eHealth Ontario

eConsult FHIR Interface Specification

Implementation Guide

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Ontario
eHealth Ontario

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1 Introduction

1.1 Background

An eConsult occurs when a Primary Care Provider (PCP) electronically sends a question to a specialist. This can be a simple question (e.g., about a drug dosage) or a more complex question following an initial assessment by the PCP (e.g., asking for a virtual dermatology assessment and providing images of the patient). An eConsult differs from an eReferral in that the patient does not have to go and see the specialist. This document can be used by point of service systems to integrate with the provincial eConsult platform. This enables health service providers to create, update and close eConsults within the point of service rather than logging into the OTN's eConsult platform. This interface is based on FHIR DSTU2 (Oct 24, 2015 1.0.2).

1.2 Package content

1.2.1 Resource Definitions

To describe the structure of resources, we use FHIR structure definition (https://www.hl7.org/fhir/structuredefinition) format. Each resource type has a file with JSON and XML extensions. These two files represent the same structure and either one of them can be used. For example, both patient.xml and patient.json represent the same patient resource structure and the information contained in these two files are the same. If you prefer working with the JSON version of these files, you can ignore the XML version or vice versa.

1.2.2 Auto-generated word document

Trifolia (trifolia.lantanagroup.com) generates a human readable version of the resource definitions. This file (*Human_readable_resources.docx*) is also included in this package.

1.2.3 Terminology

This folder contains the value sets used in this project in ATOM and excel spreadsheet formats. All of these formats have the same content and any of them can be used.

1.2.4 URI List

This folder contains all the URLs used as identifiers in this project.

1.2.5 Examples

Several examples are included in the *Examples* folder.

1.2.6 Web-based Implementation Guide

A web version of the templates, value sets and coding systems in this implementation guide can be found in *web_IG* folder.

1.3 Identifier Policy

There are many places in this project that the use of OIDs or URLs is required. OIDs are object identifiers that serve as worldwide unique names for objects. All OIDs and URLs used in eHealth Ontario projects must conform to eHealth Ontario's OID and URL Policy.

For more information, or to obtain the proper OIDs and URLs for use in this project, contact the eHealth Ontario Standards Team at architecture@ehealthontario.on.ca

2 FHIR Specification

2.1 Introduction

This FHIR spec is based on FHIR DSTU2 (Oct 24, 2015 1.0.2). The MIME type for FHIR resources in this project is *application/json+fhir; charset=utf-8*.

2.2 Resource Types

In this project, a small subset of FHIR resources needed for the eConsult solution is implemented. For a complete list of FHIR resources visit http://www.hl7.org/fhir/DSTU2/resourcelist.html. Below is the list of resources related to this project and their corresponding maturity levels in the parentheses (http://www.hl7.org/fhir/DSTU2/resourcelist.html#maturity):

- DocumentReference (2)
- OperationOutcome (2)
- ReferralRequest (1)
- Organization (1)
- Composition (2)
- Practitioner (1)
- Patient (3)
- Bundle (2)

Since FHIR DSTU2 does not support all the data elements required for this project, we have created a customized FHIR profile. To do so, we have introduced new extensions, value sets and changed the cardinality of data elements in the abovementioned resources.

2.3 Resource IDs

All resources in this project will have IDs (path: [resourceType].id) when they are retrieved from the FHIR server. These IDs are generated by the FHIR server when the resources was created and are only recognized the FHIR server. These ID's can be used to perform GET, POST, PUT operations the resources using the following generic URL: [base]/[resourceType]/[id].
To get access to other identifications that are recognized by other software systems or organizations, one should look at [resourceType].identifier. For example, below we see a part of the patient/123 resource with a Health Card Number identifier:

```
{
        "resourceType": "patient",
        "id": "123"
        ...
        "identifier":{
                "system": "www.ehealthontario.ca/API/FHIR/NamingSystem/ca-on-patient-hcn",
                "value": "123-13-123",
        }
        ...
}
```

IDs for independent resources of the same type should be unique. There are also resources that are contained in other resources. IDs of the contained resources need to be unique only in the contained resource. For example, two practitioners that are contained in a referralRequest may have IDs 1 and 2 even though [base]/practitioner/1 and [base]practitioner/2 already exist. Note that practitioners 1 and 2 contained in a resource are not the same as [base]/practitioner/1 and [base]practitioner/2.

