



retention

SMART HEART FAILURE MANAGEMENT

Horizon 2020 Project RETENTION

**“HEART FAILURE PATIENT MANAGEMENT AND INTERVENTIONS USING
CONTINUOUS PATIENT MONITORING OUTSIDE HOSPITALS AND
REAL WORLD DATA”**

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1 Executive Summary

This document is the Deliverable D4.2 entitled “RETENTION Data Management enabling Mechanisms” of WP4. It includes the Data Management enabling, transfer & handling mechanisms. More specifically, this deliverable describes the repositories in which the data are stored and the ways to achieve the accessibility of the collected data. It describes both the medical and non-medical data that are stored in different repositories. Specifically, the approach of RETENTION concerning data storage is a robust description of the compliance of the medical data with the FHIR protocol as well as the medical data representation in the FHIR database. Furthermore, the non-medical data are stored in the secondary database as the notifications and the interventions that will be extracted through the Decision Support System Component.

Additionally, the deliverable provides a detailed description of the data transfer and handling mechanisms utilized within the RETENTION project, concerning: (a) the Data Repositories, (b) the Security Component, (c) the Analytics and Decision Making. In terms of the data handling within the data repositories, APIs performing the CRUD operations are used for the reliable and secure data transmission. In particular, RESTful APIs are used for fetching data from the databases securely, whereas medical entities are following the HL7 FHIR protocol. Furthermore, RETENTION project is aimed to follow GDPR rules as described in D1.2. The Security Component (SC) is developed to support this requirement both regarding involves the Clinical Site Backend (CSB) instances the Global Inside Cloud (GIS). The SC utilizes mechanisms that for authentication and authorisation of the RESTful API, as well as pseudonymisation and IDs associations management preserving the secure transmission of data. Specifically, The Patient EDGE Mobile Application and the PE Local Home Gateway that periodically digest data are allowed by the CSB@SC to trigger the corresponding RESTful API (data in transit) in order for the collected measurements to be pseudonymized, before these are stored in the corresponding repository. Additionally, interactions between CSB via the REST API, as well as authentication are secured by the SC (token-based via HTTPS channel). Study participants personal data are held in the SC storage are encrypted and can be accessed only by authenticated users.

The simulated Machine Learning (ML) Analytics component corresponding anonymized initial data is transformed from csv to rely on the FHIR format in order to feed the Clinical Data Repository. Names and surnames of the patients are generated through the Synthea Tool. Further information regarding those data is described within in D8.2 “RETENTION Clinical Trial Protocol & Evaluation Framework”.

2 About this Document

This document corresponds to “D4.2 RETENTION Data Management enabling mechanisms v1”, the second deliverable of “WP4 - RETENTION Data Management”. This deliverable describes the work and outcomes of “Task 4.2- RETENTION Big Data Repositories Design, Specification & Setup that started on M7 and ended on M20 and part of the work of “Task 4.3- Data transfer & handling mechanisms of RETENTION platform” that started on M7 and will end on M32.

2.1 Scope of deliverable

The main scope of this deliverable is to describe the design, specification and deployment of the data repositories needed for the operation of the RETENTION platform. It also focuses on the design and specification of the data transfer and handling mechanisms needed to enable the interactions between the different components and distributed instances comprising the RETENTION platform, considering the security and privacy provisions specified in WP5.

2.2 Relationship to other RETENTION deliverables

This deliverable is closely related to:

- “D3.2 RETENTION Architecture” that provides the overall architecture and the components and functionalities of the RETENTION platform for each dedicated instance.
- “D4.3 RETENTION Data Management enabling mechanisms v2” that will be based on the first version described in this document and will deliver the final version of the RETENTION data repositories and data transfer and handling mechanisms, incorporating the outcomes of T4.3.
- “D5.1 RETENTION Analytics & Decision-making enabling mechanisms v1” that specifies the first version of the models, processes and components enabling the analytics, decision making, and data and model sharing capabilities of RETENTION.
- “D5.2 RETENTION Analytics & Decision-making enabling mechanisms v1” that will deliver the final version of the models, processes and components enabling the analytics, decision making, and data and model sharing capabilities of RETENTION.
- “D8.2 RETENTION Clinical Trial Protocol & Evaluation Framework” that provides the definition and documentation of the clinical variables based on specific criteria.

2.3 Structure of the document

The current deliverable includes 4 sections and the appendices. Thus, the structure of D4.2 is the following:

Section 2 presents the purpose, the structure of this deliverable, the relationship to other RETENTION deliverables and the Description of Action (DoA) and a brief description of data model.

Section 3 presents an overview of the database implementation and specifies the data models that are compliant and non-compliant with FHIR.

Section 4 presents the specification of the data transfer and handling mechanisms, focusing on the models of Analytics and Decision making and the Security component.

Section 5 includes the conclusions of the current document.

Section 6 presents the Appendices providing a detailed description of the FHIR models.

DoA Task Description	Addressed by D4.2
T4.2: This task will focus on the design, specification and deployment of the data repositories needed for the operation of the RETENTION platform, including the ones needed at CSB instances for patient data ingestion and the local intervention model execution, and the one at the GIC, enabling global anonymized data collection and storage.	Design and specification of data models compliant with FHIR. Design and specification of data models non-compliant with FHIR. Implementation of the database models
T4.3: This task will focus on the design, specification and implementation of the interfacing, transfer and handling (e.g., pre-processing) mechanisms needed to enable the interactions between the different components and distributed instances comprising the RETENTION platform. These will be developed considering the requirements of the platform, while also incorporating the security and privacy provisions specified in the context of Task 5.5.	Design and specification of data transfer and handling mechanisms of data repositories. Design and specification of data transfer and handling mechanisms via the Security Component according to the security and privacy provisions. Design and specification of data transfer and handling mechanisms for the models, processes and components that enable the analytics and decision making.

2.4 Brief Overview of Data Model

The design of the RETENTION Reference Model was driven by the analysis of the documents prepared by the clinical partners regarding the parameters of Heart Failure (HF), Left Ventricular Assisted Devices (LVAD) and heart transplanted (TPx) patients. According to the Reference Model, each patient is associated with different types of data, each of which has one or more parameters. Each clinical parameter is coded with HL7 widely adopted terminology interoperability standards that support clinical practice and the management of health services.

The RETENTION semantic data model follows an Entity- Relationship Model, as a visual representation of different entities within the RETENTION system and how they relate to each other. It was designed and developed under WebProtégé, which transforms the reference model in the form of an ontology (semantic data model) supporting the .RDF/.XML/.OWL universal file formats. The medical ontologies are compliant with FHIR terminology systems such as SNOMED CT, ICD-10, LOINC and ATC. The RETENTION ontology includes the data properties, classes and object properties.

The main “super-class” of the ontology is the class “Patient” which consists of the following classes: Demographics, Baseline-History, Clinical data, Electrocardiography (ECG), Echocardiography, Medications, Laboratory test, Events, Caregiver data, other data, Physical tests including 6MWT and Cardio-pulmonary exercise test, Questionnaires (Symptoms questionnaire, CBQ-HF, KCCQ, MNA, MoCA, PHQ-9), RWD Sensors, Special events, VAD measurements. Each of them is further composed of subclasses.

The semantic data model is described in detail in the submitted deliverable D4.1.

3 Data Management enabling mechanisms

3.1 Data Repositories Design

The Data Repository component of RETENTION is designed to utilise a combination of FHIR and non-FHIR databases. RETENTION data is split in two categories: (a) data that represent medical entities (described in the tables in sections 3.2.1.4-3.2.1.8), which are stored in the FHIR database, (b) data related to non-medical entities, which are stored in the secondary non-FHIR database of the Cloud Backend. Such data include the entities (described in the tables in section 3.3) containing elements that are not mapped to FHIR models (such as Notifications).

3.2 Data Model Specification compliant with FHIR

3.2.1 Overview on FHIR and available tools

FHIR is a standard developed by HL7 International aiming to define how digital healthcare information can be exchanged through different computer systems or a variety of applications (e.g., mobile apps, cloud communications, EHRs). FHIR'S philosophy is to build a set of key health entities known as resources which are a collection of healthcare information content including clinical observations and services. A resource carries a number of properties necessary for the use cases particular to it as well as links to pertinent information in other resources. For instance, the Patient resource includes contact details and demographics. Additionally, it includes linkages to a doctor or organization that is maintained in another resource. The last published version is v4.3.0 (Release 4B) and supports 145 resource types typically in XML, JSON or RDF/Turtle formats.

Another important aspect of the FHIR specification is the use of RESTful Application Programming Interfaces (API) for data exchange. Resources such as medication, observations and patients as well as interactions (searches or requests) can be retrieved using a RESTful HTTP command. Each API request includes the Resource as well as a parameter that indicates the data required. For instance, a simple FHIR request brings a single resource such as Patient. It can further return a bundle of information such as patient's blood pressure or heart rate. The request is formatted in a way that informs the system on the types and quantities of data that are required. By using this architectural style, FHIR provides the opportunity for different applications to be able to interoperate.

Although FHIR standard covers a vast number of resources, frameworks and APIs, shaping it into a "platform specification" standard, it must be further adapted to the specific subdomain of healthcare by addressing the different rules or requirements needed. This includes the definition of the resource components to be utilized or the addition of extra elements that may be needed, the APIs and the terminology that will be used for the specific subdomain of healthcare. The abovementioned modifications can be defined using an Implementation Guide (IG) which constitutes a set of rules that determine the way that FHIR resources should be utilized in order to address a specific case. Two different resource references are included in an IG. The Conformance resources, which is a set of logical statements that characterize the modifications in a computable way, and the Examples that describe the intent of the profiles stated in the IG.

Several tools are available to assist the implementation and adaption of FHIR-compliant systems.

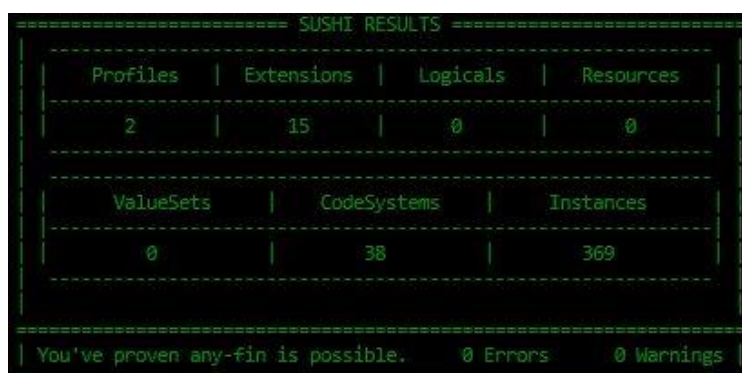
Simplifier¹ is a FHIR collaboration and publishing platform that offers the opportunity to create, upload, download and find FHIR resources. It also provides access to Forge, which is a FHIR profiling tool for building

¹ <https://simplifier.net/>

FHIR data models tailored to the specific rules that have been defined for the healthcare subdomain of interest.

ART-DÉCOR² is another tool that offers open-source utilities aiming on the creation and maintenance of data element descriptions, scenarios and HL7 profiles. It supports cloud-based federated Building Block Repositories (BBR) that allows the creation and maintenance of templates and value sets, thus encouraging the re-use of components for interoperability.

FHIR Shorthand (FSH)³ is a language that utilizes the definition of FHIR artifacts that are involved in the development of IGs. It provides tools that allow the creation of FHIR profiles, extensions and IGs. Since it is written in text statements, FSH enhances the collaborative development using source code hosts such as GitHub. SUSHI Unshortens Shorthand Inputs is a reference implementation of a FSH compiler that converts FSH into FHIR artifacts such as profiles, extensions and value sets (Figure 1).



Profiles	Extensions	Logicals	Resources
2	15	0	0
ValueSets	CodeSystems	Instances	
0	38	369	
You've proven any-fin is possible. 0 Errors 0 Warnings			

Figure 1. SUSHI outcome.

IG Publisher is a tool that converts the IG resources into:

- Three different types of files (XML, JSON and TTL formats).
- A set of fragments ready to include in generated HTML files.
- Different zip files used by implementers for various purposes.

ART-DÉCOR and FSH are free, whereas Simplifier.net has both free and paid profiles and Forge is free only for educational purposes

3.2.2 Methodology used in the RETENTION project

Due to the nature of the data handled in the RETENTION project, the development of a specific Implementation Guide (IG) was considered necessary. Thus, in accordance with the rules of the FHIR standard, a dedicated RETENTION IG was defined (<https://www.retention-project.eu/ig>) by characterizing a series of FHIR resources and terminologies from international standard code systems. Custom CodeSystems will also be used for resources that can't be described from the standard ones. The profiling of the FHIR information model was based on the FHIR Shorthand, SUSHI and IG Publisher which are the official solutions supplied by HL7.

Detailed examples about the FHIR models alongside with the corresponding Extensions, Profiles, CodeSystems and notes are provided in the Appendices.

² https://art-decor.org/mediawiki/index.php/Main_Page

³ <https://build.fhir.org/ig/HL7/fhir-shorthand/>

3.2.3 Questionnaire modelling

As part of RETENTION intervention, six questionnaires are filled. These questionnaires are modeled according to the HL7 FHIR resources. More specifically, the HL7 FHIR resources Questionnaire (<https://www.hl7.org/fhir/questionnaire.html>) and QuestionnaireResponse (<https://www.hl7.org/fhir/questionnaireresponse.html>) are used to define the questionnaire templates and the responses accordingly.

The generic model is defined as follows:

Questionnaire	
type	Questionnaire template
FHIR requirements	1. A Questionnaire resource where: a. url shall have a value b. name shall have a value c. title shall have a value d. version optionally has a value e. code optionally has a value f. Recursively for each entry in item: i. linkId shall have a value ii. type shall have a code iii. text shall have a value

QuestionnaireResponse	
type	Filled in Questionnaire
FHIR requirements	1. A QuestionnaireResponse resource where: a. questionnaire shall have a value b. subject shall have a value c. Recursively for each entry in item: i. linkId shall have a value ii. answer optionally has a value iii. text shall have a value

3.3 Data Model Specification compliant with FHIR for ML Analytics scenario

Machine Learning (ML) Scenario: Survival Rate in 250 days Prediction

The Data Model Specification described in this section relates to the simulated ML Analytics scenario, *Survival Rate*, further detailed in D5.1 “RETENTION Analytics & Decision-making enabling mechanisms v1”. The

corresponding study is based on an existing study⁴ with anonymized public data⁵, which represents the survival data of 299 patient followed up to 285 days.

For the purpose of defining the functionality of the ML Models within WP5, the data from this study was transformed from CSV into FHIR format and ingested into the FHIR test repository. For the purpose of demonstration, patients' names and surnames were randomly generated based on the Synthea tool. The patients from this study analysis were generated IDs in the range 100271 – 100569. Patients grouped as a FHIR Group resource termed "Heart Failure Study Group".

