



# INTEROPen

## Terminology Foundations

How to use the FHIR API on the  
National Terminology Server  
(and why)

I don't know much



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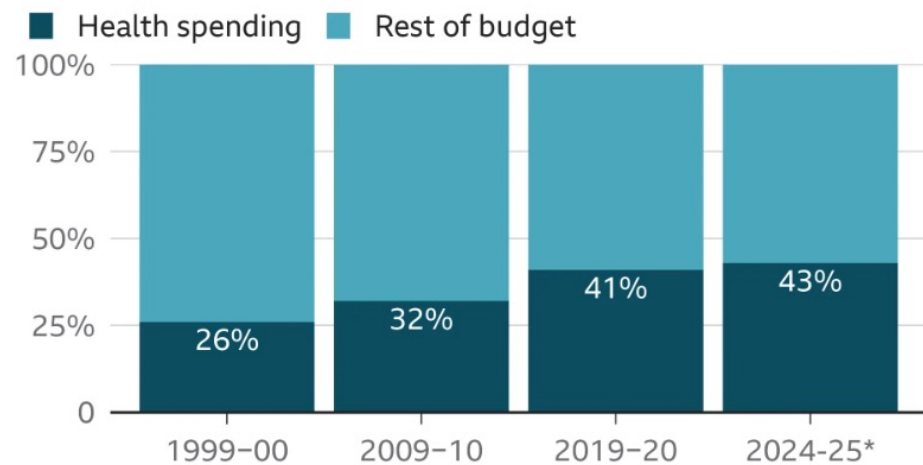




# but I do know this isn't looking good ...

## Spending on health has been rising

Health spending as percentage of day-to-day public service spending

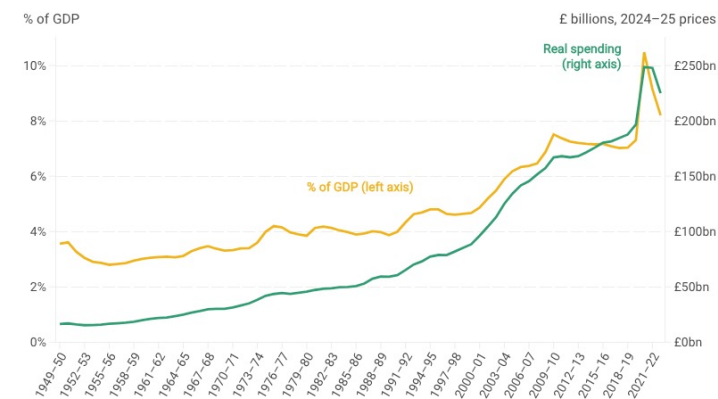


\*IFS forecast based on spending plans

Source: Institute for Fiscal Studies



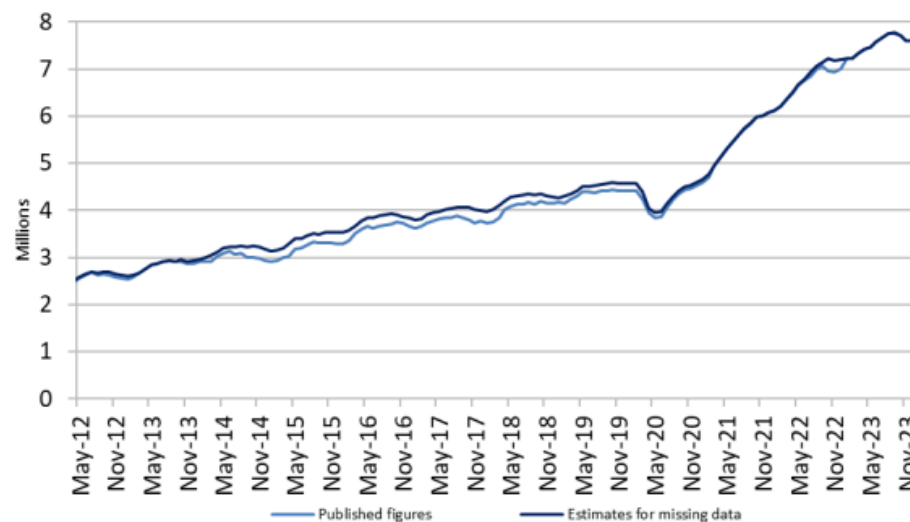
Figure 1. UK health spending in real terms and as a share of GDP, 1949-50 to 2022-23



Source: IFS spending composition sheet, HM Treasury, Country and regional analysis 2023, HM Treasury, GDP deflators at market prices, and money GDP March 2024  
OBR, Public Finances Databank, March 2024. [Download the data](#)



Chart 5: Total incomplete RTT pathways



“WHO estimates a projected shortfall of 10 million health workers by 2030”





