



EHE Person and Patient Register

Commercial Description

Version 5.1

1 Introduction

Electronic Healthcare Exchange (EHE) is a line of products fulfilling a variety of eHealth system needs, ranging from fundamental ones like infrastructure, security, and integration, over exchange and management of clinical documents and discrete medical information, to advanced functionalities like clinical decision support. Solutions made of different EHE products, alone or through integration with the existing infrastructure, support a wide range of processes in a healthcare system.

One of the fundamental elements to consider when building a healthcare information system is the establishment of the person and patient register in which the identification and administrative data of all persons connected to the healthcare system - patients, health professionals, administrators, etc., are stored.

The EHE Person and Patient Register is a register of identification and administrative data on patients and people working in healthcare based on the HL7 FHIR standard [1] and the integration profiles IHE PDQm [2][3], IHE PIXm [4] and IHE PMIR [5].

The process of registering persons, i.e., citizens of a certain country, a subset of which are health professionals, administrators, and patients, and managing data about them is usually performed outside the healthcare system and is usually in the domain of the Ministry of Internal Affairs. For this reason, data on persons in the healthcare system are synchronized from the existing registers and databases. Data on persons synchronized in this way are not changed within the healthcare system.

Data on persons and patients within the health system are managed in two basic ways:

- centralized registration of persons and patients and centralized management of their data
- distributed registration of persons and patients and distributed management of their data.

In the case of centralized registration of persons and patients and management of their data, a dedicated organization in the healthcare system collects information about them and assigns them a unique identifier that is then used in the healthcare system at the national or regional level. In this case, the EHE Person and Patient Register enables synchronization of data on persons and patients from the existing registers and patient databases.

In the case of distributed registration of persons and patients and management of their data, the health organization where the healthcare professionals and administrators work or patients are treated, collects information about them and assigns them a unique identifier. In this case, it is common for patients to have a different identifier in each health institution where they were provided with health care. The EHE Person and Patient Register supports this mode of operation by employing a graphical user

interface, which users in healthcare organizations can use to register persons and patients and manage their data, or by employing an integration interface.

Regardless of whether it is a centralized or distributed registration, the EHE Person and Patient Register enables the registration and management of data on special categories of patients, such as newborns and patients whose identity cannot be determined.

The EHE Person and Patient Register also enables linking of various patient records and identifiers (newborn, unidentifiable patient, patient records in various healthcare facilities in the case of distributed patient registration and management) with a real person using a graphical user interface or an integration interface.

The EHE Person and Patient Register supports the following functionalities:

- storage of identification and administrative data on persons and patients in accordance with the HL7 FHIR standard
- synchronization of data on persons and patients from external data sources
- creation, management and search of patient data using integration services
- creation and management of special categories of patients such as:
 - newborn whose data does not yet exist in the Register
 - person whose identity cannot be determined (for example, an unconscious person, a person without personal documents or companions)
 - foreigner (if not registered in the reference system)
- merge of different records for the same person (e.g. when the patient is registered multiple times in different institutions).

The set of data managed in the Register largely depends on where it is implemented and for what purpose it is used, which depends on the legislation of the individual country. Also, an important determinant is the level at which the Register is implemented - national, regional or within a health institution.

Examples of data on persons or patients that can be managed in the register are:

- first name
- last name
- patient identifier

- EHE Person and Patient Register supports a large number of different identifiers, whether they come from an external system with which the Register is integrated (identity number, passport number, etc.) or whether they are internally generated for persons for whom new entries are created in special cases (foreigners, newborns, persons whose identity cannot be determined)
- gender
- date of birth
- marital status
- addresses (place of residence, temporary address, contact address)
- contact data (e-mail, phone)
- photograph
- citizenship
- data on the document that establishes identity
 - document number
 - type of document (a code list is used, which does not limit the number of different documents)
 - document issuance date and/or document expiration date.

The structure of data about persons and patients and how these data are stored in the EHE Person and Patient Register using the FHIR resources is shown in Figure 1.

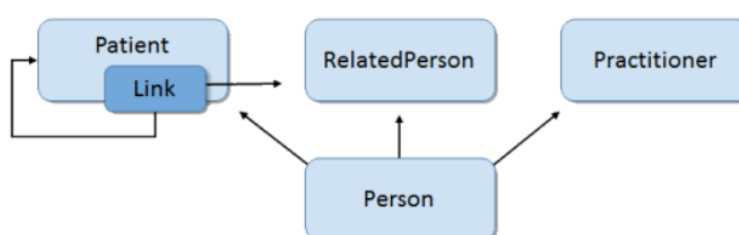


Figure1 - Structure of data on persons and patients

2 Technical Aspects

As described earlier, the EHE Person and Patient Register enables the search and retrieval of identification and administrative data on persons and patients, as well as their registration and data management via an integration interface.

The EHE Person and Patient Register implements a service for retrieving administrative data on persons and patients aligned with the IHE PDQm integration profile [3]. The Patient Demographics Supplier component and the Mobile Patient Demographics Query [ITI-78] operation of that profile have been implemented.

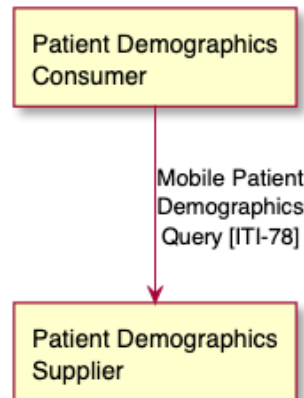


Figure 2 – IHE PDQm integration profile components and transactions

To retrieve all patient identifiers, the EHE Person and Patient Register implements a service compliant with the IHE PIXm integration profile [4]. The Patient Identifier Cross-reference Manager component and the Mobile Patient Identifier Cross-reference Query [ITI-83] operation of that profile have been implemented.