2.4 Resource Operations

2.4.1 HTTP Operation

In this section, we list allowable HTTP operation on eConsult resources. [] and {} represent mandatory and optional parameters respectively in the table of this section. Table 1 shows the allowed transactions on FHIR resources in this project and their corresponding HTTP operations:

Table 1 Supported FHIR HTTP operations

Transaction	HTP Operations	URL	Response Body Resource	Explanation
create	POST	[base]/[type]	An OperationOutcome	See section 2.5.8
update	PUT	[base]/[type]/[id]	An OperationOutcome	See section 2.5.8
read	GET	[base]/[type]/[id]	A Resource or an OperationOutcome	See section 2.5.8
Search	GET	[base]/[type][?searchExpression]	A Bundle	Search expression is mandatory

Please note that the following two transactions are not supported at the moment but may be considered for future:

Table 2 Unsupported FHIR HTTP operations

Transaction	HTP Operations	URL	Response Body Resource	Explanation
history	GET	[base]/[type]/[id]/_history/ {?searchExpression}	The return content is a Bundle containing the specified	Search expression is optional.

			version history, sorted with oldest versions last	
vread	GET	[base]/[type]/[id]/_history/[versionID]	A Resource	Reads a specific version of a resource

2.4.2 Searching

Searching is accomplished by performing a GET operation with a search expression in the URL: GET [base]/[type]/searchExpression.

2.4.2.1 Search Expression

A search expression is one or more parameter expressions in the following form:
searchExpression = parameterExpression&parameterExpression …

The parameter expression structure differs for different parameter types. Table 3 below lists the searchable parameter types and their respective parameter expression structure:

Table 3 FHIR search parameter types

Parameter Type	Parameter Expression Structure	Example	Allowed "=" sign Modifiers
String	parameter=[value]	name=john name=john,jack//john or jack	
Date	parameter ={comparator}[date]	birthdate=2010-10-01 birthdate=gt2010-10-01	lt // less than le // less than equal gt // greater than ge //greater than equal ne //not equal
Number	parameter ={comparator}[number]	length=27// equal to 27 length=27,28//equal to 27 or 28 length=lt27// less than 27 length=le27.6 length=gt27	Same as date
Token	parameter=[system]|[code]	reference=www.url.com|123	
Reference	parameter=[type]/[id]	requester=practitioner/123	

To check the membership of a parameter to set, value sets should be separated by comma. For instance, *patient/?name=john,jack* searches for patient with either of these two names.

This project does not implement all FHIR search capabilities as they are not needed for this project. Therefore, the search capabilities supported by the eConsult platform are a subset of those offered by FHIR. For more information about FHIR search capabilities refer to this page: https://www.hl7.org/fhir/search.html. In case of an erroneous search request, an operationOutcome resource describing the issues will be returned. For more information about this resource refer to section 2.5.8.

2.4.2.2 Common Search Parameters

Each resource type has a specific set of parameters that can be used to search instances of that resource. There is also a list of parameters that can be used to search any of the resources. Table 4 shows these parameters and their types:

Table 4 eConsult FHIR common search parameters

Name	Type	Explanation
_lastUpdated	Date/DateTime	Date resource last updated.

Example search for referralRequests that have been updated since 2010-10-01:
[base]/referralRequest /12/?_lastUpdated=gt2010-10-01

2.4.2.3 Summary

Performing a search may result in retrieval of a large number of resources bundled together. To reduce the size of each resource in the bundle, eConsult FHIR server has implemented the "_summary" search result parameter. If **_summary=true** is included in the search expression, parts (a summary) of the matching resources instead of the whole resources is returned. Examples:
GET [baseURL]/referralRequest/?date=gt2010-12-12&**_summary=true**
Server marks the resources with the tag SUBSETTED to ensure that the incomplete resource is not accidentally used to overwrite a complete resource as follows:


```
{
    "resourceType": "Patient",
    "id": "15617",
    "meta": {
      "versionId": "1",
      "lastUpdated": "2016-04-04T19:49:32.072-04:00",
      "tag": [
        {
          "system": "http://hl7.org/fhir/v3/ObservationValue",
          "code": "SUBSETTED",
          "display": "Resource encoded in summary mode"
        }
      ]
    },....
```

ID of the resource of the interest can be extracted from the summary and be used in a GET operation to retrieve the whole resource.
Organization is the only resource that supports summary. This resource does not support regular search. This means that if _summary=true is not a part of the search expression for this resource, the FHIR server will return an error message indicating that regular search is not supported.

