

Refleksioner over FHIR-modelleringspraksis i Danmark

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Agenda

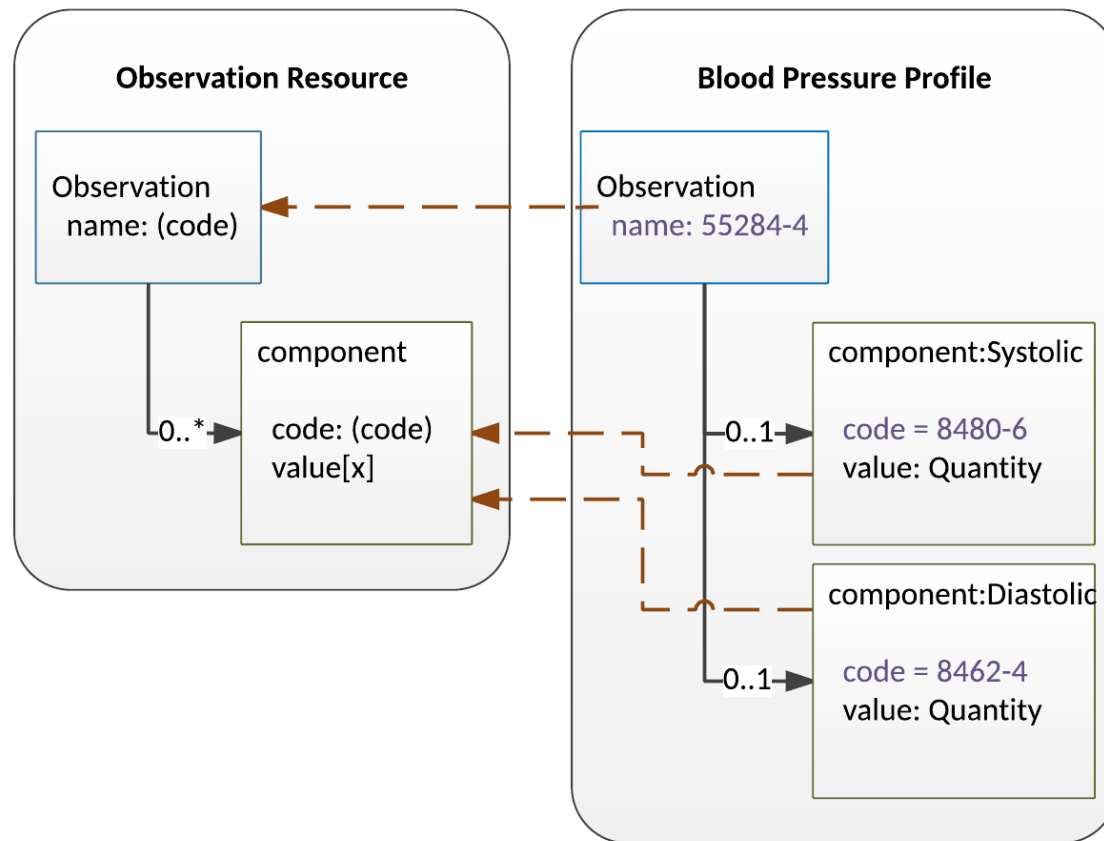
- Hvad betyder ibrugtagning af FHIR i Danmark, og hvilke eksempler er der?
- Hvordan sikres konsistent modelleringspraksis vha. profileringsguidelines?
- Udfordringer: FHIR som udviklingsværktøj – FHIR som standard



