FHIR Documentation

Authentication and configurations

Authentication for SMART on FHIR Applications

SMART on FHIR applications need to be registered with inteliMD before they can be used. To start the registration process, please submit a request by filling out this form. InteliMD will review your request and if you are approved you will receive an OAuth `client_id` to use on subsequent requests following the protocols specified in the official SMART App Authorization Guide.

inteliMD APIs are authenticated using the OAuth 2.0 protocol. All API requests must include an Authorization header with an Access Token of the form:

```
Authorization: Bearer MY_JWT_TOKEN
```

Confidential clients, such as web apps, which are capable of securely storing credentials will be issued a `client_secret` that may be used in conjunction with the `client_id` to form an authorization grant, which can be used to obtain refresh and access tokens. Our refresh tokens are long-lived and conform to Health IT criteria documented here.

Public applications, such as native apps, which are incapable of securely storing credentials will not be issued a `client_secret`. Instead, the `authorization_code` grant flow will be used to issue refresh tokens. As recommended in the OAuth 2.0 Authorization Framework spec (RFC 6749), we require additional security measures when issuing refresh tokens to native applications. Specifically, we enforce refresh token rotation for all public applications, which is an auth flow in which each refresh token issued is valid for one use only. Whenever a public application uses a refresh token to request an access token, a new refresh token will be returned in the response body in addition to the requested access token.

The **.well-known/smart-configuration** can be appended to our FHIR server's base URL in order to identify endpoints needed for authorization. For our inteliMD Production FHIR server, you would go to https://fhir.intelimd.com/.well-known/smart-configuration to see the details of our SMART configuration and the URLs you will need to authenticate. In particular these two endpoints will be needed during your authentication process.

"authorization_endpoint": "https://accounts.intelimd.com/authorize"

“token_endpoint”: “https://accounts.intelimd.com/token”

Note: Authorization URLs will differ for pre-production environments used for quality assurance and testing. Please coordinate with your implementation contact for specific guidance on which URLs apply for your target environment.

Authentication for Machine-to-Machine Bulk Access Integrations

If you are setting up a Machine-to-Machine integration, you can expect the following:

- Your contact person will put you in touch with the team that is managing our FHIR server
- Meet with the tech team so that we can talk through the data you will need to access.
- Our tech team will then work with your team to enable authentication to our FHIR server.

Software Tools for Authenticating

We have received feedback that Postman works consistently for querying our FHIR server. If you are encountering issues authenticating into our server or running queries, please use Postman or another API testing tool to help identify the source of the issue.

Overview

Terms & Conditions

Fees

inteliMD offers a range of services through a monthly subscription plan. For more information, please visit https://www.intelimd.com/providers-health-systems#packages

Restrictions

inteliMD FHIR APIs are only available to registered developers.
Production access is limited to customers that have licensed the inteliMD FHIR API functionality.
Third-party developers must execute a Business Associate Agreement (BAA) with inteliMD.
The inteliMD API uses rate limiting to safeguard against bursts of incoming traffic to help maximise its stability. Users who send many requests in quick succession may see error responses with a 429 status code.

Obligations

App developers must ensure all electronic protected health information (ePHI) is handled securely and appropriately.

Developers are encouraged to review all applicable state and federal rules including, but not limited to, the related ONC criteria:

- §170.315(d)(1) Authentication, access control, authorization
- §170.315(d)(5) Automatic access time-out
- §170.315(d)(7) End-user device encryption
- §170.315(d)(8) Integrity
- §170.315(d)(12) Encrypt authentication credentials

Schema

All API access is over HTTPS. All data is sent and received as JSON or XML. Blank fields are omitted. All timestamps are returned in FHIR® standard date/dateTime formats.

Technical documentation of FHIR

FHIR resources covering the USCDI v1 data elements (US Core v4.0.1)

USCDI v1 includes data classes such as:

- Patient Demographics
- Allergies and Intolerances
- Medications
- Problem List (Conditions)
- Procedures
- Smoking Status
- Immunizations
- Laboratory Results
- Vital Signs
- Assessment and Plan of Treatment
- Goals
- Health Concerns

inteliMD supports the R4 FHIR standard defined media type for JSON content: application/fhir+json

Root URL

inteliMD Production root URL: https://fhir.intelimd.com

FHIR API requests will be made against URLs of the following format.
:rootURL/:resource[?:parameters]

Note: These URLs will differ for pre-production environments used for quality assurance and testing. Please coordinate with your implementation contact for specific guidance on which URLs apply for your target environment.

Resource

The FHIR standard resource to access. Example: Patient

Parameters

Many API methods take optional parameters.

Resource Identity

Please note that no IDs or Identifiers in the inteliMD FHIR server are intended to be used outside of the context of their complete URL. A complete URL consists of the service root url, the resource, and the parameters (if any).

