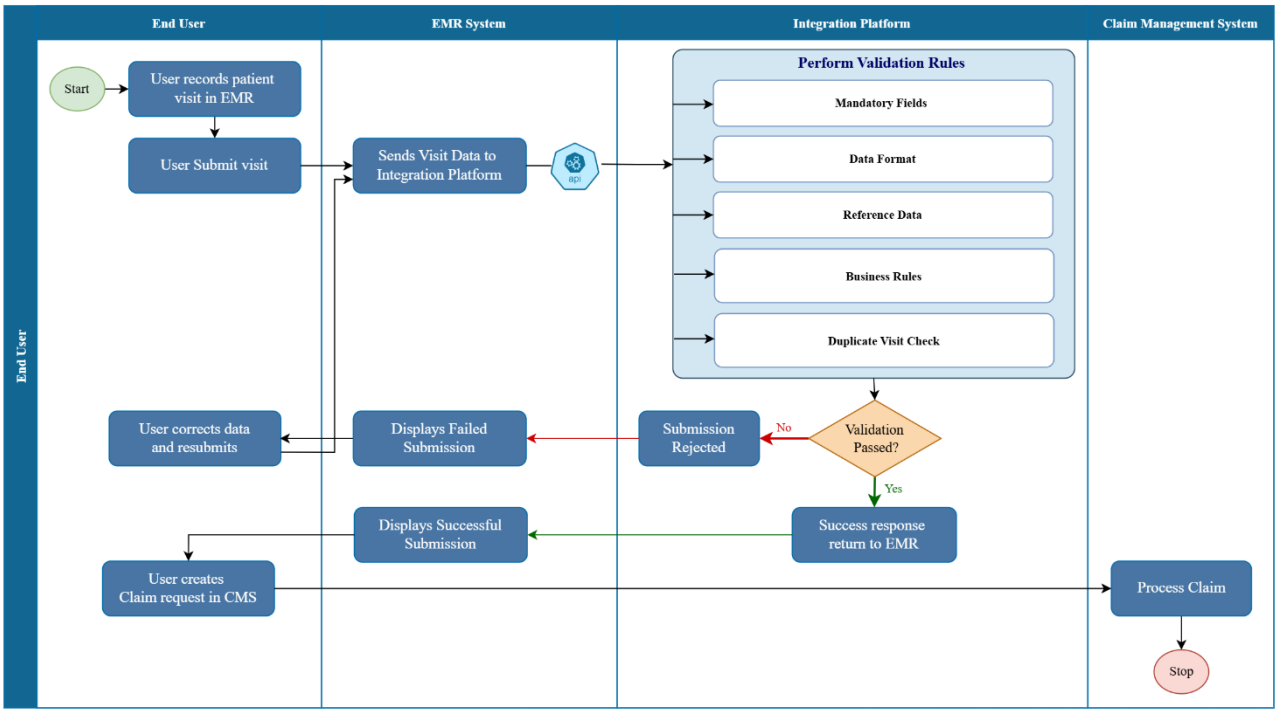
4.3.1 Request Body Structure

The following is an overview of the JSON data structured for submission to the endpoint. Each is a component that will be defined later in the document.

```
{
  "visits": [{
    "patient": {},
```

```
    "triages": [{}],
    "outpatients": [{}],
    "inpatients": [{}],
    "emergencies": [{}],
    "surgeries": [{}],
    "progress_notes ": [{}],
    "soaps ": [{}],
    "vital_signs": [{}],
    "medical_histories": [{}],
    "physical_examinations": [{}],
    "laboratories": [{}],
    "imageries": [{}],
    "diagnoses": [{}],
    "prescriptions": [{}],
    "invoices": [{}],
    "referral": {}
  }]
}
```

4.3.2 Validation Rules



Flow of Visit Submission Validation and Claim Process

N0	Category	Description
1	Mandatory Fields Validation	The system validates that all required information is provided before accepting a visit submission.
2	Data Format	The system validates all submitted data formats.
3	Reference data	The system validates submitted codes against approved reference data.
4	Business rules	The system validates operational and clinical business rules.

5	Duplicate Visit check	The system checks for duplicate submissions. The same visit must not be submitted multiple times as a new visit.

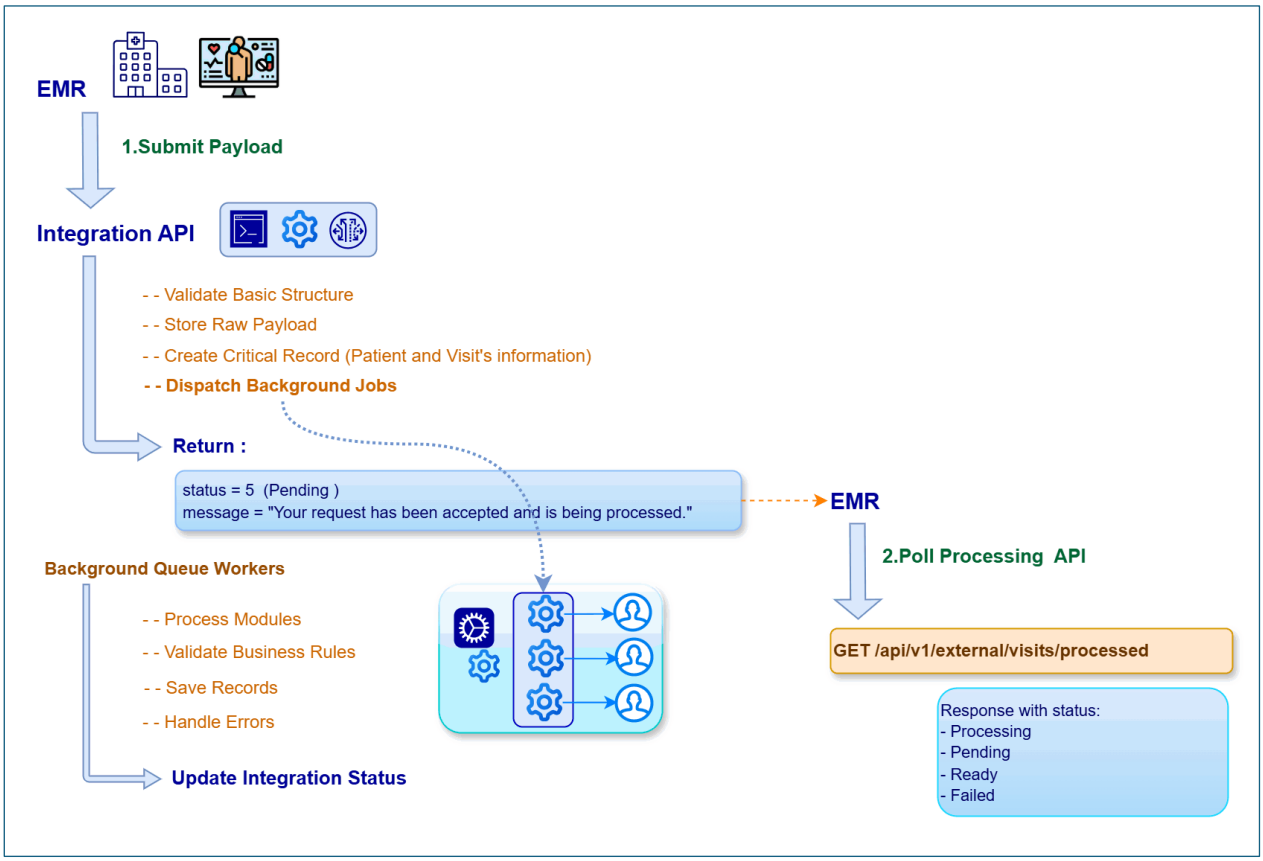
N0	Business Rules Validation	Description
1	Access & Patient Identity Rules	Verify the submitting facility is authorized, and the patient identity is valid and eligible.
2	Basic Visit Rules	Validate visit type, admission and discharge dates, visit status, unique visit code, and other core visit information.
3	Completed Case Rules	Ensure all required clinical and financial information has been submitted, including triage, diagnoses, procedures, invoices, and OPD/IPD-specific data.
4	Clinical Data Linking Rules	Verify relationships between encounters and associated clinical records such as vital signs, SOAP notes, diagnoses, prescriptions, laboratory orders, imaging, physical examinations, and medical history.
5	Resubmission Rules	Validate whether the visit is eligible for resubmission based on its current processing status, admission changes, locked records, pending validation, or previous submission results.