## and it doesn't look like ...

- Demand is reducing
- More money (alone ... maybe at all?) is a feasible answer
- Sufficient extra trained staff are about to appear
- Working harder will be enough
  
- Status quo is looking all that hopeful

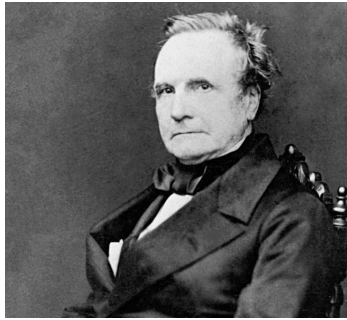


# Options?

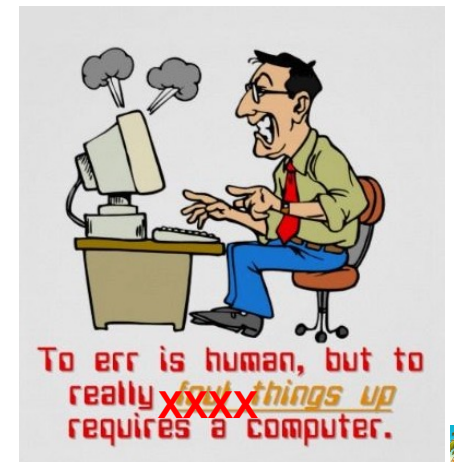


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I don't know much



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## but I do know ...

- The better the information you have
  - The better the help you're going to get
- The less information you lose when you exchange information
  - The better the help you're going to get
- The more detail and specifics you have
  - The better the help you're going to get
- The closer you are to the point and time of collection
  - The better your chances of high quality information
- The more information you start with
  - The more time/chance you have to add to it
- The more meaning you have in your data
  - The better the chance you can do something useful with it





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## So you just need?

- A really good way of modelling/describing things
- Collaboration to improve the model
- Share information
- Build on the information and share it forward
  
- Enough people to agree it's a good idea
- Babbage + Moore's law
  
- Job done





# Job done?

- SNOMED started in 1965
- SNOMED custom release file specification (282 pages)
- SNOMED release file ~550Mb zipped
- Over 1 million concepts
- Updated monthly
  
- dm+d been around for 20+ years
- custom release file specification (38 pages)
- Over 400k concepts
- Updated weekly





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- Hypercal
- Hypersal
- HyperHAES
- Hypericin
- Hypericum
- Hypericum
- Hyperoxia
- Hyper-resonant
- Hyperaemia
- Hyperamine
- Hypermimia
- Hyperpnoea
- Hyperacusis
- Hypercapnia
- Hyperemesis
- Hypermaturation
- Hypermetria
- Hypermnesia
- Hypermobile
- Hyperphonia
- Hyperphoria
- Hyperplasia
- Hyperploidy
- Hypersomnia
- Hypertrophy
- Hypertropia
- Hyperalgesia



Patient has hypertension





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I don't know much...

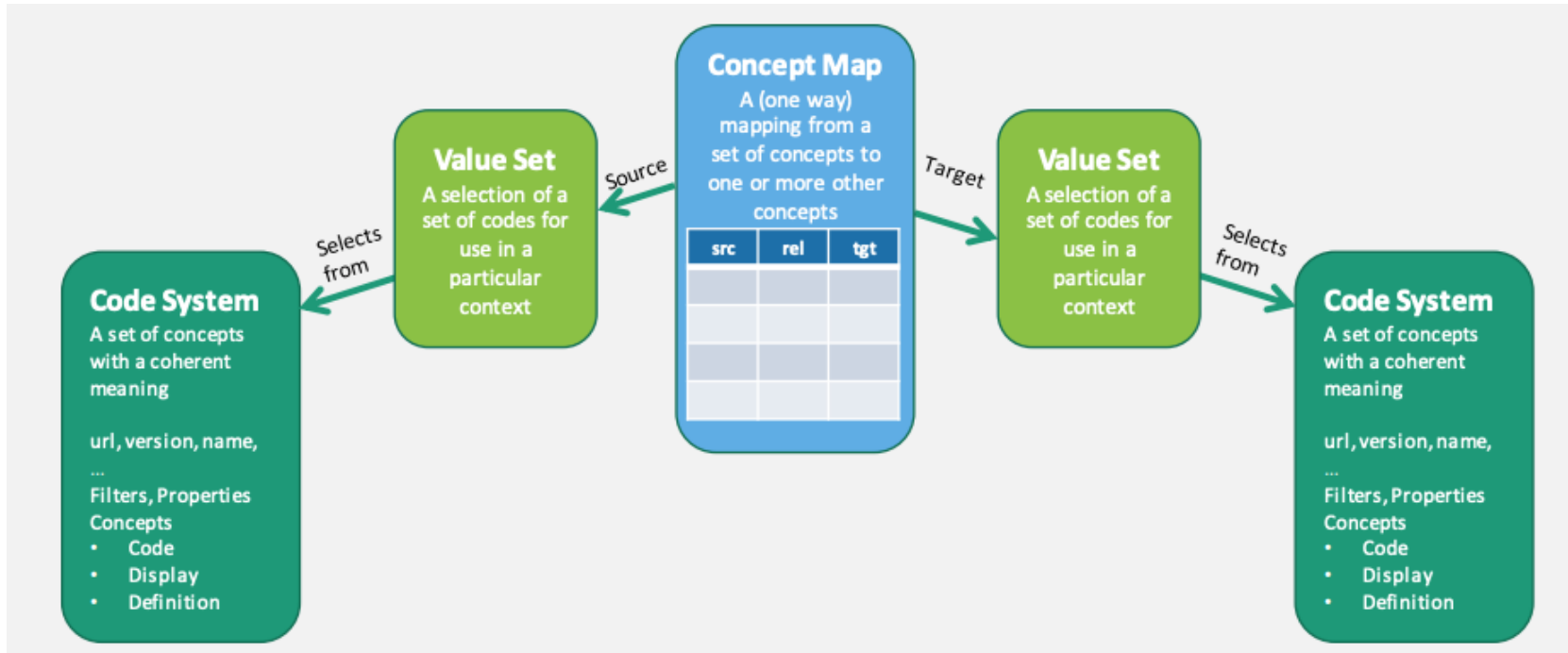
But I do know it's possible to improve the picture