Errors and Exceptions

Error codes

The FHIR server will return standard HTTP Error codes, here are some you might encounter:

- A 400 Bad Request response can be received for a variety of reasons such as making a request with a invalid query parameter. For example searching Patient resource with the “sample” query param:

```
GET rootURL/Patient?sample=1234
-> HTTP/1.1 400 Bad Request
```

- A 404 Not Found response can be received when making a request with an invalid or unsupported resource type or if a specific FHIR resource is not found for a certain ID. For example if you request the “SampleResource” that does not exist:

```
GET rootURL/SampleResource
HTTP/1.1 404 Not Found
```

- A 403 Forbidden response is received when making a request the client does not have permissions to make. For example if your token only allows access to one Patient's resources but you request all Patient resources:

```
GET rootURL/Patient
HTTP/1.1 403 Forbidden
```

OperationOutcome

For most errors we will include a response body in the form of an OperationOutcome FHIR resource. You will find more information about the error within the resource in the `issue.details`.

```
{
   "resourceType": "OperationOutcome"
   "issue": [
      {
         "code": "invalid",
         "details": {
            "text": "Not found"
         },
         "severity": "error"
      }
   ],
}
```

Validation

When making create or update requests to the FHIR server the payloads will be validated according to the FHIR Release 4 specifications. Any get or search requests will return payloads that conform to the FHIR specifications.

Capability Statement

The CapabilityStatement describes the FHIR server's functionality, including the resource types that the server supports. Resource type inclusion in this list does not guarantee that such a resource exists in the server, only that it could accept them.

Retrieve the CapabilityStatement via the following unauthenticated API:

```
GET /4.0/metadata
```

Resources

Allergyintolerance

The AllergyIntolerance resource provides a bundle of allergies for a given patient resource. An example of retrieving AllergyIntolerance records is included below.

Get allergy intolerances associated with a specific patient

Authentication: JWT

Method: GET

Function Name: AllergyIntolerance.read

Accept: application/fhir+json'

Query Parameters: patient // patientId // required

Return: Body json

API Syntax

```
GET https://fhir.intelimd.com/AllergyIntolerance?patient={Patient ID}

Example:
GET
https://fhir.intelimd.com/AllergyIntolerance?patient=76c9ba27-9547-4664-b021-cdabaec4631b
```

Condition(Health Concerns)

Condition resources identify a condition, diagnosis, or other clinical concept that has risen to a level of concern. Examples of API calls for condition resources are shown below:

Get conditions associated with a specific patient

Authentication: JWT

Method: GET

Function Name: Condition.read

Accept: application/fhir+json'

Query Parameters: patient // patientId // required

Return: Body json

API Syntax

```
GET https://fhir.intelimd.com/Condition?patient={patientID}

Example:
GET https://fhir.intelimd.com/Condition?patient=76c9ba27-9547-4664-b021-cdabaec4631b
```

Device

Device resources represent items used in the provision of healthcare, including medical devices such as durable (reusable) medical equipment, implantable devices, as well as disposable equipment used for diagnostic, treatment, and research. Specifically, resources for implantable devices use the US Core Implantable Device profile. Examples of API requests to retrieve device data are shown below:

Get implantable devices associated with a specific patient

Authentication: JWT

Method: GET

Function Name: Device.read

Accept: application/fhir+json'

Query Parameters: patient // patientId // required

Return: Body json

API Syntax

```
GET https://fhir.intelimd.com/Device?patient={patientID}
Example:
GET https://fhir.intelimd.com/Device?patient=6d07a297-0921-4a5d-ad66-05e3b512ab59
```

Encounter

Encounter resources identify an appointment or encounter where a patient met with a care provider, either in-person or virtually. Examples of encounters include in-office appointments and tele-health visits.

Get specific encounter using encounter ID

Authentication: JWT

Method: GET

Function Name: Encounter.read

Accept: application/fhir+json'

Query Parameters: _id// EncounterID // required

Return: Body json

API Syntax

```
GET https://fhir.intelimd.com/Encounter?_id={EncounterID}

Example:
GET https://fhir.intelimd.com/Encounter?_id=43x3gg54-8202-8223-l032-lkeiesc9232e
```

Get encounters associated with a specific patient

Authentication: JWT

Method: GET

Function Name: Encounter.read

Accept: application/fhir+json'

Query Parameters: patient// patientId // required

Return: Body json

```
GET https://fhir.intelimd.com/Encounter?patient={patientID}

Example:
GET https://fhir.intelimd.com/Encounter?patient=76c9ba27-9547-4664-b021-cdabaec4631b
```

Goal

The Goal resource represents a desired health state to be achieved for a patient, for example weight loss or restoring activities of daily living. This resource can also apply to a group of patients or an organization. However, here at inteliMD, the Goal resource will primarily be used for patient goals. Example API requests for goal records are shown below:

Retrieve all goals related to a patient

Authentication: JWT

Method: GET

Function Name: Goal.read

Accept: application/fhir+json'

Query Parameters: patient// patientId // required

Return: Body json

```
GET https://fhir.intelimd.com/Goal?patient={patientID}

Example:
GET https://fhir.intelimd.com/Goal?patient=87b9744f-7316-4e6d-b1dd-22b467215e05
```

Immunization

Each Immunization resource identifies an immunization performed on a patient. A bundle of these resources together can be used to represent the immunization history of the patient. Example API requests for immunization records are shown below:

Retrieve all immunizations related to a patient

Authentication: JWT

Method: GET

Function Name: Immunization.read

Accept: application/fhir+json'

Query Parameters: patient// patientId // required

Return: Body json

```
GET https://fhir.intelimd.com/Immunization?patient={patientID}

Example:
GET https://fhir.intelimd.com/Immunization?patient=d20e1c25-2bba-4b36-a52e-936eec764c98
```

Observation

The Observation resource records a variety of data elements central to determining diagnoses and managing care. Examples of observations include vital signs, laboratory data, imaging, device measurements, personal characteristics such as eye color, and social history such as smoking status.

