Connectathon 2024 Terminology Subtrack
Webinar 3

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Agenda

1   Review of current state

2   Creating FHIR Resources

3   Testing the APIs

4   Questions
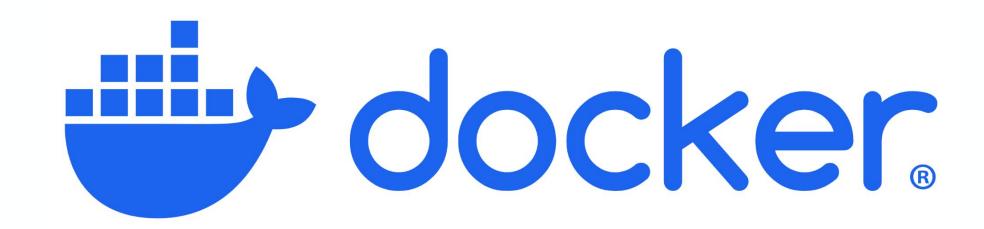
5   Next steps

Country Node

- Components of a country node:
  - HAPI FHIR server
  - IPS Middleware
  - DDVC Middleware
  - LACPass IPS Viewer
  - Snowstorm (FHIR Terminology Server)
    - FHIR API - http://localhost/fhir
    - FHIR Swagger doc - http://localhost/connectathon-swagger
    - SNOMED CT Browser - http://localhost/browser

What is Snowstorm?

- Snowstorm

  ○ Open source FHIR Terminology server

  ○ Advanced features for SNOMED CT (ECL)

  ○ Standard FHIR API

  ○ Preloaded with the Spanish Edition (International)

  ○ Users can load additional terminology content

SNOWSTORM
by SNOMED International

SNOMED CT
The global language of healthcare

+

Local Code Systems,
Value Sets and
Concept Maps

HL7 FHIR
Terminology Module

The main Terminology **Resources** are:

- **CodeSystem**
  - examples: "SNOMED CT International Edition - Sept 2023", "LOINC v2.75" or "ICD-10 Version:2019"

- **ValueSet**
  - examples: "Nursing Activities Subset" or "Clinical Procedures"

- **ConceptMap**
  - e.g. "SNOMED CT to ICD-10 Map" or "SNOMED CT to MedDRA Map"

