Microservice Specification for "Consultation-Assessment or Diagnosis function"

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1. Functional Area – Consultation (A)

1.1. Purpose

This document describes the Functional and Technical Requirement Specification (BRS) for Consultation service in a primary and specialist care setting. Since consultation service is a complex functional area and comprises of multiple smaller service areas, we have divided it into smaller microservices. We have followed the SOAP note (Subjective, Objective, Assessment, Plan) method which is a worldwide adopted method of writing a clinical summary for a patient encounter. This document covers specifications for "Assessment" information which is captured by a Doctor/ Nurse during a patient consultation.

1.2. Intended Audience

This document is intended for the Product Engineering team to commence development of 'Consultation (A)' microservice and the audience would comprise of

- Development, Design & Implementation Team which may include Architects, Designers, Developers, and Business Analysts
- Key stakeholders in the government at central and state levels

1.3. Overview

In any clinical setting during a patient consultation, the healthcare provider (Doctor/ Nurse) captures patient's critical health information which is required to arrive at the diagnosis and treatment plan for a patient. There are various ways or templates available for capturing such information. A SOAP (Subjective, Objective, Assessment & Plan) note in consultation is a way for healthcare professionals to document the information in a structured & organized way and is being used worldwide by the medical professionals. It also guides the professionals for evaluating information and provides a cognitive framework for clinical reasoning. The structure of documentation is a checklist with defined flow that serves as a cognitive aid and a potential index to capture and retrieve information about a patient's health. It classifies the health information captured according to the source or type of information and facilitates clinical decision making.

The current document will cover only Assessment component of the SOAP note. The Assessment component is designed for the Doctor which is used by a Doctor to record a patient diagnosis. In general, a Doctor reviews patient's history, presenting complaints, existing diagnosis and physical examination to arrive at a diagnosis.

There are a few critical components and related definitions a developer or an implementor should understand to develop the assessment functionality. Few of the definitions are provided below-

As already discussed above assessment segment of a SOAP structure is synonym to the "Diagnosis "segment most of the EHR/EMR applications provide. The details of the Diagnosis/Assessment section are provided in later part of the document.

Scope & Not in Scope

Functionality scope includes:

- Assessment part of the S-O-A-P style of recording medical information.
- Adding a new diagnosis
- Changing status of a diagnosis and
- Review active or preexisting diagnosis

1.4. Business Process Flow

- **Business Process Flow for Consultation (S+O)**

Description	Assessment or Diagnosis section of a SOAP note/medical summary note is basically used for two main purposes-
	1. Record a new diagnosis for a patient
	2. Review active/pre-existing Diagnosis
	Both the above use cases are very critical for a Doctor to arrive at patient specific treatment plan.
	Use Case
	If a patient visits a Doctor and his/her symptoms/test results indicates that the patient has "Dengue" and is also a Diabetic. The Doctor will not only record "Dengue" as a new diagnosis using the "Assessment " or "Diagnosis" section but will also review a pre-existing condition or comorbidity which was recorded in patient's previous visits, which will be seen in the same "Assessment" or "Diagnosis" section.
	Diagnosis Status
	Note* *Updating diagnosis status or even updating a lab order with report review should be treated as an encounter and system shall create a new encounter ID for the same.*
	A diagnosis to be recorded for a patient after reviewing his/her medical history can have multiple status, namely "Provisional, Final and Closed"
	1. Provisional Diagnosis
	A diagnosis that is recorded by the Doctor after reviewing symptoms, complaints, and patient medical history, that the patient is more likely to be suffering from , but still requires a confirmatory test to be done to be sure of the diagnosis is called a provisional diagnosis.
	2. Differential Diagnosis
	Number of problems or health conditions or diagnosis that might be responsible for the patient's presenting or chief complaints. "The process of weighing the probability of one disease versus that of other diseases possibly accounting for a patient's illness." It may involve multiple tests to be done to rule out the other possible diagnosis that were added by the treating doctor.
	A doctor can add more than one diagnosis using the differential status and can add a list of probable diagnosis that might be causing the chief complaint or symptoms.
	How it is different from provisional diagnosis is that a provisional diagnosis as explained above is more likely to be (But not 100%) the diagnosis patient might be suffering from and hence doctor won't add multiple diagnosis for that visit for presenting complaints. While there can be multiple differential diagnosis that can be added for patient and each will require a physical and lab-based examination to rule out the unlikely diagnosis.
	3. Final Diagnosis
	A diagnosis that does not require a confirmatory test or investigations, for which symptoms, chief complaints, Doctor's physical examination and patient's history is enough to decide the condition patient is suffering from is marked as Final Diagnosis.
	Note*: Status of a provisional diagnosis can be updated to "final diagnosis" by the Doctor once confirmatory investigation's results are updated or received in the

next visit or encounter.

Whenever "status" of a diagnosis is changed by a user, system should maintain the audit log of the change with audit time, date and author.

4. Closed Diagnosis

Once an active diagnosis is cured or result of associated lab or radiology investigation indicates that patient has recovered and no more suffering from a recorded diagnosis, Doctor can close a diagnosis in patient's next visits which can be just a investigation review or follow up visit.

Whenever the treating doctor changes status of a diagnosis to "close" the diagnosis should not be seen in the active diagnosis tab for future visits and should move to patient's clinical history with onset and close data.

