PERFORM+ Connect

FHIR API Document

Product Version – 22.01.02

VERSION 2.0

CitiusTech

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Acronyms and Abbreviations

This section defines the acronyms and abbreviations used in the document.

Term	Definition
API	Application Program Interface
EHR	Electronic Health Records
FHIR	Fast Health Interoperability Resources
AIDC	Automatic Identification and Data Capture
NPI	National Provider Identifier
CLIA	Clinical Laboratory Improvement Amendments
LOINC	Logical Observation Identifiers Names and Codes
EOB	Explanation of Benefit
CCDS	Common Clinical Data Set

Contents

1. Introduction

PERFORM+ Connect offers comprehensive set of REST APIs that allows third-party entities to build applications by querying patient records stored in PERFORM+ Connect FHIR Repo. PERFORM+ CONNECT solution is built using HAPI FHIR gateway to expose claims and clinical data from payer data management systems through FHIR Claims and Clinical APIs.

API responses are formatted in accordance with Fast Healthcare Interoperability Resources (FHIR) standard. FHIR is a HL7 specification for seamless transfer of healthcare information electronically. The standardized resource types make application development simpler.

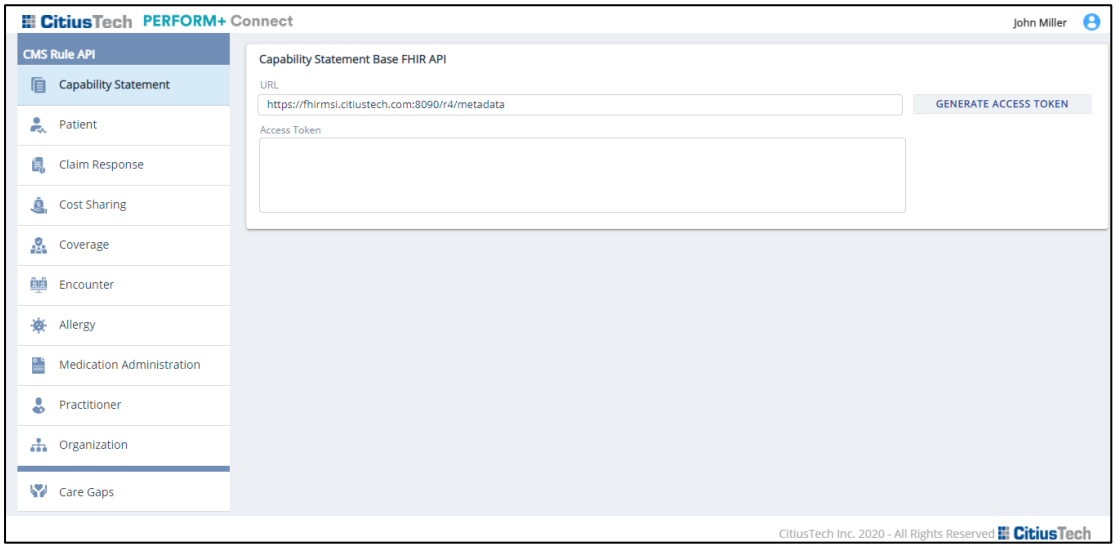
The APIs supported by the PERFORM+ CONNECT solution is as per the US Core, Carin BB and PDex implementation guide. Every resource is exposed as a URL, which can be obtained by accessing the API Root Endpoint.

This version of the PERFORM+ Connect FHIR®© APIs supports the current – R4 version of the FHIR®© Standard in the REST/JSON format using 37 APIs.

2. PERFORM+ CONNECT FHIR APIs Experience

2.1 FHIR API List

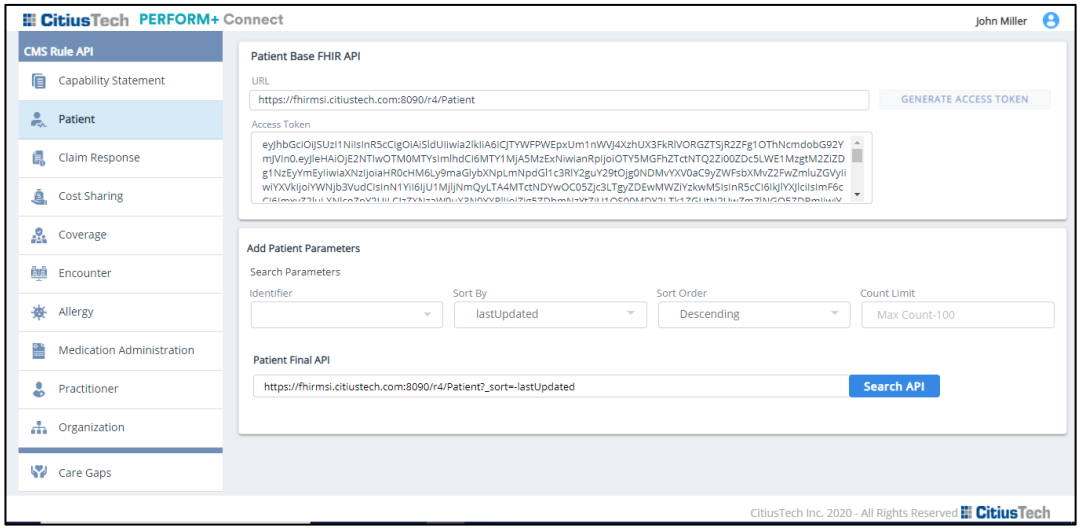
There will be a common URL that will be provided to user to directly access the FHIR API's web page. User can access few of the APIs supported by the application:



2.2 Create Request

To create a request, perform the following steps:

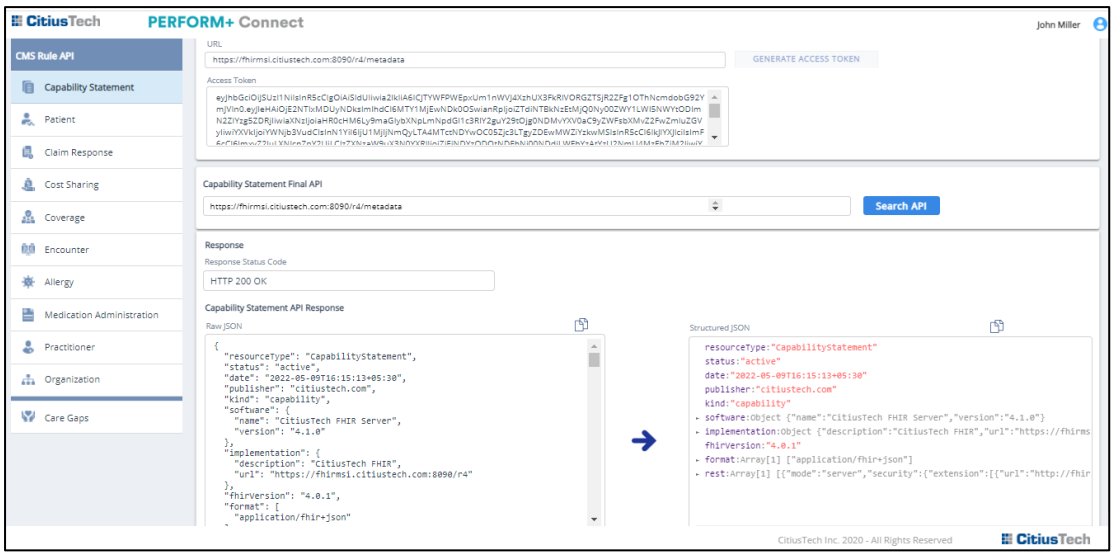
1. To create a request, select the API for which you need to request the data and generate Access Token.
2. After selecting the API, search parameters can be modified using options such as **Identifier**, **Sort By**, and **Sort Order**.



2.3 Launch Request

Once the search parameter and its values are selected, click the **Search API**. The FHIR gateway will pass the request to the Adaptor, which will query the database for the response.

The response will be displayed as follows:



The response can also be converted into Structured JSON format on clicking the arrow icon.

3. Application Programming Interfaces (APIs)

APIs are used to access underlying claims and clinical data from Payer database management system to external entities through Claim and Clinical APIs. There are mandatory search parameters which support fetching of data for each API.

The solution includes all the necessary elements and search parameters for every API.

Mandatory elements are the elements which are required in an API and the must support elements are those which should be supported if data is present in sending system.

The FHIR interface services supports 37 APIs.

- The URLs mentioned in the following sections for all APIs are of internal CitiusTech server and will be updated to corresponding DNS for the client.

3.1 AllergyIntolerance

This profile sets minimum expectations for the AllergyIntolerance resource to record, search, and fetch allergies/adverse reactions associated with a patient.

3.1.1 Mandatory and Must Support Elements

Each AllergyIntolerance must have:

- A status of the allergy
- A code which tells you what the patient is allergic to
- Patient (reference Resource)

Each AllergyIntolerance must support:

- A verification status
- A reaction manifestation

3.1.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all allergies for a patient using the patient search parameter:

GET https://hostname/r4/AllergyIntolerance?patient=[reference]

- A server will be capable of returning an AllergyIntolerance resource using:

GET https://hostname/r4/AllergyIntolerance/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/AllergyIntolerance? [parameter=value] & _revinclude=provenance: target

3.1.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/AllergyIntolerance/Kern-alit-906	Read		 Allergy Intolerance_Read.jso

BaseURL/AllergyIntolerance?clinical-status=active,final&_revinclude=Provenance:target&patient=Kern-pat-patient_101	Search	Patient,clinical-status,_revinclude	Allergy Intolerance_Search.j
{{ur}}/AllergyIntolerance/Kern-alit-1/_history	_history/read		AllergyIntolerance_Read_response.json
{{ur}}/AllergyIntolerance/Kern-alit-1/_history/2	_history/vread		AllergyIntolerance_VRead_response.json

3.1.4 Response Elements

Name	Description
id (Identifier)	The FHIR ID
type (code)	This element isn't populated
category (code)	The category of the allergy from the Type of Allergen category list The options are: • food • medication • environment • biologic
criticality (code)	The criticality of the allergy. This value is returned only for the Create interaction.
code (CodeableConcept)	The allergen name and codes
patient [Reference (Patient)]	The patient this allergy corresponds to
clinicalStatus (CodeableConcept)	Default mappings or category values in the organization's FHIR profile
verificationStatus (CodeableConcept)	If allergy: • Always set to \"confirmed\" for problem list-based allergies. • Always set to \"unconfirmed\" for document-based allergies. If no known allergy: • \"unconfirmed\" to indicate not on file

	• \"confirmed\" to indicate that no active allergies or no known allergies are on file.
recordedDate (dateTime)	The date the allergy was recorded in Epic

3.2 Appointment

Appointment resources are used to provide information about a planned meeting that may be in the future or past. The resource only describes a single meeting, a series of repeating visits would require multiple appointment resources to be created for each instance.

3.2.1 Mandatory and Must Support Elements

Each appointment must have:

- Identifier
- Status

Each appointment must support:

- location
- reason Code
- service Type
- specialty
- actor
- appointment-type
- date
- part-status
- patient
- practitioner
- reason-reference
- service-category

3.2.2 Mandatory Search Parameters

The following search parameters are supported:

- Supports fetching an Appointment using the id search parameter:

GET https://external/r4/Appointment?identifier=[Id]

- Supports fetching an Appointment using the appointmentType search parameter:

GET https://external/r4/Appointment?appointmentType=[appointmentType]

- Supports fetching an Appointment using the start search parameter:

GET https://external/r4/Appointment?start=[date]

- Supports fetching an Appointment using the part-status search parameter:

GET https://external/r4/Appointment?part-status=[part-status]

- Supports fetching an Appointment using the service-type search parameter:

GET https://external/r4/Appointment?service-type=[service-type]

- Supports fetching an Appointment using the reason-code search parameter:

GET https://external/r4/Appointment?reason-code=[reason-code]

3.2.3 API Request and Response

Request	Type	Parameters	Response
{{ur}}/Appointment?part-status=accepted,declined&date=2018-03-28T04:45:00-07:00&reason-code=ROUTINE&service-type=10&specialty=394577000	Search	part-status, date, reason-code, speciality	 appointment.json Appointment_search
{{ur}}/Appointment/Kern-apt-1/_history	_history/read		 Appointment_Read_response.json
{{ur}}/Appointment/Kern-apt-1/_history/8	_history/vread		 Appointment_VRead_response.json

3.2.4 Response Elements

Name	Description
Appointmentid	Indicates the unique identifier for Appointment
Status	Indicates the overall status of the Appointment proposed | pending | booked | arrived | fulfilled | cancelled | noshow | entered-in-error | checked-in | waitlist
ServiceCategory	Indicates a broad categorization of the service that is to be performed during this appointment
CancelationReason	Indicates the coded reason for the appointment being cancelled
ServiceType	Indicates the specific service that is to be performed during this appointment

Specialty	Indicates the specialty of a practitioner that would be required to perform the service requested in this appointment
AppointmentType	Indicates the style of appointment or patient that has been booked in the slot (not service type)
ReasonCode	Indicates the coded reason this appointment is scheduled
ReasonReferencename	Indicates the reference to the reason of the appointment to take place
ReasonReference	Indicates the reason of the appointment to take place
Priority	Indicates priority of the appointment. Can be used to make informed decisions, if needed, to re-prioritize appointments
Description	Indicates the brief description of the appointment as would be shown on a subject line in a meeting request, or appointment list
Appointmentstartdate	Indicates when appointment is to take place
Appointmentenddate	Indicates when appointment is to conclude
Appointmentcreateddate	Indicates the date that this appointment was initially created. This could be different to the meta.lastModified value on the initial entry, as this could have been before the resource was created on the FHIR server, and should remain unchanged over the lifespan of the appointment
Comments	Indicates the additional comments
PatientInstruction	Indicates detailed information and instructions for the patient
Participanttype	Indicates role of participant in the appointment
Participantname	Indicates the reference to the Person, Location/HealthcareService or Device that is participating in the appointment
Participant	Indicates a Person, Location/HealthcareService or Device that is participating in the appointment
Participantrequired	Indicates whether this participant is required to be present at the meeting
Participantstatus	Indicates participation status of the actor
Participantstartdate	Indicates participation startdate of the actor
Participantenddate	Indicates participation enddate of the actor

3.3 Bulk FHIR Export

Bulk Export is a draft specification for an Application Programming Interface (API) that enables clients to specify a broad set of FHIR resources and download them in batch as a single (or a few) file(s). Exported data can be sent to another FHIR server, a proprietary EHR system, a clinical data warehouse system, or other types of storage and processing systems.

ns-json (New line delimited JSON) is a variant of the JSON format that is supported for bulk data transfer. In principle, nd-json is a simple variation of the JSON format, but where resources are serialized with no whitespace, and separated by a newline pair (characters 13 and 10). In order to simplify nd-json processing, each nd-json document contains only resources of a single type - every line contains a resource of a particular type. (though note that resources may still contain contained resources of various types).

