FHIR mapping for
Laboratory Record (General) & Laboratory Record (Anatomical Pathology)

HL7 HONG KONG – 5TH CONNECTATHON

OCT 21, 2024

What is “Connectathon”?

Connectathon has two very important purposes and one very important principle. A Connectathon is an event that is centered on an open consensus built Interoperability (Connection) specification. The purpose of a Connectathon is both to prove that the specification is complete as well as to prove that implementations written to that specification can ‘connect’. The most important principle of a Connectathon is that it is a safe place for failure in these endeavors. That is that it is free of negative consequences of a mistake in someone’s implementation and that the specification might need to be refined.

Source: https://healthcaresecprivacy.blogspot.com/2013/11/what-is-connectathon.html

Our Purpose

EHR

- Consent HL7 interface specification for HK eHealth
- Speed up private data sharing

HL7 HK

- Form a community on HL7 & FHIR in HK to develop healthcare interface standards

Topic

- Resources
  - DiagnosticsReport
  - ServiceRequest
  - Specimen
  - Observation

- Challenge

eHR Level of Compliance

HK eHR	HL7	Data field	Field Content	
			Value	PDF
1	1	institutional (free text) description	institutional (free text) description	Y
2	2	• institution-defined code • institutional description	institutional description +/- institution-defined code	Y
3.1	3	• institution-defined code • institutional description • international code (HK)	• institution-defined code • institutional description • international code (HK)	Y
3.2	3	• institution-defined code • institutional description • international code (HK) • fully specified	• institution-defined code • institutional description • international code (HK)	Y

Free text / PDF report only

Structural data (local code)

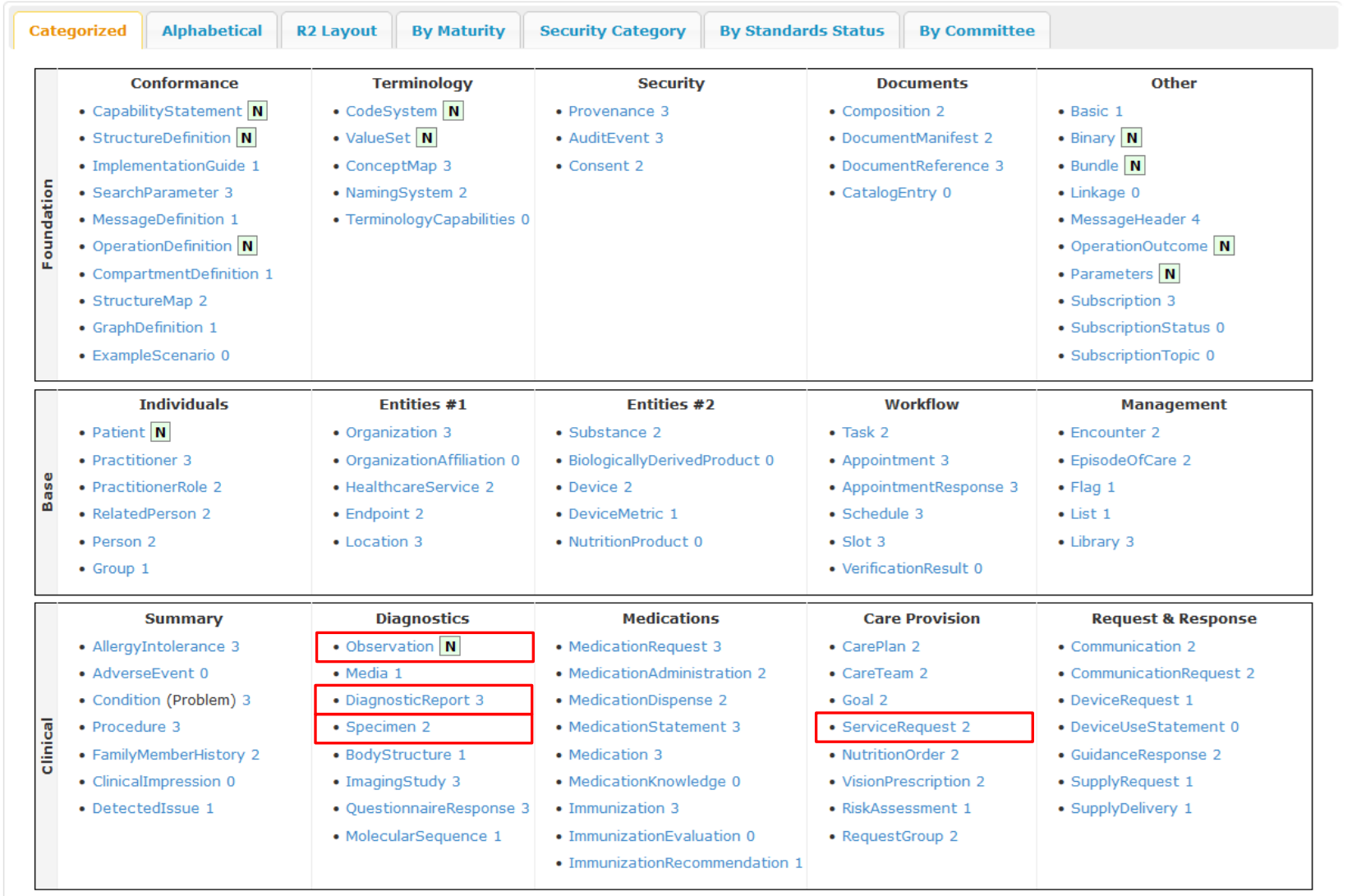
Structural data (follow and included "recognized terminology")

https://www.ehealth.gov.hk/filemanager/content/pdf/en/ehris/ehr-content-standards-guidebook.pdf

eHR domain level

Data Domain	Level 1	Level 2	Level 3
PMI, Encounter			
Allergy / ADR			
Immunisation			
Medication (Prescription / Dispensing)			
Problem			
Procedure			
Clinical Note / Summary, Investigation report, Referral			
Medical Certificate			
Laboratory (General, Microbiology, Pathology)			
Radiology			

FHIR Resources



Categorized | Alphabetical | R2 Layout | By Maturity | Security Category | By Standards Status | By Committee

Foundation

Conformance	Terminology	Security	Documents	Other
• CapabilityStatement N	• CodeSystem N	• Provenance 3	• Composition 2	• Basic 1
• StructureDefinition N	• ValueSet N	• AuditEvent 3	• DocumentManifest 2	• Binary N
• ImplementationGuide 1	• ConceptMap 3	• Consent 2	• DocumentReference 3	• Bundle N
• SearchParameter 3	• NamingSystem 2		• CatalogEntry 0	• Linkage 0
• MessageDefinition 1	• TerminologyCapabilities 0			• MessageHeader 4
• OperationDefinition N				• OperationOutcome N
• CompartmentDefinition 1				• Parameters N
• StructureMap 2				• Subscription 3
• GraphDefinition 1				• SubscriptionStatus 0
• ExampleScenario 0				• SubscriptionTopic 0