System should maintain an audit log internally for every diagnosis status change with provider details for accountability and to support medico legal use cases.

Use Case

A patient presents symptoms like sore throat, dry cough since last 3 days with a history of close contact with a COVID 19 patient in last 14 days, a doctor will record "COVID 19" as a provisional diagnosis until a confirmatory test like PCR is conducted and results are positive.

If the results are positive the doctor will change the diagnosis status from **"Provisional"** to **"Final".**

Once patient is treated and the COVID test shows negative results, doctor can change the diagnosis status to **"Closed".**

Diagnosis priority

Diagnosis priority primary and secondary can be used to indicate the importance of an active diagnosis with respect to the presenting complaint or current patient visit/encounter**.**

A. **Primary diagnosis:** It is the active condition for which a patient is complaining of and for which he is seeking consultation in the current encounter

For example, if the patient complains of fever and seeks consultation for the same, but at the same time is also a known diabetic. In such cases, fever is the primary diagnosis for the patient while diabetes is the secondary diagnosis which is equally important to be recorded for arriving at a patient specific treatment plan.

B. **Secondary diagnosis– Secondary** diagnosis are the conditions that coexists with the presenting complaint or diagnosis Co-morbidities (e.g. hypertension, diabetes, renal disorder etc.) can also be referred to as secondary diagnosis. For example, a patient complaint of fever and is also a diabetic then diabetes is the secondary diagnosis for the patient.

Recording a comorbidity is important because the treatment plan should also support management of patient's comorbidities along with the management of primary diagnosis.

Users	Nurse, Doctor
Pre-requisites	The 'Subjective' and 'Objective' sections of the SOAP note is complete
Business Process Details	This section facilitates documentation of patient's primary and secondary active diagnosis for a patient after reviewing "subjective- Presenting complaints, allergies, patient clinical history etc" and "objective- Physical examination, test results etc of the past" evidence to arrive at a diagnosis. This is the assessment of the patient's status through analysis of the problem, possible interaction of the problems, and changes in the status of the problems.

	This section involves a careful observation and analysis by the consulting doctor to not only record a diagnosis for the patient but also facilitates review or reconciliation of active secondary diagnosis (comorbidity) to arrive at a treatment plan.
Steps	- It is recommended that a clinical system should support ICD10/SNOMed codes for recording diagnosis for patients. - System can facilitate elastic/apache sonar search or lookup to pick a diagnosis from the application's diagnosis master. **Quick add**-The application should facilitate populating diagnosis as per doctor's usage i.e recently recorded. It is a critical feature to support physician to enter a diagnosis faster by saving the search time. As every specialty may have some of the most common diagnosis and it becomes easier to record those without compromising doctor-patient face time. **ICD/ SNOMeD mappings with local diagnosis codes**-In India standards like ICD and SNOMed are not often used and different health facilities have their own local diagnosis lists. While it is critical for the government to have coded diagnosis data to enable machine readable clinical condition for population health analysis and medical research. To enable adoption of such coding standards, applications should facilitate mappings for ICD/SNOMed in the backend with local diagnosis codes used by a facility until the clinicians get familiar with these international standards. This will help in change management and enable coded data for analysis **Co-morbidity (Secondary diagnosis):** If there is an evidence of more than one active clinical conditions in the patient, the consulting doctor can record the preexisting condition or comorbidity using the same table and lookup for ICD10/SNOMeD-CT - Doctor can then mark the added diagnosis as a Primary or secondary. - The primary diagnosis will get added on to the list of active diagnoses (in case of multiple diagnosis) with onset date picked by the application. - In case the patient has come for a follow up visit, the consulting doctor will update the status (Provisional, Differential, Final) of the diagnosis as per the investigation results. - A doctor can also close an active diagnosis and the status for that diagnosis is marked as closed. Closed diagnosis is then automatically moved to patient's history section. **Reconciliation Function** <u>Active Diagnosis List</u> - All the past but active Diagnosis will also reflect on the Diagnosis page of the SOAP/encounter screen for reference. - A treating doctor can then change status or priority of an active diagnosis as per the scope of patient visit being recorded. <u>Past Diagnosis List</u> - All the closed diagnosis will automatically move to the Past diagnosis or patient history section and no longer will be available under the assessment/diagnosis section of a new encounter/consultation/SOAP screen. **Note-** On closing a diagnosis an open episode for that diagnosis can be automatically closed in the application and a timeline view for all the encounters/visit under that episode should be available for the doctor to refer whenever required for future patient visit. Application should support saving the diagnosis during an active encounter and let the doctor edit any information entered until the encounter summary/consultation record is submitted. Once the summary is submitted, doctor can no longer edit the details recorded for that visit.