3.3.1 Mandatory and Must Support Elements

Bulk FHIR export must have:

- transactionTime
- request
- requiresAccessToken
- output
- error

3.3.2 Mandatory Search Parameters

The following request parameters are supported:

Name	Optional?	Description	Example
_outputFormat	Yes	Specifies the output encoding style that should be used	application/fhir+ndjson
_type	Yes	Specifies a comma-separated list of resource types to include	Patient, Practitioner
_since	Yes	Only resources that were last updated on or after the given time will be included	2019-10-25T11:14:00Z
_typeFilter	Yes	Specifies a search URL that can be used to narrow the scope of the export. Multiple repetitions of this parameter may be used to narrow the scope of multiple resources	Patient?identifier=foo

3.3.3 API Request and Response

Request	Type	Parameters	Response
Patient level export url: POST: BaseURL/bulk/Patient/$export	POST		
Group level export url GET: **BaseURL/bulk/Group/Kern-grp-721/$export**?_**type**=CarePlan&_**since**=2018-02-28T00:00:00-08:00&_**typeFilter**=CarePlan%3Fstatus%3Dactive%26category%3Dhttp://hl7.org/fhir/us/core/CodeSystem/careplan-category|assess-plan%26date%3Dgt2018-01-	GET	_type, _since, _typeFilter	

03T00:00:00-08:00%26date%3Dlt2018-06-06T00:00:00-08:00			
Status url: GET: BaseURL/bulk/bulkstatus/7e157398-5539-46a5-91a6-c69d2c04259f	GET		Status response: {"transactiontime":"2021-12-08T03:08:29-08:00", "request":"http://192.168.22.8/Patient/$export", "requiresAccessToken":true, "output":[{"type":"Appointment", "url":"https://fastint.citiustech.com:8280/bulk/download?code=MiJ7EaIaRfuRKNvcTKP3jnE0es8fBcoGeztyY+7pUQxCxkacWxXd0iem6Zwux+RFKWZ4xpwgbgpfYjjW+IYHMJy2LjOY7n62C99S95d2TPw=&file=Appointment_20211208110828_1.ndjson"}], "error":null}
Download url: GET: **BaseURL/bulk/download?**code=MiJ7EaIaRfuRKNvcTKP3jnE0es8fBcoGeztyY+7pUQxCxkacWxXd0iem6Zwux+RFKWZ4xpwgbgpfYjjW+IYHMJy2LjOY7n62C99S95d2TPw=&file=Appointment_20211208110828_1.ndjson	GET		

Patient level export – Single resource:
BaseURL/bulk/Patient/$export
POST body:
{
"resourceType": "Parameters",
"parameter": [
{
"name": "_type",
"valueString": "AllergyIntolerance"
},
{
"name": "_typeFilter",
"valueString": "AllergyIntolerance?clinical-status=http://terminology.hl7.org/CodeSystem/allergyintolerance-clinical|active"
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-1"
}
	POST		{
			"resourceType": "OperationOutcome",
			"issue": [
			{
			"severity": "information",
			"code": "processing",
			"diagnostics": "Your request has been accepted."
			}
			]
			}
			 
			AllergyIntolerance_20211227151350_1.r

}] }			
Patient level export – Multiple resources: BaseURL/bulk/Patient/$export **{** **"resourceType": "Parameters",** **"parameter": [** **{** **"name": "_type",** **"valueString": "AllergyIntolerance,Condition"** **},** **{** **"name": "_typeFilter",** **"valueString": "AllergyIntolerance?clinical-status=resolved"** **},** **{** **"name": "_typeFilter",** **"valueString": "Condition?clinical-status=inactive"** **},** **{** **"name": "patient",** **"valueReference": {** **"reference": "Patient/Kern-pat-1"** **}** **}** **]** **}**			 patient_MultipleResource.ndjson
Patient Level Export for multiple patient multiple resource: BaseURL/bulk/Patient/$export **{** **"resourceType": "Parameters",** **"parameter": [** **{** **"name": "_type",**			 MultiplePatient_resources.ndjson

"valueString": "AllergyIntolerance"
},
{
"name": "_typeFilter",
"valueString": "AllergyIntolerance?clinical-status=resolved"
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-1"
}
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-901"
}
}
]
}			

CarePlan Group level export
GET:
BaseURL/bulk/Group/Kern-grp-721/$export?_type=CarePlan&_since=2018-02-28T00:00:00-08:00&_typeFilter=CarePlan%3Fstatus%3Dactive%26category%3Dhttp://hl7.org/fhir/us/core/CodeSystem/careplan-category|assess-plan%26date%3Dgt2018-01-03T00:00:00-08:00%26date%3Dlt2018-06-06T00:00:00-08:00
	GET	_type,
		_typeFilter
			response:
			{
			"resourceType": "OperationOutcome",
			"issue": [
			{
			"severity": "information",
			"code": "processing",
			"diagnostics": "Your request has been accepted."
			}
			]
			}
			CarePlan_20211208124514_1.ndjson

3.3.4 Response Elements

Field	Optionality	Type	Description
`transactionTime`	required	FHIR instant	Indicates the server's time when the query is run. The response SHOULD NOT include any resources modified after this instant, and SHALL include any matching resources modified up to and including this instant. • To properly meet these constraints, a FHIR server might need to wait for any pending transactions to resolve in its database before starting the export process.
`Request`	required	String	The full URL of the original Bulk Data kick-off request. In the case of a POST request, this URL will not include the request parameters
`requiresAccessToken`	required	Boolean	Indicates whether downloading the generated files requires the same authorization mechanism as the `$export` operation itself. Value SHALL be `true` if both the file server and the FHIR API server control access using OAuth 2.0 bearer tokens. Value MAY be `false` for file servers that use access-control schemes other than OAuth 2.0, such as downloads from Amazon S3 bucket URLs or verifiable file servers within an organization's firewall.
`Output`	required	JSON array	An array of file items with one entry for each generated file. If no resources are returned from the kick-off request, then the server SHOULD return an empty array. Each file item SHALL contain the following fields: - `Type` - the FHIR resource type that is contained in the file. Each file SHALL contain resources of only one type, but a server MAY create more than one file for each resource type returned. The number of resources contained in a file MAY vary between servers. If no data are found for a resource, the server SHOULD NOT return an output item for that resource in the response. These rules apply only to top-level resources within the response; as always in FHIR, any resource MAY have a "contained" array that includes referenced resources of other types. - `url` - the absolute path to the file. The format of the file SHOULD reflect that requested in the `_outputFormat` parameter of the initial kick-off request. Each file item MAY optionally contain the following field:

			- `count` - the number of resources in the file, represented as a JSON number.
`deleted`	optional	JOSN array	An array of deleted file items following the same structure as the `output` array. The ability to convey deleted resources is important in cases when a server may have previously exported data and wishes to indicate that these data should be removed from downstream systems. When a `_since` timestamp is supplied in the export request, this array SHOULD be populated with output files containing FHIR Transaction Bundles that indicate which FHIR resources match the kick-off request criteria, but have been deleted subsequent to the `_since` date. If no resources have been deleted, or the `_since` parameter was not supplied, or the server has other reasons to avoid exposing these data, the server MAY omit this key or MAY return an empty array. Resources that appear in the 'deleted' section of an export manifest SHALL NOT appear in the 'output' section of the manifest. Each line in the output file SHALL contain a FHIR Bundle with a type of `transaction` which SHALL contain one or more entry items that reflect a deleted resource. In each entry, the `request.url` and `request.method` elements SHALL be populated. The `request.method` element SHALL be set to `DELETE`.
`error`	required	Array	Array of message file items following the same structure as the `output` array. Error, warning, and information messages related to the export SHOULD be included here (not in output). If there are no relevant messages, then the server SHOULD return an empty array. Only the FHIR `OperationOutcome` resource type is currently supported, so the server SHALL generate files in the same format as Bulk Data output files that contain FHIR `OperationOutcome` resources. If the request contained invalid or unsupported parameters along with a `Prefer: handling=lenient` header and the server processed the request, the server SHOULD include a FHIR `OperationOutcome` resource for each of these parameters. • This field may be renamed in a future version of this IG to reflect the inclusion of FHIR `OperationOutcome` resources with severity levels other than error.
`extension`	optional	JSON object	To support extensions, this implementation guide reserves the name `extension` and will never define a field with that name, allowing server implementations to use it to provide custom behavior and information. For

			example, a server may choose to provide a custom extension that contains a decryption key for encrypted ndjson files. The value of an extension element SHALL be a pre-coordinated JSON object. • In addition to extensions being supported on the root object level, extensions may also be included within the fields above (E.g.: in the 'output' object).

3.3.5 Member Match

To access information about a member on a payer's system, the requesting system needs to know the unique identifier of that member on the payer's system. However, in many cases, neither the client system nor the patient will have this information. The $member-match operation supports identifying the target payer's member and coverage information for a specified member so the client can use that information for subsequent queries and operations.

The **$member-match** operation allows one health plan to retrieve a unique identifier for a member from another health plan using a member's demographic and coverage information. This identifier can then be used to perform subsequent queries and operations.

3.3.5.1 Parameters

Use	Name	Cardinality	Type	Documentation
IN	MemberPatient	1..1	Resource	Parameter submitted by the new plan **SHALL** contain US Core Patient containing member demographics.
IN	OldCoverage	1..1	Resource	Parameter submitted by the new plan **SHALL** contain Coverage details of prior health plan coverage provided by the member, typically from their health plan coverage card.
IN	NewCoverage	1..1	Resource	Parameter submitted by the new plan **SHALL** contain Coverage details of new or prospective health plan coverage provided by the new health plan based upon the member's enrollment.
OUT	MemberPatient	1..1	Resource	Parameter returned by the old plan resource **SHALL** contain the MemberPatient resource received from new plan with the ADDITION of an identifier of type "UMB" representing the unique identifier identifying the member of the old health plan.
OUT	NewCoverage	1..1	Resource	Parameter returned by the old plan resource **SHALL** contain the NewCoverage record received from the new plan.

3.3.5.2 API Request and Response

Request	Type	Parameters	Response

Member match for member:
BaseURL/bulk/Patient/$member-match
Body:
{
"resourceType": "Parameters",
"parameter": [
{
"name": "MemberPatient",
"resource": {
"resourceType": "Patient",
"id":1,
"name": [
{
"use": "official",
"family": "TRUE",
"given": [
"Rachel"
],
"prefix": [
"Mr."
]
}
],
"gender": "other",
"birthDate": "2018-03-28"
}
}
]
}
	POST		member_match.json

Member match for member with old coverage and new coverage
BaseURL/bulk/Patient/$member-match
{
"resourceType": "Parameters",
"parameter": [{
"name": "MemberPatient",
"resource": {
"resourceType": "Patient",
"id":2,
"name": [
{
"use": "official",
	POST		member_match using coverage.json

```
                "family": "well",
"given": [
                  "Sane"
                ],

                "prefix": [
                  "Mr."
                ]
              }
            ],
            "gender": "other",
            "birthDate": "2018-03-28"
          }

      },
{
        "name": "MemberPatient",
        "resource": {
          "resourceType": "Patient",
          "id":3,
          "name": [
            {
              "use": "official",
              "family": "Robert Pitts",
"given": [
                "Katherine"
              ],

              "prefix": [
                "Mr."
              ]
            }
          ],
          "gender": "unknown",
          "birthDate": "2018-03-28"
        }

      },


      {
        "name": "OldCoverage",
        "resource": {
          "resourceType": "Coverage",
          "id": "qwer1234",
          "text": {
            "status": "generated",
            "div": "<div
xmlns=\"http://www.w3.org/1999/xhtml\">A human-
readable rendering of the coverage</div>"
          },
          "identifier": [
            {
              "system":
"https://www.khp.com/fhir/memberidentifier",
              "value": "21"
            }
          ],
          "beneficiary": {
            "reference": "Patient/2"
          }
        }
      },
{
        "name": "OldCoverage",
        "resource": {
          "resourceType": "Coverage",
          "id": "qwer1234",
          "text": {
            "status": "generated",
```

```
            "div": "<div
xmlns=\"http://www.w3.org/1999/xhtml\">A human-
readable rendering of the coverage</div>"
          },
          "identifier": [
            {
              "system":
"https://www.khp.com/fhir/memberidentifier",
              "value": "23"
            }
          ],
          "beneficiary": {
            "reference": "Patient/3"
          }
        }
      },
{
        "name": "NewCoverage",
        "resource": {
          "resourceType": "Coverage",
          "id": "54869",
          "text": {
            "status": "generated",
            "div": "<div
xmlns=\"http://www.w3.org/1999/xhtml\">A human-
readable rendering of the coverage</div>"
          },
          "contained": [
            {
              "resourceType": "Organization",
              "id": "Organization/2",
              "name": "New Health Plan",
              "endpoint": [
                {
                  "reference":
"http://www.newhealthplan.com"
                }
              ]
            }
          ],
          "identifier": [
            {
              "system":
"http://oldhealthplan.example.com",
              "value": "DH10001235"
            }
          ],
          "status": "draft",
          "beneficiary": {
            "reference": "Patient/2"
          },
          "period": {
            "start": "2011-05-23",
            "end": "2012-05-23"
          },
          "payor": [
            {
              "reference": "#Organization/2"
            }
          ]
        }
      },{
        "name": "NewCoverage",
        "resource": {
          "resourceType": "Coverage",
          "id": "54869",
          "text": {
            "status": "generated",
```

```
            "div": "<div
xmlns=\"http://www.w3.org/1999/xhtml\">A human-
readable rendering of the coverage</div>"
          },
          "contained": [
            {
              "resourceType": "Organization",
              "id": "Organization/2",
              "name": "New Health Plan",
              "endpoint": [
                {
                  "reference":
"http://www.newhealthplan.com"
                }
              ]
            }
          ],
          "identifier": [
            {
              "system":
"http://oldhealthplan.example.com",
              "value": "DH10001235"
            }
          ],
          "status": "draft",
          "beneficiary": {
            "reference": "Patient/3"
          },
          "period": {
            "start": "2011-05-23",
            "end": "2012-05-23"
          },
          "payor": [
            {
              "reference": "#Organization/2"
            }
          ]
        }
      }

  ]
}
```


3.4 EHI Export for 170.315(b)(10)

Bulk Export is a draft specification for an Application Programming Interface (API) that enables clients to specify a broad set of FHIR resources and download them in batch as a single (or a few) file(s). Exported data can be sent to another FHIR server, a proprietary EHR system, a clinical data warehouse system, or other types of storage and processing systems.

ns-json (New line delimited JSON) is a variant of the JSON format that is supported for bulk data transfer. In principle, nd-json is a simple variation of the JSON format, but where resources are serialized with no whitespace, and separated by a newline pair (characters 13 and 10). In order to simplify nd-json processing, each nd-json document contains only resources of a single type - every line contains a resource of a particular type. One single file holds single resource for multiple patients with multiple records. (though note that resources may still contain contained resources of various types).

3.4.1 Mandatory and Must Support Elements

Bulk FHIR export must have:

- transactionTime
- request
- requiresAccessToken
- output
- error

3.4.2 Mandatory Search Parameters

The following request parameters are supported:

Name	Optional?	Description	Example
_outputFormat	Yes	Specifies the output encoding style that should be used	application/fhir+ndjson
_type	Yes	Specifies a comma-separated list of resource types to include	Patient, Practitioner
_since	Yes	Only resources that were last updated on or after the given time will be included	2019-10-25T11:14:00Z
_typeFilter	Yes	Specifies a search URL that can be used to narrow the scope of the export. Multiple repetitions of this parameter may be used to narrow the scope of multiple resources	Patient?identifier=foo

3.4.3 API Request and Response

Request	Type	Parameters	Response

Patient level export url:
POST:
BaseURL/bulk/Patient/$export
	POST	_type, _since, _typeFilter	{
			"resourceType": "OperationOutcome",
			"issue": [
			{
			"severity": "information",
			"code": "processing",
			"diagnostics": "Your request has been accepted."
			}
			]
			}

			In the header, we will get the status URL to check the status of Export request. Example : https://fastplusdemo.citiustech.com:8280/bulkhims/bulkstatus/ccbc44df-ae5f-4170-8ee3-979e676719c0

Group level export url
GET:
BaseURL/bulk/Group/Kern-grp-721/$export?_**type**=CarePlan&_**since**=2018-02-28T00:00:00-08:00&_**typeFilter**=CarePlan%3Fstatus%3Dactive%26category%3Dhttp://hl7.org/fhir/us/core/CodeSystem/careplan-category|assess-plan%26date%3Dgt2018-01-03T00:00:00-08:00%26date%3Dlt2018-06-06T00:00:00-08:00
	GET	_type, _since, _typeFilter	{
			
			"resourceType": "OperationOutcome",
			
			"issue": [
			
			{
			
			"severity": "information",
			
			"code": "processing",
			
			"diagnostics": "Your request has been accepted."
			