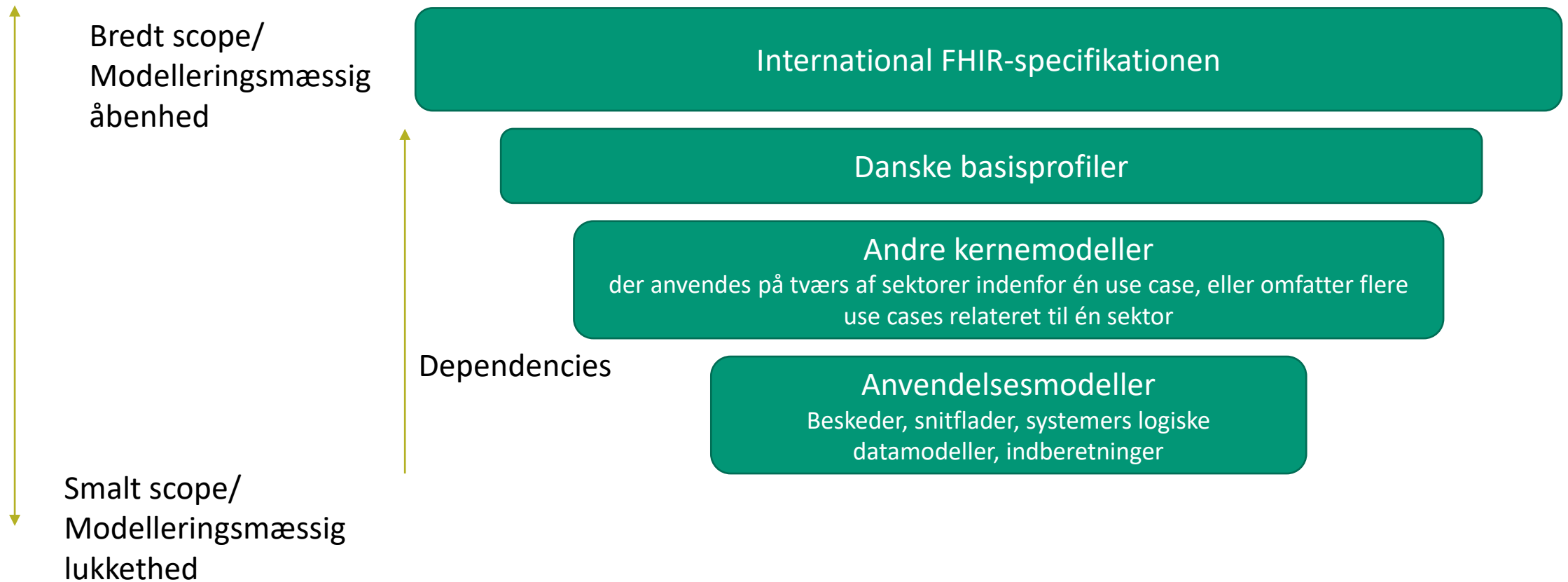
FHIR i Danmark – hvad betyder det?

- Ofte forsimplet.
 - bliver ofte udgangspunkt for en diskussion for eller imod FHIR og CDA, eller FHIR og MedCom edifact/XML.
 - Mange har en mening om, om det er en god eller en dårlig ide at ibrugtage FHIR i Danmark, og det diskuteres uden først at gøre tydeligt hvad ” ibrugtage FHIR i Danmark” betyder
- Vi bliver nødt til at nuancere diskussionen!
 - FHIR kan fx både understøtte høj fleksibilitet, og lukket registrering. Og i øvrigt kan man modellere virkelig inkonsistent uanset hvilken standard man benytter.
 - At ibrugtage FHIR giver ikke i sig selv ret mange gevinster for patienter og sundhedspersonale. Fokus på brugsscenarier og gevinstrealisering er vigtigt.

Høj fleksibilitet, og lukket registrering med samme standard – FHIR profilering



Anvendelses- og kerne-modeller



Text Summary

Differential Table

Snapshot Table

Snapshot Table (Must Support)

All

This structure is derived from [Encounter](#) [↗](#)