Additionally, several profiles are currently used in Observation resources, providing additional validation for specific use cases:

- Vital Signs
- Lab Results
- Smoking Status

Example requests for observation data are shown below:

Retrieve observations related to a patient

Authentication: JWT

Method: GET

Function Name: Observation.read

Accept: application/fhir+json'

Query Parameters: patient// patientId // required

Return: Body json

```
GET https://fhir.intelimd.com/Observation?patient={patientID}

Example:
GET https://fhir.intelimd.com/Observation?patient=be8d5796-7e63-4446-89f0-8e5d1f6d13fe
```

Patient

The Patient resource type provides demographic and contact details about the patient in InteliMD's EHR. This resource covers the "who" about the patient, including name, date of birth, birth sex, gender, and address. Example requests for patient data are shown below:

Get patient by resource ID

Authentication: JWT

Method: GET

Function Name: Patient.read

Accept: 'application/fhir+json'

Path Parameters: patient// patientId // required

Return: Body json

```
GET https://fhir.intelimd.com/Patient/{patientID}

Example:
GET https://fhir.intelimd.com/Patient/91397804-a601-40c4-a7e8-6f3270468350
```

The resource ID can also be used in combination with search parameters using the `_id` parameter:

Authentication: JWT

Method: GET

Function Name: Patient.read

Accept: application/fhir+json'

Query Parameters:_id// patientId // required

Return: Body json

```
GET https://fhir.intelimd.com/Patient?_id={patientID}

Example:
GET https://fhir.intelimd.com/Patient?_id=91397804-a601-40c4-a7e8-6f3270468350
```

Search for patients by name

Patients are searchable by their entire name, or just the given and family parts:

Authentication: JWT

Method: GET

Function Name: Patient.search

Accept: application/fhir+json'

Query Parameters: all are optional

Name, given, family, birthdate

Return: Body json

```
GET https://fhir.intelimd.com/Patient?name={string}
GET https://fhir.intelimd.com/Patient?given={string}
GET https://fhir.intelimd.com/Patient?family={string}


Examples:
GET https://fhir.intelimd.com/Patient?name=Alex
GET https://fhir.intelimd.com/Patient?given=Nancy
GET https://fhir.intelimd.com/Patient?family=Jones
```

Find using date of birth and patient name

Multiple parameters can be combined to help ensure search result uniqueness.

```
GET https://fhir.intelimd.com/Patient?birthdate={date}&name={string}

Example:
GET https://fhir.intelimd.com/Patient?birthdate=1935-01-08&name=Elvis
```

Procedure

The Procedure resource type identifies procedures performed on a patient, including surgical procedures, diagnostic procedures, endoscopic procedures, biopsies, counselling, personal support services, etc. Example API requests for procedure data are shown below:

Get all procedures performed on a patient

Authentication: JWT

Method: GET

Function Name: Procedure.search

Accept: application/fhir+json'

Query Parameters: patient // patientID // required

Code, date // optional

Return: Body json

```
GET https://fhir.intelimd.com/Procedure?patient={patientID}

Example:
GET https://fhir.intelimd.com/Procedure?patient=76c9ba27-9547-4664-b021-cdabaec4631b
```

Find specific procedure by patient ID, code, and date

```
GET https://fhir.intelimd.com/Procedure?patient={patientID}&code={system}|{code}&date={date}

Examples:
GET
https://fhir.intelimd.com/Procedure?patient=76c9ba27-9547-4664-b021-cdabaec4631b&code=http://snomed.info/sct|35637008&date=2019-01-14T00:00:00Z
(specific date)

GET
https://fhir.intelimd.com/Procedure?patient=76c9ba27-9547-4664-b021-cdabaec4631b&code=http://snomed.info/sct|35637008&date=ge2019-01-14T00:00:00Z&date=le2020-01-14T00:00:00Z
(date range)
```

CareTeam

The CareTeam resource identifies the different members of a patient's care team, and the role that these members play in caring for the patient. A patient may have multiple care teams. Example API requests for care team information are shown below:

Get Care Teams related to a specific patient

Authentication: JWT

Method: GET

Function Name: CareTeam.search

Accept: application/fhir+json'

Query Parameters: patient // patientID // required

status // optional

Return: Body json

```
GET https://fhir.intelimd.com/CareTeam?patient={patientID}

Example:
GET https://fhir.intelimd.com/CareTeam?patient=6d07a297-0921-4a5d-ad66-05e3b512ab59
```

```
Find Care Teams using a patient ID and status of the care team
GET https://fhir.intelimd.com/CareTeam?patient={patientID}&status={status}

Examples:
GET https://fhir.intelimd.com/CareTeam?patient=6d07a297-0921-4a5d-ad66-05e3b512ab59&status=active
GET https://fhir.intelimd.com/CareTeam?patient=6d07a297-0921-4a5d-ad66-05e3b512ab59&status=inactive
```

DiagnosticReport

The Diagnostic Report resource is used to summarise findings and test results from labs, imaging, and other diagnostics. Examples of API requests for diagnostic report resources are shown below:

Get Diagnostic Reports related to a specific patient

Authentication: JWT

Method: GET

Function Name: DiagnosticReport.search

Accept: application/fhir+json'

Query Parameters: patient // patientID // required

category | code // optional

Return: Body json

```
GET https://fhir.intelimd.com/DiagnosticReport?patient={patientID}

Example:
GET https://fhir.intelimd.com/DiagnosticReport?patient=700aaa12-1141-4c7b-8720-e87904c26fc6
```