			}
			
			]
			
			}

Status url: GET: BaseURL/bulk/bulkstatus/7e157398-5539-46a5-91a6-c69d2c04259f	GET	NA	Status response: { "transactionTime": "2023-03-27T12:08:05+00:00", "request": "https://fastplusdemo.citiustech.com:8280/bulkhims/Patient/$export", "requiresAccessToken": true, "output": [{ "type": "AllergyIntolerance", "url": "https://fastplusdemo.citiustech.com:8280/bulkhims/download?code=7y3Lo9rqW+AwLPMtdmzPbODab0fT8GSrHlEVO0hxuj1YvrITGQi7OUFR4FGOCv0qzPqfDdozgztyCkc0gATMVXSDMbuO0i2a8RwKfcwkctg=

			&file=AllergyIntolerance_20230327120803_1.ndjson" }], "error": null }

Download url:
GET:
BaseURL/bulk/download?code=MiJ7EaIaRfuRKNvcTKP3jnE0es8fBcoGeztyY+7pUQxCxkacWxXd0iem6Zwux+RFKWZ4xpwgbgpfYjjW+IYHMJy2LjOY7n62C99S95d2TPw=&file=Appointment_20211208110828_1.ndjson
	GET	Code, file	{
			
			"transactionTime": "2023-03-27T12:08:05+00:00",
			
			"request": "https://fastplusdemo.citiustech.com:8280/bulkhims/Patient/$export",
			
			"requiresAccessToken": true,
			
			"output": [
			
			{
			
			"type": "AllergyIntolerance",
			
			"url": "https://fastplusdemo.citiustech.com:8280/bulkhims/download?code=7y3Lo9rqW+AwLPMtdmzPbODab0fT8GSrHlEVO0hxuj1YvrITGQi7OUFR4FGOCv0qzPqfDdozgztyCkc0gATMVXSDMbuO0i2a8RwKfcwkctg=&file=AllergyIntolerance_20230327120803_1.ndjson"
			
			}
			
			],
			
			"error": null
			
			}

Patient level export – Single resource:
BaseURL/bulk/Patient/$export
POST body:
{
"resourceType": "Parameters",
"parameter": [
{
"name": "_type",
"valueString": "AllergyIntolerance"
},
 	
{
"name": "_typeFilter",
	POST	_type, _since, _typeFilter	{
			"resourceType": "OperationOutcome",
			"issue": [
			{
			"severity": "information",
			"code": "processing",
			"diagnostics": "Your request has been accepted."
			}
			]
			}

"valueString": "AllergyIntolerance?clinical-status=http://terminology.hl7.org/CodeSystem/allergyintolerance-clinical|active"
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-1"
}
}
]
}
			
			AllergyIntolerance_20211227151350_1.r

Patient level export – Multiple resources:
BaseURL/bulk/Patient/$export
{
"resourceType": "Parameters",
"parameter": [
{
"name": "_type",
"valueString": "AllergyIntolerance,Condition"
},
{
"name": "_typeFilter",
"valueString": "AllergyIntolerance?clinical-status=resolved"
},
{
"name": "_typeFilter",
"valueString": "Condition?clinical-status=inactive"
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-1"
}
}
]
}
	POST	_type, _since, _typeFilter	
			AllergyIntolerance_20230322105024_1_R

Patient Level Export for multiple patient multiple resource: BaseURL/bulk/Patient/$export	POST	_type, _since, _typeFilter	 MultiplePatient_resources.ndjson

{
"resourceType": "Parameters",
"parameter": [
{
"name": "_type",
"valueString": "AllergyIntolerance"
},
{
"name": "_typeFilter",
"valueString": "AllergyIntolerance?clinical-status=resolved"
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-1"
}
},
{
"name": "patient",
"valueReference": {
"reference": "Patient/Kern-pat-901"
}
}
]
}			

3.4.4 Response Elements

Field	Optionality	Type	Description
`transactionTime`	required	FHIR instant	Indicates the server's time when the query is run. The response SHOULD NOT include any resources modified after this instant, and SHALL include any matching resources modified up to and including this instant. • To properly meet these constraints, a FHIR server might need to wait for any pending transactions

			to resolve in its database before starting the export process.
`Request`	required	String	The full URL of the original Bulk Data kick-off request. In the case of a POST request, this URL will not include the request parameters
`requiresAccessToken`	required	Boolean	Indicates whether downloading the generated files requires the same authorization mechanism as the `$export` operation itself. Value SHALL be `true` if both the file server and the FHIR API server control access using OAuth 2.0 bearer tokens based on Authorization code flow or Client credential flow. Value MAY be `false` for file servers that use access-control schemes other than OAuth 2.0, such as downloads from Amazon S3 bucket URLs or verifiable file servers within an organization's firewall.
`Output`	required	JSON array	An array of file items with one entry for each generated file. If no resources are returned from the kick-off request, then the server SHOULD return an empty array. Each file item SHALL contain the following fields: - `Type` - the FHIR resource type that is contained in the file. Each file SHALL contain resources of only one type, but a server MAY create more than one file for each resource type returned. The number of resources contained in a file MAY vary between servers. If no data are found for a resource, the server SHOULD NOT return an output item for that resource in the response. These rules apply only to top-level resources within the response; as always in FHIR, any resource MAY have a "contained" array that includes referenced resources of other types. - `url` - the absolute path to the file. The format of the file SHOULD reflect that requested in the `_outputFormat` parameter of the initial kick-off request. Each file item MAY optionally contain the following field: - `count` - the number of resources in the file, represented as a JSON number.
`deleted`	optional	JOSN array	An array of deleted file items following the same structure as the `output` array. The ability to convey deleted resources is important in cases when a server may have previously exported data and wishes to indicate that these data should be removed from downstream systems. When a `_since` timestamp is supplied in the export request, this array SHOULD be populated with output files containing FHIR Transaction Bundles that indicate which FHIR resources match the

			kick-off request criteria, but have been deleted subsequent to the _since date. If no resources have been deleted, or the _since parameter was not supplied, or the server has other reasons to avoid exposing these data, the server MAY omit this key or MAY return an empty array. Resources that appear in the 'deleted' section of an export manifest SHALL NOT appear in the 'output' section of the manifest. Each line in the output file SHALL contain a FHIR Bundle with a type of transaction which SHALL contain one or more entry items that reflect a deleted resource. In each entry, the request.url and request.method elements SHALL be populated. The request.method element SHALL be set to DELETE.
error	required	Array	Array of message file items following the same structure as the output array. Error, warning, and information messages related to the export SHOULD be included here (not in output). If there are no relevant messages, then the server SHOULD return an empty array. Only the FHIR OperationOutcome resource type is currently supported, so the server SHALL generate files in the same format as Bulk Data output files that contain FHIR OperationOutcome resources. If the request contained invalid or unsupported parameters along with a Prefer: handling=lenient header and the server processed the request, the server SHOULD include a FHIR OperationOutcome resource for each of these parameters. • This field may be renamed in a future version of this IG to reflect the inclusion of FHIR OperationOutcome resources with severity levels other than error.
extension	optional	JSON object	To support extensions, this implementation guide reserves the name extension and will never define a field with that name, allowing server implementations to use it to provide custom behavior and information. For example, a server may choose to provide a custom extension that contains a decryption key for encrypted ndjson files. The value of an extension element SHALL be a pre-coordinated JSON object. • In addition to extensions being supported on the root object level, extensions may also be included within the fields above (E.g.: in the 'output' object).

3.5 CarePlan

This profile sets minimum expectations for the CarePlan resource to record, search, and fetch assessment and plan of treatment data associated with a patient.

Mandatory and Must Support Elements

Each CarePlan must have:

- A narrative summary of the patient assessment and plan of treatment
- A status
- An intent
- A category code of “assess-plan”
- A patient

3.5.1 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/CarePlan?patient=[reference]&category=http://hl7.org/fhir/us/core/CodeSystem/careplan-category|assess-plan

- A server will be capable of returning a CarePlan resource using:

GET https://hostname/r4/CarePlan /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/CarePlan? [parameter=value] & _revinclude=Provenance: target

3.5.2 API Request and Response

Request	Type	Parameters	Response
BaseUrl/CarePlan/bf5c7e67-5774-4282-839d-4c30fcfde097	Read		CarePlan_Read.json
BaseURL/CarePlan?_id=bf5c7e67-5774-4282-839d-4c30fcfde097&category=assess-plan&date=1937-01-12T16:22&patient=7b7709ff-a107-49ea-8211-56771b65cd19&_lastupdated=le1999-07-09&_revinclude=Provenance:target	Search	_id, category, date, patient, _lastupdated, _revinclude	Careplan_Search.json

{{ur}}/CarePlan/Kern-crpl-1/_history	_history/read		 CarePlan_Read_response.json
{{ur}}/CarePlan/Kern-crpl-1/_history/1	_history/vread		 CarePlan_VRead_response.json

3.5.3 Response Elements

Name	Description
Subject (Reference)	Patient FHIR ID
Status (Code)	Active
Intent (proposal | plan | order | option)	The degree of authority/intentionality associated with a care plan
Category	Type of plan

3.6 CareTeam

This profile sets minimum expectations for the CareTeam resource for identifying the CareTeam members associated with a patient.

3.6.1 Mandatory and Must Support Elements

Each CareTeam must have:

- A patient (Reference resource)
- A participant role for each CareTeam member
- Names of CareTeam members which can be:
  - A practitioner (doctor, nurse, therapist)
  - The patient
  - A relative or friend or guardian
  - An organization

Each Condition must support:

- Status code

3.6.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports search using the combination of the patient and status search parameters:

GET https://hostname/r4/CareTeam?patient=[reference]&status=active

- A server will be capable of returning a CareTeam resource using:

GET https://hostname/r4/Careteam/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Careteam? [parameter=value] & _revinclude=Provenance: target

3.6.3 API Request and Response

Request	Type	Parameters	Response
tp://192.168.22.9:31613/patient/paa/r4/CareTeam/Kern-crtm-Careteam-101	Read		CareTeam_Read.json
BaseURL/CareTeam?_revinclude=Provenance:target&patient=Patient/Kern-pat-Pat-101,Kern-pat-Pat-101&status=proposed&patient=BaseURL/Patient/Kern-pat-Pat-101&_id=Kern-crtm-Careteam-101&_lastupdated=2018-02-28T01:45:00-04:00,gt2018-02-28T01:49:00-04:00	Search	_id, Patient, Status, _lastupdated, _revinclude	CareTeam_Search.json
{{ur}}/CareTeam/Kern-crtm-1/_history	_history/read		Careteam_Read_response.json
{{ur}}/CareTeam/Kern-crtm-1/_history/10	_history/vread		Careteam_VRead_response.json

3.6.4 Response Elements

Name	Description
id (Identifier)	The FHIR ID
Status	The status of the CareTeam
Subject	Patient
Participant	Members of the team
Role	Type of involvement
Member	Involved members

3.7 Condition

This profile sets minimum expectations for the Condition resource to record, search, and fetch a list of conditions associated with a patient.

3.7.1 Mandatory and Must Support Elements

Each Condition must have:

- A status of the condition
- A category
- A code that identifies the condition
- A patient (Reference resource)

Each Condition must support:

- A verification status

3.7.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all conditions including problems, health concerns, and encounter diagnosis for a patient using the patient search parameter:

GET https://hostname/r4/Condition? Patient=[reference]

- A server will be capable of returning a Condition resource using:

GET https://hostname/r4/Condition/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Condition? [parameter=value] & _revincludes = provenance: target

3.7.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Condition/7f4f8031-fc74-4422-9ee1-23215e8e7849	Read		 Condition_Read.json
BaseURL/Condition?clinical-status=active&onset-date=lt2011-04-08&patient=7b7709ff-a107-49ea-8211-56771b65cd19&category=encounter-diagnosis&code=15777000	Search	clinical-status,onset-date,patient,category	 Condition_Search.json
{{ur}}/Condition/Kern-cond-1/_history	_history/read		 Condition_Read_response.json

{{ur}}/Condition/Kern-cond-1/_history/2	_history/vread		Condition_VRead_response.json

3.7.4 Response Elements

Name	Description
id (Identifier)	The ID for this condition record
category (CodeableConcept)	For encounter-level diagnoses, this is "encounter-diagnosis". For problems, this is "problem-list-item". For health concerns, this is "health-concern".
code (CodeableConcept)	If a list of codes is sent, they are listed in this element. Otherwise, this element uses the problem name from the name element.
verificationStatus (CodeableConcept)	If this is on the patient's local chart, then the value is \"confirmed\". If it is outside data, then it is \"unconfirmed\". This element is optional for encounter-level diagnoses.
encounter (Reference (Encounter))	Reference to an Encounter resource
subject [Reference (Patient)]	The patient's encoded FHIR ID in a relative URL reference such as the following: Patient/eIC1uDjEWqggL5pYQTmqjQw3
clinicalStatus (CodeableConcept)	The clinical status, which can be active, resolved, or inactive. This element can be returned for visit diagnoses (but not admissions or discharges).

3.8 Consent

This profile sets minimum expectations for the Consent resource to record, search, and fetch basic information about an individual patient's consent to share the healthcare data with an Organization/Provider/third-Party App.

3.8.1 Mandatory and Must Support Elements

Each Consent must have:

- A consent identifier
- Consent Status (Active| Inactive)
- Consent scope
- Consent Provision Period (Date)
- A policy Rule applied as either OPTIN or OPTOUT

3.8.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports fetching a Consent using the patient search parameter:

GET https://localexternalurl/r4/Consent?patient=id

- Supports searching a Consent using the actor search parameter :

GET https://localexternalurl/r4/Consent?actor=[organisation]

- Supports searching for a consent using the provision period search parameter:

GET https://localexternalurl/r4/Consent?enddate=[dateTime]

- Supports searching using the combination of the patient and actor search parameters:

GET https://localexternalurl/r4/Consent?actor=[Device]&patient=[id]

3.8.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Consent	Post (Create)		 Create Consent.json
BaseURL/Consent/CT704883	PUT (Update)		 Update Consent.json
BaseURL/Consent?identifier=CT717016	Search/Read (GET)	Identifier, Patient, ProvisionPeriod, actor	 Get Consent.json
BaseURL/Consent/$validateConsent	Validate		 Validate_Member.json
BaseURL/Consent/CT2021011415359536	Delete		 Delete_consent.json
BaseURL/Consent/$getGroupConsentDetail?actor=Organization&groupId=kern-grp	Group GET	Identifier, actor, groupId	 group_get.json
BaseURL/Consent/GCT20210316061848272/$groupConsentUpdate	Group Update		 Gr_consent_update.json
BaseURL/Consent/GCT20210316061848272/$groupConsentDelete	Group Delete		 GroupConsent_delete.json

BaseURL/Consent/kern-grp-2601/$groupConsent	Group Create		 group_create.json

3.8.4 Response Elements

Name	Description
Identifier (Identifier)	Identifier for this record (external references) Business Key of the Consent
Status (code)	As per FHIR: draft | proposed | active | rejected | inactive | entered-in-error Currently Supported: Active/Inactive
Scope (CodeableConcept)	Which of the four areas this resource covers (extensible)
Category (CodeableConcept)	Classification of the consent statement - for indexing/retrieval
patient (Reference(Patient))	Who the consent applies to "reference": "Patient/f001"
dateTime (dateTime)	When this Consent was created or indexed Server datetime (not client datetime)
Performer (Reference)	Who is agreeing to the policy and rules
organization (Reference)	The payer organization
policy (BackboneElement)	Policies covered by this consent
policyRule (CodeableConcept)	A reference to the specific base computable regulation or policy. Currently Supported: Opt-in/Optout
Verification (BackboneElement)	Whether a treatment instruction (E.g.: artificial respiration yes or no) was verified with the patient, his/her family, or another authorized person. Will populate this value. Has been verified, Person who verified, When consent verified
Provision (BackboneElement)	An exception to the base policy of this consent. An exception can be an addition or removal of access permissions.
provisionType (code)	Allow or deny values

provisionPeriod (Period)	Effective start and end date for the consent. Currently only date is supported
actor (BackboneElement)	Who what controlled by this rule (or group, by role)
action (CodeableConcept)	Actions controlled by this rule
securityLabel (Coding)	Security Labels which define affected resources To be implemented later
Purpose (Coding)	Context of activities covered by this rule
Class (Coding)	E.g.: Resource Type, Profile, CDA, and more

3.9 Coverage

The Coverage resource is intended to provide the high-level identifiers and descriptors of an insurance plan, typically the information which would appear on an insurance card, which may be used to pay, in part or in whole, for the provision of healthcare products and services.

3.9.1 Mandatory and Must Support Elements

Each coverage will have:

- Status
- Beneficiary (Patient)
- Payer
- Class

Each coverage will support:

- Identifier
- SubscriberId
- Relationship

3.9.2 Mandatory Search Parameters

The following search parameters are supported:

- Supports searching using the combination of the id parameter:
GET https://hostname/r4/ExplanationOfBenefit? _id=[id]
- Supports searching using the combination of the patient parameter:
GET https://hostname/r4/ExplanationOfBenefit? Patient=[patient]
- Supports searching using the combination of the lastupdated parameter:
GET https://hostname/r4/ExplanationOfBenefit? _lastUpdated=[prefix][date]
- Supports searching using the combination of the type parameter:
GET https://hostname/r4/ExplanationOfBenefit? Type=[system][code]
- Supports searching using the combination of the identifier parameter:
GET https://hostname/r4/ExplanationOfBenefit? Identifier=[system][value]
- Supports searching using the combination of the service-date parameter:
GET https://hostname/r4/ExplanationOfBenefit? Service-date=[prefix][date]

3.9.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Coverage/27b407a1-80ee-89bc-267f-710e578e7625	Read		Coverage_Read.json
BaseURL/Coverage?_id=27b407a1-80ee-89bc-267f-710e578e7625&_include=Coverage:payor&_lastUpdated=lt2021-10-22	Search	_id,include:Payor,_lastupdated	Coverage_Search.json
{{ur}}/Coverage/Kern-cvrg-1/_history	_history/read		Coverage_Read_response.json
{{ur}}/Coverage/Kern-cvrg-1/_history/274	_history/vread		Coverage_VRead_response.json

3.9.4 Response Elements

Name	Description
status (code)	Identifies the status of the coverage information
subject [Reference (Patient)]	Patient
Payer	Issuer of the claim
Class	Additional coverage classifications
Identifier	Business Identifier for the coverage
Relationship	Relationship of the member to the person insured

3.10 Claim

The primary uses of this resource is to support eClaims, the exchange of information relating to the proposed or actual provision of healthcare-related goods and services for patients to their benefit payors, insurers and national health programs, for treatment payment planning and reimbursement.