Base

Individuals	Entities #1	Entities #2	Workflow	Management
• Patient N	• Organization 3	• Substance 2	• Task 2	• Encounter 2
• Practitioner 3	• OrganizationAffiliation 0	• BiologicallyDerivedProduct 0	• Appointment 3	• EpisodeOfCare 2
• PractitionerRole 2	• HealthcareService 2	• Device 2	• AppointmentResponse 3	• Flag 1
• RelatedPerson 2	• Endpoint 2	• DeviceMetric 1	• Schedule 3	• List 1
• Person 2	• Location 3	• NutritionProduct 0	• Slot 3	• Library 3
• Group 1			• VerificationResult 0	

Clinical

Summary	Diagnostics	Medications	Care Provision	Request & Response
• AllergyIntolerance 3	• Observation N	• MedicationRequest 3	• CarePlan 2	• Communication 2
• AdverseEvent 0	• Media 1	• MedicationAdministration 2	• CareTeam 2	• CommunicationRequest 2
• Condition (Problem) 3	• DiagnosticReport 3	• MedicationDispense 2	• Goal 2	• DeviceRequest 1
• Procedure 3	• Specimen 2	• MedicationStatement 3	• ServiceRequest 2	• DeviceUseStatement 0
• FamilyMemberHistory 2	• BodyStructure 1	• Medication 3	• NutritionOrder 2	• GuidanceResponse 2
• ClinicalImpression 0	• ImagingStudy 3	• MedicationKnowledge 0	• VisionPrescription 2	• SupplyRequest 1
• DetectedIssue 1	• QuestionnaireResponse 3	• Immunization 3	• RiskAssessment 1	• SupplyDelivery 1
	• MolecularSequence 1	• ImmunizationEvaluation 0	• RequestGroup 2	
		• ImmunizationRecommendation 1		

DiagnosticReport

The findings and interpretation of diagnostic tests performed on patients, groups of patients, devices, and locations, and/or specimens derived from these. The report includes clinical context such as requesting and provider information, and some mix of atomic results, images, textual and coded interpretations, and formatted representation of diagnostic reports.

10.3.1 Scope and Usage

This resource is an *event* resource from a FHIR workflow perspective - see Workflow. It is the intent of the Orders and Observation Workgroup to align this resource with the workflow pattern for *event* resources.

A diagnostic report is the set of information that is typically provided by a diagnostic service when investigations are complete. The information includes a mix of atomic results, text reports, images, and codes. The mix varies depending on the nature of the diagnostic procedure, and sometimes on the nature of the outcomes for a particular investigation. In FHIR, the report can be conveyed in a variety of ways including a Document, RESTful API, or Messaging framework. Included within each of these, would be the DiagnosticReport resource itself.

The DiagnosticReport resource has information about the diagnostic report itself, and about the subject and, in the case of laboratory tests, the specimen of the report. It can also refer to the request details and atomic observations details or image instances. Report conclusions can be expressed as a simple text blob, structured coded data or as an attached fully formatted report such as a PDF.

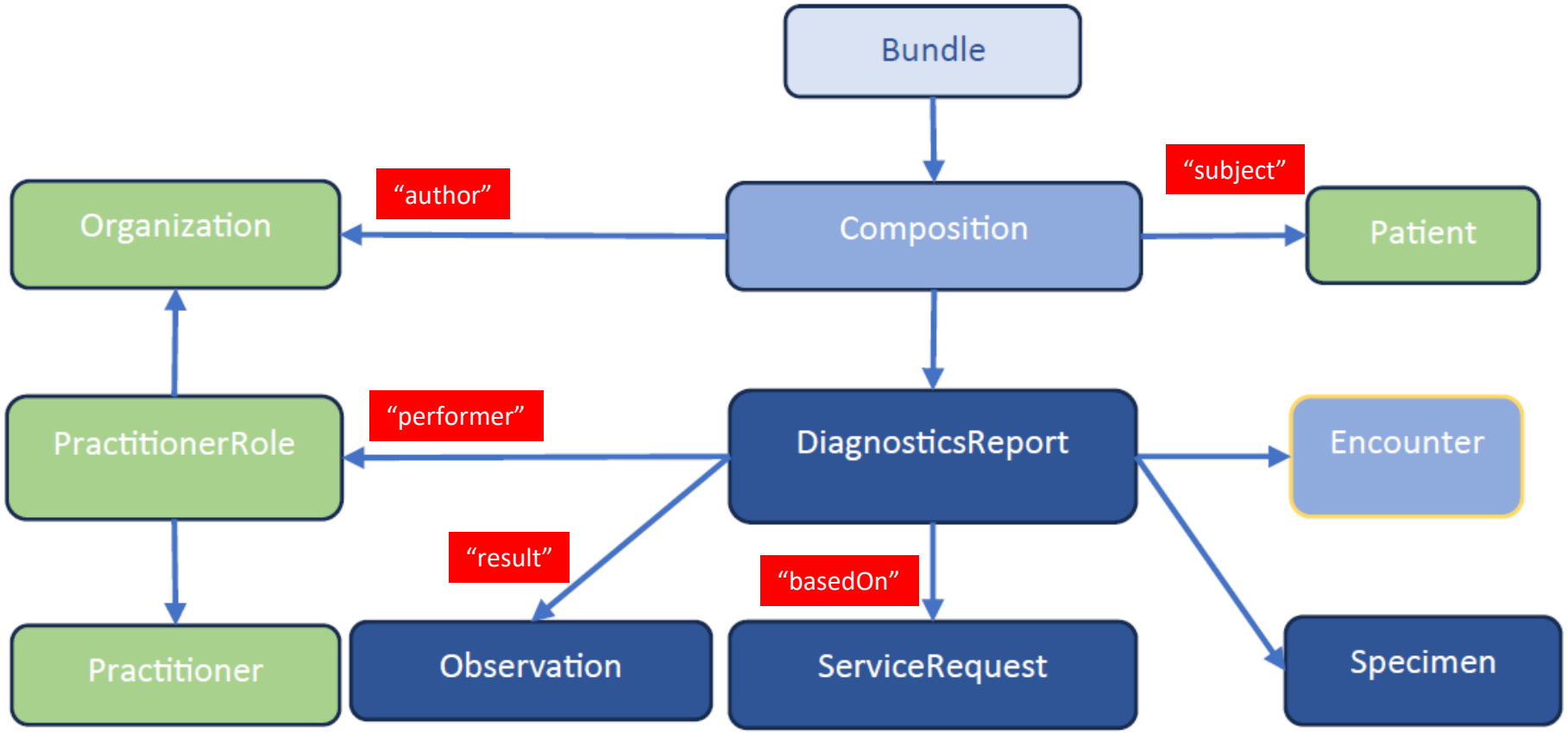
The DiagnosticReport resource is suitable for the following kinds of diagnostic reports:

- Laboratory (Clinical Chemistry, Hematology, Microbiology, etc.)
- Pathology / Histopathology / related disciplines
- Imaging Investigations (x-ray, CT, MRI etc.)
- Other diagnostics - Cardiology, Gastroenterology etc.
- Product quality tests such as pH, Assay, Microbial limits, etc. on product and substance

The DiagnosticReport resource is not intended to support cumulative result presentation (tabular presentation of past and present results in the resource). The DiagnosticReport resource does not yet provide full support for detailed structured reports of sequencing; this is planned for a future release.

https://www.hl7.org/FHIR/diagnosticreport.html

Composition structure for Laboratory Record

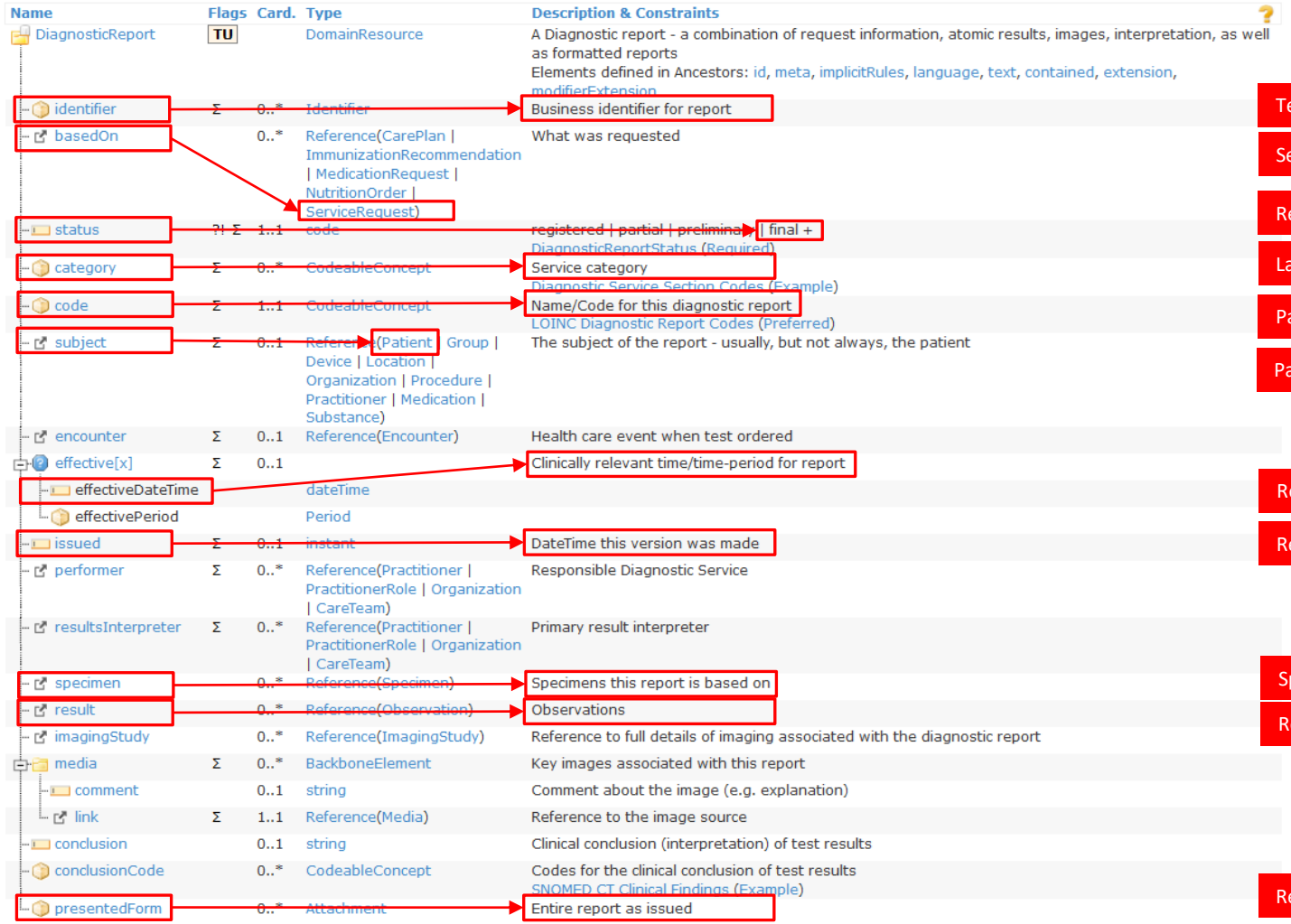


DiagnosticReport Structure

Name	Flags	Card.	Type	Description & Constraints
DiagnosticReport	TU		DomainResource	A Diagnostic report - a combination of request information, atomic results, images, interpretation, as well as formatted reports Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	Business identifier for report
basedOn		0..*	Reference(CarePlan | ImmunizationRecommendation | MedicationRequest | NutritionOrder | ServiceRequest)	What was requested
status	?! Σ	1..1	code	registered | partial | preliminary | final + DiagnosticReportStatus (Required)
category	Σ	0..*	CodeableConcept	Service category Diagnostic Service Section Codes (Example)
code	Σ	1..1	CodeableConcept	Name/Code for this diagnostic report LOINC Diagnostic Report Codes (Preferred)
subject	Σ	0..1	Reference(Patient | Group | Device | Location | Organization | Procedure | Practitioner | Medication | Substance)	The subject of the report - usually, but not always, the patient
encounter	Σ	0..1	Reference(Encounter)	Health care event when test ordered
effective[x]	Σ	0..1		Clinically relevant time/time-period for report
effectiveDateTime			dateTime	
effectivePeriod			Period	
issued	Σ	0..1	instant	DateTime this version was made
performer	Σ	0..*	Reference(Practitioner | PractitionerRole | Organization | CareTeam)	Responsible Diagnostic Service
resultsInterpreter	Σ	0..*	Reference(Practitioner | PractitionerRole | Organization | CareTeam)	Primary result interpreter
specimen		0..*	Reference(Specimen)	Specimens this report is based on
result		0..*	Reference(Observation)	Observations
imagingStudy		0..*	Reference(ImagingStudy)	Reference to full details of imaging associated with the diagnostic report
media	Σ	0..*	BackboneElement	Key images associated with this report
comment		0..1	string	Comment about the image (e.g. explanation)
link	Σ	1..1	Reference(Media)	Reference to the image source
conclusion		0..1	string	Clinical conclusion (interpretation) of test results
conclusionCode		0..*	CodeableConcept	Codes for the clinical conclusion of test results SNOMED CT Clinical Findings (Example)
presentedForm		0..*	Attachment	Entire report as issued

https://www.hl7.org/FHIR/diagnosticreport.html

DiagnosticReport Structure



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conclusionCode		0..*	CodeableConcept	Codes for the clinical conclusion of test results SNOMED CT Clinical Findings (Example)
presentedForm		0..*	Attachment	Entire report as issued