Data modelling

The Heart Failure Study Group contains patients as members. Patient resource has Attributes and references to Condition and Observation resources (Figure 1).

Group: Heart Failure Study Group

Patient: Age, Gender, Name *(generated), Surname *(generated), Id (generated)

Condition: Hypertension, Anemia, Smoker, Diabetes, Death Status

Observation: Serum sodium, Serum creatinine, Ejection Fraction, Platelets, Creatinine Phosphokinase

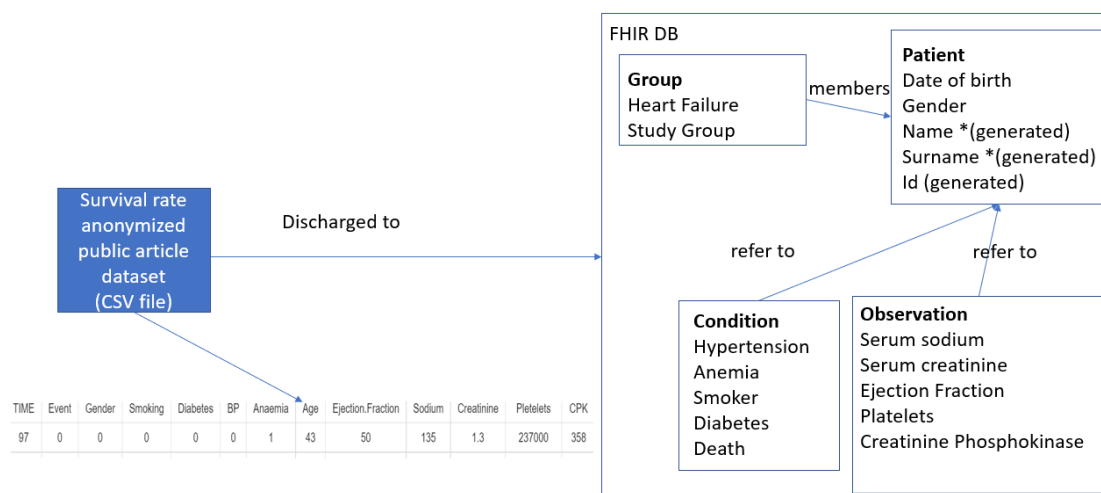


Figure 2. Data modelling for the survival rate study.

Dataset variables

The variables used for this scenario, further detailed in D8.2 "RETENTION Clinical Trial Protocol & Evaluation Framework", are represented in Table 4 along with their specification and FHIR resource information.

⁴ Ahmad, T., Munir, A., Bhatti, S. H., Aftab, M., & Raza, M. A. (2017a). Survival analysis of heart failure patients: A case study. PLoS one, 12(7), e0181001, DOI: 10.1371/journal.pone.0181001

⁵ Ahmad, Tanvir; Munir, Assia; Bhatti, Sajjad Haider; Aftab, Muhammad; Ali Raza, Muhammad (2017b): DATA_MINIMAL.. PLOS ONE. Dataset. DOI: 10.1371/journal.pone.0181001.s001; <https://ndownloader.figstatic.com/files/8937223>

Table 1. Survival Rate Dataset Details of the FHIR resource's structure and definition:

Component Type	Variable type	Snomed Code	Feature	Explanation	Measurement Unit	Range
Patient	Demographics	184099003	Birth Date	Birth Date of the patient	Date	Jan 1927 – Dec 1982
Patient	Demographics	2634950	Gender*	Woman, man	Binary	0, 1 [0=Male, 1=Female]
Patient	Personal Data		Name	Family and Given Name	String	
Patient	ID		ID	Unique id (for internal references)	String	100271 – 100569
Condition	Baseline-History	271737000	Anemia	Decrease of red blood cells or hemoglobin	Boolean	0, 1 [0=No, 1=Yes]
Condition	Baseline-History	38341003	Arterial Hypertension	If a patient has hypertension	Boolean	0, 1 [0=No, 1=Yes]
Condition	Baseline-History	46635009	Diabetes	If the patient has diabetes	Boolean	0, 1 [0=No, 1=Yes]
Condition	Baseline-History	77176002	Smoker	If the patient smokes	Boolean	0, 1 [0=No, 1=Yes]
Observation	Laboratory	75828004	Creatinine phosphokinase (CPK)	Level of the CPK enzyme in the blood	mIU/ml	[23,..., 7861]
Observation	Echocardiography	70822001	Ejection fraction	Percentage of blood leaving the heart at each contraction	Percentage	[14,..., 80]
Observation	Laboratory	16378004	Platelets	Platelets in the blood	K/ μ L	[25 ,..., 850]
Observation	Laboratory	15373003	Serum creatinine	Level of creatinine in the blood	mg/dL	[0.50,..., 9.40]
Observation	Laboratory	39972003	Serum sodium	Level of sodium in the blood	μ mol/L	[114, ..., 148]
Observation	Events	399753006	Time	Follow-up date / Date of Death	Date	[Jan – Sept '22]
Condition	Events	419620001	DEATH	If the patient died during the follow-up period	Boolean	0, 1 [0=No, 1=Yes]

**In the next version, gender information will be adjusted to 3 options: Male/Female/Other as decided during the 4th Retention plenary Meeting

3.4 Data model specification non compliant with FHIR

In this section we describe the non-medical data that will not be modelled based on FHIR protocol. As it is already stated, an additional database is required for the storage of metadata that relate to the interventions and the notifications. For each of those entities the details are analysed below.

Notifications

This data model is storing the notifications that are generated by the platform, using the DSS algorithms.

Table 2. Notifications

Property	Type	Details
NotificationId	Integer	Identifier of the notification
Source	String	The component that triggered the notification
Type	String	Type of the notification
Content	String	The actual content of the notification
InterventionId	Integer	Reference to the intervention that relates to the notification
UserId	String	The identifier of the user to whom the notification is being sent
ScheduledDatetime	DateTime	Indicates the datetime the notification will be transmitted to the user
TransmissionDatetime	DateTime	Indicates the datetime the notification was sent
Status	String	The status of the transmission (e.g. pending, sent, failed, etc)
AknowledgeStatus	Boolean	Indicates if the user acknowledged the notification
CreatedDatetime	DateTime	The creation datetime of the notification

Interventions

The intervention data model, is storing the interventions generated by the DSS algorithms, which afterwards generate the notifications mentioned above.

Table 3. Interventions

Property	Type	Details
InterventionId	Integer	Identifier of the intervention

Property	Type	Details
Condition	String	The condition of the user for whom the intervention is created
Type	String	Type of the intervention
Content	String	The actual content of the intervention
CreatedDatetime	DateTime	The creation datetime
ModifiedDatetime	DateTime	The modification datetime
Revision	String	Value to keep number of updates of the workflow configuration

Measurements

The measurement data model, is storing the measurements generated by the DSS algorithms, which afterwards generate the notifications mentioned above.

Table 4. Measurements

Property	Type	Details
MeasurementId	Integer	Identifier of the measurement
State	String	The state of the measurement
Type	String	Type of measurement
UserId	String	The identifier of the user to whom the measurement is referred to
MeasurementDatetime	DateTime	The datetime on which the measurement is taken
CreatedDatetime	DateTime	The creation datetime
ModifiedDatetime	DateTime	The modification datetime
Revision	String	Value to keep number of updates of the workflow configuration

4 Data transfer & handling mechanisms

4.1 Data transfer mechanisms of data repositories

In this section, the data transfer mechanisms are outlined for the data repositories described in the sections above.

Below, the medical standardized repository and the API for performing data CRUD operations with the repository are presented. A RESTful API is provided together with the Clinical Data Repository to fetch the data from the database. The RESTful API can access with safety all clinical information, allowing developers to abstract from the integration with clinical information sources, and focus completely on their applications. All the clinical information is stored and served following the definition of HL7 FHIR. Standardized data is available in a highly adaptable manner. That is accomplished based on the utilization of relational database technologies, which are configurable for each of the scenarios, and their indexing through information retrieval engines.

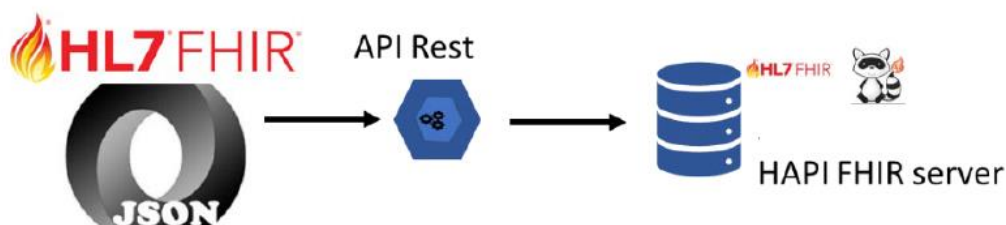


Figure 3. Representation of the storage into the RETENTION server through the API. The HL7 FHIR data is transferred in JSON format and is stored in the RETENTION database.

The internal architecture of HAPI-FHIR outlining the dependencies of the subcomponents is represented below (Figure 3).

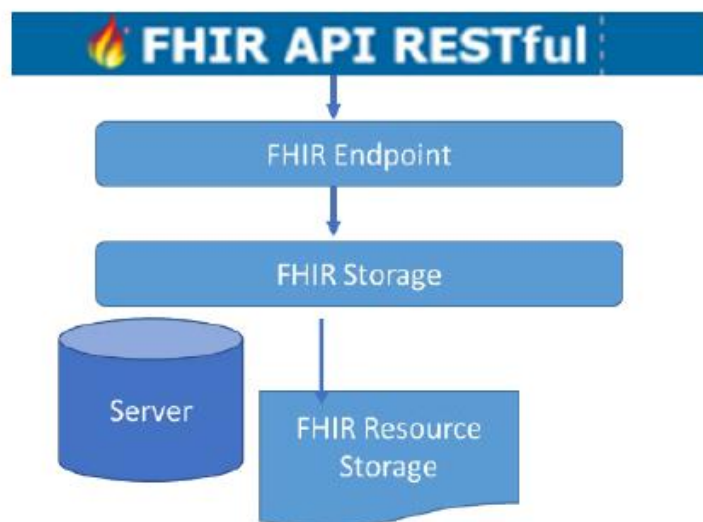


Figure 4. Representation of the RETENTION HAPI-FHIR SERVER and the internal architecture.

The API allows smoothly interaction with the RETENTION Clinical Data Repository by interacting with the repository in a intuitive and presentable form. Furthermore, the API provides interfaces for visualizing how data is stored in HL7 FHIR and codified with the international standard code systems.

Another RESTful API is provided for performing data CRUD operations with the non-clinical data RETENTION repository. The API allows secure data transmission with the RETENTION secondary Data Repository by interacting with the database in a simple and human-readable form.

4.2 Data transfer mechanisms via the Security Component

4.2.1 Introduction

RETENTION integrates heterogeneous medical devices and home sensors to enable the continuous collection of usage data from the everyday life of the Heart Failure (HF) patients RETENTION study participants), which will be later analyzed. In addition, manages personal health records of those in such a way to ensure that personal data are processed fairly and transparently, conforming to the General Data Protection Regulation (GDPR) rules (procedures on how personal data are protected presented in D1.2). To support these objectives, the technical solution that adheres to the “Privacy by Design” principle involves the Clinical Site Backend (CSB) instances (one per hospital), the Global Inside Cloud (GIS), the GIC and the EDGE in such a way that operations upon data (i.e., at rest, in transit, in processing) are processed fairly and transparently.

The Security Component reside in both CSB (CSB@SC) and in GIC (CIG@SC) is the component responsible for a) monitoring the security of all operations and preserving the privacy (supporting RBAC, managing study participants personal data and KPI, managing end-users personal data, handling/allowing secure and authorised transactions, handling the pseudonymisation process, monitoring the metadata of usage data transmissions), and b) having control of knowing by whom and how personal data are being processed in a verifiable way (managing log files as evidence). This component - withing the scope of all CSB and GIC - protects data (reside in all repositories) and resources (i.e., REST API) from unauthorised viewing and other type of access (Confidentiality), from unauthorised changes to ensure that data are reliable and correct (Integrity), and ensures the only authorised users (i.e., Dashboard(s) end-users) have access to the

RETENTION platform and the resources they need (Availability), thus supports the “CIA Triad” model that most organisations use to evaluate their security capabilities and risk.

4.2.2 Security Component: Building Blocks

The Security Component consists of 3 main building blocks:

- 1 The authentication server is the first layer of the SC. Its primary purpose is to hold Dashboard end-user credentials and in turn authenticate them using a username and a password by issuing a JSON Web Token (JWT). A JWT is a digitally signed file containing, among others, additional data (claims) about the authenticated user such as their username, role, or other user attributes.
- 2 In addition to the authentication server, the SC incorporates an API gateway, a tool whose main role is to ensure that any REST API calls to the backend (CSB and GIC) services happen exclusively in an authorised manner. To this end, the gateway resided between any RETENTION “clients” (i.e., CSB@Dashboard, GIC@Dashboard, PEMA, and PELHG) and the backend services. As such, any triggering to the REST API passes through the SC, which first verifies that the JWT received (as part of the request) is valid, and then checks if all claims defined within it are sufficient for the client to access the requested resource (e.g., usage data transmitted by a stolen smartphone associated with a valid study participant are not allowed to be digested). If both cases are true, the gateway relays the request to the backend, and sends the corresponding response back to the client.

The pseudoanonymisation sub-component is an API gateway plugin that intercepts incoming and outgoing messages and substitutes patients’ IDs with pseudo-IDs (e.g., Pseudo-Id1 to Pseudo-Id2). This is necessary to ensure that any backend service never exposes a study participant’s internal database ID (Pseudo-Id2) to the client. In such manner the pseudoanonymisation ensures their seamless communication. To support this pseudo-ID substitution, the SC handles the pseudo-ID generation during the study participant creation and stores their mapping (Pseudo-ID1, Pseudo-ID2, Pseudo-ID3 for each) in its own database. Upon intercepting a request, it checks for patient IDs in either the query parameters or the body, and if found, substitutes them according to the SC’s database records. This process happens for both requests and responses.

- 3 Finally, the SC supports study participant management and GDPR requests management via backend services. As for the former, its purpose is to store all sensitive data and PII, and to holds the mappings to all participants’ pseudo-IDs. While this backend service is also protected by the SC API gateway, it encrypts all information stored by using the Advanced Encryption Standard (AES) algorithm, to further protect against unauthorised access to sensitive data (based on the GDPR guidance that personal data and PIIs should be stored encrypted in a separate repository).