Name	Flags	Card.	Type	Description & Constraints ?
 Encounter		0..*	Encounter	An interaction during which services are provided to the patient ?
...  identifier		0..0		
...  status		1..1	code	[DK] kontaktstatus
...  statusHistory		0..0		
 class		1..1	Coding	[DK] kontaktklasse
...  system		1..1	uri	Identity of the terminology system Required Pattern: At least the following Fixed Value: http://terminology.hl7.org/CodeSystem/v3-ActCode
...  code		1..1	code	Symbol in syntax defined by the system Fixed Value: HH
...  version		0..0		
...  display		0..0		
...  userSelected		0..0		
...  classHistory		0..0		
 type		1..1	CodeableConcept	Specific type of encounter Binding: KLKontaktTyper (required)
...  coding		1..1	Coding	[DK] kontaktttype Required Pattern: At least the following
...  system		1..1	uri	Identity of the terminology system Fixed Value: http://kl.dk/fhir/common/caresocial/CodeSystem/KLCommonCareSocialCodes
...  code		1..1	code	Symbol in syntax defined by the system Fixed Value: 9f03dfbb-7a97-45a5-94db-d4c3501714a9
...  version		0..0		
...  display		0..0		

KLGateway Encounter

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Hvad er god modelleringspraksis?

- Det kommer først og fremmest an på formålet.....
 - En kerne-model, en indberetning, og en besked skal ikke det samme
 - Der er forskellig risiko forbundet med klinisk indhold. Hvor kan vi tåle ekspressive modeller, og hvor er entydighed kritisk?



Profileringsguideline

- God modelleringspraksis er en eksplicit formuleret praksis
 - Det bringer os fra diskussionen af, om det er en god ide at ibrugtage FHIR, til diskussionen af, hvordan der bliver overensstemmelse mellem formålet og den måde FHIR ibrugtages på.
- En profileringsguideline er metoden for FHIR-profileringen. Det kunderne giver til leverandørerne og leverandøren giver til udviklerne for at gøre centrale design-principper og kvalitetskrav eksplicitte



Hvad skal der være i en profileringsguideline?

- Temaer: Genbrug (ekspressivitet), Gennemskuelighed, Entydighed, modifikation, terminologi, alignment, metadata, ændringshåndtering og versionering.

Kilder fx:

<https://simplifier.net/guide/ProfilingAcademy/Best-practices>

<https://github.com/AuDigitalHealth/ci-fhir-r4/wiki/Conventions-for-StructureDefinitions>

<https://confluence.ihtsdotools.org/display/FHIR/Bindings+to+FHIR+Clinical+Resources>

[https://wiki.hl7.org/FHIR Guide to Designing Resources](https://wiki.hl7.org/FHIR+Guide+to+Designing+Resources)

<https://github.com/AuDigitalHealth/ci-fhir-r4/wiki/Guiding-principles-and-assumptions-when-modelling>



Gennemskuelighed

2.3.1.1 Scope and usage

In a Danish municipality setting, CommonCareSocialCompletedIntervention is used to describe what activities has been delivered (e.g. a visit from a nurse to a citizen home where wound care is delivered). A CompletedIntervention always describes actual activities of one encounter. It should not be confused with PlannedIntervention, which describes the intention of activities, typically for several encounters. The CompletedIntervention may point to the request-resource that authorized the intervention. This can be either a PlannedIntervention, where the municipality visitation has authorized the intervention or a ServiceRequest, if the request directly has initiated the intervention e.g. acute nurse care issued by a general practitioner. It should be blank for activities delivered without pre-authorization e.g. when a home care practitioner comes to clean the house but finds the citizen on the floor after a fall and helps with this.

Procedure.complication.coding should be set if the planned intervention has been delivered with some complication. If the complication code is set, the basedOn-attribute should point to the relevant PlannedIntervention OR the code attribute should be populated with a FSIII or FFB intervention code. The complication should be described in Procedure.complication.text.

Procedure.performedPeriod.start og Procedure.performedPeriod.end are only important if the time spend on one out of more interventions delivered in one encounter needs monitoring. E.g. one home care visit on the 20th of June with cleaning from 8:30-8:50 and help with food preparation from 8:50-9:00.

