



Exercise

Searching in FHIR resources

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During the hands-on session of the Searching in FHIR resource tutorial, you will learn how to create FHIR search requests. It covers introductory topics as well as more advanced search request. It will help you to request content from a FHIR server, as needed.

After completing this tutorial, you will be able to:

- Understand how FHIR Search API requests are structured
- Create advanced search requests using chaining, reverse chaining and include expressions
- Have an overview what is possible within a FHIR search request

FHIR Search Quiz

The following quiz will help you to understand in which areas of the FHIR Search API you are already proficient and where there are still new things to learn!

Have fun, and remember to ask for help if you get stuck!

1 FHIR Search Proficiency

1.1 Quiz: Search Interactions

Question: Search for all resources with the id “example”.

Goal: Searches on all resources

Complexity: Low

Question: Search for all resources which conform to a profile.

Goal: Searches on all resources

Complexity: High (Concept of a profile and a base search need to be understood)

Question: Search for all resources which have any reference to the patient with the id “example”.

Goal: Searches on a compartment

Complexity: Low

Question: Search for all Observations and Encounters of the Patient with the id “example”.

Goal: Searches on a compartment

Complexity: High (_type needs to be combined with a compartment)

Question: Search for all ValueSets.

Goal: Searches on a specific resource

Complexity: Low

Question: Scenario: You - as a General Practitioner - want to retrieve the last MedicationRequest that was entered in your system.

Goal: Searches on a specific resource

Complexity: High (_sort in combination with _count)

1.2 Quiz: Search Types, Prefixes and Modifiers

Question: Search for all Encounters which took longer than 3 days.
Goal: Searches on Number
Complexity: Low

Question: Searches on for a Risk assesment within in the range [0.35 ... 0.955).
Goal: Search on Number
Complexity: High (Concept: Implicit ranges)

Question: Searches for all Patients which where born the the year 1984.
Goal: Search on Date
Complexity: Low

Question: Search for all Patient which died on 2000-01-02 (UTC).
Goal: Search on DateTime
Complexity: High (Date Formatting in Search Requests)

Question: How can interoperability for searching be fostered when storing a Patient with the name “ÁSTRÍÐUR”?
Goal: Search on String
Complexity: Low

Question: Get a list of all Patients with a name starting with A-D, sorted in a lexicographical order.
Goal: Search on String
Complexity: High (Multiple values for a single search parameter)

Question: Search for all Conditions that were diagnosed based on a CT scan (Conditions contains evidence of a CT scan).

Goal: Search on Token

Complexity: Low

Question: Search for all Observations with a code indicating some kind of development disorder.

Goal: Search on Token

Complexity: High (Subsumption Concept)

Question: Given an American patient record with a recorded height of 6.07 feet, search on it using European measuring units.

Goal: Search on Quantity

Complexity: Low

1.3 Quiz: Advanced Search Requests

Question: Search for all Observations which contain the words “Vital Signs”.

Goal: Search with `_text`

Complexity: Low

Question: Search for all male patients which are older than 18 years or all female patients.

Goal: Search with `_filter`

Complexity: Low

Question: Search for all Observations and Conditions which contain Body weight related SNOMED CT codes.

Goal: Search with `_filter`

Complexity: High

Question: Search for all intakes of a Medication which were completed. The taken medication should be a medication which was issued via a prescription for the Patient named Jane.

Goal: Chaining

Complexity: Low

Question: Search for all Procedures which were performed in some Encounters due to a Diagnosis asserted by a Practitioner.

Goal: Chaining

Complexity: High (Check if resources in chain exist with `_id`)

Question: Search for Patients who were involved in some Encounters which were scheduled due to an appointment.

Goal: Chaining

Complexity: Low)

Question: Search for Patients who were involved in some Encounters which were scheduled due to an appointment and who at least one DiagnosticReport based on some Observations.

Goal: Chaining

Complexity: High (Reverse Chaining with `_filter` due to AND combination)

1.4 Answers: Search Interactions

Question: Search for all resources with the id “example”.

Goal: Searches on all resources

Complexity: Low

Search Request: [base]/?_id=example

Question: Search for all resources which conform to a profile.

Goal: Searches on all resources

Complexity: High (Concept of a profile and a base search need to be understood)

Search Request: [base]/?_profile:missing=false

Question: Search for all resources which have any reference to the patient with the id “example”.

Goal: Searches on a compartment

Complexity: Low

Search Request: [base]/Patient/example/*

Question: Search for all Observations and Encounters of the Patient with the id “example”.