Terminology Subtrack

SNOWSTORM
by SNOMED International

SNOMED
International

Data Entry
Terminology Bindings

FHIR Terminology Server

Implementation Guides
Terminology Bindings

CodeSystems

$lookup

$expand

$translate

CodeSystems

ValueSets

ConceptMaps
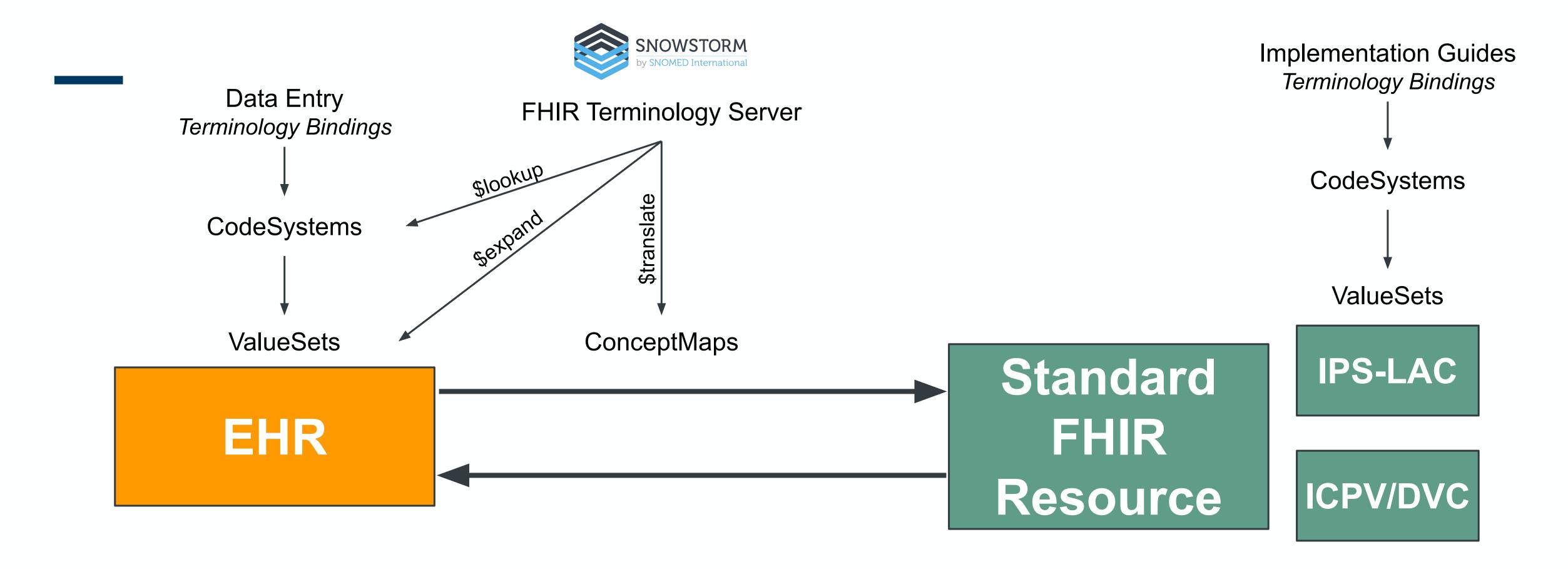
ValueSets

EHR

Standard FHIR Resource

IPS-LAC

ICPV/DVC

Connectathon Value Sets

- Agreed terminology subsets that we will use to demonstrate data exchange
- The sets will be mapped to preferred binding code systems
- Participants that don't use these code systems will map to these codes

	Antecedentes
1	Diabetes Mellitus insulino requiriente
2	Daiabetes Mellitus no insulino requeriente
3	Hipertensión arterial esencial
4	Dislipemia
5	Hiperuricemia
6	Infarto de Miocardio
7	Enfermedad pulmonar obstructiva crónica
8	Lupus eritematoso Sistémico
9	Accidente cerebro vascular
10	Migraña
11	Epilepsia
12	Hipotiroidismo
13	Dermatitis atópica
14	Tabaquismo
15	Sedentarismo
16	Enfermedad renal crónica
17	Tuberculosis
18	Hipoacusia
19	Apnea obstructiva del sueño
20	Trombosis venosa profunda

	Diagnósticos
1	Hipertensión arterial primaria
2	Neumonia bacteriana
3	Asma
4	Artritis reumatoridea
5	Anemia ferropénica
6	Convulsión
7	Trastorno depresivo
8	Cáncer de mama
9	Enfermedad de Párkinson
10	Desnutrición
11	Enfermedad de Crohn
12	Esquizofrenia paranoide
13	Trastorno de ansiedad generalizada
14	Gota
15	Hipotiroidismo congénito
16	Deshidratación aguda
17	Neumotórax espontáneo
18	Ulcera péptica
19	Endocarditis infecciosa
20	Leucemia linfoblástica aguda

	Vacunas
1	Vacuna contra SARS - CoV-2
2	Vacuna antituberculosa (BCG)
3	Vacuna contra tétanos, difteria y tos ferina
4	Vacuna contra fiebre amarilla
5	Vacuna contra Hepatits B
6	Vacuna contra sarampión, paperas y rubéola
7	Vacuna contra el virus del papiloma humano
8	Vacuna antipoliomelítica oral (VOP)
9	Vacuna contra influenza
10	Vacuna antirrábica
11	Vacuna antineumocóccica
12	Vacuna antipoliomelítica inactivada (VIP)
13	Vacuna antimeningocócica
14	Vacuna contra hepatitis A
15	Vacuna contra la fiebre tifoidea
16	Vacuna contra la varicela
17	
18	
19	
20	

	Alergias
1	Alergia a alimentos
2	Alergia a amoxicilina
3	Alergia a analgesicos no esteroideos
4	Alergia al ibuprofeno
5	Alergia al látex
6	Alergia a picadura de insectos
7	Alergia al ácido acetilsalicílico
8	Alergia a cefalosporinas
9	Alergia a sulfonamidas
10	Alergia a quinolonas
11	Alergia a allopurinol
12	Alergia a gentamicina
13	Alergia a medios de contraste
14	Alergia a lidocaína
15	Alergia a corticosteroides
16	Alergia a proteína de leche de vaca
17	Alergia al Huevo
18	Alergia a betabloqueantes
19	Alergia al gluten
20	Alergia a propofol