	Doctor can modify the status or priority of active diagnosis in future visits but will be marked as visit/encounter with edit details with the doctor's name and will maintain last updated date and time details.
Outputs	None
Messages & Alerts	• System alert on missing information

1.5. Required MDDS Data Elements

- **Entity: Generic**

Data Elements	MDDS Codes	Data Format	Maximum Size	Code Directory
Time	05.001.0001	HH:MM:SS	8	
Date		dd/mm/yyyy	10	G00.01
Alternate Identifier Type	05.001.0003	Integer	2	CD05.053
Alternate Identifier	05.001.0004	Varchar	254	
Alternate Identifier Format	05.001.0005	Bytes	20	
Comments	05.001.0007	Varchar	99	
Healthcare Application Number	05.001.0019	Integer	5	CD05.013
Code System Qualifier Type	05.001.0020	Char	1	
Code System Qualifier	05.001.0021	Varchar	15	CD05.032
System of Medicine	05.001.0022	Integer	2	CD05.030
Document ID	05.001.0023	Varchar	50	
Reference Document ID	05.001.0024	Varchar	50	
Non-Clinical Document Type	05.001.0025	Integer	2	CD05.034
Reference Document	05.001.0026	Varchar	254	
Non-Clinical Document	05.001.0027	Varchar	4096	

- **Entity: Person**

Data Elements	MDDS Codes	Data Format	Maximum Size	
Unique Health Identification Number	G01.01	Integer	12	
Alternate Unique Identification Number (UID) Type	05.002.0001	Integer	2	Refer to CD05.007
Alternate Unique Identification Number (UID)	05.002.0002	Varchar	Max. Size =18 10 - PAN Card 08 - Passport No. 18 - Voter ID 18 - Any other Identifier	
Time of Birth	05.002.0003	HH:MM:SS	8	
Nationality Code	05.002.0006	Integer	1	
Person Name Type	05.002.0008	Char	1	

Author Name	05.002.0017			Refer to G01.02
Author Landline Telephone Number	05.002.0018	Varchar	8	Refer to G00.06- 01-05
Author Mobile number	05.002.0019	Char	10	Refer to G00.06- 02-05
Author Email Address/URL	05.002.0020	Varchar	254	Refer to G00.09

- **Entity: Patient**

Data Elements	MDDS Codes	Data Format	Maximum size	Code Directory
Provider's Patient ID	05.003.0001	Varchar	18	
Patient Name	05.003.0002			Refer to G01.02
Reason for visit	05.003.0016	Varchar	99	

- **Entity: Facility**

Data Elements	MDDS Codes	Data Format	Maximum Size	Code Directory
Unique Facility Identification Number	05.008.0001	Integer	10	Refer to CD05.001

- **Entity: Episode**

Data Elements	MDDS Codes	Data Format	Maximum Size	Code Directory
Episode ID	05.009.0001	Varchar	50	
Episode Type	05.009.0002	Integer	1	
Episode From Date	05.009.0003	dd/mm/yyyy	10	Refer to G00.01
Episode End Date	05.009.0004	dd/mm/yyyy	10	Refer to G00.01

- **Entity: Encounter**

Data Elements	MDDS Codes	Data Format	Maximum Size	Code Directory
Encounter ID	05.010.0001	Varchar	18	
Encounter Type	05.010.0002	Integer	2	Refer to CD05.047
Encounter Type Description	05.010.0003	Varchar	254	
Encounter Time	05.010.0004	HH:MM:SS	8	
Encounter Date	05.010.0005	dd/mm/yyyy	10	Refer to G00.01

- **Entity: Diagnosis**

Data Elements	MDDS Codes	Data Format	Maximum Size	Code Directory
Health Condition Type	05.020.0001	Integer	3	Refer to CD05.022
Health Condition Name	05.020.0002	Varchar	99	Refer to CD05.019
Health Condition Code	05.020.0003	Varchar	10	Refer to CD05.019
Health Condition Description	05.020.0004	Varchar	254	
Health Condition Category	05.020.0005	Char	1	
Diagnosis Priority	05.020.0006	Integer	1	
Health Condition Status	05.020.0007	Integer	2	Refer to CD05.021
Comorbidity Indicator	05.020.0008	Integer	1	
Comorbidity Code	05.020.0009	Varchar	10	Refer to CD05.019
Present Health Condition Onset Date	05.020.0010			Refer to G00.01

e- Encounter Note Object

Data Elements Labels	FHIR Label	Cardinality	Field Type	Data Format String,Varchar,Integer,Value set	Maximum Size	Applicable code directory/value set	MDDS Label	Remark
Header (Encrypted and stored) This data will be machine readable and not viewed on the screen								
Unique Health Identification Number (UHID)	Patient.identifier	1	Mandatory	Integer	12		G01.01	This will be generated once MOHFW builds the mater patient index for the country, as per NDHB we have to keep a place holder for the same. States can also build the state lever patient or citizen registry and can use that ID here and later can roll up to the central.
Alternate Unique Identification	Patient.identifier	1	Mandatory	Integer	12	CD05.007	05.002.0001	Till the time the UHID is unavailable,

Number (UID) Type								patient alternate id can used in place of a unique identifier. For a hospital setting it can be the patient's AADHAR number. and for those enrolled in vertical programs, the IDs allotted to each patient under that program can be utilized for example, NIKSHAY ID.
Alternate Unique Identification Number (UID) Type	Patient.identifier	1	Mandatory	Varchar			05.002.0002	
Facility Global Unique Identifier (GUID)		1	Mandatory	Bits	16	CD05.001	05.008.0025	Custodian of patient record or the object Government is working on creating a National Facility Registry for all the healthcare facilities (Public and Private) and
	Patient.managingOrganization							