4.4 PROCESSING ENDPOINT

URL	/api/v1/external/visits/processed
Method	GET
Params	• discharged_at_from: YYYY-mm-dd • discharged_at_to: YYYY-mm-dd • admitted_at_from: YYYY-mm-dd • admitted_at_to: YYYY-mm-dd • status: processing / failed / ready / pending • visit_code: String • per_page: Number (Number of items per page) *Importance: Apply this enhancement to improve the identification of records that require updates.*
Response	Object • success: Boolean • http_code: Number • message: String • data: Objects

4.5 TRACKING PROCESSING RESULT

4.5.1 Submission API Flow



Flow of Submission Tracking Process

4.5.2 Implement Processing Status Retrieval

EMR systems must retrieve processing results after a visit enters Status 5. This ensures users receive final processing outcomes.

Benefits:

- Automatic update on EMR UI
- No manual checking
- Better user experience

4.5.3 Display Processing Status

Users should be able to see:

- Processing
- Failed
- Ready
- Pending

directly from the EMR interface.

4.5.4 Submission Status Reference

Status	Processing Status	Meaning
5	Processing	Background processing in progress
3	Pending	Additional updates are required before processing can continue.
2	Failed	Validation or processing failure
1	Ready	Processing completed successfully

4.5.5 Display Failure Reasons

When processing fails, the EMR system should display the reason for the failure returned by the Integration Platform.

Examples:

- Referral reason is required.
- Diagnosis code is invalid.
- Visit Code has been submitted.
- Systolic Blood Pressure must be a number.

4.5.6 Support Data Correction and Resubmission

When processing fails:

1. User reviews the failure reason.
2. User corrects the data.
3. User resubmits the visit.

The EMR system must support this workflow.

4.6 Submission Response Handling

4.6.1 Success Responses

Response	Description
{ *"success": true,* *"http_code": 200,* *"message": "Your request is accepted and pending update.",* *"data": {* *"visit_ulid": "{ ulid }",* *"visit_code": "{ visit_code }",* *"status": 3* *}* *}*	Submission has been accepted, and additional updates are required before processing can continue.
{ *"success": true,*	Submission has been accepted and is being processed in the background.

"http_code": 200, *"message": "Your request is accepted and is being processed.",* *"data": {* *"visit_ulid": "{ ulid }",* *"visit_code": "{ visit_code }",* *"status": 5* *}* *}*	

4.6.2 Error Response

4.6.2.1 400 Bad Request

```
{
  "success": false,
  "http_code": 400,
  "message": "Invalid request data",
  "errors": "Error Message"
}
```

4.6.2.2 401 Unauthorized

```
{
  "success": false,
  "http_code": 401,
  "message": "Unauthenticated",
  "errors": "Invalid or expired token"
}
```

4.6.2.3 403 Forbidden

```
{
  "success": false,
  "http_code": 403,
  "message": "Access denied",
  "errors": "You do not have permission to create visits"
}
```

4.6.2.4 500 Server Error

```
{
  "success": false,
  "http_code": 403,
  "message": "Internal server error",
  "errors": "An unexpected error occurred while processing your request"
}
```

4.6.2.5 Validation Error

Format	Example
{	*{*

"success": false, *"http_code": 422,* *"message": "Invalid request data",* *"errors": "{ error_field_name } { error_message }",* *"data": null* *}*	*"success": false,* *"http_code": 422,* *"message": "Invalid request data",* *"errors": "The visits.0.code field is required.",* *"data": null* *}*

5 BASE COMPONENTS

This section attempts to explain the basic concept of each component used under the visit component.

5.1 ENCOUNTER

An Encounter represents a clinical interaction between a patient and a healthcare provider during a visit.

5.1.1 Data Model

Field	Type	Required	Description
patient_code	string	YES	Reference to the patient's unique code
visit_code	string	YES	Reference to visit the unique code
code	string	YES	Unique identifier for the encounter
class	string	YES	Class of encounter (“IPD”, “OPD”, or “EMERGENCY”)
name	string	YES	What is the encounter (triage, ward names, sub-clinic ...)
service_type	string	YES	Type of the service provided (nullable)
started_at	datetime	YES	Date and time encounter started
ended_at	datetime	YES	Date and time encounter ended (nullable)
encountered_by	string	YES	Name of healthcare provider
title	string	YES	Whether the healthcare provider is doctor or nurse
created_at	datetime	YES	Record creation timestamp
updated_at	datetime		Record the last update timestamp

5.1.2 Example

```
{
  "patient_code": "P25003877",
  "visit_code": "V420650",
  "code": "E317001",
  "class_name": "OPD",
  "name": "General Medicine"
  "service_type": "General Consultation",
  "started_at": "2025-03-17T09:35:00.000+07:00",
  "ended_at": "2025-03-17T10:15:00.000+07:00",
  "encountered_by": "Dr. Chhun Sovannarith"
  "title": "Doctor",
```

```
  "created_at": "2025-03-17T09:35:00.000+07:00",
  "updated_at": "2025-03-17T10:15:00.000+07:00"
}
```

5.2 OBSERVATIONS

Observations contain clinical data about a patient. They are designed to be flexible enough to capture virtually any type of patient information.

5.2.1 Data Model

Field	Type	Required	Description
encounter_code	string	YES	Reference to encounter unique code
observation_code	string		Reference to parent observation (nullable)
name	string	YES	Name for the observation
category	string	YES	Name for the category of the observation if applicable
value	various	YES	Value of the observation (type depends on value_type)
value_type	string	YES	Type of value (“boolean”, “string”, “text”, “integer”, “float”, “datetime”, “time”, “array”, “complex”)
value_unit	string		Unit of measurement (nullable)

5.2.2 Value Types

The observation structure needs to be flexible so any type of data stored in the EMR can be submitted via API. To introduce flexibility, a value type is necessary. It basically determines what type of data it is in the value field.

5.2.2.1 Boolean Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Smoker",
  "category": "Social History",
  "value": false,
  "value_type": "boolean",
  "value_unit": null
}
```

5.2.2.2 String Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Blood Type",
  "category": "Laboratory",
  "value": "O+",
  "value_type": "string",
  "value_unit": null
}
```

5.2.2.3 Text Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Clinical Notes",
  "category": "Assessment",
  "value": "Patient reports symptoms of malaria including periodic
fever, headache, and fatigue. Has history of travel to Mondulkiri
province two weeks ago.",
  "value_type": "text",
  "value_unit": null
}
```

5.2.2.4 Numeric Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Blood Glucose",
  "category": "Vital Signs",
  "value": 110,
  "value_type": "integer",
  "value_unit": "mg/dL"
}
```

5.2.2.5 Datetime Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Last Meal Time",
  "category": "Nutrition",
  "value": "2025-03-17T07:00:00.000+07:00",
  "value_type": "datetime",
  "value_unit": null
}
```

5.2.2.6 Time Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Duration of Symptoms",
  "category": "History",
  "value": "48:00:00",
  "value_type": "time",
  "value_unit": "hh:mm:ss"
}
```

5.2.2.7 Array Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Symptoms",
  "category": "History",
  "value": ["Fever", "Headache", "Fatigue", "Joint Pain"],
  "value_type": "array",
  "value_unit": null
}
```

5.2.2.8 Complex Example