Find by patient ID and category of report

```
GET https://fhir.intelimd.com/DiagnosticReport?patient={patientID}&category={system}|{code}

Example:
```

```
GET
https://fhir.intelimd.com/DiagnosticReport?patient=700aaa12-1141-4c7b-8720-e87904c26fc6&category=
http://loinc.org|LP29684-5
```

DocumentReference

The DocumentReference resource identifies the location of a clinical note, image, or PDF related to a patient. This is used as a pointer to the location of the document: the actual content is stored elsewhere, and will need to be accessed separately. Example API requests for a specific document, as well as to see all of the documents associated with a particular patient, are shown below:

Get using DocumentReference ID

Authentication: JWT

Method: GET

Function Name: DocumentReference.read

Accept: application/fhir+json'

Path Parameters: documentReferenceID// required

Return: Body json

```
GET https://fhir.intelimd.com/DocumentReference/{documentReferenceID}

Example:
GET https://fhir.intelimd.com/DocumentReference/5d6b8688-1d0d-434d-8107-d9353b2fc056
```

Retrieve all document references related to a patient

Authentication: JWT

Method: GET

Function Name: DocumentReference.search

Accept: application/fhir+json'

Query Parameters:patient// required

Category|code, date // optional

Return: Body json

```
GET https://fhir.intelimd.com/DocumentReference?patient={patientID}

Example:
GET https://fhir.intelimd.com/DocumentReference?patient=42ff5814-5cbc-4990-84b7-7610d687c21f
```

Find by Patient ID, category and date search parameters

```
GET
https://fhir.intelimd.com/DocumentReference?patient={patientID}&category={system}|{code}&dat
e={date}

Example:
GET
https://fhir.intelimd.com/DocumentReference?patient=42ff5814-5cbc-4990-84b7-7610d687c21f&cat
egory=http://loinc.org|11488-4&date=ge2020-01-01T00:00:00Z
```

Medication

The Medication resource represents the medication dictionary that inteliMD clinicians use when ordering medications or when adding items to a patient's medications list. The Medication resource is referenced by each MedicationRequest – you will need to resolve the reference to the specific Medication resource in order to understand the underlying medication that is used in the MedicationRequest that is related to a patient.

Retrieve all medications used by inteliMD

Authentication: JWT

Method: GET

Function Name: Medication.read

Accept: application/fhir+json'

Query Parameters:_id // required

Return: Body json

```
GET https://fhir.intelimd.com/Medication
```

Retrieve a specific medication based on the medication's ID

```
GET https://fhir.intelimd.com/MedicationRequest?_id={medication ID}

Example:
GET https://fhir.intelimd.com/MedicationRequest/?_id=7fe175a3-594b-11ed-9cbf-0691d460fa69
```

MedicationRequest

The MedicationRequest resource records medications that have been prescribed to a patient, and self-reported over-the-counter medications. This is not intended for diet prescriptions or for non-medication items (such as sunglasses, supplies, etc.)

To differentiate between ordered and patient-reported medications, look at the intent field.

```
intent field = "plan":   This indicates a patient-reported medication

intent field = "order":  This indicates a prescribed medication
```

Retrieve all medication requests related to a patient

Authentication: JWT

Method: GET

Function Name: MedicationRequest.read

Accept: application/fhir+json'

Query Parameters: patient // required

Return: Body json

```
GET https://fhir.intelimd.com/MedicationRequest?patient={patientID}

Example:
GET https://fhir.intelimd.com/MedicationRequest?patient=9335d39b-65eb-4394-b674-ef2d31b98bbb
```

Find medications related to a patient based on the date/time that the order was initially created

Authentication: JWT

Method: GET

Function Name: MedicationRequest.search

Accept: application/fhir+json'

Query Parameters: patient // required

authoredon // optional

Return: Body json

```
GET https://fhir.intelimd.com/MedicationRequest?patient={patientID}&authoredon={date}

Examples:
GET
https://fhir.intelimd.com/MedicationRequest?patient=9335d39b-65eb-4394-b674-ef2d31b98bbb&authoredon=2019-01-01
(search on specific date)

GET
https://fhir.intelimd.com/MedicationRequest?patient=9335d39b-65eb-4394-b674-ef2d31b98bbb&authoredon=ge2019-01-01T00:00:00Z&authoredon=lt2020-01-01T00:00:00Z
(search in date range)
```

Search and Results

Basic Searches

InteliMD supports many of the basic FHIR searches for each resource. For these specific searches, please click the Resource links, and review the examples of the basic searches that we support. HL7 has a detailed informational page about searching using FHIR. HL7 has a detailed page about search results.

Results and Bundles

Search results are returned as Bundles.

Below is an example of a bundle response, where two AllergyIntolerances were found for a specific patient.

