Medical Data Standards

Jakob E. Bardram, PhD

Professor, Dept. of Health Technology, Technical University of Denmark
Adjunct Professor, Dept. Public Health, University of Copenhagen
Director, Copenhagen Center for Health Technology

DTU Technical University of Denmark

cachet | Copenhagen Center for Health Technology

UNIVERSITY OF COPENHAGEN

Director

Copenhagen Center for Health Technology

Professor in computer science

Department of Health Technology

Technical University of Denmark

Adjunct professor in public health

Faculty of Health and Medical Sciences

University of Copenhagen

Co-founder

Cetrea, Monsenso, DataFair

cachet | Copenhagen Center for Health Technology

DTU Technical University of Denmark

DET SUNDHEDSVIDENSKABELIGE FAKULTET
KØBENHAVNS UNIVERSITET

MONSENSO

Cetrea
MAQUET GETINGE GROUP

DataFair

Research interests

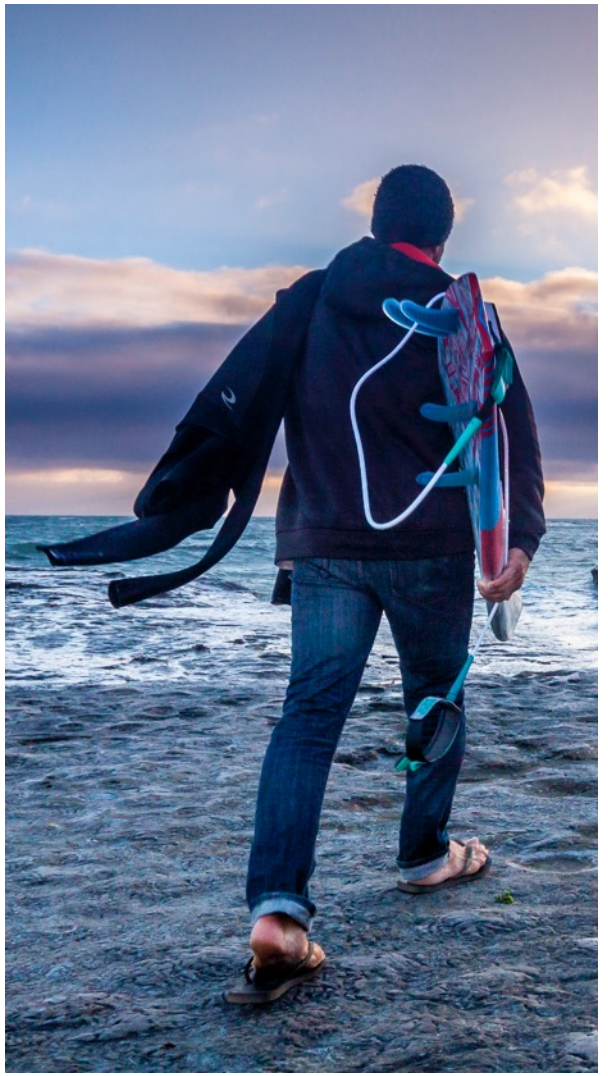
- Ubiquitous Computing
- Pervasive Health
- Human-Computer Interaction
- Software Architecture

@jbardram

www.bardram.net

Where are we going?

- **PART I – EXAMPLES OF CLINICAL SYSTEMS**
  - Clinical Logistics
  - Mobile Health for Cardiovascular Diseases
- **PART II – MEDICAL STANDARDS**
  - Overview
  - HL7 FHIR
  - IEEE P1752
- **PART III – EXERCISES**



PART I – EXAMPLES

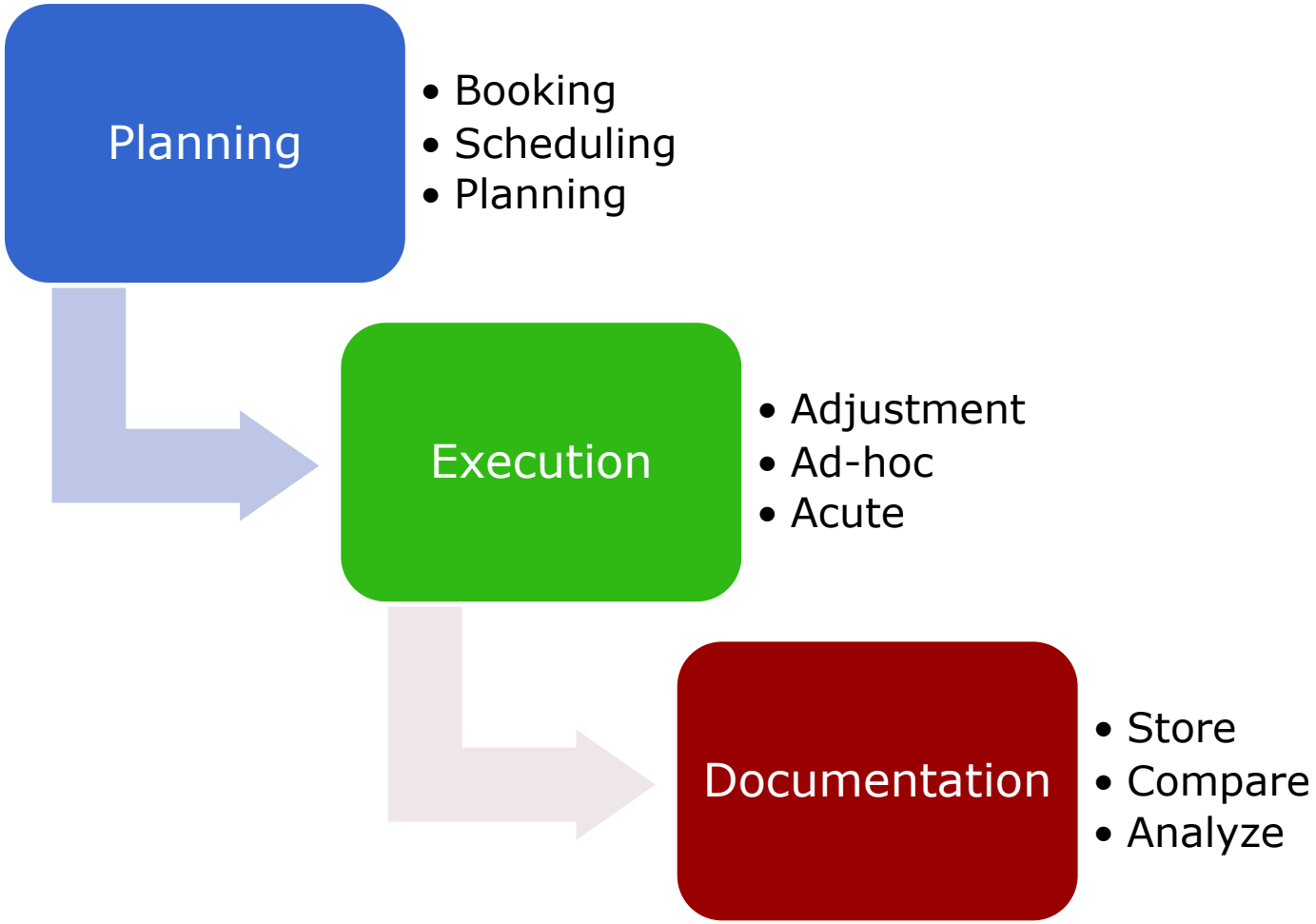
Health Informatics System

Clinical Logistics

Mobile Health

Long-term ECG Monitoring and Arrythmia Detection

Clinical Logistics



Planning is Key...?

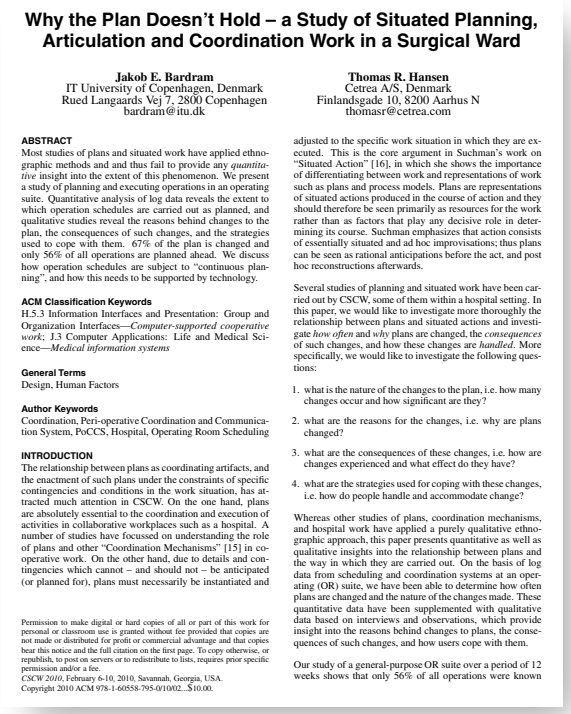
Table 1. Scheduled, Acute, and Cancelled Operations.

	Total	*%*
No. of days (D)	133	
Total no. operations (N)	3,221	100%
No. operations executed (E)	2,979	92%
No. elective operation		
No. acute operations		
– day shift (07:00–1		
– night shift (16:00–		
– weekends		
No. cancelled operati		
No. operations execut		
No. cancellations pr.		

Table 2.

Total no. of chang	
– start/stop time	
– start/stop time	
No. of minor char	

- Only 56% of all operations are planned ahead. The remaining 44% are acute and thus scheduled *ad-hoc*.
- 8 % of all operations are cancelled.
- 31% of all operations are shortened or prolonged more than 30 minutes.
- 67% of all planned ("elective") operations are substantially changed.



Why the Plan Doesn't Hold – a Study of Situated Planning, Articulation and Coordination Work in a Surgical Ward

Jakob E. Bardram
IT University of Copenhagen, Denmark
Rued Langaards Vej 7, 2800 Copenhagen
bardram@itu.dk

Thomas R. Hansen
Cetrea A/S, Denmark
Finlandsgade 10, 8200 Aarhus N
thomasr@cetrea.com

ABSTRACT
Most studies of plans and situated work have applied ethnographic methods and and thus fail to provide any *quantitative* insight into the extent of this phenomenon. We present a study of planning and executing operations in an operating suite. Quantitative analysis of log data reveals the extent to which operation schedules are carried out as planned, and qualitative studies reveal the reasons behind changes to the plan, the consequences of such changes, and the strategies used to cope with them. 67% of the plan is changed and only 56% of all operations are planned ahead. We discuss how operation schedules are subject to "continuous planning", and how this needs to be supported by technology.

ACM Classification Keywords
H.5.3 Information Interfaces and Presentation: Group and Organization Interfaces—*Computer-supported cooperative work*; J.3 Computer Applications: Life and Medical Science—*Medical information systems*

General Terms
Design, Human Factors

Author Keywords
Coordination, Peri-operative Coordination and Communication System, PoCCS, Hospital, Operating Room Scheduling

INTRODUCTION
The relationship between plans as coordinating artifacts, and the enactment of such plans under the constraints of specific contingencies and conditions in the work situation, has attracted much attention in CSCW. On the one hand, plans are absolutely essential to the coordination and execution of activities in collaborative workplaces such as a hospital. A number of studies have focussed on understanding the role of plans and other "Coordination Mechanisms" [15] in cooperative work. On the other hand, due to details and contingencies which cannot – and should not – be anticipated (or planned for), plans must necessarily be instantiated and adjusted to the specific work situation in which they are executed. This is the core argument in Suchman's work on "Situated Action" [16], in which she shows the importance of differentiating between work and representations of work such as plans and process models. Plans are representations of situated actions produced in the course of action and they should therefore be seen primarily as resources for the work rather than as factors that play any decisive role in determining its course. Suchman emphasizes that action consists of essentially situated and ad hoc improvisations; thus plans can be seen as rational anticipations before the act, and post hoc reconstructions afterwards.