2.4.2.4 Pagination

Performing a search may result in retrieval of a large number of resources bundled together. To reduce the number of resources in a bundle, eConsult server may choose to do pagination. In such a scenario, Bundle.total will be greater than the total number of resources returned in the search response bundle. To retrieve the next page of the resources, one needs to look at the URL at this path bundle.link[?(@.relation==“next”)].url . A GET operation on this URL retrieves the next page. The first page of the results will be available at this path: bundle.link[?(@.relation==“first”)].url .There are no requirements as to how these URLs are formatted and whether this call is stateful or stateless. If there is no link with the “next” relation in a search result bundle, we have reached the last page and no resources are left to be retrieved.
Please note that each page only has a link to the immediate next page (like a linked list). Retrieving the next page should be performed recursively in order to retrieve all the requested resources.
As an example, imagine 50 resources match our practitioner search criteria and server is including less than 50 resources in each bundle. Bundle below shows an example of what is returned by the server in this scenario when we do the search:

```
{
        "bundle": {
            …
                "type": "searchset",
                "total": 50,
                "link": [
                        {
                                "relation": "self",
                                "url": "https://example.com/base/Patient?family=smith"
                        }, {
                                "relation": "next",
                                "url": "https://example.com/base/nextpageurl"
                        },
                        {
                                "relation": "first",
                                "url": "https://example.com/base/firstpageurl"
                        }
                ]
        }       …
}
```

To retrieve the next page, user needs to perform a get on this URL:
https://example.com/base/nextpage_url
Please note that currently only referralRequest search results might be paginated.

2.5 Resources

Resources in this section are constrained version of FHIR DSTU2 resources. In sections below, [ehoExtensions] should be replaced with the following URL: *https://www.ehealthontario.ca/API/FHIR/StructureDefinition/eConsult/1/extension*.

Note that some resources may not exist independently and be contained in another resource. For example, resource patient is always contained in a ReferralRequest instance. Description of each resource points out these containments.

Table 5 shows the allowed transactions on resources in this server.

Table 5 Allowed FHIR operations on each resource

Resource	Create	Update	Read	Regular Search	_summary Search
DocumentReference					
OperationOutcome					
ReferralRequest	*		*	*	
Organization			*		*
Composition	*				
Practitioner			*	*	
Patient					
Bundle					

Search parameters that are customized proprietary to this project are *italicized* in the following tables in this section.

2.5.1 ReferralRequest

Since there are no resources defined in the FHIR specification for eConsults, we use the closest resource to this concept called referralRequest. Note that we use the words *case* and *eConsult* interchangeably. This resource is used to share relevant information required to support an eConsult request from a practitioner or an organization to another. For more information about the structure of this resource refer to the *Human_readable_resources.docx* and the corresponding StructureDefinition files. The following HTTP operations are allowed on a referralRequest: POST, PUT and GET. A referralRequest is available through the following URL: *[base]/referralRequest*. Table 6 shows the possible referralRequest search parameters that can be used in a GET operation.

Table 6 Referral Request Search Parameters

Name	Type	Description	Paths
priority	token	The priority assigned to the referral	ReferralRequest.priority
recipient	reference	The person that the referral was sent to	ReferralRequest.recipient (Organization, Practitioner)
requester	reference	Requester of referral /transfer of care	ReferralRequest.requester (Organization, Practitioner)

Name	Type	Description	Paths
status	token	The status of the referral which is equal to the last action performed on it.	ReferralRequest.status
date	date	Creation or activation date	ReferralRequest.date
tags	*string*	*Search the tag extension as follows: ?tag=tagname%3Dtagvalue*	*ReferralRequest.extension[?(@.url=="[ehoExtensions]/tag")].valueString*

Patient, composition and document reference resources are always contained in a referral request. Organizations and practitioners may be contained in a referralRequest or exist independently.

Please note that referralRequest search results may be paginated by the server.

2.5.2 Practitioner

In this project, both PCP and the specialist are represented using Practitioner resource. Practitioner covers all individuals who are engaged in the healthcare process and healthcare-related services For more information about the structure of this resource refer to the *Human_readable_resources.docx* and the provided structureDefinition files. The only allowed HTTP operation on this resource is GET. Table 7 shows the possible practitioner search parameters that can be used in a GET operation.

Table 7 Practitioner Search Parameters

Name	Type	Description	Paths
services	*token*	*Possible values-> "ECONSULT", "SECUREMESSAGING","VIDEOCONSULTS"*	*practitioner.extension[?(@.url=="[ehoExtensions]/eConsult_available_service")].valueCoding.code*
specialty	token	The practitioner has this specialty at an organization	Practitioner.practitionerRole.specialty
city	string	One of the cities at which this practitioner provides care	Practitioner.address.city
name	*string*	*A portion of the family name*	*Practitioner.name.family*
identifier	token	A practitioner's Identifier	Practitioner.identifier
organization	reference	The identity of the organization the practitioner represents / acts on behalf of	Practitioner.practitionerRole.managingOrganization (Organization)

Name	Type	Description	Paths
keyword	*string*	*Keyword(s), e.g. name, specialty, address, organization. If multiple keywords are provided, the & operator will be used. A keyword may be matched anywhere in the resource.*	*No path*

Practitioner may be contained in a referralRequest or exist independently. Independent practitioner resources are searchable via the following URL: *[base]/practitioner*.