Authentication: JWT

Method: GET

Function Name: Bundle.search

Accept: application/fhir+json'

Query Parameters: type, _id, // all are optional


```
{
    "entry": [
        {
            "fullUrl":
"https://fhir.intelimd.com/AllergyIntolerance/3b3812f2-f35a-11ed-aaad-06425ade9f2d/_history/86d2c6ca-60f8-46b3
-87f6-ca9eb86117e0",
            "resource": {
                "clinicalStatus": {
                    "coding": [
                        {
                            "code": "inactive",
                            "display": "Inactive",
                            "system": "http://terminology.hl7.org/CodeSystem/allergyintolerance-clinical"
                        }
                    ]
                },
                "code": {
                    "coding": [
                        {
                            "code": "372788003",
                            "system": "http://snomed.info/sct"
                        }
                    ],
                    "text": "Sulfa (Sulfonamide Antibiotics)"
                },
                "id": "3b3812f2-f35a-11ed-aaad-06425ade9f2d",
                "meta": {
```

```
                    "lastUpdated": "2023-05-15T20:15:12Z",
                    "source": "Device/b9b21c63-4ab7-427e-a46b-eba26e2e4c67",
                    "versionId": "86d2c6ca-60f8-46b3-87f6-ca9eb86117e0"
                },
                "patient": {
                    "reference": "Patient/735565a9-46dc-11e9-bd76-0a23f1c538ce"
                },
                "resourceType": "AllergyIntolerance"
            }
        },
        {
            "fullUrl":
"https://fhir.intelimd.com/AllergyIntolerance/3b38cb2e-f35a-11ed-aaad-06425ade9f2d/_history/a4027b9b-a5dd-49a5
-b993-5e6a1b4ccf3b",
            "resource": {
                "clinicalStatus": {
                    "coding": [
                        {
                            "code": "inactive",
                            "display": "Inactive",
                            "system": "http://terminology.hl7.org/CodeSystem/allergyintolerance-clinical"
                        }
                    ]
                },
                "code": {
                    "text": "shellfish derived"
                },
                "id": "3b38cb2e-f35a-11ed-aaad-06425ade9f2d",
                "meta": {
                    "lastUpdated": "2023-05-15T20:15:13Z",
                    "source": "Device/b9b21c63-4ab7-427e-a46b-eba26e2e4c67",
                    "versionId": "a4027b9b-a5dd-49a5-b993-5e6a1b4ccf3b"
                },
                "patient": {
                    "reference": "Patient/735565a9-46dc-11e9-bd76-0a23f1c538ce"
                },
                "resourceType": "AllergyIntolerance"
            }
        }
    ],
    "id": "0d91ebcf-5812-4aec-89f1-f5b7c144dd8b",
    "link": [
        {
```

```
            "url": "AllergyIntolerance?_page=1&patient=Patient%2F735565a9-46dc-11e9-bd76-0a23f1c538ce",
            "relation": "first"
        },
        {
            "url": "AllergyIntolerance?_page=2&patient=Patient%2F735565a9-46dc-11e9-bd76-0a23f1c538ce",
            "relation": "last"
        },
        {
            "url": "AllergyIntolerance?_page=2&patient=Patient%2F735565a9-46dc-11e9-bd76-0a23f1c538ce",
            "relation": "next"
        }
    ],
    "resourceType": "Bundle",
    "total": 2,
    "type": "searchset"
}
```


Clinical Coding Searches

We support the system and code search functionality for Codeable Concept systems. This is one of the token parameter searches, for searching coding system URIs and specific codes.

For example, to search for Conditions where:

- the code system is ICD-10CM
- the code is Z34.00 (this is a pregnancy code)
- and the condition is active

you may use the following:

Authentication: JWT

Method: GET

Function Name: Condition.search

Accept: application/fhir+json'

Query Parameters: all are optional

code, clinical-status // optional

Return: Body json

```
GET https://fhir.intelimd.com/Condition?code={System URI}|{Code}&clinical-status={System URI}|{Code}

Example:
GET
https://fhir.intelimd.com/Condition?code=http://hl7.org/fhir/sid/icd-10-cm|Z34.00&clinical-status=http://terminology.hl7.org/CodeSystem/condition-clinical|active
```

You may also modify this search to restrict it to a specific patient

```
GET https://fhir.intelimd.com/Condition?code={System URI}|{Code}&clinical-status={System URI}|{Code}&patient=Patient/{Patient ID}


Example:
GET
https://fhir.intelimd.com/Condition?code=http://hl7.org/fhir/sid/icd-10-cm|Z34.00&clinical-status=http://terminology.hl7.org/CodeSystem/condition-clinical|active&patient=Patient/0475f461-46dd-11e9-bd76-0a23f1c538ce
```

The above are only examples of token parameter searches related to the Condition resource. This can be applied to other Codeable Concept fields, such as those found in AllergyIntolerance, Medications, Procedures, Labs, and more.

Obtaining referenced resources (_include)

We support the _include search function, which allows you to quickly pull in referenced resources, without requiring separate API calls to obtain those referenced resources.

For example, the following search will provide all of the MedicationRequests associated with a patient, along with all of the Medication resources that are referenced by those MedicationRequests. Please note that the bundle count at the bottom of the search result will only count the top level resources that you searched for. In this case, the count would include the MedicationRequests that were found for the specific patient. The bundle count would not include the underlying Medication resources that were pulled in as a result of the _include search.