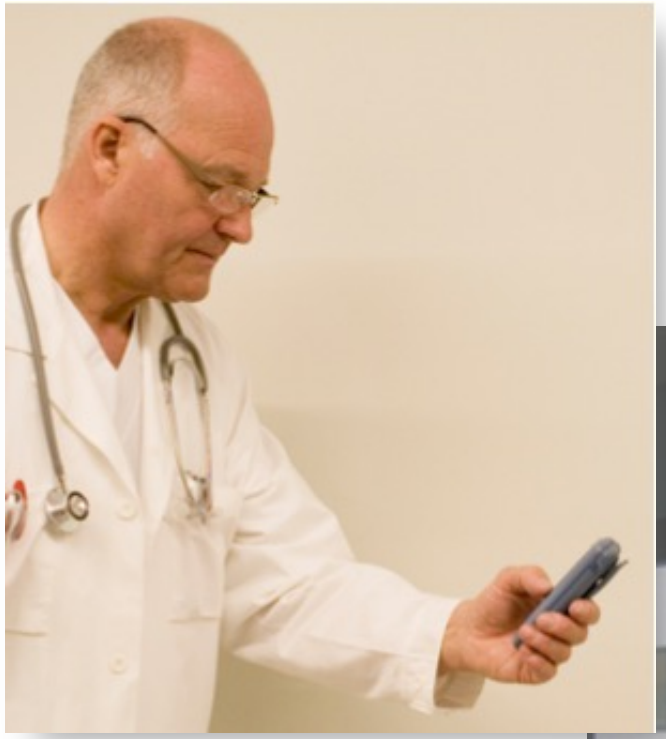
Several studies of planning and situated work have been carried out by CSCW, some of them within a hospital setting. In this paper, we would like to investigate more thoroughly the relationship between plans and situated actions and investigate *how often* and *why* plans are changed, the *consequences* of such changes, and how these changes are *handled*. More specifically, we would like to investigate the following questions:

1. what is the nature of the changes to the plan, i.e. how many changes occur and how significant are they?
2. what are the reasons for the changes, i.e. why are plans changed?
3. what are the consequences of these changes, i.e. how are changes experienced and what effect do they have?
4. what are the strategies used for coping with these changes, i.e. how do people handle and accommodate change?

Whereas other studies of plans, coordination mechanisms, and hospital work have applied a purely qualitative ethnographic approach, this paper presents quantitative as well as qualitative insights into the relationship between plans and the way in which they are carried out. On the basis of log data from scheduling and coordination systems at an operating (OR) suite, we have been able to determine how often plans are changed and the nature of the changes made. These quantitative data have been supplemented with qualitative data based on interviews and observations, which provide insight into the reasons behind changes to plans, the consequences of such changes, and how users cope with them.

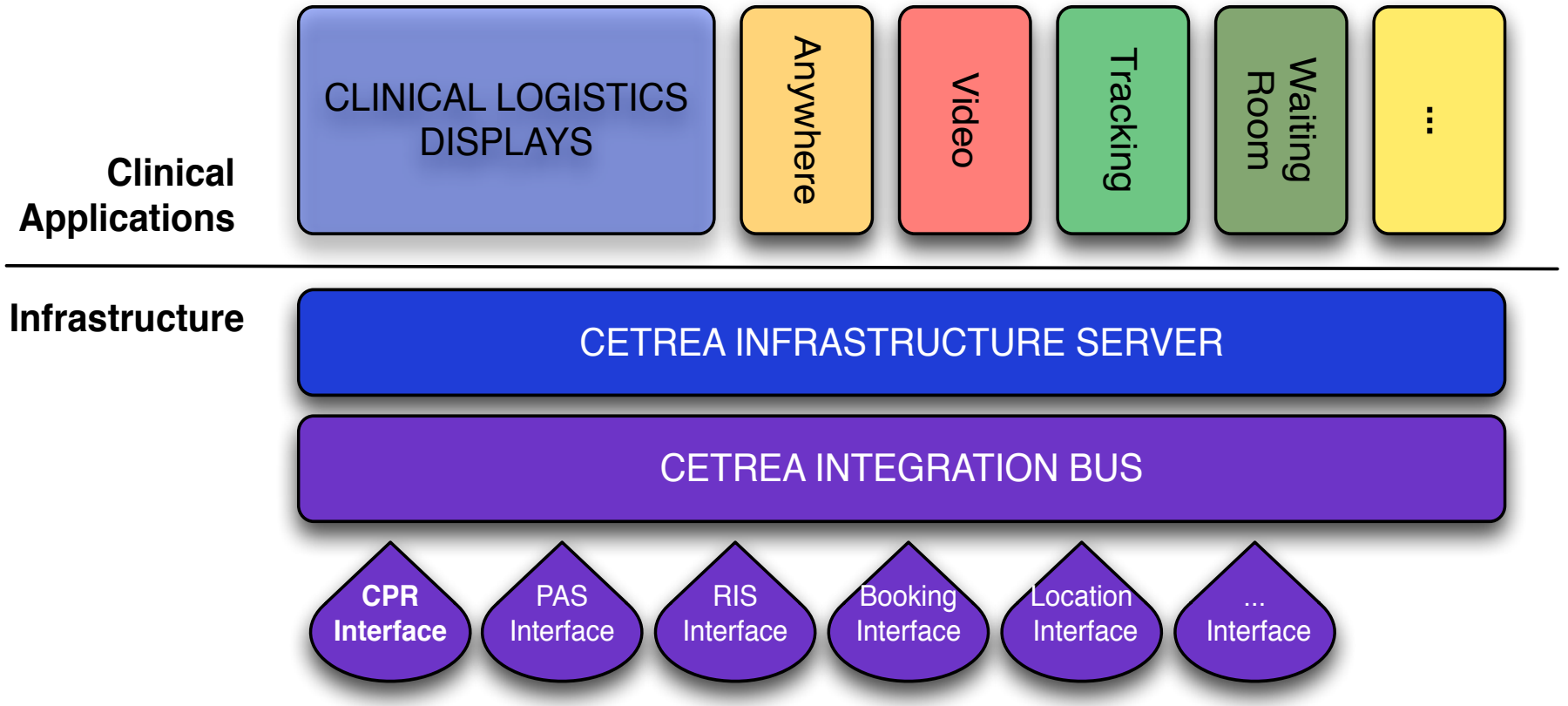
Our study of a general-purpose OR suite over a period of 12 weeks shows that only 56% of all operations were known

CSCW 2010, February 6-10, 2010, Savannah, Georgia, USA.




Cetrea Anywhere
Home
My Surgeries
All Surgeries
Personnel
Beds
Waiting Patients
Inbound Patients
Find Patient
Chat
Create new patient

System Overview

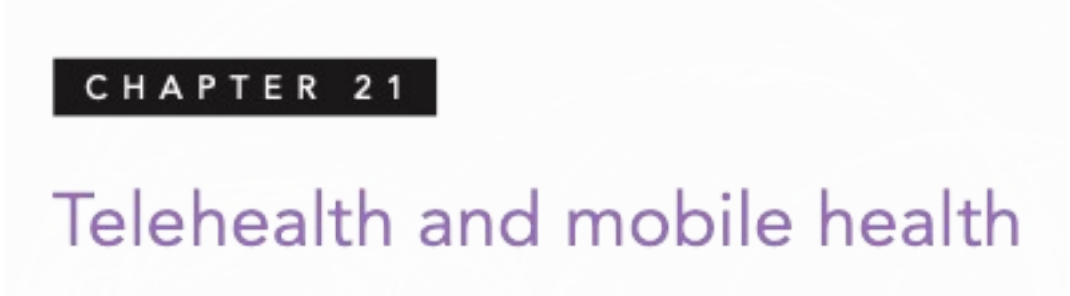


Questions Related to Standards....

- How can we integrate with the “big” systems
  - Patient Administration System (PAS)
  - Electronic Medical Record (EMR)
  - Booking and Scheduling

- What needs to be integrated
  - Patient information (id, name, diagnosis, ward, ...)
  - Booking & scheduling information, incl. resources (staff, rooms, equipment, ...)
  - Procedure (operation, type, ...)
  - Real-time data (status, ...)
  - Communication (messages, video, ...)
  - ...

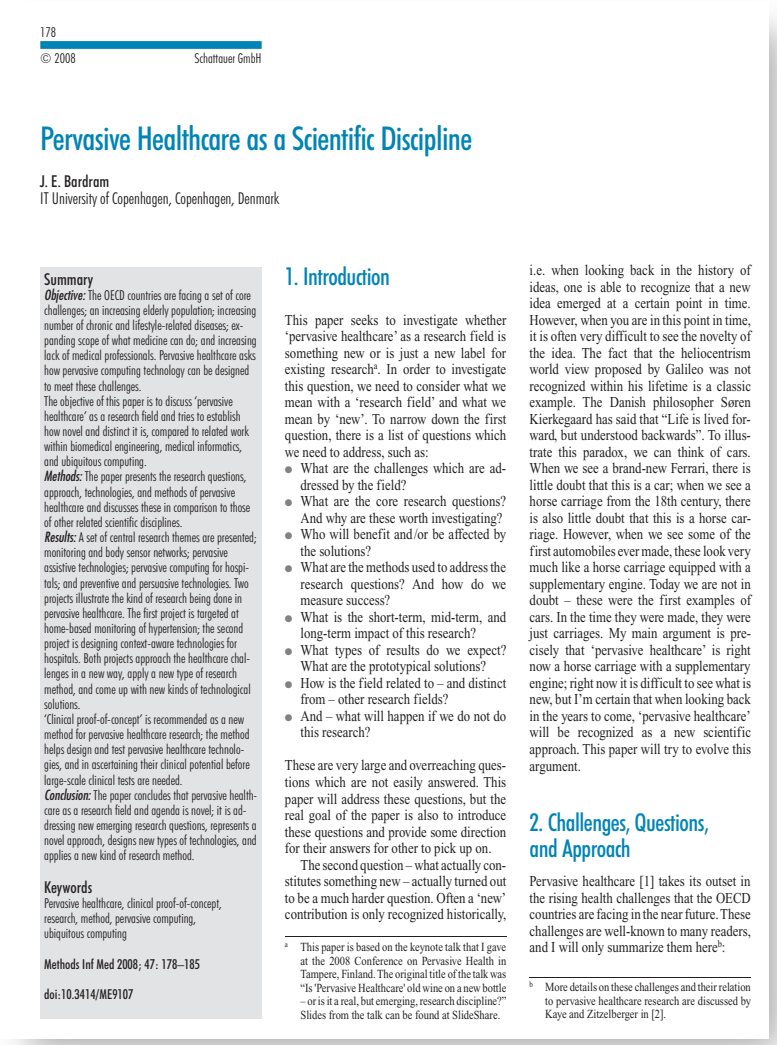
Mobile Health (mHealth)



Mobile healthcare or *m-health* is specifically concerned with using wireless communications, computing and sensing devices in the service of care delivery (Istepanian *et al.*, 2004; Tachakra *et al.*, 2003). Smart phones and wearable computing devices that blend physiological and activity sensors with wireless connectivity are making wireless patient monitoring commonplace, where once procedures such as ECG Holter monitoring were specialized services. More profoundly, information technology blends naturally with communication services on these mobile platforms and permits rich interaction with clinicians or sharing of data with others through social media. M-health thus falls naturally under the broader telehealth umbrella and can be thought of as a technological evolution of 'old-fashioned' telehealth. In some senses, the term m-health is also an unnecessary and technically driven distinction that confuses, rather than adds, to our understanding of how technology mediates communication. The choice of network channel and the platform for the delivery of a telehealth service are not the only consequential elements in the service bundle.