4.2.3 Implemented mechanisms

The RETENTION platform (CSB, GIC, EDGE) as a standpoint (platform’s architecture presented in D3.1) adheres with the Privacy and Security-by design principle, the notion by which security and privacy measures and enhancing technologies (PETs) are being embedded directly into the design of a system. On this axis, data minimisation, pseudonymisation, transparency in the processing of personal data, and other appropriate technical (and organisational) measures considered at an early stage of the platform design to ensure that GDPR requirements are met and preserve the anonymity of any personal data, the confidentiality of any personal data, and Personal Identifiable Information (PII) (i.e., IDs association records, and Dashboard end-users profile information stored in the SC).

Briefly (detailed information presented in forthcoming D6.2), as data protection was a critical issue for the RETENTION platform, the SC provides mechanisms that support authentication/authorisation of the RESTful

API, along with pseudonymisation and IDs associations management to protect the transmission of any (sensitive or not) data. In this context:

- The Patient EDGE Mobile Application (EDGE@MobileApp, or PEMA) and the PE Local Home Gateway (PELHG) (technical aspects of both presented in D3.2) that periodically digest usage data/measurements from (m)IoT devices and sensors operated by the study participant (actively or passively), are allowed by the CSB@SC to trigger the corresponding RESTfull API (data in transit) in order for the collected measurements to properly annotated (pseudonymisation), before these are stored in the appropriate repository (data at rest).
- Interactions between CSB components via the REST API, as well as authentication (Dashboard end users) are secured by the SC (token-based via HTTPS channel).
- Study participants personal data and PII are held in the SC storage, a separated data repository in which those personal data and IDs associations that may lead to study participants identification (i.e., Pseudo-Id1 and Pseudo-Id2 associations of all study participants) reside in an encrypted fashion. Access to encrypted data is only provided once the end-user has been successfully authenticated, and has a role granted with this access.
- Previously pseudonymised data are transmitted to the GIC for further analysis, in accordance with the RETENTION pseudonymisation method (presented in D3.1, illustrated in Figure 5).

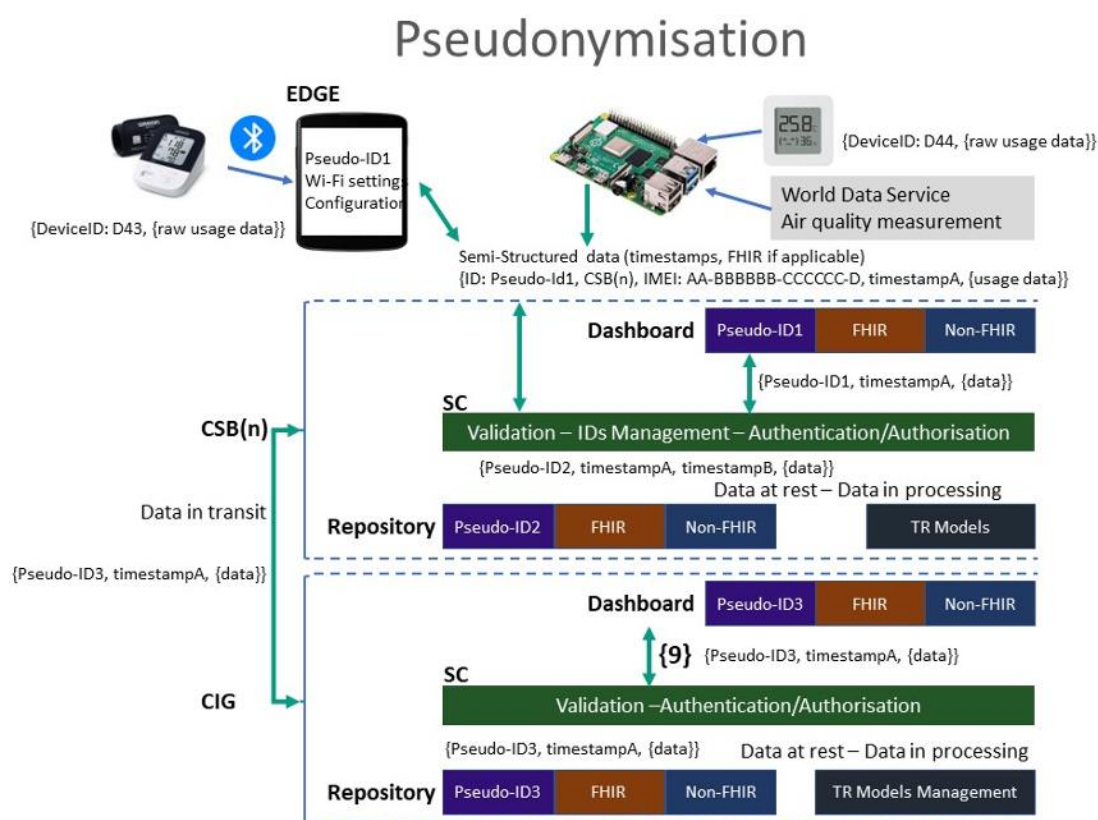


Figure 5. Pseudonymisation process supported by the Security Component in both CSB and GIC. The Pseudo-Id1 (provided by CSB@SC) used for associating transmitted devices usage data/measurements. The Pseudo-ID2 used in the context of the FHIR and non-FHIR repositories (e.g., handling participants medical data, and analytics being executed within each CSB scope). The Pseudo-Id3 used in the context of GIC (ML analytics).

The detailed description of the SC is presented in D6.2.



5 Conclusions

This deliverable specifies the initial versions of the relevant RETENTION infrastructure components such as the repositories in which the data are stored as well as the methods for making the acquired data accessible. It specifies the medical's data conformance with the FHIR protocol and the way they are represented in the FHIR database. It also covers the non-medical data (notifications and interventions generated through the DSS component). Additionally, it features a comprehensive description of the components related to data transfer (Data Repositories, Security Component and Analytics and Decision Making) as well as the utilization of the APIs for secure data transmission. These elements will be combined and deployed to support the RETENTION pilots.

6. Appendix - FHIR models

6.1 Demographics

Demographics	
FHIR Resource	Patient
Name	P001
FHIR requirements	A patient which must have: a. A meta.profile = "https://www.retention-project.eu/ig/StructureDefinition/PatientRetention" b. An extension with: a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientSex" b. A valueUsageContext with: i. code.system = "http://snomed.info/sct" ii. code.code = 263495000 iii. code.display = "Gender" iv. A valueCodeableConcept with: 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Sex" 2. coding.code = ¹ 3. coding.display = ¹ c. An extension with: a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientEthnicity" b. A valueUsageContext with: i. code.system = "http://snomed.info/sct" ii. code.code = 397731000 iii. code.display = "Ethnic group finding" iv. A valueCodeableConcept with: 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Ethnicity" 2. coding.code = ² 3. coding.display = ²

Demographics

- d. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientCountryOfResidence"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 416647007
 - iii. code.display = "Country of residence"
 - iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/CountryOfResidence"
 - 2. coding.code = ³
 - 3. coding.display = ³
- e. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientMaritalStatus"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 125680007
 - iii. code.display = "Marital status"
 - iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/MaritalStatus"
 - 2. coding.code = ⁴
 - 3. coding.display = ⁴
- f. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientHeight"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 1153637007
 - iii. code.display = "Body height"
 - iv. A valueQuantity with:
 - 1. A value
 - 2. unit = "cm"

Demographics

- g. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientAboBloodGroup"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 365637002
 - iii. code.display = "Finding of ABO blood group"
 - iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Ab oBloodGroup"
 - 2. coding.code = ⁵
 - 3. coding.display = ⁵
 - 4.
- h. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientHighestLevelOfEducation"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 105421008
 - iii. code.display = "Educational achievement"
 - iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/HighestLevelOfEducation"
 - 2. coding.code = ⁶
 - 3. coding.display = ⁶
 - 4.
- i. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/PatientEmploymentStatus"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 224362002

Demographics	
	iii. <code>code.display = "Employment status"</code> iv. A <code>valueCodeableConcept</code> with: 1. <code>coding.system = "https://www.retention-project.eu/ig/CodeSystem/EmploymentStatus"</code> 2. <code>coding.code = 7</code> 3. <code>coding.display = 7</code> j. A birthdate k. An address with: a. A line b. A city c. A postalCode
Notes	1. 0: Male 1: Female 2: Other 2. 1: European 2: North African 3: Middle East 4: Sub-saharian African 5: Central Asia 6: East and South East Asia 7: Pacific Islands 8: Caribbean -South America 3. 1: Germany 2: Greece 3: Italy 4: Spain 4. 0: single/widow, no family support 1: single/widow, living with other family members 2: living with a partner/spouse 5. 0: A 1: B 2: O 3: AB 6. 0: up to and including high school 1: above high school education 2: no education 3: other 7. 0: working (full or part time) 1: not currently working 2: full-time homemaker 3: retired 4: student 5: other

6.2 Baseline-History

Baseline	
FHIR Resource	Condition
Name	Arterial Hypertension
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 38341003 c. coding.display = "Hypertensive disorder, Dyslipidemiasystemic arterial"

Baseline	
FHIR Resource	Condition
Name	Dyslipidemia
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 38341003 c. coding.display = "Hypertensive disorder, Dyslipidemiasystemic arterial"

Baseline	
FHIR Resource	Condition
Name	Diabetes Mellitus type 1
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 46635009 c. coding.display = "Diabetes mellitus type 1"

Baseline	
FHIR Resource	Condition
Name	Diabetes Mellitus type 2
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 44054006 c. coding.display = " Diabetes mellitus type 2"

Baseline	
FHIR Resource	Condition
Name	Renal insufficiency
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 723188008 c. coding.display = " Renal insufficiency"

Baseline	
FHIR Resource	Condition
Name	COPD
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 13645005 c. coding.display = " Chronic obstructive lung disease"

Baseline	
FHIR Resource	Condition
Name	Cerebrovascular disease

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 62914000 c. coding.display = "Cerebrovascular disease"
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Baseline

FHIR Resource	Condition
Name	Peripheral artery disease
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 840580004 c. coding.display = "Peripheral arterial disease"

Baseline

FHIR Resource	Condition
Name	Aortic aneurysm
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 67362008 c. coding.display = "Aortic aneurysm"

Baseline

FHIR Resource	Condition
Name	Venous thromboembolism / pulmonary embolism

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 59282003 c. coding.display = "Pulmonary embolism "
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Baseline

FHIR Resource	Condition
Name	Carotid Artery Disease
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 371160000 c. coding.display = "Disorder of carotid artery"

Baseline

FHIR Resource	Condition
Name	Cancer
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 86049000 c. coding.display = "Malignant neoplasm, primary"

Baseline

FHIR Resource	Condition
Name	Anemia

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271737000 c. coding.display = "Anemia"
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Baseline

FHIR Resource	Condition
Name	Benign Prostatic hyperplasia
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 266569009 c. coding.display = "Benign Prostatic hyperplasia"

Baseline

FHIR Resource	Condition
Name	Coronary artery disease
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 53741008 c. coding.display = "Coronary arteriosclerosis"

Baseline

FHIR Resource	Condition
Name	Brady-arrhythmias / AV block

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 233917008 c. coding.display = "Atrioventricular block"
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Baseline

FHIR Resource	Condition
Name	Ventricular tachycardia / Ventricular fibrillation / Resuscitated sudden death
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 25569003 c. coding.display = "Ventricular tachycardia"

Baseline

FHIR Resource	Condition
Name	ICD
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72506001 c. coding.display = "Implantable defibrillator, device"

Baseline

FHIR Resource	Condition
Name	CRT

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 870255009 c. coding.display = "Cardiac resynchronization therapy"
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Baseline

FHIR Resource	Condition
Name	Pacemaker
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 14106009 c. coding.display = "Cardiac pacemaker, device"

Baseline

FHIR Resource	Condition
Name	Previous Cardiac surgery
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408466002 c. coding.display = "Cardiac surgery"

Baseline

FHIR Resource	Condition
Name	Heart transplant

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 32413006 c. coding.display = "Transplantation of heart"
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Baseline

FHIR Resource	Condition
Name	CMV infection after transplant
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 28944009 c. coding.display = "Cytomegalovirus infection"

Baseline

FHIR Resource	Condition
Name	Previous opportunistic infections
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 61274003 c. coding.display = "Opportunistic infectious disease"

Baseline

FHIR Resource	Condition
Name	Allograft vasculopathy

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://hl7.org/fhir/sid/icd-9" b. coding.code = BE1A c. coding.display = "Cardiac allograft vasculopathy"
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Baseline

FHIR Resource	Condition
Name	LVAD implant
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 232967006 c. coding.display = "Implantation of left cardiac ventricular assist device"

Baseline

FHIR Resource	Condition
Name	Stroke after LVAD implantation
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 230690007 c. coding.display = "Cerebrovascular accident"

Baseline

FHIR Resource	Condition
Name	Type of LVAD

Baseline	
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 360066001 c. coding.display = "Left ventricular assist device" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/TypeOfLvad" b. coding.code = * c. coding.display = *
*Notes	0: HM3 1: HMII 2: HW

Baseline	
FHIR Resource	Condition
Name	Intention of LVAD
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 232967006 c. coding.display = "Implantation of left cardiac ventricular assist device" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/IntentionOfLvad" b. coding.code = * c. coding.display = *
*Notes	0: destination therapy 1: bridge to transplant 2: bridge to decision

Baseline	
FHIR Resource	Condition
Name	Transient ischemic attack

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 266257000 c. coding.display = "Transient ischemic attack"
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Baseline

FHIR Resource	Condition
Name	Gastrointestinal bleeding after LVAD
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 74474003 c. coding.display = "Gastrointestinal hemorrhage"

Baseline

FHIR Resource	Condition
Name	Driveline infections
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 764680009 c. coding.display = "Infection of left ventricular assist device driveline"

Baseline

FHIR Resource	Condition
Name	Sustained ventricular tachycardia one month after implantation

Baseline	
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 426525004 c. coding.display = "Sustained ventricular tachycardia"

Baseline	
FHIR Resource	Condition
Name	Thyroid disease
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 14304000 c. coding.display = "Disorder of thyroid gland" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/ThyroidDisease" b. coding.code = * c. coding.display = *
*Notes	1: Hyperthyroidism 2: Hypothyroidism

Baseline	
FHIR Resource	Condition
Name	Smoker
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 77176002 c. coding.display = "Smoker" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Smoker"

Baseline	
	b. coding.code = * c. coding.display = *
*Notes	0: never 1: current 2: past (meaning>6 months)

Baseline	
FHIR Resource	Condition
Name	Severe alcohol intake
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 228281002 c. coding.display = "Problem drinker" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/SevereAlcoholIntake" b. coding.code = * c. coding.display = *
*Notes	0: never 1: current 2: past (meaning>6 months)