								will generate unique facility IDs for each. This ID will come through that registry. For now states can use their own facility ID if they have at state level that identifies each facility uniquely in the state. (Required to be used for PMJAY
Unique Individual Health Care Provider Number			1	Mandatory	Varchar	18	CD05.008	05.005.0001	Similarly, as per NDHB each healthcare provider like doctor, nurse etc will have a unique identifier that will be maintained Nationally in the provider registry. A placeholder for the same is required, till then medical
	Practitioner.identifier								

								council number or registration number of the doctor can be used here
Clinical Document Type Code Composition.type		1	Mandatory	Integer	2	CD05.046	05.019.0006	These will be backend values that will help to track all the clinical documents that will be generated by any application.
Document ID Composition.identifier		1	Mandatory	Varchar	50		05.001.0023	This most of the application generates and store in their audit trail can just map with the MDDS code
Episode ID EpisodeOfCare.identifier		1	Optional	Varchar	50		05.009.0001	Automatically generated by the system and NSF card should store this information for the encounter info they store
Episode Type EpisodeOfCare.type		1	Optional	Integer	1	1 - New 2 - Ongoing 3 - Active 4 - Inactive	05.009.0002	

Episode Status	EpisodeOfCare.status		1	Mandatory			planned Waitlist Active On hold Finished Cancelled Entered in error		
Encounter Date	Encounter.appointment		1	Optional	G00.01			05.010.0005	Every time a new visit is created for consultation or any other service system automatically generates this to maintain the longitudinal record of a patient
Encounter ID	Encounter.identifier		1	Optional	Varchar	18		05.010.0001	
Title To be printed									
Unique Health Identification Number (UHID)	Patient.identifier	1		Optional	Integer	12	G01.01		Nationally (State level) maintained patient's health ID
Hospital's Patient ID	Condition.subject	1		Optional	Varchar	18		05.003.0001	Local Registration ID of the facility
Patient Name	Patient.name	1		Optional			G01.02	05.003.0002	Retrievable fields
Patient Age	Patient.birthDate	1		Optional	Age-year(s) (yyy) Integer(3) Age-	7		05.003.0003	

				Month(s) (mm) Integer(2) Age-Day(s) (dd) Integer (2) Default Value: 999,99,99 no preceding zero [years, months, days]				
Patient Gender	Patient.gender	1	Optional	Char	1	G01.03		
Patient Class	Encounter.class	1	Mandatory	Integer	2	CD05.047	05.003.0013	
Unique Individual Health Care Provider Number	Practitioner.identifier	1	Mandatory	Varchar	18		05.005.0001	**Auto captures as per the user log in**
Patient Address (05.003.0009)								
Patient Address Type	Address.use	1	Optional	Char	1	CD05.120	05.003.0010	
Premises Identifier	Address.line	1	Optional	Varchar	60		G02.03-00-02	
Sub Locality-1	Address.line	1	Optional	Varchar	50		G02.03-01-03	**Retrievable fields**
Locality	Address.line	1	Optional	Varchar	50		G02.03-03-03	
Land Region code	Address.country	1	Optional	Integer	State - 2 District - 3 Sub-District - 5 Village - 6		G02.01	

					Town - 6			
District	Address.district	1	Optional	Integer	3	CD02.03	G02.01	
Sub-District	Address.line	1	Optional	Integer	5	CD02.04	G02.02-01	
Village	Address.line	1	Optional	Integer	6		G02.01	
Town	Address.city	1	Optional	Integer		CD02.06		
State	Address.state	1	Optional	Integer	2	CD02.02		
Pin	Address.postalCode	1	Optional	Integer	6		G02.04-01	
Name of a Land region in English	Address.country	1	Optional	Varchar	50		G02.02-01	
Patient's email Address	Patient.telecom	1	Optional	Refer to Email (G00.09)			G00.09	
Patient Mobile Number	Patient.telecom	1	Optional	Char	10		05.003.0012	
Subjective Information								
Family History								
Family Member Medical History	FamilyMemberHistory	0....many	Mandatory	Varchar	4096	CD05.046	05.002.0024	
Family Member UID number	FamilyMemberHistory.identifier/ Condition.subject	0..many	Optional	G01.01			05.002.0025	
Family Member Relationship	FamilyMemberHistory.relationship	1	Mandatory	G01.08-01			05.002.0027	
Health Condition Code (Family	FamilyMemberHistory.condition.code	0 to many	Mandatory	Varchar	10	ICD10/snomed/ICD11	05.020.0003	Record only there is an active condition

								or a notifiable or NCD history
Member)								
Health Condition status	FamilyMemberHistory.condition.outcome	1	Mandatory			CD05.021	05.020.0007	
Patient's Clinical History								
Existing/comorbidity Health Condition Code	Condition.code	0 to many	Mandatory	Varchar	10	ICD10/11/SNOMED D	05.020.0003	
Health Condition status	Condition.clinicalStatus	1	Mandatory			CD05.021	05.020.0007	For the next encounter all the cured and closed diagnosis will be shown here with a logic built by the healthcare facility (eg: till what date a closed diagnosis should be shown)
Past Health Condition Onset Date	Condition.onset[x]	1	Optional	Refer to Date (G00.01)	8		NA	
Chief Complaints								
Chief Complaint ID	Condition.identifier	0 to many	Mandatory	Varchar			NA	Can have more than 1 cardinality)
Chief	EpisodeOfCare.diagnosis.role	o to many	Mandatory	Varchar		ICD 10 (Signs &	NA	