Major Trends

Acute	→	Continuous
Hospitalization	→	Ambulatory & Home
Reactive	→	Pro-active & Preventive
Information Tech	→	Health Technology
Centralized	→	Pervasive
Sampling	→	Monitoring
Doctor-centric	→	Patient-centric



178

Pervasive Healthcare as a Scientific Discipline

J. E. Bardram
IT University of Copenhagen, Copenhagen, Denmark

Summary

Objective: The OECD countries are facing a set of core challenges; an increasing elderly population; increasing number of chronic and lifestyle-related diseases; expanding scope of what medicine can do; and increasing lack of medical professionals. Pervasive healthcare asks how pervasive computing technology can be designed to meet these challenges.
The objective of this paper is to discuss 'pervasive healthcare' as a research field and tries to establish how novel and distinct it is, compared to related work within biomedical engineering, medical informatics, and ubiquitous computing.
Methods: The paper presents the research questions, approach, technologies, and methods of pervasive healthcare and discusses these in comparison to those of other related scientific disciplines.
Results: A set of central research themes are presented; monitoring and body sensor networks; pervasive assistive technologies; pervasive computing for hospitals; and preventive and persuasive technologies. Two projects illustrate the kind of research being done in pervasive healthcare. The first project is targeted at home-based monitoring of hypertension; the second project is designing context-aware technologies for hospitals. Both projects approach the healthcare challenges in a new way, apply a new type of research method, and come up with new kinds of technological solutions.
'Clinical proof-of-concept' is recommended as a new method for pervasive healthcare research; the method helps design and test pervasive healthcare technologies, and in ascertaining their clinical potential before large-scale clinical tests are needed.
Conclusion: The paper concludes that pervasive healthcare as a research field and agenda is novel; it is addressing new emerging research questions, represents a novel approach, designs new types of technologies, and applies a new kind of research method.

Keywords
Pervasive healthcare, clinical proof-of-concept, research, method, pervasive computing, ubiquitous computing

Methods Inf Med 2008; 47: 178–185

doi:10.3414/ME9107

1. Introduction

This paper seeks to investigate whether 'pervasive healthcare' as a research field is something new or is just a new label for existing research[a]. In order to investigate this question, we need to consider what we mean with a 'research field' and what we mean by 'new'. To narrow down the first question, there is a list of questions which we need to address, such as:

- What are the challenges which are addressed by the field?
- What are the core research questions? And why are these worth investigating?
- Who will benefit and/or be affected by the solutions?
- What are the methods used to address the research questions? And how do we measure success?
- What is the short-term, mid-term, and long-term impact of this research?
- What types of results do we expect? What are the prototypical solutions?
- How is the field related to – and distinct from – other research fields?
- And – what will happen if we do not do this research?

These are very large and overreaching questions which are not easily answered. This paper will address these questions, but the real goal of the paper is also to introduce these questions and provide some direction for their answers for other to pick up on.

The second question – what actually constitutes something new – actually turned out to be a much harder question. Often a 'new' contribution is only recognized historically, i.e. when looking back in the history of ideas, one is able to recognize that a new idea emerged at a certain point in time. However, when you are in this point in time, it is often very difficult to see the novelty of the idea. The fact that the heliocentrism world view proposed by Galileo was not recognized within his lifetime is a classic example. The Danish philosopher Søren Kierkegaard has said that "Life is lived forward, but understood backwards". To illustrate this paradox, we can think of cars. When we see a brand-new Ferrari, there is little doubt that this is a car; when we see a horse carriage from the 18th century, there is also little doubt that this is a horse carriage. However, when we see some of the first automobiles ever made, these look very much like a horse carriage equipped with a supplementary engine. Today we are not in doubt – these were the first examples of cars. In the time they were made, they were just carriages. My main argument is precisely that 'pervasive healthcare' is right now a horse carriage with a supplementary engine; right now it is difficult to see what is new, but I'm certain that when looking back in the years to come, 'pervasive healthcare' will be recognized as a new scientific approach. This paper will try to evolve this argument.

2. Challenges, Questions, and Approach

Pervasive healthcare [1] takes its outset in the rising health challenges that the OECD countries are facing in the near future. These challenges are well-known to many readers, and I will only summarize them here[b]:

[a] This paper is based on the keynote talk that I gave at the 2008 Conference on Pervasive Health in Tampere, Finland. The original title of the talk was "Is 'Pervasive Healthcare' old wine on a new bottle – or is it a real, but emerging, research discipline?" Slides from the talk can be found at SlideShare.

[b] More details on these challenges and their relation to pervasive healthcare research are discussed by Kaye and Zitzelberger in [2].

JE Bardram. Pervasive Healthcare as a Scientific Discipline. *Methods of Information in Medicine*, 3(47):129-142, 2008.

cachet | Copenhagen Center for Health Technology

Leading causes 2019	Percentage of DALYs 2019	Perce numb 1990
1 Neonatal disorders	7·3 (6·4 to 8·4)	3
2 Ischaemic heart disease	7·2 (6·5 to 7·9)	5
3 Stroke	5·7 (5·1 to 6·2)	3
4 Lower respiratory infections	3·8 (3·3 to 4·3)	−5
5 Diarrhoeal diseases	3·2 (2·6 to 4·0)	−5
6 COPD	2·9 (2·6 to 3·2)	2
7 Road injuries	2·9 (2·6 to 3·0)	
8 Diabetes	2·8 (2·5 to 3·1)	14
9 Low back pain	2·5 (1·9 to 3·1)	4
10 Congenital birth defects	2·1 (1·7 to 2·6)	−3
11 HIV/AIDS	1·9 (1·6 to 2·2)	12
12 Tuberculosis	1·9 (1·7 to 2·0)	−4
13 Depressive disorders	1·8 (1·4 to 2·4)	6
14 Malaria	1·8 (0·9 to 3·1)	−2
15 Headache disorders	1·8 (0·4 to 3·8)	5
16 Cirrhosis	1·8 (1·6 to 2·0)	3
17 Lung cancer	1·8 (1·6 to 2·0)	6
18 Chronic kidney disease	1·6 (1·5 to 1·8)	9
19 Other musculoskeletal	1·6 (1·2 to 2·1)	12
20 Age-related hearing loss	1·6 (1·2 to 2·1)	8
21 Falls	1·5 (1·4 to 1·7)	4
22 Self-harm	1·3 (1·2 to 1·5)	–
23 Gynaecological diseases	1·2 (0·9 to 1·5)	4
24 Anxiety disorders	1·1 (0·8 to 1·5)	5
25 Dietary iron deficiency	1·1 (0·8 to 1·5)	1

	Percentage of DALYs 2019	Percentage change in number of DALYs, 1990–2019	Percentage change in age-standardised DALY rate, 1990–2019
	7·3 (6·4 to 8·4)	−32·3 (−41·7 to −20·8)	−32·6 (−42·1 to −21·2)
	7·2 (6·5 to 7·9)	50·4 (39·9 to 60·2)	−28·6 (−33·3 to −24·2)
	5·7 (5·1 to 6·2)	32·4 (22·0 to 42·2)	−35·2 (−40·5 to −30·5)
tions	3·8 (3·3 to 4·3)	−56·7 (−64·2 to −47·5)	−62·5 (−69·0 to −54·9)
	3·2 (2·6 to 4·0)	−57·5 (−66·2 to −44·7)	−64·6 (−71·7 to −54·2)
	2·9 (2·6 to 3·2)	25·6 (15·1 to 46·0)	−39·8 (−44·9 to −30·2)
	2·9 (2·6 to 3·0)	2·4 (−6·9 to 10·8)	−31·0 (−37·1 to −25·4)
	2·8 (2·5 to 3·1)	147·9 (135·9 to 158·9)	24·4 (18·5 to 29·7)
	2·5 (1·9 to 3·1)	46·9 (43·3 to 50·5)	−16·3 (−17·1 to −15·5)
s	2·1 (1·7 to 2·6)	−37·3 (−50·6 to −12·8)	−40·0 (−52·7 to −17·1)
	1·9 (1·6 to 2·2)	127·7 (97·3 to 171·7)	58·5 (37·1 to 89·2)
	1·9 (1·7 to 2·0)	−41·0 (−47·2 to −33·5)	−62·8 (−66·6 to −58·0)
	1·8 (1·4 to 2·4)	61·1 (56·9 to 65·0)	−1·8 (−2·9 to −0·8)
	1·8 (0·9 to 3·1)	−29·4 (−56·9 to 6·6)	−37·8 (−61·9 to −6·2)
	1·8 (0·4 to 3·8)	56·7 (52·4 to 62·1)	1·1 (−4·2 to 2·9)
	1·8 (1·6 to 2·0)	33·0 (22·4 to 48·2)	−26·8 (−32·5 to −19·0)
	1·8 (1·6 to 2·0)	69·1 (53·1 to 85·4)	−16·2 (−24·0 to −8·2)
	1·6 (1·5 to 1·8)	93·2 (81·6 to 105·0)	6·3 (0·2 to 12·4)
	1·6 (1·2 to 2·1)	128·9 (122·0 to 136·3)	30·7 (27·6 to 34·3)
ss	1·6 (1·2 to 2·1)	82·8 (75·2 to 88·9)	−1·8 (−3·7 to −0·1)
	1·5 (1·4 to 1·7)	47·1 (31·5 to 61·0)	−14·5 (−22·5 to −7·4)
	1·3 (1·2 to 1·5)	−5·6 (−14·2 to 3·7)	−38·9 (−44·3 to −33·0)
s	1·2 (0·9 to 1·5)	48·7 (45·8 to 51·8)	−6·8 (−8·7 to −4·9)
	1·1 (0·8 to 1·5)	53·7 (48·8 to 59·1)	−0·1 (−1·0 to 0·7)
	1·1 (0·8 to 1·5)	13·8 (10·5 to 17·2)	−16·4 (−18·7 to −14·0)
	1·1 (1·0 to 1·2)	10·2 (3·2 to 19·2)	−23·8 (−28·6 to −17·8)
	0·6 (0·5 to 0·8)	−51·3 (−59·4 to −42·0)	−57·2 (−64·4 to −48·6)
rition	0·6 (0·5 to 0·7)	−71·1 (−79·6 to −59·7)	−74·5 (−82·0 to −64·5)
	0·5 (0·5 to 0·6)	−60·6 (−65·2 to −53·6)	−68·2 (−71·9 to −62·8)
	0·4 (0·2 to 0·7)	−54·5 (−74·6 to −16·9)	−56·3 (−75·6 to −20·3)
	0·3 (0·1 to 0·6)	−89·8 (−92·3 to −86·8)	−90·4 (−92·8 to −87·5)

Lancet 2020; 396: 1204–22

This online publication has been corrected. The corrected version first appeared at thelancet.com on October 23, 2020

*For the list of Collaborators see Viewpoint *Lancet* 2020; 396: 1135–59

Correspondence to: Prof Christopher J L Murray, Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA 98195, USA
cjlm@uw.edu

Summary

Background In a

Methods GBD es

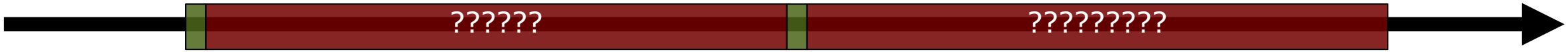
Findings Global l

Interpretation A

Funding Bill & M

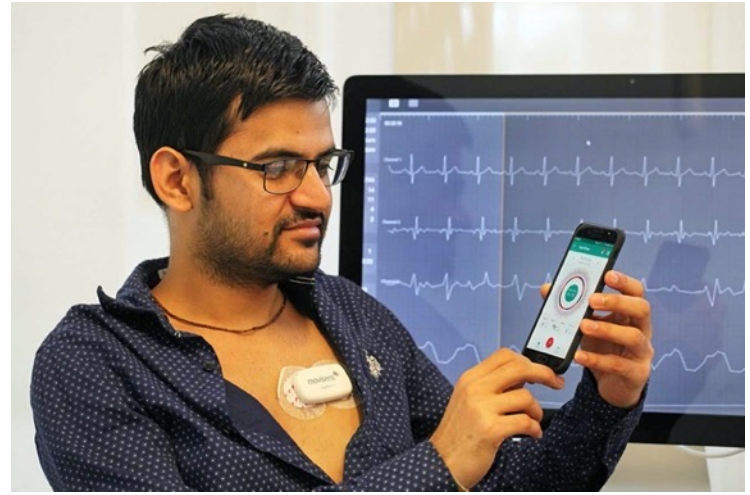
mCardia :: Detection of Atrial Fibrillation

- Cardiovascular diseases is the 1st cause of death and the 2nd leading disease burden (WHO)
- ECG monitoring is core to most CVD treatment
- Today
  - in-clinic monitoring for short period (10 min)
  - constrained Holter monitoring w. manual data upload
  - no knowledge on "context" (physiological, behavioral, medical, cognitive, mental, ...)
  - a manual labeling and detection process



mCardia: A Context-Aware System for Arrhythmia Screening

- Novel digital phenotyping technology for arrhythmia screening
  - **ambulatory** – data collection under free-living conditions
  - **longitudinal** – 2-5 weeks of data collection
  - **contextual** – behavior, environment, activity, self-reports
- 2 studies :: Denmark & India
  - N=24
  - high usability and user engagement scores
  - huge ambulatory dataset collected
  - patient annotation of experienced “events”



D Kumar, R Maharjan, A Maxhuni, H Dominguez, A Frølich, JE Bardram. " mCardia: A Context-Aware Ambulatory ECG Collection System for Arrhythmia Screening" To be published in *ACM Transaction on Computing for Health, 2021*.