Test request number

ServiceRequest

Report Status

Lab Category

Panel

Patient

Report Reference Date Time

Report Authorized Date Time

Specimen

Result

Report (PDF)

https://www.hl7.org/FHIR/diagnosticreport.html

DiagnosticReport (LABGEN) Example


```
{
  "fullUrl": "DiagnosticReport/3439322d-ab3c-46af-a991-184ad7bc8cc5",
  "resource": {
    "resourceType": "DiagnosticReport",
    "id": "3439322d-ab3c-46af-a991-184ad7bc8cc5",
    "meta": {
      "versionId": "1",
      "lastUpdated": "2022-09-27T15:22:56.319+08:00"
    },
    "extension": [
      {
        "url": "https://ehealth.gov.hk/FHIR/1003520-LabReportStatusDesc",
        "valueString": "Final report"
      },
      {
        "url": "https://ehealth.gov.hk/FHIR/1003521-LabReportStatusLocalDesc",
        "valueString": "Final report"
      }
    ],
    "identifier": [
      {
        "system": "https://ehealth.gov.hk/FHIR/HCP/local/RequestNum",
        "value": "21017888"
      }
    ],
    "basedOn": [
      {
        "reference": "ServiceRequest/31ccc180-e5f4-4a28-bbb5-788227ac36df"
      }
    ],
    "status": "final",
    "category": [
      {
        "coding": [
          {
            "system": "https://ehealth.org.hk/fhir/LabCatCode",
            "code": "CHEM",
            "display": "Chemical Pathology"
          }
        ],
        "text": "Chemistry"
      }
    ],
    "code": {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/FHIR/HCP/local/PanelCode",
          "code": "LIPID",
          "display": "Lipid"
        }
      ]
    },
    "subject": {
      "reference": "Patient/419a662e-cf78-4d99-be8f-9794126dbec2"
    },
    "effectiveDateTime": "2021-02-25T10:35:15.000+08:00",
    "issued": "2021-02-25T11:50:02.000+08:00",
    "performer": [
      {
        "reference": "PractitionerRole/3af5c1f3-017d-422c-b2ea-3edbd7036f91"
      }
    ],
```


Test request number

ServiceRequest

Report Status

Lab Category

Panel

Report Reference Date Time

DiagnosticReport (LABAP) Example


```
"status": "final",
"category": [
  {
    "coding": [
      {
        "system": "https://ehealth.gov.hk/FHIR/LabCatCode",
        "code": "PATH",
        "display": "Anatomical Pathology"
      }
    ],
    "text": "Pathology"
  }
],
"code": {
  "text": "Gynaecologic cytology Report"
},
"subject": {
  "reference": "Patient/cf20ea48-2eb3-4330-91c2-ac9197a4b6f3"
},
"effectiveDateTime": "2017-11-10T12:00:00+08:00",
"issued": "2017-11-13T14:29:00+08:00",
"performer": [
  {
    "reference": "PractitionerRole/bb2cf10f-7710-4914-8071-6f886bf9ead3"
  }
],
```

ServiceRequest

Name	Flags	Card.	Type	Description & Constraints
ServiceRequest	TU		DomainResource	A request for a service to be performed *+ Rule: orderDetail SHALL only be present if code is present* Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	Identifiers assigned to this order
instantiatesCanonical	Σ	0..*	canonical(ActivityDefinition | PlanDefinition)	Instantiates FHIR protocol or definition
instantiatesUri	Σ	0..*	uri	Instantiates external protocol or definition
basedOn	Σ	0..*	Reference(CarePlan | ServiceRequest | MedicationRequest)	What request fulfills
replaces	Σ	0..*	Reference(ServiceRequest)	What request replaces
requisition	Σ	0..1	Identifier	Composite Request ID
status	?! Σ	1..1	code	draft | active | on-hold | revoked | completed | entered-in-error | unknown RequestStatus (Required)
intent	?! Σ	1..1	code	proposal | plan | directive | order | original-order | reflex-order | filler-order | instance-order | option RequestIntent (Required)
category	Σ	0..*	CodeableConcept	Classification of service Service Request Category Codes (Example)
priority	Σ	0..1	code	routine | urgent | asap | stat RequestPriority (Required)
doNotPerform	?! Σ	0..1	boolean	True if service/procedure should not be performed
code	Σ	0..1	CodeableConcept	What is being requested/ordered Procedure Codes (SNOMED CT) (Example)
orderDetail	Σ I	0..*	CodeableConcept	Additional order information Service Request Order Details Codes (Example)

Laboratory test order number (e-Referral number)

https://www.hl7.org/FHIR/servicerequest.html

ServiceRequest Example


```
{
  "fullUrl": "ServiceRequest/31ccc180-e5f4-4a28-bbb5-788227ac36df",
  "resource": {
    "resourceType": "ServiceRequest",
    "id": "31ccc180-e5f4-4a28-bbb5-788227ac36df",
    "identifier": [
      {
        "system": "https://ehealth.gov.hk/HCP/OrderNum",
        "value": "8088450656:12345678900000000111"
      }
    ],
    "status": "completed",
    "intent": "order",
    "subject": {
      "reference": "Patient/419a662e-cf78-4d99-be8f-9794126dbec2"
    },
    "encounter": {
      "reference": "Encounter/cee5d6cc-bf18-4622-81ec-82757184f487"
    },
    "requester": {
      "reference": "PractitionerRole/134beb51-92ec-4ce8-8a38-75e1f7460357"
    },
    "supportingInfo": [
      {
        "reference": "Laboratory test request clinical information",
        "display": "?PR bleed ?hematuria"
      }
    ]
  }
},
```


Lab test order number

Specimen

Name	Flags	Card.	Type	Description & Constraints
Specimen	TU		DomainResource	Sample for analysis Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	External Identifier
accessionIdentifier	Σ	0..1	Identifier	Identifier assigned by the lab
status	?! Σ	0..1	code	available | unavailable | unsatisfactory | entered-in-error SpecimenStatus (Required)
type	Σ	0..1	CodeableConcept	Kind of material that forms the specimen hl7VS-specimenType (Example)
subject	Σ	0..1	Reference(Patient | Group | Device | Substance | Location)	Where the specimen came from. This may be from patient(s), from a location (e.g., the source of an environmental sample), or a sampling of a substance or a device
receivedTime	Σ	0..1	dateTime	The time when specimen was received for processing
parent		0..*	Reference(Specimen)	Specimen from which this specimen originated
request		0..*	Reference(ServiceRequest)	Why the specimen was collected
collection		0..1	BackboneElement	Collection details
collector	Σ	0..1	Reference(Practitioner | PractitionerRole)	Who collected the specimen
collected[x]	Σ	0..1		Collection time
collectedDateTime			dateTime	
collectedPeriod			Period	

