



HL7 FHIR DevDays 2017



FHIR Questionnaires

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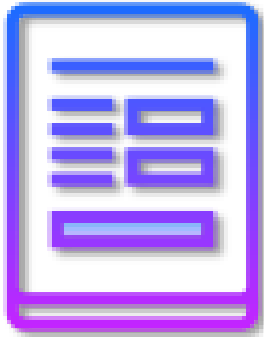
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What is going to be covered?



- Overview
- Uses
- Workflows
- FHIR resource definitions
- Creating Questionnaires
- Pre-population
- Conversion/Mapping data to other resources
- Advanced validation

Overview

- Surveys, assessments, forms
- Schema
- Layout
- Validation
- Mappings
- Data
- Questionnaire
- QuestionnaireResponse
- ValueSet / Terminologies
- Similar to StructureDefinition

Uses of FHIR Questionnaires

- Assessments (GP)
- Assessments (consumer)
- Surveys
- Gov't/Statutory forms
- Referrals template?
- Admission form?
- General data entry?
- Care Plans
- Research
- Oncology
- Pathology
- Public Health Reporting
- Insurance/Payments

Workflow



- Locate questionnaire to use (for given context)
- Load/render questionnaire (and referenced content)
- Pre-populate questionnaire with other data
 - E.g. patient demographics, observations etc
- User enters data
 - Local validations may occur during data entry
- QuestionnaireResponse is validated by server
 - Errors/Warnings/issues reported to the user
- QuestionnaireResponse is saved to the target server
 - Data extracted into other resources

Form Definitions

Questionnaire

- Metadata
- Items (nested)
 - LinkId
 - Text
 - Item Type
 - repeats
 - Data rules (validation)
 - Formatting hints

QuestionnaireResponse

- Context
- Items (nested)
 - LinkId (must match)
 - Answer value

LinkId joins answer to definition
MUST MATCH
(including the nesting depth)

Item-Type	Response Type	Definition
group	Group	An item with children, may be repeating. Could be a section, table or other layout (e.g. tabs)
display	(none)	Just a label to be displayed (no answer to be collected)
Boolean	valueBoolean	Yes/no answer (checkbox, radio group or similar)
decimal	valueDecimal	Real number answer (restricted textbox, slider, ...)
integer	valueInteger	Integer answer (restricted textbox, slider, ...)
date	valueDate	Date answer (restricted textbox, date picker ...)
dateTime	valueDateTime	Date and time answer (restricted textbox, date picker ...)
time	valueTime	Time only answer (hour:minute:second) answer independent of date (restricted textbox, ...)
string	valueString	Short free-text answer (single line textbox)
text	valueString	Longer free-text answer, potentially multi-paragraph (multi-line textbox)
url	valueUri	URL (website, FTP site, etc.) answer (restricted textbox)
choice	valueCoding	Coding drawn from a list of options (specified in either the option property, or via the ValueSet referenced in the options property) as an answer (radio buttons, checkboxes, combobox, autocomplete ...)
open-choice	valueCoding or valueString	Coding drawn from a list of options (as with the choice type) or a free-text entry in a string (similar controls to choice, except with ability to include textbox)
attachment	valueAttachment	Binary content such as a image, PDF, etc. as an answer (file selector ...)
reference	valueReference	A reference to another resource, e.g. practitioner, organization, etc. (resource finder?)
quantity	valueQuantity	Question with a combination of a numeric value and unit. ()

Difference between DSTU2 and STU3

DSTU2

- Group/Question
- Group 0..1 at root
- enableWhen, readonly, maxLength, initialValue (extension)
- Concept
- Label (extension)
- Group/question child collection ordering ambiguous

STU3

- Item (with type=group)
- Item 0..* at root
- Moved to core
- Code (and definition)
- Use Item (type=display)
- More metadata at root

<http://hl7.org/fhir/questionnaire.html> (check the R2 Diff tab – not a complete mapping)

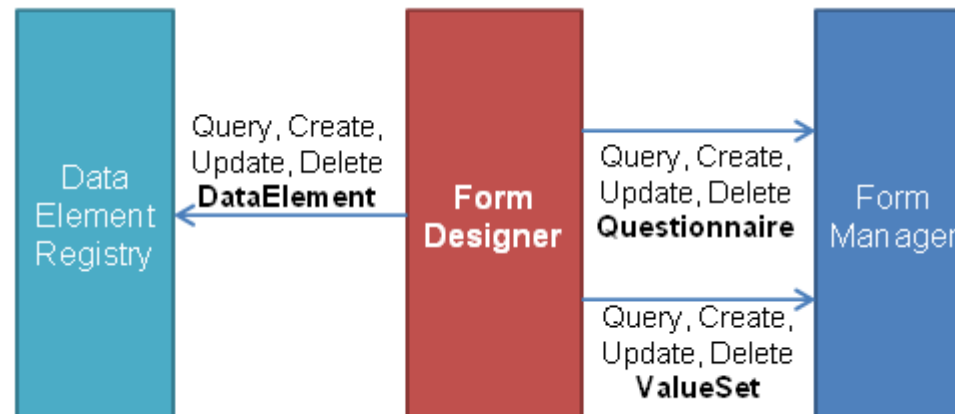
Structured Data Capture (SDC) Implementation Guide