```
{
  "encounter_code": "EN20250317001",
  "observation_code": null,
  "name": "Malaria Risk Assessment",
  "category": "Risk Assessment",
  "value": {
    "risk_level": "High",
    "travel_history": true,
    "prevention_measures": ["Bed nets", "Repellent"],
    "endemic_area": "Mondulkiri province"
  },
  "value_type": "complex",
  "value_unit": null
}
```

Note: conditions also have the same structure and values as observations. But for simplicity, the conditions in the Medical History components are shortened and unified to make it easier to implement them.

6 CORE COMPONENTS



6.1 PATIENT

The Patient object contains personal information and demographics for an individual under medical care.

6.1.1 Data Model

Field	Type	Required	Description
code	string	YES	Unique identifier for the patient in the system
surname	string	YES	Patient's family name
name	string	YES	Patient's given name
sex	string	YES	Patient's biological sex
birthdate	date	YES	Patient's date of birth
phone	string	YES	Patient's contact number
nationality	string	YES	Patient's nationality
disabilities	array of strings		List of disabilities, if applicable
occupation	string		Patient's job or profession (nullable)
marital_status	string	YES	Patient's marital status (nullable)
photos	array of strings		URLs to patient photos (nullable)

address	object	YES	Patient's address information (see Address model)
identifications	array of objects		Patient identification documents (see Identification model)
death_date	datetime		Date and time of death, if applicable
spid	string	YES	Patient's Social Protection ID
created_at	datetime	YES	Record creation timestamp
updated_at	datetime	YES	Record the last update timestamp

6.1.2 Address Model

Field	Type	Required	Description
province	object	YES	Information about the province
province.code	string	YES	Province code from NCDD standard
province.name	string	YES	Province's name in Khmer
district	object	YES	Information about the district
district.code	string	YES	District code from NCDD standard
district.name	string	YES	District name in Khmer
commune	object	YES	Information about the commune
commune.code	string	YES	Commune code from NCDD standard
commune.name	string	YES	Commune name in Khmer
village	object	YES	Information about the village
village.code	string	YES	Village code from NCDD standard
village.name	string	YES	Village name in Khmer
house_number	string		House number (nullable)
street_number	string		Street number (nullable)
location	string		Additional location details (nullable)

6.1.3 Identification Model

Field	Type	Required	Description
patient_code	string	YES	Reference to patient unique code
card_code	string	YES	Identification number
card_type	string	YES	Type of identification document

6.1.4 Example


```
{
  "patient": {
    "code": "P25003877",
    "surname": "សៅ",
    "name": "សុវ៉ាន់",
    "sex": "M",
```

```
    "birthdate": "1980-05-15",
    "phone": "012 345 678",
    "nationality": "Cambodian",
    "disabilities": ["Hearing impairment"],
    "occupation": "Teacher",
    "marital_status": "Married",
    "photos": ["https://hospital.example/photos/PT20250317001_1.jpg"],
    "address": {
      "province": {
        "code": "12",
        "name": "Phnom Penh"
      },
      "district": {
        "code": "1201",
        "name": "Chamkar Mon"
      },
      "commune": {
        "code": "120101",
        "name": "Tonle Bassac"
      },
      "village": {
        "code": "12010101",
        "name": "Phsar Deum Thkov"
      },
      "house_number": "45",
      "street_number": "302",
      "location": "Near Central Market"
    },
    "identifications": [
      {
        "patient_code": "P25003877",
        "card_code": "ID123456789",
        "card_type": "National ID"
      }
    ],
    "death_date": null,
    "spid": "250317001",
    "created_at": "2025-03-17T08:30:00.000+07:00",
    "updated_at": "2025-03-17T08:30:00.000+07:00"
  }
}
```


6.2 VISIT

A Visit represents a patient's stay at a healthcare facility, from admission to discharge.

6.2.1 Data Model

Field	Type	Required	Description
health_facility_code	string	YES	Unique identifier for the healthcare facility, issued by NPCA

patient_code	string	YES	Reference to the patient's unique code
code	string	YES	Unique identifier for the visit
admission_type	string	YES	How a patient is admitted to a healthcare facility
discharge_type	string	YES	How a patient is discharged from a healthcare facility
visit_outcome	string	YES	The patient's condition at the end of the visit
visit_type	string	YES	The type or purpose of a patient's visit (IPD or OPD)
admitted_at	datetime	YES	Date and time of admission
discharged_at	datetime	YES	Date and time of discharge
followup_at	datetime		When the patient is scheduled to return for follow-up care
created_at	datetime	YES	Record creation timestamp
updated_at	datetime	YES	Record the last update timestamp

6.2.2 Example


```
{
  "visits": [
    {
      "health_facility_code": "121020",
      "patient_code": "P25003877",
      "code": "V420650",
      "admission_type": "Walk-in",
      "discharge_type": "Authorized",
      "visit_outcome": "Improved",
      "visit_type": "OPD",
      "admitted_at": "2025-03-17T09:30:00.000+07:00",
      "discharged_at": "2025-03-17T10:45:00.000+07:00",
      "followup_at": "2025-03-24T09:00:00.000+07:00",
      "created_at": "2025-03-17T09:30:00.000+07:00",
      "updated_at": "2025-03-17T10:45:00.000+07:00"
    }
    ...
 ]
}
```


6.3 TRIAGE

Triage represents the initial assessment of a patient to determine treatment priority.

6.3.1 Data Model

Field	Type	Required	Description
patient_code	string	YES	Reference to patient's unique code
visit_code	string	YES	Reference to visit the unique code
encounter_code	string	YES	Reference to encounter a unique code (nullable)
code	string	YES	Unique identifier for the triage

chief_complaint	text	YES	Primary symptom or problem reported by the patient at the time of the visit
height	number	YES	Value of height of the patient in CM
weight	number	YES	Value of weight of the patient in KG
recorded_at	datetime	YES	Date and time triage was recorded
recorded_by	string	YES	Name of the healthcare provider who recorded the triage
title	string		Position of the healthcare provider

6.3.2 Example


```
{
  "triages": [{
    "visit_code": " V420650",
    "encounter_code": "P25003877",
    "code": "TR250317",
    "chief_complaint": "Periodic fever with chills for 3 days",
    "height": 170,
    "weight": 65,
    "recorded_at": "2025-03-17T09:32:00.000+07:00",
    "recorded_by": "Khun Srey Mom",
    "title": "Doctor",
  }]
}
```


6.4 VITAL SIGNS

Vital signs contain key physiological measurements of a patient. This object must contain all the vital signs information, such as temperature, pulse (heart rate), respiratory rate, systolic blood pressure, diastolic blood pressure, oxygen saturation, and an optional random rapid blood glucose test.

Vital Sign	Normal Range	Units
Temperature	36.5–37.3 °C	°C
Pulse (Heart Rate)	60–100 beats per minute	/mn
Respiratory Rate	12–20 breaths per minute	/mn
Blood Pressure	Systolic: 90–120 mmHg, Diastolic: 60–80 mmHg	mmHg
Oxygen Saturation (SpO_2)	95–100%	%
Random Glucose Rapid Test	Random: < 140 mg/dL, Fasting: 70–99 mg/dL	mg/dL

6.4.1 Data Model

Field	Type	Required	Description
encounter_code	string	YES	The code of the patient encounter when the vital signs were recorded. It **can match** different encounter types depending on the context: • **Triage.code** – if recorded during triage

			• **IPD.code** – if recorded during an inpatient visit • **Emergency.code** – if recorded during an emergency visit • **ProgressNote.code** – if recorded during a routine daily assessment
recorded_at	datetime	YES	Date and time vital signs were recorded
recorded_by	string	YES	Name of healthcare provider who recorded the vital signs
title	string	YES	Doctor or nurse
observations	array of objects	YES	Array of vital sign measurements

6.4.2 Observation in Vital Sign

Field	Type	Required	Description
name	string	YES	Name of the vital sign
value	numeric	YES	Measured value

6.4.3 Example

```
{
  "vital_signs": [
    {
      "encounter_code": "E417001",
      "recorded_at": "2025-03-17T09:40:00.000+07:00",
      "recorded_by": "Khun Srey Mom",
      "title": "Doctor",
      "observations": [
        {
          "name": "Systolic Blood Pressure",
          "value": 135,
        },
        {
          "name": "Diastolic Blood Pressure",
          "value": 85,
        },
        {
          "name": "Heart Rate",
          "value": 92,
        },
        {
          "name": "Respiratory Rate",
          "value": 18,
        },
        {
          "name": "Temperature",
          "value": 38.7,
        },
        {
```

