



DK-core

FHIR Fagforum d. 12/6-2024





HL7.dk

- How we work
- Status on core profiles
- Current work
- FHIR Projects
- Recommendations for procurement of FHIR
- Future work



How we work

- Special Interest Groups in HL7.dk (SIG)
 - Patient Reported Outcome (PRO), look into StructuredDataCapture IG
 - FHIR services (IPA, Smart on FHIR)
 - DK-core SIG performs profiling of DK-core
 - Education and Branding
- Activity of the DK-core SIG can be tracked at [GitHub](#)
- DK-core SIG Meeting minutes can be found one [Confluence](#)



How we work

- MedCom is steward
 - Quality assurance
 - Hearings
 - Approval by National Health Data Authorities
 - National catalog of standards

- Contract (SOP)
 - Change management
 - Consultation responses (review)
 - Release

Figure 1 Process for change management of DK Core

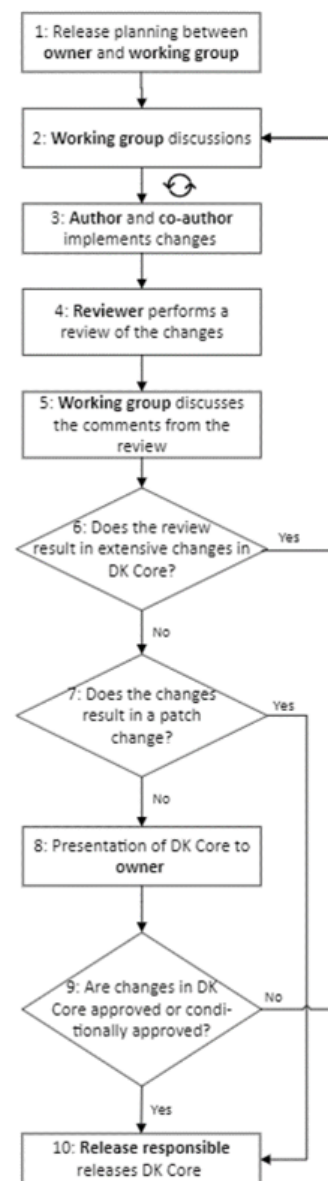
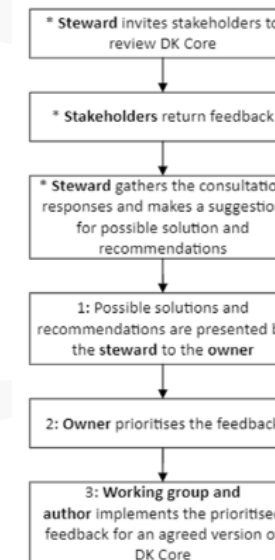