Data Collection

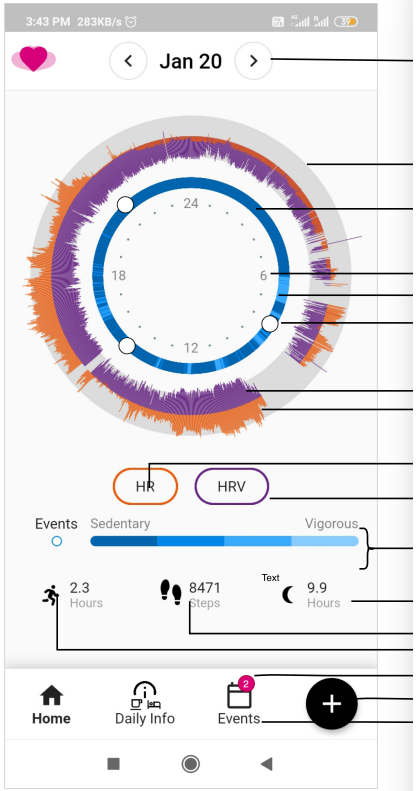
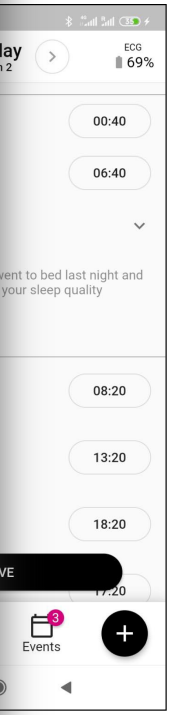


Table 1. Data Features Collected in ***mCardia*** with Source and Sampling Rate

Parameters	Type	Source	Sampling rate
ECG	S	EcgMove4	1024 Hz
HR	S	EcgMove4	1/60 Hz
HRV	S	EcgMove4	1/60 Hz
MET Level	S	EcgMove4	1/60 Hz
Acceleration	S	EcgMove4	64 Hz
Rotation rate	S	EcgMove4	64 Hz
Body position	S	EcgMove4	1/60 Hz
Activity	S	Phone	EB
Steps	S	EcgMove4 & Phone	1/60Hz & EB
Events	PR	EcgMove4 & Phone	EB
Weather	S	Phone	4/day
Location	S	Phone	EB
Sleep	PR & S	Phone	1/Day
Noise level	S	Phone	1/120 Hz
Dietary	PR	Phone	1/Day

S: Sensed. PR: Patient-reported. EB: Event-based. Dietary includes food timings and type (light, moderate or heavy), sleep quality, and self perceived stress levels.



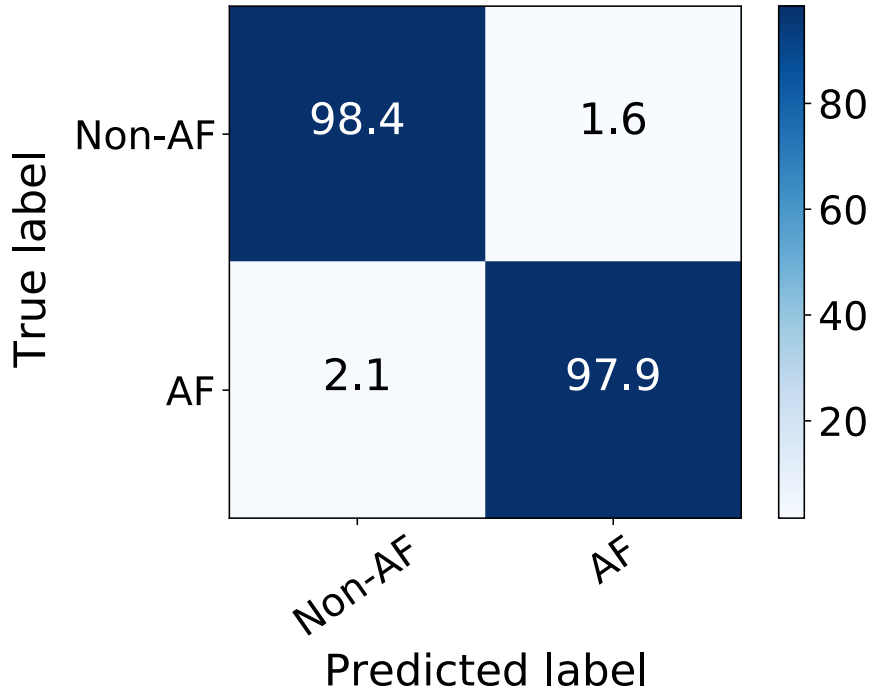
aily Info

gn).

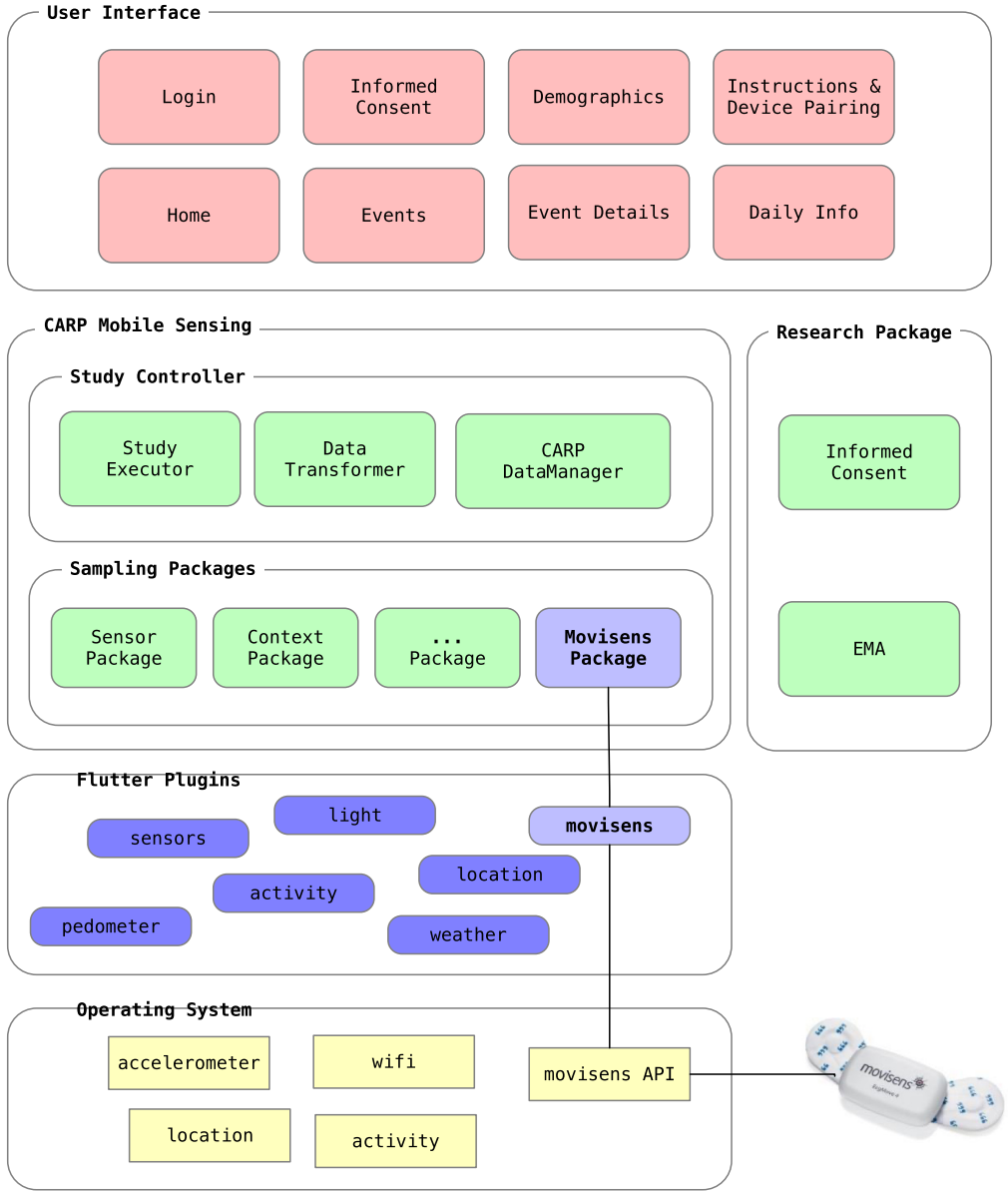
Deep-learning Method for Ambulatory AF Detection

- **"In-the-Wild"** real-time detection of atrial fibrillation
  - ambulatory, contextual data
  - patient-reported data
  - based on CACHET-CADB ("in-the-wild" data)
  - **98% accuracy**

- Implications
  - reduction of **manual** Holter analysis
  - **pro-active** detection of AF
  - semi-automatic **triage**
  - early **intervention**



D Kumar, A Peimankar, K Sharma, H Dominguez, S Puthusserypady, and JE Bardram. "*DeepAware*: A Hybrid Deep Learning and Context-Aware Heuristics Based Model for Atrial Fibrillation Detection" Under review.


User Interface
Login
Informed Consent
Demographics
Instructions & Device Pairing
Home
Events
Event Details
Daily Info
CARP Mobile Sensing
Study Controller
Study Executor
Data Transformer
CARP DataManager
Sampling Packages
Sensor Package
Context Package
... Package
Movisens Package
Research Package
Informed Consent
EMA
Flutter Plugins
sensors
light
movisens
location
activity
pedometer
weather
Operating System
accelerometer
wifi
movisens API
location
activity
movisens

Questions Related to Standards....

- How can we integrate with the “big” systems
  - Patient Administration System (PAS)
  - Electronic Medical Record (EMR)
  - Booking and Scheduling

- What needs to be integrated
  - Patient information (id, name, diagnosis, ward, ...)
  - Clinical information (diagnosis, ...)
  - Medical device information (type, configuration, instructions, ...)
  - Communication (messages, video, ...)
  - Observations (physical activity, behavior, sleep, HR, HRV, MET, ECG, PRO, ...)
  - ...