2.5.3 Organization

This resource represents specialty groups that provide eConsult services. For more information about the structure of this resource refer to the *Human_readable_resources.docx* or the provided structureDefinition files. The only allowed HTTP operation on this resource is GET. Table 8 shows the possible search parameters that can be used in a GET operation.

Table 8 Organization Search Parameters

Name	Type	Description	Paths
services	*token*	*"ECONSULT", "SECUREMESSAGING", "VIDEOCONSULTS"*	*organization.extension[?(@.url=="[ehoExtensions]/eConsult_available_service ").valueCodin.code*
specialty	*token*	*Specialty offered by this specialty group*	*organization.extension[?(@.url == "[ehoExtensions]/specialty")].valueCoding.code*
name	string	A portion of the organization's name	organization.name
keyword	*string*	*Keyword(s), e.g. name, specialty, address, city, organization. If multiple keywords are provided, the AND operator will be used. A keyword may be matched anywhere in the resource.*	*No path*

Organization may be contained in a referralRequest or exist independently. Independent organizations resources are searchable via the following URL: *[base]/organization*.

2.5.4 Patient

This resource covers data about patients in the eConsult related activities. For more information about the structure of this resource refer to *Human_readable_resources.docx* or the provided structureDefinition files. This resource is always contained in a referral request and no HTTP operations are allowed on this resource.

2.5.5 Composition

A FHIR composition represents notes (by the referrer, requester or delegates) on an eConsult (represented by the ReferralRequest). For more information about the structure of this resource refer to *Human_readable_resources.docx* or the provided structureDefinition files. A composition is always contained a ReferralRequest. The following HTTP operations are defined on this resource: POST, PUT. Compositions are accessible using the following URL: [base]/referralRequest/[id]/composition.

2.5.6 DocumentReference

A DocumentReference resource is used to describe a document that is made available to a healthcare system. This resource does not have an endpoint and no HTTP operations are defined in this resource. For more information about the structure of this resource refer to *Human_readable_resources.docx* or the provided XML or JSON files. Note that this resource only provides a link to a document in a document repository. This FHIR specification does not provide resources to upload and download files. This resource is always contained in a referralRequest resource.

2.5.7 Bundle

When a search operation is performed on the eConsult server, a bundle containing resources that match the search criteria is returned. No endpoints or HTTP operations are defined for this resource. For more information about the structure of this resource refer to the *Human_readable_resources.docx* or the corresponding StructureDefinition xml file accompanied by this guide. This resource is not contained in other resources.

2.5.8 OperationOutcome

An operation outcome is a collection of errors, warning or information messages that result from an HTTP operation. An operationOutcome resource instance is returned by the FHIR server in the following scenarios:

1. In response to any PUT or POST operations
2. In response to a GET operations when there is an error

This resource does not have an endpoint and no HTTP operations are defined in this resource. For more information about the structure of this resource refer to *Human_readable_resources.docx* or the provided XML or JSON files. This resource does not contain other resources and is not contained in other resources.

If the operationOutcome.issue is empty, it means that the transaction has been performed successfully; otherwise, this element is populated. In case of a successful POST, the operationOutcome.id is the ID of the created resource. Depending on the resource that the operation is performed on, the FHIR server returns a different set of error codes in operationOutcome.issue.details.coding. Table 9 to Table 14 below show the codes, description sand also HTTP codes of the FHIR server response in case of an error.

Practitioner and Organization Errors:

Table 9 Search Practitioner Error List

Description	Code	HTTP Code
Keyword is less than two characters	R_KEYWORD_TOO_SHORT	400
Specialty is less than two characters	R_SPECIALTY_TOO_SHORT	400
Last Name is less than two characters	R_LASTNAME_TOO_SHORT	400
Search Criteria not Supported	R_SEARCH_CRITERIA_NOT_SUPPORTED	400
City is less than two characters	R_CITY_TOO_SHORT	400
Organization is less than two characters	R_ORGANIZATION_TOO_SHORT	400
No search criteria provided	R_MANDATORY_FIELD_MISSING	400
User doesn't have proper permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
User not found in eConsult	R_USER_NOT_FOUND	404
Internal error	R_INTERNAL_ERROR	500

Table 10 Search Organization Error List

Description	Code	HTTP Code
Keyword is less than two characters	R_KEYWORD_TOO_SHORT	400
Specialty is less than two characters	R_SPECIALTY_TOO_SHORT	400
Organization is less than two characters	R_ORGANIZATION_TOO_SHORT	400
Search Criteria not Supported	R_SEARCH_CRITERIA_NOT_SUPPORTED	400
No search criteria provided	R_MANDATORY_FIELD_MISSING	400
User not found in eConsult	R_USER_NOT_FOUND	404
User doesn't have proper permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
Internal error	R_INTERNAL_ERROR	500