```
          "name": "Blood Oxygen",
          "value": 97,
        },
        {
          "name": "Random Blood Glucose",
          "value": 110,
        }
      ]
    }
  ]
}
```

6.5 MEDICAL HISTORIES

Medical History records the patient's past and current health conditions for clinical reference.

6.5.1 Components

Category	Section	Description
Current Illness	History of Present Illness	Detailed narrative of symptoms — onset, duration, severity, aggravating/relieving factors, associated symptoms
Current Illness	Current Medication	Current medications (name, dose, frequency), over-the-counter drugs, supplements
Health History	Past Medical History	Previous diagnoses (e.g., diabetes, hypertension), hospitalizations, chronic conditions
Health History	Past Surgical History	Details of past surgeries (type, date, complications, if any)
Health History	Allergies	Known food, drug, or environmental reaction
Health History	Immunization	Vaccination status — especially for tetanus, flu, COVID-19, and childhood vaccines
Women's Health	Obstetric & Gynecologic History	For female patients: menarche, menstruation pattern, pregnancies, contraception, and menopause
Family & Lifestyle	Family History	Hereditary conditions in parents, siblings, and grandparents. Example: heart disease, cancer
Family & Lifestyle	Social History	Lifestyle factors: tobacco use, alcohol, drug use, occupation, living situation, marital status

Note: the medical history detailed information must use these section names.

6.5.2 Data Model

Field	Type	Required	Description
medical_history	array of conditions objects	NO	Array of conditions (nullable)

6.5.3 Condition Model

Field	Type	Required	Description
patient_code	string	YES	Reference to the patient unique code
visit_code	string	YES	Reference to visit the unique code
encounter_code	text	YES	Reference to encounter a unique code
name	string	YES	Name of the condition
value	array of string	YES	Array of value in string of the condition

6.5.4 Example


```
{
  "medical_histories": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": " Immunization History",
      "value": [
        "BCG",
        "OPV",
        "DTP",
        "Measles",
        "COVID-19"
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Allergies",
      "value": [
        "Prahok",
        "Shrimp paste",
        "Penicillin"
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Past Surgical History",
      "value": [
        "Appendectomy Surgery"
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Past Medical History",
```

```
      "value": [
        "Dengue fever (2020)",
        "Typhoid (2018)",
        "Cesarean section at Calmette Hospital (2019)"
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Family History",
      "value": [
        "Mother with diabetes",
        "Father with hypertension and stroke at age 60"
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Current Illness History",
      "value": [
        "Patient reports high fever with chills occurring every 48
hours, accompanied by headache and joint pain. Symptoms started 3 days
ago after returning from a trip to Mondulkiri province. No prior history
of malaria. No medication taken yet."
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Current Medication",
      "value": [
        "Metformin 500mg",
        "Amlodipine 5mg"
      ]
    }
  ]
}
```


*Note: if the value is empty or not available, the object must not be included

6.6 PHYSICAL EXAMINATIONS

Physical Examination contains clinical findings from examination of a patient.

6.6.1 Assessment Points

System/Section	Assessment Points
General Appearance	Consciousness (alert/drowsy), Distress, Nutrition, Posture, Gait, Hygiene, Pallor, Jaundice, Cyanosis, Edema

Glasgow Coma Scale	Eye opening, Verbal response, Motor response
Head	Scalp condition, Hair distribution, Lesions, Deformities
Eyes	Pupils (size, reaction), Conjunctiva (pallor), Sclera (icterus), Eye movements
Ears	Canal and Tympanic membrane, Discharge, Hearing
Nose	Nasal mucosa, Septum deviation, Discharge, Polyps
Throat/Mouth	Tonsils, Pharynx, Uvula, Oral mucosa, Tongue, Teeth
HEENT*	Information of Head, Eyes, Ears, Nose, Throat can be combined
Neck	Lymph nodes, Thyroid gland, Tracheal position, JVP
Cardiovascular System	Inspection (chest), Palpation (apex beat), Auscultation (S1/S2, murmurs), Peripheral pulses
Respiratory System	Chest symmetry, Expansion, Percussion (dullness), Breath sounds, Crepitations, Wheezing
Digestive System	Inspection (distension), Palpation (tenderness, organ size), Percussion, Bowel sounds
Genitourinary System	External genitalia (if applicable), Bladder palpation, Costovertebral angle tenderness, Discharge (if present)
Musculoskeletal System	Joint swelling, Deformity, Range of motion, Muscle tone/strength, Spine, Gait
Nervous System	Mental status, Cranial nerves, Motor/sensory function, Reflexes, Coordination
Skin	Rashes, Lesions, Color changes, Ulcers, Turgor, Temperature
Lymph Nodes	Cervical, Axillary, Inguinal – enlargement, tenderness, mobility

6.6.2 Data Model

Field	Type	Required	Description
physical_examinations	array of object	NO	Array of assessment points (nullable)

6.6.3 Physical Examination Model

Field	Type	Required	Description
patient_code	string	YES	Reference to patient unique code
visit_code	string	YES	Reference to visit unique code
encounter_code	string		Reference to encounter unique code
name	string	YES	Name for the physical assessment point
value	various	YES	Value of the assessment result
value_type	string	YES	Type of Value
value_unit	string		Measurement unit represent the value

6.6.4 Example

```
{
  "physical_examinations": [
    {
```

```
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "General Appearance",
      "value": "Ill-appearing with intermittent shivering",
      "value_type": "text",
      "value_unit": null
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "name": "Skin",
      "value": "Warm, jaundiced, no rash",
      "value_type": "text",
      "value_unit": null
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E317001",
      "name": "Digestive System",
      "value": [
        {
          "inspection": "Flat, no visible masses"
        },
        {
          "palpation": "Soft, mild RUQ tenderness, spleen palpable 1cm
below costal margin"
        },
        {
          "percussion": "No shifting dullness"
        },
        {
          "auscultation": "Normal bowel sounds"
        }
      ],
      "value_type": "complex",
      "value_unit": null
    }
  ]
}
```


6.7 LABORATORIES

6.7.1 Data Model

Field	Type	Required	Description
laboratories	array of object	NO	Array of laboratory tests (nullable)

6.7.2 Laboratories Model

Field	Type	Required	Description
patient_code	string	YES	Reference to patient unique code
visit_code	string	YES	Reference to visit unique code
encounter_code	string		Reference to encounter unique code
srequest_code	string	YES	Unique code represents the lab request
requested_at	datetime	YES	Date and time laboratory were requested
requested_by	string	YES	Name of doctor who requested the laboratory
title	string		Name of doctor
results	array of object	YES	Array of laboratory objects

6.7.3 Result Model

Field	Type	Required	Description
name	string	YES	The item of lab result
category	string	YES	Category that lab result fall under (e.g. biochemistry, hematology)
value	various	YES	Measured value
value_type	string	YES	Type of value
value_unit	string	YES	Unit of measurement
reference_range	string	YES	Normal range for the measurement
interpretation	string	YES	Interpretation of the result
verified_at	datetime	YES	Date and time of doctor who verified
verified_by	string	YES	Name of healthcare provider who verified
recorded_at	datetime	YES	Date and time of doctor who recorded
recorded_by	string	YESs	Name of healthcare provider who recorded

6.7.4 Example – Structured


```
{
  "laboratories": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "request_code": "L7001",
      "requested_at": "2025-03-17T10:30:00.000+07:00",
      "requested_by": "Dr. Chhun Sovannarith",
      "title": "Doctor",
      "results": [
        {
          "name": "Malaria Blood Smear",
          "category": "Parasitology",
          "value": "Positive for P. falciparum",
          "value_type": "string",
```