and it's time to talk about terminology services





# FHIR Terminology basic building blocks



“coded value” = “coded element” = “concept”

```

{
  "name": "code",
  "valueCode": "RR8"
},
{
  "name": "display",
  "valueString": "LEEDS TEACHING HOSPITALS NHS TRUST"
},

```

- Set of concepts (e.g. SNOMED CT/dm+d/ICD10 etc.)
- (sub)set of concepts for use in a particular context
- Map – relationship between concepts in different

Terminology Agnostic





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# You lost me at FHIR

- I use something better than FHIR
- I have a use case that FHIR doesn't work for
- It really doesn't matter "nobody cares"
- There is a great standardised model for terminology
- It has a well thought out, rich REST API (happens to be FHIR)
- Everybody uses it and it makes life massively easier
- Keep doing what you are doing ... use the REST APIs it isn't a slippery slope







# Key REST API Operations

- ValueSet \$expand
- ValueSet \$validate-code
  
- ConceptMap \$translate
  
- CodeSystem/\$validate-code
- CodeSystem/\$subsumes
- CodeSystem/\$lookup

<https://hl7.org/fhir/R4/valueset-operations.html>

<https://hl7.org/fhir/R4/conceptmap-operations.html>

<https://hl7.org/fhir/R4/codesystem-operations.html>





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# StructureDefinition

- FHIR StructureDefinition
  - Structure
  - Data elements
  - Bindings to ValueSet
  - Rules
  - FHIR StructureDefinition
- REST Operation – check compliance  
/[Resource]/\$validate





# Example Use Cases

Data in/out

## **Authoring, Maintenance and Distribution**

- I want to make national content readily available by the FHIR APIs and Syndication Service
- I want to author and maintain CodeSystems, Value Sets and Concept Maps
- I want to keep up to date with national CodeSystems and maintain local content
- I want to collaborate with the National Service or other HealthCare organisations to develop and publish of content for others to use
- I want to readily adopt SNOMED CT and keep up to date with national releases, but I don't want to have to understand RF2

Data in

## **Interoperability/Electronic Health Records/ Secure Messaging**

- I want to validate or translate content
- I want to validate that FHIR profiles are compliant

Data out

## **Analytics**

- I want to use terminology in advanced way in my analytics queries- subsumption
- I want to translate content on load or on demand as part of my analytics service.

Data in

## **Information Modelling and Specification Development**

- I want to bind terminology and value to sets to data models and specifications
- I want to validate the terminology content against the specifications
- I want to validate that the FHIR resources are compliant

## **Smart Data Entry and Performant Run Time Use**

- I want to support performant smart search of SNOMED CT or other CodeSystems in my clinical information system
- I want to support advanced use of SNOMED CT for decision support, subsumption etc.





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# NHS Terminology Service Basics

- Where to access it: <https://ontology.nhs.uk>
- What is in it: SNOMED, dm+d, ICD10, NICIP, OPCS, UCUM, HRG, HPO, ODS\* ...
- User Access (self service)
- System Access (<https://digital.nhs.uk/services/terminology-server/system-to-system-account-request-form>)





# By Example (ValueSet for Diabetes)

- Maybe for a form
- Maybe for some analysis

doc\_SNOMEDCTReleaseFileSpecification\_Current-en-US\_INT\_20220202.pdf

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Release File Specification - SNOMED CT Release File Specifications

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