MEDICAL DATA STANDARDS

DTU Technical University of Denmark

cachet Copenhagen Center for Health Technology

UNIVERSITY OF COPENHAGEN

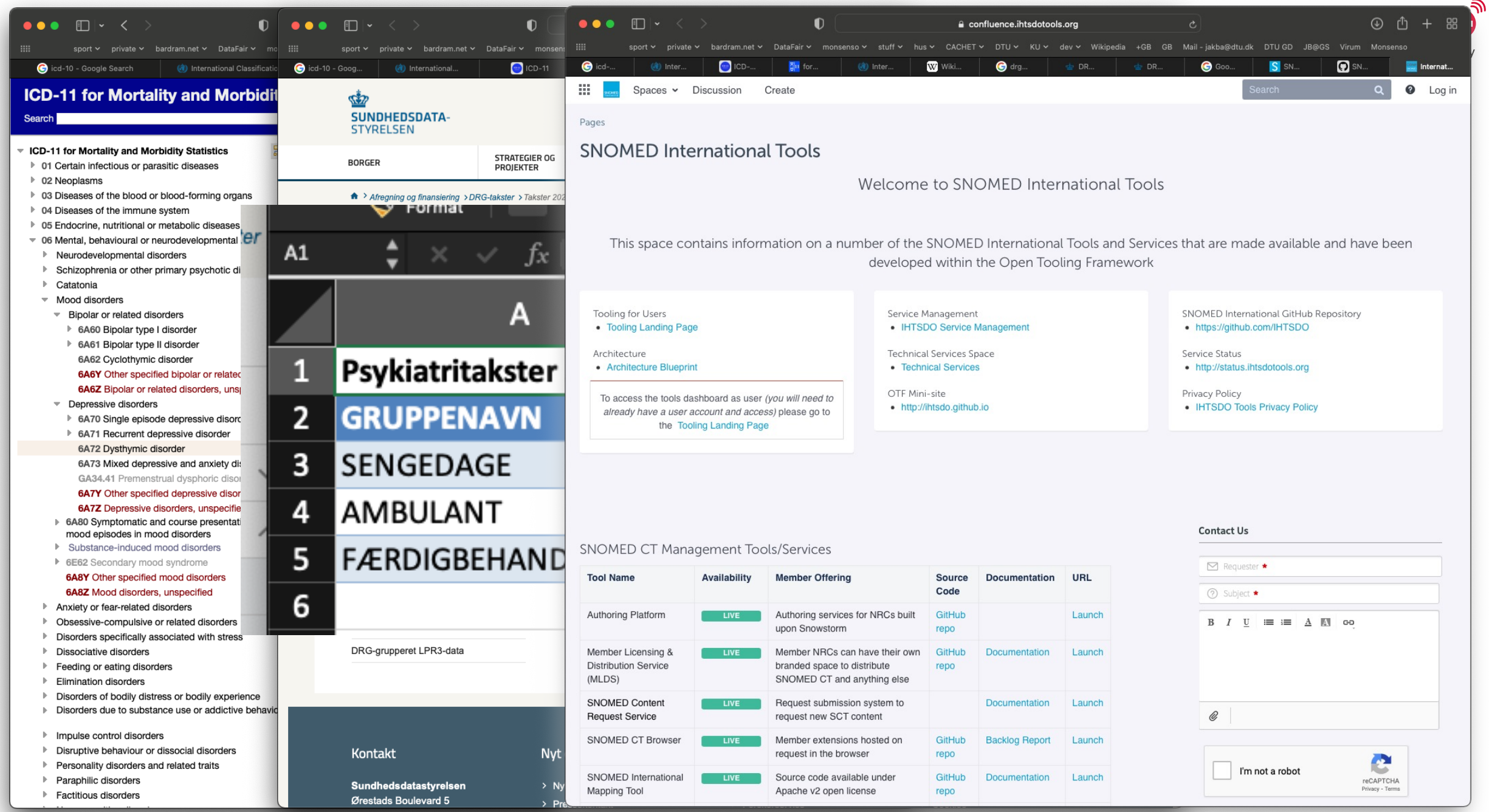
Healthcare Classification Systems

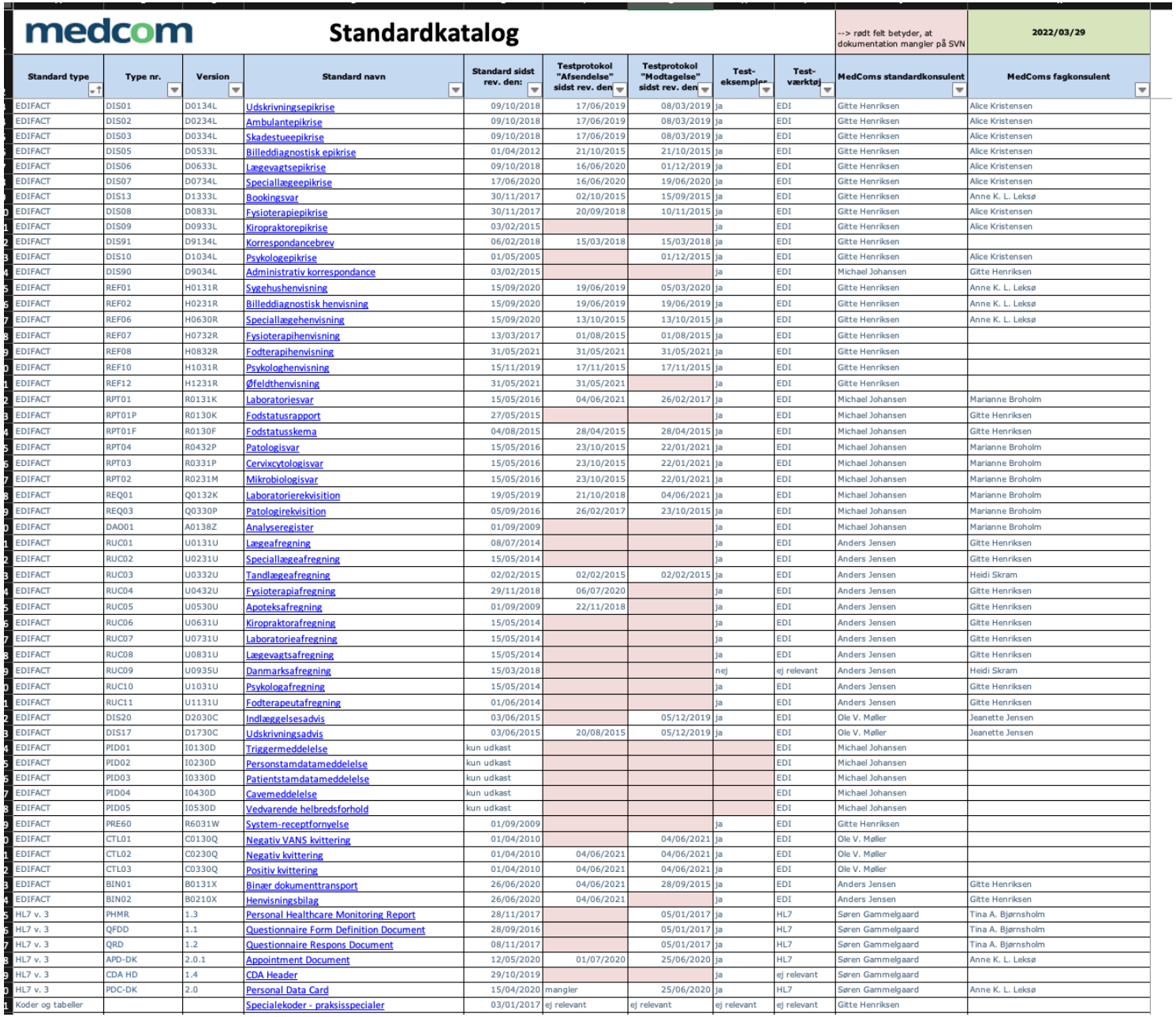
- ICD-1
- DRG
- Read
- SNOM
- SNOM
- UMLS
- DSM
- LOINC
- RxNO
- ICPC
- CPT
- RadLE

Table 23.7 A comparison of coding for four different clinical concepts using some of the major coding systems

Clinical concept	UMLS	ICD-10	ICD-9-CM 4th edition	Read, 1999	SNOMED International, 1998	SNOMED CT, 2002
Chronic ischaemic heart disease	448589 Chronic ischaemic heart disease	I25.9 Chronic ischaemic heart disease	414.9 Chronic ischaemic heart disease	XE0WG Chronic ischaemic heart disease NOS	14020 Chronic ischaemic heart disease	84537008 Chronic ischaemic heart disease
Epidural haematoma	'453700 Hematoma, epidural'	S06.4 Epidural haemorrhage	432.0 Nontraumatic extradural haemorrhage	Xa0AC Extradural haematoma	89124 Extradural haemorrhage	68752002 Nontraumatic extradural haemorrhage
Lymphosarcoma	'1095849 Lymphoma, diffuse'	C85.0 Lymphosarcoma	200.1 Lymphosarcoma	B601z Lymphosarcoma	'95923 Lymphosarcoma, diffuse'	'1929004 Malignant lymphoma, non-Hodgkin'
Common cold	1013970 Common cold	J00 Acute nasopharyngitis (common cold)	460 Acute nasopharyngitis (common cold)	XE0X1 Common cold	35210 Common cold	82272006 Common cold

ICD, International Classification of Diseases; UMLS, United Medical Language System.
From the National Centre for Classification in Health, Australia.


ICD-11 for Mortality and Morbidity
Search
ICD-11 for Mortality and Morbidity Statistics
01 Certain infectious or parasitic diseases
02 Neoplasms
03 Diseases of the blood or blood-forming organs
04 Diseases of the immune system
05 Endocrine, nutritional or metabolic diseases
06 Mental, behavioural or neurodevelopmental
Neurodevelopmental disorders
Schizophrenia or other primary psychotic di
Catatonia
Mood disorders
Bipolar or related disorders
6A60 Bipolar type I disorder
6A61 Bipolar type II disorder
6A62 Cyclothymic disorder
6A6Y Other specified bipolar or related
6A6Z Bipolar or related disorders, unsp
Depressive disorders
6A70 Single episode depressive disorc
6A71 Recurrent depressive disorder
6A72 Dysthymic disorder
6A73 Mixed depressive and anxiety di
GA34.41 Premenstrual dysphoric disor
6A7Y Other specified depressive disor
6A7Z Depressive disorders, unspecifie
6A80 Symptomatic and course presentati
mood episodes in mood disorders
Substance-induced mood disorders
6E62 Secondary mood syndrome
6A8Y Other specified mood disorders
6A8Z Mood disorders, unspecified
Anxiety or fear-related disorders
Obsessive-compulsive or related disorders
Disorders specifically associated with stress
Dissociative disorders
Feeding or eating disorders
Elimination disorders
Disorders of bodily distress or bodily experience
Disorders due to substance use or addictive behavic
Impulse control disorders
Disruptive behaviour or dissocial disorders
Personality disorders and related traits
Paraphilic disorders
Factitious disorders
SUNDHEDSDATA-STYRELSEN
BORGER
STRATEGIER OG PROJEKTER
Afregning og finansiering
DRG-takster
A1
A
1 Psykiatritakster
2 GRUPPENAVN
3 SENGEDAGE
4 AMBULANT
5 FÆRDIGBEHAND
6
DRG-grupperet LPR3-data
Kontakt
Sundhedsdatastyrelsen
Ørestads Boulevard 5
Nyt
confluence.ihtsdotools.org
Spaces
Discussion
Create
Search
Log in
Pages
SNOMED International Tools
Welcome to SNOMED International Tools
This space contains information on a number of the SNOMED International Tools and Services that are made available and have been developed within the Open Tooling Framework
Tooling for Users
Tooling Landing Page
Architecture
Architecture Blueprint
To access the tools dashboard as user (you will need to already have a user account and access) please go to the Tooling Landing Page
Service Management
IHTSDO Service Management
Technical Services Space
Technical Services
OTF Mini-site
http://ihtsdo.github.io
SNOMED International GitHub Repository
https://github.com/IHTSDO
Service Status
http://status.ihtsdotools.org
Privacy Policy
IHTSDO Tools Privacy Policy
SNOMED CT Management Tools/Services
Tool Name | Availability | Member Offering | Source Code | Documentation | URL
Authoring Platform | LIVE | Authoring services for NRCs built upon Snowstorm | GitHub repo | | Launch
Member Licensing & Distribution Service (MLDS) | LIVE | Member NRCs can have their own branded space to distribute SNOMED CT and anything else | GitHub repo | Documentation | Launch
SNOMED Content Request Service | LIVE | Request submission system to request new SCT content | | Documentation | Launch
SNOMED CT Browser | LIVE | Member extensions hosted on request in the browser | GitHub repo | Backlog Report | Launch
SNOMED International Mapping Tool | LIVE | Source code available under Apache v2 open license | GitHub repo | Documentation | Launch
Contact Us
Requester *
Subject *
I'm not a robot
reCAPTCHA