Complaint Name						Symptoms)		
Body Site	Condition.bodySite	1	Mandatory	Integer	2	CD05.026	05.023.0007	
Duration	Condition.abatement[x]	1	Mandatory	Integer			NA	
Patient Allergies								
Allergy Product Code	AllergyIntolerance.code	0 to many	Mandatory	Integer	5	CD05.018	05.018.0001	This information is collected during the first consultation, but treating doctor can add more allergies if reported by the patient or through an adverse event reported by the hospital in future.
Allergy Product Description	AllergyIntolerance.reaction.substance	0 to many	Mandatory	Varchar	99		05.018.0002	
Allergy Status	AllergyIntolerance.clinicalStatus	0 to many	Mandatory	Integer	2	CD05.021	05.018.0008	
Author Time	AllergyIntolerance.onset[x]	1	Optional	HH:MM:SS	8		05.019.0001	To be maintained internally
Author Date	AllergyIntolerance.onset[x]	1	Optional	Refer to Date (G00.01)			05.019.0002	
Author ID	AllergyIntolerance.asserter	1	Mandatory	Varchar	18		05.002.0032	Code of the Author who has authored the clinical information that need to be exchanged. E.g. provider who has authored patient

								discharge summary or referral notes.
Observations								
Vitals https://www.hl7.org/fhir/observation-vitalsigns.html								
Vital Sign Result Time	Observation.effective[x]	0 to many	Optional	HH:MM:SS	8		05.017.0001	
Vital Sign Result Type	Observation.category	0 to many	Optional	Integer	2	CD05.038/ https://www.hl7.org/fhir/observation-vitalsigns.html/	05.017.0002	Can be configured as
Vital Signs Result Status	Observation.status	0 to many	Mandatory	Integer	2	CD05.038	05.017.0003	per the
Vital Sign Result Value	Observation.value[x]	0 to many	Optional	Varchar	20		05.017.0004	specialty or clinical problem
Vital Sign Result Unit	Observation.value[x]	0 to many		Integer	2	CD05.025	05.017.0005	an application is trying to
Vital Sign Result Interpretation	Observation.interpretation	0 to many	Optional	Integer	2	CD05.135	05.017.0006	solve. A facility or department
Vital Sign Result Reference Range - lower limit	Observation.interpretation	0 to many	Optional	Integer	3	CD05.039	05.017.0007	can decide which vitals they would like to capture. The vital parameters
Vital Sign Result Reference Range - Upper limit	Observation.referenceRange.high	0 to many	Optional	Integer	3	CD05.039	05.017.0008	are provided in the associated code directory which is provided in
Vital Sign Result Date	Observation.issued	0 to many	Optional	Refer to Date (G00.01)			05.017.0009	another excel in this folder.
Vital Sign	Observation.identifier	0 to many	Optional	Integer	2		05.017.0010	

Result ID								Each vital parameter will have cardinality 1, and is captured in every encounter.
Examination								
Examination Type	Observation.category	0 to many	Optional	Integer	3	CD05.061	05.016.0001	There will be specific templates for each Type as per the medical speciality.
Examination Finding	Observation.code	0 to many	Mandatory	Varchar	4096		05.016.0002	
Examined System	BodyStructure.location	0 to many	Optional	Integer	2	CD05.033	05.016.0003	
Assessment								
Diagnosis								
Health Condition Type	Condition.code	1 to many	Mandatory	Integer	2	CD05.022	05.020.0001	
Health Condition name	Condition.code	1 to many	Mandatory	Varchar	9	CD05.019	05.020.0002	
Health Condition Code	Condition.code	1 to many	Mandatory	Varchar	10	CD05.019/ ICD10/SNOMeD	05.020.0003	Diagnosis ID
Health Condition Description	Condition.note	1 to many	Optional	Varchar	254		05.020.0004	
Health Condition Category	Condition.category	1 to many	Optional	Char	1		05.020.0005	
Diagnosis	Condition.severity	1 to many	Optional	Integer	1		05.020.0006	

Priority								
Present Health Condition Onset Date	Condition.onset[x]	1 to many	Optional	Refer to Date (G00.01)			05.020.0010	Auto captures date of entry
Health Condition Status	Condition.clinicalStatus	1 to many	Optional	Integer	2	CD05.021	05.020.0007	System should facilitate closure of a cured condition
Comorbidity Indicator	EpisodeOfCare.diagnosis.role	1 to many	Optional	Integer	1		05.020.0008	
Comorbidity Health Condition Code	CarePlan.supportingInfo	1 to many	Optional	Varchar	10	ICD 10/SNOMeD	05.020.0009	
Plan (Orders)								
Order Info (Applicable for all orders)								
Order Date	CarePlan.created	1	Optional	Refer to Date (G00.01)			05.023.0013	
Order Time	CarePlan.period	1		HH:MM:SS			05.023.0014	
Order Group ID	CarePlan.identifier	1	Optional	Varchar	10		05.025.0007	Applicable for composite orders or order set (since order sets are used in janta clinic flow) example annual health and wellness check up
Order ID	CarePlan.identifier	1	Optional	Varchar	12		05.025.0004	
Order Status	CarePlan.status	1	Mandatory	Char	2		05.025.0008	