3.10.1 3.9.1 Mandatory and Must Support Elements

Each Claim must have:

- Status
- Type
- Use
- Patient
- Creation Date
- Provider
- Priority
- Insurance Details
  - Insurance Sequence
  - Insurance Focal
  - Coverage

Each Claim must support:

- Billable period
- Insurer

3.10.2 3.9.2 Mandatory Search parameters

The following search parameters are supported:

- Supports fetching a Claim using the id search parameter:

GET https://hostname/r4/Claim?_id= [id]

- Supports searching a Claim by an identifier such as an MPI using the identifier search parameter:

GET https://hostname/r4/Claim? Identifier={[system]} |[code]

- Supports searching for a Claim by a created-team

GET https://hostname/r4/Claim? care-team={string]

- Supports searching using the combination of the created and patient search parameters:

GET https://hostname/r4/Claim? created=[date]&patient =[string]

- A server will be capable of returning a patient resource using:

GET https://hostname/r4/Claim/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/ Claim? [parameter=value] & _revinclude=Provenance: target

3.10.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Claim/Kern-cla-newtest1	Read		Claim_Read.json
BaseURL/Claim?_id=Kern-cla-newtest1&patient=Kern-pat-consenttest25&care-team=Kern-pract-ref_Prescribing-Pract-	Search	_id,patient,care-team,created,facility,identifier,insurer,payee, priority,procedure-udi ,provider,status,_lastUpdated	Claim_Search.json

13&created=2018-01-31 13:00:00+01&facility=Kern-loc-ref_Loc-103&identifier=Claim_header-3&insurer=Kern-org-ref_Org-103&payee=Kern-pat-consenttest25&priority=Normal&procedure-udi=Kern-dev-ref_dev-103&use=claim&provider=Kern-org-ref_org_111111&status=active&_lastUpdated=2016-05-14 09:00:00+02			
{{ur}}/Claim/Kern-cla-1/_history	_history/read		 Claim_read_response.json
{{ur}}/Claim/Kern-cla-1/_history/7	_history/vread		 Claim_Vread_response.json

3.10.4 Response Elements

Name	Description
care-team	Member of the CareTeam
Created	The creation date for the Claim
Insurer	The target payor/insurer for the Claim
Encounter	Encounters associated with a billed line item
Enterer	The party responsible for the entry of the Claim
Facility	Facility where the products or services have been or will be provided
Identifier	The primary identifier of the financial resource
Payee	The party receiving any payment for the Claim
Patient	Patient receiving the products or services
Priority	Processing priority requested
procedure-udi	UDI associated with a procedure

Provider	Provider responsible for the Claim
Status	The status of the Claim instance

3.11 Capability Statement

This section describes the expected capabilities of the Server actor which is responsible for providing responses to the queries submitted by the Requestors.

3.11.1 FHIR RESTful Capabilities

The server supports:

- The US Core Patient resource profile
- At least one additional resource profile from the list of US Core Profiles
- Implements the RESTful behavior according to the FHIR specification
- Returns the following response classes:
  - (Status 400): invalid parameter
  - (Status 401/4xx): unauthorized request
  - (Status 403): insufficient scope
  - (Status 404): unknown resource
  - (Status 410): deleted resource
- JSON source formats for all interactions
- Rejection of any unauthorized requests by returning an HTTP 401 unauthorized response code
- The US Drug Formulary CoveragePlan (List) and FormularyDrug (Medication Procedure) resource profile
- The search parameters described for all the supported profiles

3.11.2 FHIR RESTful by Resource

The capability statement supports 34 resources/profiles.

The details of all the resources are mentioned in the document.

3.12 Diagnostic Report for Laboratory Results

This profile sets minimum expectations for the DiagnosticReport resource to record, search, and fetch laboratory results associated with a patient.

3.12.1 Mandatory and Must Support Elements

Each DiagnosticReport must have:

- A status
- A category code of 'LAB'
- A code (preferably a LOINC code) which tells you what is being measured
- A patient
- A time indicating when the measurement was taken
- A time indicating when the measurement was reported

Each DiagnosticReport must support:

- Who issues the report

- A result

3.12.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient parameter:

GET https://hostname/r4/DiagnosticReport? Patient=[reference]

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/DiagnosticReport?patient=[patient]&category=[system]|[code]

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/DiagnosticReport?Patient=[patient]&code=[system]|
[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET
https://hostname/r4/DiagnosticReport?patient=[patient]&category=[system]|[code]&date=[date]

- A server will be capable of returning a resource DiagnosticReport using:

GET https://hostname/r4/Observation/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.12.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/DiagnosticReport/34f71727-08b0-496a-8d25-6ea6fbf28f50	Read		Diagnostic_Lab_Read.json
BaseURL/DiagnosticReport?status=final&_id=34f71727-08b0-496a-8d25-6ea6fbf28f50&category=|LAB&date=ge2004-03-02&_revinclude=Provenance:target&patient={{local}}/Patient/7b7709ff-a107-49ea-8211-56771b65cd19	Search	_id,category,patient,date,revinclude-Provenance:target,status	Diagnostic_Lab_Search.json
{{ur}}/DiagnosticReport/Kern-dgrpt-1/_history	_history/read		DiagnosticReport_Read_response.json

{{ur}}/DiagnosticReport/Kern-dgrpt-1/_history/1	_history/vread		 DiagnosticReport_VRead_response.json

3.12.4 Response Elements

Name	Description
identifier (Identifier)	The business identifier for the report. This is the order ID, specimen ID, or external order ID.
status (code)	The status of the report. You can find the list of values here: http://hl7.org/fhir/diagnostic-report-status.
category (CodeableConcept)	The service category
code (CodeableConcept)	The Name/Code for this diagnostic report
subject (Reference (Patient))	The subject of the report
effective (dateTime)	Clinically relevant time/time period for report
issued (instant)	DateTime this version was released
result (Reference (Observation))	Observations, simple or complex nested groups
encounter (Reference (Encounter))	Encounter when the test was ordered
performer (Reference)	The responsible diagnostic service, which is a Practitioner, PractitionerRole, Organization, or CareTeam reference

3.13 Diagnostic Report for Note and Report Exchange

This profile sets minimum expectations for searching and fetching Diagnostic Reports and Notes using the DiagnosticReport resource.

3.13.1 Mandatory and Must Support Elements

Each Diagnostic Report must have:

- A status
- A category
- A code describing the type of report
- A patient
- Date and time the report was created

Each Diagnostic Report must support:

- The encounter the report occurred within
- The instant the report was released
- An author (actor) producing the report
- A reference to the full report (presentedForm)

3.13.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient parameter:

GET https://hostname/r4/DiagnosticReport? Patient=[reference]

- Supports searching using the combination of the patient and category search parameters:

GET https://fhirmsi.citiuctech.com:8096/r4/DiagnosticReport?patient=[patient]&category=[system]|[code]

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/DiagnosticReport?Patient=[patient]&code=[system]|[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET https://hostname/r4/DiagnosticReport?patient=[patient]&category=[system]|[code]&date=[date]

- A server will be capable of returning a resource DiagnosticReport for Note using:

GET https://hostname/r4/Observation/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.13.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/DiagnosticReport/1c13306c-24d2-4473-8b7d-575bb67d19c3	Read		Diagnostic_Note_Read.json
BaseURL/DiagnosticReport?status=final&_id=0e482978-75c4-4bf2-81bb-2cd2328a226d&category=|LP7839-6&date=le2004-03-02&_revinclude=Provenance:target&patient={{local}}/Patient/7b7709ff-a107-49ea-8211-56771b65cd19	Search	_id,category,patient,date,revinclude-Provenance:target,status	Diagnostic_Note_Search.json
{{ur}}/DiagnosticReport/Kern-dgrpt-1/_history	_history/read		DiagnosticReport_Read_response.json

{{ur}}/DiagnosticReport/Kern-dgrpt-1/_history/1	_history/vread		DiagnosticReport_VRead_response.json

3.13.4 Response Elements

Name	Description
identifier (Identifier)	The business identifier for the report. This is the order ID, specimen ID, or external order ID.
status (code)	The status of the report. You can find the list of values here: http://hl7.org/fhir/diagnostic-report-status.
category (CodeableConcept)	The service category
code (CodeableConcept)	The Name/Code for this diagnostic report
subject [Reference (Patient)]	The subject of the report
effective (dateTime)	Clinically relevant time/time period for report
issued (instant)	DateTime this version was released
result [Reference (Observation)]	Observations, simple or complex nested groups
encounter [Reference (Encounter)]	Encounter when the test was ordered
performer (Reference)	The responsible diagnostic service, which is a Practitioner, PractitionerRole, Organization, or CareTeam reference

3.14 Document Reference

This profile sets minimum expectations for searching and fetching patient documents including Clinical Notes using the DocumentReference resource.

3.14.1 Mandatory and Must Support Elements

Each Procedure must have:

- A status
- A code that identifies the type of procedure performed on the patient
- A patient
- When the procedure was performed

3.14.2 Mandatory Search parameters

The following search parameters and search parameter combinations are supported:

- Supports fetching a DocumentReference using the id search parameter:

GET https://hostname/r4/DocumentReference[id]

- Supports searching for all DocumentReference for a patient using the patient search parameter:

GET https://hostname/r4/DocumentReference? Patient=[reference]

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/DocumentReference?patient=[patient]&category=[system]|[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET https://hostname/r4/
DocumentReference?patient=[patient]&category=[system]|[code]&date=[date]

- Supports searching using the combination of the patient and type search parameters:

GET https://hostname/r4/DocumentReference?patient=[reference]&type={[system]} |[code]

- A server will be capable of returning a DocumentReference resource using:

GET https://hostname/r4/DocumentReferenece /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/DocumentReference? [parameter=value] & _revinclude=Provenance: target.

3.14.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/DocumentReference/e0817f78-ec84-4c06-890f-8fee4892312e	Read		DocumentReference_Read.json
BaseURL/DocumentReference?patient=Patient/7b7709ff-a107-49ea-8211-56771b65cd19&category=clinical-note&date=2010-09-10	Search	patient, category and patient	DocumentReference_Search.json
{{ur}}/DocumentReference/Kern-docref-1/_history	_history/read		DocumentReference_Read_response.json
{{ur}}/DocumentReference/Kern-docref-1/_history/1	_history/vread		DocumentReference_VRead_response.json

3.14.4 Response Elements

Name	Description
Subject (Reference)	Who/what is the subject of the document
Identifier (Identifier)	Master Version Specific Identifier
Type (CodeableConcept)	Kind of document (LOINC if possible)

category (CodeableConcept)	Categorization of document
Created (dateTime)	Document creation time
Status (Code)	Current, superseded, or entered-in-error
Content (BackboneElement)	The document referenced
attachment (Attachment)	Where to access the document
URL (Url)	A reference to the Binary resource which contains the document content

3.15 Encounter

This profile sets minimum expectations for the Encounter resource to record, search, and fetch basic encounter information for an individual patient.

3.15.1 Mandatory and Must Support Elements

Each Encounter must have:

- A status
- A classification such as inpatient, outpatient, or emergency
- An encounter type
- A patient

Each Encounter must support:

- An encounter identifier
- Providers involved in the encounter
- When the encounter occurred
- Reason for the visit
- The discharge dispositions
- Where the encounter occurred

3.15.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports fetching an encounter using the id search parameter:

GET https://hostname/r4/Encounter[id]

- Supports searching for all encounters for a patient using the patient search parameter:

GET https://hostname/r4/Encounter?patient=[reference]

- Supports searching using the combination of the date and patient search parameters:

GET https://hostname/r4/Encounter?date=[date]&patient=[patient]

- A server will be capable of returning an Encounter resource using:

GET https://hostname/r4/Encounter /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Encounter? [parameter=value] & _revinclude=Provenance: target

3.15.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Encounter/2f0f059f-97b9-4e94-871f-dbba5a694b0a	Read		Encounter_Read.json
BaseURL/Encounter?patient=https://fhirmsi.citiustech.com:8080/paa/r4/Patient/7b7709ff-a107-49ea-8211-56771b65cd19&date=le1986-12-25&_revinclude=Provenance:target&_id=2f0f059f-97b9-4e94-871f-dbba5a694b0a&status=finished	Search	patient, date, _revinclude, _id, status	Encounter_Search.json
{{ur}}/Encounter/Kern-enc-1/_history	_history/read		Encounter_read_response.json
{{ur}}/Encounter/Kern-enc-1/_history/255	_history/vread		Encounter_Vread_response.json

3.15.4 Response Elements

Name	Description
identifier (Identifier)	The unique ID for the encounter
status (code)	The encounter status
class (Coding)	The contact type
type (CodeableConcept)	The encounter type
subject [Reference (Patient)]	The patient
participant (participant)	The participant
period (Period)	The period
hospitalization (hospitalization)	Details about the admission to a healthcare service
location (location)	List of locations where the patient has been

reasonCode (CodeableConcept)	The reason for visit

3.16 Explanation of Benefit Inpatient-Facility

The profile is used for Explanation of Benefits (EOBs) based on claims submitted by clinics, hospitals, skilled nursing facilities and other institutions for inpatient services, which may include the use of equipment and supplies, laboratory services, radiology services, and other charges. Inpatient claims are submitted for services rendered at a facility as part of an overnight stay.

3.16.1 Mandatory and Must Support Elements

Each EOB Inpatient-facility must have:

- Identifier
  - Claim number
- Type
- Patient
- Response creation date
- Insurer
- Provider
- Outcome of claim
- Diagnosis
- Insurance of the patient
- Adjudication
  - In-out network – Benefit payment status

Each EOB Inpatient-facility must support:

- Billable period
- Prior claims
- Payee
- CareTeam
- Supporting information
  - Billing network contacting status
  - Attending network contacting status
  - Referring network contacting status
  - Claim received date
  - Type of bill
  - Point of origin
  - Claim priority type
  - Discharge status
  - Claim diagnosis related group
- Procedure
- Product or service provided
- Adjudication
  - Amount type
  - Denial reason
  - Allowed units
- Payment details

3.16.2 Mandatory Search Parameters

The following search parameters are supported:

- Supports searching using the combination of the id parameter:

GET https://hostname/r4/ExplanationOfBenefit? _id=[id]

- Supports searching using the combination of the patient parameter:

GET https://hostname/r4/ExplanationOfBenefit? Patient=[patient]

- Supports searching using the combination of the lastupdated parameter:

GET https://hostname/r4/ExplanationOfBenefit? _lastUpdated=[prefix][date]

- Supports searching using the combination of the type parameter:

GET https://hostname/r4/ExplanationOfBenefit? Type=[system][code]

- Supports searching using the combination of the identifier parameter:

GET https://hostname/r4/ExplanationOfBenefit? Identifier=[system][value]

- Supports searching using the combination of the service-date parameter:

GET https://hostname/r4/ExplanationOfBenefit? Service-date=[prefix][date]

3.16.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/ExplanationOfBenefit/8d38f846-b98a-3010-565c-4f91be9ff3fc	Read		EOB_InPatient_Read.json
BaseURL/ExplanationOfBenefit?identifier=4c526495-d631-e2d6-914e-23ad58bb1c58&_lastupdated=gt2001-02-13T15:22&patient=Patient/83b04146-da80-d342-6f37-d06cc4b3c770&type=institutional&service-date=1957-07-14T14:59&_include=ExplanationOfBenefit:patient&_include=ExplanationOfBenefit:provider&_include=ExplanationOfBenefit:care-team&_include=ExplanationOfBenefit:coverage&_include=ExplanationOfBenefit:insurer	Search	Identifier, _lastupdated, patient, type, service-date, _include: patient, provider, care-team, coverage, insurer	EOB_InPatient_Search.json

{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history	_history/read		 EOB_Read_response.json
{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history/2	_history/vread		 EOB_VRead_response.json

3.16.4 Response Elements

Name	Description
Type	Category or discipline
subject [Reference (Patient)]	Patient
Provider	Party responsible for the claim
Insurer	Party responsible for reimbursement
Identifier	Business Identifier for the coverage
Outcome of claim	The outcome status of the claim
Diagnosis	Pertinent diagnosis information
BillablePeriod	Relevant time frame for the claim
CareTeam	CareTeam members

3.17 Explanation of Benefit Outpatient-Facility

This profile is used for EOBs based on claims submitted by clinics, hospitals, skilled nursing facilities, and other institutions for outpatient services, which includes the use of equipment and supplies, laboratory services, radiology services and other charges. Outpatient claims are submitted for services rendered at a facility that are not part of an overnight stay.

