FHIR Shorthand 3.0 Quick Reference: Syntax

KEY to Expression Syntax

{curly braces}	If **datatype**, substitute with a **value** If **item**, substitute with **name, id, or URL**
<angle brackets>	Path to an element of given datatype
Orange text	Optional
ellipsis (…)	Indicates a pattern that can be repeated
forward slash (/)	Indicates a choice of items
flag(s)	one or more flags separated by white space
datatype(s)	one or more datatypes separated by 'or' in rules, by commas in keywords
bold	Default value

Notations and Special Values

code	#{code}		
Coding	{CodeSystem}|{version} #{code} "{display}"		
cardinality	{min}..{max}	{min}..	..{max}
Quantity with units	{decimal} '{UCUM code}' "{display}" {decimal} {Coding} "{display}"		
Comments	// single line comment	/* multi-line comment */	
Flags	MS must support SU summary, Σ ?! modifier	TU trial use N normative D draft	
Triple quote string	"""{string/markdown}"""		
Array indices	[{integer}]	[+] next index	[=] same index
Double brackets	[[RuleSet argument without escape characters]]		
References	Reference({Item1} or {Item2} or {Item3}...) CodeableReference({Item1} or {Item2} or {Item3}...) Canonical({name/id/url}|{version string})		

Paths

Array element	<array element>[0-based index]
Reference	<Reference>[{Resource or Profile}]
Extension	<Extension>[{extension}]
Sliced array	<array element>[slice-name][reslice-name]
Indented rules	Two spaces before a rule prepends the path of the previous rule to the current path
Caret paths	^<metadata element of StructureDefinition> <element in Profile/Extension/Logical Model> ^<element in corresponding ElementDefinition> <code in CodeSystem> ^<metadata element in CodeSystem.concept> <code in ValueSet> ^<metadata element in ValueSet.compose.include.concept>

Creating Items

Declaration	Keywords	Applicable Rules
Alias	none	none
CodeSystem	Id, Description, Title	Assignment‡, Local Code, Insert
Extension	Id, Description, Title, Parent	Assignment, Binding, Cardinality, Contains, Flag, Insert, Obeys, Path, Type
Instance	InstanceOf, Description, Title, Usage	Assignment, Insert, Path
Invariant	Description, Severity, XPath, Expression	Assignment, Insert, Path
Logical or Resource	Id, Description, Title, Parent	Add Element, Assignment, Binding, Cardinality, Flag§, Insert, Obeys, Path, Type
Mapping	Source, Target, Description, Title	Insert, Mapping
Profile	Parent, Id, Description, Title	Assignment, Binding, Cardinality, Contains, Flag, Insert, Obeys, Path, Type
RuleSet	none	all
ValueSet	Id, Description, Title	Assignment‡, Exclude, Include, Insert

‡ applies only to caret paths
§ excludes must support (MS) flag

Keyword	Data Type
Character-istics	code
Context	name/id/fully-qualified path/FHIRPath string
Description	string/markdown
Expression	FHIRPath string
Id	id
InstanceOf	name/id/url
Parent	name/id/url
Severity	code
Source	name
Target	uri
Title	string
Usage	code
XPath	XPath string

Declaration	Data Type
Alias	expression†
CodeSystem	name
Extension	name
Instance	id
Invariant	id
Logical	name
Mapping	id
Profile	name
Resource	name
RuleSet	name
ValueSet	name

† {$name} = {uri|urn:oid}

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Rule Syntax

Add Element	* <element> {card} {flag(s)} {datatype(s)} "{short}" "{definition}"
Assignment	* <element> = {value} (exactly)
Binding	* <bindable> from {ValueSet} (**required**/extensible/preferred/example)
Cardinality	* <element> {card}
Contains (slices/inline extensions)	* <array/Extension> contains {name1} {card} {flag(s)} and {name2} {card} {flag(s)} and {name3} {card} {flag(s)} …
Contains (standalone extensions)	* <Extension> contains {Extension1} named {name1} {card} {flag(s)} and {Extension2} named {name2} {card} {flag(s)} and {Extension3} named {name3} {card} {flag(s)} …
Flag	* <element1> and <element2> and … {flag(s)}
Include/ Exclude	* **include**/exclude {Coding} * **include**/exclude codes from valueset {ValueSet} * **include**/exclude codes from system {CodeSystem} where {filter1} and {filter2} and … Filter syntax: {property} {filter-operator} {value}
Insert	* insert {RuleSet} * insert {RuleSet}({param1}, {param2}, …) * <element> insert {RuleSet}({param1}, {param2}, …)
Local Code	* #{code} #{child code} "{display string}" "{definition}"
Mapping	* <element> -> "{map string}" "{comment string}" #{mime-type code}
Obeys	* <element> obeys {Invariant1} and {Invariant2} …
Path/Indent	* <element> ␣␣* <subelement> ␣␣␣␣* <sub-subelement>
Type	* <element> only {datatype(s)} or {datatype2} or {datatype3} or … * <element> only Reference/CodeableReference/ Canonical({Resource/Profile1} or {Resource/Profile2} or…)