ReferralRequest Errors:

Table 11 POST, PUT referralRequest Error List

Description	Code	HTTP Code

Description	Code	HTTP Code
Mandatory fields missing. Missing field name will be returned	R_MANDATORY_FIELD_MISSING	400
Invalid recipient	R_INVALID_RECIPIENT	400
Invalid requester	R_INVALID_REQUESTER	400
Validation error	R_VALIDATION_ERROR	400
No permission to send cases to the specialty group. Certain specialty groups only accept cases from referrers on the "allowed list".	R_PERMISSION_REQUIRED_ FOR_SPECIALTY_GROUP	400
User does not have permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
Specialty group has been unpublished/removed.	R_SPECIALTY_GROUP_NOT_PUBLISHED	400
During the "re-assign" action, the original case is cancelled and a new case is created and should be submitted to a different recipient.	R_RECIPIENT_CANNOT_BE_THE_SAME	400
Internal error	R_INTERNAL_ERROR	500

Table 12 Search (GET) ReferralRequest Error List

Description	Code	HTTP Code
PracticeID doesn't have proper permission to invoke this API	R_PRACTICE_ID_INSUFFICIENT_PERMISSION (Referrer)	403
Tag(s) not found	R_INVALID_TAG	400
Case state from input is not a valid state	R_INVALID_STATE	400
Mandatory fields missing	R_MANDATORY_FIELD_MISSING	400
User not found in eConsult	R_USER_NOT_FOUND	404
User doesn't have proper permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
Search Criteria not Supported	R_SEARCH_CRITERIA_NOT_SUPPORTED	400
Validation Error	R_VALIDATION_ERROR	400
Internal error	R_INTERNAL_ERROR	500

Table 13 Retrieve (GET) ReferralRequest Error List

Description	Code	HTTP Code

Description	Code	HTTP Code
PracticeID doesn't have proper permission to invoke this API	R_PRACTICE_ID_INSUFFICIENT_PERMISSION	403
Case not found	R_CASE_NOT_FOUND	404
User not found in eConsult	R_USER_NOT_FOUND	404
User does not have permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
Internal error	R_INTERNAL_ERROR	500

Composition Errors:

Table 14 POST, PUT Composition Error List

Description	Code	HTTP Code
PracticeID doesn't have proper permission to invoke this API	R_PRACTICE_ID_INSUFFICIENT_PERMISSION	403
User doesn't have proper permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
Mandatory fields missing	R_MANDATORY_FIELD_MISSING	400
Action not allowed in the current state	R_ACTION_NOT_ALLOWED_IN_CURRENT_STATE	400
User not found in eConsult	R_USER_NOT_FOUND	404
User input exceeds limit on field	R_FIELD_EXCEEDS_LIMIT	400
Internal error	R_INTERNAL_ERROR	500

File operations:

These operations are customized and do not conform to the FHIR standard. Therefore, an operationOutcome will NOT be returned by the FHIR sever. In case of an error, these operations will return a customize JSON format. For more information and a complete list of possible returned error messages refer to section 3.2.10

3 eConsult FHIR Server Functionalities

In this section, a list the eConsult server functionalities are presented and then it is shown how each of them is handled by a RESTful operation.

3.1 Assumptions

- Delegates can perform all actions their delegators can perform
- To re-assign an eConsult, the EMR system should cancel a case and then resubmit a new one. The following element provides a reference to the original case: referralRequest.supportingInformation[@display="originalCase"].reference
- Each user would be able to access all eConsult cases associated with him from his EMR system; and regardless whether the patient in the case exists or in the EMR. Residue data will only exist in the EMR if the patient exists and if the user has associated the eConsult case with the patient in the EMR.
- Draft eConsults cannot be submitted to the eConsult server and should reside on the EMR.

3.2 Functionalities

3.2.1 Search Recipient

Here are some examples:

- List of all organizations (specialty groups) that provide video consult

  *GET [baseURL]/**organization**/?services=https://ehealthontario.ca/API/FHIR/NamingSystem/eConsult/1/eConsultService|VIDEOCONSULTS&_summary=true*

- List of all cardiologist whose last name contains the word "smith"

*GET [baseURL]/Practitioner/?specialty=http://snomed.info/sct|394579002**&**name=smith*

Please note that 394579002 is the code for Cardiology from this value set: *http://hl7.org/fhir/NamingSystem/c80-practice-codes* that contain codes from SNOMED CT code system (identified by http://snomed.info/sct)

- List of all cardiologist who have the word "Toronto" **and** "Hamilton" in their information:

*GET [baseURL]/Practitioner/?specialty=http://snomed.info/sct|394579002**&***
keyword=Toronto+Hamilton

- Find a recipient based on the identifier (practitioner.identifier or organization.identifier)

GET [baseURL]/Practitioner/?identifier=www.ehealthontario.ca
/API/FHIR/NamingSystem/ca-on-patient-hcn|1234567890

3.2.2 Create eConsult

A post will create an eConsult:

POST [baseURL]/referralRequest –d '{data goes here}'. An example eConsult is included in *Examples* folder in this package. The referralRequest example contains other resources.