3.17.1 Mandatory and Must Support Elements

Each EOB Outpatient-facility must have:

- Identifier
  - ➢ Claim number
- Type
- Patient
- Response creation date
- Insurer
- Provider
- Outcome of claim
- Diagnosis
- Insurance of the patient
- Adjudication

- In-out network – Benefit payment status

Each EOB Outpatient-facility must support:

- Billable period
- Prior claims
- Payee
- CareTeam
- Supporting information
  - Billing network contacting status
  - Attending network contacting status
  - Referring network contacting status
  - Claim received date
  - Type of bill
  - Point of origin
  - Claim priority type
  - Discharge status
  - Claim diagnosis related group
- Procedure
- Product or service provided
- Adjudication
  - Amount type
  - Denial reason
  - Allowed units
- Payment details

3.17.2 Mandatory Search Parameters

The following search parameters are supported:

- Supports searching using the combination of the id parameter:

GET https://hostname/r4/ExplanationOfBenefit? _id=[id]

- Supports searching using the combination of the patient parameter:

GET https://hostname/r4/ExplanationOfBenefit? Patient=[patient]

- Supports searching using the combination of the lastupdated parameter:

GET https://hostname/r4/ExplanationOfBenefit? _lastUpdated=[prefix][date]

- Supports searching using the combination of the type parameter:

GET https://hostname/r4/ExplanationOfBenefit? Type=[system][code]

- Supports searching using the combination of the identifier parameter:

GET https://hostname/r4/ExplanationOfBenefit? Identifier=[system][value]

- Supports searching using the combination of the service-date parameter:

GET https://hostname/r4/ExplanationOfBenefit? Service-date=[prefix][date]

3.17.3 API Request and Response

Request	Type	Parameters	Response
https://hostname/r4/ExplanationOfBenefit?_id=[id]	Read (Sample)		Outpatient.txt

{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history	_history/read		 EOB_Read_response.json
{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history/2	_history/vread		 EOB_VRead_response.json

3.17.4 Response Elements

Name	Description
Type	Category or discipline
subject [Reference (Patient)]	Patient
Provider	Party responsible for the claim
Insurer	Party responsible for reimbursement
Identifier	Business Identifier for the coverage
Outcome of claim	The outcome status of the claim
Diagnosis	Pertinent diagnosis information
BillablePeriod	Relevant timeframe for the claim
CareTeam	CareTeam members

3.18 Explanation of Benefit Pharmacy

This profile is used for EOBs based on claims submitted by retail pharmacies.

3.18.1 Mandatory and Must Support Elements

Each EOB Pharmacy must have:

- Identifier
  - ➢ Claim number
- Type
- Patient
- Response creation date
- Insurer
- Provider
- Outcome of claim
- Diagnosis
- Insurance of the patient
- Adjudication
  - ➢ In-out network – Benefit payment status

Each EOB Pharmacy must support:

- Billable period
- Prior claims
- Payee
- CareTeam
- Supporting information
  - Billing network contacting status
  - Attending network contacting status
  - Referring network contacting status
  - Claim received date
  - Type of bill
  - Point of origin
  - Claim priority type
  - Discharge status
  - Claim diagnosis related group
- Procedure
- Product or service provided
- Adjudication
  - Amount type
  - Denial reason
  - Allowed units
- Payment details

3.18.2 Mandatory Search Parameters

The following search parameters are supported:

- Supports searching using the combination of the id parameter:

GET https://hostname/r4/ExplanationOfBenefit? _id=[id]

- Supports searching using the combination of the patient parameter:

GET https://hostname/r4/ExplanationOfBenefit? Patient=[patient]

- Supports searching using the combination of the lastupdated parameter:

GET https://hostname/r4/ExplanationOfBenefit? _lastUpdated=[prefix][date]

- Supports searching using the combination of the type parameter:

GET https://hostname/r4/ExplanationOfBenefit? Type=[system][code]

- Supports searching using the combination of the identifier parameter:

GET https://hostname/r4/ExplanationOfBenefit? Identifier=[system][value]

- Supports searching using the combination of the service-date parameter:

GET https://hostname/r4/ExplanationOfBenefit? Service-date=[prefix][date]

3.18.3 API Request and Response

Request	Type	Parameters	Response
https://fastplusdemo.citiustech.com:8280/patienta/paa/r4/ExplanationOfBenefit/Demo-eob-13	Read		eob_read.txt

https://fastplusdemo.citiustech.com:8280/patienta/paa/r4/ExplanationOfBenefit?_id=Demo-eob-13	Search	_id	eob_id.txt
https://fastplusdemo.citiustech.com:8280/patienta/paa/r4/ExplanationOfBenefit?patient=Patient/Demo-pat-6	Search	patient	eob_patient.txt
https://fastplusdemo.citiustech.com:8280/patienta/paa/r4/ExplanationOfBenefit?_lastUpdated=eq2018-08-03T00:00:00-07:00	Search	_lastUpdated	eob_lastUpdated.txt
https://fastplusdemo.citiustech.com:8280/patienta/paa/r4/ExplanationOfBenefit?identifier=https://www.upmchealthplan.com/fhir/EOBIdentifier|InpatientEOBExample1	Search	identifier	eob_identifier.txt
https://fastplusdemo.citiustech.com:8280/patienta/paa/r4/ExplanationOfBenefit?type=http://terminology.hl7.org/CodeSystem/claim-type|pharmacy	Search	type	eob_type.txt
{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history	_history/read		EOB_Read_response.json
{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history/2	_history/vread		EOB_VRead_response.json

3.18.4 Response Elements

Name	Description
Type	Category or discipline
subject [Reference (Patient)]	Patient

Provider	Party responsible for the claim
Insurer	Party responsible for reimbursement
Identifier	Business Identifier for the coverage
Outcome of claim	The outcome status of the claim
Diagnosis	Pertinent diagnosis information
BillablePeriod	Relevant time frame for the claim
CareTeam	CareTeam members

3.19 Explanation of Benefit Professional Non-Clinician

This profile is used for EOBs based on claims submitted by physicians, suppliers, and other non-institutional providers for professional services.

3.19.1 Mandatory and Must Support Elements

Each EOB Professional Non-Clinician must have:

- Identifier
  - Claim number
- Type
- Patient
- Response creation date
- Insurer
- Provider
- Outcome of claim
- Diagnosis
- Insurance of the patient
- Adjudication
  - In-out network – Benefit payment status

Each EOB Professional Non-Clinician must support:

- Billable period
- Prior claims
- Payee
- CareTeam
- Supporting information
  - Billing network contacting status
  - Attending network contacting status
  - Referring network contacting status
  - Claim received date
  - Type of bill
  - Point of origin
  - Claim priority type
  - Discharge status
  - Claim diagnosis related group
- Procedure
- Product or service provided

- Adjudication
  - Amount type
  - Denial reason
  - Allowed units
- Payment details

3.19.2 Mandatory Search parameters

The following search parameters are supported:

- Supports searching using the combination of the id parameter:

GET https://hostname/r4/ExplanationOfBenefit? _id=[id]

- Supports searching using the combination of the patient parameter:

GET https://hostname/r4/ExplanationOfBenefit? Patient=[patient]

- Supports searching using the combination of the lastupdated parameter:

GET https://hostname/r4/ExplanationOfBenefit? _lastUpdated=[prefix][date]

- Supports searching using the combination of the type parameter:

GET https://hostname/r4/ExplanationOfBenefit? Type=[system][code]

- Supports searching using the combination of the identifier parameter:

GET https://hostname/r4/ExplanationOfBenefit? Identifier=[system][value]

- Supports searching using the combination of the service-date parameter:

GET https://hostname/r4/ExplanationOfBenefit? Service-date=[prefix][date]

3.19.3 API Request and Response

Request	Type	Parameters	Response
https://hostname/r4/ExplanationOfBenefit?_id=[id]	Read (Sample)		Professional-Non Clinician.txt
{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history	_history/read		EOB_Read_response.json
{{ur}}/ExplanationOfBenefit/Kern-eob-1/_history/2	_history/vread		EOB_VRead_response.json

3.19.4 Response Elements

Name	Description
Type	Category or discipline
subject [Reference (Patient)]	Patient
Provider	Party responsible for the claim
Insurer	Party responsible for reimbursement

Identifier	Business Identifier for the coverage
Outcome of claim	The outcome status of the claim
Diagnosis	Pertinent diagnosis information
BillablePeriod	Relevant timeframe for the claim
CareTeam	CareTeam members

3.20 Formulatory Drug List

3.19.1 Formulary Drug

The FormularyDrug resource represents a drug that is part of a drug formulary. A drug formulary is a list of brand-name and generic prescription drugs a health insurer agrees to pay for, at least partially, as part of health insurance coverage.

3.19.1.1 Mandatory and Must Support Elements

Each formulary drug must have:

- Code
- Plan ID
- Drug tier ID

Each formulary drug must support:

- Prior Authorization
- Step therapy limit
- Quantity limit

3.19.1.2 Mandatory Search Parameters

The US Drug Formulary Server supports the following search Parameters individually and in combination:

- DrugName
- DrugPlan
- DrugTier
- Code

3.19.1.3 API Request and Response

Request	Type	Parameters	Response
https://hostname/r4/Formulary Drug?_id=[id]	Read (Sample)		 Formulary Drug.txt

{{ur}}/List/Kern-lit-1/_history	_history/read		 List_Read_response.json
{{ur}}/List/Kern-lit-1/_history/1	_history/vread		 List_VRead_response.json

3.19.2 Response Elements

Name	Description
Code	Code that identifies this medication
PlanID	ID for the plan
DrugTierID	ID for the Drug
QuantityLimit	Whether the coverage plan imposes a quantity limit on this drug
Prior Authorization	Whether the coverage plan imposes a prior authorization requirement on this drug

3.19.3 Coverage Plan

The Coverage Plan resource represents a health plan and contains links to administrative information, a list of formulary drugs covered under that plan, and a definition of drug tiers and their associated cost-sharing models.

3.19.3.1 Mandatory and Must Support Elements

Each Coverage plan must have:

- Drug tier definition
- Network
- Summary URL
- Plan ID type
- Identifier
- Status
- Mode
- Title

Each coverage plan must support:

- Formulary URL
- Marketing URL
- Email plan contact

3.19.3.2 Mandatory Search Parameters

The US Drug Formulary Server supports the following search Parameters individually and in combination:

- DrugName
- DrugPlan
- DrugTier
- Code

3.19.3.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/List/541565be-98f1-f9c4-539c-43a302f846d2	Read		List_Coverage_Plan_Read.json
BaseURL/List?_lastUpdated=eq1999-07-09T14:21:08&_id=2950c2ff-0ddb-7d8d-7cfb-80ae10859732	Search	_id, _lastUpdated	List_Coverage_Plan_Search.json
{{ur}}/List/Kern-lit-1/_history	_history/read		List_Read_response.json
{{ur}}/List/Kern-lit-1/_history/1	_history/vread		List_VRead_response.json

3.19.4 Response Elements

Name	Description
Status	Status of the plan
Identifier	Business identifier
PlanID Type	Type of PlanID
Mode	The processing mode that applies to this list
Title	Descriptive name for the list
Network	Networks of the plan
Drug Tier Definition	Description of drug tiers

3.21 Goal

This profile sets minimum expectations for the Goal resource to record, search, and fetch Goal information associated with a patient.

3.21.1 Mandatory and Must Support Elements

Each Goal must have:

- A status
- A Text description of the goal
- A patient

Each Goal must support:

- Target date(s)

3.21.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all goals for a patient using the patient search parameter:

GET https://hostname/r4/Goal? Patient=[reference]

- A server will be capable of returning a Goal resource using:

GET https://hostname/r4/Goal /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Goal? [parameter=value] & _revinclude=Provenance: target

3.21.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Goal/0eb7069f-2c16-4038-bdad-6f28bb371910	Read		 Goal_Read.json
BaseURL/Goal?_revinclude=Provenance:target&lifecycle-status=accepted&target-date=ge1982-12-25&patient=https://localhost:8080/paa/r4/Patient/7b7709ff-a107-49ea-8211-56771b65cd19&_lastUpdated=gt1999-07-09	Search	_revinclude:Provenance:target,lifecycle-status,targetdate,patient	 Goal_Search.json
{{ur}}/Goal/Kern-gol-1/_history	_history/read		 Goal_Read_response.json

{{ur}}/Goal/Kern-gol-1/_history/172	_history/vread		 Goal_VRead_response.json

3.21.4 Response Elements

Name	Description
subject (Reference)	Who the goal is intended for, Will always be the patient
description (String)	SNOMED code or other text describing the goal.
lifecycle Status (CodeableConcept)	Supported values for Epic integration: • active ➢ corresponds to Epic value of 1-Active • completed ➢ corresponds to Epic value of 2-Done • cancelled ➢ corresponds to Epic value of 3-Deleted
Target	Target outcome for the goal

3.22 Immunization

This profile sets minimum expectations for the Immunization resource to record, fetch, and search immunization history associated with a patient.

3.22.1 Mandatory and Must Support Elements

Each Immunization must have:

- A status
- A vaccine code that identifies the kind of vaccine administered
- A date when the vaccine was administered
- A patient

Each Immunization must support:

- A statusReason if the vaccine was not given

3.22.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all immunizations for a patient using the patient search parameter:
GET https://hostname/r4/Immunization?patient=[reference]
- A server will be capable of returning an Immunization resource using:
GET https://hostname/r4/Immunization /[id]
- Server will be capable of supporting the following revincludes: Provenance: target-
GET https://hostname/r4/Immunization? [parameter=value] & _revinclude=Provenance: target

3.22.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Immunization/Kern-imm-I_101	Read		Immunization_read.json
BaseURL/Immunization?_revinclude=Provenance:target&status=completed,not-done&date=ge2018-03-28T01:45:00+14:00&_id=Kern-imm-I_101&patient=BaseURL/Immunization/Patient/Kern-pat-P_001&_lastupdated=2018-02-28T01:45:00+04:30	Search	_id, status, date, Patient, lastupdated, _revinclude	Immunization_Search.json
{{ur}}/Immunization/Kern-imm-1/_history	_history/read		Immunization_Read_response.json
{{ur}}/Immunization/Kern-imm-1/_history/1	_history/vread		Immunization_VRead_response.json

3.22.4 Response Elements

Name	Description
Identifier (Identifier)	
Status (Code)	Possible values: in-progress | on-hold | completed | entered-in-error | stopped.
Date (dateTime)	Vaccination administration date
vaccine Code (CodeableConcept)	Vaccine product administered
Patient (Reference)	The patient that was immunized
wasNotGiven (Boolean)	Flag for whether immunization was given
reasonNotGiven (CodeableConcept)	reasonNotGiven will only be returned if wasNotGiven is true

3.23 Implantable Device

This profile sets minimum expectations for the Device resource to record, search, and fetch UDI information associated with a patient's implantable device(s).

3.23.1 Mandatory and Must Support Elements

Each Device must have:

- A code identifying the type of device
- A patient (Reference)

Each Device must support:

- The Device Identifier (UDI-DI)
- A Unique Device Identifier (UDI) numeric or alphanumeric code
  - Either as the Human Readable Form (HRF) string representation of the barcode
  - Or the Automatic Identification and Data Capture (AIDC) representation
- The following parsed Production Identifiers (UDI-PI) from the UDI:
  - The manufacture date
  - The expiration date
  - The lot number
  - The serial number
  - The distinct identifier (that is, the distinct identification code)

3.23.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all devices for a patient, including implantable devices using the patient search parameter:

GET https://hostname/r4/Device?patient=[reference]

- A server will be capable of returning an ImplantableDevice resource using:

GET https://hostname/r4/ImplantableDevice /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/ImplantableDevice? [parameter=value] & _revinclude=Provenance: target

3.23.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Device/6f7dfb5d-8b16-4f6a-8754-7b0b711cbca9	Read		Device_Read.json
BaseURL/Device?patient=Patient/7b7709ff-a107-49ea-8211-56771b65cd19&type=http://snomed.info/sct|705643001	Search	Patient, type	Device_Search.json

{{ur}}/Device/Kern-dev-1/_history	_history/read		 Device_Read_response.json
{{ur}}/Device/Kern-dev-1/_history/2	_history/vread		 Device_VRead_response.json

3.23.4 Response Elements

Name	Description
status (code)	One of the following values: • active • inactive • entered-in-error • unknown Configuration is controlled by the organization's FHIR profile.
type (CodeableConcept)	A SNOMED or other device code Configuration is controlled by the organization's FHIR profile.
lotNumber (string)	Device lot number
manufacturer (string)	Device manufacturer
manufactureDate (dateTime)	Date of device manufacture
expirationDate (dateTime)	Device expiration date
patient (Reference (Patient))	Patient identifier
udiCarrier (udiCarrier)	Device carrier identification details Under FDA regulations, all medical devices are required to include a Unique Device Identifier (UDI) on device labels and packages, in both human-readable and barcode format. The FDA also maintains a public database of medical devices and UDI information called the Global Unique Device Identification Database (GUDID). A Unique Device Identifier (UDI) is a unique numeric or alphanumeric code that is comprised of two components: • Device Identifier (DI) ("Static UDI") – a mandatory, fixed portion of a UDI that

	identifiers the labeler and specific version or model of a device. • Production Identifiers (PI) ("Dynamic UDI") – a conditional, variable portion of a UDI that identifies one or more of the following: ➢ Lot or batch number within which a device was manufactured ➢ Serial number of a specific device ➢ Expiration date of a specific device ➢ Production date of a specific device ➢ Distinct identification code for a human cell, tissue, or cellular- and tissue-based product
serialNumber (String)	Device serial number
deviceName (deviceName)	Device name and type details
modelNumber (String)	Device model number

3.24 Location

This profile sets minimum expectations for the Location resource for recording, searching for, and fetching a Location associated with a patient, provider, or organization.