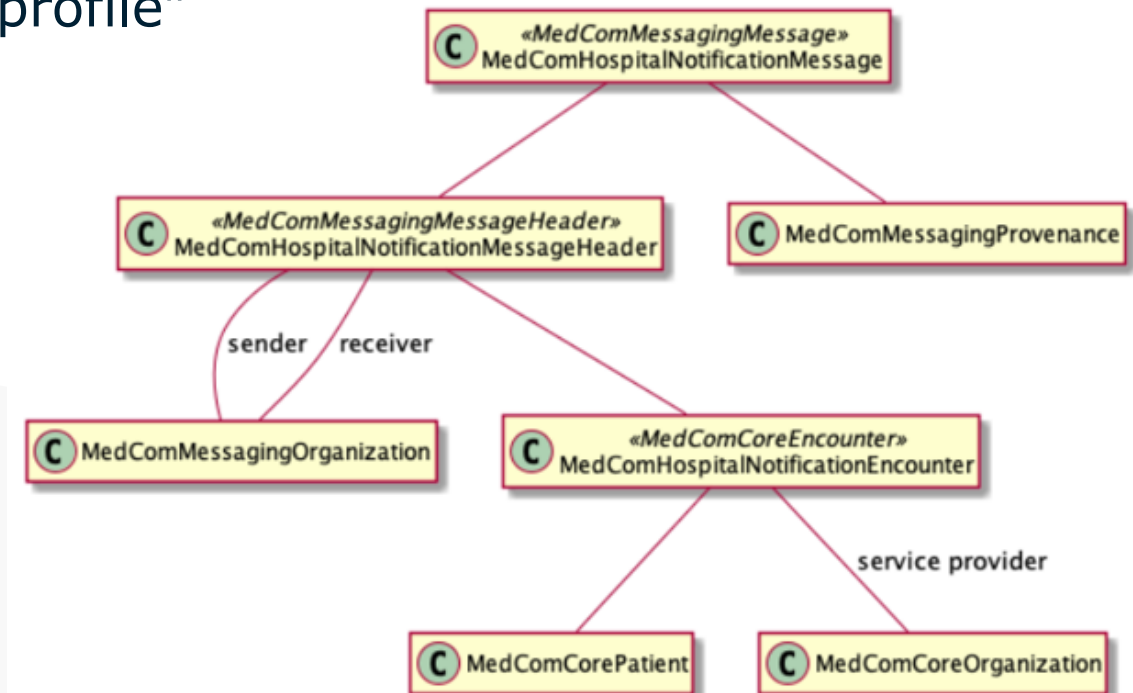
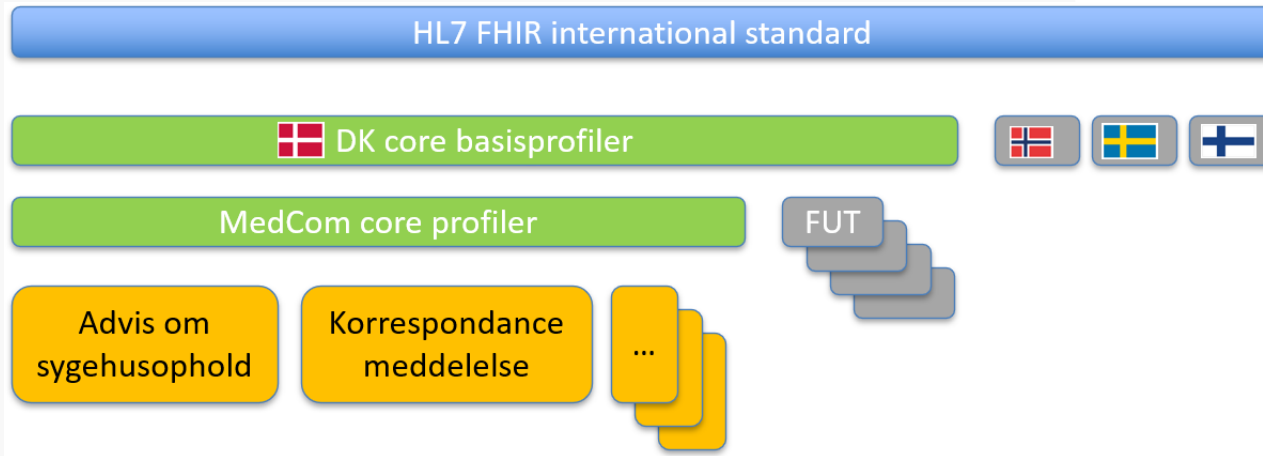


Figure 2 Process for consultation responses of DK Core



Core vs Base

- DK-core used at national level
- Base profiles are maintained within the projects
 - MedCom has base profiles used for all message types
- “Core profile is less restricted than Base profile”





DK-core profiles version 3.2

- 7 Resources
 - Patient
 - Organization
 - Practitioner
 - Observation
 - Basic observation (Vital Signs)
 - Condition
 - RelatedPerson
- 4 Extensions (region, municipality, condition dates)
- 8 Identifiers
- 15 code systems
- 12 value sets



Identifiers

- Patient-ID (CPR-nr.)
 - National unique e-CPR
 - Regional e-CPR
- Business-ID (CVR-nr.)
- Health Organization (SOR)
 - Social Care Organization (municipality)
 - Producer Organization (classification for lab. report)
- Health Professionals Authorization
- Global Location Number (GLN) from GS/1

