

CS6440: Introduction to Health Informatics

FHIR Shorthand (FSH) Lab Report

Jun Huang
jhuang709@gatech.edu

Abstract—This report documents the FHIR Shorthand (FSH) Lab conducted in the Spring 2024 offering of CS6440: Introduction to Health Informatics. The lab focuses on creating a FHIR Implementation Guide using FSH, encompassing profiles, extensions, and examples that demonstrate the utility and application of FSH in defining FHIR resources.

GITHUB REPOSITORY

Access to the GitHub repository: <https://github.gatech.edu/jhuang709/fsh-lab>.
TAs have been granted access as per the assignment requirements.

SUSHI-CONFIG.YAML

Link to the `sushi-config.yaml` in the repository: [sushi-config.yaml](#).

PROFILES AND EXTENSION

MyPatient Profile

- FSH Input File: [MyPatient.fsh](#)
- Generated JSON: [StructureDefinition-MyPatient.json](#)
- Screenshot of MyPatient Differential Table 1:

Differential Table	Key Elements Table	Snapshot Table	Statistics/References	All
This structure is derived from Patient				
Name	Flags	Card.	Type	Description & Constraints
Patient		0..*	Patient	Information about an individual or animal receiving health care services
✱ Slices for extension		0..*	Extension	Extension Slice: Unordered, Open by value:url
• favoriteColor		0..1	string	Favorite Color Extension URL: http://example.org/StructureDefinition/favorite-color
name		1..1	HumanName	A name associated with the patient
use		0..1	code	usual official temp nickname anonymous old maiden Required Pattern: official
gender	S	0..1	code	male female other unknown
address	S	1..1	Address	An address for the individual
country	S	1..1	string	Country (e.g. can be ISO 3166 2 or 3 letter code)
? Documentation for this format				

Figure 1—Screenshot of MyPatient Differential Table

WeightObservation Profile

- FSH Input File: [WeightObservation.fsh](#)
- Generated JSON: [StructureDefinition-WeightObservation.json](#)
- Screenshot of WeightObservation Differential Table 2:

Differential Table	Key Elements Table	Snapshot Table	Statistics/References	All
This structure is derived from Observation				
Name	Flags	Card.	Type	Description & Constraints
Observation		0..*	Observation	Measurements and simple assertions
code	S	1..1	CodeableConcept	Type of observation (code / type) Required Pattern: At least the following Fixed Value: (complex)
coding		1..*	Coding	Code defined by a terminology system Fixed Value: (complex)
system		1..1	uri	Identity of the terminology system Fixed Value: http://loinc.org
code		1..1	code	Symbol in syntax defined by the system Fixed Value: 29463-7
display		1..1	string	Representation defined by the system Fixed Value: Body weight
subject	S	0..1	Reference(My Patient)	Who and/or what the observation is about
value[x]	S	0..1	Quantity	Actual result
? Documentation for this format				

Figure 2—Screenshot of WeightObservation Differential Table

FavoriteColorExtension

- FSH Input File: [FavoriteColorExtension.fsh](#)
- Generated JSON: [StructureDefinition-FavoriteColor.json](#)
- Screenshot of FavoriteColor Differential Table 3:

Name	Flags	Card.	Type	Description & Constraints
Extension		0..*	Extension	Favorite Color Extension
extension		0..0		
url		1..1	uri	"http://example.org/StructureDefinition/favorite-color"
Slices for value[x]		0..1	string	Value of extension
value[x]:valueString		0..1	string	Slice: Unordered, Open by type:\$this Value of extension

[Documentation for this format](#)

Figure 3—Screenshot of FavoriteColor Differential Table

SpecificVaccination Profile (Custom Profile)

- FSH Input File: [SpecificVaccination.fsh](#)
- Generated JSON: [StructureDefinition-SpecificVaccination.json](#)
- Screenshot of SpecificVaccination Differential Table 4:

Differential Table	Key Elements Table	Snapshot Table	Statistics/References	All
This structure is derived from Immunization ?				
Name	Flags	Card.	Type	Description & Constraints
Immunization		0..*	Immunization	Immunization event information
status	S	1..1	code	completed entered-in-error not-done
vaccineCode	S	1..1	CodeableConcept	Vaccine product administered
coding		1..*	Coding	Required Pattern: At least the following Code defined by a terminology system Fixed Value: (complex)
system		1..1	uri	Identity of the terminology system Fixed Value: http://snomed.info/sct
code		1..1	code	Symbol in syntax defined by the system Fixed Value: 840539006
display		1..1	string	Representation defined by the system Fixed Value: COVID-19
patient	S	1..1	Reference(Patient)	Who was immunized
Slices for occurrence[x]		1..1	dateTime, string	Vaccine administration date Slice: Unordered, Open by type:\$this
occurrence[x]:occurrenceDateTime	S	0..1	dateTime	Vaccine administration date
lotNumber	S	0..1	string	Vaccine lot number
performer	S	0..*	BackboneElement	Who performed event
reaction	S	0..*	BackboneElement	Details of a reaction that follows immunization
protocolApplied	S	0..*	BackboneElement	Protocol followed by the provider

[? Documentation for this format](#)

Figure 4—Screenshot of SpecificVaccination Differential Table

- Constraints Implemented:
 1. **Status Must Support:** A *cardinality* constraint ensuring the `status` element is marked as must support.
 2. **Vaccine Code Fixed to "COVID-19 vaccine":** A *fixed value* constraint where the `vaccineCode` element is set to a specific LOINC code for "COVID-19 vaccine".
 3. **Vaccine Code Must Support:** A *cardinality* constraint, marking the `vaccineCode` element as must support.
 4. **Patient Must Support:** A *cardinality* constraint indicating the `patient` element as must support.
 5. **Occurrence DateTime Must Support:** A *cardinality* constraint for the `occurrenceDateTime` element.
 6. **Lot Number Must Support:** A *cardinality* constraint marking the `lotNumber` as must support.
 7. **Performer Must Support:** A *cardinality* constraint to ensure `performer` is must support.
 8. **Reaction Must Support:** A *cardinality* constraint for the `reaction` element.

9. **Protocol Applied Must Support:** A *cardinality* constraint on the protocolApplied element.

ALIASES.FSH

Link to the `Aliases.fsh` file in the repository: [Aliases.fsh](#).