Baseline	
FHIR Resource	Condition
Name	NYHA
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 420816009 c. coding.display = "New York Heart Association Classification" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NyhaClass"

Baseline	
	b. coding.code = * c. coding.display = *
*Notes	1: I 2: II 3: III 4: IV

Baseline	
FHIR Resource	Condition
Name	Atrial fibrillation
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 49436004 c. coding.display = "Atrial fibrillation" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/AtrialFibrillation" b. coding.code = * c. coding.display = *
*Notes	0: paroxysmal 1: persistent 2: permanent

Baseline	
FHIR Resource	Condition
Name	Ventricular stimulation
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 180329009 c. coding.display = "Electrical operative cardiac stimulation" b. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/VentricularStimulation"

Baseline	
	b. coding.code = * c. coding.display = *
*Notes	1: right ventricular stimulation 2: biventricular stimulation

Baseline	
FHIR Resource	Condition
Name	Cardiomyopathy - Dilated
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399020009 c. coding.display = " Congestive cardiomyopathy"

Baseline	
FHIR Resource	Condition
Name	Cardiomyopathy - Ischemic
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 194849004 c. coding.display = " Generalized ischemic myocardial dysfunction"

Baseline	
FHIR Resource	Condition
Name	Cardiomyopathy - Restrictive
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 415295002 c. coding.display = " Restrictive cardiomyopathy"

Baseline	
FHIR Resource	Condition
Name	Cardiomyopathy - Toxic
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72972005 c. coding.display = " Dilated cardiomyopathy caused by drug"

Baseline	
FHIR Resource	Condition
Name	Cardiomyopathy - Hypertrophic

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 233873004 c. coding.display = " Hypertrophic cardiomyopathy "
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Baseline

FHIR Resource	Condition
Name	Cardiomyopathy - Congenital
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 762228008 c. coding.display = " Congenital cardiovascular disorder"

Baseline

FHIR Resource	Condition
Name	Cardiomyopathy - Other
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 85898001 c. coding.display = "Cardiomyopathy" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 74964007

Baseline

	c. coding.display = "Other"
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Baseline

FHIR Resource	Condition
Name	Previous valvular intervention - Mitraclip
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 464887003 c. coding.display = "Mitral valve clip"

Baseline

FHIR Resource	Condition
Name	Previous valvular intervention - TAVr
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 773996000 c. coding.display = "Transcatheter aortic valve implantation"

Baseline	
FHIR Resource	Condition
Name	Previous valvular intervention - Tricuspid device
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 8069005 c. coding.display = "Implantation of tricuspid valve prosthesis or synthetic device"

Baseline	
FHIR Resource	Condition
Name	Previous valvular intervention - Surgical aortic valve repair
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 119481000119105 c. coding.display = "History of aortic valve repair"

Baseline	
FHIR Resource	Condition
Name	Previous valvular intervention - Surgical mitral valve repair

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 429219001 c. coding.display = "History of repair of mitral valve"
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Baseline

FHIR Resource	Condition
Name	Previous valvular intervention - Surgical tricuspid valve repair
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 119541000119104 c. coding.display = "History of repair of tricuspid valve"

Baseline

FHIR Resource	Condition
Name	Previous valvular intervention - Aortic mechanical valve
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with:

Baseline

	a. coding.system = "http://snomed.info/sct" b. coding.code = 125411000119107 c. coding.display = "History of mechanical aortic valve replacement"
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Baseline

FHIR Resource	Condition
Name	Previous valvular intervention - Mitral mechanical valve
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 96271000119109 c. coding.display = "History of mechanical mitral valve replacement"

Baseline

FHIR Resource	Condition
Name	Previous valvular intervention - Tricuspid mechanical valve
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 36791000119109 c. coding.display = "History of mechanical tricuspid valve replacement"

Baseline	
FHIR Resource	Condition
Name	Previous valvular intervention -Other
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code =47432005 c. coding.display = "Implantation of heart valve prosthesis or synthetic device" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 74964007 c. coding.display = "Other"

Baseline	
FHIR Resource	Condition
Name	CMV risk profile - Low risk
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code =28944009 c. coding.display = "Cytomegalovirus infection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 723505004 c. coding.display = "Low Risk"

Baseline	
FHIR Resource	Condition
Name	CMV risk profile - High risk
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code =28944009 c. coding.display = "Cytomegalovirus infection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 723509005

Baseline

	c. coding.display = "High Risk"
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Baseline

FHIR Resource	Condition
Name	CMV risk profile - Moderate risk
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 28944009 c. coding.display = "Cytomegalovirus infection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 25594002 c. coding.display = "Moderate Risk"

Baseline

FHIR Resource	Condition
Name	Previous rejection episodes - 1R
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72627004 c. coding.display = "Graft rejection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 50662000 c. coding.display = "Mild cellular graft rejection"

Baseline

FHIR Resource	Condition
Name	Previous rejection episodes - 2R

Baseline

FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72627004 c. coding.display = "Graft rejection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 112140009 c. coding.display = "Moderate cellular graft rejection"
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Baseline

FHIR Resource	Condition
Name	Previous rejection episodes - 3R
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72627004 c. coding.display = "Graft rejection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 40442005 c. coding.display = "Acute cellular graft rejection"

Baseline

FHIR Resource	Condition
Name	Previous rejection episodes - Humoral
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72627004 c. coding.display = "Graft rejection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 26522000 c. coding.display = "Hyperacute cellular graft rejection"

Baseline	
FHIR Resource	Condition
Name	Previous coronary revascularization - Percutaneous
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 297183000 c. coding.display = "Revascularization - action" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 68457009 c. coding.display = "Percutaneous transluminal balloon angioplasty"

Baseline	
FHIR Resource	Condition
Name	Previous coronary revascularization - Surgical
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 297183000 c. coding.display = "Revascularization - action" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 31413008 c. coding.display = "Operative procedure on coronary artery"

Baseline	
FHIR Resource	Observation
Name	Number of HF admissions during the previous year
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 84114007 c. coding.display = "Heart failure" b. One code with:

Baseline

	a. coding.system = "http://snomed.info/sct" b. coding.code = 310537006 c. coding.display = "Previous multiple hospital admissions" c. One valueQuantity with: a. A value
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Baseline

FHIR Resource	Observation
Name	Date of HF admission (Last)
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 84114007 c. coding.display = "Heart failure" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399423000 c. coding.display = "Date of admission" c. One valueDateTime

Baseline

FHIR Resource	Condition
Name	Right heart failure - One month after implantation
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 367363000 c. coding.display = "Right ventricular failure" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 101 c. coding.display = "One month after implantation"

Baseline	
FHIR Resource	Condition
Name	Right heart failure - At the time of implantation
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 367363000 c. coding.display = "Right ventricular failure" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 102 c. coding.display = "At the time of implantation"

Baseline	
FHIR Resource	Condition
Name	Previous antibody mediated rejection
FHIR requirements	A Condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 26522000 c. coding.display = "Hyperacute graft rejection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 9130008 c. coding.display = "Previous"

Baseline	
FHIR Resource	Observation
Name	Estimated glomerular filtration rate
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 80274001 c. coding.display = "Glomerular filtration rate" b. One valueQuantity with: a. A value b. A Unit = "mL/min/1.73 m²"

Baseline

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Baseline

FHIR Resource	Observation
Name	Date HF diagnosis
FHIR requirements	A Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 432213005 c. coding.display = "Date of diagnosis" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 84114007 c. coding.display = "Heart failure" c. One valueDateTime

Baseline

FHIR Resource	Observation
Name	Date heart transplant
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439272007 c. coding.display = "Date of procedure" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 32413006 c. coding.display = "Transplantation of heart" c. One valueDateTime

Baseline	
FHIR Resource	Observation
Name	Date LVAD implant
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439272007 c. coding.display = "Date of procedure" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 232967006 c. coding.display = "Implantation of left cardiac ventricular assist device" c. One valueDateTime

Baseline	
FHIR Resource	Observation
Name	Date stroke
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439771001 c. coding.display = "Date of event" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 230690007 c. coding.display = "Cerebrovascular accident" c. One valueDateTime

Baseline	
FHIR Resource	Observation
Name	Date GI bleeding

Baseline

FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439771001 c. coding.display = "Date of event" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 74474003 c. coding.display = "Gastrointestinal hemorrhage" c. One valueDateTime
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Baseline

FHIR Resource	Observation
Name	Date DL infection
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439771001 c. coding.display = "Date of event" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 764680009 c. coding.display = "Infection of left ventricular assist device driveline" c. One valueDateTime

6.3 Medications**Current medication use**

FHIR Resource	MedicationStatement
Name	ACEi Captopril

Current medication use	
FHIR requirements	A MedicationStatement which must have - One Category in MedicationStatement with: - coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" - coding.code = 200 - coding.display = ACEi - One medicationCodeableConcept with: - coding.system = "http://snomed.info/sct" - coding.code = 387160004 - coding.display = Captopril - A Dosage with: - doseAndRate.type with coding: - system = "http://snomed.info/sct" - code = 408102007 - display = Unit dose - doseAndRate with: - value - unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ACEi Cilazapril

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 395947008 c. coding.display = Cilazapril c. A Dosage with: a. doseAndRate.type with coding: i. system = "http://snomed.info/sct" ii. code = 408102007 iii. display = Unit dose b. doseAndRate with: i. value ii. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ACEi Enalapril

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372658000 c. coding.display = Enalapril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ACEi Fosinopril

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372510000 c. coding.display = Fosinopril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	ACEi Lisinopril

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386873009 c. coding.display = Lisinopril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	ACEi Perindopril

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372916001 c. coding.display = Perindopril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ACEi Quinapril

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386874003 c. coding.display = Quinapril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ACEi Ramipril

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386872004 c. coding.display = Ramipril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ACEi Trandolapril

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 200 c. coding.display = ACEi b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386871006 c. coding.display = Trandolapril c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ARBs Candesartan

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 201 c. coding.display = ARBs b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372512008 c. coding.display = Candesartan c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	ARBs Losartan

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 201 c. coding.display = ARBs b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 373567002 c. coding.display = Losartan c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	ARBs Olmesartan

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 201 c. coding.display = ARBs b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 412259001 c. coding.display = Olmesartan c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	ARBs Valsartan

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 201 c. coding.display = ARBs b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386876001 c. coding.display = Valsartan c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Sacubitril - Valsartan

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 202 c. coding.display = Sacubitril b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 777480008 c. coding.display = Valsartan c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Beta-blocker Bisoprolol

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 203 c. coding.display = Beta-blocker b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386868003 c. coding.display = Bisoprolol c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Beta-blocker Carvedilol

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 203 c. coding.display = Beta-blocker b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386870007 c. coding.display = Carvedilol c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Beta-blocker Metoprolol

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 203 c. coding.display = Beta-blocker b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372826007 c. coding.display = Metoprolol c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Beta-blocker Nebivolol

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 203 c. coding.display = Beta-blocker b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 395808005 c. coding.display = Nebivolol c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	MRA Spironolactone

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 204 c. coding.display = MRA b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387078006 c. coding.display = Spironolactone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	MRA Eplerenone

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 204 c. coding.display = MRA b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 407010008 c. coding.display = Eplerenone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	SGLT2i Canagliflozin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 205 c. coding.display = SGLT2i b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 703676004 c. coding.display = Canagliflozin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	SGLT2i Dapagliflozin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 205 c. coding.display = SGLT2i b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 703674001 c. coding.display = Dapagliflozin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	SGLT2i Empagliflozin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 205 c. coding.display = SGLT2i b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 703894008 c. coding.display = Empagliflozin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	SGLT2i Ertugliflozin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 205 c. coding.display = SGLT2i b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 764274008 c. coding.display = Ertugliflozin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	SGLT2i Sotagliflozin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 205 c. coding.display = SGLT2i b. One medicationCodeableConcept with: a. coding.system = "http://www.whocc.no/atc" b. coding.code = A10BK06 c. coding.display = Sotagliflozin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Ivabradine

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 206 c. coding.display = Ivabradine b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 421228002 c. coding.display = Ivabradine c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Vericiguat

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 207 c. coding.display = Vericiguat b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 1145150000 c. coding.display = Vericiguat c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Digoxin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 208 c. coding.display = Digoxin b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387461009 c. coding.display = Digoxin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Vasodilators Hydralazine

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 209 c. coding.display = Vasodilators b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387125005 c. coding.display = Hydralazine c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Vasodilators Isosorbide dinitrate

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 209 c. coding.display = Vasodilators b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387332007 c. coding.display = Isosorbide dinitrate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Antiplatelets Aspirin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 210 c. coding.display = Antiplatelets b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387458008 c. coding.display = Aspirin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Antiplatelets Clopidogrel

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 210 c. coding.display = Antiplatelets b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386952008 c. coding.display = Clopidogrel c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Antiplatelets Prasugrel

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 210 c. coding.display = Antiplatelets b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 443129001 c. coding.display = Prasugrel c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Antiplatelets Ticagrelor

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 210 c. coding.display = Antiplatelets b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 698805004 c. coding.display = Ticagrelor c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Anticoagulants Acenocoumarol

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 211 c. coding.display = Anticoagulants b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387457003 c. coding.display = Acenocoumarol c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Anticoagulants Apixaban

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 211 c. coding.display = Anticoagulants b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 698090000 c. coding.display = Apixaban c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Anticoagulants Dabigatran

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 211 c. coding.display = Anticoagulants b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 698871007 c. coding.display = Dabigatran c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Anticoagulants Edoxaban

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 211 c. coding.display = Anticoagulants b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 712778008 c. coding.display = Edoxaban c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Anticoagulants Rivaroxaban

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 211 c. coding.display = Anticoagulants b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 442031002 c. coding.display = Rivaroxaban c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Anticoagulants Warfarin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 211 c. coding.display = Anticoagulants b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372756006 c. coding.display = Warfarin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Loop diuretics Bumetanide

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 212 c. coding.display = Loop diuretics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387498005 c. coding.display = Bumetanide c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Loop diuretics Furosemide

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 212 c. coding.display = Loop diuretics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387475002 c. coding.display = Furosemide c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Loop diuretics Torasemide

Current medication use	
FHIR requirements	A MedicationStatement which must have d. One Category in MedicationStatement with: d. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" e. coding.code = 212 f. coding.display = Loop diuretics e. One medicationCodeableConcept with: d. coding.system = "http://snomed.info/sct" e. coding.code = 108476002 f. coding.display = Torasemide f. A Dosage with: a. doseAndRate.type with coding: d. system = "http://snomed.info/sct" e. code = 408102007 f. display = Unit dose b. doseAndRate with: c. value d. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Thiazides Bendroflumethiazide

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 213 c. coding.display = Thiazides b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387520007 c. coding.display = Bendroflumethiazide c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Thiazides Chlortalidone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 213 c. coding.display = Thiazides b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387324004 c. coding.display = Chlortalidone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Thiazides Hydrochlorothiazide