Authentication: JWT

Method: GET

Function Name:[Resource**]**.search

Accept: application/fhir+json'

Query Parameters: all are optional

_count,patient, _include=Related resource // optional

Return: Body json

```
GET https://fhir.intelimd.com/MedicationRequest?_count={Number}&patient={Patient ID}&_include=MedicationRequest:medication

Example:
GET https://fhir.intelimd.com/MedicationRequest?_count=2000&patient=Patient/test-101&_include=MedicationRequest:medication
```

Response:


```
{
  "resourceType": "Bundle",
  "id": "0034f6ec-d667-46e5-b57c-1b23708b780e",
  "meta": {
      "lastUpdated": "2024-05-31T09:43:43.865+00:00"
  },
  "type": "searchset",
  "total": 3,
  "link": [
      {
          "relation": "self",
          "url":
"https://fhir.intelimd.com/MedicationRequest?_count=2000&_include=MedicationRequest%3Amedication&patient=Patient%2Ftest-101"
      }
  ],
  "entry": [
      {
          "fullUrl":
"https://fhir.intelimd.com/MedicationRequest/local-order-8",
          "resource": {
              "resourceType": "MedicationRequest",
              "id": "local-order-8",
```

```
            "meta": {
                "versionId": "1",
                "lastUpdated": "2023-11-29T12:49:29.364+00:00",
                "source": "#PXC4zCfiIiQnsZmJ"
            },
            "status": "active",
            "intent": "order",
            "category": [
                {
                    "coding": [
                        {
                            "system":
"http://terminology.hl7.org/CodeSystem/medicationrequest-category",
                            "code": "inpatient",
                            "display": "Inpatient"
                        }
                    ]
                }
            ],
            "reportedBoolean": true,
            "medicationReference": {
                "reference": "Medication/local-55"
            },
            "subject": {
                "reference": "Patient/test-101"
            },
            "encounter": {
                "reference": "Encounter/local-445"
            },
            "authoredOn": "2023-01-02T08:19:53.000Z",
            "requester": {
                "reference": "Practitioner/local-265"
            },
            "dosageInstruction": [
                {
                    "text": "ergocalciferol, 1, MEQ/ML, Oral Solution,
Oral Disintegrating, BID, PRN:None, First Dose\n
:1/2/2023 13:49:31 MST"
                }
            ]
```

```
          },
          "search": {
              "mode": "match"
          }
      },
      {
          "fullUrl":
"https://fhir.intelimd.com/MedicationRequest/local-prescribe-202",
          "resource": {
              "resourceType": "MedicationRequest",
              "id": "local-prescribe-202",
              "meta": {
                  "versionId": "1",
                  "lastUpdated": "2023-11-29T12:50:22.051+00:00",
                  "source": "#bwcJMjq82XSqPSkx"
              },
              "status": "active",
              "intent": "plan",
              "category": [
                  {
                      "coding": [
                          {
                              "system":
"http://terminology.hl7.org/CodeSystem/medicationrequest-category",
                              "code": "outpatient",
                              "display": "Outpatient"
                          }
                      ]
                  }
              ],
              "reportedBoolean": false,
              "medicationReference": {
                  "reference": "Medication/local-31"
              },
              "subject": {
                  "reference": "Patient/test-101"
              },
              "encounter": {
                  "reference": "Encounter/local-445"
              },
```

```
            "authoredOn": "2023-01-03T11:56:56.000Z",
            "requester": {
                "reference": "Practitioner/local-265"
            },
            "dosageInstruction": [
                {
                    "text": "vitamin E/zinc oxide/ascorbic acid/beta
carotene/cuprous oxide, Rectal, 1 Oral Cap, 7 times per day, 2 days,
PRN:None, Refill:3"
                }
            ]
        },
        "search": {
            "mode": "match"
        }
    },
    {
        "fullUrl":
"https://fhir.intelimd.com/MedicationRequest/local-prescribe-203",
        "resource": {
            "resourceType": "MedicationRequest",
            "id": "local-prescribe-203",
            "meta": {
                "versionId": "1",
                "lastUpdated": "2023-11-29T12:50:47.782+00:00",
                "source": "#T6C4JCJAEh5ULmYx"
            },
            "status": "active",
            "intent": "plan",
            "category": [
                {
                    "coding": [
                        {
                            "system":
"http://terminology.hl7.org/CodeSystem/medicationrequest-category",
                            "code": "outpatient",
                            "display": "Outpatient"
                        }
                    ]
                }
```

```
            ],
            "reportedBoolean": false,
            "medicationReference": {
                "reference": "Medication/local-31"
            },
            "subject": {
                "reference": "Patient/test-101"
            },
            "encounter": {
                "reference": "Encounter/local-445"
            },
            "authoredOn": "2023-01-03T11:59:00.000Z",
            "requester": {
                "reference": "Practitioner/local-265"
            },
            "dosageInstruction": [
                {
                    "text": "lopinavir/ritonavir, Oral Pill, 1 cap, 5
times per day, 2 days, PRN:None, Refill:2"
                }
            ]
        },
        "search": {
            "mode": "match"
        }
    },
    {
        "fullUrl": "https://fhir.intelimd.com/Medication/local-31",
        "resource": {
            "resourceType": "Medication",
            "id": "local-31",
            "meta": {
                "versionId": "1",
                "lastUpdated": "2023-11-29T12:36:17.637+00:00",
                "source": "#C3OKnMFogBOGOKiV"
            },
            "text": {
                "status": "generated",
                "div": "<div xmlns=\"http://www.w3.org/1999/xhtml\"><div
class=\"hapiHeaderText\"> METHYLTESTOSTERONE(ORETON METHYL) </div></div>"
```

```
            },
            "code": {
                "coding": [
                    {
                        "system":
"http://www.nlm.nih.gov/research/umls/rxnorm",
                        "code": "314110",
                        "display": "METHYLTESTOSTERONE(ORETON METHYL)"
                    }
                ]
            },
            "status": "active"
        },
        "search": {
            "mode": "include"
        }
    },
    {
        "fullUrl": "https://fhir.intelimd.com/Medication/local-55",
        "resource": {
            "resourceType": "Medication",
            "id": "local-55",
            "meta": {
                "versionId": "1",
                "lastUpdated": "2023-11-29T12:36:31.360+00:00",
                "source": "#dqZ5X3TgXalY563u"
            },
            "text": {
                "status": "generated",
                "div": "<div xmlns=\"http://www.w3.org/1999/xhtml\"><div
class=\"hapiHeaderText\"> DIETHYLSTILBESTROL(DIETHYLSTILBESTROL)
</div></div>"
            },
            "code": {
                "coding": [
                    {
                        "system":
"http://www.nlm.nih.gov/research/umls/rxnorm",
                        "code": "204499",
```

```
                            "display":
"DIETHYLSTILBESTROL(DIETHYLSTILBESTROL)"
                        }
                    ]
                },
                "status": "active"
            },
            "search": {
                "mode": "include"
            }
        }
    ]
}
```