3.24.1 Mandatory and Must Support Elements

Each Location must have:

- A name

Each Location must support:

- Location.Status
- Location.name
- Location.Telecom
- Location.Address
- managingOrganization

3.24.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching by location name using the name search parameter:
GET https://hostname/r4/Location?name=[string]
- Supports searching location based on text address using the address search parameter:
GET https://hostname/r4/Location?address=[string]
- A server will be capable of returning a Location resource using:
GET https://hostname/r4/Location/[id]
- Server will be capable of supporting the following revincludes: Provenance: target-
GET https://hostname/r4/Location? [parameter=value] & _revinclude=Provenance: target

3.24.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Location/Kern-loc-2102	Read • Patient Access API		Location_PA_Read.json
BaseURL/Location?_lastupdated=ge2018-02-28T00:00:00-08:00,le2018-02-28T00:00:00-08:00&address=358 Karen Mountains Kellyville, SD 53308&address-city=Dwaynemouth&address-postalcode=42016&address-state=State C&name=Health Level Seven International - Amherst, Health&_id=Kern-loc-2102	Search • Patient Access API	_id, name, address, address-city, address-state, address-postalcode, -lastupdated	Location_PA_Search.json
BaseURL/Location/plannet-location-123008590	Read – Provider Directory		Location_PD_Read.json
BaseURL/Location?type=ACSN&_id=19790d32-a89c-c087-a74c-23cfc0c67ed5&_lastUpdated=2020-09-08T10:28:23.676+00:00&address=TEWKSBURY	Search – Provider Directory		Location_PD_Search.json
{{ur}}/Location/Kern-loc-1/_history	_history/read		Location_Read_response.json
{{ur}}/Location/Kern-loc-1/_history/1	_history/vread		Location_VRead_response.json

3.24.4 Response Elements

Name	Description
Status (Code)	The status
Name (String)	The name of the location
Alias (String)	A list of alternative names that the location is known as or was known as in the past
Telecom (ContactPoint)	The contact details of the location

Address (Address)	The physical location
managingOrganization (Reference)	Organization responsible for provisioning and upkeep
Mode (Code)	Must be set to "instance". Instance represents a specific, findable location
Endpoint (Reference)	The endpoint reference, such as a location or provider

3.25 Laboratory Results Observation

This profile sets minimum expectations for the Observation resource to record, search, and fetch laboratory test results associated with a patient.

3.25.1 Mandatory and Must Support Elements

Each Observation must have:

- A status
- A category code of 'laboratory'
- A LOINC code, if available, which tells you what is being measured
- A patient

Each Observation must support:

- A time indicating when the measurement was taken
- A result value or a reason why the data is absent
  - if the result value is a numeric quantity, a standard UCUM unit

3.25.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|[code]

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/Observation?patient=[patient]&code=[system]|[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|[code]&date=[date]

- A server will be capable of returning a resource Laboratory Result Observation using:

GET https://hostname/r4/Observation/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.25.3 API Request and Response

Request	Type	Parameters	Response

BaseURL/Observation/0ff04e07-b557-4c06-81af-569416094d6c	Read		 Observation_LabResult_Read.json
BaseURL/Observation?code=2093-3&status=final&_id=0ff04e07-b557-4c06-81af-569416094d6c&category=laboratory	Search	Code, Status, _Id, Category	 Observation_LabResult_Search.json
{{ur}}/Observation/Kern-obs-1/_history	_history/read		 Observation_Read_response.json
{{ur}}/Observation/Kern-obs-1/_history/27	_history/vread		 Observation_vread_response.json

3.25.4 Response Elements

Name	Description
status (code)	The status of an observation
category (CodeableConcept)	Type of observation
code (CodeableConcept)	Laboratory Test Name
subject [Reference (Patient)]	Patient
effectivePeriod (Period)	Date for observation taken
issued (instant)	Date/Time this version was made available
ValueQuantity	Vital Signs value are recorded using the Quantity data type.

3.26 MedicationDispense

This profile is used to record a member's prescription drug claims.

3.26.1 Mandatory and Must Support Elements

Each MedicationDispense must have:

- A status of the Medication Dispense
- Patient (reference Resource)
- A code which tells you the medication

Each MedicationDispense must support:

- A substitution

3.26.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- A server will be capable of returning an MedicationDispense resource using:

GET https://hostname/r4/ MedicationDispense /[id]

3.26.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/MedicationDispense/Kern-mdcd-meddis-1	Read		 Medication Dispense_Read.json
BaseURL/MedicationDispense?_id=Kern-mdcd-meddis-1&code=http://build.fhir.org/ig/HL7/davinci-epdx/ValueSet-FDANationalDrugCode.html|693002&context=Kern-enc-Enc-1&destination=Location/Kern-loc-Desloc-1&patient=Kern-pat-Pat-1&identifier=http://hl7.org/fhir/sid/us-npi|Identifier-1&performer=Practitioner/Kern-pract-Pract-1,BaseURL/Practitioner/Kern-pract-Pract-1&prescription=BaseURL/MedicationRequest/Kern-mrq-AutPre-1&receiver=Kern-pat-Recid-1&responsibleparty=BaseURL/Practitioner/Kern-pract-Resp-1&type=http://terminology.hl7.org/CodeSys	Search	_id, code, context, destination, patient, identifier, performer, prescription, receiver, responsibleparty, type, _lastupdated, whenhandedover, whenprepared	 Medication Dispense_Search.jso

tem/v3-ActCode|FFS&_lastupdated=eq2018-02-28T01:45:00+04:30&whenhandedover=lt2018-03-28T01:48:00-10:00&whenprepared=2018-02-28T01:45:00+13:45			
{{ur}}/MedicationDispense/Kern-mdcd-1/_history	_history/read		 Medicationdispense_Read_response.json
{{ur}}/MedicationDispense/Kern-mdcd-1/_history/124	_history/vread		 Medicationdispense_VRead_response.json

3.26.4 Response Elements

Name	Description
id (Identifier)	The FHIR ID
status	The status of the medication dispensed from the medication dispense status codes list The options are: • preparation • in-progress • cancelled • on-hold • completed • entered-in-error • stopped • declined • unknown
patient (Reference (Patient))	The patient who has prescribed the medication
substitution	Whether a substitution was or was not performed on the dispense

3.27 Medication

This profile sets minimum expectations for the Medication resource to record, search, and fetch medications associated with a patient.

3.27.1 Mandatory and Must Support Elements

Each Medication must have:

- A medication code

3.27.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- A server will be capable of returning a Medication resource using:

GET https://hostname/r4/Medication /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Medication? [parameter=value] & _revinclude=Provenance: target

3.27.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Medication/72bc6d96-e7cf-cdeb-08b2-b7f9dafa81af	Read		Medication_Read.json
{{ur}}/Medication/Kern-med-1/_history	_history/read		Medication_Read_response.json
{{ur}}/Medication/Kern-med-1/_history/1	_history/vread		MEdication_VRead_response.json

3.27.4 Response Elements

Name	Description
code (CodeableConcept)	Codes that identify this medication
form (CodeableConcept)	This is the form a dose can take, such as tablets or powder.

3.28 Medication Request

The MedicationRequest resource can be used to record a patient's medication prescription or order. This profile sets minimum expectations for the MedicationRequest resource to record, search, and fetch medications associated with a patient.

3.28.1 Mandatory and Must Support Elements

Each MedicationRequest must have:

- A status
- An intent code
- A medication
- A patient
- A date for Prescription
- A prescriber

Each MedicationRequest must support:

- The reported flag, signaling that information is from a secondary source such as a patient
- The encounter
- The prescription

3.28.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and intent search parameters:

GET https://hostname/r4/MedicationRequest? Patient=[reference]&intent=order

- Supports searching using the combination of the patient and intent and status search parameters:

GET https://hostname/r4/MedicationRequest?patient=[patient]&intent=[system]|[code]&status=[status]

- A server will be capable of returning a MedicationRequest resource using:

GET https://hostname/r4/MedicationRequest /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/MedicationRequest? [parameter=value] & _revinclude=Provenance: target

3.28.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/MedicationRequest/011379d3-38b3-4263-9397-d25a38a4eb34	Read		MedicationRequest_Read.json
BaseURL/MedicationRequest?intent=order,complete,halt&_revinclude=Provenance:target&authoredon=eq2012-	Search	_id, status, patient, authoredon, intent, _revinclude	MedicationRequest_Search.json

02-14&patient=7b7709ff-a107-49ea-8211-56771b65cd19&status=stopped&_id=4dbf5103-97fa-4117-a294-62d52d4199cc			
{{ur}}/MedicationRequest/Kern-mrq-1/_history	_history/read		 MedicationRequest_Read_response.json
{{ur}}/MedicationRequest/Kern-mrq-1/_history/1	_history/vread		 MedicationRequest_VRead_response.json

3.28.4 Response Elements

Name	Description
identifier (Identifier)	The order ID
groupIdentifier (Identifier)	The group ID and index for linked orders
status (Code)	The status of the medication request
intent (Code)	Hardcoded to "order"
subject (Reference - Patient)	Who the medication request is for
authoredOn (Datetime)	The date the prescription was written
encounter (Reference (Encounter))	Reference to the encounter resource that the request was placed on
requester (Reference (Practitioner))	Who made the request

3.29 Organization

This profile sets minimum expectations for the Organization resource to search and fetch an Organization associated with a patient or provider.

3.29.1 Mandatory and Must Support Elements

Each Organization must have:

- A status of the organization
- A name

Each Organization must support:

- An identifier
  - National Provider Identifier (NPI) for organizations

- Clinical Laboratory Improvement Amendments (CLIA) for laboratories

- A list of contact information

3.29.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching by organization name using the name search parameter:

GET https://hostname/r4/Organization? Name=[string]

- Supports searching organization based on text address using the address search parameter:

GET https://hostname/r4/Organization? Address=[string]

- A server will be capable of returning an Organization resource using:

GET https://hostname/r4/Organization /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Organization? [parameter=value] & _revinclude=Provenance: target

3.29.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Organization/plannet-organization-1230085657	Read		Organization_Read.json
BaseURL/Organization?address-city=tha&_id=Kern-coveragetest&_name=BAYSIDE ENDOSCOPY,Garrettside&_lastUpdated=lt2021-01-01	Search	Address_city, _id, name, _lastupdated	Organization_Search1.json
BaseURL/Organization?_id=db0acede-4abe-3c01-8d03-5c68a190d8c7&_revinclude=Provenance:target	Search	_id, _revinclude:Provenance:target	Organization_Search2.json
BaseURL/Organization/plannet-organization-1230085657	Read – Provider Directory		Organization_PD_Read.json
BaseURL/Organization?name:exact=HARVARD VANGUARD BRAINTREE PRACTICE URGENT CARE&_id=c63d0602-	Search- Provider Directory	name:exact, _id, _lastUpdated, address-postalcode, _revinclude: PractitionerRole:network, _revinclude:	Organization_PD_Search.json

724d-3d74-958a-a31b1364eaef&_lastUpdated=2020-11-20&address-postalcode=2184&_revinclude=PractitionerRole:network&_revinclude=OrganizationAffiliation:participating-organization		OrganizationAffiliation:participating-organization	
{{ur}}/Organization/Kern-org-1/_history	_history/read		 Organization_Read_response.json
{{ur}}/Organization/Kern-org-1/_history/1	_history/vread		 Organization_VRead_response.json

3.29.4 Response Elements

Name	Description
Identifier	Identifies this organization across multiple systems
Active (Boolean)	Whether the organization's record is in active use
Name (String)	The name used for the organization
Address (Address)	The address from the place of service or department
Telecom (ContactPoint)	The phone number, fax number, and emergency phone number

3.30 Practitioner Role

This profile sets minimum expectations for the Practitioner Role resource to record, search, and fetch the practitioner role for a practitioner.

3.30.1 Mandatory and Must Support Elements

Each PractitionerRole must have:

- An associated practitioner
- An associated organization

Each PractitionerRole must support:

- A role
- A specialty
- An associated location
- Contact information

- A communication endpoint

3.30.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching practitioner role by specialty using the specialty search parameter:

GET https://hostname/r4/PractitionerRole?specialty={[system]} |[code] {&_include=PractitionerRole: practitioner} {&_include=PractitionerRole? Endpoint}

- Supports searching practitioner role by practitioner name and identifier using chained parameters using the practitioner search parameter:

GET https://hostname/r4/PractitionerRole?practitioner=[reference] {&_include=PractitionerRole: practitioner} {&_include=PractitionerRole? endpoint}

- A server will be capable of returning a PractitionerRole resource using:

GET https://hostname/r4/practitionerRole/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/PractitionerRole? [parameter=value] & _revinclude=Provenance: target

3.30.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/PractitionerRole/plannet-practitionerrole-1230081110	Read		PractitionerRole_PA_Read.json
BaseURL/PractitionerRole?specialty=101YP2500X&_include=PractitionerRole:endpoint&_id=767b41ba-a8e8-2050-efd5-c54502fb0826	Search	specialty, _include, _id	PractitionerRole_PA_Search.json
BaseURL/PractitionerRole/plannet-practitionerrole-1230081110	Read – Provider Directory		PractitionerRole_PD_Read.json
BaseURL/PractitionerRole?practitioner=Kern-pract-101&organization=https://fhirmsi.citiustech.com:8081/pda/r4/Organization/Kern-org-Org1&service=HealthcareService/Kern-hcs-ref_Healt_2&specialty=|364SI0800X&endpoi	Search-ProviderDirectory	practitioner, organization, service, speciality	PractitionerRole_PD_Search.json

nt=Endpoint/Kern-endpt-27			
{{ur}}/PractitionerRole/Kern-practrole-1/_history	_history/read		 PractitionerRole_Read_response.json
{{ur}}/PractitionerRole/Kern-practrole-1/_history/1	_history/vread		 PractitionerRole_VRead_response.json

3.30.4 Response Elements

Name	Description
Active (Boolean)	Whether the unique address is active. If there is no unique address and no primary address, then this will fall back to the Record State
Practitioner (Reference)	The practitioner
Code (CodeableConcept)	The provider role
Specialty (CodeableConcept)	The provider specialty
Location (Reference)	A location containing address information for the provider. This element isn't returned in a patient-facing context
Telecom (ContactPoint)	Contact information specific to the unique address
Endpoint (Reference)	The endpoint

3.31 Procedure

This profile sets minimum expectations for the Procedure resource to record, search, and fetch procedures associated with a patient.

3.31.1 Mandatory and Must Support Elements

Each Procedure must have:

- A status
- A code that identifies the type of procedure performed on the patient
- A patient (Reference)
- When the procedure was performed

3.31.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all procedures for a patient using the patient search parameter:

GET https://hostname/r4/Procedure?patient=[reference]

- Supports searching using the combination of the patient and date search parameters:

GET https://hostname/r4/Procedure?patient=[patient]&date=[date]

- A server will be capable of returning a Procedure resource using:

GET https://hostname/r4/Procedure/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/procedure? [parameter=value] & _revinclude=Provenance: target

3.31.3 API Request and Response

Request	Type	Parameters	Response
BaseURL//Procedure/Kern-proc-Proc-51002	Read		Procedure_read.json
BaseURL//Procedure?_id=Kern-proc-Proc-51002&status=in-progress,not-done&patient=Patient/Kern-pat-Pat-102&date=2018-02-28T01:45:21-10:00&code=http://snomed.info/sct|2344008,|2344008,http://snomed.info/sct|&_lastupdated=le2018-02-28T01:45:21-10:00&_revinclude=Provenance:target	Search	_id, Patient, status, code, date, _lastupdated, _revinclude	Procedure_Search.json
{{ur}}/Procedure/Kern-proc-1/_history	_history/read		Procedure_Read_response.json
{{ur}}/Procedure/Kern-proc-1/_history/1	_history/vread		Procedure_VRead_response.json

3.31.4 Response Elements

Name	Description
code (CodeableConcept)	External codes associated with the procedure Can include code types specified in the organization's FHIR profile

identifier (Identifier)	ID for the procedure order record. Value can be ORD for orders, EAP for procedures, or OPE for orders performed
performedDateTime (dateTime)	When the procedure was performed
subject (Reference (Patient))	Reference to the patient resource
status (code)	Supported API Values: • active ➢ Corresponding FHIR event-status: in-progress • completed ➢ Corresponding FHIR event-status: completed • cancelled ➢ Corresponding FHIR event-status: stopped • aborted ➢ Corresponding FHIR event-status: stopped
encounter (Reference (Encounter))	Reference to an encounter resource

3.32 Patient

This profile sets minimum expectations for the Patient resource to record, search, and fetch basic demographics and other administrative information about an individual patient.

