

Attendee notes for IPS Noobies track

This page is a set of ideas that people attending this track could use over the course of the event. There's no need to be 'officially' attending the Noobies track - if there's something useful in here then use it! It's intended to have high level descriptions of key concepts, with links to details - sort of a glorified index page.

It's very much a living document and will be continuously updated up to and during the Connectathon.

We're expecting 2 types of attendees at the event:

- Technical folk who want to learn FHIR - or who have specific questions
- Clinicians and Business focussed

Goals

- Have an understanding of FHIR
- Know where to find out more info
- Engage with the [community](#)

On the day:

- Review this page
- Give the [FHIR overview](#) presentation
- Review the exercises
- Some can start exercises if they want
- Choose topics to discuss in more detail - break out sessions but in the same room. Can be anything that people want (within reason 😊)
- [Specific topics to cover](#)

Link to [event confluence page](#)

Link to [NZ Zulip chat](#)

[FHIR R4](#) specification

Acronyms and TLAs

Brief description of acronyms and other terms you may come across

What is:

The FHIR Standard	The FHIR specification. We're using version R4 with the current version being R5. There's a lot of stuff in the specification, but it's surprisingly readable and fully hyperlinked (FHIR embraced web technologies from the very beginning). There's a getting started page and some summary pages for specific roles. The resources list page is a great way to get a feel for the overall scope of FHIR - and you're definitely going to need those resources! And there a whole section for implementers
FHIR chat	The best way to interact with the FHIR community. Ton's of useful stuff and very helpful experts. Perhaps to best way to start is to keep an eye on the implementers page
FHIR profiling	FHIR can be thought of as a 'platform' specification - it describes a base infrastructure upon which specific usage scenarios can be developed. In particular, resources are intentionally designed to be as simple as possible, containing the elements most commonly used rather than all possible ones. Additional elements can be defined using extensions, and then added to a resource using profiling. (Note that you don't need a profile to add an extension to a resource instance - the profile says 'use these extensions on that resource' for some specific use case. It gets a lot more complicated than that of course, but fundamentally profiling is all about adapting the core resources and other artifacts for a specific purpose. One term you will likely come across is slicing. Though it can be complex, it's a way of taking a repeating element, and specifying certain values that may/must appear. For example, Patient.identifier can occur multiple times. You may want to say that there must be one value that is the NHI - where the system value is <code>https://standards.digital.health.nz/ns/nhi-id</code>

FHIR Implementation guides	Implementation Guides show how to meet some particular need using profiled FHIR. Some of them describe common extensions and profiles to be used in a given country (like NZBase or US Base) for their specific data requirements, while others take a more 'global' approach - such as Structured Data Capture which describes how to capture information in forms, and create resources from the input IGs have a common format, and can be created by anyone - though the tooling does require some effort to master. The formal documentation is available in confluence, and there's a tutorial from the authors of FHIR Shorthand. FSH (FHIR Shorthand) is commonly used as a language to describe profiles and even FHIR instances, but it is NOT an exchange format. List of international IGs
IPS (International)	The International Patient Summary is an IG that is intended to record the key clinical information about a patient needed when being treated by someone unfamiliar with the person. It's actually the FHIR representation of a separate standard - there is a CDA version available for example. Technically, the IPS is a Document - a summary at a point in time of the patient's health status and is shared as a Bundle of resources with a Composition resource that identifies it as an IPS document. It is still under development (as is the whole of FHIR) and there is an active chat stream where questions can be asked/
IPS (New Zealand)	The New Zealand IPS is an adaptation of the International IPS for specific NZ requirements. It can be thought of as a profile on international IPS. Here's the chat stream
IPA	Although IPA (International Patient Access) sounds like IPS it's quite different, describing how to access patient data on behalf of a patient from a RESTful API in real time - ie an app that a patient is using to access their data. IPS by contrast, is a static, point in time summary document. It also describes how to use SMART authentication to authorise the caller.