Specimen Type

Specimen arrival datetime

Specimen collection datetime

https://www.hl7.org/FHIR//specimen.html

Specimen (LABGEN) Example


```
{
  "fullUrl": "Specimen/b74bd922-5304-4f28-bdc9-c249a18ab43a",
  "resource": {
    "resourceType": "Specimen",
    "id": "b74bd922-5304-4f28-bdc9-c249a18ab43a",
    "extension": [
      {
        "url": "1003530-SpecimenDetail",
        "valueString": "Left lower quadrant"
      }
    ],
    "type": {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/FHIR/HCP/local/SpecimenType",
          "code": "BLOOD",
          "display": "Blood"
        }
      ]
    },
    "subject": {
      "reference": "Patient/419a662e-cf78-4d99-be8f-9794126dbec2"
    },
    "receivedTime": "2021-02-25T11:35:15.000+08:00",
    "request": [
      {
        "reference": "ServiceRequest/31ccc180-e5f4-4a28-bbb5-788227ac36df"
      }
    ],
    "collection": {
      "collectedDateTime": "2021-02-25T11:35:15.000+08:00"
    }
  }
}
```


Specimen details

Specimen type

Specimen arrival datetime

Specimen collection datetime

Specimen (LABAP) Example


```
{
  "fullUrl": "Specimen/a4793303-e477-416b-9b45-88beec7286ba",
  "resource": {
    "resourceType": "Specimen",
    "id": "a4793303-e477-416b-9b45-88beec7286ba",
    "extension": [
      {
        "url": "https://ehealth.gov.hk/FHIR/1003530-SpecimenDetail",
        "valueString": "Cervix"
      }
    ],
    "receivedTime": "2017-11-10T14:00:00+08:00",
    "collection": {
      "collectedDateTime": "2017-11-10T12:00:00+08:00"
    }
  }
}
```


Specimen details

Specimen arrival datetime

Specimen collection datetime

Observation

10.1 Resource Observation - Content

Orders and Observations Work Group	Maturity Level: N	Normative (from v4.0.0)	Security Category: Patient	Compartments: Device, Encounter, Patient, Practitioner, RelatedPerson

This page has been approved as part of an ANSI standard. See the Observation Package for further details.

Measurements and simple assertions made about a patient, device or other subject.

10.1.1 Scope and Usage

This resource is an *event resource* from a FHIR workflow perspective - see Workflow.

Observations are a central element in healthcare, used to support diagnosis, monitor progress, determine baselines and patterns and even capture demographic characteristics. Most observations are simple name/value pair assertions with some metadata, but some observations group other observations together logically, or even are multi-component observations. Note that the DiagnosticReport resource provides a clinical or workflow context for a set of observations and the Observation resource is referenced by DiagnosticReport to represent laboratory, imaging, and other clinical and diagnostic data to form a complete report.

Uses for the Observation resource include:

- Vital signs such as body weight, blood pressure, and temperature
- Laboratory Data like blood glucose, or an estimated GFR
- Imaging results like bone density or fetal measurements
- Clinical Findings* such as abdominal tenderness
- Device measurements such as EKG data or Pulse Oximetry data
- Clinical assessment tools such as APGAR or a Glasgow Coma Score
- Personal characteristics: such as eye-color
- Social history like tobacco use, family support, or cognitive status
- Core characteristics like pregnancy status, or a death assertion

*The boundaries between clinical findings and disorders remains a challenge in medical ontology. Refer the Boundaries section below and in Condition for general guidance. These boundaries can be clarified by profiling Observation for a particular use case.

https://www.hl7.org/FHIR/observation.html

Observation Structure (1)

Name	Flags	Card.	Type	Description & Constraints
Observation	N		DomainResource	Measurements and simple assertions *+ Rule: dataAbsentReason SHALL only be present if Observation.value[x] is not present* *+ Rule: If Observation.code is the same as an Observation.component.code then the value element associated with the code SHALL NOT be present* Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	Business Identifier for observation
basedOn	Σ	0..*	Reference(CarePlan | DeviceRequest | ImmunizationRecommendation | MedicationRequest | NutritionOrder | ServiceRequest)	Fulfills plan, proposal or order
partOf	Σ	0..*	Reference(MedicationAdministration | MedicationDispense | MedicationStatement | Procedure | Immunization | ImagingStudy)	Part of referenced event
status	?! Σ	1..1	code	registered | preliminary | final | amended + ObservationStatus (Required)
category		0..*	CodeableConcept	Classification of type of observation Observation Category Codes (Preferred)
code	Σ	1..1	CodeableConcept	Type of observation (code / type) LOINC Codes (Example)
subject	Σ	0..1	Reference(Patient | Group | Device | Location | Organization | Procedure | Practitioner | Medication | Substance)	Who and/or what the observation is about
focus	Σ TU	0..*	Reference(Any)	What the observation is about, when it is not about the subject of record
encounter	Σ	0..1	Reference(Encounter)	Healthcare event during which this observation is made
effective[x]	Σ	0..1		Clinically relevant time/time-period for observation
effectiveDateTime			dateTime	
effectivePeriod			Period	
effectiveTiming			Timing	
effectiveInstant			instant	
issued	Σ	0..1	instant	Date/Time this version was made available
performer	Σ	0..*	Reference(Practitioner | PractitionerRole | Organization | CareTeam | Patient | RelatedPerson)	Who is responsible for the observation

Result Status ("Final")

Observation Category (AP)

Observation Code

https://www.hl7.org/FHIR/observation.html

Observation Structure (2)

value[x]	Σ I	0..1		Actual result
valueQuantity			Quantity	
valueCodeableConcept			CodeableConcept	
valueString			string	
valueBoolean			boolean	
valueInteger			integer	
valueRange			Range	
valueRatio			Ratio	
valueSampledData			SampledData	
valueTime			time	
valueDateTime			dateTime	
valuePeriod			Period	
dataAbsentReason	I	0..1	CodeableConcept	Why the result is missing DataAbsentReason (Extensible)
interpretation		0..*	CodeableConcept	High, low, normal, etc. Observation Interpretation Codes (Extensible)
note		0..*	Annotation	Comments about the observation
bodySite		0..1	CodeableConcept	Observed body part SNOMED CT Body Structures (Example)
method		0..1	CodeableConcept	How it was done Observation Methods (Example)
specimen		0..1	Reference(Specimen)	Specimen used for this observation
device		0..1	Reference(Device | DeviceMetric)	(Measurement) Device
referenceRange	I	0..*	BackboneElement	Provides guide for interpretation *+ Rule: Must have at least a low or a high or text*
low	I	0..1	SimpleQuantity	Low Range, if relevant
high	I	0..1	SimpleQuantity	High Range, if relevant
type		0..1	CodeableConcept	Reference range qualifier Observation Reference Range Meaning Codes (Preferred)
appliesTo		0..*	CodeableConcept	Reference range population Observation Reference Range Applies To Codes (Example)
age		0..1	Range	Applicable age range, if relevant
text		0..1	string	Text based reference range in an observation
hasMember	Σ	0..*	Reference(Observation | QuestionnaireResponse | MolecularSequence)	Related resource that belongs to the Observation group