	Medicación
1	Metformina
2	Enalapril
3	Levotiroxina
4	Atorvastatina
5	Insulina glargina
6	Salbutamol
7	Omperazol
8	Warfarina
9	Prednisona
10	Pregabalina
11	Morfina
12	Salbutamol
13	Loratadina
14	Atenolol
15	Carbamazepina
16	Ranitidina
17	Allopurinol
18	Losartán
19	Rivastigmina
20	Acido acetilsalicílico

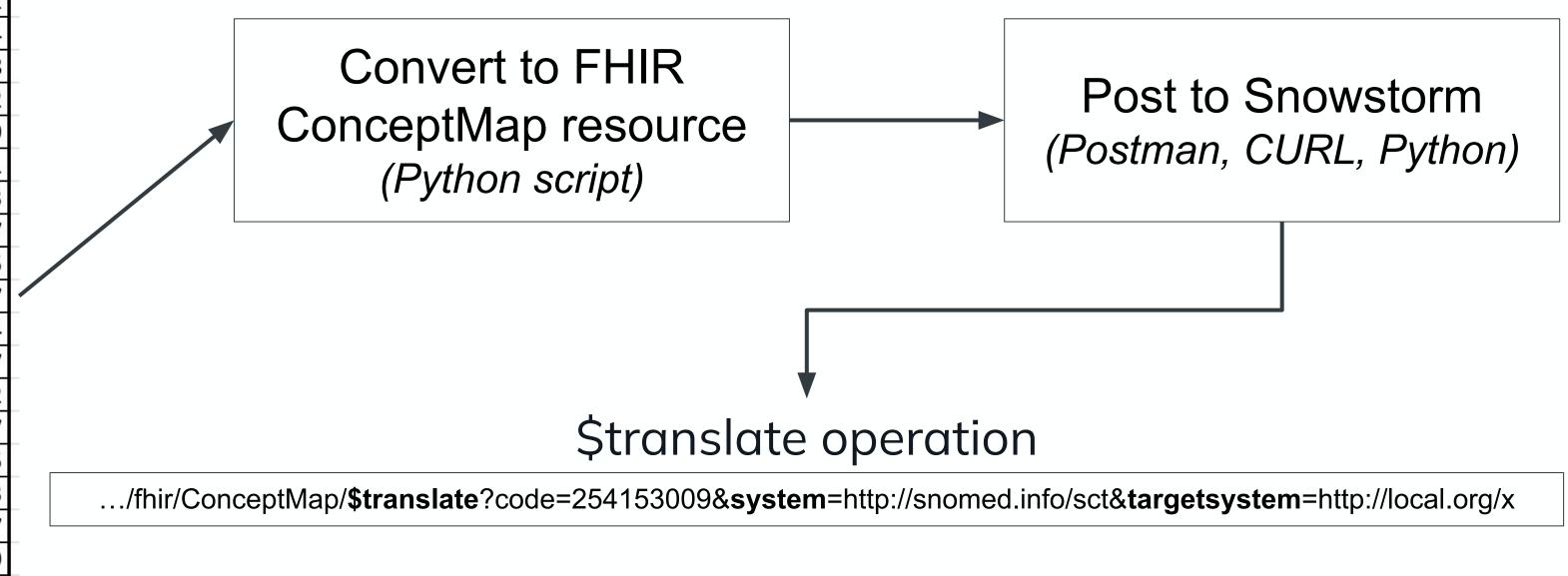# Connectathon Value Sets

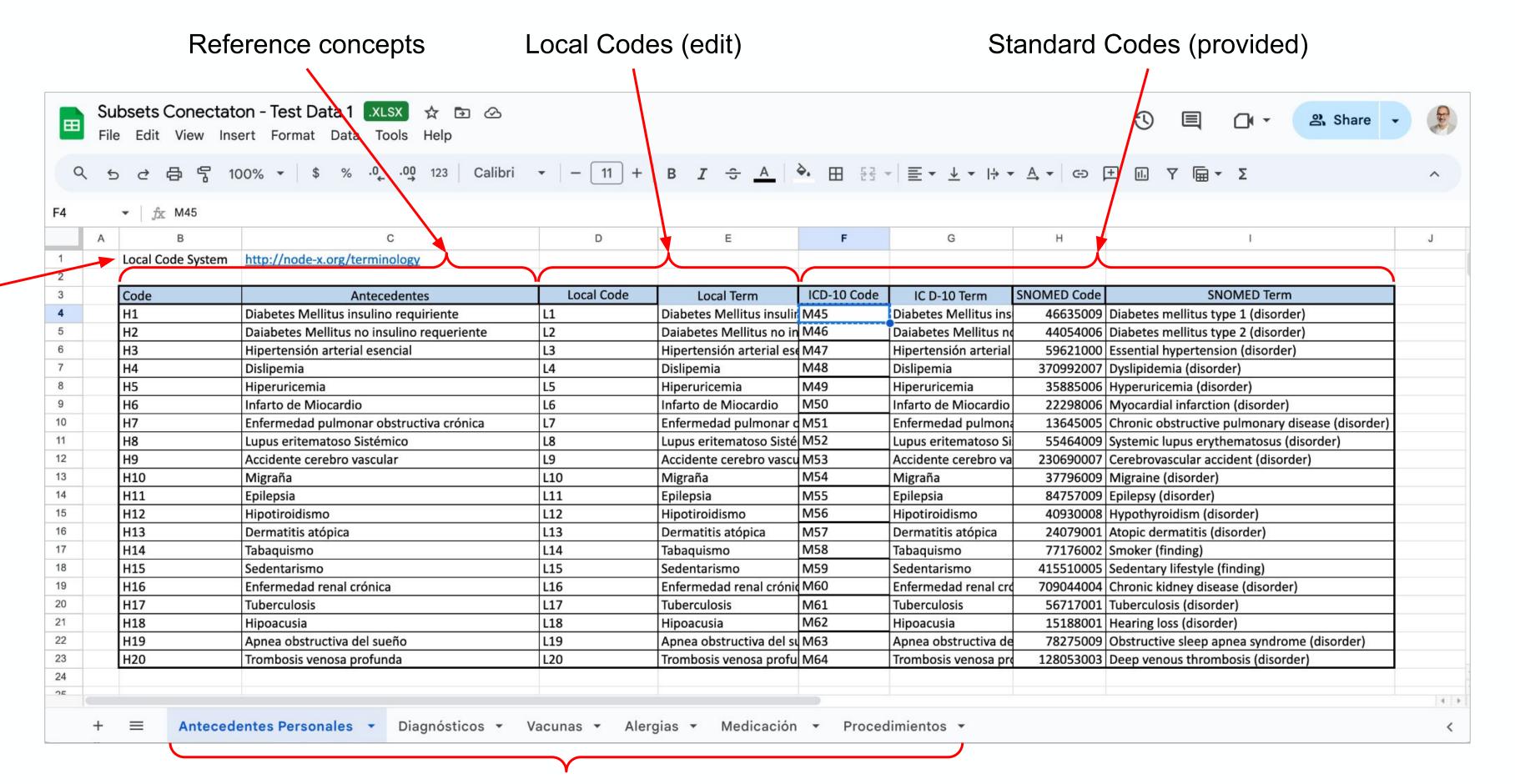● Maps will be uploaded to Snowstorm as FHIR ConceptMaps to enable $translate

	Diagnósticos	Local Code
1	Hipertensión arterial primaria	242
2	Neumonia bacteriana	32234
3	Asma	675678
4	Artritis reumatoridea	3342
5	Anemia ferropénica	8899
6	Convulsión	121
7	Trastorno depresivo	333
8	Cáncer de mama	667
9	Enfermedad de Párkinson	135
10	Desnutrición	987
11	Enfermedad de Crohn	234
12	Esquizofrenia paranoide	567
13	Trastorno de ansiedad generalizada	342
14	Gota	8787
15	Hipotiroidismo congénito	645645
16	Deshidratación aguda	3453
17	Neumotórax espontáneo	89687
18	Ulcera péptica	269
19	Endocarditis infecciosa	443
20	Leucemia linfoblástica aguda	4534