CodeSystems & ValueSets

- Expansions on HL7 defined CodeSystems

6.2 CodeSystems

- DK Profession Group Codes
- DK Address Type
- DK Address Use
- DK Administrative Gender Supplement
- DK CareTeam Status
- DK Consent State
- DK Days Of Week
- DK Decentralised eCPR Systems
- DK Greenland Municipality Codes
- DK Municipality Codes
- DK Regional Subdivision Codes
- DK Marital Statuses
- DK Related Person Relationship Codes
- DK Episode Of Care Status
- DK Publication Status
- DK Request Status
- DK Role Code

6.1 ValueSets

- DK D-eCPR OID values
- DK Profession Group
- Dk Core IEEE Basic Observation
- DK Core LOINC Basic Observations
- DK Municipality Codes
- DK Core NPU Basic Observation
- DK Regional Subdivision Codes
- DK Related Person Relationship Types
- DK Core SNOMED CT Basic Observation
- DK TechniquesSCTCodes
- DK Core UCUM Basic Units
- DK MaritalStatus
- DK SOR Organization Type

Expansion based on:

- [codesystem DK Related Person Relationship Codes v3.2.0 \(CodeSystem\)](#)
- [codesystem RoleCode v3.0.0 \(CodeSystem\)](#)
- [supplement DK Role Code v3.2.0 \(CodeSystem\)](#)

NOK	http://terminology.hl7.org/CodeSystem/v3-RoleCode	next of kin	Played b scopes t
POWATT	http://terminology.hl7.org/CodeSystem/v3-RoleCode	power of attorney	A relatio manner persona
PARAUTH	http://hl7.dk/fhir/core/CodeSystem/dk-relatedperson-relationshipcodes	Parental authority	The play
PRICARE	http://hl7.dk/fhir/core/CodeSystem/dk-relatedperson-relationshipcodes	Primary caretaker	The play



FHIR versions

- DK-core support more versions
 - R4
 - R5



Current work

- Danish FHIR implementation guide for Diagnosis
 - FHIR documents with “problem list” shared in national IHE XDS infrastructure
- Maintenance of core profiles (2nd half of 2024)
 - ServiceRequest
 - PractitionerRole



Project showcases

- 9 projects
 - Affiliate publish projects overview
 - There are more projects, but not all projects wish to appear on list
- 3 use DK-core
 - MedCom messaging
 - Production May 26th with HospitalNotification (west half of Denmark before summer)
 - Telemedicine infrastructure (FUT)
 - Municipality Gateway (KL gateway)
 - Some projects started earlier than DK-core



FHIR projects (using DK-core)

- **FUT - Common Support for Telemedicine (DK: Fælles Udvikling af Telemedicin)**
 - [FUT](#) is a national infrastructure implemented mainly to support exchange of patient reported information from citizens at home with a disease, e.g. severe chronic obstructive pulmonary, to the healthcare professionals. The infrastructure is mainly used by the Danish regions and municipalities. Data is structured using FHIR profiles and where possible the profiles are based on profiles in DK-core. FUT is developed by Systematic and Trifork and is administered by Region Midt.
- **KLGateway**
 - [KLGateway](#), which is an add-on to the FUT infrastructure, is implemented to support reporting from the 98 Danish municipalities. The reporting is for secondary use, such as statistics and management information, which can be used to improve elderly- and childcare across the municipalities. The reporting information is transferred using FHIR profiles, and they do inherit from DK-core. The Danish Local Government Association (DK: Kommunernes Landsforening) is responsible for the solution.
- **MedCom Communication**
 - Since the late 1990'ies, MedCom has standardized the way data is exchanged between parties within Danish healthcare. MedCom has now begun a modernization of the old standards to improve new business requires. This modernization further involves using FHIR to specify the content in the standards. Currently, this has resulted in three FHIR standards with more to come. These three standards are based on FHIRs messaging paradigm and are being implemented by vendors. [MedCom's FHIR-standards](#) are a further profiling of DK-core. The project incl. a HAPI terminology server.