```
          "value_unit": null,
          "reference_range": "Negative",
          "interpretation": "Positive",
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        },
        {
          "name": "Parasitemia",
          "category": "Parasitology",
          "value": 2.5,
          "value_type": "float",
          "value_unit": "%",
          "reference_range": "0",
          "interpretation": "High",
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        },
        {
          "name": "Hemoglobin",
          "category": "Hematology",
          "value": 11.2,
          "value_type": "float",
          "value_unit": "g/dL",
          "reference_range": "13.5-17.5",
          "interpretation": "Low",
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        }
      ]
    }
  ]
}
```


6.7.5 Example – Complex


```
{
  "laboratories": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "request_code": "L7001",
      "requested_at": "2025-04-22T09:15:00.000+07:00",
      "requested_by": "Dr. Chhun Sovannarith",
      "results": [
        {
          "name": "Complete Blood Count",
```

```
      "category": "Hematology",
      "value": {
        "Hemoglobin": {
          "result": "11.2 g/dL",
          "reference": "13.5-17.5 g/dL",
          "interpretation": "Low"
        },
        "White Blood Cells": {
          "result": "4.5 x10^3/µL",
          "reference": "4.5-11.0 x10^3/µL",
          "interpretation": "Normal"
        },
        "Red Blood Cells": {
          "result": "4.1 x10^6/µL",
          "reference": "4.5-5.9 x10^6/µL",
          "interpretation": "Low"
        },
        "Platelets": {
          "result": "120 x10^3/µL",
          "reference": "150-450 x10^3/µL",
          "interpretation": "Low"
        },
        "Hematocrit": {
          "result": "34%",
          "reference": "41-50%",
          "interpretation": "Low"
        },
        "MCV": {
          "result": "83 fL",
          "reference": "80-96 fL",
          "interpretation": "Normal"
        },
        "MCH": {
          "result": "27.3 pg",
          "reference": "27-33 pg",
          "interpretation": "Normal"
        },
        "MCHC": {
          "result": "32.9 g/dL",
          "reference": "32-36 g/dL",
          "interpretation": "Normal"
        }
      },
      "value_type": "object",
      "value_unit": null,
      "reference_range": null,
      "interpretation": null,
      "verified_at": "2025-03-17T10:50:00.000+07:00",
      "verified_by": "Dr. Meas Chenda",
      "recorded_at": "2025-03-17T10:52:00.000+07:00",
      "recorded_by": "Meas Chandaravuth"
    },
```

```
      {
        "name": "Liver Function",
        "category": "Chemistry",
        "value": {
          "ALT": {
            "result": "45 U/L",
            "reference": "7-56 U/L",
            "interpretation": "Normal"
          },
          "AST": {
            "result": "42 U/L",
            "reference": "10-40 U/L",
            "interpretation": "High"
          },
          "ALP": {
            "result": "110 U/L",
            "reference": "44-147 U/L",
            "interpretation": "Normal"
          },
          "Total Bilirubin": {
            "result": "1.2 mg/dL",
            "reference": "0.1-1.2 mg/dL",
            "interpretation": "High-normal"
          },
          "Direct Bilirubin": {
            "result": "0.3 mg/dL",
            "reference": "0.0-0.3 mg/dL",
            "interpretation": "High-normal"
          },
          "Total Protein": {
            "result": "7.2 g/dL",
            "reference": "6.0-8.3 g/dL",
            "interpretation": "Normal"
          },
          "Albumin": {
            "result": "4.0 g/dL",
            "reference": "3.4-5.4 g/dL",
            "interpretation": "Normal"
          }
        },
        "value_type": "object",
        "value_unit": null,
        "reference_range": null,
        "interpretation": null,
        "verified_at": "2025-03-17T10:50:00.000+07:00",
        "verified_by": "Dr. Meas Chenda",
        "recorded_at": "2025-03-17T10:52:00.000+07:00",
        "recorded_by": "Meas Chandaravuth"
      }
    ]
  }
```

```
  ]
}
```

6.7.6 Example – File

```
{
  "laboratories": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "request_code": "L7001",
      "requested_at": "2025-04-22T11:00:00.000+07:00",
      "requested_by": "Dr. Tep Veasna",
      "results": [
        {
          "name": "Blood Smear",
          "category": "Parasitology",
          "value":
["https://example.com/lab/EN20250422002/blood_smear_field1.jpg","https:/
/example.com/lab/EN20250422002/blood_smear_field2.jpg","https://example.
com/lab/EN20250422002/blood_smear_field3.jpg"
          ],
          "value_type": "array",
          "value_unit": null,
          "reference_range": null,
          "interpretation": "Positive for P. falciparum",
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        },
        {
          "name": "Microbiology Culture",
          "category": "Microbiology",
          "value":
["https://example.com/lab/EN20250422002/culture_plate1.jpg","https://exa
mple.com/lab/EN20250422002/culture_plate2.jpg","https://example.com/lab/
EN20250422002/gram_stain.jpg","https://example.com/lab/EN20250422002/sen
sitivity_test.jpg"],
          "value_type": "array",
          "value_unit": null,
          "reference_range": null,
          "interpretation": "Positive for Salmonella typhi",
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        }
      ]
    }
```

```
  ]
}
```

6.8 IMAGERIES

6.8.1 Data Model

Field	Type	Required	Description
imageries	array of object	NO	Array of medical imaging records for a patient encounter (nullable)

6.8.2 Imageries Model

Field	Type	Required	Description
patient_code	string	YES	Reference to patient's unique code
visit_code	string	YES	Reference to visit the unique code
encounter_code	string		Reference to encounter a unique code
request_code	string	YES	Unique code represents the lab request
requested_at	datetime	YES	Date and time of the imagery requested
requested_by	string	YES	Name of the healthcare provider who requested the imagery
title	string	YES	Name of doctor
results	array of object	YES	Array of imagery objects

6.8.3 Result Model

Field	Type	Required	Description
name	string	YES	The item of the imaging result
category	string	YES	Category that imaging falls under (e.g. radiology, ...)
images	array of string	YES	Measured value
result	string	YES	Full result of the imagery
conclusion	string	YES	Summary of the result
verified_at	datetime	YES	Date and time that the sample was verified
verified_by	string	YES	Name of healthcare provider who verified the sample
recorded_at	datetime	YES	Date and time results were recorded
recorded_by	String	YES	Name of the healthcare provider who recorded the result

6.8.4 Example

```
{
  "imageries": [
    {
      "patient_code": "P25003877",
```

```
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "request_code": "IM2301",
      "requested_at": "2025-03-17T11:30:00.000+07:00",
      "requested_by": "Dr. Chhun Sovannarith",
      "title": "title",
      "results": [
        {
          "name": "Brain Scan",
          "category": "CT Scan",
          "images": [
            "img.com/result2.jpg"
          ],
          "result": "string",
          "conclusion": null,
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        }
      ]
    },
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "requested_at": "2025-03-17T11:35:00.000+07:00",
      "requested_by": "Dr. Chhun Sovannarith",
      "title": "Doctor",
      "results": [
        {
          "name": "Adomen Ultrasound",
          "category": "Ultrasound",
          "images": [
            "img.com/result1.jpg"
          ],
          "result": "string",
          "conclusion": null,
          "verified_at": "2025-03-17T10:50:00.000+07:00",
          "verified_by": "Dr. Meas Chenda",
          "recorded_at": "2025-03-17T10:52:00.000+07:00",
          "recorded_by": "Meas Chandaravuth"
        }
      ]
    }
  ]
}
```

6.9 DIAGNOSIS

6.9.1 Diagnosis Types

Diagnosis Type	Description
Differential	A list of possible conditions that could explain the symptoms
In	The condition is suspected when the patient is first admitted
Out	Final diagnosis after treatment and evaluation, recorded at discharge
Primary	The main reason for the current hospital visit or treatment
Secondary	Coexisting conditions that influence care or outcomes

6.9.2 Diagnosis Model

Field	Type	Require	Description
patient_code	string	YES	Reference to patient unique code
visit_code	string	YES	Reference to visit unique code
encounter_code	string		Reference to encounter unique code
diagnosis_type	string	YES	Name of diagnosis type as above table
diagnosis_code	string	YES	ICD-10 code for the diagnosis
diagnosis_name	string	YES	Name of the diagnosis
diagnosis_description	string		Detailed description of the diagnosis
diagnosed_at	datetime	YES	Date and time of diagnosis
diagnosed_by	string	YES	Name of healthcare provider who made the diagnosis
title	string		Position of the healthcare provider (doctor or nurse)

6.9.3 Example