3.32.1 Mandatory and Must Support Elements

Each Patient must have:

- A patient identifier (E.g.: MRN)
- A patient name
- A gender

Each Patient must support:

- First Name
- Middle Name
- Last Name
- Previous Name
- Suffix
- Birth Sex
- Date of Birth
- Race
- Ethnicity
- Preferred Language
- Address

3.32.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports fetching a Patient using the id search parameter:

GET https://hostname/r4/Patient[id]

- Supports searching a patient by an identifier such as an MPI using the identifier search parameter:

GET https://hostname/r4/Patient? Identifier={[system]} |[code]

- Supports searching for a patient by a string match of any part of name using the name search parameter:

GET https://hostname/r4/Patient? Name=[string]

- Supports searching using the combination of the birthdate and name search parameters:

GET https://hostname/r4/Patient? Birthdate=[date]&name=[string]

- Supports searching using the combination of the gender and name search parameters:

GET https://hostname/r4/Patient? Gender={[system]} |[code]&name=[string]

- A server will be capable of returning a patient resource using:

GET https://hostname/r4/patient /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/patient? [parameter=value] & _revinclude=Provenance: target

3.32.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Patient/b488e1c0-f077-959d-0c97-c50fff0a296e	Read		Patient_Read.json
BaseURL/Patient?family=Tromp100&birthdate=1935-11-19&gender=male&_id=7b7709ff-a107-49ea-8211-56771b65cd19	Search	family, birthdate, gender, _id	Patient_Search.json
{{ur}}/Patient/Kern-pat-1/_history	_history/read		Patient_read_response.json
{{ur}}/Patient/Kern-pat-1/_history/2	_history/vread		Patient_Vread_response.json

3.32.4 Response Elements

Name	Description
identifier (Identifier)	The Identity IDs and national ID

active (Boolean)	Whether the patient record is active
name (HumanName)	The patient's name
telecom (ContactPoint)	Telephone numbers and email address for the patient
gender (code)	The patient's gender
birthdate (date)	The patient's date of birth
address (Address)	The patient's addresses
extension (preferred provider sex) (Extension)	The patient's preferred PCP gender
extension (preferred provider language) (Extension)	The patient's preferred PCP language
communication (communication)	Language which may be used to communicate with the patient about his or her health
extension (birth sex) (Extension)	The patient's sex assigned at birth
extension (race) (Extension)	The patient's race
extension (ethnicity) (Extension)	The patient's ethnicity

3.33 Practitioner

This profile sets minimum expectations for the Practitioner resource to record, search, and fetch basic demographics and other administrative information about an individual practitioner.

3.33.1 Mandatory and Must Support Elements

Each Practitioner must have:

- An identifier which must support an NPI if available
- A name

3.33.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for a practitioner by a string match of any part of name using the name search parameter:

GET https://hostname/r4/Practitioner? Name=[string]

- Supports searching a practitioner by an identifier such as an NPI using the identifier search parameter:

GET https://hostname/r4/Practitioner? Identifier={[system]} |[code]

- A server will be capable of returning a Practitioner resource using:

GET https://hostname/r4/Practitioner /[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Practitioner? [parameter=value] & _revinclude=Provenance: target

3.33.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Practitioner/plannet-practitioner-1230081110	Read – Patient Access		Practitioner_Read.json
BaseURL/Practitioner?_revinclude=Provenance:target&family:contains=Rau	Search – Patient Access	_revinclude, Family	Practitioner_Search1.json
BaseURL/Practitioner?_id=plannet-practitioner-1230681064&_revinclude=Provenance:target	Search- – Patient Access	_revinclude, _id	Practitioner_Search2.json
BaseURL/Practitioner/plannet-practitioner-1230081110	Read -Provider Directory		Practitioner_PD_Read.json
BaseURL/Practitioner?given=john,johnie&_revinclude=PractitionerRole:practitioner&_id=Kern-pract-109&_lastUpdated=2018-02-28&family=Miller	Search- Provider Directory	given, revinclude:PractitionerRole, _id, _lastupdated	Practitioner_PD_Search.json
{{ur}}/Practitioner/Kern-pract-1/_history	_history/read		Practitioner_Read_response.json
{{ur}}/Practitioner/Kern-pract-1/_history/1	_history/vread		Practitioner_VRead_response.json

3.33.4 Response Elements

Name	Description
Identifier (Identifier)	The practitioner or user ID
Active (Boolean)	Whether the practitioner's record is active

name (HumanName)	The name associated with the practitioner
gender (Code)	The practitioner's gender

3.34 Provenance

This profile sets minimum expectations for the Provenance resource to record, search, and fetch Provenance information associated with a record.

3.34.1 Mandatory and Must Support Elements

Each Provenance must have:

- Resource(s) the Provenance record is supporting (target)
- A date and time for the activity

Each Provenance must support:

- An author responsible for the update
- The author's organization responsible for the information
- The transmitter that provided the information
- The transmitter organization responsible for the transmission (if the transmitter is a device the transmitter organization must also be valued)

3.34.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching for all resources of a particular type for a patient and all the Provenance records for those resources using a combination of the patient and _revinclude search parameters:

GET https://hostname/r4/ [Provenance]?patient=[id]&_revinclude=Provenance: target

- Supports searching for a particular resource and all its Provenance resources using combination of the _id and the _revinclude search parameters:

GET https://hostname/r4/ [provenance]? _id=[id]&_revinclude=Provenance: target

- A server will be capable of returning a Provenance resource using:

GET https://hostname/r4/Provenance /[id]

3.34.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Provenance/418ff68c-71bc-40de-99ac-beeb7b289403	Read		Provenance_Read.json
BaseURL/Provenance?_id=Kern-prov-28471&_lastUpdated=gt2019-10-06T12:08:40.960+00:00	Search	_id, _lastupdated	Provenance_Search.json

{{ur}}/Provenance/Kern-prov-1/_history	_history/read		Provenance_Read_response.json
{{ur}}/Provenance/Kern-prov-1/_history/1	_history/vread		Provenance_VRead_response.json

3.34.4 Response Elements

Name	Description
Target	The Resource this Provenance record supports
RecordedDateTime	Timestamp when the activity was recorded
Author	Actor involved
Author organization	The organization author is representing
Transmitter	The actor who provides the information
Transmitter organization	The organization transmitter is representing

3.35 Pulse Oximetry

This profile sets minimum expectations for the Observation resource to record, search, and fetch pulse oximetry and inspired oxygen observations associated with a patient.

3.35.1 Mandatory and Must Support Elements

Each Observation must have:

- A fixed code for oxygen saturation in arterial blood as defined in the FHIR oxygen saturation profile
- An additional coding for oxygen saturation in arterial blood by pulse oximetry

Each Observation must support:

- A code for inspired oxygen concentration
- A value for inspired oxygen concentration

3.35.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|
[code]

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/Observation?patient=[patient]&code=[system]|[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|[code]&date=[date]

- A server will be capable of returning a Pulse oximetry resource using:

GET https://hostname/r4/Observation/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.35.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Observation/6527bd3d-8984-f956-4f81-36dc88d06429	Read		ObservationPulseOxy_Read.json
BaseURL/Observation?code=2708-6&status=final&_id=6527bd3d-8984-f956-4f81-36dc88d06429&_lastUpdated=2016-12-26T05:39:07.836&category=vital-signs	Search	Code, status, _id, _lastUpdated, category	ObservationPulseOxy_Search.json
{{ur}}/Observation/Kern-obs-1/_history	_history/read		Observation_Read_response.json
{{ur}}/Observation/Kern-obs-1/_history/27	_history/vread		Observation_vread_response.json

3.35.4 Response Elements

Name	Description
status (code)	The status of an observation
category (CodeableConcept)	Type of observation
code (CodeableConcept)	Oxygen Saturation by Pulse Oximetry
subject (Reference (Patient))	Patient
effectivePeriod (Period)	Date when person vital signs are taken
issued (instant)	Date/Time this version was made available

DataAbsenceReason	Reason for missing result

3.36 Pediatric BMI for Age Observation

This profile sets minimum expectations for the Observation resource to record, search, and fetch pediatric Body Mass Index (BMI) per the age and gender observations associated with a patient.

3.36.1 Mandatory and Must Support Elements

Each Observation must have:

- A fixed code for pediatric BMI per age and gender measurement
- A result value

3.36.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|
[code]

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/Observation?patient=[patient]&code=[system]|[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|[code]&date=[date]

- A server will be capable of returning a resource Pediatric BMI for Age Observation using:

GET https://hostname/r4/Observation/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.36.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Observation/ebc8476d-93b0-3449-84f4-91ffa6abee20	Read		Observation_Ped_Read.json
BaseURL/Observation?code=39156-5&status=final&_id=ebc8476d-93b0-3449-84f4-91ffa6abee20&_lastUpdated=2016-12-26T05:39:07.836&category=vital-signs	Search	Code, Status, _Id, Category, _lastupdated	Observation_Ped_Search.json

{{ur}}/Observation/Kern-obs-1/_history	_history/read		 Observation_Read_response.json
{{ur}}/Observation/Kern-obs-1/_history/27	_history/vread		 Observation_vread_response.json

3.36.4 Response Elements

Name	Description
status (code)	The status of an observation
category (CodeableConcept)	Type of observation
code (CodeableConcept)	BMI percentile per age and sex for youth 2-20
subject [Reference (Patient)]	Patient
effectivePeriod (Period)	Date for observation taken
issued (instant)	Date/Time this version was made available
ValueQuantity	Vital Signs value are recorded using the Quantity data type

3.37 Pediatric Weight for Height Observation

This profile sets minimum expectations for the Observation resource to record, search, and fetch pediatric weight for height and age observations associated with a patient.

3.37.1 Mandatory and Must Support Elements

Each Observation must have:

- A fixed code for pediatric weight for height and age measurement
- A result value

3.37.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and category search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|
[code]

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/Observation?patient=[patient]&code=[system]|[code]

- Supports searching using the combination of the patient and category and date search parameters:

GET https://hostname/r4/Observation?patient=[patient]&category=[system]|[code]&date=[date]

- A server will be capable of returning a resource Pediatric weight for height Observation using:
GET https://hostname/r4/Observation/[id]
- Server will be capable of supporting the following revincludes: Provenance: target-
GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.37.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/Observation/d108e9a7-de49-9807-b910-4783c3719b8d	Read		Observation_WeightHeight_Read.json
BaseURL/Observation?code=29463-7&status=final&_id=d108e9a7-de49-9807-b910-4783c3719b8d&_lastUpdated=2016-12-26T05:39:07.836&category=vital-signs	Search	Code, Status, _Id, Category, _lastupdated	Observation_WeightHeight_Search.json
{{ur}}/Observation/Kern-obs-1/_history	_history/read		Observation_Read_response.json
{{ur}}/Observation/Kern-obs-1/_history/27	_history/vread		Observation_vread_response.json

3.37.4 Response Elements

Name	Description
status (code)	The status of an observation
category (CodeableConcept)	Type of observation
code (CodeableConcept)	Weight-for-length per age and gender
subject [Reference (Patient)]	Patient
effectivePeriod (Period)	Date for observation taken
issued (instant)	Date/Time this version was made available
ValueQuantity	Vital Signs value are recorded using the Quantity data type.

3.38 Endpoint

The technical details of an endpoint can be used for electronic services, such as for web services providing a REST endpoint for another FHIR server.

3.38.1 3.37.1 Mandatory and Must Support Elements

Each endpoint must have:

- Status
- Connection type
- Pay load type
- Technical base address

Each endpoint must support:

- Name
- Managing organization
- Contact
- Pay load mime type
- Operational period
- Header

Following table lists the Search parameters supported by endpoint:

Parameters	Description
Identifier	Selects endpoints with the specified identifier
Last updated	Selects record with last updated date
organization	Selects endpoints managed by the specified organization

3.38.2 3.37.2. API Request and Response

Request	Type	Parameters	Response
BaseURL/Endpoint?_id=52d092f4-8ef7-c2bd-bd8f-aa08ca9b7d79	Read (Sample)		Endpoint_PD_Read.json
{{base}}/Endpoint?organization.name:exact=William Cambell org&_id=End-org-345	Search	organization.name:exact, _id,	Endpoint_PD_Search.json
{{ur}}/Endpoint/Kern-endpt-1/_history	_history/read		Endpoint_Read_response.json

{{ur}}/Endpoint/Kern-endpt-1/_history/1	_history/vread		 Endpoint_VRead_response.json

3.38.3 3.37.3. Response Elements

Name	Description
Status (Code)	This is always "active".
connectionType (Coding)	This is always "direct-project".
name (String)	A name by which you can identify this endpoint
payloadType (CodeableConcept)	This element returns "urn: hl7-org: sdwg: ccda-structuredBody:1.1" and "urn: hl7-org: sdwg: ccda-nonXMLBody:1.1"
payloadMimeType (Code)	This element returns "text/xml", "text/plain", and "application/pdf".
Address (url)	The provider addresses. This is a direct address, not a general address.

3.39 Provider Directory

The Provider directory API comprises of the following resources:

3.38.1 Contract

This profile is Legally enforceable, formally recorded unilateral or bilateral directive, that is, a policy or agreement.

3.38.1.1 Mandatory and Must Support Elements

Each Contract must have:

- Context of the Contract term
- Participant engagement type
- A patient (Reference resource)

3.38.1.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- A server will be capable of returning a Contract resource using:
  GET https://hostname/r4/ Contract /[id]

3.38.1.3 API Request and Response

Request	Type	Parameters	Response

BaseURL/Contract/Kern-cntr-Contract-101	Read		 Contract_Read.json
BaseURL/Contract?authority=Organization/901&subject=Practitioner/ref_sub_1&status=amended,appended&_lastupdated=2018-02-28T01:45:00-08:00&_id=Kern-cntr-Contract-101&domain=Location/901&identifier=Cont_no_1&issued=2018-03-16T01:45:00-08:00&signer=ref_sig_rltper	Search	authority, subject, status, _lastupdated, _id, domain, identifier, issued, signer	 Contract_Search.json
{{ur}}/Contract/Kern-cntr-1/_history	_history/read		 Contract_Read_response.json
{{ur}}/Contract/Kern-cntr-1/_history/1	_history/vread		 Contract_VRead_response.json

3.38.1.4 Response Elements

Name	Description
id (Identifier)	The FHIR ID
patient [Reference (Patient)]	The patient this contract is related to
Offer	Context of the Contract term
Role	Participant engagement type

3.38.2 Healthcare Service

The Healthcare Service resource typically describes services offered by an organization/practitioner at a location.

3.38.2.1 Mandatory and Must Support Elements

Each Healthcare Service must have:

- Delivery method
- Category

Each healthcare service must support:

- New patients
- Organization that provides the service
- Active status
- Type
- Specialty
- Location
- Name
- Comment
- Extra details
- Photo
- Telecom
- Appointment required
- Available time
- Unavailable time
- Endpoint

Idnetifer – optional

Following table lists the Search parameters supported by Healthcare Service:

Parameters	Description
id	Selects HealthcareServices with Unique id for the record
coverage-area	Selects services available in a region described by the specified location
endpoint	Selects HealthcareServices with the specified endpoint
identifier	Selects HealthcareServices with the specified identifier
Location	Selects HealthcareServices available at the specified location
Name	Selects HealthcareServices with the specified name
organization	Selects HealthcareServices provided by the specified organization
service-category	Selects HealthcareServices providing the specified category of services
service-type	Selects HealthcareServices of the specified type
specialty	Selects services associated with the specified specialty
Last updated	Selects record with last updated date

3.38.2.2 API Request and Response

Request	Type	Parameters	Response
BaseURL /HealthcareService/BurrClinicServices99	Read		HealthCareService_PD_Read.json
BaseURL /HealthcareService?_count=100&specialty=103G00000X&service-type=http://terminology.hl7.org/CodeSystem/service-type|&_lastUpdated=2020-11-20T11:38:28.390+00:00&_id=0216f87a-40ff-7c4c-2216-e5e040cc0fdc	Search	Specialty, service-type. _lastUpdated, _id	HealthCareService_PD_Search.json
{{ur}}/HealthcareService/Kern-hcs-1/_history	_history/read		HealthcareService_Read_response.json
{{ur}}/HealthcareService/Kern-hcs-1/_history/1	_history/vread		HealthcareService_VRead_response.json

3.38.2.3 Response Elements

Name	Description
Category	Broad category of service being performed or delivered
Delivery Method	Delivery method of the service (E.g.: Virtual)
Name	Name of the service
Type	Type of the service provided or performed
Location	Physical location of the Healthcare service
Specialty	Specialties handled by the service
Telecom	Contact number of the Healthcare Service
Active Status	Whether the healthcare Service is active or not
Appointment required	Whether appointment is required or not

3.38.3 Insurance Plan

InsurancePlan describes a health insurance offering which comprises of a list of covered benefits (that is, the product), costs associated with those benefits (that is, the plan), and additional information about the offering, such as who it is owned and administered by, a coverage area, contact information, and more.