2.3.1.2 Conversions between Danish information model and FHIR-profile

Nedenstående tabel oversætter mellem de attributter der er defineret i den fælleskommunale informationsmodel (FKI), definerer kort den enkelte attribut på dansk og specificere hvilke af FHIR-profilens atributter der skal bruges til specifikation af indholdet

FKI-attribut	Definition	FHIR
leveretIndsatsAktivitetstatus	Indikation af hvor i det kliniske forløb indsatsen er.	Procedure.status
leveretIndsatsAktivitetstatusTekst	Grund til at en indsats ikke er gennemført	Procedure.statusReason.text
leveretIndsatsAktivitetAfvigelseskode	En klasse der, hvis den er til stede, angiver på hvilken måde indsatsen ikke er leveret i overensstemmelse med den PlanlagteIndsats.	Procedure.complication.coding
leveretIndsatsAktivitetAfvigelsestekst	Beskrivelse af hvilken afvigelse der er ift. det planlagte	Procedure.complication.text
leveretIndsatsAktivitetNotat	Beskrivelse af hvilken indsats der konkret er leveret.	Procedure.note.text
leveretIndsatsAktivitetSubjekt	Den borger som indsatsen er leveret til.	Procedure.subject
leveretIndsatsAktivitetDokumenterendeLeverandør	Den leverandør, som er ansvarlig for dokumentationen af den leverede indsats.	Procedure.recorder

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Udvikler-nære aktører er positivt indstillede overfor FHIR

- Værktøjsunderstøttelse
- Fleksibilitet
- Implementerbarhed – og open source projekter
- Straksvalidering



Profiling

Med få linjer har jeg
specificeret, hvad data skal
leve op til

```
input > fsh > KLCommonCareSocialCondition.fsh
1 Profile:      KLCommonCareSocialCondition
2 Parent:      Condition
3 Title:       "Condition"
4 Description:  ""
5 Detailed information about conditions in Danish municipalities health, social and elderly care.
6 ""
7 //Setting the cardinality of the clinical status
8 * clinicalStatus 1..1
9 //Setting cardinality of recordedDate (oprettelsestid)
10 * recordedDate 1..1
11 //Declaring the cardinality of code
12 * code 1..1
13 //Slicing code, declaring discriminator, and slicing type
14 * code.coding ^slicing.discriminator.type = #value
15 * code.coding ^slicing.discriminator.path = "system"
16 * code.coding ^slicing.rules = #open
17 * code.coding ^slicing.ordered = false // can be omitted, since false is the default
18 * code.coding ^slicing.description = "Slice based on the code.system value which allow both a FSIII/FFB condition code and a SNOMED CT code to represent the condition"
19 //Declaring the slices, and their cardinalities, to allow a KL-code and a SNOMED CT code
20 * code.coding contains
21   FSIIIConditionCode 0..1 and FFBCConditionCode 0..1 and SCTConditionCode 0..1
22
23 //Declaring the value set binding for the KLConditionCode slice, and setting the system.
24 //System is fixed to allow the slicing to work
25 * code.coding[FSIIIConditionCode] from KLConditionCodesFSIII (required)
26 * code.coding[FSIIIConditionCode].system = FSIII
27
28 * code.coding[FFBCConditionCode] from KLConditionCodesFFB (required)
29 * code.coding[FFBCConditionCode].system = FFB
30
31 //Declaring the value set binding for the SCTConditionCode slice, and setting the system.
32 //System is fixed to allow the slicing to work (See Aliases for value set, and system info)
33 * code.coding[SCTConditionCode] from SCTConditionValueset (required)
34 * code.coding[SCTConditionCode].system = SCT
35
36 //Setting the value set of the severities attribute
37 * severity from KLSeverities (required)
38
39 //Declaring extensions, used in this profile.
40 //See extension file for the locally defined and,
41 //aliases for the externally defined
42 * extension contains
43   ExtEventHist named eventHistory 0..* and
44   ExtDueTo named dueTo 0..1 and
45   FollowUpEncounter named followUpEncounter 0..1 and
46   ConditionLastAssertedDate named conditionLastAssertedDate 0..1
47
48 //Specifying the use of the extension in this profile, by constraining content further
49 * extension[dueTo].value[x] only Reference
50 * extension[dueTo].valueReference only Reference(KLCommonCareSocialCondition or KLCommonCareSocialFocusCondition)
51
```