Treatment Plan details (If applicable)								
Treatment plan ID /Package ID/ (Primary)		0 to many	Optional	Integer	5		05.007.0038	Once we have standard treatment guidelines those can be used or the facility may have defined their own set of treatment plan Note: Until STGs arrives we can use package IDs for insurance beneficiary (With cardinality if there are more than one package applicable in case of multiple surgeries during the same patient stay or episode (two open episodes)
	CarePlan.activity							
Lab Investigations								
Lab Order Code	DiagnosticReport.code	0 to many	Mandatory	Varchar	10	CD05.024/LOINC	05.021.0022	
Lab Order Description	DiagnosticReport.category	0 to many	Optional	Varchar	50		NA	

Lab Result ID	DiagnosticReport.result	0 to many	Optional	Varchar	10		05.021.0025	These values will be visible only when there is a follow up visit for result awaited or a follow up visit for the same episode
Result Status	DiagnosticReport.status	0 to many	Mandatory	Char	2		05.021.0004	
Result Value	DiagnosticReport.presentedForm	0 to many	Optional	Varchar	20		05.021.0005	
Result Interpretation	DiagnosticReport.conclusion	0 to many	Optional	Integer	2		05.021.0006	
Result Reference Range - lower limit	Observation.referenceRange.low	0 to many	Optional	Integer	7	CD05.039	05.021.0007	
Result Reference Range - Upper limit	Observation.referenceRange.high	0 to many	Optional	Integer	7	CD05.039	05.021.0008	
Radiology Investigations								
Radiology Procedure Code	Procedure.code	0 to many	Optional	Varchar	18	CD05.043	05.022.0008	
Radiology Procedure Name	Procedure.code	0 to many	Optional	Varchar	255	CD05.043	05.022.0007	
Radiology Result Status	DiagnosticReport.status	0 to many	Mandatory	Integer	2	CD05.038	05.022.0009	Applicable to follow up visit
Radiology Result ID	DiagnosticReport.identifier	0 to many	Optional	Varchar	10		05.022.0010	
scanned report attachment		0 to many						
Non-radiology Procedure Orders								
Procedure Code	Procedure.code	0 to many	Mandatory	Varchar	10	CD05.043	05.026.0003	If applicable
Procedure	Procedure.code	0 to many	Optional	Varchar	255	CD05.043	05.026.0001	

Name								
				Rx Orders				
Prescription ID	MedicationRequest.identifier	1	Mandatory	Varchar	20		05.023.0012	
Generic Drug Code	MedicationKnowledge.code	0 to many	Mandatory	Integer	5	CD05.104	05.031.0004	
Brand Drug Code	Medication.code	0 to many	Optional	Integer	10	CD05.105	05.031.0006	
Brand Drug Name	Medication.identifier	0 to many	Mandatory	Varchar	99	CD05.105	05.031.0005	
Strength Value	Medication.ingredient.strength	0 to many	Optional	Varchar	25		05.031.0011	
Route of Administration	MedicationAdministration.dosage.route	0 to many	Optional	Varchar	6	CD05.111	05.023.0002	
Medication Frequency	MedicationAdministration.dosage.rate[x]	0 to many	Optional	Varchar	5	CD05.023	05.023.0003	
Medication Administration Interval	MedicationAdministration.dosage.rate[x]	0 to many	Optional	Varchar	40		05.023.0004	
Dose	MedicationAdministration.dosage	0 to many	Optional	Varchar	60		05.023.0005	
Medication Stopped Indicator	MedicationStatement.status	0 to many	Mandatory	Integer	1			
Medication Status	Medication.status	0 to many	Optional	Integer	2	CD05.123	05.023.0010	
Medication Fills	MedicationRequest.dispenseRequest.initialFill	0 to many	Optional	Integer	3		05.023.0019	
Medication Fill No.	MedicationRequest.dispenseRequest.numberOfRepeatsAllowed	0 to many	Optional				NA	
Quantity	MedicationDispense.quantity	0 to many	Optional	Integer	10		05.023.0020	

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Ordered Value								
Pharmacy Units	MedicationDispense.quantity	0 to many	Optional	Varchar	25	CD05.109	05.023.0021	
Immunization Order (If applicable)								
Immunization Performer Identification Number	Immunization.performer	0 to many	Optional	Varchar	18		05.024.0004	
Immunization Product Code	Immunization.vaccineCode	0 to many	Mandatory	Integer	3	CD05.036	05.024.0005	
Medication Series No.	Immunization.protocolApplied.seriesDoses[x]	0 to many	Optional	Integer	2		05.024.0003	
Immunization Administered Date	Immunization.occurrence[x]	0 to many	Mandatory	G00.01			05.024.0008	
Follow Up Order								
Follow Up Date	Appointment.start	0 to many	Optional	G00.01	8		NA	
Follow up interval	Appointment.slot	0 to many	Optional				NA	
Patient Instruction	CarePlan.note	0 to many	Optional	Free Text			NA	
Author Details								
Author Date	Composition.date		1	Mandatory	G00.01			05.019.0002	Auto captured with role based access control/ Doctor's digital signature who created the encounter note
Author Time	Composition.attester.time		1	Optional	HH:MM:SS	8		05.019.0001	
Author's Digital Signature	Signature.who		1	Mandatory					

Consultation Assessment Microservice – Technical Specification based on Microservice CQRS and Event Sourcing Architecture