Convert to FHIR
ConceptMap resource
(Python script)

Post to Snowstorm
(Postman, CURL, Python)

$translate operation

…/fhir/ConceptMap/**$translate**?code=254153009&**system**=http://snomed.info/sct&**targetsystem**=http://local.org/x

Creating local codes

Reference concepts

Local Codes (edit)

Standard Codes (provided)

Local CodeSystem URI (edit)

The six Sections of the IPS Composition

Open Spreadsheet →

Connectathon Value Sets

39 FHIR Resources

- **4 CodeSystems** *(SNOMED CT is preloaded)*
  - ICD-10*, ICD-11*, Local CodeSystem, RACSEL Reference (* fragments)

- **23 ValueSets**
  - Full lists + domain lists

- **12 ConceptMaps** *(SNOMED → ICD-10 full map is preloaded)*
  - 4 to local, 4 from local, 4 SCT - ICD bidirectional

FHIR Package

CodeSystem URIs

- http://snomed.info/sct

- http://hl7.org/fhir/sid/icd-10

- http://id.who.int/icd/release/11/mms

- http://racsel.org/connectathon

- http://node-x.org/terminology

Are ids unique in local code lists?

Single local code system

One code system for each domain

Conversion with split code system flag

66 FHIR Resources

- **9 CodeSystems** *(SNOMED CT is preloaded)*
  - ICD-10*, ICD-11*, Local CodeSystem (split x 6), RACSEL Reference (* fragments)

- **23 ValueSets**
  - Full lists + domain lists

- **34 ConceptMaps** *(SNOMED → ICD-10 full map is preloaded)*
  - 4 to local (+11), 4 from local (+11), 4 SCT - ICD bidirectional

FHIR Package

CodeSystem URIs

- http://snomed.info/sct
- http://hl7.org/fhir/sid/icd-10
- http://id.who.int/icd/release/11/mms
- http://racsel.org/connectathon
- http://node-x.org/terminology/antecedentes
- http://node-x.org/terminology/diagnosis
- http://node-x.org/terminology/vacunas
- http://node-x.org/terminology/alergias
- http://node-x.org/terminology/medicacion
- http://node-x.org/terminology/procedimientos

ValueSet URIs

- Examples:
  - http://racsel.org/fhir/ValueSet/alergias-local-vs (Local Code System, Allergies)
  - http://racsel.org/fhir/ValueSet/alergias-vs (SNOMED CT, Allergies)
  - http://racsel.org/fhir/ValueSet/cie10-vs (ICD-10, all)
  - http://racsel.org/fhir/ValueSet/cie11-vs (ICD-11, all)
  - http://racsel.org/fhir/ValueSet/snomed-vs (SNOMED CT, all)
  - ...

Conversion with split code system flag

FHIR Package

FHIR Terminology Server

Using the terminology

Data entry

- Search in the Local Allergies Value Set matching "amox"

Data entry

- Search in the SNOMED Allergies Value Set matching "amox"

Mapping between Code Systems

- Find the SNOMED code for my local Allergy code "L62"

