**FHIR Shorthand 1.2 Quick Reference: Syntax**

### Keywords
- Indicates a pattern that can be repeated
- One or more flags separated by white space
- One or more datatypes separated by ‘or’

### Notations and Special Values
- Parameters: (curly braces) - If `datatype`, substitute with a `value`
- If `item`, substitute with name, id, or URL
- Orange text - Optional
- Ellipsis (...) - Indicates a pattern that can be repeated
- Forward slash (/) - Indicates a choice of items

### 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 pre-points the path of the previous rule to the current path`
- Caret paths: `<element in Profile> ^ <element in corresponding ElementDefinition>`

### Slicing Rubric
- `<array-path>` = `slicing.discriminator.type = (#pattern/#value/#type/#profile) #exists`
- `<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)`

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**Creating Items**

<table>
<thead>
<tr>
<th>Declaration</th>
<th>Keywords</th>
<th>Applicable Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alias</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>CodeSystem</td>
<td>id, Description, Title</td>
<td>Assignment, Local Code, Insert</td>
</tr>
<tr>
<td>Extension</td>
<td>id, Description, Title, Parent</td>
<td>Assignment, Binding, Cardinality, Contains (all types), Flag, Insert, Obeys, Path, Type</td>
</tr>
<tr>
<td>Instance</td>
<td>InstanceOf, Description, Title, Usage</td>
<td>Assignment, Insert, Path</td>
</tr>
<tr>
<td>Invariant</td>
<td>Description, Severity, XPath, Expression</td>
<td>Add Element, Assignment, Binding, Cardinality, Contains (all types), Flag, Insert, Obeys, Path, Type</td>
</tr>
</tbody>
</table>

**Rule Syntax**

<table>
<thead>
<tr>
<th>Add Element</th>
<th>`&lt;element&gt; {card} {flag(s)} {datatype(s)} &quot;(short)&quot; {&quot;(definition)&quot;}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td><code>&lt;element&gt; = (value) (exactly)</code></td>
</tr>
<tr>
<td>Binding</td>
<td><code>&lt;bindable&gt; from {ValueSet} {required}/extensible/preferred/example</code></td>
</tr>
<tr>
<td>Cardinality</td>
<td><code>&lt;element&gt; {card}</code></td>
</tr>
<tr>
<td>Contains</td>
<td><code>&lt;array/Extension&gt; contains {name1} {card} {flag(s)} and {name2} {card} {flag(s)} and {name3} {card} {flag(s)} ...</code></td>
</tr>
<tr>
<td>Contains</td>
<td><code>&lt;Extension&gt; contains {Extension1} named {name1} {card} {flag(s)} and {Extension2} named {name2} {card} {flag(s)} and {Extension3} named {name3} {card} {flag(s)} ...</code></td>
</tr>
<tr>
<td>Flag</td>
<td><code>&lt;element1&gt;</code> and <code>&lt;element2&gt;</code> and ... <code>{flag(s)}</code></td>
</tr>
<tr>
<td>Include/Exclude</td>
<td><code>&lt;code&gt; / exclude {Coding}</code></td>
</tr>
<tr>
<td>Insert</td>
<td><code>&lt;element&gt; {RuleSet}</code></td>
</tr>
<tr>
<td>Local Code</td>
<td>`{#code} #child code &quot;(display string)&quot; {&quot;(definition)&quot;}</td>
</tr>
<tr>
<td>Mapping</td>
<td><code>&lt;element&gt; &gt; {map string} {&quot;(definition)&quot;} #mime-type code</code></td>
</tr>
<tr>
<td>Obey</td>
<td><code>&lt;element&gt; obeys {Invariant1} and {Invariant2} ...</code></td>
</tr>
<tr>
<td>Path</td>
<td><code>&lt;element&gt;</code></td>
</tr>
</tbody>
</table>

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More Information

- [FSH Specification](#)
- [FSH Chat](#)
- [FSH School](#)
- [HL7 Project Page](#)
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 ..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[Organisation]
Extensions  extension[terminationReason]
Sliced arrays  component[DiastolicPressure]
Resliced arrays  component[RespiratoryScore][OneMinute]
StructureDefinition escape (caret syntax)  ^abstract

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"

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Item  Declaration & Keywords

Alias  Alias: SUCUM = http://unitsofmeasure.org
Alias: Srace = urn:oid:2.16.840.1.113883.6.238
Alias: SGenderIdentity = 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 ICG-examples."

Extension  Extension: TreatmentTerminationReason
Id: treatment-termination-reason
Title: "Treatment Termination Reason"
Description: "Reason for stopping a treatment."

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: "given or f:family"

Logical  Logical: FamilyMember
Title: "Family Member"
Description: "Member of a family unit."

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
RuleSet: AddPatientName(first, last) /simple

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 address(es)."
* 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 SUCUMmms "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..8

Contains (inline)  * extension contains treatmentIntent 0..1 MS and terminationReason 0..* MS

Contains (standalone extension)  * extension contains SGenderIdentity named genderIdentity 0..1 MS

Contains (slicing)  * component contains GeneStudied 0..* MS and GenomicDNAChange 0..1 MS

Flag  * deceased[x] MS ? SU
* reasonCode and extension[terminationReason] MS

Include/Exclude  * $SCT#54102005 "G1 grade (finding)"
* exclude $SCT#12619005
* include codes from value set claim exception
* include codes from system $SCT where concept is a #123037004 "Body Structure"

Insert  * insert CommonRadiologyRules
* insert AddPatientName(Jane, Doe)

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)