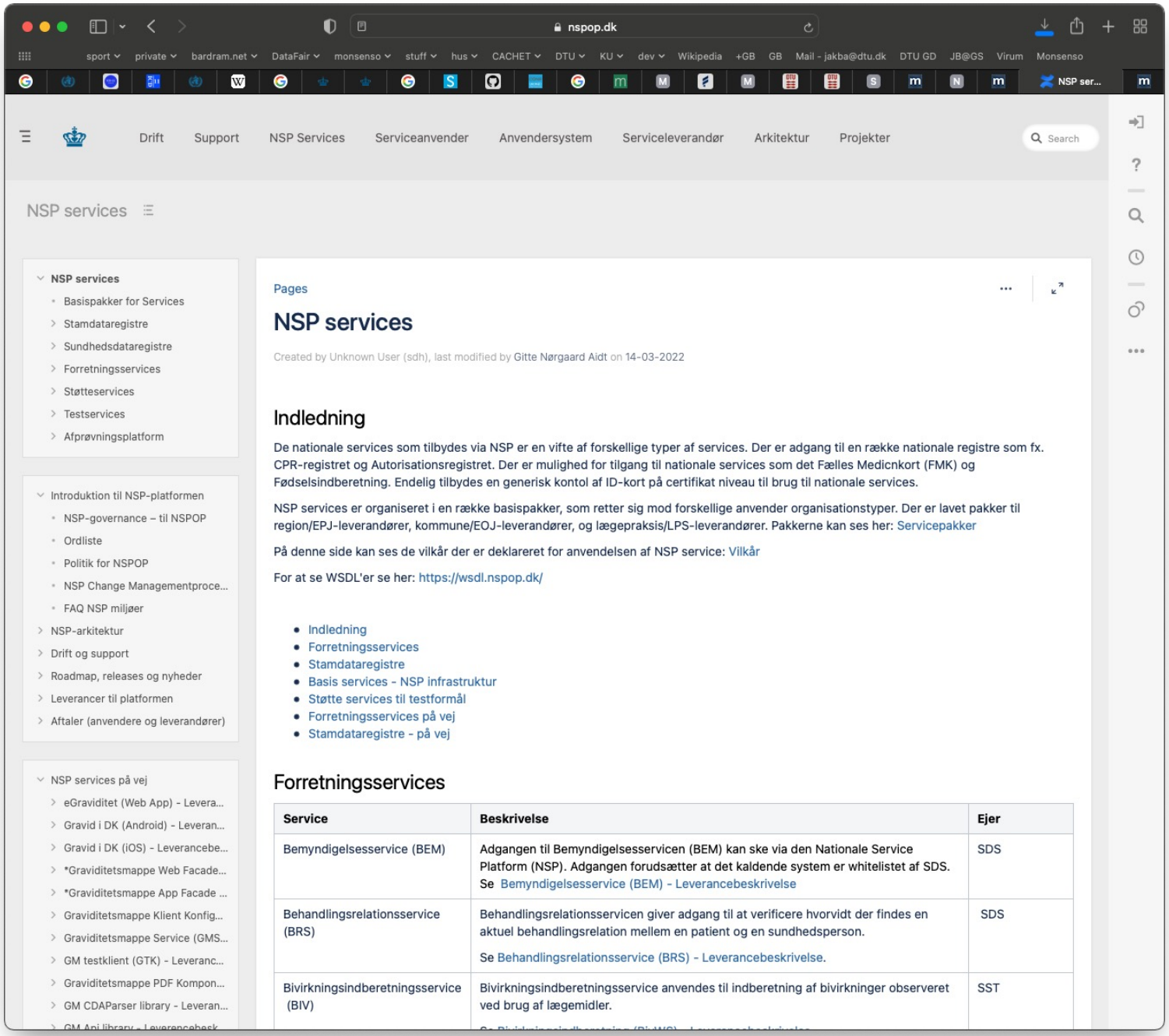
medcom **Standardkatalog**

--> rødt felt betyder, at dokumentation mangler på SVN | 2022/03/29

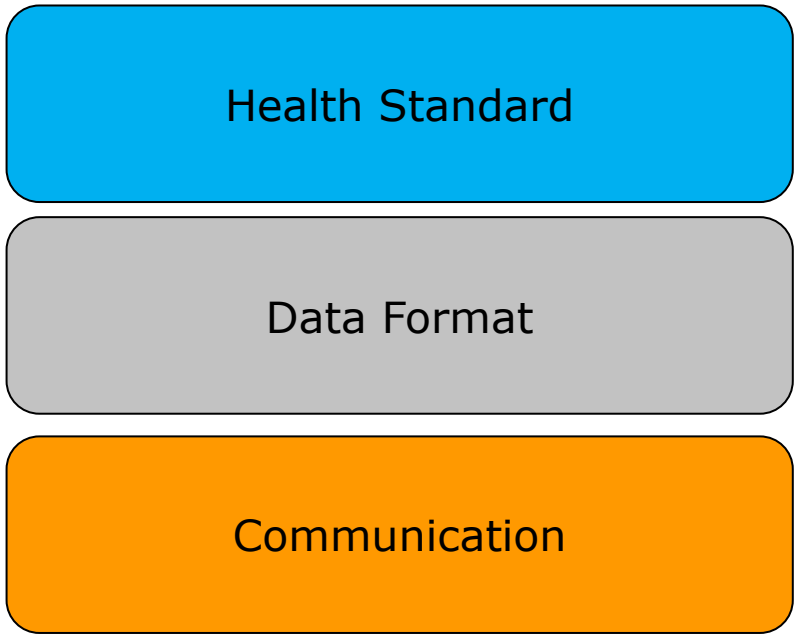
Standard type	Type nr.	Version	Standard navn	Standard sidst rev. den:	Testprotokol "Afsendelse" sidst rev. den	Testprotokol "Modtagelse" sidst rev. den	Test-eksempler	Test-værktøj	MedComs standardkonsulent	MedComs fagkonsulent
EDIFACT	DIS01	D0134L	Udskrivningsepikrise	09/10/2018	17/06/2019	08/03/2019	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS02	D0234L	Ambulantepikrise	09/10/2018	17/06/2019	08/03/2019	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS03	D0334L	Skadestueepikrise	09/10/2018	17/06/2019	08/03/2019	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS05	D0533L	Billeddiagnostisk epikrise	01/04/2012	21/10/2015	21/10/2015	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS06	D0633L	Lægevagtsepikrise	09/10/2018	16/06/2020	01/12/2019	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS07	D0734L	Speciallægeepikrise	17/06/2020	16/06/2020	19/06/2020	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS13	D1333L	Bookingsvar	30/11/2017	02/10/2015	15/09/2015	ja	EDI	Gitte Henriksen	Anne K. L. Leksø
EDIFACT	DIS08	D0833L	Fysioterapiepikrise	30/11/2017	20/09/2018	10/11/2015	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS09	D0933L	Kiropraktorepikrise	03/02/2015			ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS91	D9134L	Korrespondancebrev	06/02/2018	15/03/2018	15/03/2018	ja	EDI	Gitte Henriksen	
EDIFACT	DIS10	D1034L	Psykologepikrise	01/05/2005		01/12/2015	ja	EDI	Gitte Henriksen	Alice Kristensen
EDIFACT	DIS90	D9034L	Administrativ korrespondance	03/02/2015			ja	EDI	Michael Johansen	Gitte Henriksen
EDIFACT	REF01	H0131R	Sygehushenvisning	15/09/2020	19/06/2019	05/03/2020	ja	EDI	Gitte Henriksen	Anne K. L. Leksø
EDIFACT	REF02	H0231R	Billeddiagnostisk henvisning	15/09/2020	19/06/2019	19/06/2019	ja	EDI	Gitte Henriksen	Anne K. L. Leksø
EDIFACT	REF06	H0630R	Speciallægehenvisning	15/09/2020	13/10/2015	13/10/2015	ja	EDI	Gitte Henriksen	Anne K. L. Leksø
EDIFACT	REF07	H0732R	Fysioterapihenvisning	13/03/2017	01/08/2015	01/08/2015	ja	EDI	Gitte Henriksen	
EDIFACT	REF08	H0832R	Fodterapihenvisning	31/05/2021	31/05/2021	31/05/2021	ja	EDI	Gitte Henriksen	
EDIFACT	REF10	H1031R	Psykologhenvisning	15/11/2019	17/11/2015	17/11/2015	ja	EDI	Gitte Henriksen	
EDIFACT	REF12	H1231R	Øfeldthenvisning	31/05/2021	31/05/2021		ja	EDI	Gitte Henriksen	
EDIFACT	RPT01	R0131K	Laboratoriesvar	15/05/2016	04/06/2021	26/02/2017	ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	RPT01P	R0130K	Fodstatusrapport	27/05/2015			ja	EDI	Michael Johansen	Gitte Henriksen
EDIFACT	RPT01F	R0130F	Fodstatusskema	04/08/2015	28/04/2015	28/04/2015	ja	EDI	Michael Johansen	Gitte Henriksen
EDIFACT	RPT04	R0432P	Patologisvar	15/05/2016	23/10/2015	22/01/2021	ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	RPT03	R0331P	Cervixcytologisvar	15/05/2016	23/10/2015	22/01/2021	ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	RPT02	R0231M	Mikrobiologisvar	15/05/2016	23/10/2015	22/01/2021	ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	REQ01	Q0132K	Laboratorierekvisition	19/05/2019	21/10/2018	04/06/2021	ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	REQ03	Q0330P	Patologirekvisition	05/09/2016	26/02/2017	23/10/2015	ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	DA001	A0138Z	Analyseregister	01/09/2009			ja	EDI	Michael Johansen	Marianne Broholm
EDIFACT	RUC01	U0131U	Lægeafregning	08/07/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC02	U0231U	Speciallægeafregning	15/05/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC03	U0332U	Tandlægeafregning	02/02/2015	02/02/2015	02/02/2015	ja	EDI	Anders Jensen	Heidi Skram
EDIFACT	RUC04	U0432U	Fysioterapiafregning	29/11/2018	06/07/2020		ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC05	U0530U	Apoteksafregning	01/09/2009	22/11/2018		ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC06	U0631U	Kiropraktorafregning	15/05/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC07	U0731U	Laboratorieafregning	15/05/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC08	U0831U	Lægevagtsafregning	15/05/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC09	U0935U	Danmarksafregning	15/03/2018			nej	ej relevant	Anders Jensen	Heidi Skram
EDIFACT	RUC10	U1031U	Psykologafregning	15/05/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	RUC11	U1131U	Fodterapeutafregning	01/06/2014			ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	DIS20	D2030C	Indlæggelsesadvis	03/06/2015		05/12/2019	ja	EDI	Ole V. Møller	Jeanette Jensen
EDIFACT	DIS17	D1730C	Udskrivningsadvis	03/06/2015	20/08/2015	05/12/2019	ja	EDI	Ole V. Møller	Jeanette Jensen
EDIFACT	PID01	I0130D	Triggermeddelelse	kun udkast				EDI	Michael Johansen	
EDIFACT	PID02	I0230D	Personstamdatameddelelse	kun udkast				EDI	Michael Johansen	
EDIFACT	PID03	I0330D	Patientstamdatameddelelse	kun udkast				EDI	Michael Johansen	
EDIFACT	PID04	I0430D	Cavemeddelelse	kun udkast				EDI	Michael Johansen	
EDIFACT	PID05	I0530D	Vedvarende helbredsforhold	kun udkast				EDI	Michael Johansen	
EDIFACT	PRE60	R6031W	System-receptfornyelse	01/09/2009			ja	EDI	Gitte Henriksen	
EDIFACT	CTL01	C0130Q	Negativ VANS kvittering	01/04/2010		04/06/2021	ja	EDI	Ole V. Møller	
EDIFACT	CTL02	C0230Q	Negativ kvittering	01/04/2010	04/06/2021	04/06/2021	ja	EDI	Ole V. Møller	
EDIFACT	CTL03	C0330Q	Positiv kvittering	01/04/2010	04/06/2021	04/06/2021	ja	EDI	Ole V. Møller	
EDIFACT	BIN01	B0131X	Binær dokumenttransport	26/06/2020	04/06/2021	28/09/2015	ja	EDI	Anders Jensen	Gitte Henriksen
EDIFACT	BIN02	B0210X	Henvisningsbilag	26/06/2020	04/06/2021		ja	EDI	Anders Jensen	Gitte Henriksen
HL7 v. 3	PHMR	1.3	Personal Healthcare Monitoring Report	28/11/2017		05/01/2017	ja	HL7	Søren Gammelgaard	Tina A. Bjørnsholm
HL7 v. 3	QFDD	1.1	Questionnaire Form Definition Document	28/09/2016		05/01/2017	ja	HL7	Søren Gammelgaard	Tina A. Bjørnsholm
HL7 v. 3	QRD	1.2	Questionnaire Respons Document	08/11/2017		05/01/2017	ja	HL7	Søren Gammelgaard	Tina A. Bjørnsholm
HL7 v. 3	APD-DK	2.0.1	Appointment Document	12/05/2020	01/07/2020	25/06/2020	ja	HL7	Søren Gammelgaard	Anne K. L. Leksø
HL7 v. 3	CDA HD	1.4	CDA Header	29/10/2019			ja	ej relevant	Søren Gammelgaard	
HL7 v. 3	PDC-DK	2.0	Personal Data Card	15/04/2020	mangler	25/06/2020	ja	HL7	Søren Gammelgaard	Anne K. L. Leksø
Koder og tabeller			Specialekoder - praksisspecialer	03/01/2017	ej relevant	ej relevant	ej relevant	ej relevant	Gitte Henriksen	