Sorting and Pagination

To control the sort order of the search results returned by the FHIR server, pass the `_sort` parameter with a list of fields in priority order on which to sort. To sort a field in inverse order, prefix the field name with `-`. For example, `GET https://fhir.intelimd.com/Patient?_sort=-birthdate` would return the list of all patients sorted by age, from youngest to oldest.

If the set of search results is too large to fit in a single response, the FHIR server will return a page of partial results. To get the full set of results, it is possible to request pages in linear order using the `Bundle.link` field in the result payload. The response is formatted as follows:

```
{
    "resourceType": "Bundle",
    "type": "searchset",
    "entry": [
        {
            "fullURL": "https://fhir.intelimd.com/Patient/123",
            "resource": {
                "resourceType": "Patient",
                "id": "123",
                // ...
            }
```

```
        },
        //...
    ],
    "link": [
        {
            "url": "https://fhir.intelimd.com/Patient?name=Elvis&_page=1",
            "relation": "first"
        },
        {
            "url": "https://fhir.intelimd.com/Patient?name=Elvis&_page=2",
            "relation": "next"
        },
        {
            "url": "https://fhir.intelimd.com/Patient?name=Elvis&_page=2",
            "relation": "last"
        }
    ],
    "total": 172
}
```

The links presented can be used directly to retrieve the next page of results, as they preserve the search parameters present in the initial request. Links to the `first` and `last` pages are always present (and may point to the same page), with `next` and `previous` links present only when applicable.

Additionally, the size of the result set can be controlled using the `_count` parameter. The number of results returned will be at most the number specified in the parameter, e.g. `_count=20`. The FHIR server currently supports a maximum page size of 1,000 resources.

Extensions

The FHIR server allows the use of FHIR Extensions to add data not directly supported by the FHIR standard.

Searching on extension

The server supports a custom search parameter to allow searching for resources that have a given extension. The `extension=[url]` parameter is available for all resource types, and will

return any resource on which the given extension is attached. For example, to retrieve patients with the US Core Race extension:

```
GET /4.0/Patient?extension=http://hl7.org/fhir/us/core/StructureDefinition/us-core-race
```

Extensions at inteliMD

Many extensions are already used in resources stored by inteliMD, and information about them is collected here for reference. Applications reading data from the FHIR server should be aware of any extensions that exist on the data they use, but should generally ignore any extensions they do not understand.

```
Note: If an extension appears in the modifierExtension field that your application does not understand, you should NOT attempt to process that resource as normal: it may have a different meaning than it appears to.
```

US Core

Several extensions are included as a part of the US Core profiles, and are generally only used in resources conforming to those profiles.

Race

- **Currently used in:** Patient
- **URL:** http://hl7.org/fhir/us/core/StructureDefinition/us-core-race

Documents the patient's race, and is generally paired with the US Core Ethnicity extension.

Example:

```
{
  "url": "http://hl7.org/fhir/us/core/StructureDefinition/us-core-race",
  "extension": [
    {
      "url": "ombCategory",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "2106-3",
        "display": "White"
      }
    },
```

```
    {
      "url": "ombCategory",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "1002-5",
        "display": "American Indian or Alaska Native"
      }
    },
    {
      "url": "ombCategory",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "2028-9",
        "display": "Asian"
      }
    },
    {
      "url": "detailed",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "1586-7",
        "display": "Shoshone"
      }
    },
    {
      "url": "detailed",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "2036-2",
        "display": "Filipino"
      }
    },
    {
      "url": "text",
      "valueString": "Mixed"
    }
  ]
}
```


Ethnicity

- **Currently used in:** Patient

- **URL:** http://hl7.org/fhir/us/core/StructureDefinition-us-core-ethnicity

Documents the patient's ethnicity.

Example:


```
{
  "extension": [
    {
      "url": "ombCategory",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "2135-2",
        "display": "Hispanic or Latino"
      }
    },
    {
      "url": "detailed",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "2184-0",
        "display": "Dominican"
      }
    },
    {
      "url": "detailed",
      "valueCoding": {
        "system": "urn:oid:2.16.840.1.113883.6.238",
        "code": "2148-5",
        "display": "Mexican"
      }
    },
    {
      "url": "text",
      "valueString": "Hispanic or Latino"
    }
  ],
  "url":
"http://hl7.org/fhir/us/core/StructureDefinition/us-core-ethnicity"
}
```

Revoke Token

The FHIR Token Revocation process is an important security feature for managing and invalidating access tokens that have been issued to clients. This process ensures that tokens can be revoked when they are no longer needed

Overview

Token revocation allows a client or authorization server to invalidate an access token or refresh token. Once a token is revoked, it can no longer be used to access FHIR resources.