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 213 c. coding.display = Thiazides b. One medicationCodeableConcept with: d. coding.system = "http://snomed.info/sct" a. coding.code = 387525002 b. coding.display = Hydrochlorothiazide c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Thiazides Metolazone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 213 c. coding.display = Thiazides b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387123003 c. coding.display = Metolazone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Thiazides Indapamide

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 213 c. coding.display = Thiazides b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387419003 c. coding.display = Indapamide c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Potassium sparing diuretics Amiloride

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 214 c. coding.display = Potassium sparing diuretics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387503008 c. coding.display = Amiloride c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Potassium sparing diuretics Triamterene

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 214 c. coding.display = Potassium sparing diuretics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387053007 c. coding.display = Triamterene c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Potassium supplements Citrate

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 215 c. coding.display = Potassium supplements b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387450001 c. coding.display = Citrate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Potassium supplements Phosphate

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 215 c. coding.display = Potassium supplements b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 80916004 c. coding.display = Phosphate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Potassium supplements Aspartate

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 215 c. coding.display = Potassium supplements b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 19751002 c. coding.display = Aspartate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Potassium supplements Bicarbonate

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 215 c. coding.display = Potassium supplements b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 77849004 c. coding.display = Bicarbonate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Potassium supplements Gluconate

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 215 c. coding.display = Potassium supplements b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 89219006 c. coding.display = Gluconate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Potassium binders Sodium zirconium cyclosilicate

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 216 c. coding.display = Potassium binders b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 770718007 c. coding.display = Sodium zirconium cyclosilicate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Potassium binders Patiromer

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 216 c. coding.display = Potassium binders b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 715260008 c. coding.display = Patiromer c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Potassium binders Sodium polystyrene sulfonate

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 216 c. coding.display = Potassium binders b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387149008 c. coding.display = Sodium polystyrene sulfonate c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Statins Atorvastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 373444002 c. coding.display = Atorvastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Statins Fluvastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387585004 c. coding.display = Fluvastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Statins Lovastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 96303004 c. coding.display = Lovastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Statins Pravastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 373566006 c. coding.display = Pravastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Statins Pitavastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 443586000 c. coding.display = Pitavastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Statins Rosuvastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 700067006 c. coding.display = Rosuvastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Statins Simvastatin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 217 c. coding.display = Statins b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387584000 c. coding.display = Simvastatin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Ezetimibe

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 218 c. coding.display = Ezetimibe b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 409149001 c. coding.display = Ezetimibe c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Other Antihyperlipidemic Drugs Fibrates

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 219 c. coding.display = Other Antihyperlipidemic Drugs b. One medicationCodeableConcept with: a. coding.system = "http://www.whocc.no/atc" b. coding.code = C10AB c. coding.display = Fibrates c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antihyperlipidemic Drugs Drugs Fish oil

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 219 c. coding.display = Other Antihyperlipidemic Drugs b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 735341005 c. coding.display = Fish oil c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antihyperlipidemic Drugs PCSK9

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 219 c. coding.display = Other Antihyperlipidemic Drugs b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 737573001 c. coding.display = PCSK9 c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Calcium Channel Blockers Amlodipine

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 220 c. coding.display = Calcium Channel Blockers b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386864001 c. coding.display = Amlodipine c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Calcium Channel Blockers Diltiazem

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 220 c. coding.display = Calcium Channel Blockers b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372793000 c. coding.display = Diltiazem c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Calcium Channel Blockers Felodipine

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 220 c. coding.display = Calcium Channel Blockers b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386863007 c. coding.display = Felodipine c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Calcium Channel Blockers Lacidipine

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 220 c. coding.display = Calcium Channel Blockers b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 395764001 c. coding.display = Lacidipine c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Calcium Channel Blockers Nifedipine

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 220 c. coding.display = Calcium Channel Blockers b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387490003 c. coding.display = Nifedipine c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Calcium Channel Blockers Verapamil

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 220 c. coding.display = Calcium Channel Blockers b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372754009 c. coding.display = Verapamil c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Amiodarone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 221 c. coding.display = Amiodarone b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372821002 c. coding.display = Amiodarone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Other antiarrhythmics Flecainide

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 222 c. coding.display = Other antiarrhythmics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372751001 c. coding.display = Flecainide c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Other antiarrhythmics Sotalol

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 222 c. coding.display = Other antiarrhythmics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372911006 c. coding.display = Sotalol c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Other antiarrhythmics Mexiletine

Current medication use**FHIR requirements**

A MedicationStatement which must have

- a. One Category in MedicationStatement with:
 - a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication"
 - b. coding.code = 222
 - c. coding.display = Other antiarrhythmics
- b. One medicationCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 372909002
 - c. coding.display = Mexiletine
- c. A Dosage with:
 - a. doseAndRate.type with coding:
 - a. system = "http://snomed.info/sct"
 - b. code = 408102007
 - c. display = Unit dose
 - b. doseAndRate with:
 - a. value
 - b. unit = mg/day

Current medication use

FHIR Resource	MedicationStatement
Name	PPI

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 223 c. coding.display = PPI b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372525000 c. coding.display = PPI c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Steroids Cortisone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 224 c. coding.display = Steroids b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 32498003 c. coding.display = Cortisone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Steroids Dexamethasone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 224 c. coding.display = Steroids b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372584003 c. coding.display = Dexamethasone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Steroids Hydrocortisone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 224 c. coding.display = Steroids b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 396458002 c. coding.display = Hydrocortisone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Steroids Methylprednisolone

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 224 c. coding.display = Steroids b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 116593003 c. coding.display = Methylprednisolone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Steroids Prednisolone

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 224 c. coding.display = Steroids b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 116601002 c. coding.display = Prednisolone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Steroids Prednisone

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 224 c. coding.display = Steroids b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 116602009 c. coding.display = Prednisone c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Tacrolimus Immediate release (Prograft)

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 225 c. coding.display = Tacrolimus b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386975001 c. coding.display = Immediate release (Prograft) c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Tacrolimus Slow release (Advagraft)

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 226 c. coding.display = Tacrolimus b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386975001 c. coding.display = Slow release (Advagraft) c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Tacrolimus Extended release (Envarsus)

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 227 c. coding.display = Tacrolimus b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386975001 c. coding.display = Extended release (Envarsus) c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Everolimus

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 228 c. coding.display = Everolimus b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 428698007 c. coding.display = Everolimus c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Ciclosporin

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 229 c. coding.display = Ciclosporin b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387467008 c. coding.display = Ciclosporin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Mycophenolate mofetil

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 230 c. coding.display = Mycophenolate b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 409330005 c. coding.display = mofetil c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Mycophenolate sodium

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 231 c. coding.display = Mycophenolate b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 409330005 c. coding.display = sodium c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Antibiotics

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 232 c. coding.display = Antibiotics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 255631004 c. coding.display = Antibiotics c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Insulin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 233 c. coding.display = Insulin b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 67866001 c. coding.display = Insulin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antidiabetics Metformin

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 234 c. coding.display = Other Antidiabetics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372567009 c. coding.display = Metformin c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antidiabetics Thiazolidinedione

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 234 c. coding.display = Other Antidiabetics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372568004 c. coding.display = Thiazolidinedione c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antidiabetics Sulfonylurea

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 234 c. coding.display = Other Antidiabetics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 372711004 c. coding.display = Sulfonylurea c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antidiabetics Glucagon-like peptide-1 receptor agonist

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 234 c. coding.display = Other Antidiabetics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 416171004 c. coding.display = Glucagon-like peptide-1 receptor agonist c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antidiabetics Dipeptidyl peptidase-4 inhibitors

Current medication use

FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 234 c. coding.display = Other Antidiabetics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 423837000 c. coding.display = Dipeptidyl peptidase-4 inhibitors c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day
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Current medication use

FHIR Resource	MedicationStatement
Name	Other Antidiabetics Alpha-glucosidase inhibitor

Current medication use	
FHIR requirements	A MedicationStatement which must have a. One Category in MedicationStatement with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication" b. coding.code = 234 c. coding.display = Other Antidiabetics b. One medicationCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 762432004 c. coding.display = Alpha-glucosidase inhibitor c. A Dosage with: a. doseAndRate.type with coding: a. system = "http://snomed.info/sct" b. code = 408102007 c. display = Unit dose b. doseAndRate with: a. value b. unit = mg/day

Current medication use	
FHIR Resource	MedicationStatement
Name	Other drugs

Current medication use

FHIR requirements

- A MedicationStatement which must have
- a. One Category in MedicationStatement with:
 - a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Medication"
 - b. coding.code = 410942007
 - c. coding.display = Drug or medicament
 - b. A Dosage with:
 - a. doseAndRate.type with coding:
 - a. system = "http://snomed.info/sct"
 - b. code = 408102007
 - c. display = Unit dose
 - b. doseAndRate with:
 - a. value
 - b. unit = mg/day

6.4 Clinical Data

Clinical Data	
FHIR Resource	Observation
Name	Dyspnea - Clinical Data
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 58147004 c. coding.display = "Clinical" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 267036007 c. coding.display = "Dyspnea" c. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Dyspnea" b. coding.code = * c. coding.display = *
*Notes	0: no 1: at rest 2: at exertion 3: orthopnea 4: bendopnea 5: paroxysmal nocturnal dyspnea

Clinical Data	
FHIR Resource	Observation
Name	Angina
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 194828000 c. coding.display = "Angina" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Angina" b. coding.code = * c. coding.display = *

Clinical Data

*Notes	0: no 1: at rest 2: at exertion
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Clinical Data

FHIR Resource	Observation
Name	Syncope
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271594007 c. coding.display = "Syncope " b. A valueCodeableConcept with: a. coding.system = " https://www.retention-project.eu/ig/CodeSystem/NoYes " b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data

FHIR Resource	Observation
Name	Fatigue - Clinical Data
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 58147004 c. coding.display = "Clinical" b. One code with: d. coding.system = "http://snomed.info/sct" e. coding.code = 84229001 f. coding.display = "Fatigue" c. A valueCodeableConcept with: d. coding.system = " https://www.retention-project.eu/ig/CodeSystem/NoYes "

Clinical Data	
	e. coding.code = * f. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Pulmonary rales
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 48409008 c. coding.display = "Pulmonary rales" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes " b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Jugular Venous Pressure
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 37476000 c. coding.display = "Jugular Venous Pressure" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/JugularVenousPressure " b. coding.code = *

Clinical Data	
	c. coding.display = *
*Notes	0: <6cm 1: >6cm

Clinical Data	
FHIR Resource	Observation
Name	Pleural effusion
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60046008 c. coding.display = "Pleural effusion" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes " b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Hepatomegaly
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 80515008 c. coding.display = "Hepatomegaly" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes " b. coding.code = *

Clinical Data	
	c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Ascites
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 389026000 c. coding.display = "Ascites" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes " b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Peripheral edema
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271809000 c. coding.display = "Peripheral edema" b. A valueCodeableConcept with:

Clinical Data	
	a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Peripheral edema" b. coding.code = * c. coding.display = *
*Notes	0: no 1: upper legs 2: ankles and feet

Clinical Data	
FHIR Resource	Observation
Name	S3
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 277455002 c. coding.display = "Third heart sound" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes" b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	S4
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4592006 c. coding.display = "Fourth sound gallop"

Clinical Data	
	b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes" b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Peripheral hypoperfusion
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 264533003 c. coding.display = "Hypoperfusion" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes" b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

Clinical Data	
FHIR Resource	Observation
Name	Peripheral capillary oxygen saturation - Clinical Data
FHIR requirements	An Observation which must have: b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 58147004 c. coding.display = "Clinical"

Clinical Data

	b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 442440005 c. coding.display = "Capillary oxygen saturation" c. A valueQuantity with: a. A value b. Unit = "%"
--	--

Clinical Data

FHIR Resource	Observation
Name	Body weight - Clinical Data
FHIR requirements	An Observation which must have: c. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 58147004 c. coding.display = "Clinical" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 726527001 c. coding.display = "Weight" c. A valueQuantity with: a. A value b. Unit = "kg"

Clinical Data

FHIR Resource	Observation
Name	Body Temperature - Clinical Data
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 58147004 c. coding.display = "Clinical"

Clinical Data

	b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386725007 c. coding.display = "Body temperature " c. A valueQuantity with: a. A value b. Unit ="°C"
--	--

Clinical Data

FHIR Resource	Observation
Name	Diastolic blood pressure - Clinical Data
FHIR requirements	An Observation which must have: d. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 58147004 c. coding.display = "Clinical" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 75367002 c. coding.display = "Blood pressure" c. One component with: one code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271650006 c. coding.display = "Diastolic Blood pressure" c. A valueQuantity with: a. A value b. Unit ="mm Hg"

Clinical Data

FHIR Resource	Observation
Name	Systolic blood pressure - Clinical Data

Clinical Data**FHIR requirements**

An Observation which must have:

a. One category with:

- a. coding.system = "http://snomed.info/sct"
- b. coding.code = 58147004
- c. coding.display = "Clinical"

b. One code with:

- a. coding.system = "http://snomed.info/sct"
- b. coding.code = 75367002
- c. coding.display = "Blood pressure"

c. One component with:

one code with:

- a. coding.system = "http://snomed.info/sct"
- b. coding.code = 271649006
- c. coding.display = "Systolic Blood pressure"

d. A valueQuantity with:

- a. A value
- b. Unit = "mm Hg"

Clinical Data**FHIR Resource**

Observation

Name

Heart rate - Clinical Data

FHIR requirements

An Observation which must have:

a. One category with:

- a. coding.system = "http://snomed.info/sct"
- b. coding.code = 58147004
- c. coding.display = "Clinical"

b. One code with:

- a. coding.system = "http://snomed.info/sct"
- b. coding.code = 364075005
- c. coding.display = "Heart rate"

c. A valueQuantity with:

- a. A value
- b. Unit = "bpm"



6.5 ECG

ECG	
FHIR Resource	Observation
Name	Conduction delay - LBBB
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 63467002 c. coding.display = "Left bundle branch block"

ECG	
FHIR Resource	Observation
Name	Conduction delay - RBBB
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 59118001 c. coding.display = "Right bundle branch block"

ECG	
FHIR Resource	Observation

ECG	
Name	Conduction delay - LAH
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 37760005 c. coding.display = "Left anterior fascicular block"

ECG	
FHIR Resource	Observation
Name	Conduction delay - LPH
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 62026008 c. coding.display = "Left posterior fascicular block"

ECG	
FHIR Resource	Observation
Name	Conduction delay - incomplete RBBB

ECG

FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 301 c. coding.display = "Incomplete right bundle branch block"
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ECG