Slicing Rubric

* <array-path> ^slicing.discriminator.type = {#pattern/#value/#type/#profile/#exists/#position}
* <array-path> ^slicing.discriminator.path = {FHIRPath string}
* <array-path> ^slicing.rules = {#open/#closed/#openAtEnd}
* <array-path> ^slicing.ordered = true/**false**
* <array-path> ^slicing.description = {string}

FHIR Shorthand 3.0 Quick Reference: Examples

Notations and Special Values

code	#confirmed
Coding and CodeableConcept	http://snomed.info/sct#363346000 "Malignant neoplastic disease (disorder)"
	ICD10CM#C004
Quantity (UCUM units)	155.0 '[lb_av]' "pounds"
Cardinality	0..1 1..1 2 ..* (two-sided) ..1 1.. 2.. (one-sided)
Comments	// end of line or single line
	/* This comment continues over multiple lines */
References	Reference(Patient) Reference(Patient or Practitioner) Canonical(MyPatient)

Paths

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

Slicing Rubric

```
* component ^slicing.discriminator.type = #pattern
* component ^slicing.discriminator.path = "code"
* component ^slicing.rules = #open
* component ^slicing.ordered = false
* component ^slicing.description = "Slice on component.code"
```

More Information

FSH Specification | FSH School | VSCode Extension | FSH Chat

Item	Declaration & Keywords
Alias	Alias: $UCUM = http://unitsofmeasure.org
	Alias: $race = urn:oid:2.16.840.1.113883.6.238
	Alias: $GenderIdentity = http://hl7.org/fhir/StructureDefinition/patient-genderIdentity
Code system	CodeSystem: AJCC_FairUse Title: "AJCC Fair Use" Description: "A small subset of AJCC staging codes used for IG examples."
Extension	Extension: TreatmentTerminationReason Id: treatment-termination-reason Title: "Treatment Termination Reason" Description: "Reason for stopping a treatment." Context: Procedure, MedicationAdministration
Instance	Instance: TumorMarkerExample01 InstanceOf: TumorMarker Usage: #example Description: "Epidermal growth factor example."
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"
Logical	Logical: FamilyMember Title: "Family Member" Description: "Member of a family unit." Characteristics: #can-be-target
Mapping	Mapping: USCancerPatientToArgonaut Source: USCancerPatient Target: "http://unknown.org/Argonaut-DQ-DSTU2" Id: argonaut-dq-dstu2 Title: "Argonaut DSTU2"
Profile	Profile: USCancerPatient Parent: USCorePatientProfile Id: mcode-cancer-patient Title: "Cancer Patient" Description: "A patient diagnosed with cancer"
Resource	Resource: EmergencyVehicle Title: "Emergency Vehicle" Description: "A vehicle such as ambulance."
Rule set	RuleSet: CommonRadiologyRules //simple RuleSet: AddPatientName(first, last) //parameterized
Value set	ValueSet: AnatomicalOrientationVS Title: "Anatomical Orientation Value Set" Description: "Values for anatomical orientation."

Rules

Add Element	* email 0..* SU string "Email address" "Patient's email addresse(s)." * primaryClinicians 0..* Reference(Organization or Practitioner) "PCP" "Primary care physician(s)" * preferredName[x] 0..1 string or HumanName "Preferred Name" "The person's preferred name"
Assignment	* status = #arrived * code = $SCT#18165001 "Jaundice (finding)" * onsetDateTime = "2019-04-02" * subject = Reference(EveAnyperson) * valueQuantity = 2.5 'mm' * valueQuantity = 2.5 $UCUM#mm "millimeters"
Binding	* bodySite from CancerBodyLocationVS (preferred) * valueCodeableConcept from http://loinc.org/vs/LL1971-2 (required) * valueQuantity from LengthUnitsVS (extensible)`````
Cardinality	* severity 0..0 * subject 1..
Contains (inline)	* extension contains treatmentIntent 0..1 MS and terminationReason 0..* MS
Contains (standalone extension)	* extension contains $GenderIdentity named genderIdentity 0..1 MS and http://hl7.org/fhir/StructureDefinition/patient-disability named disability 0..1 MS
Contains (slicing)	* component contains GeneStudied 0..* MS and VariationCode 0..* and GenomicDNAChange 0..1
Flag	* deceased[x] MS ?! SU * reasonCode and extension[terminationReason] MS
Include/ Exclude	* $SCT#54102005 "G1 grade (finding)" * exclude $SCT#12619005 * include codes from valueset claim-exception * include codes from system $SCT where concept is-a #123037004 "Body Structure"
Insert	* insert CommonRadiologyRules * insert AddPatientName(Jane, Doe) * insert BundleSlice(Vital Signs, 0, *, [["Height, weight, etc. (see US Core)"]], USCoreVitalSigns)
Local Code	* #NED "No Evidence of Disease" "No physical evidence of disease on exam or imaging tests."
Mapping	* -> "Patient" * identifier.system -> "Patient.identifier.system"
Obeys	* obeys us-core-6 and us-core-9 * name obeys us-core-8
Type	* value[x] only CodeableConcept * effective[x] only dateTime or Period * subject only Reference(CancerPatient) * asserter only Reference(Practitioner or Patient) * reason only CodeableReference(Observation)