Referrer's EMR can put referralRequest.requester={"reference":"practitioner/@self"} in the referralRequest at creation times instead of a reference to the actual referrer. FHIR server will resolve @self and insert the correct reference to the current user who is creating the eConsult.

3.2.3 Get eConsult Details

GET [baseURL]/referralRequest/[id]

3.2.4 Get eConsult (search)

For allowed search parameters refer to section 2.5.1. Below examples searches for referral requests that are created after 2010-12-12, their status is "requested" and the recipient is practitioner/123

GET [baseURL]/referralRequest/?date=gt2010-12-12&status=requested&recipient= practitioner/123

Tags are treated similar to allowable search parameters. For instance, if a referralRequest has a tag (MRN=123), we can use the following search URL to find this referral request:

*GET [baseURL]/referralRequest/?tag= MRN**%3D**132*

(**%3D** is URL encoding of "=")

3.2.5 Add Note, Provide More info, Request Clarification, Cancel eConsult, Request More Info, Decline eConsult, Reply (specialist),

To add a note, create a composition resource, and then POST it to the following URL: *[base]/referralRequest/[id]/composition*

3.2.6 Complete eConsult

To complete a case by CP, a new composition should be posted to *[base]/referralRequest/[id]/composition*.

3.2.7 Provide Consult (specialist)

Consult is provided by posting to the following URL: *[base]/referralRequest/[id]/composition*

3.2.8 Unsuccessful POST

An unsuccessfully attempt at creating an eConsult request with a missing field will result in return of the following operation outcome by the FHIR server:


```
{
        "resourceType": "operationOutcome",
        "issue": {
                "severity": "error",
                "details": {
                        "coding": {
```

```
                        "system":
"https://ehealthontario.ca/API/FHIR/NamingSystem/eConsult/1/eConsultErrors",
                                "code": "R_MANDATORY_FIELD_MISSING",
                                "display": "Mandatory fields missing"
                        }
                }
        }
}
```


3.2.9 Retrieving multiple resources

When searching for resources, multiple resources might be returned in a bundle resource instance. Example below is returned in response to this search:

*Get [baseURL]/**practitioner**/?services=https://ehealthontario.ca/API/FHIR/NamingSystem/eConsult/1/eConsultService|VIDEOCONSULTS*


```
{
        "resourceType": "bundle",
        "type": "searchset",
        "total": 2,
        "link": [
                {
                        "relation": "self",
                        "url":
"[baseURL]/practitioner/?services=https://ehealthontario.ca/API/FHIR/NamingSystem/eConsult/1/eConsultService|VIDEOCONSULTS"
                }
        ],
        "entry": [
                {
                        "fullURL": "[baseURL]/practitioner/1",
                        "resource": {
                                "_comment": "complete resource goes here"
                        }
                }, {
                        "fullURL": "[baseURL]/practitioner/333",
                        "resource": {
                                "_comment": "complete resource goes here"
                        }
                }
        ]
}
```


3.2.10 File operations

In order to upload or download a file, a temporary URL should be requested. These custom operations are **not** FHIR compatible. See below the pertaining URLs, error messages:

Request URL for file upload

POST the file name using this format {“fileName":"file123.docx"} to *http://api.otn.ca/hub/v1/documents/*

If this operation is successful, a response similar to following is returned:

```
{
        "url":" http://api.otn.ca/hub/v1/files/XcLBv57ifQGt_vB4YkYJfX5CNtW1Ozm7UzawNs-r5WF",
        "expiresInMin":xyz
}
```

If this operation fails an error form table below is returned :

Table 15 Request URL to upload file error list

Description	Code	HTTP Code
User not found in eConsult	R_USER_NOT_FOUND	404
User doesn't have proper permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
Mandatory field missing	R_MANDATORY_FIELD_MISSING	400
Internal error	R_INTERNAL_ERROR	500

Here is an error example:

ERROR example:

```
{
        "status":403,
        "app":"FILES",
        "error":"R_MANDATORY_FIELD_MISSING",
        "reference":"R-8a32fcd3-03d2-42a0-90f4-1c28cdfc7c79",
        "details":"File type is not supported",
}
```