FHIR Resource	Observation
Name	Conduction delay - incomplete LBBB
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 300 c. coding.display = "Incomplete left bundle branch block"

ECG

FHIR Resource	Observation
Name	Conduction delay – Non specific

ECG

FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4554005 c. coding.display = "Intraventricular conduction defect" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 698252002 c. coding.display = "Non-specific intraventricular conduction delay"
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ECG

FHIR Resource	Observation
Name	QT
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 81435004 c. coding.display = "QT interval feature" b. A valueQuantity with: a. A value b. Unit= "ms"

ECG

FHIR Resource	Observation
Name	QRS
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 39632005 c. coding.display = "QRS interval, function" b. A valueQuantity with:

ECG

	a. A value b. Unit= "ms"
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ECG

FHIR Resource	Observation
Name	PQ/PR
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code =164944000 c. coding.display = "PR interval feature" b. A valueQuantity with: a. A value b. Unit= "ms"

ECG

FHIR Resource	Observation
Name	Heart rate - ECG
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 364075005 c. coding.display = "Heart rate" b. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 29303009 c. coding.display = "Electrocardiographic procedure" c. A valueQuantity with: a. A value b. Unit= "bpm"



ECG	
FHIR Resource	Observation
Name	Sinus rhythm
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 251150006 c. coding.display = "Sinus rhythm" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes" b. coding.code = * c. coding.display = *
*Notes	0: no 1: yes

6.6 Laboratory

Laboratory	
FHIR Resource	Observation
Name	Troponin
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 102680009 c. coding.display = "Troponin" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Troponin" b. coding.code = * c. coding.display = *
*Notes	1: Hyperthyroidism 2: Hypothyroidism

Laboratory	
FHIR Resource	Observation
Name	Hemoglobin
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 38082009 c. coding.display = Hemoglobin b. A valueQuantity with: a. A value b. Unit = g/dL

Laboratory	
FHIR Resource	Observation
Name	Haematocrit
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 28317006 c. coding.display = Haematocrit b. A valueQuantity with: a. A value b. Unit = %

Laboratory	
FHIR Resource	Observation
Name	. White Blood Cells
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 52501007 c. coding.display = Leukocyte b. A valueQuantity with: a. A value b. Unit = "K/UL"

Laboratory	
FHIR Resource	Observation
Name	Platelets
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 16378004

Laboratory

	c. coding.display = Platelet b. A valueQuantity with: a. A value b. Unit = "K/μL"
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Laboratory

FHIR Resource	Observation
Name	Urea
FHIR requirements	An Observation which must have: b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 387092000 c. coding.display = Urea b. A valueQuantity with: a. A value b. Unit = "mg/dl"

Laboratory

FHIR Resource	Observation
Name	Creatinine
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 15373003 c. coding.display = Creatinine b. A valueQuantity with: a. A value b. Unit = "mg/dL"

Laboratory	
FHIR Resource	Observation
Name	Uric acid
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 1710001 c. coding.display = Uric acid b. A valueQuantity with: a. A value b. Unit = " mg/dL"

Laboratory	
FHIR Resource	Observation
Name	Glucose
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 67079006 c. coding.display = Glucose b. A valueQuantity with: a. A value b. Unit = " mg/dl"

Laboratory	
FHIR Resource	Observation
Name	Sodium
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 39972003 c. coding.display = Sodium

Laboratory

	b. A valueQuantity with: a. A value b. Unit = " µmol/L"
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Laboratory

FHIR Resource	Observation
Name	Potassium
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 88480006 c. coding.display = Potassium b. A valueQuantity with: a. A value b. Unit = " µmol/L"

Laboratory

FHIR Resource	Observation
Name	Magnesium
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 38151008 c. coding.display = Magnesium b. A valueQuantity with: a. A value b. Unit = " mg/dl"

Laboratory	
FHIR Resource	Observation
Name	Cholesterol
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 84698008 c. coding.display = Cholesterol b. A valueQuantity with: a. A value b. Unit = " mg/dl"

Laboratory	
FHIR Resource	Observation
Name	Triglycerides
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 14740000 c. coding.display = "Triglycerides measurement" b. A valueQuantity with: a. A value b. Unit = "mg/dL"

Laboratory	
FHIR Resource	Observation
Name	HDL
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 102737005

Laboratory

	c. coding.display = "High density lipoprotein cholesterol" b. A valueQuantity with: a. A value b. Unit = "mg/dL"
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Laboratory

FHIR Resource	Observation
Name	LDL
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 102739008 c. coding.display = "Low density lipoprotein cholesterol" b. A valueQuantity with: a. A value b. Unit = "mg/dL"

Laboratory

FHIR Resource	Observation
Name	ALAT
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 56935002 c. coding.display = "Alanine aminotransferase " b. A valueQuantity with: a. A value b. Unit = " mIU/ml"

Laboratory	
FHIR Resource	Observation
Name	ASAT
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 26091008 c. coding.display = "Aspartate aminotransferase" b. A valueQuantity with: a. A value b. Unit = "mIU/ml"

Laboratory	
FHIR Resource	Observation
Name	gGT
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60153001 c. coding.display = "Gamma-glutamyltransferase" b. A valueQuantity with: a. A value b. Unit = "mIU/ml"

Laboratory	
FHIR Resource	Observation
Name	LDH
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 250644007

Laboratory

	c. coding.display = "Lactic dehydrogenase blood measurement" b. A valueQuantity with: a. A value b. Unit = " mIU/ml"
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Laboratory

FHIR Resource	Observation
Name	ALP
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 57056007 c. coding.display = "Alkaline phosphatase" b. A valueQuantity with: a. A value b. Unit = " mIU/ml"

Laboratory

FHIR Resource	Observation
Name	Tot prot
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 304383000 c. coding.display = "Total protein measurement" b. A valueQuantity with: a. A value b. Unit = "gr/dl"

Laboratory	
FHIR Resource	Observation
Name	ALB
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 52454007 c. coding.display = "Albumin" b. A valueQuantity with: a. A value b. Unit = "gr/dl"

Laboratory	
FHIR Resource	Observation
Name	Nt pro BNP
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 414798009 c. coding.display = "N-terminal pro-B-type natriuretic peptide" b. A valueQuantity with: a. A value b. Unit = "pg/ml"

Laboratory	
FHIR Resource	Observation
Name	Tbil
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 359986008

Laboratory

	c. coding.display = "Bilirubin, total measurement" b. A valueQuantity with: a. A value b. Unit = "mg/dl"
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Laboratory

FHIR Resource	Observation
Name	D-Dimer
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 25607008 c. coding.display = "D-dimer" b. A valueQuantity with: a. A value b. Unit = "ng/ml"

Laboratory

FHIR Resource	Observation
Name	Fibrinogen
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 23295004 c. coding.display = "Coagulation factor I" b. A valueQuantity with: a. A value b. Unit = "mg/dl"

Laboratory	
FHIR Resource	Observation
Name	INR
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 313341008 c. coding.display = "International Normalized Ratio raised" b. A valueQuantity with: a. A value b. Unit = "-"

Laboratory	
FHIR Resource	Observation
Name	CPK
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 75828004 c. coding.display = "Creatine kinase" b. A valueQuantity with: a. A value b. Unit = "mIU/ml"

Laboratory	
FHIR Resource	Observation
Name	CPK - MB

Laboratory**FHIR requirements**

An Observation which must have:

- a. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 12016004
 - c. coding.display = "Creatine kinase isoenzyme, MB fraction"
- b. A valueQuantity with:
 - a. A value
 - b. Unit = " ng/ml "

Laboratory**FHIR Resource**

Observation

Name

Calcium

FHIR requirements

An Observation which must have:

- a. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 5540006
 - c. coding.display = " Calcium"
- b. A valueQuantity with:
 - a. A value
 - b. Unit = " mg/dl "

Laboratory**FHIR Resource**

Observation

Name

Phosphorus

FHIR requirements

An Observation which must have:

- a. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 30820000
 - c. coding.display = " Phosphorus "

Laboratory

	b. A valueQuantity with: a. A value b. Unit = "mg/dL"
--	--

Laboratory

FHIR Resource	Observation
Name	CRP
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 61425002 c. coding.display = "C reactive protein " b. A valueQuantity with: a. A value b. Unit = "mg/l"

Laboratory

FHIR Resource	Observation
Name	PRCLT
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 418752001 c. coding.display = "Procalcitonin " b. A valueQuantity with: a. A value b. Unit = " ng/ml "

Laboratory	
FHIR Resource	Observation
Name	TSH
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 65428006 c. coding.display = " Thyrotrophin " b. A valueQuantity with: a. A value b. Unit = " mIU/lt "

Laboratory	
FHIR Resource	Observation
Name	fT3
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 259356007 c. coding.display = " Free triiodothyronine " b. A valueQuantity with: a. A value b. Unit = " pg/ml"

Laboratory	
FHIR Resource	Observation
Name	fT4
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 86211008

Laboratory

	c. coding.display = " Free thyroxine " b. A valueQuantity with: a. A value b. Unit = " ng/dl "
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Laboratory

FHIR Resource	Observation
Name	B12
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 419382002 c. coding.display = " Cyanocobalamin " b. A valueQuantity with: a. A value b. Unit = " pg/ml "

Laboratory

FHIR Resource	Observation
Name	Iron
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 3829006 c. coding.display = " Iron" b. A valueQuantity with: a. A value b. Unit = " µg/dl "



Laboratory	
FHIR Resource	Observation
Name	Ferritin
FHIR requirements	An Observation which must have: a. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 32789000 c. coding.display = " Ferritin" b. A valueQuantity with: a. A value b. Unit = " ng/ml"

6.7 Echocardiography

Echocardiography	
FHIR Resource	Observation
Name	Echo date
FHIR requirements	An Observation which must have: a. A valueDateTime b. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 40701008 c. coding.display = " Echocardiography" c. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439771001 c. coding.display = " Date of event"

Echocardiography	
FHIR Resource	Observation
Name	LVED Volume
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 250932006 c. coding.display = " Left ventricular end-diastolic cavity size" b. A valueQuantity with: a. A value b. Unit = " ml"

Echocardiography	
FHIR Resource	Observation
Name	LVES Volume
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 250931004 c. coding.display = " Left ventricular end-systolic cavity size" b. A valueQuantity with: a. A value b. Unit = " ml"

Echocardiography	
FHIR Resource	Observation
Name	EF
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 70822001 c. coding.display = " Cardiac ejection fraction, function" b. A valueQuantity with: a. A value b. Unit = " %"

Echocardiography	
FHIR Resource	Observation
Name	Basal right ventricle diameter
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 250964004 c. coding.display = " Right ventricular cavity size" b. A valueQuantity with: a. A value b. Unit = " ml"

Echocardiography	
FHIR Resource	Observation
Name	TAPSE
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://loinc.org" b. coding.code = 77903-3 c. coding.display = " Tricuspid valve annulus Excursion distance during systole by US.M-" b. A valueQuantity with: a. A value b. Unit = " mm"

Echocardiography	
FHIR Resource	Observation

Echocardiography	
Name	Fractional area change
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399287000 c. coding.display = " Left ventricular area fractional change" b. A valueQuantity with: a. A value b. Unit = " %"

Echocardiography	
FHIR Resource	Observation
Name	Left atrium volume
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399235004 c. coding.display = " Left atrium systolic volume" b. A valueQuantity with: a. A value b. Unit = " ml"

Echocardiography	
FHIR Resource	Observation
Name	Right atrium area

Echocardiography

FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://loinc.org" b. coding.code = 80075-5 c. coding.display = " Left ventricular end-diastolic cavity size" b. A valueQuantity with: a. A value b. Unit = " cm²"
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Echocardiography

FHIR Resource	Observation
Name	RVSP
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 276772001 c. coding.display = " Right ventricular systolic pressure" b. A valueQuantity with: a. A value b. Unit = " mmHg"

Echocardiography

FHIR Resource	Observation
Name	Aortic Root diameter
FHIR requirements	An Observation which must have:

Echocardiography

	a. A code with: a. coding.system = " http://loinc.org " b. coding.code = 78176-5 c. coding.display = " Aorta root Diameter by US 2D " b. A valueQuantity with: a. A value b. Unit = " mm"
--	---

Echocardiography

FHIR Resource	Observation
Name	Inferior Vena Cava (IVC)
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 64131007 c. coding.display = " Inferior vena cava structure " b. A valueQuantity with: a. A value b. Unit = " mm"

Echocardiography

FHIR Resource	Observation
Name	Cardiac index
FHIR requirements	An Observation which must have: a. A code with:

Echocardiography

	a. coding.system = "http://snomed.info/sct" b. coding.code = 54993008 c. coding.display = " Cardiac index " b. A valueQuantity with: a. A value b. Unit = " l/min/m² "
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Echocardiography

FHIR Resource	Observation
Name	Interventricular Septum Thickness
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://loinc.org" b. coding.code = 18155-2 c. coding.display = " Left ventricular Thickness septal wall/Thickness posterior wall b" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 302 c. coding.display = " Thickness septal wall Interventricular" c. A valueQuantity with: a. A value b. Unit = "mm"

Echocardiography

FHIR Resource	Observation
Name	Left ventricular Posterior wall thickness

Echocardiography

FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://loinc.org" b. coding.code = 18155-2 c. coding.display = " Left ventricular Thickness septal wall/Thickness posterior wall" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 303 c. coding.display = " Thickness septal wall Posterior" c. A valueQuantity with: a. A value b. Unit = "mm"
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Echocardiography

FHIR Resource	Observation
Name	AR - Mild
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60234000 c. coding.display = " Aortic valve regurgitation" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838544003 c. coding.display = " Mild aortic valve regurgitation"

Echocardiography	
FHIR Resource	Observation
Name	AR - Moderate
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60234000 c. coding.display = "Aortic valve regurgitation" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838545002 c. coding.display = "Moderate aortic valve regurgitation"

Echocardiography	
FHIR Resource	Observation
Name	AR - Severe
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60234000 c. coding.display = "Aortic valve regurgitation" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838546001 c. coding.display = "Severe aortic valve regurgitation"

Echocardiography	
FHIR Resource	Observation
Name	MR - Mild

Echocardiography

FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 48724000 c. coding.display = "Mitral valve regurgitation" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838451005 c. coding.display = "Mild mitral valve regurgitation"
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Echocardiography

FHIR Resource	Observation
Name	MR - Moderate
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 48724000 c. coding.display = "Mitral valve regurgitation " b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838452003 c. coding.display = "Moderate mitral valve regurgitation"

Echocardiography

FHIR Resource	Observation
Name	MR - Severe

Echocardiography**FHIR requirements**

An Observation which must have:

- a. A code with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 48724000
 - c. coding.display = "Mitral valve regurgitation "
- b. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 838453008
 - c. coding.display = "Severe mitral valve regurgitation"

