

⊗ Features not yet implemented in SUSHI, the reference implementation of FSH

Paths	
Nested element	<i>element.subelement.subelement</i>
Array element	<i>array-element</i> [<i>index</i>] ([0] optional)
Choice [x] element	value <i>DataType</i>
Reference choices	<i>reference-element</i> [<i>Resource or Profile</i>]
Extensions	extension[<i>extension-name or id or url</i>]
Sliced arrays	<i>slice-path</i> [<i>slice-name</i>] <i>slice-path</i> [<i>slice-name</i>][<i>reslice-name</i>]
StructureDefinition	<i>^structure-definition-path</i>
Escape	<i>element-path</i> <i>^element-definition-path</i>

Notations and Special Values	
code	<i>#code</i> "optional-display-text"
Coding and CodeableConcept	<i>system#code</i> "optional-display-text"
Cardinality	<i>min..max</i> (min integer, max int or *)
Comments	// <i>single line</i> /* <i>multi-line</i> */
Flags	MS (must support, S) SU (summary, Σ) ?! (modifier)
Binding strengths	required, extensible, preferred, example
Multi-line string	""" <i>string or markdown with new line</i> """

SUSHI and IG Publisher	
File extension	.fsh
Install/update SUSHI	\$ npm install -g fsh-sushi
Run SUSHI	\$ sushi <i>input-dir</i> -o <i>output-dir</i>
Update IG Publisher (in output directory)	\$ _updatePublisher (Windows) \$./_updatePublisher.sh (Mac)
Run IG Publisher (in output directory)	\$ _genonce (Windows) \$./_genonce.sh (Mac)

More Information	
FHIR Shorthand Zulip channel (#shorthand)	https://chat.fhir.org/#narrow/stream/215610-shorthand
FHIR Shorthand Documentation and Tutorial	http://build.fhir.org/ig/HL7/fhir-shorthand
FHIR Shorthand Documentation Issue Reports	https://github.com/HL7/fhir-shorthand/issues
SUSHI Code Repository	https://github.com/FHIR/sushi
SUSHI Issue Reports	https://github.com/FHIR/sushi/issues
HL7 Confluence Site	https://confluence.hl7.org/display/FHIR/FHIR+Shorthand
Conference Calls	See http://hl7.org/concalls for details

Item	Keywords
Alias	Alias: <i>alias-name</i> = <i>url or oid</i>
Profile	Profile: <i>name</i> Parent: <i>profile or resource name or url</i> ⊗ Mixins: <i>mixin1, mixin2, ...</i> Id: <i>id</i> (optional, defaults to name) Title: <i>string</i> Description: <i>string or markdown</i>
Instance	Instance: <i>id</i> InstanceOf: <i>profile or resource name or URL</i> Description: <i>string or markdown</i>
Extension	Extension: <i>name</i> Parent: <i>extension name or id or url</i> (optional, defaults to FHIR Extension element) Id: <i>id</i> (optional, defaults to name) Title: <i>string</i> Description: <i>string or markdown</i>
Value set	ValueSet: <i>name</i> Id: <i>id</i> (optional, defaults to name) Title: <i>string</i> Description: <i>string or markdown</i>
Code system	CodeSystem: <i>name</i> Title: <i>string</i> Description: <i>string or markdown</i>
⊗ Invariant	Invariant: <i>key</i> Description: <i>string or markdown</i> Expression: <i>FHIRPath string</i> Severity: #error #warning XPath: <i>XPath expression string</i>
⊗ Mixin	Mixin: <i>name</i>

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Rules	
Fixed Value	* <i>path</i> = <i>value</i>
Binding	* <i>path</i> from <i>valueset</i> (<i>binding strength</i>)
Cardinality	* <i>path</i> <i>min..max</i>
Data type[x] restriction	* <i>path</i> only <i>type</i> * <i>path</i> only <i>type1</i> or <i>type2</i> or <i>type3</i> ...
Reference restriction	* <i>path</i> only Reference(<i>Resource or Profile</i>) * <i>path</i> only Reference(<i>Resource1</i> <i>Profile2</i> <i>Profile3</i> ...)
Flags	* <i>path</i> <i>flag1</i> <i>flag2</i> * <i>path1, path2, path3... flag</i>
Extensions	* <i>extension-path</i> contains <i>extension-reference1</i> <i>card1</i> <i>flags1</i> and <i>extension-reference2</i> <i>card2</i> <i>flags2</i> ... (extension-reference can be id or name or url)
Slices	* <i>array-element-path</i> contains <i>slice-name1</i> <i>card1</i> <i>flags1</i> and <i>slice-name2</i> <i>card2</i> <i>flags2</i> ...
⊗ Invariants	* obeys <i>invariant</i> (applies to entire profile) * <i>path</i> obeys <i>invariant</i> * <i>path1, path2, ...</i> obeys <i>invariant</i>