Laboratory Test Result value

Abnormal result indicator

Reference range

https://www.hl7.org/FHIR/observation.html

Observation Example - 1


```
{
  "fullUrl": "Observation/257dc93b-ae7b-4127-85cb-fba81168cb74",
  "resource": {
    "resourceType": "Observation",
    "id": "257dc93b-ae7b-4127-85cb-fba81168cb74",
    "extension": [
      {
        "url": "https://ehealth.gov.hk/FHIR/1003543-LabTestNumericResult",
        "valueDecimal": 3.8
      },
      {
        "url": "https://ehealth.gov.hk/FHIR/1003545-LabReportableResult",
        "valueString": "3.8"
      }
    ],
    "status": "final",
    "code": {
      "coding": [
        {
          "system": "http://loinc.org",
          "code": "70204-3",
          "display": "Cholesterol non HDL [Moles/volume] in Serum or Plasma"
        },
        {
          "system": "https://ehealth.gov.hk/FHIR/HCP/local/LabTest",
          "code": "NHDLC",
          "display": "Non-HDL Cholesterol"
        }
      ]
    },
```


Result Value

Result Status

Laboratory test name

Observation Example - 1 (cont.)

Observation Example - 2

```
    },
    {
      "url": "https://ehealth.gov.hk/FHIR/1003545-LabReportableResult",
      "valueString": "3.9"
    }
  ],
  "status": "final",
  "code": {
    "coding": [
      {
        "system": "http://loinc.org",
        "code": "32309-7",
        "display": "Cholesterol.total/Cholesterol in HDL [Molar ratio] in Serum or Plasma"
      },
      {
        "system": "https://ehealth.gov.hk/FHIR/HCP/local/LabTest",
        "code": "C/H",
        "display": "Chol/HDL Ratio"
      }
    ]
  },
  "subject": {
    "reference": "Patient/419a662e-cf78-4d99-be8f-9794126dbec2"
  },
  "valueQuantity": {
    "unit": ""
  },
  "interpretation": [
    {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/fhir/AbnormalResultIndCode",
          "code": "H",
          "display": "High"
        }
      ],
      "text": "High"
    }
  ],
```

Result Value

Laboratory test name

Abnormal result indicator

```
  "referenceRange": [
    {
      "text": "<3.5"
    }
  ]
```

Laboratory test – Level 2 / 3

```
"code": {
  "coding": [
    {
      "system": "http://loinc.org",
      "code": "70204-3",
      "display": "Cholesterol non HDL [Moles/volume] in Serum or Plasma"
    },
    {
      "system": "https://ehealth.gov.hk/FHIR/HCP/local/LabTest",
      "code": "NHDLC",
      "display": "Non-HDL Cholesterol"
    }
  ]
},
```

Recognised terminology name

Test name identifier

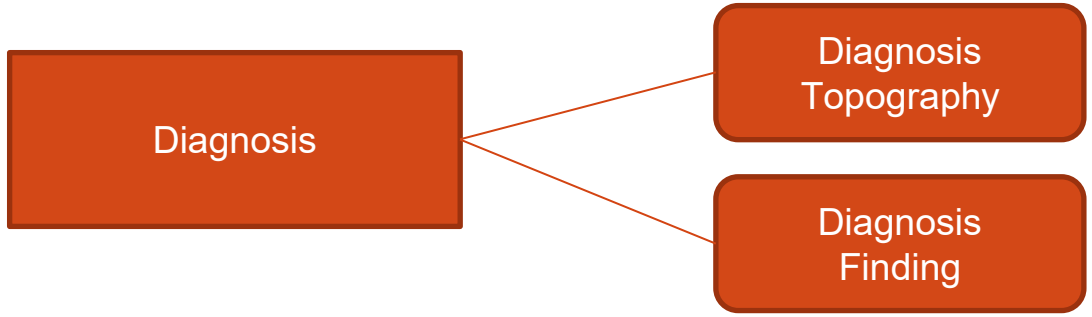
Test name description

Test name local code

Test name local description

Observation on LABAP

Report Details
(Clinical Info, Specimen, Gross Exam, Microscopic Exam, Comment, etc.)



status	?! Σ	1..1	code	registered | preliminary | final | amended + ObservationStatus (Required)	Result Status ("Final")
category		0..*	CodeableConcept	Classification of type of observation Observation Category Codes (Preferred)	Observation Category (AP)
code	Σ	1..1	CodeableConcept	Type of observation (code / type) LOINC Codes (Example)	Observation Code

LABAP Report Details

Report Details
(Clinical Info, Specimen, Gross Exam, Microscopic Exam, Comment, etc.)

eHR Codex Table – Anatomical Pathology Report Structure

Anatomical pathology report structure table
Purpose: To describe the anatomical pathology report structure in section
Reference: Hospital Authority

Term ID	eHR Value	eHR Description
9050077	CLIN	Clinical Information
9050420	SPEC	Specimen
9050160	GROSS	Gross Examination
9050000	MICRO	Microscopic Examination
9050083	COMM	Comment
9050319	OTH	Other Pathology Report Section


```
{
  "fullUrl": "Observation/0b90909e-768c-43b0-9210-54669ed5f5ec",
  "resource": {
    "resourceType": "Observation",
    "id": "0b90909e-768c-43b0-9210-54669ed5f5ec",
    "status": "final",
    "category": [
      {
        "coding": [
          {
            "system": "https://ehealth.gov.hk/FHIR/APcategory",
            "code": "APReportDetail"
          }
        ]
      }
    ],
    "code": {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/FHIR/APReportDetail",
          "code": "MICRO",
          "display": "Microscopic Examination"
        }
      ],
      "text": "MICROSCOPIC EXAMINATION:"
    },
    "subject": {
      "reference": "Patient/cf20ea48-2eb3-4330-91c2-ac9197a4b6f3"
    },
      "valueString": "Specimen Adequacy : Satisfactory for evaluation; endocervical / transformation zone component absent. The slide shows some atypical squamous cells featuring mild nuclear hyperchromasia and irregularity."
  }
},
```