Upload file

Using temporary URL retreived in the previous step, a file may be uploaded as follows:
POST http://api.otn.ca/hub/v1/files/XcLBv57ifQGt_vB4YkYJfX5CNtW1Ozm7UzawNs-r5WF file123.docx

Response example of a succesful operation:

```
{
        "id":24192867,
        "fileName":" file123.docx ",
        "contentType":"application/vnd.openxmlformats-officedocument.wordprocessingml.document",
        "createdBy":"username",
        "fileSize":12784
}
```

If the above operation fails on of the error message in the table below is returbed:

Table 16 Upload file error list

Description	Code	HTTP Code
Non-supported file types	R_FILE_TYPE_NOT_SUPPORTED	400
File size exceeds 500MB	R_FILE_SIZE_TOO_LARGE	400
Virus detected	R_VIRUS_DETECTED	400
File description exceeds 50 characters	R_FIELD_EXCEEDS_LIMIT	400

Description	Code	HTTP Code
File upload URL expired. The expiration period is 30 seconds.	R_EXPIRED_FILE_URL	403
File content is missing or file size is 0	R_EMPTY_FILE	400
The uploaded file name does not match the record	R_INVALID_FILE_NAME	400
The url is invalid	R_INVALID_URL	400
Non-supported file types	R_FILE_TYPE_NOT_SUPPORTED	400
Internal error	R_INTERNAL_ERROR	500

Error example:


```
{
        "status":403,
        "app":"FILES",
        "error":"R_EXPIRED_FILE_URL",
        "reference":"R-8a32fcd3-03d2-42a0-90f4-1c28cdfc7c79",
        "details":"File upload URL expired. The expiration period is 30 seconds.
}
```


Request URL for file download

GET http://api.otn.ca/hub/v1/documents/24192867 where 24192867 is file ID from the previous step. See below a Sucessful response example:


```
{
        "url": " http://api.otn.ca/hub/v1/files/XcLBv57ifQGDILHY8VHo214t_X",
        "expiresInMin": 15
}
```


Table below lists possible error codes of the above operation should it fail:

Table 17 Request URL for file download error list

Description	Code	HTTP Code
User not found in eConsult	R_USER_NOT_FOUND	404
User does not have permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
File ID Missing	R_MANDATORY_FIELD_MISSING	400
File not found	R_FILE_NOT_FOUND	404
Internal error	R_INTERNAL_ERROR	500

Download file

GET http://api.otn.ca/hub/v1/files/ XcLBv57ifQGDILHY8VHo214t_X

Response will be the file streamed.If this operation fails, one of the error message in the table below will be returned:

Table 18 Download file error list

Description	Code	HTTP Code
PracticeID doesn't have proper permission to invoke this API	R_PRACTICE_ID_INSUFFICIENT_PERMISSION	403 For future use only, not returned in POC
User not found in eConsult	R_USER_NOT_FOUND	404
User does not have permission to invoke this API	R_USER_INSUFFICIENT_PERMISSIONS	403
The url is invalid	R_INVALID_URL	400
File not found	R_FILE_NOT_FOUND	404
File url expired. The expiration period is 30 seconds	R_EXPIRED_FILE_URL	403
Internal error	R_INTERNAL_ERROR	500

4 Functionality per User Role

The following table shows the mapping between the eConsult server functionalities and the user roles that are allowed to perform them.

Table 19 Mapping between eConsult server functionaltieies and RESTful operations

Functionality	Referrer	Specialist	RESTful Operation
Search Recipient	X	X	GET organization, GET practitioner
Create eConsult	X		POST referralRequest
Get eConsult	X	X	GET referralRequest
Add Note	X	X	POST referralRequest/composition
Provide More Info	X		
Complete eConsult	X		
Request Clarification	X		
Cancel eConsult	X		
Request More Info		X	
Decline eConsult		X	
Provide Consult		X	
Reply to Request for clarification		X	

5 eConsult State Transition Diagram

Figure below shows eConsults' state transition diagram.