- Data Element Registries
- Form Manager

<http://hl7.org/fhir/us/sdc/index.html>

<http://hl7.org/fhir/us/sdc/sdc-questionnaire.html>



Creating Questionnaires

- Converting existing non FHIR definitions
- SmartQ editor (DSTU2 only)
<http://smartqedit.azurewebsites.net>
- Grahame's editor
- Using text editor
- Others?

(or combination of the above)

Demo creating/filling Questionnaires

Pre-population

- \$populate operation
 - XML content, with paths for extract
 - Questionnaire.item.definition
<http://hl7.org/fhir/questionnaire.html#2.38.5.4>
 - ConceptMap
 - Currently no standard defining the data selection
 - SDC extends this
- Telstra Health \$populate
 - Extension for FHIR query to execute
 - Uses Smart on FHIR context in query syntax
 - Extension for fhirpath statement to extract content from results of above extension
 - Works with repeating groups

Conversion/Mapping to other resources

- Questionnaire.item.definition
<http://hl7.org/fhir/questionnaire.html#2.38.5.4>
 - Directly link to an element in a structure definition
 - Can link each item
 - Supports repeating items!
- Perfect for extraction
 - Map to a specific StructureDefinition
 - Caveat: can't do complex split/join/calculations
- Custom Operations
 - \$convert-to-resources
 - \$save-atomic-data

Validation



- FHIR json/xml valid (serialization)
- Core FHIR profile validation
(maybe local profiles too)
- QuestionnaireResponse validation
 - Item Types
 - Extensions
 - Custom validation?
- OperationOutcome
 - Content/messages appropriate to display to users?

Validation code walkthrough and demo

Advanced Validation (*non standard*)

- Core resources can be profiled with invariants
- Extension to add this to Questionnaires



Name	Flags	Card.	Type
★ Extension		0..*	Extension
☐ ★ extension		0..*	Extension
☐ ★ details		1..1	Extension
☐ ★ location		0..*	Extension
☐ ★ severity		0..1	Extension
☐ ★ expression		1..1	Extension
☐ url		1..1	uri Fixed Value

<https://simplifier.net/sqlonfhir-stu3/Questionnaire-validation-expression>

Scoring (non standard)

- <http://sqlonfhir-dstu2.azurewebsites.net/fhir/Questionnaire/demo-scoring2>
- Concepts in options have a weighting

```

<question >
  <extension url="http://standards.healthconnex.com.au/fhir/StructureDefinition/Questionnaire-hcx-aggregate" >
    <extension url="question" >
      <valueString value="q2"/>
    </extension>
    <extension url="question" >
      <valueString value="q3"/>
    </extension>
    <extension url="question" >
      <valueString value="q4"/>
    </extension>
    <extension url="question" >
      <valueString value="q5"/>
    </extension>
    <extension url="question" >
      <valueString value="q6"/>
    </extension>
    <valueCoding >
      <code value="sum"/>
    </valueCoding>
  </extension>
  <linkId value="calculatedscore"/>
  <text value="Total"/>
  <type value="decimal"/>
</question>

```

Scoring Demonstration

Purpose: Demonstrate how scoring could be implemented in a Questionnaire.

In the past 3 months, how often have you used tobacco?

Never
 Once/twice
 Monthly
 Weekly
 Daily/Almost Daily

During the past 3 months, how often have you had a strong desire or urge to use tobacco?

Never
 Once/twice
 Monthly
 Weekly
 Daily/Almost Daily

During the past three months how often has your use of tobacco led to health, social, legal or financial problems?

Never
 Once/twice
 Monthly
 Weekly
 Daily/Almost Daily

Has a friend or relative or anyone else ever expressed concern about your use of tobacco?

Never
 Yes, in past 3 months
 Yes, not in past 3 months

Have you ever tried and failed to control, cut down or stop using tobacco?

Never
 Yes, in past 3 months
 Yes, not in past 3 months

Total

Summary



- Create a form definition
 - with validation rules
 - with resource mappings
- Create form data
- Perform Validation
- Map to a new resource from form data
- Terminology interactions
- Advanced Validations

- Where will you use Questionnaires?

Questions?

Thank you

Keep FHIR-ing on all cylinders