	It is, however, closely aligned with IPS. There is a chat stream to interact with the developers of IPA.
SMART App launch	SMART App Launch describes how to use the OAuth2 standard to access a FHIR server. It's also worth reviewing the IPA IG which uses SMART and is a good resource when getting started. Another resource is the SMART launch site - this is one of the exercises suggested below There are a number of client libraries available - here's a Javascript one This is a more detailed description from hapi And here's a video from Josh Mandel - who was the original developer of SMART (before it became part of the FHIR ecosystem) More SMART stuff
FHIR libraries	FHIR libraries are intended to make it easier for implementers to develop FHIR based abstractions by providing a language specific abstraction layer. There are a number available, including: • .net • Java • Javascript And here's a more complete list from confluence
JSON / XML	Both JSON and XML are widely used text based formats for representing information being exchanged between systems. They are human readable - though does need a little experience to understand and can become quite complicated. JSON is more commonly used in FHIR than XML as it's easier for applications to process.
FSH	FSH stands for FHIR Shorthand. It was originally developed to help with creating profiles (as the underlying structure is quite complex) but can also describe FHIR instances. There's a tool produced by the community that takes an FSH file and produces the 'real' FHIR artifacts from it.

	It's not an exchange format (like JSON or XML) for sharing resources but rather a Domain Specific Language - a specific language that understands FHIR. If you're going to do profiling or creating IGs then FSH makes it a lot easier - pretty much all the international IGs are created using FSH.
FHIRPath	FHIRPath is a language for searching for elements within a FHIR resource based on their position within the resource. It's used for a number of purposes such as specifying constraints during profiling (eg if a patient's first name is present, then the last name must be present as well) or within the SDC IG to specify how resources can be extracted from a QuestionnaireResponse or used to pre-populate a form.
SDC	The Structured Data Capture IG describes how to use the Questionnaire / QuestionnaireResponse resources to create a user facing form and to extract individual FHIR resources from the response. It's surprisingly complex.

Exercises

This is a list of potential exercises for participants to choose from.

FHIR REST API: technical

The [REST spec](#) and [search](#)

Choose a test server to use

Public HAPI (<http://hapi.fhir.org/baseR4/metadata>)

[Servers for this event](#)

Can write your own code or use a REST client like [POSTMan](#)

Create a [Patient](#) resource

Use [losefa data](#) (may want to change name / identifier to be different from others)

Or just make up your own

[\\$validate](#) is your friend - POST your resource to [host]/{type}/\$validate

Eg [http://hapi.fhir.org/baseR4/Patient/\\$validate](http://hapi.fhir.org/baseR4/Patient/$validate)

Remember to set content-type header to application/json+fhir

Query for patients

- Different search parameters

 - Name

 - Identifier (NHI)

- Note definition of [search parameters](#) in spec

Update patient

Include extensions on the resource

- Choose from [NZBase extensions](#)

- Create and query

Add Conditions

- Create and query

Add Immunizations

- Create and query

More advanced queries

- All immunizations for a patient

- Patient and all Conditions

- Patient with all clinical data

- Patients with a Condition

Add security

- Find a server that implements [IPA](#) and perform the above actions on that server.

- Or a server that supports SMART

 - <https://launch.smarthealthit.org/>

 - <https://fhir.epic.com/Documentation?docId=testpatients>

There's also the [September connectathon](#) that has some more ideas

Notes

When creating resources manually, it's very useful to be able to validate that they are correct.

There are many ways to do this - one of the simplest being to use the [\\$validate operation](#) which many servers (including HAPI) support.

For example, to validate a patient just POST it to:

[http://hapi.fhir.org/baseR4/Patient/\\$validate](http://hapi.fhir.org/baseR4/Patient/$validate)

By default, the validation will be against the core FHIR spec. You can specify a profile, and the validator will use that instead - provided it has access to all the required profiles and supporting artifacts - like terminology.

FHIR design: clinical

Use clinFHIR [Graph Builder](#) to create resource graph

[Blog post](#) describing Graph Builder

Use [losefa data](#)

You could:

- Create losefa patient
- Create and link his GP
- Create some vitals
- Create medications

You can go further if you like, but the graph will start getting big - and as the intent is to reinforce the 'connected' nature of FHIR resources that may not

Another approach:

- Create a graph that represents the people in the story - losefa and others (just the individuals). Hint: check out [RelatedPerson](#)
- Start to add clinical data - losefas data as graph on FHIR server. Don't try to create an IPS document, just create the resources and link them appropriately

Yet another scenario is to re-create the [consultation graph](#) given in the presentation.