LABAP Diagnosis

Diagnosis


```
{
  "fullUrl": "Observation/2d60f3b1-2977-4df2-a09a-7d8e0171f6bf",
  "resource": {
    "resourceType": "Observation",
    "id": "2d60f3b1-2977-4df2-a09a-7d8e0171f6bf",
    "status": "final",
    "category": [
      {
        "coding": [
          {
            "system": "https://ehealth.gov.hk/FHIR/APcategory",
            "code": "Diagnosis"
          }
        ],
        "text": "Laboratory"
      }
    ],
    "code": {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/FHIR/HCP/local/APDiagTitle"
        }
      ],
      "text": "DIAGNOSIS : "
    },
    "subject": {
      "reference": "Patient/cf20ea48-2eb3-4330-91c2-ac9197a4b6f3"
    },
    "valueString": "CERVIX,  cytology - ATYPICAL SQUAMOUS CELLS OF UNDETERMINED SIGNIGICANCE; ABSENCE OF ENDOCERVICAL/
TRANSFORMATION ZONE COMPONENT."
  }
},
```

LABAP Diagnosis Topography

Diagnosis Topography


```
{
  "fullUrl": "Observation/8a0f7453-3469-49b9-987d-139749403913",
  "resource": {
    "resourceType": "Observation",
    "id": "8a0f7453-3469-49b9-987d-139749403913",
    "status": "final",
    "category": [
      {
        "coding": [
          {
            "system": "https://ehealth.gov.hk/FHIR/APcategory",
            "code": "Topography"
          }
        ]
      }
    ],
    "code": {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/FHIR/HKCTT",
          "code": "8003128",
          "display": "Endocervical Structure"
        },
        {
          "system": "https://ehealth.gov.hk/FHIR/HCP/local/DiagTopography",
          "code": "CERV1",
          "display": "CERVIX"
        }
      ]
    },
    "subject": {
      "reference": "Patient/cf20ea48-2eb3-4330-91c2-ac9197a4b6f3"
    }
  }
```


L3 code & description

Local code & description

LABAP Diagnosis Topography

Diagnosis Finding


```
{
  "fullUrl": "Observation/9022048c-b128-48cd-97a2-416e0be1e7a7",
  "resource": {
    "resourceType": "Observation",
    "id": "9022048c-b128-48cd-97a2-416e0be1e7a7",
    "status": "final",
    "category": [
      {
        "coding": [
          {
            "system": "https://ehealth.gov.hk/FHIR/APcategory",
            "code": "DiagFinding"
          }
        ]
      }
    ],
    "code": {
      "coding": [
        {
          "system": "https://ehealth.gov.hk/FHIR/HKCTT",
          "code": "8002400",
          "display": "Atypical squamous cells of undetermined significance"
        },
        {
          "system": "https://ehealth.gov.hk/FHIR/HCP/local/DiagFing",
          "code": "ATYPSQUA1",
          "display": "ATYPICAL SQUAMOUS CELLS OF UNDETERMINED SIGNIGICANCE"
        }
      ]
    },
    "subject": {
```


L3 code & description

Local code & description

Laboratory report (PDF)

Name	Flags	Card.	Type	Description & Constraints
DiagnosticReport	TU		DomainResource	A Diagnostic report - a combination of request information, atomic results, images, interpretation, as well as formatted reports Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	Business identifier for report
basedOn		0..*	Reference(CarePlan | ImmunizationRecommendation | MedicationRequest | NutritionOrder | ServiceRequest)	What was requested
status	?! Σ	1..1	code	registered | partial | preliminary | final + DiagnosticReportStatus (Required)
category	Σ	0..*	CodeableConcept	Service category Diagnostic Service Section Codes (Example)
code	Σ	1..1	CodeableConcept	Name/Code for this diagnostic report LOINC Diagnostic Report Codes (Preferred)
subject	Σ	0..1	Reference(Patient | Group | Device | Location | Organization | Procedure | Practitioner | Medication | Substance)	The subject of the report - usually, but not always, the patient
encounter	Σ	0..1	Reference(Encounter)	Health care event when test ordered
effective[x]	Σ	0..1		Clinically relevant time/time-period for report
effectiveDateTime			dateTime	
effectivePeriod			Period	
issued	Σ	0..1	instant	DateTime this version was made
performer	Σ	0..*	Reference(Practitioner | PractitionerRole | Organization | CareTeam)	Responsible Diagnostic Service
resultsInterpreter	Σ	0..*	Reference(Practitioner | PractitionerRole | Organization | CareTeam)	Primary result interpreter
specimen		0..*	Reference(Specimen)	Specimens this report is based on
result		0..*	Reference(Observation)	Observations
imagingStudy		0..*	Reference(ImagingStudy)	Reference to full details of imaging associated with the diagnostic report
media	Σ	0..*	BackboneElement	Key images associated with this report
comment		0..1	string	Comment about the image (e.g. explanation)
link	Σ	1..1	Reference(Media)	Reference to the image source
conclusion		0..1	string	Clinical conclusion (interpretation) of test results
presentedForm		0..*	Attachment	Entire report as issued

Attachment

Name	Flags	Card.	Type	Description & Constraints
Attachment	N		Element	Content in a format defined elsewhere *+ Rule: If the Attachment has data, it SHALL have a contentType* Elements defined in Ancestors: id, extension
contentType	Σ	0..1	code	Mime type of the content, with charset etc. MimeType (Required)
language	Σ	0..1	code	Human language of the content (BCP-47) Common Languages (Preferred but limited to All Languages)
data		0..1	base64Binary	Data inline, base64ed
url	Σ	0..1	url	Uri where the data can be found
size	Σ	0..1	unsignedInt	Number of bytes of content (if url provided)
hash	Σ	0..1	base64Binary	Hash of the data (sha-1, base64ed)
title	Σ	0..1	string	Label to display in place of the data
creation	Σ	0..1	dateTime	Date attachment was first created

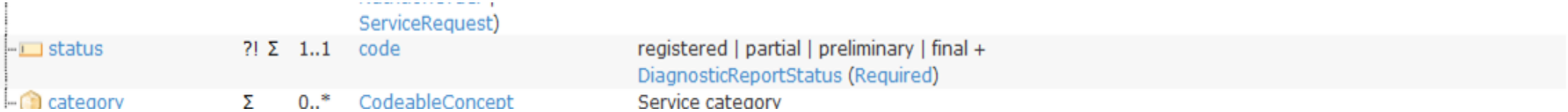
application/pdf

```
"presentedForm": [
  {
    "contentType": "application/pdf",
    "data":
xLjQNJeLjz9MNCjQgMCBvYmoNPDwvTGluZWFyaXplZCAxL0wgMjk1ODczL08gNi9FIDI5MTE0Ni9OIDEvVCAyOTU2NzQvSCBbIDc3NiA
DE2IDAwMDAwIG4NCjAwMDAwMDA5NjMgMDAwMDAgbg0KMDAwMDAwMTA2OSAwMDAwMCBuDQowMDAwMDAxMjg2IDAwMDAwIG4NCjAwMDAwM
NCjAwMDAwMDE0MzEgMDAwMDAgbg0KMDAwMDAwMTgyNCAwMDAwMCBuDQowMDAwMDAyMjM4IDAwMDAwIG4NCjAwMDAwMDIzODkgMDAwMDA
DggMDAwMDAgbg0KMDAwMDAwMzk2MCAwMDAwMCBuDQowMDA0MDI5IDAwMDAwIG4NCjAwMDAwMDQxODMgMDAwMDAgbg0KMDAwMDAyM
```