3.38.3.1 Mandatory and Must Support Elements

Each Insurance plan must have:

- Status
- Type
- Owned by
- Administered by

Each insurance plan must support:

- Name
- Alias (Alternative name)
- Coverage area
- Contact

Following table lists the Search parameters supported by Insurance Plan:

Parameters	Description
administered-by	Selects products that are administered by the specified organization
coverage-area	Selects products that are offered in the specified location
coverage-benefit-type	Selects health insurance products offering covered benefits of the specified type
coverage-network	Selects products offering covered benefits through the specified health insurance provider network
coverage-type	Selects products offering the specified type of coverage
identifier	Selects products with the specified identifier
Name	Selects products with the specified name
network	Selects products associated with the specified health insurance provider network
owned-by	Selects products that are owned by the specified organization
plan-coverage-area	Selects plans that are available in the specified location
plan-identifier	Selects plans with the specified identifier

plan-network	Selects plans associated with the specified health insurance provider network
plan-type	Selects plans of the specified type
Type	Selects insurance plans of the specified type

3.38.3.2 API Request and Response

Request	Type	Parameters	Response
BaseURL/InsurancePlan/b5079ac7-b500-e308-dd0d-8ed0a5455a17	Read		InsurancePlan_PD_Read.json
BaseURL/InsurancePlan?_id=QA-Insu-12&_include=InsurancePlan:owned-by&coverage-area.identifier=https://bayside-endoscopy-llc.com|main campus1	Search	_id, _include, coverage-area.identifier	InsurancePlan_PD_Search.json
{{ur}}/InsurancePlan/Kern-inspln-1/_history	_history/read		InsurancePlan_Read_response.json
{{ur}}/InsurancePlan/Kern-inspln-1/_history/1	_history/vread		InsurancePlan_VRead_response.json

3.38.3.3 Response Elements

Name	Description
Status	Status of the plan
Type	Product type
OwnedBy	Plan issuer
AdministeredBy	Product Administrator
Name	Official name
Coverage Area	Coverage Details
Contact	Contact Details

3.38.4 Location

To access the location details, refer Section 4.24

3.38.5 Network

A Network refers to a healthcare provider insurance network. A healthcare provider insurance network is an aggregation of organizations and individuals that deliver a set of services across a geography through health insurance products/plans. A network is typically owned by a payer.

3.38.5.1 Mandatory and Must Support Elements

Each network must have:

- Active status
- Organization (part of)

Each network must support:

- Type
- Name
- Alias (Alternative name)
- Address
- Contact
- Endpoint

3.38.5.2 API Request and Response

Request	Type	Parameters	Response
{{url}/Location/plannet-location-123008590	Read (Sample)		 Network.txt
{{ur}}/Organization/Kern-org-1/_history	_history/read		 Organization_Read_response.json
{{ur}}/Organization/Kern-org-1/_history/1	_history/vread		 Organization_VRead_response.json

3.38.5.3 Response Elements

Name	Description
Status	Whether the organization's record is still in active use
Type	Kind of Organization
Name	Official name

Contact	Contact Details
Address	Address of the organization
Endpoint	Technical endpoints providing access to services operated for the organization

3.38.6 Organization

To access the organization details, refer to Section 4.29

3.38.7 Organization Affiliation

The OrganizationAffiliation resource describes relationships between two or more organizations, including the services one organization provides another, the location(s) where they provide services, the availability of those services, electronic endpoints, and other relevant information.

3.38.7.1 Mandatory and Must Support Elements

Each OrganizationAffiliation must have:

- Code
- Issuer
- Status

Each OrganizationAffiliation must support:

- Identifier
- Period
- Where valid
- Active
- Period
- Code
- Organization
- Participating organization
- Network
- Specialty
- Location
- Healthcare service
- Telecom
- Endpoint

Following table lists the Search parameters supported by OrganizationAffiliation:

Parameters	Description
identifier-assigner	Selects OrganizationAffiliations with an identifier issued by the specified organization
identifier	Selects OrganizationAffiliations with the specified identifier
Location	Selects OrganizationAffiliations available at the specified location

network	Selects roles where the organization is a member of the specified health insurance provider network
participating-organization	Selects roles filled by the specified organization
primary-organization	Selects roles offered by the specified organization
Role	Selects OrganizationAffiliations with the specified role
Service	Selects OrganizationAffiliations providing the specified service
specialty	Selects OrganizationAffiliations associated with the specified specialty

3.38.7.2 API Request and Response

Request	Type	Parameters	Response
BaseURL/OrganizationAffiliation/ab23e2ba-44cd-e030-4e83-4a1f21044b0e	Read		 Org_Aff_PD_Read.json
BaseURL/OrganizationAffiliation?endpoint=Endpoint/QA-end-chain12&_id=Orgaffliа-12&_lastUpdated=2020-10-08&location=QA-Loc-12&network=Organization/QA-Org-chain12&participating-organization=Organization/Org-end-987	Search	endpoint,_id,_lastUpdated,location,network,participating-organization	 Org_Aff_PD_Search.json
{{ur}}/OrganizationAffiliation/Kern-orgafl-1/_history	_history/read		 OrganizationAffiliation_Read_response.jsor
{{ur}}/OrganizationAffiliation/Kern-orgafl-1/_history/1	_history/vread		 OrganizationAffiliation_VRead_response.jsc

3.38.7.3 Response Elements

Name	Description
Code	The role the participatingOrganization plays
Issuer	Organization that issued id
Active	Whether this organization affiliation record is in active use
Identifier	Business identifier specific to the role
Specialty	Specific Specialty of the organization
Location	The location at which the role occurs
Healthcare Service	Services provided through the role
Telecom	Contact Details
Endpoint	Technical endpoints providing access to services operated for this role
Network	Health insurance provider network in which the participatingOrganization provides the role's services at the indicated locations

3.38.8 Practitioner

To access the Practitioner details, refer to section 4.33

3.38.9 Practitioner Role

To access the Practitioner Role details, refer to Section 4.30

3.40 Pharmacy Directory

Pharmacy directory and provider comprises the same resources. To access the details, refer to section 4.38.

3.41 RelatedPerson

This profile builds on the RelatedPerson Resource. It includes additional constraints relevant to the use cases addressed by this IG.

3.40.1 Mandatory and Must Support Elements

Each RelatedPerson must have:

- A human identifier for this person

3.40.2 Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

Parameters	Description
active	Indicates if the related person record is active
address	A server defined search that may match any of the string fields in the Address, including line, city, district, state, country, postalCode, and/or text
address-city	A city specified in an address
address-country	A country specified in an address
address-postalcode	A postal code specified in an address
address-state	A state specified in an address
address-use	A use code specified in an address
family	A portion of the family name of the related person
gender	Gender of the related person
given	A portion of the given name of the related person
identifier	An Identifier of the RelatedPerson
name	A server defined search that may match any of the string fields in the HumanName, including family, give, prefix, suffix, suffix, and/or text
patient	The patient this related person is related to
relationship	The relationship between the patient and the relatedperson

3.40.3 API Request and Response

Request	Type	Parameters	Response
BaseURL/RelatedPerson/Kern-rtdp-1	Read		 RelatedPerson_Read.json
BaseURL/RelatedPerson?_lastUpdated=2018-02-28T01:45:00+04:30&_id=Kern-rtdp-1&active=true,false&address=7702 East Center St.&gender=male,female&identifier=http://t	Search	_id, active, address, gender, identifier, patient, relationship, name, address-city, address-state, address-postalcode, _include, _lastUpdated,	 RelatedPerson_Search.json

erminology.hl7.org/CodeSystem/v2-0203|Member-101&patient=Patient/Kern-pat-1&relationship=http://terminology.hl7.org/CodeSystem/v2-0131|C&name=Mcpherson&address-city=San Antonio&address-state=Texas&address-postalcode=75240&_include=RelatedPerson:patient			
{{ur}}/RelatedPerson/Kern-rtdp-1/_history	_history/read		RelatedPerson_read_response.json
{{ur}}/RelatedPerson/Kern-rtdp-1/_history/2	_history/vread		RelatedPerson_Vread_response.json

3.40.4 Response Elements

Name	Description
id (Identifier)	The FHIR ID
patient (Reference (Patient))	The patient this person is related to
Subscriberid (Identifier)	A human identifier for this person

3.42 Smoking Status

This profile sets minimum expectations for the Observation resource to record, search, and fetch smoking status data associated with a patient.

3.41.1. Mandatory and Must Support Elements

Each Observation must have:

- A status
- A code for smoking observation
- A patient
- A date representing when the smoking status was recorded
- A result value code for smoking status

3.41.2. Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching using the combination of the patient and code search parameters:

GET https://hostname/r4/Observation?patient=[patient]&code=[system]|[code]

- A server will be capable of returning a Smoking status resource using:

GET https://hostname/r4/Observation/[id]

- Server will be capable of supporting the following revincludes: Provenance: target-

GET https://hostname/r4/Observation? [parameter=value] & _revinclude=Provenance: target

3.41.3. API Request and Response

Request	Type	Parameters	Response
BaseURL/Observation/ee3ae80f-105e-9a91-dd5e-1291800e6533	Read		 ObservationObservation-Smoking_Rea
BaseURL/Observation?code=72166-2&status=final&_id=ee3ae80f-105e-9a91-dd5e-1291800e6533&_lastUpdated=2016-12-26T05:39:07.836&category=survey	Search	Code, status, _id, _lastUpdated, category	 ObservationObservation-Smoking_Sear
{{ur}}/Observation/Kern-obs-1/_history	_history/read		 Observation_Read_response.json
{{ur}}/Observation/Kern-obs-1/_history/27	_history/vread		 Observation_vread_response.json

3.41.4. Response Elements

Name	Description
status (code)	The status of an observation
category (CodeableConcept)	Type of observation
code (CodeableConcept)	The LOINC code for smoking history
subject [Reference (Patient)]	Patient
effectivePeriod (Period)	Date when person starts or ends smoking

issued (instant)	Date/Time this version was made available
valueCodeableConcept (CodeableConcept)	The SNOMED code pertaining to smoking status

3.43 Vital Signs

The FHIR Vital Signs profile sets minimum expectations for the Observation resource to record, search, and fetch the vital signs associated with a patient that include the primary vital signs along with additional measurements such as height, weight, and BMI.

3.42.1. Mandatory and Must Support Elements

Each Observation must have:

- A status
- A category code of 'vital-signs'
- A ‘magic value’ which tells you what is being measured

LOINC was chosen for the ‘magic values’ because this aligns with the most countries, but it can be treated as a fixed core set of common codes to communicate basic vital signs. Implementers that need to use a different code system can still map accordingly.

- A patient
- A time indicating when the measurement was taken
- A numeric result value and standard UCUM unit.
- If there is no numeric result, then you have to state a reason.

3.42.2. Mandatory Search Parameters

The following search parameters and search parameter combinations are supported:

- Supports searching of a patient's vital signs by category using:

GET https://hostname/r4/Observation?patient=[id]&category=vital-signs.

- Supports searching of a patient's vital signs by category code and date range using:

GET https://hostname/r4/Observation?patient=[id]&category=vital-signs&date=[date]{&date=[date]}.

- Supports searching of a patient's vital signs by one or more of the codes listed above using:

GET https://hostname/r4/Observation?patient=[id]&code [vital sign LOINC {, LOINC2, LOINC3...}].

The vital signs supported by the profile are:

- Systolic blood pressure
- Diastolic blood pressure
- Body height
- Body weight
- Heart Rate
- Respiratory Rate
- Body temperature
- Oxygen Saturation
- Head circumference
- Body mass index
- Blood pressure

3.42.3. API Request and Response

Request	Type	Parameters	Response
BaseURL/Observation/57bf20be-9886-181e-45bd-3b00f41b3507	Read		Observation_VitalSign_Read.json
BaseURL/Observation?code=85354-9&status=final&_id=57bf20be-9886-181e-45bd-3b00f41b3507&category=vital-signs	Search	Code, Status, _Id, Category	Observation_VitalSign_Search.json
{{ur}}/Observation/Kern-obs-1/_history	_history/read		Observation_Read_response.json
{{ur}}/Observation/Kern-obs-1/_history/27	_history/vread		Observation_vread_response.json

3.42.4. Response Elements

Name	Description
status (code)	The status of an observation
category (CodeableConcept)	Type of observation
code (CodeableConcept)	Name of the Vital sign
subject [Reference (Patient)]	Patient
effectivePeriod (Period)	Date for observation taken
issued (instant)	Date/Time this version was made available
ValueQuantity	Vital Signs value are recorded using the Quantity data type.

4 Errors and Exceptions

PERFORM+ Connect uses HTTP status codes to indicate success or failure of an API call. In general, status codes in the 2xx range means success, 4xx range means there was an error in the provided information, and those in the 5xx range indicate server-side errors. Commonly used HTTP status codes are listed as follows:

Status Code	Description
200	OK
201	Created
400	Bad request
401	Unauthorized (Invalid AuthToken)
404	URL Not Found
405	Method Not Allowed (Method you have called is not supported for the invoked API)
429	Rate Limit Exceeded (API usage limit exceeded)
500	Internal Error

Customized error codes for Internal Error 500 error are as follows:

Error Code	Severity	Description	Example
FPE-1000	error	FPE-1000: Internal server error	Can occur if the format for date type of param is incorrect
FPE-1001	error	FPE-1001: Invalid Expression	any issue with query formation - for example, when the attribute column name in entity Search table is not correct
FPE-1002	error	FPE-1002: DB Connection Error	if DB is down
FPE-3004	error	FPE-3004: Global patient param is missing	if global patient parameter is missing in Patient export
FPE-3002	error	FPE-3002: Parsing error	if resource JSON in invalid
FPE-4000	error	FPE-4000: No record found	If no record found
FPE-4001	error	FPE-4001: Cancelled Request	
FPE-4002	error	FPE-4002: Not Started	

FPE-4003	error	FPE-4003: In-Progress	
FPE-4004	error	FPE-4004: Expired Request	
FPE-4005	error	FPE-4005: Request Cancelled	
FPE-4006	error	FPE-4006: Completed Request	
FPE-4007	error	FPE-4007: Failed Request	
FPE-4008	error	FPE-4008: Invalid Status	
FPE-5000	error	FPE-5000: Consent Server unavailable	If consent server is down
FPE-5001	error	FPE-5001: Consent Internal server error	If any exception is thrown from consent server side
FPE-5002	error	FPE-5002: Misconfiguration in consent, authentication is required	If consent is on and KeyCloak settings are off
FPE-5003	error	FPE-5003: Issue in IAM consent, please check the configuration	
FPE-5005	error	FPE-5005: Consent not found	If consent is not available for group id or for all the patient mentioned in the export API
FPE-6000	error	FPE-6000: Download URL expired.	
FPE-6001	error	FPE-6001: File not found.	
FPE-6005	error	FPE-6005: User is not authorized to download file %s.	

5 Terms and Conditions of Use

This section discusses the terms and conditions of using PERFORM+ Connect FHIR® API Server.

Documentation of FHIR® API Server and materials including the support of the FHIR® Specification (referred to as the "Materials") have been made available for development and testing. The Materials are provided to developers as-is with no other warranties expressed or implied. Developers may use the Materials with adherence to the following terms and conditions:

- PERFORM+ Connect FHIR® API Server has the most up-to-date documentation. Developers may keep copies of the Materials; however, they may not be distributed. Developers wishing to share the Materials may do so through linking other developers to the Materials hosted on the FHIR® API Server.
- Developers own developments using the Materials. PERFORM+ CONNECT owns the Materials, and also any improvements to Materials or the derivative of the Materials, such as enhancements to the testing tools or documentation. Any suggested improvements of the Materials may become part of the Materials without any obligation or notice to the submitter.
- Developers are responsible for the products developed to consume the API. Developers are also responsible for complying with all applicable laws, including but not limited to those related to PERFORM+ CONNECT's intellectual property rights. Resources available on the PERFORM+ CONNECT FHIR® API Services may require a customer to license additional functionality or build additional workflows.
- Developers interested in advertising products using PERFORM+ CONNECT's FHIR®API, PERFORM+ CONNECT's name, or PERFORM+ CONNECT's logo must contact info@citiustech.com to obtain permission.
- FHIR® is the registered trademark of Health Level Seven International and is used with the permission of HL7.

6 Files Referenced

6.1 General Guidance

The US Core Profiles were originally designed to meet the 2015 Edition certification criterion for Patient Selection 170.315(g)(7), and Application Access – Data Category Request 170.315(g)(8). They were created for each item in the 2015 Edition Common Clinical Data Set (CCDS). The Location, Organization, and Practitioner Profiles are not called out specifically in the certification criteria but are included because they are directly referenced by other profiles.

The US Core Profiles are informed by the prior Data Access Framework and the Argonaut Data Query Implementation Guides; however, the profiles here are standalone and include new requirements from the latest proposed ONC U.S. Core Data for Interoperability (USCDI) and includes all the API Resource Collection in Health (ARCH) resources.

6.2 References

1. https://www.hl7.org/fhir/us/core/profiles.html
2. https://build.fhir.org/ig/HL7/carin-bb/profiles.html
3. http://hl7.org/fhir/us/davinci-drug-formulary/profiles.html
4. https://build.fhir.org/ig/HL7/davinci-pdex-plan-net/profiles.html