Name – AssessmentConsultation Microservice

Domain Model

Aggregate Root

ConsultationAssessment class

S.No	Attributes (ConsultationAssessment Aggregate Root Class)	MDDS Mapping
1	Assessment ID	Aggregate Identifier
2	episodeID	05.009.0001
3	encounterId	05.010.0001
4	providerPatientID	05.003.0001
5	uniqueFacilityIdentificationNumber	05.008.0001
14	List <Diagnosis>	Aggregate Member

Diagnosis Entity

S.No	Attributes (MedicationOrder Entity class)	MDDS Mapping
1	DiagnosisID	entityId
2	DiagnosisType (Enum)	05.020.0006
3	DiagnosisCategory (Enum)	05.020.0005
4	DiagnosisStatus (Enum)	05.020.0007

5	DiagnosisCode	05.020.0003 (Refer to CD05.019)
6	DiagnosisDescription	05.020.0004
7	LocalCode (Mapping with ICD10 or SNOMED)	
8	Diagnosis Record Date	
9	Comorbidity Indicator	05.020.0008
10	Present Health Condition Onset Date	05.020.0010

DiagnosisType (Enum)   (refer to 05.020.0006 (MDDS Code directory)

Primary
Secondary

DiagnosisCategory (Enum)   )   (refer to 05.020.0005 (MDDS Code directory)

P (Presumptive or Provisional)
S (Suspected)
L (Lab confirmed or Final)
C (Clinically confirmed)

DiagnosisStatus (Enum)   )   (refer to 05.020.0007 (MDDS Code directory)

Active
Inactive
Closed
Resolved
Relapsed
Remitted

REST API Specification (Restful Web service APIs)

getPatientDiagnosisDetailsByEpisodeID
Method Type– POST
Request parameter – episodeID
Response – List of Consultation Assessment Aggregate Root Model/DTO Objects
(This will be a paginated response as it covers diagnosis details across all the visits for a given Issue (Episode)

getPatientDiagnosisByEncounterID

Method Type– POST

Request parameter – encounterId

Response –Consultation Assessment Aggregate Root Model /DTO Objects (covers the diagnosis detail registered by careprovider during a patient visit at care provider facility)

getPatientDiagnosisByDate

Method Type– POST

Request parameter – providerPatientId, uniqueFacilityIdentificationNumber, DiagnosisRecordedDate

Response – Consultation Assessment Aggregate Root Model /DTO Objects (covers the diagnosis detail registered by careprovider during a patient visit at care provider facility)

getPatientCurrentDiagnosis

Method Type– POST

Request parameter – providerPatientId, uniqueFacilityIdentificationNumber,encounterId

Response –Consultation Assessment Aggregate Root Model /DTO Objects (covers the diagnosis details of a patient recorded by careprovider at the facility for current diagnosis)

getPatientPreviousDiagnosis

Method Type– POST

Request parameter – providerPatientId, uniqueFacilityIdentificationNumber,encounterId

Response – List of Consultation Assessment Aggregate Root Model /DTO Objects (covers the diagnosis details of a patient recorded by careprovider across multiple visits of patient for all previous visits)

if the facility is registered with NDHM sandbox and patient has voluntarily participated in consent manager based exchange by creating health ID , linking his care records across the facilities, this call will return the EHR view of patient diagnosis recorded across the facilities including previous diagnosis recorded at the facility,.

In case, uniqueFacilityIdentificationNumber is provided in Request Body , all previous diagnosis of patient recorded at that facility will be returned.

(this will be a paginated response)

getPatientComorbidities

Method Type– POST
Request parameter – providerPatientId, DiagnosisCategory (=Comorbidity), uniqueFacilityIdentificationNumber
Response – List of Consultation Assessment Aggregate Root Model /DTO Objects (covers the comorbidity details of a patient recorded by careprovider across multiple visits across the facilities)

if the facility is registered with NDHM sandbox and patient has voluntarily participated in consent manager based exchange by creating health ID , linking his care records across the facilities, this call will return the EHR view of patient comorbidities recorded across the facilities,.
In case, uniqueFacilityIdentificationNumber is provided in Request Body , all comorbidities of patient recorded at that facility will be returned.

(this will be a paginated response)

createPatientConsultationAssessmentForAPatientVisit

Method Type– POST

Request parameter

String encounterId
String providerPatientId
String UniqueFacilityIdentificationNumber
List<Diagnosis> Diagnosis

Response – HTTP Status 201(created) , Assessment ID

This API creates the patient consultation assessment with single or multiple diagnosis recorded for patient at a facility. The diagnosis code will be ICD10/SNOMED code or Facility local code for diagnosis.

updatePatientConsultationAssessmentForAPatientVisit[

Method Type– POST

Request parameter

String assessmentID
String encounterId
String providerPatientId

String UniqueFacilityIdentificationNumber
List<Diagnosis> Diagnosis

Response – HTTP Status 200 (ok)

This API updates the patient consultation assessment with single or multiple diagnosis recorded for patient at a facility. The API will be called to update the existing assessment details of a patient (in scenarios like adding additional diagnosis, changing diagnosis priority, type or status of diagnosis (e.g. closing the diagnosis) etc. for an active encounter. Once the encounter is closed, this API will not make any updation of patient diagnosis list.