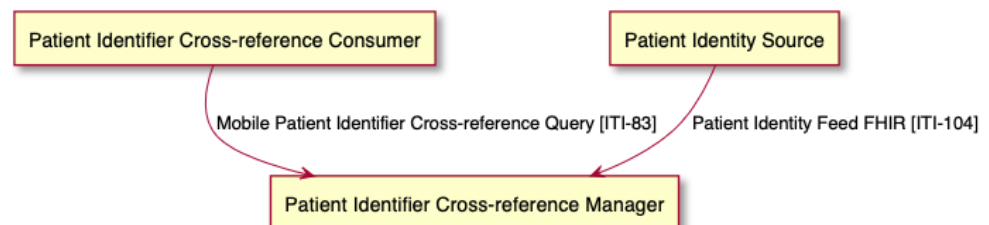


Figure 3 – IHE PIXm integration profile components and transactions

For the purposes of patient registration and patient data management, the EHE Person and Patient Register implements a service aligned with the IHE PMIR integration profile [5]. The Patient Identity Register component and the Mobile Patient Identity Feed [ITI-93] operation of that profile have been implemented.

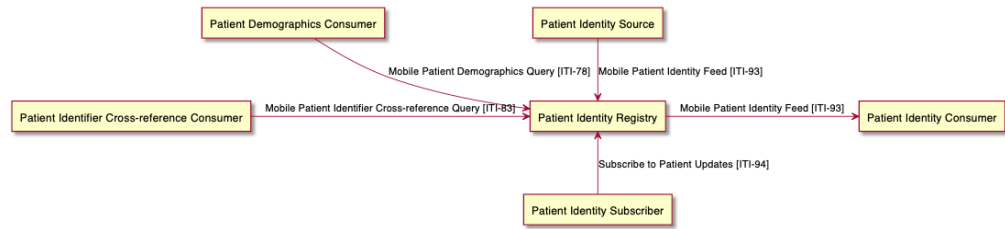


Figure 4 – IHE PMIR Integration Profile Components and Transactions

For the purpose of synchronizing data on persons and/or patients from external data sources, specialized components are used that semantically and syntactically harmonize data from the data source with the syntax and semantics of the data in the EHE Person and Patient Register.

Since the data source is different in each project and various standard and non-standard interfaces are used for retrieving data, such specialized components are developed separately for the needs of each project and are not part of this product.

3 Interdependencies

The EHE Person and Patient Register depends on the following components:

- EHE FHIR Repository [6] – It is also possible to use other suppliers' data repository compliant with the FHIR R4 standard.
- EHE Terminology Services [7] – It is possible to use other suppliers' terminology repository and a terminology service provider compliant with the FHIR R4 standard and IHE SVCM integration profile.
- EHE Infrastructure [8].

To implement the EHE Person and Patient Register, it is necessary to provide the operating system Ubuntu Linux.

The components of the EHE Person and Patient Register can be installed on physical servers, in virtual machines or containers.

4 Free and Open Source Software

This product uses free and open source software (FOSS) components with the following licenses:

- Apache Software License 2.0 [9]
- MIT License [10]
- Eclipse Distribution License [11]
- Eclipse Public License [12]

- Creative Commons CC0 [13]
- BSD License (2 clause and 3 clause) [14]
- Bouncy Castle License [15]
- Common Development and Distribution License [16]
- GNU Library General Public License [17]
- Mozilla Public License (MPL) [18].

5 Version

The current product version is 5.1.

6 References

- [1] HL7 FHIR (Fast Healthcare Interoperability Resources) - This is a standard that describes data formats and elements and an application programming interface for electronic health record exchange. It was created by Health Level Seven, an organization for international health standards. The specification is available at <https://www.hl7.org/fhir/>.
- [2] IHE (Integrating the Healthcare Enterprise) – This is a joint initiative of healthcare professionals and industry with the aim of improving the way in which information systems and applications in healthcare exchange information by defining integration profiles that determine standards to solve common integration tasks in healthcare (<https://ihe.net>).
- [3] IHE PDQm (Patient Demographics Query for Mobile) – a profile that is defined by a simple RESTful interface according to the patient's demographics – specification available at <https://profiles.ihe.net/ITI/PDQm/>.
- [4] IHE PIXm (Patient Identifier Cross-Reference for Mobile) – profile that is defined by a simple RESTful interface for retrieving patient identifiers across domains – specification available at <https://profiles.ihe.net/ITI/PIXm/>.
- [5] IHE PMIR (Patient Master Identity Registry) – profile that supports creating and updating patient data using HL7 FHIR resources and RESTful transactions - specification available at <https://profiles.ihe.net/ITI/PMIR/>.

- [6] EHE FHIR Repository – standard Ericsson Nikola Tesla product which enables data management and storage based on the HL7 FHIR standard.
- [7] EHE Terminology Services – standard Ericsson Nikola Tesla’s product which enables the use of terminologies, terminological operations and management of terminologies (code lists, concept groups, concept maps) based on the HL7 FHIR standard and the IHE SVCM integration profile.
- [8] EHE Infrastructure – standard Ericsson Nikola Tesla’s product which implements the functions necessary for the operation, internal communication and monitoring of the components of the solution.
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