Echocardiography**FHIR Resource**

Observation

Name

TR - Mild

FHIR requirements

An Observation which must have:

- a. A code with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 111287006
 - c. coding.display = "Tricuspid valve regurgitation"
- b. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 838544003
 - c. coding.display = "Mild tricuspid valve regurgitation"

Echocardiography**FHIR Resource**

Observation

Name

TR - Moderate

Echocardiography

FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 111287006 c. coding.display = "Tricuspid valve regurgitation" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838455001 c. coding.display = "Moderate tricuspid valve regurgitation"
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Echocardiography

FHIR Resource	Observation
Name	TR - Severe
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 111287006 c. coding.display = "Tricuspid valve regurgitation" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838456000 c. coding.display = "Severe tricuspid valve regurgitation"

Echocardiography

FHIR Resource	Observation
Name	AS - Mild

Echocardiography

FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60573004 c. coding.display = "Aortic valve stenosis" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 836480008 c. coding.display = "Mild stenosis of aortic valve"
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Echocardiography

FHIR Resource	Observation
Name	AS - Moderate
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60573004 c. coding.display = "Aortic valve stenosis " b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 836481007 c. coding.display = "Moderate stenosis of aortic valve"

Echocardiography

FHIR Resource	Observation
Name	AS - Severe

Echocardiography**FHIR requirements**

An Observation which must have:

- a. A code with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 60573004
 - c. coding.display = "Aortic valve stenosis"
- b. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 836482000
 - c. coding.display = "Severe stenosis of aortic valve"

Echocardiography**FHIR Resource**

Observation

Name

MS - Mild

FHIR requirements

An Observation which must have:

- a. A code with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 79619009
 - c. coding.display = "Mitral valve stenosis"
- b. A valueCodeableConcept with:
 - a. coding.system = "http://snomed.info/sct"
 - b. coding.code = 838448003
 - c. coding.display = "Mild mitral valve stenosis"

Echocardiography**FHIR Resource**

Observation

Name

MS - Moderate

FHIR requirements

An Observation which must have:

- a. A code with:
 - a. coding.system = "http://snomed.info/sct"

Echocardiography

	b. coding.code = 79619009 c. coding.display = " Mitral valve stenosis" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838449006 c. coding.display = " Moderate mitral valve stenosis"
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Echocardiography

FHIR Resource	Observation
Name	MS - Severe
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 79619009 c. coding.display = " Mitral valve stenosis" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838450006 c. coding.display = " Severe mitral valve stenosis"

Echocardiography

FHIR Resource	Observation
Name	TS - Mild
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 49915006 c. coding.display = " Tricuspid valve stenosis" b. A valueCodeableConcept with:

Echocardiography

- a. coding.system = "http://snomed.info/sct"
- b. coding.code = 838535004
- c. coding.display = "Mild tricuspid valve stenosis"

Echocardiography

FHIR Resource	Observation
Name	TS - Moderate
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 49915006 c. coding.display = "Tricuspid valve stenosis" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838536003 c. coding.display = "Moderate tricuspid valve stenosis"

Echocardiography

FHIR Resource	Observation
Name	TS - Severe
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 49915006 c. coding.display = "Tricuspid valve stenosis" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 838537007 c. coding.display = "Severe tricuspid valve stenosis"

Echocardiography

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Echocardiography

FHIR Resource	Observation
Name	MR Aetiology
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 48724000 c. coding.display = " Mitral valve regurgitation" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 116675007 c. coding.display = " Associated etiology" c. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = * c. coding.display = *
Notes	1: primary 2: secondary

6.8 6MWT

6MWT	
FHIR Resource	Observation
Name	Capillary oxygen saturation at beginning
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 442440005 c. coding.display = " Capillary oxygen saturation" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 263678003 c. coding.display = " At rest" c. A valueQuantity with: a. A value b. Unit = "%"

6MWT	
FHIR Resource	Observation
Name	Capillary oxygen saturation at the end
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 442440005 c. coding.display = " Capillary oxygen saturation" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 255214003 c. coding.display = " After exercise" c. A valueQuantity with: a. A value b. Unit = "%"

6MWT	
FHIR Resource	Observation
Name	BORG
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 263487004 c. coding.display = " Borg scale" b. A valueQuantity with: a. A value b. Unit = "units"

6MWT	
FHIR Resource	Observation
Name	6MWT
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 1144649008 c. coding.display = " Six minute walk test distance" b. A valueQuantity with: a. A value b. Unit = "m"

6.9 Cardio-pulmonary

Cardio-Pulmonary	
FHIR Resource	Observation
Name	CPET
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 447346005 c. coding.display = "Cardiopulmonary exercise test" b. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/CPET" b. coding.code = * c. coding.display = *
Notes*	1: I 2: II 3: III 4: IV

Cardio-Pulmonary	
FHIR Resource	Observation
Name	O2 max
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 251898000 c. coding.display = "Maximum oxygen uptake " b. A valueQuantity with: a. A value b. Unit = " ml/kg/min"

Cardio-Pulmonary	
FHIR Resource	Observation
Name	E to CO2 slope
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 251408004 c. coding.display = "Carbon dioxide output" b. A valueQuantity with: a. A value b. Unit = "-"

Cardio-Pulmonary	
FHIR Resource	Observation
Name	METS
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://loinc.org" b. coding.code = 82261-9 c. coding.display = "Measured activity metabolic rate/Standard RMR [Relative energy/T" b. A valueQuantity with: a. A value b. Unit = "-"

Cardio-Pulmonary	
FHIR Resource	Observation
Name	RER

Cardio-Pulmonary

FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 74427007 c. coding.display = "Respiratory quotient" b. A valueQuantity with: a. A value b. Unit = "l"
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6.10 VAD measurements

VAD	
FHIR Resource	Observation
Name	VAD flow - VAD measurements
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 100 c. coding.display = "VAD measurements" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 304 c. coding.display = "VAD flow" c. A valueQuantity with: a. A value b. Unit = "L/min"

VAD	
FHIR Resource	Observation
Name	VAD speed - VAD measurements
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 100 c. coding.display = " VAD measurements" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 305 c. coding.display = "VAD speed" c. A valueQuantity with: a. A value b. Unit = "rpm"

VAD	
FHIR Resource	Observation
Name	VAD power - VAD measurements
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 100 c. coding.display = " VAD measurements" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 306 c. coding.display = "VAD power" c. A valueQuantity with: a. A value b. Unit = "Watt"

VAD	
FHIR Resource	Observation
Name	VAD PI - VAD measurements
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 100 c. coding.display = " VAD measurements" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 307 c. coding.display = "VAD PI" c. A valueQuantity with: a. A value b. Unit = "Pulse Index "

VAD	
FHIR Resource	Observation
Name	VAD alarm - VAD measurements
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 100 c. coding.display = " VAD measurements" b. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 308 c. coding.display = "VAD alarm" c. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/VadAlarm" b. coding.code = * c. coding.display = *



VAD

Notes*	0: none 1: low flow 2: battery connection 3: control failure
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6.11 Caregiver data

Caregiver data	
FHIR Resource	CareTeam
Name	Caregiver Example
FHIR requirements	A CareTeam which must have: - A meta.profile = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverRetention" - A participant which must have: - A role with: - coding.system = "http://snomed.info/sct" - coding.code = 133932002 - coding.display = "Caregiver" - An extension with: - url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverSex" - A valueUsageContext with: - code.system = "http://snomed.info/sct" - code.code = 263495000 - code.display = "Gender" - A valueCodeableConcept with: - coding.system = "https://www.retention-project.eu/ig/CodeSystem/Sex" - coding.code = 1 - coding.display = 1 - An extension with: - url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverDateOfBirth" - A valueUsageContext with: - code.system = "http://snomed.info/sct" - code.code = 184099003 - code.display = "Date of birth" - A valueCodeableConcept with: - A text - An extension with: - url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverChildren" - A valueUsageContext with: - code.system = "http://snomed.info/sct" - code.code = 224117009

Caregiver data

- iii. code.display = "Details of own children"
- iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/NoYes"
 - 2. coding.code = ²
 - 3. coding.display = ²
- f. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverLivingStatus"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 243796009
 - iii. code.display = "Situation with explicit context"
 - iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/LivingSituation"
 - 2. coding.code = ³
 - 3. coding.display = ³
- g. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverHighestLevelOfEducation"
 - b. A valueUsageContext with:
 - i. code.system = "http://snomed.info/sct"
 - ii. code.code = 105421008
 - iii. code.display = "Educational achievement"
 - iv. A valueCodeableConcept with:
 - 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/HighestLevelOfEducation"
 - 2. coding.code = ⁴
 - 3. coding.display = ⁴
- h. An extension with:
 - a. url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverEmploymentStatus"
 - b. A valueUsageContext with:

Caregiver data	
	i. code.system = "http://snomed.info/sct" ii. code.code = 224362002 iii. code.display = "Employment status" iv. A valueCodeableConcept with: 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/EmploymentStatus" 2. coding.code = ⁵ 3. coding.display = ⁵ i. An extension with: a. url = "https://www.retention-project.eu/ig/StructureDefinition/CaregiverMedicalCondition" b. A valueUsageContext with: i. code.system = "http://snomed.info/sct" ii. code.code = 260905004 iii. code.display = "Condition" iv. A valueCodeableConcept with: 1. coding.system = "https://www.retention-project.eu/ig/CodeSystem/MedicalCondition" 2. coding.code = ⁶ 3. coding.display = ⁶
Notes	1. 0: Male 1: Female 2: Other 2. 0: no 1: yes 3. 0: Living alone 1: Living with the person that cares for only 2: Living with the person cared for and other family members 3: Other 4. 0: up to and including high school 1: above high school education 2: no education 3: other 5. 0: working (full or part time) 1: not currently working 2: full-time homemaker 3: retired 4: student 5: other 6. 0: Cardiovascular Disease 1: Hypertension 2: High Blood Pressure 3: Diabetes Mellitus 4: High Cholesterol

6.12 RWD sensors

RWD Sensors	
FHIR Resource	Observation
Name	Heart rate - RWD Sensors
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408746007 c. coding.display = "Sensor device" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 364075005 c. coding.display = "Heart rate" c. A valueQuantity with: a. A value b. Unit = "bpm"

RWD Sensors	
FHIR Resource	Observation
Name	Deep sleep time
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 60984000 c. coding.display = "Non-rapid eye movement sleep, function" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 762636008 c. coding.display = "Duration" c. A valueQuantity with: a. A value

RWD Sensors

	b. Unit = "min"
--	-----------------

RWD Sensors

FHIR Resource	Observation
Name	Light sleep time
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 29373008 c. coding.display = "Light sleep" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 762636008 c. coding.display = "Duration" c. A valueQuantity with: a. A value b. Unit = "min"

RWD Sensors

FHIR Resource	Observation
Name	Body weight - RWD Sensors
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408746007 c. coding.display = "Sensor device" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 726527001

RWD Sensors

	c. coding.display = "Weight" c. A valueQuantity with: a. A value b. Unit = "kg"
--	--

RWD Sensors

FHIR Resource	Observation
Name	Peripheral capillary oxygen saturation - RWD Sensors
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408746007 c. coding.display = " Sensor device" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 442440005 c. coding.display = "Capillary oxygen saturation" c. A valueQuantity with: a. A value b. Unit = "%"

RWD Sensors

FHIR Resource	Observation
Name	Body Temperature - RWD Sensors
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408746007 c. coding.display = " Sensor device" b. A code with: a. coding.system = "http://snomed.info/sct"

RWD Sensors

	b. coding.code = 386725007 c. coding.display = " Body Temperature" c. A valueQuantity with: a. A value b. Unit = " °C "
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RWD Sensors

FHIR Resource	Observation
Name	Systolic blood pressure - RWD Sensors
FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408746007 c. coding.display = " Sensor device" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 75367002 c. coding.display = " Blood pressure" c. A component with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271649006 c. coding.display = " Systolic blood pressure" d. A valueQuantity with: a. A value b. Unit = "mm Hg"

RWD Sensors

FHIR Resource	Observation
Name	Diastolic blood pressure - RWD Sensors

RWD Sensors

FHIR requirements	An Observation which must have: a. A category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 408746007 c. coding.display = " Sensor device" b. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 75367002 c. coding.display = " Blood pressure" c. A component with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271650006 c. coding.display = " Diastolic blood pressure" d. A valueQuantity with: a. A value b. Unit = "mm Hg"
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RWD Sensors

FHIR Resource	Observation
Name	Sleep interruptions
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 192004002 c. coding.display = " Repeated rapid eye movement sleep interruptions" b. A valueQuantity with: a. A value b. Unit = "-"

RWD Sensors	
FHIR Resource	Observation
Name	Steps
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 309 c. coding.display = "Steps" b. A valueQuantity with: c. A value d. Unit = "-"

RWD Sensors	
FHIR Resource	Observation
Name	Distance
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 246132006 c. coding.display = "Distance" b. A valueQuantity with: a. A value b. Unit = "m"

RWD Sensors	
FHIR Resource	Observation
Name	Calories
FHIR requirements	An Observation which must have: b. A code with:

RWD Sensors

	a. coding.system = "http://snomed.info/sct" b. coding.code = 258790008 c. coding.display = "calorie" b. A valueQuantity with: a. A value b. Unit = "kcal"
--	---

RWD Sensors

FHIR Resource	Observation
Name	Floors climbed
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention" b. coding.code = 310 c. coding.display = "Floors climbed " b. A valueQuantity with: a. A value b. Unit = "-"

RWD Sensors

FHIR Resource	Observation
Name	Heart rate variability
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 251671002 c. coding.display = "Fetal heart rate variability " b. A valueQuantity with: a. A value

RWD Sensors

	b. Unit = "ms"
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RWD Sensors

FHIR Resource	Observation
Name	Resting heart rate
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 444981005 c. coding.display = " Resting heart rate " b. A valueQuantity with: a. A value b. Unit = "bpm"

RWD Sensors

FHIR Resource	Observation
Name	Arrhythmia alarms - Bradycardia
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 185087000 c. coding.display = " Notifications" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 48867003 c. coding.display = " Bradycardia"

RWD Sensors	
FHIR Resource	Observation
Name	Arrhythmia alarms - Tachycardia
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 185087000 c. coding.display = " Notifications" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 3424008 c. coding.display = " Tachycardia"

RWD Sensors	
FHIR Resource	Observation
Name	Arrhythmia alarms - Atrial fibrillation
FHIR requirements	An Observation which must have: a. A code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 185087000 c. coding.display = " Notifications" b. A valueCodeableConcept with: a. coding.system = "http://snomed.info/sct" b. coding.code = 49436004 c. coding.display = " Atrial fibrillation"

6.13 Events

Events	
FHIR Resource	Condition
Name	Death
FHIR requirements	A condition which must have: I. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 419620001 c. coding.display = "Death"