Commands

Patient Consultation Assessment Microservice will be capable of handling following types of commands

(All request and response parameters should be encapsulated as Data Transfer Objects)

1. **CreatePatientConsultationAssessmentCommand**

   parameters -

String AssessmentId
String episodeId
String encounterId
String providerPatientId
String facilityIdentificationNumber
List<Diagnosis> Diagnosis

(Diagnosis Entity encapsulate the diagnosis detail.)

Mode - Synchronous

2. **UpdatePatientConsultationAssessmentCommand**

   parameters –

String AssessmentId

String episodeId
String encounterId
String providerPatientId
String facilityIdentificationNumber
List<Diagnosis> Diagnosis

(Diagnosis Entity encapsulates the diagnosis detail.)

Mode – Synchronous

3. CreatePatientDiagnosisCommand

parameters –

String diagnosisId
String encounterId
String providerPatientId
Date diagnosisRecordedDate
DiagnosisTypeEnum diagnosisType
DiagnosisCategoryEnum diagnosisCategory
DiagnosisStatusEnum diagnosisStatus
String diagnosisCode (ICD10 or SNOMED-CT Code)
String diagnosisdescription
String diagnosislocalcode
String UniqueFacilityIdentificationNumber

Mode – Synchronous

4. updatePatientDiagnosisCommand

parameters –

String diagnosisId
String encounterId
String providerPatientId
Date diagnosisRecordedDate
DiagnosisTypeEnum diagnosisType

DiagnosisCategoryEnum diagnosisCategory
DiagnosisStatusEnum diagnosisStatus
String diagnosisCode (ICD10 or SNOMED-CT Code)
String diagnosisdescription
String diagnosislocalcode
String UniqueFacilityIdentificationNumber

Events Published

Channel – Patient ConsultationAssessment event channel

Patient Consultation Assessment Microservice will be capable of handling following types of Events

1. PatientConsultationAssessmentCreatedEvent

Data structure of PatientConsultationAssessmentCreatedEvent object

String AssessmentId
String episodeId
String encounterId
String providerPatientId
String facilityIdentificationNumber
List<Diagnosis> Diagnosis

2. PatientConsultationAssessmentUpdatedEvent

Data structure of PatientConsultationAssessmentUpdatedEvent object

String AssessmentId
String episodeId
String encounterId
String providerPatientId
String facilityIdentificationNumber
List<Diagnosis> Diagnosis

3. PatientDiagnosisCreatedEvent
Data structure of PatientDiagnosisCreatedEvent object

String diagnosisId
String encounterId
String providerPatientId
Date diagnosisRecordedDate
DiagnosisTypeEnum diagnosisType
DiagnosisCategoryEnum diagnosisCategory
DiagnosisStatusEnum diagnosisStatus
String diagnosisCode (ICD10 or SNOMED-CT Code)
String diagnosisdescription
String diagnosislocalcode
String UniqueFacilityIdentificationNumber

4. PatientDiagnosisUpdatedEvent
       Data structure of PatientDiagnosisUpdatedEvent object

String diagnosisId
String encounterId
String providerPatientId
Date diagnosisRecordedDate
DiagnosisTypeEnum diagnosisType
DiagnosisCategoryEnum diagnosisCategory
DiagnosisStatusEnum diagnosisStatus
String diagnosisCode (ICD10 or SNOMED-CT Code)
String diagnosisdescription
String diagnosislocalcode
String UniqueFacilityIdentificationNumber

Queries

The Consultation Assessment service will be capable of handling different types of Queries:

1. **getConsultationAssessmentByEncounterId**
    Parameter - encounterId

2. **getPatientActiveDiagnosis**
    Parameter – provider patient id, uniquefacilityidentificationnumber, encounterId

3. **getPatientPreviousDiagnosis**

    Parameter –PatientID, uniquefacilityidentificationnumber, encounterId

    (this is a paginated query)

4   **getPatientComorbidities**

    Parameter –PatientID, uniquefacilityidentificationnumber, diagnosisCategory=comorbidity

    (this is a paginated query)

5   g**etPatientDiagnosisByDateRange**

    Parameter –PatientID, uniquefacilityidentificationnumber, startdate, enddate

    (this is a paginated query will be used to create timeline view of patient multiple visits within a date range)

6   **getPatientAssessmentDetailByDiagnosisId**

    Parameter –PatientID, DiagnosisId

Dependencies

Invokes	Subscribes To
Patient Registration Microservice	Viisit Microservice
getPatientByFacilityAssignedTemporaryRegistrationNumber()	**EncounterCheckedIn Event**
	ConsultationSubjectiveCreated Consultation Subjective Microservice (for accessing patient chief complaints, history etc.)
Visit Microservice	
getPatientVisitByEncounterId()	**ConsultationObjectiveCreated** Consultation Objective Microservice (for accessing vital signs, examination details etc)
Consultation Subjective Microservice	Result Microservice (TBD)
getPatientSubjectiveConsultationByEncounterID()	**InvestigationResultsAvailableEvent (TBD)**
Consultation Objective Microservice	**T**his event will publish details about Investigation results (for plan orders given in previous visits) and will update the diagnosis detail (e.g change status of diagnosis from provisional to final based on investigation results - It will be automatic in case of lab result change triggering diagnosis update and manual in all other cases where doctor access the lab results and update diagnosis manually.)
getPatientObjectiveConsultationByEncounterID()	
	Billing Microservice (TBD)
	Billing Performed Event (for post episodic billing scenario)