Få hjælp af et stort community



Kirstine Rosenbeck Gøeg

12:43 PM

I am looking for a FHIR terminology server that can expand a Value Set based on a filter (descendants of a concept). The Code system is not SNOMED or LOINC, but a complete FHIR CodeSystem. I realize that "filters" are server specific, but I wonder if anyone have implemented this? or plan to do so? It would decrease the maintenance burden significantly, because additions to the CodeSystem in most cases, would not require a manual update of the related ValueSets.

Suggestions for alternative implementations are also welcome :-)

I have tried using a hapi fhir server. I can implement the CodeSystem and ValueSet, but not use the expand operator (naturally), since the server does not implement the filter.

(If you have seen this post before, it is because I have also posted it in the Implementers-stream. They suggested that I posted it here instead :-))



Grahame Grieve

1:07 PM

I think the server running at tx.fhir.org does, but if HAPI does not, you can make a PR to it so that it does



Rob Hausam

7:25 PM

@Kirstine Rosenbeck Gøeg Which version(s) of HAPI have you tried? I believe at least the latest versions (e.g. 5.1.0) should be able to do this. If you can share an example, that could help.



Michael Lawley

11:30 PM

Ontoserver does this. In fact it supports use of a ValueSet of any filter defined in the FHIR CodeSystem. <https://ontoserver.csiro.au>



2

Udstille i implementation guides

The screenshot shows a web browser window with the address bar displaying 'build.fhir.org/ig/hl7dk/KL-dk/index.html'. The page title is 'Implementation Guide for fælleskommunal informationsmodel 0.3.0 - CI Build'. A purple navigation bar contains links: 'IG Home', 'Table of Contents', 'Artifacts Summary', and 'Other Resources'. Below this, a breadcrumb trail shows 'Table of Contents > Home'. A yellow warning box states: 'Implementation Guide for fælleskommunal informationsmodel, published by Kommunernes landsforening. This is not an authorized publication; it is the continuous build for version 0.3.0). This version is based on the current content of <https://github.com/hl7dk/KL-dk/> and changes regularly. See the [Directory of published versions](#)'.

1 Home

1.1 Background

This is the FKI FHIR implementation guide. FKI stands for "Fælleskommunal InformationsModel" in English "Common Municipality Information Model". The FKI FHIR profiles can be used to exchange and report health care and social care data from Danish municipalities.

The health and care related data is a result of routine documentation in home care nursing, home care, health promotion and prevention and physical rehabilitation. The documentation practice follows [FSIII](#).

Social care data results from routine documentation in adult social care. The documentation practice follows [VUM](#) and [FFB](#).

1.2 FKI is a core model

FKI is a core model, which means that it is the recommended way to encapsulate the above-mentioned data, but it does not in itself specify use cases. FKI has so far been used for two use cases:

- Reporting of municipality data to KLGateway, which is e.g., used for management information and national statistics. [Implementation guide KLGateway](#)
- Structuring documentation tools, measurements and observations commonly used in Danish municipalities. [Implementation guide for FFinst](#)

1.3 Documentation in Danish

The documentation of the FHIR profiles is also available in a Danish edition for non-FHIR users. This edition is called [FKI Lægemiddel...](#)

- [Background](#)
- [FKI is a core model](#)
- [Documentation in Danish](#)
- [Getting started](#)
- [Overview](#)
- [Versioning and change management](#)

Instantiere

Narrative Content

XML

JSON

TTL

2.147.1 Example CarePlan: Mark tryksårsindsats

Generated Narrative

status: active

intent: order

subject: [Generated Summary: Mark Jensen ; birthDate: 1982-02-02](#)

period: 2020-05-30 --> (ongoing)

created: 2020-05-29

author: [Generated Summary: id: 330411000016001; name: Hjemmesygepleje – visitation – hjemmehjælp, Sønderborg Kommune; Phone: 88725537](#)

activity

outcomeReference: [Generated Summary: status: finished; home health; udførelse af planlagt indsats; period: Jun 7, 2020, 3:30:00 PM --> \(ongoing\)](#)