cachet | Copenhagen Center for Health Technology

- 154 standards
  - 52 EDIFACT
  - 6 HL7 v. 3
  - 32 "codes"
  - 14 web services
  - 49 XML


nspop.dk
Drift
Support
NSP Services
Serviceanvender
Anvendersystem
Serviceleverandør
Arkitektur
Projekter
Search
NSP services
NSP services
Basispakker for Services
Stamdataregistre
Sundhedsdataregistre
Forretningsservices
Støtteservices
Testservices
Afprøvningsplatform
Introduktion til NSP-platformen
NSP-governance – til NSPOP
Ordliste
Politik for NSPOP
NSP Change Managementproce...
FAQ NSP miljøer
NSP-arkitektur
Drift og support
Roadmap, releases og nyheder
Leverancer til platformen
Aftaler (anvendere og leverandører)
NSP services på vej
eGraviditet (Web App) - Levera...
Gravid i DK (Android) - Leveran...
Gravid i DK (iOS) - Leverancebe...
*Graviditetsmappe Web Facade...
*Graviditetsmappe App Facade ...
Graviditetsmappe Klient Konfig...
Graviditetsmappe Service (GMS...
GM testklient (GTK) - Leveranc...
Graviditetsmappe PDF Kompon...
GM CDAParser library - Leveran...
Pages
NSP services
Created by Unknown User (sdh), last modified by Gitte Nørgaard Aidt on 14-03-2022
Indledning
De nationale services som tilbydes via NSP er en vifte af forskellige typer af services. Der er adgang til en række nationale registre som fx. CPR-registret og Autorisationsregistret. Der er mulighed for tilgang til nationale services som det Fælles Medicnkort (FMK) og Fødselsindberetning. Endelig tilbydes en generisk kontol af ID-kort på certifikat niveau til brug til nationale services.
NSP services er organiseret i en række basispakker, som retter sig mod forskellige anvender organisationstyper. Der er lavet pakker til region/EPJ-leverandører, kommune/EOJ-leverandører, og lægepraksis/LPS-leverandører. Pakkerne kan ses her: Servicepakker
På denne side kan ses de vilkår der er deklareret for anvendelsen af NSP service: Vilkår
For at se WSDL'er se her: https://wsdl.nspop.dk/
Indledning
Forretningsservices
Stamdataregistre
Basis services - NSP infrastruktur
Støtte services til testformål
Forretningsservices på vej
Stamdataregistre - på vej
Forretningsservices
Service
Beskrivelse
Ejer
Bemyndigelsesservice (BEM)
Adgangen til Bemyndigelsesservicen (BEM) kan ske via den Nationale Service Platform (NSP). Adgangen forudsætter at det kaldende system er whitelistet af SDS. Se Bemyndigelsesservice (BEM) - Leverancebeskrivelse
SDS
Behandlingsrelationsservice (BRS)
Behandlingsrelationsservicen giver adgang til at verificere hvorvidt der findes en aktuel behandlingsrelation mellem en patient og en sundhedsperson.
Se Behandlingsrelationsservice (BRS) - Leverancebeskrivelse.
SDS
Bivirkningsindberetningsservice (BIV)
Bivirkningsindberetningsservice anvendes til indberetning af bivirkninger observeret ved brug af lægemidler.
SST

Different types of standards



HL7, FHIR, ICD-11, SNOMED, ...

Binary, XML, JSON, EDI, RDF, ...

SOAP, HTTP/REST, TCP/IP, ...

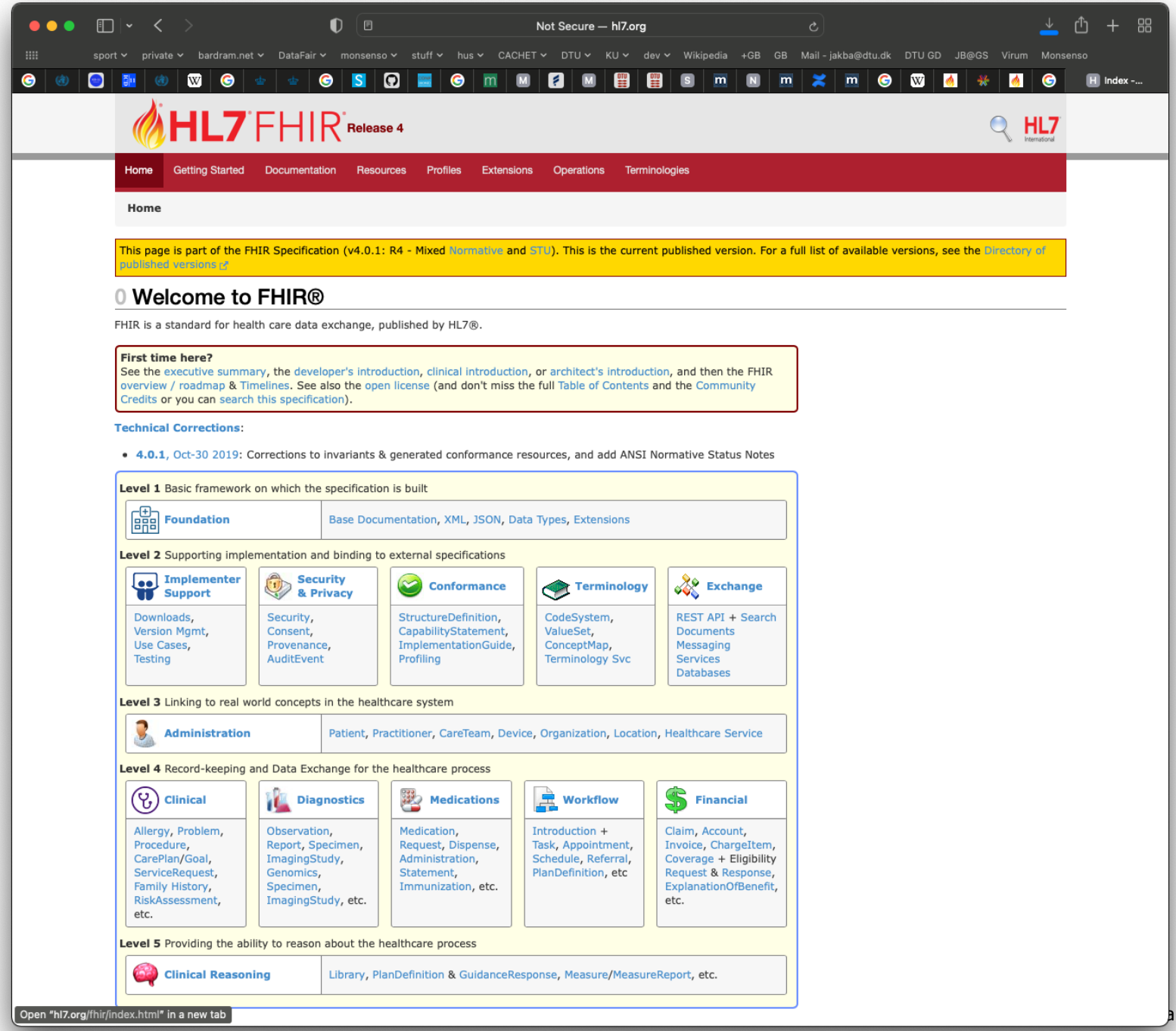
Examples of Health Standards

Fast Healthcare Interoperability Resources (FHIR)

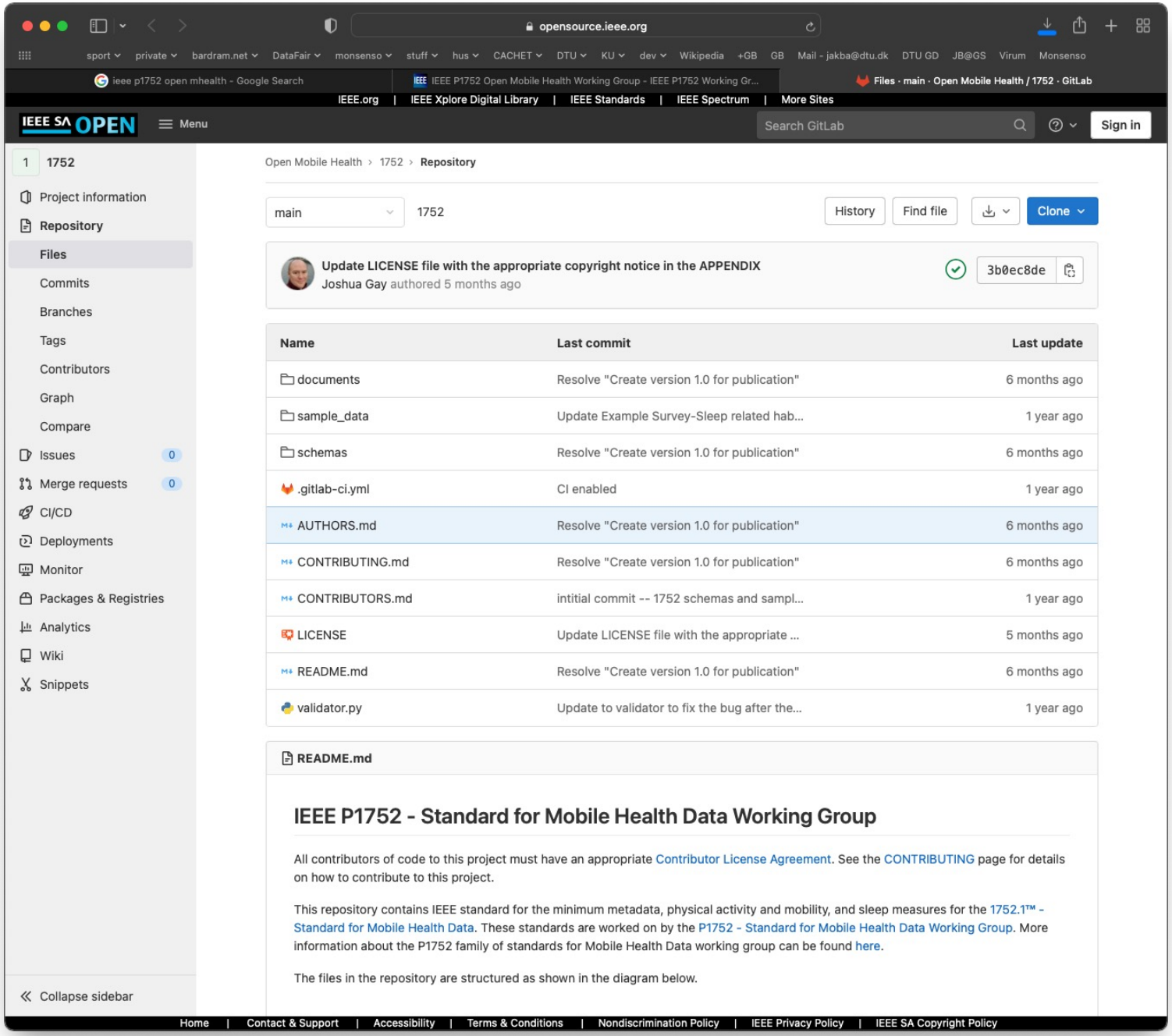
- a modern version of HL7
- data format and API standards
- for exchange of EHR "documents"
- JSON, XML, RDF

IEEE P1752 Standard for Mobile Health Data

- standard semantics
- description, exchange, sharing, and use of mobile health data
- sleep, physical activity, meta-data, surveys, ...
- device & app agnostic
- JSON



http://hl7.org/fhir/



https://sagroups.ieee.org/1752/

https://opensource.ieee.org/omh/1752/-/tree/main

QUESTIONS?