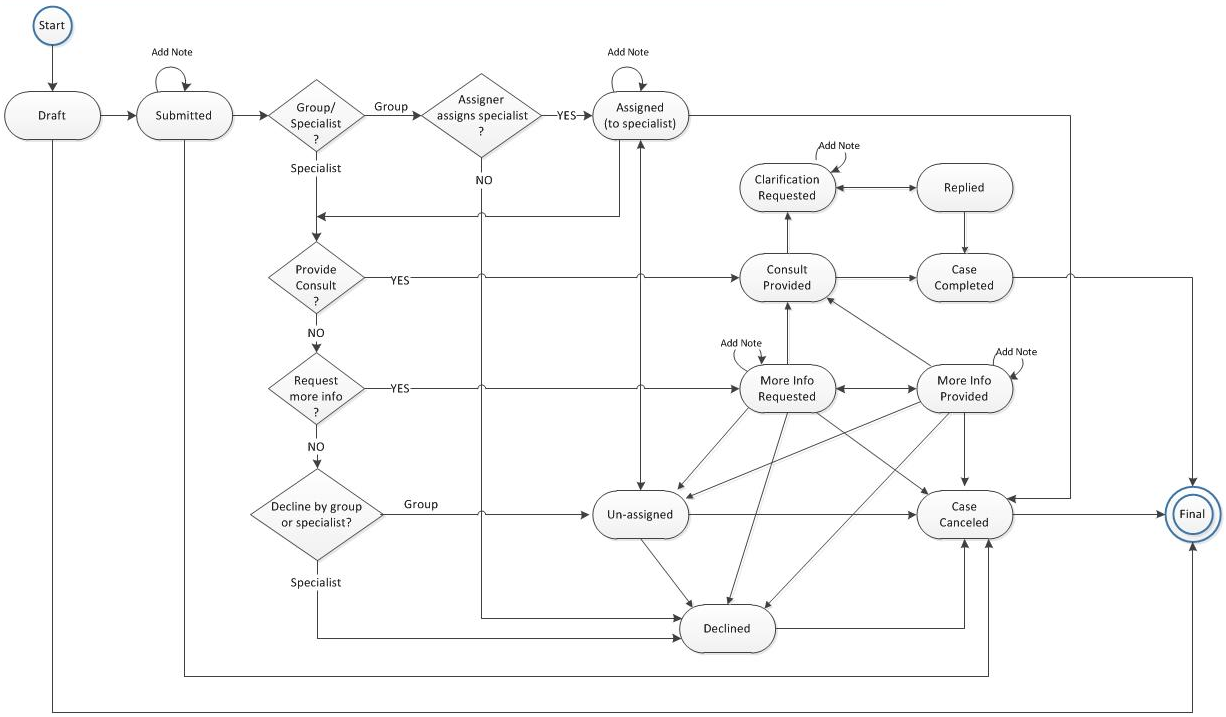

Figure 1 eConsult state transition diagram

Table 20 shows a list of eConsult states, their descriptions and a list of possible actions allowed by the referrer, specialist and specialist assigner in each of these states.

Table 20 Allowed actions that can be performed on eConsults during their lifecycle states

eConsult State	State Description	Allowed Referrer Action	Allowed Specialist Action	Allowed Specialty Group Assigner Action	Allowed Specialty Group Specialist Action
"Submitted"	Referrer submitted the eConsult to the recipient. The recipient could be either an individual specialist or a specialty group	Cancel eConsult Add Note Re-assign	Decline eConsult Request More Info Provide Consult	Decline eConsult Assign eConsult	
"Cancelled"	Referrer cancelled the eConsult	View eConsult	View eConsult	View eConsult	View eConsult

eConsult State	State Description	Allowed Referrer Action	Allowed Specialist Action	Allowed Specialty Group Assigner Action	Allowed Specialty Group Specialist Action
"Assigned"	If the recipient is a specialty group, the assigner assigned the eConsult to a specialist within the group	Cancel eConsult Add Note		Un-assign eConsult	Decline eConsult Request More Info Provide Consult
"Un-assigned"	The assigner of the specialty group has unassigned the eConsult from the specialist; or the specialist in the specialty group has declined the eConsult back to the assigner. Now the eConsult is ready to be assigned again by the specialty group assigner.	Cancel eConsult Add Note Re-assign		Decline eConsult Assign eConsult	
"More Info Requested"	Specialist has requested more info from the referrer	Cancel eConsult Provide More Info	Decline eConsult Add Note Provide Consult	View eConsult	Decline eConsult Add Note Provide Consult
"More Info Provided"	Referrer has provided more info in response to specialist's request	Cancel eConsult Add Note	Decline eConsult Request More Info Provide Consult	View eConsult	Decline eConsult Request More Info Provide Consult
"Consult Provided"	Specialist has provided consult for the eConsult	Complete eConsult Request Clarification	View eConsult	View eConsult	View eConsult
"Clarification Requested"	After specialist provided consult, referrer has asked for additional clarification	Add Note	Reply	View eConsult	Reply

eConsult State	State Description	Allowed Referrer Action	Allowed Specialist Action	Allowed Specialty Group Assigner Action	Allowed Specialty Group Specialist Action
	questions.				
"Replied"	Specialist has replied to clarification request	Complete eConsult Request Clarification	View eConsult	View eConsult	View eConsult
"Declined"	Specialist or specialty group has declined to consult on the eConsult	Cancel eConsult Re-assign	View eConsult	View eConsult	
"Completed"	Referrer has completed the eConsult after specialist provided consult	View eConsult	View eConsult	View eConsult	View eConsult