Goal: Searches on a compartment

Complexity: High (_type needs to be combined with a compartment)

Search Request: [base]/Patient/example/*?_type=Observation,Encounter

Question: Search for all ValueSets.

Goal: Searches on a specific resource

Complexity: Low

Search Request: [base]/ValueSet/

Question: Scenario: You - as a General Practitioner - want to retrieve the last MedicationRequest that was entered in your system.

Goal: Searches on a specific resource

Complexity: High (_sort in combination with _count)

Search Request: [base]/MedicationRequest?_sort=-_lastUpdated&_count=1

1.5 Answers: Search Types, Prefixes and Modifiers

Question: Search for all Encounters which took longer than 3 days.

Goal: Searches on Number

Complexity: Low

Search Request: [base]/Encounter?length=gt3

Question: Searches on for a Risk assesment within in the range [0.35 ... 0.955).

Goal: Search on Number

Complexity: High (Concept: Implicit ranges)

Search Request: [base]/RiskAssesment?probability=ge0.35&probability=lt0.955

Question: Searches for all Patients which where born the the year 1984.

Goal: Search on Date

Complexity: Low

Search Request: [base]/Patient?birthdate=1984

Question: Search for all Patient which died on 2000-01-02 (UTC).

Goal: Search on DateTime

Complexity: High (Date Formatting in Search Requests)

Search Request: [base]/Patient?death-date=2000-01-02Z

Question: How can interoperability for searching be fostered when storing a Patient with the name “ÁSTRÍÐUR”?

Goal: Search on String

Complexity: Low

Answer: Enable a search on only the base characters of the name.

Question: Get a list of all Patients with a name starting with A-D, sorted in a lexicographical order.

Goal: Search on String

Complexity: High (Multiple values for a single search parameter)

Search Request: [base]/Patient?name:contains=A,B,C,D&_sort=name

Question: Search for all Conditions that were diagnosed based on a CT scan (Conditions contains evidence of a CT scan).

Goal: Search on Token

Complexity: Low

Search Request: [base]/Condition?evidence:text=CT

Question: Search for all Observations with a code indicating some kind of development disorder.

Goal: Search on Token

Complexity: High (Subsumption Concept)

Search Request: [base]?Observation=code:below=http://snomed.info/sct|5294002

Question: Given an American patient record with a recored height of 6.07 feet, search on it using European measuring units.

Goal: Search on Quantity

Complexity: Low

Search Request: [base]/Observation?value-quantity=gt185||cm

1.6 Answers: Advanced Search Requests

Question: Search for all Observations which contain the words “Vital Signs”.

Goal: Search with `_text`

Complexity: Low

Search Request: [base]/Observation?_text=Vital Signs

Question: Search for all male patients which are older than 18 years or all female patients.

Goal: Search with `_filter`

Complexity: Low

Search Request: [base]/Patient?_filter=(gender eq male and birthdate co 2000) or (gender eq female)

Question: Search for all Observations and Conditions which contain Body weight related SNOMED CT codes.

Goal: Search with `_filter`

Complexity: High

Search Request: `[base]/?_type=Observation,Condition&_filter=code ss 363804004 or code eq 301336003`

Question: Search for all intakes of a Medication which were completed. The taken medication should be a medication which was issued via a prescription for the Patient named Jane.

Goal: Chaining

Complexity: Low

Search Request: `[base]/MedicationAdministration?prescription.patient.name=Jane &status=completed`

Question: Search for all Procedures which were performed in some Encounters due to a Diagnosis asserted by a Practitioner.

Goal: Chaining

Complexity: High (Check if resources in chain exist with `_id`)

Search Request: `[base]/Procedure?context:Encounter.diagnosis:Condition.asserter :Practitioner._id:missing=false`

Question: Search for Patients who were involved in some Encounters which were scheduled due to an appointment.

Goal: Chaining

Complexity: Low

Search Request: `[base]/Patient?_has:Appointment:actor:_has:Encounter: appointment:_id:missing=false`

Question: Search for Patients who were involved in some Encounters which were scheduled due to an appointment and who at least one DiagnosticReport based on some Observations.

Goal: Chaining

Complexity: High (Reverse Chaining with `_filter` due to AND combination)

Search Request: `[base]/Patient?_filter=(_has:Appointment:actor:_has:Encounter :appointment:_id:missing=false) and (_has:Observation:patient:_has: DiagnosticReport:result:missing=false)`