Key Components

1. **Revocation Endpoint:** The server endpoint that handles token revocation requests.
2. **Client Authentication:** Ensures that only authorized clients can request token revocation.
3. **Token Type Hint:** Optionally indicates the type of token being revoked (access token or refresh token).

Flow and Description

The client sends a token revocation request to the authorization server's revocation endpoint.

- **Endpoint:** https://accounts.intelimd.com/revoke
- HTTP Method: POST
- Headers:
    - Content-Type**:** application/x-www-form-urlencoded
    - Authorization**:** Basic base64(client_id:client_secret) **(if client authentication is required)**
- **Body Parameters:**
    - token**: The token to be revoked (required).**
    - client_id**: A hint about the type of the token submitted for revocation (optional, can be** access_token **or** refresh_token**).**

Successful Response

```
HTTP/1.1 200 OK
Content-Type: application/json
{}
```

Error Response

```
HTTP/1.1 400 Bad Request
Content-Type: application/json

{
  "error": "unsupported_token_type"
}
```

Service base URL

In the context of FHIR, an **Endpoint** resource represents the technical details of a web service, such as a RESTful API, that is available for the purpose of exchanging healthcare data. An **Organization** resource represents an entity that is involved in providing healthcare services.

FHIR Service Base URL and Endpoint Resource

1. **Service Base URL**:
    - This is the root URL where the FHIR server is hosted. All FHIR API requests are based on this URL.
    - Example: `https://fhir.intelimd.com/Endpoint?_include=Endpoint:organization`
2. **Endpoint Resource**:
    - The `Endpoint` resource provides the technical details of the web services provided by the organization.
    - It includes information like the address (URL), connection type, and other relevant details.
    - The `Endpoint` resource is linked to an `Organization` to specify which organization offers this endpoint.
3. **Organization Resource**:

- The `Organization` resource provides information about an entity that provides healthcare services.
- This includes details like the organization's name, contact details, and address.

4. **Bundle Resource**:
   - A `Bundle` is a collection of resources. It can contain multiple resources of different types, including `Endpoint` and `Organization`.

Method: GET

Function Name: Endpoint.search

Accept: application/fhir+json'

Query Parameters: _include=Endpoint:organization

Return: Body json


```
{
 "resourceType": "Bundle",
 "type": "searchset",
 "total": 1,
 "entry": [
   {
     "fullUrl": "https://fhir.intelimd.com/Endpoint/local-88",
     "resource": {
       "resourceType": "Endpoint",
       "id": "local-88",
       "meta": {
         "versionId": "4",
         "lastUpdated": "2024-05-31T17:04:42.763+05:30",
         "source": "#Y5W0KV6KTiJHJBkh"
       },
```

```
      "extension": [
        {
          "url":
"http://hl7.org/fhir/StructureDefinition/endpoint-fhir-version",
          "valueCode": "4.0.1"
        }
      ],
      "status": "active",
      "connectionType": {
        "system":
"http://terminology.hl7.org/CodeSystem/endpoint-connection-type",
        "code": "hl7-fhir-rest"
      },
      "name": "TIN A Endpoint",
      "managingOrganization": {
        "reference": "Organization/local-88"
      },
      "payloadType": [
        {
          "coding": [
            {
              "system":
"http://terminology.hl7.org/CodeSystem/endpoint-payload-type",
              "code": "none"
```

```
            }
          ]
        }
      ],
      "address": "http://localhost:4000"
    }
  },
  {
    "fullUrl": "https://fhir.intelimd.com/Organization/local-88",
    "resource": {
      "resourceType": "Organization",
      "id": "local-90",
      "meta": {
        "versionId": "3",
        "lastUpdated": "2024-05-31T17:04:48.299+05:30",
        "source": "#ylyZMplVYBF2TMAS"
      },
      "identifier": [
        {
          "system": "http://hl7.org/fhir/sid/us-npi",
          "value": "1558444216"
        }
      ],
```

```
      "active": true,
      "type": [
        {
          "coding": [
            {
              "system":
"http://terminology.hl7.org/CodeSystem/organization-type",
              "code": "prov",
              "display": "Healthcare Provider"
            }
          ]
        }
      ],
      "telecom": [
        {
          "system": "phone",
          "value": "+1 2349857410",
          "use": "work"
        },
        {
          "system": "fax",
          "value": "4356645968",
          "use": "work"
        }
```

```
    ],
    "address": [
      {
        "use": "work",
        "type": "both",
        "line": [
          "A 5 Evontech",
          "IT Park"
        ],
        "city": "Dehradun",
        "state": "AK",
        "postalCode": "24801",
        "country": "USA"
      }
    ],
    "endpoint": [
      {
        "reference": "Endpoint/local-88",
        "display": "TIN A Endpoint"
      }
    ]
  }
}
```

```
 ]

}
```

Developer Name – inteliMD PLLC.

Product Name - inteliMD

Version 1

Certificate number -

Certification date -

Criteria certified - §170.315(g)(10)

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