FHIR projects

- **Prehospital journal**

- [Dedalus' Pre-hospital Record](#) is the national pre-hospital patient record (PPR) in Denmark, in which doctors, paramedics, ambulance rescuers and other pre-hospital staff can document information about the patient, the patient's condition and treatment given at the scene of accident, in the ambulance or the medical helicopter. Information registered in PPR is transferred from the tablet in the ambulance to the receiving hospital's emergency room and the clinicians. The data is exchanged using the RESTful interface and FHIR profiles, used to support real-time exchange of events. The profiles do not inherit from DK-core but are highly inspired hereby.

- **Bed-side application**

- Bed-side application (BSA) for colorectal cancer is developed by Center for Surgical Science in Region Zealand and DTU. The BSA includes an AI-model to assess risks of readmission, complications and mortality and is trained on data from Danish registries. FHIR API's are used to get data from the hospital's electronic patient record into the BSA, to create an individual risk profile for the patient. The BSA does not use profiles from DK-core.

- **Bookplan**

- [Bookplan](#), developed by Capgemini, is a booking system and overview of appointment for healthcare professionals, and it further has a user interface for patients and relatives. Bookplan is used in three of the five Danish regions to make appointments at hospitals. It has a FHIR-based integration for several external systems, where approximately 20 FHIR profiles are used. However, none of the profiles inherits from DK-core, as DK-core wasn't established at the time Bookplan was developed.



FHIR projects

- **Columna CIS and Columna Cura**

- [Columna CIS](#) and [Columna Cura](#) are electronic patient records used at hospitals and in municipalities, respectively. The systems are developed by Systematic and support the daily work for many healthcare professionals. They use different versions of FHIR and RESTful, and do not inherit from DK-core.

- **QuestionAid**

- QuestionAid is a questionnaire solution provided to support clinical reporting. The solution is a part of the Danish Region's Clinical Quality Development Program, called RKKP (DK: Regionernes Kliniske Kvalitetsudviklingsprogram) and is developed by Trifork. QuestionAid prefills questionnaires with all available information from national and local registers. FHIR is used as a data model to gather the information such as diagnosis, medicine, and generally available and relevant patient information, which makes it easier for the practitioners to fill out the rest.

- **Sundhedsplatformen**

- Epic is the integrated electronic health system used by all hospitals in the Capital Region and Region Sjælland in Denmark. Epic is a global implementer and contributor to global interoperability standards with production support for a broad range of FHIR functionality such as SMART on FHIR, FHIR's International Patient Access, HL7 CDS Hooks, HL7 FHIRcast. Details of Epic's support of FHIR, including specifications and a testing sandbox, are publicly available at [OPEN Epic](#).



Procurement recommendations

- HL7 FHIR is under ongoing development, under international auspices under HL7 and under Danish auspices under the Danish HL7 affiliate. This means, among other things, that new versions are continuously published, which can influence IT acquisitions. To help with the acquisition of IT solutions, including tenders, HL7 Denmark has prepared this description.
- The document is intended as guidance for inspiration and help for setting requirements regarding the use of FHIR. The document touches, for example, on the handling of versions in relation to further development and inspiration for making demands connection with national FHIR profiling in acquisitions where the organization wants to use FHIR



Future work

- Maintenance of core profiles
 - Encounter, DiagnosticReport, Consent
- Modernized messaging infrastructure "EHMI", build upon eDelivery
 - Healthcare Addressing Service (FHIR REST-service)
 - Endpoint Register (FHIR REST-based solution inspired by and based upon IHE mCSD)
 - Delivery Status Track'n'trace (REST-service based on FHIR AuditEvent)
 - FAPI Security-extension on OAuth 2.0
- FHIR-roadmap 1.0 transition of all old Danish legacy Standards
- Gateway for Primary Care (GP)