Value Set Rules	
Include single code	* <i>system#code</i> "display"
Exclude single code	* exclude <i>system#code</i> "display"
Include entire code system	* codes from system <i>codesystem</i>
Include from value set	* codes from valueset <i>valueset</i>
Exclude from value set	* exclude codes from valueset <i>valueset</i>
Filter syntax: <i>property operator string-code-boolean-or-regex-value</i>	
Operators (not applicable to every code system): is-a descendent-of = is-not-a regex in not-in generalizes exists	
Include codes with filtering	* codes from system <i>codesystem</i> where <i>filter1</i> and <i>filter2</i> and ...
Exclude codes with filtering	* exclude codes from system <i>codesystem</i> where <i>filter</i>

Slicing Rubric	
* <i>array-path</i> ^slicing.discriminator.type = #pattern #value	
* <i>array-path</i> ^slicing.discriminator.path = <i>FHIRPath string</i>	
* <i>array-path</i> ^slicing.rules = #open #closed #openAtEnd (optional)	
* <i>array-path</i> ^slicing.ordered = true false (optional)	
* <i>array-path</i> ^slicing.description = <i>string</i> (optional)	

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Paths	
Nested element	stage.assessment
Array element	name[0].given[1]
Choice [x] element	valueQuantity, valueReference
Reference choices	performer[Organization]
Extensions	extension[EvidenceType]
	extension[http://hl7.org/fhir/StructureDefinition/location-distance]
Sliced arrays	component[DiastolicPressure]
Resliced arrays	component[RespiratoryScore][OneMinute]
StructureDefinition	^abstract
Escape	component[VariationCode] ^short

Notations and Special Values	
code	#confirmed
Coding and CodeableConcept	http://snomed.info/sct#363346000 "Malignant neoplastic disease (disorder)"
	ICD10CM#C004
Cardinality	0..0 1..1 1..*
Comments	// end of line or single line
	/* This comment continues over multiple lines */

SUSHI and IG Publisher	
FSH file	MyFile.fsh
Install/update SUSHI	\$ npm install -g fsh-sushi
Run SUSHI from FSH directory output by default to ./build	\$ sushi .
Update IG Publisher (from ./build directory)	\$ _updatePublisher (Windows)
	\$./_updatePublisher.sh (Mac)
Run IG Publisher (from ./build directory)	\$ _genonce (Windows)
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Item	Keywords
Alias	Alias: LNC = http://loinc.org
	Alias: RACE = urn:oid:2.16.840.1.113883.6.238
	Alias: USCorePatient = http://hl7.org/fhir/us/core/StructureDefinition/us-core-patient
Profile	Profile: CancerPatient Parent: USCorePatient (alias defined above) Id: CancerPatient Title: "Cancer Patient" Description: "A patient diagnosed with cancer"
Instance	Instance: mCODETumorMarkerExample01 InstanceOf: TumorMarker Description: "Epidermal growth factor example."
Extension	Extension: TerminationReason Id: TerminationReason Title: "Termination Reason" Description: "Reason for stopping a treatment."
Value set	ValueSet: AnatomicalOrientationVS Title: "Anatomical Orientation Value Set" Description: "Values for anatomical orientation."
Code system	CodeSystem: AJCC_FairUse Title: "AJCC Fair Use" Description: "A small subset of AJCC staging codes used for IG examples."
⊘ Invariant	Invariant: us-core-8 Description: "Patient.name.given or Patient.name.family or both SHALL be present" Expression: "family.exists() or given.exists()" Severity: #error XPath: "f:given or f:family"
⊘ Mixin	Mixin: USCoreMetadata

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Rules	
Fixed Value	* status = #arrived
	* code = SCT#363346000 "Malignant neoplastic disease (disorder)"
	* onsetDateTime = "2019-04-02"
	* subject = Reference(EveAnyperson)
Binding	* bodySite from CancerBodyLocationVS (preferred)
	* valueCodeableConcept from http://loinc.org/vs/LL1971-2 (required)
Cardinality	* severity 0..0
Datatype[x] restriction	* value[x] only CodeableConcept
	* effective[x] only dateTime or Period
Reference restriction	* subject only Reference(CancerPatient)
	*asserter only Reference(Practitioner Patient)
Flags	* deceased[x] MS ?! SU
	* reasonCode, extension[TerminationReason] MS
Extensions	* extension contains TreatmentIntent 0..1 MS and TerminationReason 0..* MS
Slicing	* component contains GeneStudied 0..* MS and VariationCode 0..* and GenomicDNAChange 0..1
⊘ Invariants	* obeys us-core-9
	* name obeys us-core-8

Value Set Rules	
Single code	* SCT#54102005 "G1 grade (finding)"
Exclude single code	* exclude SCT#12619005
All codes in system	* codes from system HGVS
Filter Rules for SNOMED-CT (assumes code system aliased as 'SCT')	
Subsumption	* codes from system SCT where concept is-a #123037004 "Body Structure"
Exclude subsumptions	* exclude codes from system SCT where concept is-a #128462008 "Secondary malignant neoplastic disease (disorder)"

Slicing Rubric	
* component ^slicing.discriminator.type = #pattern	
* component ^slicing.discriminator.path = "code"	
* component ^slicing.rules = #open	
* component ^slicing.ordered = false	
* component ^slicing.description = "Slice pattern for component.code"	