2.147.1.1 Details

-	Code	Status	Performer	Description
*	Sårbehandling	in-progress	Generated Summary: id: 330411000016001; name: Hjemmesygepleje – visitation – hjemmehjælp, Sønderborg Kommune; Phone: 88725537	Tryksår på venstre ben skal tilses og behandles dagligt. Vigtigt at tjekke for infektion

Og validere instanser med få linjers kode

java -jar validator_cli.jar

C:/Users/kirst/Projects/Testdata/FKI/Validation/PlannedIntervention/CarePlan-

PressureUlcerIntervention.json

-ig dk.fhir.ig.kl.common.caresocial#current-profile

<http://kl.dk/fhir/common/caresocial/StructureDefinition/KLCommonCareSocialPlannedIntervention>

```
"resourceType": "CarePlan",
"id": "PressureUlcerIntervention",
"meta": {
  "profile": [
    "http://kl.dk/fhir/common/caresocial/StructureDefinition/KLCommonCareSocialPlannedIntervention"
  ]
},
"activity": [
  {
    "detail": {
      "code": {
        "coding": [
          {
            "code": "G1.39",
            "system": "http://kl.dk/fhir/common/caresocial/CodeSystem/FSIII",
            "display": "Sårbehandling"
          }
        ]
      },
      "description": "Tryksår på venstre ben skal tilses og behandles dagligt. Vigtigt at tjekke for infektion",
      "status": "in-progress",
      "performer": [
        {
          "reference": "Organization/HjemmesygeplejeSonderborg"
        }
      ],
      "outcomeReference": [
        {
          "reference": "Encounter/MarkogSaarsygeplejerske"
        }
      ]
    }
  },
  {
    "created": "2020-05-29",
    "intent": "order",
    "status": "active",
    "period": {
      "start": "2020-05-30"
    }
  },
  {
    "author": {
      "reference": "Organization/HjemmesygeplejeSonderborg"
    }
  },
  {
    "subject": {
      "reference": "Patient/Mark"
    }
  }
]
```

Bygge open-souce kode, sammen med mine egne produkter, og bruge eksisterende FHIR klienter og servere

```
import ca.uhn.fhir.context.FhirContext;
import ca.uhn.fhir.rest.client.api.IGenericClient;
import java.io.IOException;
import org.hl7.fhir.r4.model.*;

public class SearchPatientsR4 {

    public static void main(String[] args) throws IOException {
        // We're connecting to a R4 compliant server in this example
        FhirContext ctx = FhirContext.forR4();
        String serverBase = "http://hapi.fhir.org/baseR4";

        IGenericClient client = ctx.newRestfulGenericClient(serverBase);

        // Perform a search
        Bundle results = client
            .search() IUntypedQuery<IBaseBundle>
            .forResource(Patient.class) IQuery<IBaseBundle>
            .where(Patient.FAMILY.matches().value(s: "Jupiter"))
            .returnBundle(Bundle.class) IQuery<Bundle>
            .execute();

        System.out.println("Found " + results.getEntry().size() + " patients named 'Jupiter'");
    }
}
```

Udvikler-nære aktører er positivt indstillede overfor FHIR.....

- Pga. værktøjerne, ikke fordi det er en standard
- Nationale aktører (fx MedCom og KL) bruger FHIR, fordi det er et godt værktøj at standardisere med
- Det giver en koordineringsudfordring, som er uløst



Så hvad skal vi gøre?

- Løsninger?
 - Vi skal finde en måde at koordinere indsatsen på, uden at ødelægge fleksibilitet og agilitet
 - Transparens i tilgang til profilering fx profileringsguidelines



Tak for i dag!

Refleksioner over FHIR- modelleringspraksis i Danmark

28-04-2021

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