Events	
FHIR Resource	Observation
Name	Date death
FHIR requirements	An observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399753006 c. coding.display = "Date of death" b. One valueDateTime

Events	
FHIR Resource	Observation
Name	Type death
FHIR requirements	An observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 184305005 c. coding.display = "Cause of death" b. One valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/TypeDeath" b. coding.code = * c. coding.display = * d. text = **
Notes	* 0: CV 1: non-CV ** freetext

Events	
FHIR Resource	Condition
Name	HF admission
FHIR requirements	A condition which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 416683003 c. coding.display = "Emergency hospital admission for heart failure"

Events	
FHIR Resource	Observation
Name	Number HF admission
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 84114007 c. coding.display = "Heart failure" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 298060002r c. coding.display = "Number of admissions " c. One valueQuantity with: a. A value

Events	
FHIR Resource	Condition
Name	HF decompensation needing iv. Diuretic-inotrops
FHIR requirements	A condition which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 424404003 c. coding.display = "Decompensated chronic heart failure"

Events	
FHIR Resource	Observation
Name	Number HF decompensations

Events

FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 87228002 c. coding.display = "Decompensation" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 298060002r c. coding.display = "Number of admissions " c. One valueQuantity with: a. A value
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Events

FHIR Resource	Observation
Name	Date HF decomp
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 87228002 c. coding.display = "Decompensation" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399423000 c. coding.display = "Date of admission" c. One valueDateTime

Events

FHIR Resource	Condition
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Events	
Name	CV admission other than HF
FHIR requirements	A condition which must have: d. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 103 c. coding.display = "CV admission other than HF" e. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 32485007 c. coding.display = "Hospital admission "

Events	
FHIR Resource	Observation
Name	Number of CV admissions
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 103 c. coding.display = "CV admission other than HF" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 298060002r c. coding.display = "Number of admissions " c. One valueQuantity with: a. A value

Events	
FHIR Resource	Observation
Name	Date CV admission

Events	
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 103 c. coding.display = "CV admission other than HF" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399423000 c. coding.display = "Date of admission" c. One valueDateTime d. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 410657003 iii. coding.display = "Type" b. One valueCodeableConcept with: i. coding.system = "https://www.retention-project.eu/ig/CodeSystem/TypeOfCvAdmission" ii. coding.code = * iii. coding.display = * iv. text = **
Notes	* 0: stroke/TIA 1: bleeding 2: rejection 3: driveline infection 4: arrhythmia 5: other ** freetext

Events	
FHIR Resource	Condition
Name	Other non-CV admissions

Events

FHIR requirements	A condition which must have: a. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 104 c. coding.display = "Other non-CV admissions" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 32485007 c. coding.display = "Hospital admission "
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Events

FHIR Resource	Observation
Name	Number of non-CV admissions
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 104 c. coding.display = "Other non-CV admissions" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 298060002 c. coding.display = "Number of admissions " c. One valueQuantity with: a. A value

Events

FHIR Resource	Observation
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Events	
Name	Date non-CV admission
FHIR requirements	An observation which must have: e. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Helper" b. coding.code = 104 c. coding.display = "Other non-CV admissions" f. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 399423000 c. coding.display = "Date of admission" g. One valueDateTime h. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 410657003 iii. coding.display = "Type" b. One valueCodeableConcept with: i. One text = *
Notes	* freetext

Events	
FHIR Resource	Condition
Name	Heart failure related visit
FHIR requirements	A condition which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 84114007 c. coding.display = "Heart failure" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 103324002 c. coding.display = "Patient visit for"

Events	
FHIR Resource	Condition
Name	Unplanned emergency department visits

Events

FHIR requirements	A condition which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 4525004 c. coding.display = "Emergency department patient visit"
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Events

FHIR Resource	Observation
Name	Unplanned emergency department visit date
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 4525004 c. coding.display = "Emergency department patient visit " b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 406543005 c. coding.display = "Date of visit" c. One valueDateTime d. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 439401001 iii. coding.display = "Diagnosis" b. One valueCodeableConcept with: i. One text = *
Notes	* freetext

Events

FHIR Resource	Observation
Name	Rejection needing treatment in HT

Events	
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 72627004 c. coding.display = "Graft rejection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 439771001 c. coding.display = "Date of event" c. One valueDateTime d. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 410657003 iii. coding.display = "Type" b. One valueCodeableConcept with: i. coding.system = "https://www.retention-project.eu/ig/CodeSystem/TypeOfRejection" ii. coding.code = * iii. coding.display = *
Notes	* 0: none 1: cellular 2: humoral 3: mixed

Events	
FHIR Resource	Observation
Name	CMV infection requiring medical treatment
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 28944009 c. coding.display = "Cytomegalovirus infection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 410672004 c. coding.display = "Date property" c. One valueDateTime

Events	
FHIR Resource	Observation

Events	
Name	Infection
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 40733004 c. coding.display = "Infectious disease" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 410672004 c. coding.display = "Date property" c. One valueDateTime d. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 410657003 iii. coding.display = "Type" b. One valueCodeableConcept with: i. One text = *
Notes	* freetext

Events	
FHIR Resource	Observation
Name	Drive line infection
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 764680009 c. coding.display = "Infection of left ventricular assist device driveline" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 410672004 c. coding.display = "Date property" c. One valueDateTime d. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 281789004 iii. coding.display = "Antibiotic therapy" b. One valueCodeableConcept with: i. One text = *
Notes	* freetext

Events	
FHIR Resource	Observation
Name	Drive line Reinfection
FHIR requirements	An observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct " b. coding.code = 255230006 c. coding.display = "Reinfection" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 410672004 c. coding.display = "Date property" c. One valueDateTime d. One component with: a. One code with: i. coding.system = "http://snomed.info/sct" ii. coding.code = 281789004 iii. coding.display = "Antibiotic therapy" b. One valueCodeableConcept with: i. One text = *
Notes	* freetext

Events	
FHIR Resource	Observation
Name	Infection in other LVAD components
FHIR requirements	An observation which must have: c. One category with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention " b. coding.code = 311 c. coding.display = "Infection in other LVAD components" d. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 410672004 c. coding.display = "Date property" e. One valueDateTime f. One component with: a. One code with:

Events	
	i. coding.system = "http://snomed.info/sct" ii. coding.code = 281789004 iii. coding.display = "Antibiotic therapy" b. One valueCodeableConcept with: i. One text = *
Notes	* freetext

Events	
FHIR Resource	Condition
Name	Included in heart transplant list due to driveline infections
FHIR requirements	A condition which must have: a. One code with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/Retention " b. coding.code = 312 c. coding.display = "Included in heart transplant list due to driveline infections "

6.14 Other data

Other Data	
FHIR Resource	Observation
Name	Fluid intake
FHIR requirements	An Observation which must have: a. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 251992000 c. coding.display = "Fluid intake" b. A valueQuantity with: a. One value b. Unit ="ml"

6.15 Special Events

Special Event	
FHIR Resource	Observation
Name	VAD Power – Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003 c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 306 c. coding.display = "VAD power" b. A valueQuantity with: a. One value b. Unit = "Watt"

Special Event	
FHIR Resource	Observation
Name	VAD PI – Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003 c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 307 c. coding.display = "VAD PI" c. A valueQuantity with: a. One value b. Unit = "Pulse Index"

Special Event	
FHIR Resource	Observation
Name	Body weight - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 726527001 c. coding.display = "Weight" c. A valueCodeableConcept with: a. coding.system = " https://www.retention-project.eu/ig/CodeSystem/BodyWeight" b. coding.code = * c. coding.display = *
*Notes	0: Gain >1kg in one day 1: Gain ≥3kg in 2 days

Special Event	
FHIR Resource	Observation
Name	Peripheral capillary oxygen saturation - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 442440005 c. coding.display = "Capillary oxygen saturation" c. A valueCodeableConcept with:

Special Event	
	a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/PeripheralCapillaryOxygenSaturation" b. coding.code = * c. coding.display = *
*Notes	0: <95 1: <90

Special Event	
FHIR Resource	Observation
Name	Body Temperature - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003 c. coding.display = "Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 386725007 c. coding.display = "Body Temperature" c. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/BodyTemperature" b. coding.code = * c. coding.display = *
*Notes	0: 37.2-37.8 1: >37.8

Special Event	
FHIR Resource	Observation
Name	Heart rate - Special Event

Special Event	
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003 c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 364075005 c. coding.display = "Heart rate" c. A valueCodeableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/HeartRate" b. coding.code = * c. coding.display = *
*Notes	0: <40 1: <50 2: >110 3: >150

Special Event	
FHIR Resource	Observation
Name	Dyspnea - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003 c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 267036007 c. coding.display = "Dyspnea " c. A valueQuantity with: a. One value b. Unit = "-"

Special Event	
FHIR Resource	Observation
Name	Fatigue - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 84229001 c. coding.display = "Fatigue" c. A valueQuantity with: a. One value b. Unit = "-"

Special Event	
FHIR Resource	Observation
Name	Dizziness - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 404640003 c. coding.display = "Dizziness" c. A valueQuantity with: a. One value b. Unit = "-"

Special Event	
FHIR Resource	Observation
Name	Palpitations - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 80313002 c. coding.display = "Palpitations" c. A valueQuantity with: a. One value b. Unit = "-"

Special Event	
FHIR Resource	Observation
Name	Other - Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 74964007 c. coding.display = "Other" c. A valueQuantity with: a. One value b. Unit = "-"

Special Event	
FHIR Resource	Observation
Name	Systolic blood pressure – Special Event
FHIR requirements	An Observation which must have: a. One category with: a. coding.system = "http://snomed.info/sct" b. coding.code = 405615003" c. coding.display = " Notable event" b. One code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 75367002 c. coding.display = "Blood pressure" c. One component with: one code with: a. coding.system = "http://snomed.info/sct" b. coding.code = 271649006 c. coding.display = "Systolic Blood pressure" d. A valueCodableConcept with: a. coding.system = "https://www.retention-project.eu/ig/CodeSystem/SystolicBloodPressure" b. coding.code = * c. coding.display = *
*Notes	0: <90 1: <100 2: >140 3: >150

6.16 Questionnaires

QuestionnairePhq9	
type	Questionnaire
FHIR requirements	1. A Questionnaire resource where: a. url = "https://www.retention-project.eu/ig/Questionnaire/QuestionnairePhq9" b. name = "PHQ-9" c. title = "Questionnaire PHQ-9" d. version = "1.0.0" e. code = "http://snomed.info/sct#895537006" f. item[0] must have: i. linkId = 0 ii. type = "integer" iii. text = "Depression Severity score: [0, 27]"

QuestionnaireKccq	
type	Questionnaire
FHIR requirements	1. A Questionnaire resource where: a. url = "https://www.retention-project.eu/ig/Questionnaire/QuestionnaireKccq" b. name = "KCCQ" c. title = "Questionnaire KCCQ" d. version = "1.0.0" e. code = "http://loinc.org#71941-9" f. item[0] must have: i. linkId = 0 ii. type = "integer" iii. text = "Health status score: [0, 100]"

QuestionnaireCbqHf	
type	Questionnaire
FHIR requirements	1. A Questionnaire resource where: a. url = " https://www.retention-project.eu/ig/Questionnaire/Questionnaire CbqHf" b. name = "CBQ-HF" c. title = "Questionnaire CBQ-HF" d. version = "1.0.0" e. item[0] must have: i. linkId = 0 ii. type = "integer" iii. text = " Questionnaire CBQ-HF score"

QuestionnaireMoca	
type	Questionnaire
FHIR requirements	1. A Questionnaire resource where: a. url = " https://www.retention-project.eu/ig/Questionnaire/Questionnaire Moca" b. name = "MoCA" c. title = "Questionnaire MoCA" d. version = "1.0.0" e. code = "http://snomed.info/sct#443597000" f. item[0] must have: 1. linkId = 0 2. type = "integer" 3. text = "Visuospatial: [0, 5]" g. item[1] must have: 1. linkId = 1 2. type = "integer" 3. text = "Naming: [0, 3]" h. item[2] must have: 1. linkId = 2 2. type = "integer" 3. text = "Memory: [0, 10]" i. item[3] must have: 1. linkId = 3 2. type = "integer" 3. text = "Attention-1: [0, 2]"

QuestionnaireMoca	
	j. item[4] must have: - linkId = 4 - type = "integer" - text = "Attention-2: [0, 1]" k. item[5] must have: - linkId = 5 - type = "integer" - text = "Attention-3: [0, 3]" l. item[6] must have: - linkId = 6 - type = "integer" - text = "Language-1: [0, 2]" m. item[7] must have: - linkId = 7 - type = "integer" - text = "Language-2: [0, 1]" n. item[8] must have: - linkId = 8 - type = "integer" - text = " Abstraction: [0, 2]" o. item[9] must have: - linkId = 9 - type = "integer" - text = "Delayed recall: [0, 5]" p. item[10] must have: - linkId = 10 - type = "integer" - text = " Orientation: [0, 6]" q. item[11] must have: - linkId = 11 - type = "integer" - text = "Age <= 12: [0, 1]" r. item[12] must have: - linkId = 12 - type = "integer" - text = " Total: [0, 30]"

QuestionnaireMna	
type	Questionnaire

QuestionnaireMna	
FHIR requirements	1. A Questionnaire resource where: a. url = "https://www.retention-project.eu/ig/Questionnaire/Questionnaire Mna" b. name = "MNA" c. title = "Questionnaire MNA" d. version = "1.0.0" e. code = "http://snomed.info/sct#895537006" f. item[0] must have: i. linkId = 0 ii. type = "integer" iii. text = " Malnutrition Indicator Score: [0, 30]"

Questionnaire Symptoms	
type	Questionnaire
FHIR requirements	1. A Questionnaire resource where: a. url = "https://www.retention-project.eu/ig/Questionnaire/Questionnaire Symptoms" b. name = "Symptoms" c. title = "Questionnaire Symptoms" d. version = "1.0.0" e. item[0] must have: 1. linkId = 0 2. type = "choice" 3. text = " How are you feeling today?" f. item[1] must have: 1. linkId = 1 2. type = "boolean" 3. text = " Have you noticed more leg oedema?" g. item[2] must have: 1. linkId = 2 2. type = "integer" 3. text = " Are you short of breath? [0, 10]" h. item[3] must have: 1. linkId = 3 2. type = "integer"



Questionnaire Symptoms

- 3. text = " Are you dizzy? [0, 10]"
- i. item[4] must have:
 - 1. linkId = 4
 - 2. type = "integer"
 - 3. text = " Are you feeling weak? [0, 10]"
- j. item[5] must have:
 - 1. linkId = 5
 - 2. type = "display"
 - 3. text = " Other symptom"