

# Mapping of OpenEHR Archetypes to FHIR Resources in Use Case Oncology

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**Abstract.** Unambiguous data exchange among healthcare systems is essential for error-free reporting and improved patient care. Mapping of different standards plays a crucial role in making different systems communicate with each other and have an efficient healthcare systems. This work focuses on exploring the possibilities of semantic interoperability between two widely used clinical modelling standards, OpenEHR and FHIR (Fast Healthcare Interoperability Resources). A manually curated map is being developed where the same semantically meaning OpenEHR Archetypes are mapped to the relevant FHIR Resources.

**Keywords.** OpenEHR, FHIR, OpenEHR Templates, Semantic Interoperability, HiGHmed

## 1. Introduction

OpenEHR is a technology for e-health, consisting of open specifications, clinical models, and software that can be used to create standards, and build information and interoperability solutions for healthcare [1]. It is an open-source healthcare information modeling standard that enables modelling of interoperable Electronic Health Records (EHRs). It started in response to the absence of an open-source platform for the exchange of clinical data. The standard is maintained by a community of healthcare professionals and software developers. Since its inception, it has been used widely across the globe [2–4].

On the other hand, FHIR (Fast Healthcare Interoperability Resources) is also an emerging open standard in healthcare. It is considered as “HTML” of healthcare [5], it facilitates extensive data modeling and data exchange, irrespective of the necessity of a common Electronic Health Record (EHR) system. Transitioning the patient data to FHIR would make the data able to connect various applications and increases interoperability significantly.

HiGHmed Consortium [6] uses OpenEHR as a standard for clinical data exchange. However, there are some use cases where usage of FHIR is foreseen and required. For that purpose mapping between both those emerging standards was needed.

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2. Methods

The archetypes associated with the use case Oncology in OpenEHR Clinical Knowledge Manager (CKM) [7] have been identified and downloaded. The components of the archetypes were analyzed and extracted into an excel file. Each data element of OpenEHR archetypes was searched on the HL7 FHIR website [8] manually for the corresponding resource term. The FHIR resource elements, which had the same semantic meaning as OpenEHR archetypes elements, were mapped into the excel file accordingly.

3. Results

A mapping table was created that contains the archetype elements mapped to resource elements with the web address but also the archetypes elements that can not be mapped when the subsequent resource elements were not found. Figure 1 shows the table of mapped terms.

Archetype	Archetype Element	FHIR Resource Element	Webpage
openEHR-EHR-EVALUATION.problem_diagnosis.v0	Date/time of onset	Condition.recordedDate	<a href="https://www.hl7.org/fhir/...Condition.code">https://www.hl7.org/fhir/...Condition.code</a>
openEHR-EHR-EVALUATION.problem_diagnosis.v0	Severity	Condition.severity	<a href="https://www.hl7.org/fhir/...Condition.severity">https://www.hl7.org/fhir/...Condition.severity</a>
openEHR-EHR-EVALUATION.problem_diagnosis.v0	Status	Condition.clinicalStatus	<a href="https://www.hl7.org/fhir/...Condition.clinicalStatus">https://www.hl7.org/fhir/...Condition.clinicalStatus</a>
openEHR-EHR-EVALUATION.problem_diagnosis.v0	Comment	Condition.note	<a href="https://www.hl7.org/fhir/...Condition.note">https://www.hl7.org/fhir/...Condition.note</a>

**Figure 1.** The table shows the OpenEHR archetype in first column, its captured elements in second column, corresponding FHIR resource elements and web address in third and fourth columns respectively.

Our findings show that archetypes were more specific as they were designed by clinical domain experts and they are consist of a formal model. Their elements could only be mapped to only one FHIR resource element. On the contrary, FHIR resource elements could be mapped to more than one archetype element.

In addition, different elements of a single archetype can be mapped to multiple resources because a single FHIR resource does not cover all the information that a single archetype contains. It was also noticed that there are FHIR resources that overlap with each other and the boundaries are not strict in FHIR.

4. Discussion and Conclusion

A mapping between different standards is crucial for the efficient data exchange among different standards. It is a complex and time-consuming process. The emerging new health data standards, FHIR and OpenEHR, require to communicate as each of them has limitations. The manual mapping between both standards not only make it easier to understand the data representation in a different context but also streamline the data exchange. The mutual understanding of the limitations of each standard and the development of tools designed to facilitate communication among different standards is highly desirable.

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## References

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