Or - build a graph of some other scenario of interest to you.

Notes

The term 'graph' is used to describe the resources and the references between them.

IPS document: technical

Create an IPS (International or NZ) - use losefa data

Start simple and add stuff as you go

Validate bundle using <https://validator.fhir.org/>

Visualize using CF Bundle Visualizer

Consume IPS

save as document on a FHIR server

extract data Note [Fede's track](#) and [Matts track](#)

Terminology queries:

Authenticate to Term server

Endpoint: <https://nzhts.digital.health.nz/fhir/>

Sample credentials:

App name: try-nzhts

Secret: VqBEJsFzfk2FZjkgwk6DmvH5pGgRoKI

Getting a token:

```
async function getAccessToken() {
  url = "https://authenticate.nzhts.digital.health.nz/auth/realms/nzhts/protocol/openid-connect/token"
  let body = `grant_type=client_credentials&client_id=${clientId}&client_secret=${clientSecret}`

  try {
    let result = await axios.post(url, body)
    return result.data['access_token']
  } catch (ex) {
    console.log(ex)
  }
}
```

Then include the token in the Authorization header of a request

```
getAccessToken().then(
  async function(at) {

    let config = {headers:{authorization:'Bearer ' + at}}
    config['Content-Type'] = "application/fhir+json"
    ...
  })
```

Queries to try

- Retrieve VS based on URL
- Perform an expansion
- Get details on a concept
- Create hierarchy of a concepts parents

[CanShare UI](#) for examples

Tooling

General

[POSTMan](#)

General REST query

[MS Code](#)

Write scripts in favorite language

View XML / Json files

FHIR project

[\\$validate](#)

[FHIR Validator](#)

clinFHIR tooling

clinFHIR is an application developed as the FHIR specification progressed to help non-technical people understand and visualize FHIR.

It is sponsored by [InterSystems](#) - for which I am very grateful!

Module	Purpose
Patient Visualizer	Display resources for a patient retrieved from a FHIR server in a number of different formats. Intended for those new to FHIR
Server Query	Make RESTful queries and display resources
Graph Builder	Create resource graphs - resource instances. Can save on a FHIR

	server. Uses FSH Blog post
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Links

- [Devdays](#) preso
- [Walkthrough](#)

CanShare

Canshare is a NZ project that is aiming to collect cancer related data into a FHIR based repository. There have been a number of prototype applications developed over the course of the project - including a full [Proof of Concept](#) - but of interest to this audience is the [API query](#) module which has specific functions for accessing the NZ Health Terminology Server.

The first tab displays the ValueSets the project has created thus far, and allows them to be expanded.

These are available to any developers that want real terminology resources to use, and provides examples of how to expand a ValueSet and to explore the SNOMED-CT relationships

Query Terminology Server

Authoring Instance

TE AHO
O TE KAHU
CANCER
CONTROL
AGENCY

CanShare ValueSets 476
ConceptMap
NZHTS analysis

This tab will make queries against the New Zealand National Terminology server

data

A reason that no specific value is available.

NZ cancer data absent reason

Json
Expand
Forms where used

Language

CanShare

Filter text

5 concepts

Expand

Query: ValueSet/\$expand?url=https://nzhts.digital.health.nz/fhir/ValueSet/canshare-data-absent-reason&_summary=false&displayLanguage=en-x-sctlang-23162100-0210105&displayLanguage=en-x-sctlang-23162100-0210105

Concepts
Json

Display	Code	System
Not applicable	261721000210105	http://snomed.info/sct
None known	410516002	http://snomed.info/sct
Other	74964007	http://snomed.info/sct
Unknown	261665006	http://snomed.info/sct
Not asked	261711000210100	http://snomed.info/sct

Presentations & other links to useful stuff

- FHIR on [youtube](#)
- [Grahame masterclass](#)
- [FHIR overview](#)
- The [HL7 FHIR presentations](#) (caution: there are a lot of them!)
- [IPS presentations](#)
- [SNOMED](#) resources
- NZ SNOMED [release centre](#)
- Docs on the [NZ Terminology server](#)
- [Devdays](#) - heaps of videos on FHIR stuff
- Synthetic data
 - [Synthea](#)
 - [HL7 event](#)
- [HL7 Confluence](#) - all things HL7
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