```
{
  "diagnosis": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E317001",
      "diagnosis_type": "Primary",
      "diagnosis_code": "B50",
      "diagnosis_name": "Plasmodium falciparum malaria",
      "diagnosis_description": "Plasmodium falciparum malaria with
cerebral complications",
      "diagnosed_at": "2025-03-17T10:05:00.000+07:00",
      "diagnosed_by": "Dr. Chhun Sovannarith",

      "title": "Doctor"
    }
  ]
}
```

6.10 SOAPs

SOAPs are structured clinical notes that record Subjective, Objective, Assessment, and Plan information. They may supplement detailed clinical data or provide a summary of the patient's clinical information

6.10.1 Data Model

Field	Type	Require	Description
soaps	array of object	NO	Array of clinical notes written using the SOAP format for a patient encounter (nullable)

6.10.2 SOAPs Model

Field	Type	Require	Description
encounter_code	string	YES	Reference to encounter unique code
subjective	text		Patient's reported symptoms and feelings
objective	text		Provider's objective
assessment	text		Provider's assessment of the patient situation
evaluation	text		Provider's summary or evaluation regarding the assessment
plan	text		Plan for treatment or next steps
code	string		Unique identifier for the SOAPs
recorded_at	datetime		Date and time SOAPs was written
recorded_by	string		Name of healthcare provider who wrote the SOAPs
title	string		Position of the healthcare provider (doctor or nurse)

6.10.3 Example


```
{
  "soaps": [
    {
      "encounter_code": "EN20250317001",
       "code": "SP3177998",
      "subjective": "Patient reports fever has decreased after first dose of medication. Still experiencing mild headache and fatigue. No chills since this morning. Able to tolerate oral intake well.",
      "objective": "Temperature 37.8°C (down from 38.7°C). Heart rate 85/min. Blood pressure 125/80 mmHg. Skin less jaundice. Abdomen remains soft with mild tenderness in RUQ.",
      "assessment": "Uncomplicated malaria showing initial response to treatment. Fever is trending down. No signs of complications.",
      "plan": "Continue artemether-lumefantrine as prescribed. Encourage oral hydration. Follow-up in clinic in 3 days. Return sooner if symptoms worsen or unable to tolerate medication.",
```

```
      "recorded_at": "2026-02-27T03:56:57.000+07:00",
      "recorded_by":  "Dr.Sochea",
      "title": "Doctor"
     }
   ]
}
```


6.11 PRESCRIPTIONS

A prescription contains all medications, dosages, and instructions for a patient during a particular encounter.

6.11.1 Data Model

Field	Type	Require	Description
prescriptions	array of object	NO	Array of medications ordered by a doctor for a patient (nullable)

6.11.2 Prescription Model

Field	Type	Require	Description
patient_code	string	YES	Reference to the patient's unique code
visit_code	string	YES	Reference to visit the unique code
encounter_code	string		Reference to encounter a unique code
code	string	YES	Unique identifier for the prescription
prescribed_at	datetime	YES	Date and time the prescription was written
prescribed_by	string	YES	Name of healthcare provider who wrote the prescription
title	string		Position, whether doctor or nurse, or else
medications	array of objects	YES	Array of medications is prescribed

NOTE:

- **Medication dispenses during hospitalization**: Require encounter_code linking to progress_notes, outpatient, inpatient, surgery, or emergency
- **Medication dispensed for home use**: Require encounter_code to be null

6.11.3 Medication Model

Field	Type	Require	Description
medicine_code	string	YES	Unique identifier for the medication
medicine_name	string	YES	Name of the medicine
strength	string		Strength of the medicine

method	string	YES	Method of administration
unit	string	YES	Unit of measurement
morning	numeric		Morning dose
afternoon	numeric		Afternoon dose
evening	numeric		Evening dose
night	numeric		Night dose
days	integer	YES	Duration of prescription in days
interval	string		Interval between doses
note	text		Additional notes or instructions

NOTE:

- If no **interval** => **morning, afternoon, evening, night** should be presented
- Strength is required if it is not presented in medicine_name

6.11.4 Dispense Model

Field	Type	Require	Description
unit	string	YES	Unit of measurement (e.g., "Boxes", "Bottles", "Tablets")
quantity	integer	YES	Total amount dispensed to the patient

6.11.5 Example


```
{
  "prescriptions": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "code": "RX20250317001",
      "prescribed_at": "2025-03-17T10:10:00.000+07:00",
      "prescribed_by": "Dr. Chhun Sovannarith",
      "title": "Doctor",
      "medications": [
        {
          "medicine_code": "MED001",
          "medicine_name": "Artemether-Lumefantrine",
          "strength": "20/120mg",
          "form": "Tablet",
          "method": "Oral",
          "unit": "Tablet",
          "morning": 4,
          "afternoon": 0,
          "evening": 4,
          "night": 0,
```

```
          "days": 3,
          "interval": null,
          "note": "Take with food. Complete full course even if feeling better."
        },
        {
          "medicine_code": "MED002",
          "medicine_name": "Paracetamol",
          "strength": "500mg",
          "form": "Tablet",
          "method": "Oral",
          "unit": "Tablet",
          "morning": null,
          "afternoon": null,
          "evening": null,
          "night": null,
          "days": 3,
          "interval": "8 hours",
          "note": "Take as needed for fever or pain.",
          "dispense": {
             "quantity": 1,
             "unit": "Boxes"
          }
        }
      ]
    }
  ]
}
```


6.12 Referral

Referral contains information about patient transfers between healthcare facilities.

6.12.1 Data Model

Field	Type	Description
referred_from	object	Information about the referring facility
referred_to	object	Information about the receiving facility

6.12.2 Detail Model

Field	Type	Require	Description
code	string	YES	Unique identifier for the referral
referral_number	string	YES	Unique reference number for the referral
transportation	string	YES	Mode of transportation
reason	string	YES	Reason for referral
has_called	boolean		Whether the receiving facility was called in advance
caretaker_name	string		Name of the person accompanying the patient
caretaker_phone	string		Contact number for the caretaker
referred_by	string		Name of the referring provider

referred_by_phone	string		Contact number for the referring provider
referred_at	datetime		Date and time of referral
received_by	string		Name of the receiving provider
received_by_phone	string		Contact number for the receiving provider
received_at	datetime		Date and time the patient was received
medications	string		Medications that the patient is taking
health_facility	object		receiving facility/ referring facility

6.12.3 Health Facility Model

Field	Type	Require	Description
name	string	YES	Health facility ‘s name
code	string	YES	Health facility ‘s code
label	string		Health facility ‘s label
type	string		Health facility ‘s type

6.12.4 Example

```
{
  "referrals": {
    "referred_from": null,
    "referred_to": {
      "code": "REF20250317001",
      "referral_number": "HCPP/REF/2025/317",
      "transportation": "Ambulance",

      "health_facility": {

            "name": "string",//required

            "code": "string",//required

            "label": "string",  //optional

            "type": "HF level"//optional

          },
      "reason": "Severe malaria with signs of organ dysfunction
requiring ICU care",
      "has_called": true,
      "caretaker_name": "Sok Channary",
      "caretaker_phone": "012345678",
      "referred_by": "Dr. Chhun Sovannarith",
      "referred_by_phone": "0987654321",
      "referred_at": "2025-03-17T11:30:00.000+07:00",
      "received_by": "Dr. Pich Vothy",
      "received_by": "0712345678",
      "received_at": "2025-03-17T12:15:00.000+07:00",
      "medications": "Artemether-Lumefantrine 20/120mg (1 dose given at
10:15), IV Artesunate 120mg initiated at 11:00"
    }
  }
}
```

6.13 CONSULTATIONS

A clinical encounter where a patient interacts with a healthcare provider for assessment, advice, or diagnosis, *without necessarily receiving a prescription or procedure*.

Field	Type	Require	Description
consultations	Array of String	NO	assesses, advises, and guides a patient regarding their health condition.

Example:


```
{
 "visits": [
   {
     "health_facility_code": "HEFA-00002S75",
     "patient_code": "PT005852",
     "code": "VIS012455",
     "admission_type": "Walk-in",
     "visit_type": "OPD",
     "admitted_at": "2025-11-28T21:46:00.000+07:00",
     "discharge_type": "Authorizeds",
     "discharged_at": "2025-11-28T22:23:00.000+07:00",
     "consultations": ["Do exercise regularly", "Drink more water"],
   {…}
   {…}
}
```


6.14 INVOICES

Invoice records track payments for healthcare services and medications.

6.14.1 Data Model

Field	Type	Require	Description
patient_code	string	YES	Reference to patient unique code
visit_code	string	YES	Reference to visit unique code
encounter_code	string		Reference to encounter unique code
code	string	YES	Invoice identifier
payment_type	string	YES	Type of payment
invoice_date	datetime	YES	Invoice date
total	number	YES	Total amount
created_at	datetime	YES	Creation timestamp

updated_at	datetime		Update timestamp
cashier	string	YES	Name of cashier

6.14.2 Service Model

Field	Type	Require	Description
invoice_code	string	YES	Invoice identifier
service_code	string	YES	Code identify the provided service
service_name	string	YES	Name of the service provided
service_category	string	YES	Category name of the service
price	number	YES	Unit price
quantity	number		Number of service provided
payment	number		Payment received from patient
paid	boolean		Payment status
discount_type	string		String whether in percentage or amount
discount	number		Discount amount or percentage

6.14.3 Medication Model

Field	Type	Require	Description
invoice_code	string	YES	Invoice identifier
medicine_code	string	YES	Code identifies the provided service
medicine_name	string	YES	Name of the service provided
quantity	number	YES	Number of medicines provided
price	number	YES	Unit price
payment	number		Payment received from patient
paid	boolean		Payment status
discount_type	string		String whether in percentage or amount
discount	number		Discount amount or percentage

6.14.4 Example


```
{
  "invoices": [
    {
      "patient_code": "P25003877",
      "visit_code": "V420650",
      "encounter_code": "E417001",
      "code": "INV20250317001",
      "payment_type": "HEF",
      "invoice_date": "2025-03-17T11:00:00.000+07:00",
      "total": 120000,
      "created_at": "2025-03-17T11:00:00.000+07:00",
      "updated_at": "2025-03-17T11:00:00.000+07:00",
      "cashier": "Sok Kunthea",
      "services": [
        {
```

```
          "invoice_code": "INV20250317001",
          "service_code": "SRV001",
          "service_name": "Blood Smear for Malaria",
          "service_category": "Lab Test",
         "quantity": 1,
          "price": 15000,
          "payment": 0,
          "paid": false,
          "discount_type": null,
          "discount": 0
        }
      ],
      "medications": [
        {
          "invoice_code": "INV20250317001",
          "medicine_code": "MED001",
          "medicine_name": "Artemether-Lumefantrine 20/120mg",
          "quantity": 24,
          "unit": "Tablet",
          "price": 1500,
          "payment": 0,
          "paid": false,
          "discount_type": null,
          "discount": 0
        },
        {
          "invoice_code": "INV20250317001",
          "medicine_code": "MED002",
          "medicine_name": "Paracetamol 500mg",
          "quantity": 24,
          "unit": "Tablet",
          "price": 1000,
          "payment": 0,
          "paid": false,
          "discount_type": null,
          "discount": 0
        }
      ]
    }
  ]
}
```


7 SPECIFIC ENCOUNTERS

7.1 INPATIENT ADMISSION

Inpatient Admission represents a patient's hospital stay where at least one overnight stay is required for treatment, observation, or procedures.

7.1.1 Data Model

Field	Type	Require	Description
visit_code	string	YES	Reference to the visit unique code
is_new	boolean		Field to distinguish new cases from follow-ups
code	string	YES	Unique identifier for the operation
symptoms	Array of string		Primary symptom or problem reported by the doctor(nullable)
ward	string	YES	Name of the ward or clinic, or sub-clinic
service_type	string	YES	Name of the service or purpose of inpatient (nullable)
started_at	datetime	YES	Date and time operation started
ended_at	datetime		Date and time the operation ended
encountered_by	string	YES	Name of the healthcare provider
title	string		Position, whether doctor or nurse, or else
created_at	datetime	YES	Record creation timestamp
updated_at	datetime	YES	Record the last update timestamp

7.1.2 Example


```
{
  "inpatients": [
    {
      "visit_code": "V420650",
      "is_new": false,
      "code": "E317001",
      "symptoms": ["fever","red skin"],
      "ward": "General IPD",
      "service_type": "Internal Medicine",
      "started_at": "2025-03-20T14:00:00.000+07:00",
      "ended_at": "2025-03-23T10:00:00.000+07:00",
      "encountered_by": "Dr. Chhun Sovannarith",
      "title ": "Doctor",
      "created_at": "2025-03-20T14:00:00.000+07:00",
      "updated_at": "2025-03-23T10:00:00.000+07:00"
    }
  ]
}
```


7.2 OUTPATIENT

Outpatient represents a patient visit for treatment or consultation without requiring an overnight hospital stay.

7.2.1 Data Model

Field	Type	Require	Description
visit_code	string	YES	Reference to the visit unique code
is_new	boolean		Field to distinguish new cases from follow-ups
code	string	YES	Unique identifier for the operation
symptoms	Array of string		Primary symptom or problem reported by the doctor(nullable)
ward	string	YES	Name of the ward or clinic, or sub-clinic
service_type	string	YES	Name of the service or purpose of outpatient (nullable)
started_at	datetime	YES	Date and time the operation started
ended_at	datetime		Date and time the operation ended
encountered_by	string	YES	Name of the healthcare provider
title	string		Position, whether doctor or nurse, or else
created_at	datetime	YES	Record creation timestamp
updated_at	datetime	YES	Record the last update timestamp

7.2.2 Example


```
{
  "outpatients": [
    {
      "visit_code": "V420650",
      "code": "E317000",
      "symptoms": ["fever","red skin"],
      "ward": "General Inpatient",
      "service_type": "General Medicine",
      "started_at": "2025-03-17T09:35:00.000+07:00",
      "ended_at": "2025-03-17T10:15:00.000+07:00",
      "encountered_by": "Dr. Chhun Sovannarith",
      "title ": "Doctor",
      "created_at": "2025-03-20T14:00:00.000+07:00",
      "updated_at": "2025-03-23T10:00:00.000+07:00",
      "created_at": "2025-03-17T09:35:00.000+07:00",
      "updated_at": "2025-03-17T10:15:00.000+07:00"
    }
  ]
}
```

7.3 EMERGENCY

Emergency represents a patient visit requiring immediate attention for acute or potentially life-threatening conditions.

7.3.1 Data Model

Field	Type	Required	Description
visit_code	string	YES	Reference to the visit unique code
is_new	boolean		Field to distinguish new cases from follow-ups
code	string	YES	Unique identifier for the operation
symptoms	Array of string		Primary symptom or problem reported by the doctor(nullable)
ward	string	YES	Name of the ward or clinic, or sub-clinic
service_type	string	YES	Name of the service type or purpose (nullable)
started_at	datetime	YES	Date and time the encounter started
ended_at	datetime		Date and time the encounter ended
emergency_note	text	YES	Detailed notes about the emergency (nullable)
encountered_by	string	YES	Name of the healthcare provider
title	string		Position, whether doctor or nurse, or else
created_at	datetime	YES	Record creation timestamp
updated_at	datetime	YESs	Record the last update timestamp

7.3.2 Example