Small Exercises…

#1 – What is the difference between HL7 (v. 3) and FHIR?

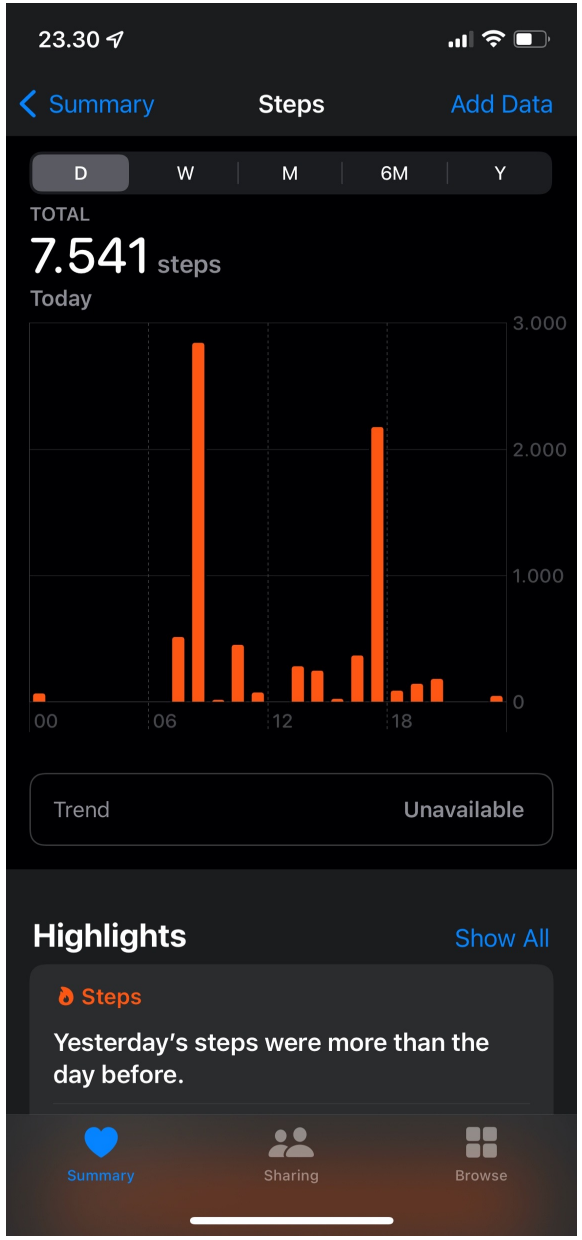
#2 – Write yourself as a FHIR Patient object in JSON.

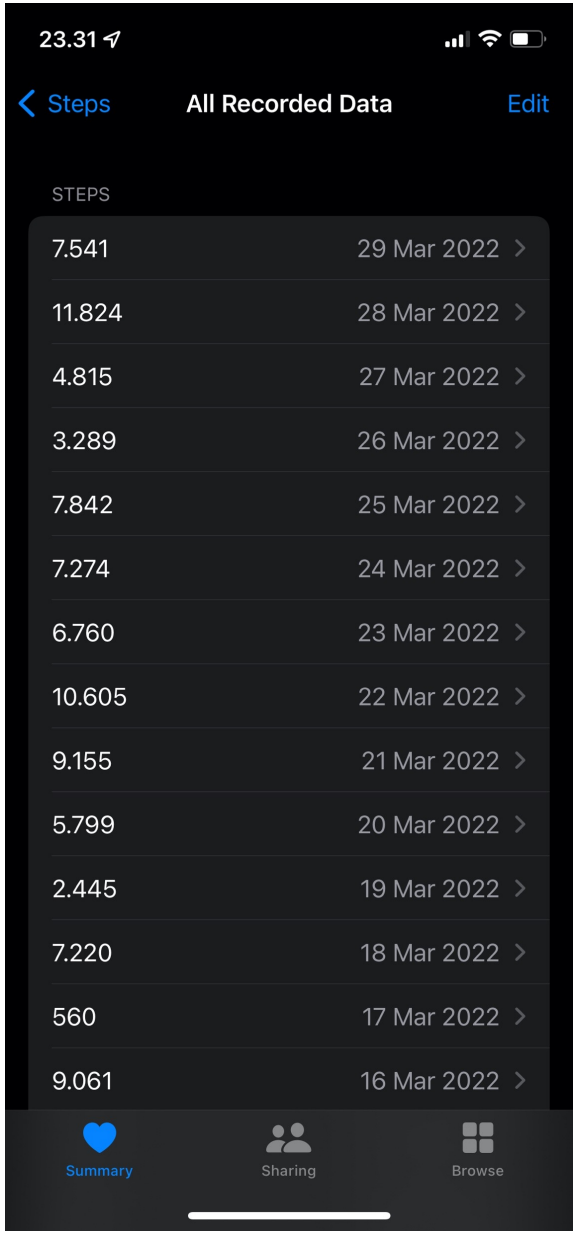
#3 – Take a look in the Apple Health app on your phone. How would you represent the "walking" activity you did yesterday as an IEEE P1752 JSON object?

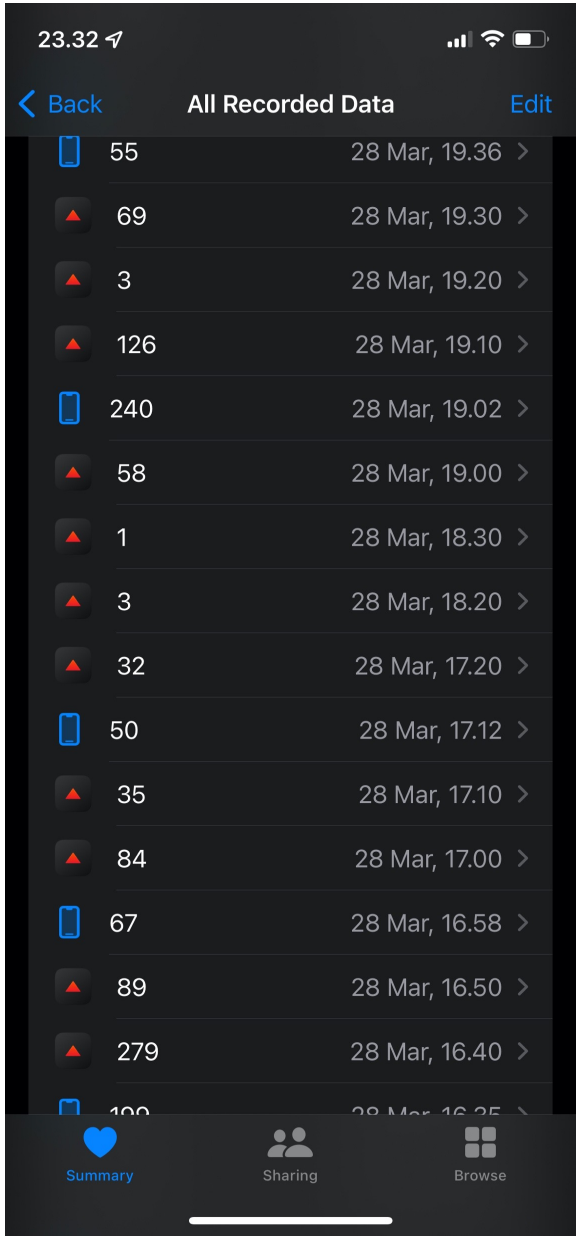
#4 – Same question as #3, but in the FHIR format?

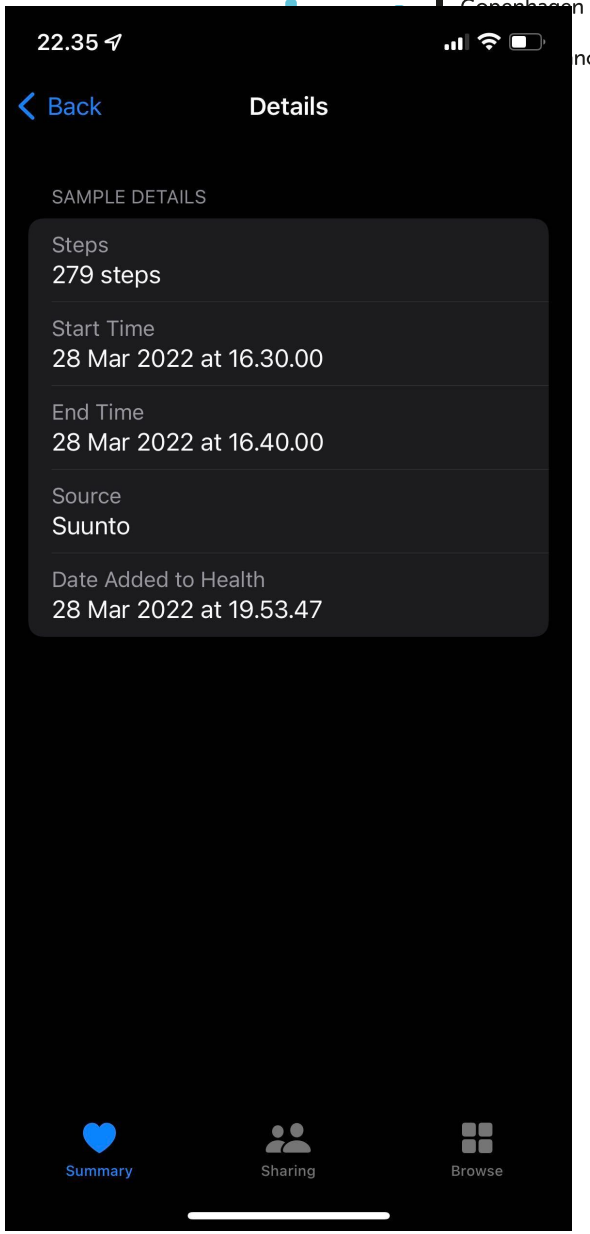
#5 – Outline a small Python script that transforms Apple Health data to the IEEE format

#6 – Which types of health application are the two standards useful for?


23.30
Summary
Steps
Add Data
D
W
M
6M
Y
TOTAL
7.541 steps
Today
3.000
2.000
1.000
0
00
06
12
18
Trend
Unavailable
Highlights
Show All
Steps
Yesterday's steps were more than the day before.
Summary
Sharing
Browse


23.31
Steps
All Recorded Data
Edit
STEPS
7.541 29 Mar 2022
11.824 28 Mar 2022
4.815 27 Mar 2022
3.289 26 Mar 2022
7.842 25 Mar 2022
7.274 24 Mar 2022
6.760 23 Mar 2022
10.605 22 Mar 2022
9.155 21 Mar 2022
5.799 20 Mar 2022
2.445 19 Mar 2022
7.220 18 Mar 2022
560 17 Mar 2022
9.061 16 Mar 2022
Summary
Sharing
Browse


23.32
Back
All Recorded Data
Edit
55 28 Mar, 19.36
69 28 Mar, 19.30
3 28 Mar, 19.20
126 28 Mar, 19.10
240 28 Mar, 19.02
58 28 Mar, 19.00
1 28 Mar, 18.30
3 28 Mar, 18.20
32 28 Mar, 17.20
50 28 Mar, 17.12
35 28 Mar, 17.10
84 28 Mar, 17.00
67 28 Mar, 16.58
89 28 Mar, 16.50
279 28 Mar, 16.40
Summary
Sharing
Browse


22.35
Back
Details
SAMPLE DETAILS
Steps
279 steps
Start Time
28 Mar 2022 at 16.30.00
End Time
28 Mar 2022 at 16.40.00
Source
Suunto
Date Added to Health
28 Mar 2022 at 19.53.47
Summary
Sharing
Browse