Mapping the SPHN Dataset to FHIR

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Abstract. Several European health data research initiatives aim to make health data FAIR for research and healthcare, and supply their national communities with coordinated data models, infrastructures, and tools. We present a first map of the Swiss Personalized Healthcare Network dataset to Fast Healthcare Interoperability Resources (FHIR®). All concepts could be mapped using 22 FHIR resources and three datatypes. Deeper analyses will follow before creating a FHIR specification, to potentially enable data conversion and exchange between research networks.

Keywords. Standards, Interoperability, FHIR, SPHN, RDF, Datasets

1. Introduction

The Swiss Government funds the Swiss Personalized Health Network (SPHN) to foster the ability to share health data for research and ultimately enable personalized health, as part of their eHealth strategy. The SPHN and German Medical Informatics Initiative (MII) share these goals and create, validate and implement necessary data infrastructures and tools [1, 2]. The “SPHN Semantic Interoperability Framework” includes a dataset composed of fully defined, combinable informational units (concepts), that can be bound to semantic standards and value sets. A Resource Description Framework (RDF) schema is used as exchange format [3]. The MII chose the syntactic standard Fast Healthcare Interoperability Resources (FHIR), building on resources leveraging semantic standards to define content and structure of healthcare concepts [4]. Envisaging to enable data exchange between research networks, we present a first analysis of a SPHN to FHIR map.

2. Methods

We filtered the SPHN dataset (version 2022.1) [5] on the columns “active status (yes/no)” and “concept or concept compositions or inherited”. Two authors mapped independently

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the active concepts to FHIR (v4.0.1) based on their descriptions and noted information from the specification [4]. All authors discussed both maps to derive a consolidated map.

3. Results and Discussion

All active SPHN concepts could be mapped to FHIR using 22 unique FHIR resources (59/63 SPHN concepts), and three datatypes (4/63 SPHN concepts): Most were mapped to the “Observation” (20/63), “Patient” (6/63), “Condition” and “Procedure” (both 5/63) resources. Five concepts could not be unambiguously mapped to a single FHIR resource. A more complex modeling is necessary to fully represent 22 SPHN concepts, requiring several FHIR elements used in combination or calculations. For some SPHN concepts, the exact datatype cannot be defined in the map as it might depend on the context [6].

All SPHN concepts could be represented using FHIR resources and datatypes, but several SPHN concepts need a complex representation due to their genericness. By using RDF, the dataset does not follow a data model-based approach, allowing the framework to be applied in a broad way, but impeding direct mapping to FHIR. SPHN aims to cooperate with diverse research communities by developing maps and conversion of the RDF schema [3]. To complete the map and ease the creation of a FHIR specification for the dataset, all other SPHN elements beside “concepts” must be mapped to FHIR, cardinalities evaluated, value sets compared and adapted, and required FHIR elements that currently do not have an equivalent in the SPHN dataset be added. Preexisting FHIR profiles should also be considered during specification. To foster data exchange and improve health research cross-border, an in-depth comparison of the content covered in MII’s core data set modules and the SPHN dataset should be performed as well.

4. Conclusion

Mapping SPHN to FHIR is overall possible. Deeper analyses based on example data should follow before profiling the SPHN dataset in FHIR. Framing the SPHN dataset with a FHIR specification would aid the seamless exchange of research data generated within the SPHN and MII. A conversion tool could be helpful on the long term to enable data exchange between the German and Swiss health research communities.

References