```
{
  "emergencies": [
    {
      "visit_code": "V420650",
      "code": "E317001",
      "is_new": false,
      "ward": "Emergency",
      "symptoms": ["None"],
      "service_type_name": "Emergency Medicine",
      "started_at": "2025-03-17T15:30:00.000+07:00",
      "ended_at": "2025-03-17T17:45:00.000+07:00",
      "encountered_by": "Dr. Chhun Sovannarith",
      "title ": "Doctor",
      "created_at": "2025-03-20T14:00:00.000+07:00",
      "updated_at": "2025-03-23T10:00:00.000+07:00",
      "emergency_notes": "Patient brought by family after motorcycle
accident. GCS 14/15. No loss of consciousness. Skull X-ray negative for
fracture. CT not available. Multiple abrasions on right side. No
```

```
apparent fractures. Wound cleaning and dressing performed. Tetanus
prophylaxis given.",
      "created_at": "2025-03-17T15:30:00.000+07:00",
      "updated_at": "2025-03-17T17:45:00.000+07:00"
    }
  ]
}
```


7.4 SURGERY

Surgery refers to medical procedures performed on a patient in an operating theatre to treat, repair, or diagnose a condition, usually under anesthesia.

7.4.1 Data Model

Field	Type	Required	Description
visit_code	string	YES	Reference to the visit unique code
is_new	boolean		Field to distinguish new cases from follow-ups
encounter_code	string		Unique identifier for the encounter result in operation
code	string	YES	Unique identifier for the operation
symptoms	Array of string		Primary symptom or problem reported by the doctor(nullable)
theater_name	string	YES	Name of the operating theater
service_type	string	YES	Name of the operation
started_at	datetime	YES	Date and time the operation started
ended_at	datetime	YES	Date and time the operation ended
reason	string	YES	Reason for operating
anesthesia_type	string		Type of anesthesia used
procedure_notes	text	YES	Detailed notes about the procedure
complications	array of strings		Any complications during the operation
specimens	array of strings		Specimens collected during the operation
pre_operative_diagnosis	string		The clinical diagnosis made BEFORE surgery, based on symptoms, physical examination, and investigations.
post_operative_diagnosis	string		The final diagnosis confirmed AFTER the surgery, based on what the surgeon actually found during the operation.
blood_loss	string		Amount of blood loss during surgery (including unit)

surgeon_name	string	YES	Name of the surgeon
anesthetist_name	string		Name of the anesthetist
assistant_names	array of strings		Names of assistants
created_at	datetime	YES	Record creation timestamp
updated_at	datetime		Record the last update timestamp
details	object		Details how the surgery was performed

7.4.2 Detail Model

Field	Type	Required	Description
position	string	YES	How the patient lies during surgeries

7.4.3 Example


```
{
  "surgeries": [{
    "visit_code": "V420650",
    "encounter_code": "E401001",
    "code": "SUR20250401001",
    "theater_name": "Operating Theater 2",
    "service_type": "Laparoscopic Cholecystectomy",
    "started_at": "2025-04-01T08:30:00.000+07:00",
    "ended_at": "2025-04-01T10:15:00.000+07:00",
    "reason": "Symptomatic gallstones with recurrent biliary colic",
    "anesthesia_type": "General Endotracheal",
    "procedure_notes": "Patient positioned supine. Pneumoperitoneum
established with Veress needle. Four ports were placed. Gallbladder
dissected from liver bed with hook cautery. Cystic duct and artery
identified, clipped and divided. Gallbladder removed through umbilical
port. Hemostasis confirmed. No bile leak. Ports removed under direct
visualization. Wounds closed with 3-0 Vicryl and 4-0 Monocryl. Patient
tolerated procedure well.",
    "complications": [
      "Mild bleeding from liver bed, controlled with electrocautery"
    ],
    "specimens": [
      "Gallbladder with multiple stones",
      "Cystic fluid sample"
    ],

    "pre_operative_diagnosis": "Ancienne Sign nail du fémur gauche avec
plaie infecté (3ans)",

    "post_operative_diagnosis": "Ancienne Sign nail du fémur gauche avec
plaie infecté (3ans)",s

    "details": {
```

```
        "position": "Décubitus dorsale"
    },
    "blood_loss": "5cl",
    "surgeon_name": "Dr. Sok Vichet",
    "anesthetist_name": "Dr. Meas Sokunthea",
    "assistant_names": ["Dr. Chhan Rathana" , "Nurse Van Bopha"s],
    "created_at": "2025-04-01T08:30:00.000+07:00",
    "updated_at": "2025-04-01T10:20:00.000+07:00"
  }]
}
```

7.5 PROGRESS NOTES

Progress Note documents a patient's ongoing assessment, treatment, and response during their care. It often uses the SOAP format.

7.5.1 Data Model

Field	Type	Require	Description
visit_code	string	YES	Reference to the visit unique code
encounter_code	string		Reference to the parent encounter code
code	string	YES	Unique identifier for the daily progress note
started_at	datetime	YES	Date and time the assessment started
ended_at	datetime		Date and time the assessment ended
encountered_by	string	YES	Name of the healthcare provider
title	string	YES	Position, whether doctor or nurse, or else
created_at	datetime	YES	Record creation timestamp
updated_at	datetime	YES	Record the last update timestamp

7.5.2 Example

```
{
  "progress_notes ": [
    {
      "visit_code": "VS20250317001",
      "encounter_code": "E417001",
      "code": "E317001",
      "started_at": "2025-03-17T16:00:00.000+07:00",
      "ended_at": "2025-03-17T16:15:00.000+07:00",
      "encountered_by": "Dr. Chhun Sovannarith",
      "title ": "Doctor",
      "created_at": "2025-03-20T14:00:00.000+07:00",
      "updated_at": "2025-03-23T10:00:00.000+07:00"
    }
  ]
}
```

8 SPECIFIC CLINICAL DATA FORM COMPONENTS

8.1 INTRODUCTION TO CLINICAL DATA FORM

Clinical Data Forms are designed to provide a standardized structure for collecting additional clinical information that cannot be adequately represented by the common clinical data components such as Patient, Visit, Triage, Vital Signs, Medical History, Diagnosis, Prescription, Referral, or Invoice.

A unique Form Code identifies each Clinical Data Form and contains a defined set of clinical attributes. The Form Code identifies the type of clinical form and determines how the submitted data should be processed and stored.

Code	Form Name	Description
ENTY-000016Z	Birth Control	ទម្រង់ពន្យារកំណើត
ENTY-000H014	OPD ANC	ពិនិត្យផ្ទៃពោះ
ENTY-0000K1B	Abortion	ទម្រង់រំលូត/រលូតកូនដោយសុវត្ថិភាព
ENTY-0000K15	Delivery	សម្រាលកូន
ENTY-00000A8C	Child Phy-Exam(0-28)	ទម្រង់ពិនិត្យកាយសម្បទា សម្រាប់ទារកទើបកើត (0-28 ថ្ងៃ)
ENTY-000001B2	OPD PNC	ពិនិត្យក្រោយសម្រាល
ENTY-000001E9	Child Phy-Exam(1M-5Y)	ទម្រង់ពិនិត្យកាយសម្បទា សម្រាប់កុមារពី១ខែ ទៅ៥ឆ្នាំ

8.2 FORM STRUCTURE

A Clinical Data Form must contain the following information:

Field	Type	Require	Description
visit_code	String	YES	Reference to the visit unique code
encounter_code	String	YES	A unique encounter identifier that references the code of the related clinical encounter. Its value must match exactly one of the following, depending on the encounter type: outpatient.code or inpatient.code
form_code	String	YES	Code of the clinical form.
form_name	String	YES	Name of the clinical form.
form_data	Object	YES	Clinical data collected by the form.

8.3 EXAMPLE

```
"forms": [
        {
          "visit_code": "VIS071315",
          "form_code": "ENTY-000016Z",
          "form_name": "OPD Contraception",
          "encounter_code": "MED062210",
          "form_data": {
            "birth_control_type": "ថ្នាំគ្រាប់",
            "birth_control_customer_type": "ធ្លាប់ប្រើ"
          }
        }
]
```

9 RELATED DOCUMENTS

- EMR Clinical Data Components
- OPD Sample JSON
- IPD Sample JSON
- Transfer OPD to IPD Sample JSON
- Referral Sample JSON
- Form Sample JSON