http://localhost/fhir/ConceptMap/$translate?code=L62&system=http%3A%2F%2Fnode-x.org%2Fterminology%2Falergias&targetsystem=http%3A%2F%2Fsnomed.info%2Fsct
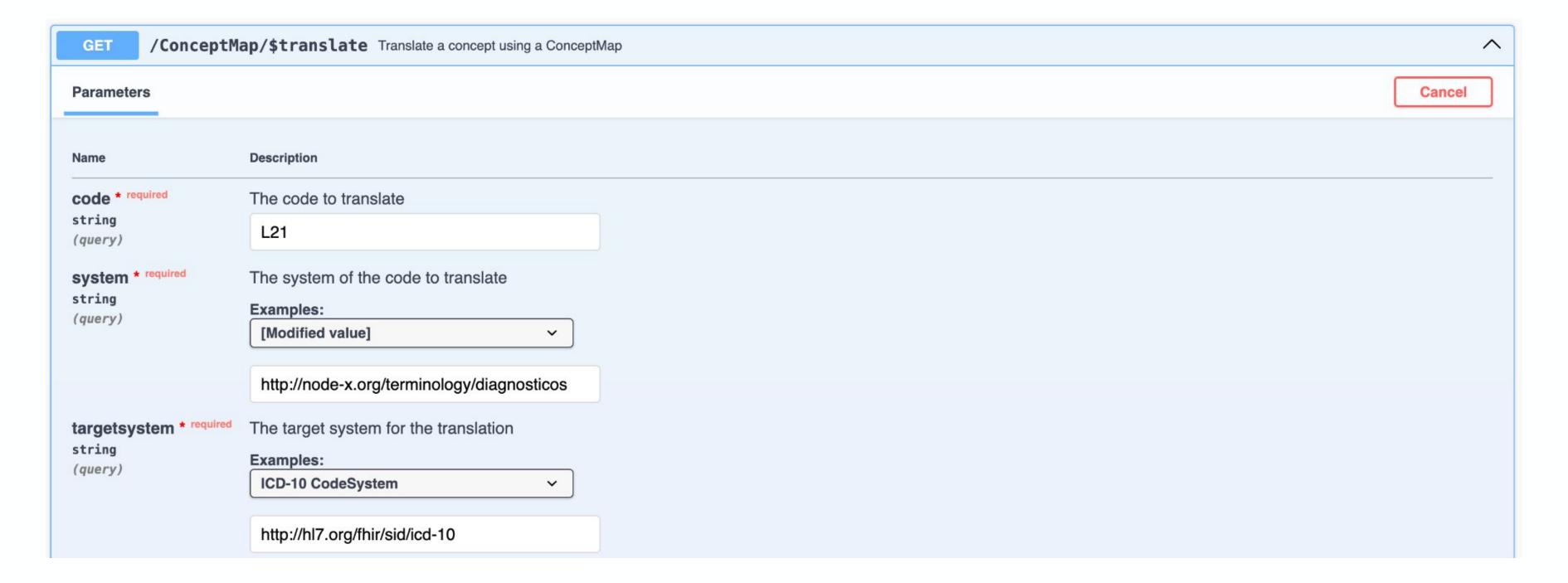
Mapping between Code Systems

- Find the ICD-10 code for my local Allergy code "L21"