PDF size limit

- The size of PDF embedded is limited to 10MB

DiagnosticReport.Status



Level	Code	Display	Definition
1	registered	Registered	The existence of the report is registered, but there is nothing yet available.
1	partial	Partial	This is a partial (e.g. initial, interim or preliminary) report: data in the report may be incomplete or unverified.
2	preliminary	Preliminary	Verified early results are available, but not all results are final.
1	final	Final	The report is complete and verified by an authorized person.
1	amended	Amended	Subsequent to being final, the report has been modified. This includes any change in the results, diagnosis, narrative text, or other content of a report that has been issued.
2	corrected	Corrected	Subsequent to being final, the report has been modified to correct an error in the report or referenced results.
2	appended	Appended	Subsequent to being final, the report has been modified by adding new content. The existing content is unchanged.
1	cancelled	Cancelled	The report is unavailable because the measurement was not started or not completed (also sometimes called "aborted").
1	entered-in-error	Entered in Error	The report has been withdrawn following a previous final release. This electronic record should never have existed, though it is possible that real-world decisions were based on it. (If real-world activity has occurred, the status should be "cancelled" rather than "entered-in-error".).
1	unknown	Unknown	The authoring/source system does not know which of the status values currently applies for this observation. Note: This concept is not to be used for "other" - one of the listed statuses is presumed to apply, but the authoring/source system does not know which.

https://www.hl7.org/FHIR/valueset-diagnostic-report-status.html

DiagnosticReport.Status Mapping

ServiceRequest)

status	?! Σ	1..1	code	registered | partial | preliminary | final + DiagnosticReportStatus (Required)
category	Σ	0..		

Level	Code	Display
1	registered	Registered
1	partial	Partial
2	preliminary	Preliminary
1	final	Final
1	amended	Amended
2	corrected	Corrected
2	appended	Appended
1	cancelled	Cancelled
1	entered-in-error	Entered in Error
1	unknown	Unknown

eHR Codex Table – Laboratory Report Status

Laboratory report status
Purpose: To indicate the laboratory report reporting status
Reference: Hospital Authority

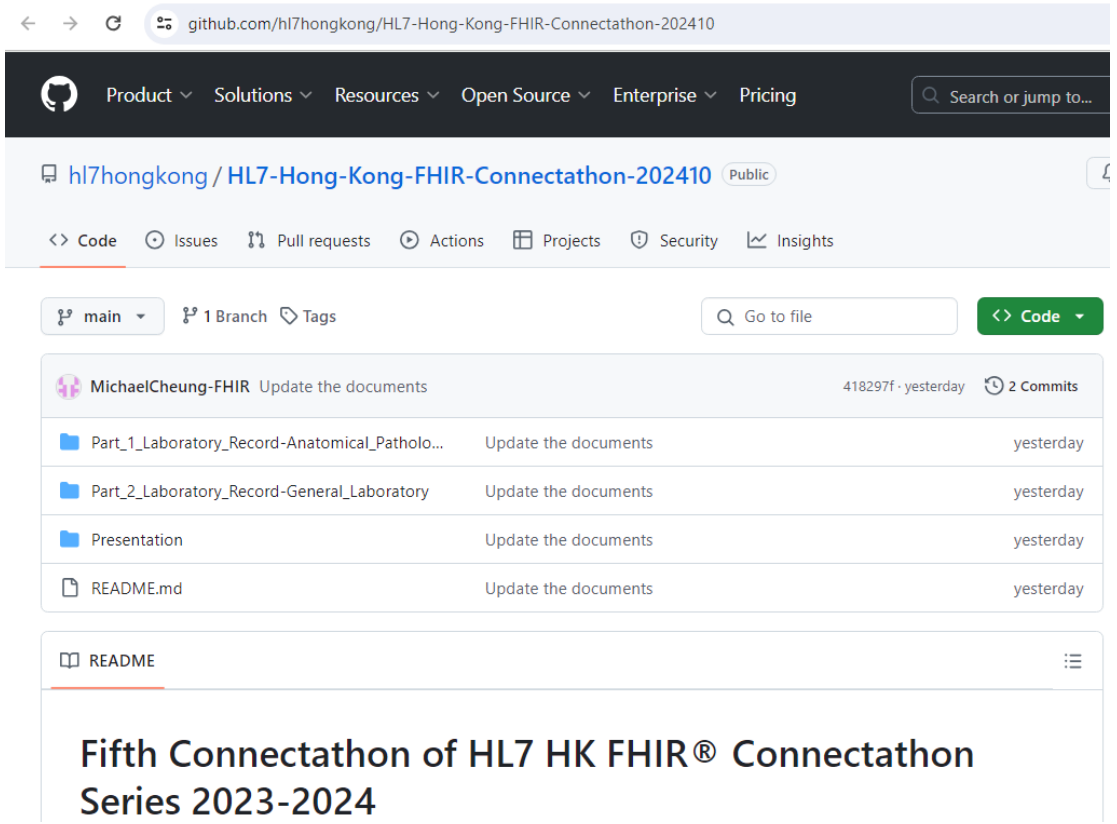
Term ID	eHR Value	eHR Description	Definition
9050361	P	Provisional/Preliminary report	A provisional report is issued when provisional or partial results become available and report is submitted to eHR. A final report will always follow after the provisional report.
9050137	F	Final report	A completed report for the laboratory request.
9050010	A	Amended report	An Amended report is issued when the final report of diagnosis or test result(s) have been changed or amended. Amended report includes information with the latest submitted provisional report/final report/supplementary report.
9050427	S	Supplementary report	A supplementary report is issued when additional information is available when provisional/ final/ amended report has been submitted to eHR.
9050470	U	Unspecified report status	Laboratory report status cannot be provided.

https://www.hl7.org/FHIR/valueset-diagnostic-report-status.html

Challenge

Specifications

- Specifications can be found at
  - https://github.com/hl7hongkong/HL7-Hong-Kong-FHIR-Connectathon-202410



Exercise

- Following the instructions at the GitHub
  - Submit the answers via
    - Fork the repository by pull request and update the related files
    - Google Form
      - https://forms.gle/vU9fgXP4dBiDyfvK7

Format of the exercise

- Based on the scenario, select the correct answer (multiple choice)

Open Discussion