Mapping between Code Systems

● Find the local code for the ICD-11 Vaccine code "Y5" (* not real codes)
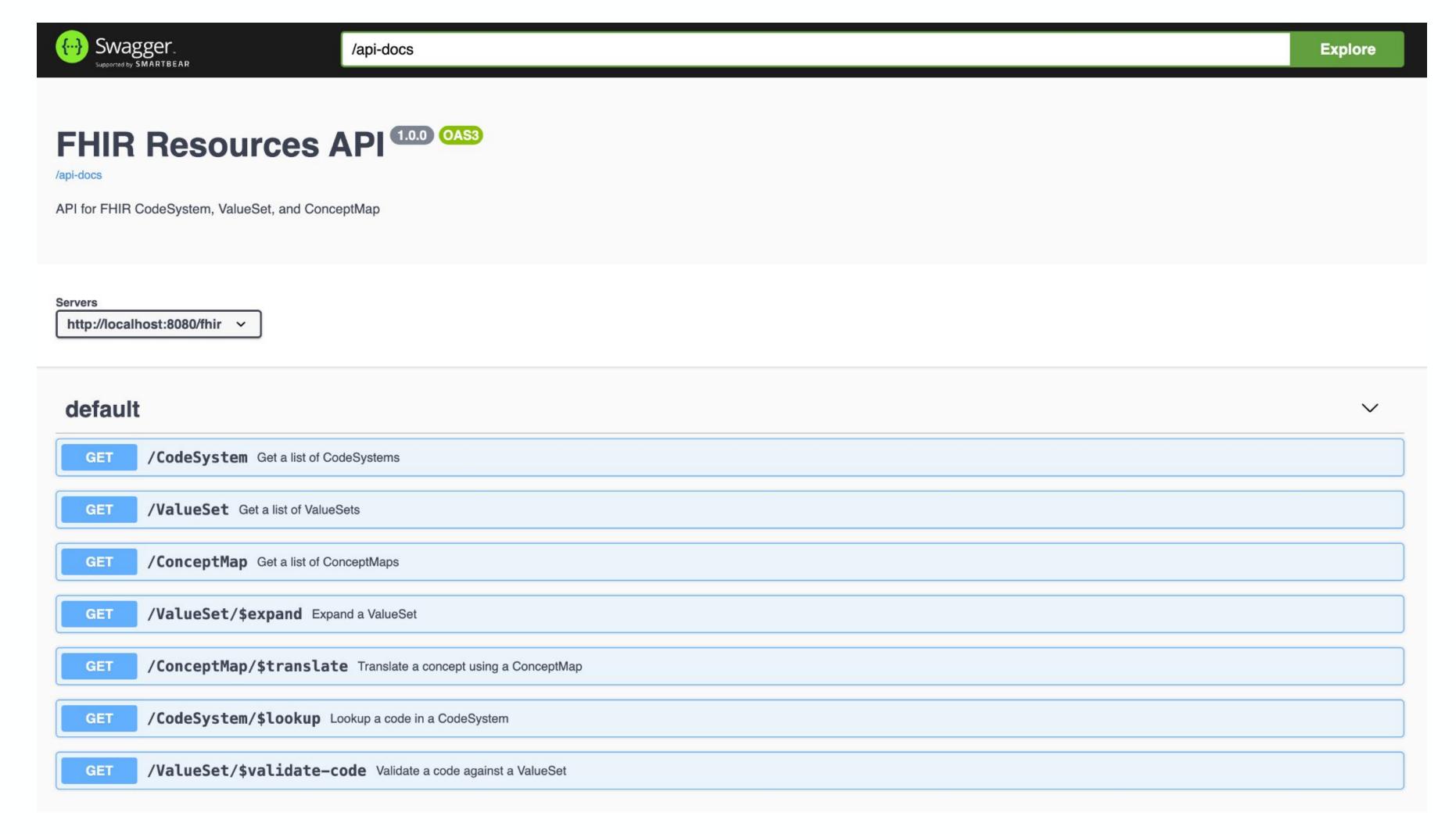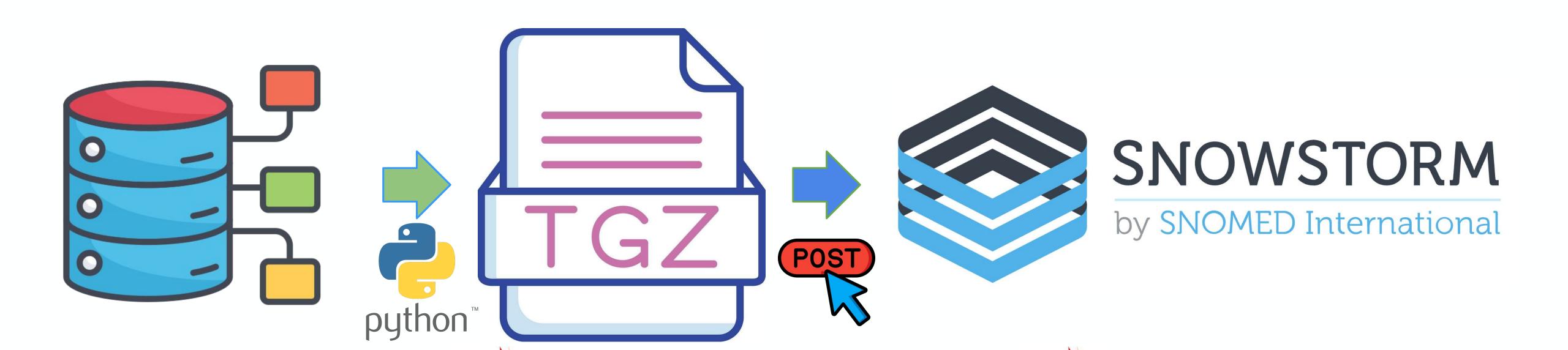
Swagger playground

Using this experience in production

Local Terminologies in
Production Database

FHIR Package

FHIR Terminology Server

Next steps

- Good luck in the connectathon!

- Please reach out in Slack!

snomed.org   x.com/SnomedCT   linkedin.com/company/ihtsdo   youtube.com/@snomedct

SNOMED International

Thank You

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