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eHealth Suisse

eMedication in the context of the Electronic Patient Record

Summary of the implementation Concept

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Zweck und Positionierung dieses Dokuments

Implementierungskonzept für einen nationalen eMedication Service: Überprüfung bestehender Lösungen, Untersuchung möglicher Architekturen in Bezug auf die EPD-Infrastruktur und Empfehlung einer Architektur, die die Anforderungen erfüllt und gleichzeitig die Auswirkungen auf die EPD-Gesetzgebung minimiert.

Im Interesse einer besseren Lesbarkeit wird auf die konsequente gemeinsame Nennung der männlichen und weiblichen Form verzichtet. Wo nicht anders angegeben, sind immer beide Geschlechter gemeint.

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1 Context

The continuity of medication is of primary importance for patient safety: indeed it is recognized that a significant percentage¹ of emergency admissions in hospitals is due to medication “problems” – wrong intake, wrong posology, incompatible medications, etc. Medication anamnesis is also a key element during the admission phase into a hospital or any other medical structure. Considering that at least two sources should be taken into account, having at disposal an as complete and accurate as possible list of current and possibly past medication is a key advantage.

Context

While ePrescription addresses the logistic aspects related to prescription and dispense – including possible actions against falsified prescriptions - optimal medication anamnesis benefits more from medication lists (e.g. active medications, medication history).

The new EPR law addresses the problem of the access to the information by the patient and the sharing of this information with his/her healthcare providers. As such it provides key founding functionality like document sharing, access control, stakeholders’ identification, logging and traceability. However high expectations are placed on value added services, considering that the full power of the EPR will be revealed by such services. Among the EPR related services is one considered often as a “killing application”: the shared medication treatment plan. Indeed many care processes do need an as exhaustive as possible medication overview, with important benefits for the **quality of therapeutic processes and the patient safety**. The expectations of health professionals are high in **improving their work** with regards to medication management thanks to the EPR environment. However the current architecture of the EPR do not enable the secured and easy access of an updated, accurate patient medication list and its history. Moreover, any on-the-fly² consolidation of all the documents in the EPR system may suffer from performance issues for bringing the actual view of the medication to the patient and his or her authorized professionals as the content may come from different communities.

A working group has been established in order to create an eMedication Service Concept for an eMedication Service. The concept has to rely on existing Communities (establishing a value added service on top of existing EPR functionality) while minimizing required changes or evolution of exiting regulations.

eMedication Service
Concept

¹ Recent studies are mentioning a percentage around 8% – 10%.

² I.e. in real time.

2 Requirements

The key requirements which have to be fulfilled by the eMedication Service Concept are the following:

Key requirements

- Smooth integration into EPR Communities landscape comprising Communities and Reference Communities;
- Use of international IHE Profiles for a standard-based approach;
- Compatibility with EPR Law and Ordinances establishing the global framework and defining a set of key rules;
- Provision of a service with a real added value to its users in terms of functionality;
- Performance is a key issue;
- Many different profiles of users are contributing to the shared medication treatment plan: physicians, pharmacists, nurses, etc. but also patients;
- Contributors may belong to different communities;
- Patients are willing to distinguish between access to their eMedication information and access to the other documents available in their EPR.

3 Evaluated architectures

In order to fulfil these requirements, several architectures have been analysed and PROs and CONs were described. A unanimous consensus was reached in favour of a distributed solution with several eMedication Services with the following key characteristics:

One architecture reached consensus

- There is one eMedication Service per community;
- A full service is implemented in reference communities' eMedication Service (including an eMedication Repository);
- A proxy service is implemented in non-reference communities;
- Primary systems are connected either to their community of affiliation (for non eMedication interactions) or to the eMedication Service of their community of affiliation (for all eMedication related transactions).

Distributed service over every community, distributed storage over reference communities only

The other five architectures which were studied in details had the following key characteristics:

1. The first studied architecture is based on a national component called "eMedication Service". The eMedication Service implements all the necessary functionality and stores every eMedication document into a single local eMedication Repository. Primary systems are connected either to their community of affiliation (for non eMedication interactions) or to the national eMedication Service (for all eMedication related transactions).

Centralized service, centralized storage

2. The second architecture foresees one eMedication Service per reference community, each with its own eMedication Repository. Primary systems are connected either to their community of affiliation (for non eMedication interactions) or to the eMedication Service of the reference community of the patient_(for all eMedication related transactions).
Distributed service and distributed repository over reference communities only
3. The third architecture is a variation of the selected one and foresees one national eMedication Service like architecture 1 but with a distributed eMedication Repository: there is one eMedication Repository in each Reference Community and eMedication documents are stored into the eMedication Repository of the Reference Community of the patient. Primary systems are connected either to their community of affiliation (for non eMedication interactions) or to the national eMedication Service (for all eMedication related transactions).
Centralized service, distributed storage over reference communities only
4. Version 4 foresees a full implementation of the eMedication Service in each community. Each eMedication Service implements its own local eMedication Repository, introducing a need for synchronization between eMedication Services. Primary systems are connected either to their community of affiliation (for non eMedication interactions) or to the eMedication Service of their community of affiliation (for all eMedication related transactions).
Distributed service and storage over every community
5. Finally version 5 integrates the eMedication Service into core EPR Community services. There is no eMedication Repository. Primary systems are connected only to their community of affiliation. Access to eMedication documents implies the query of all other communities for getting an exhaustive view.
Extension of core EPR services, distributed service and storage over every community

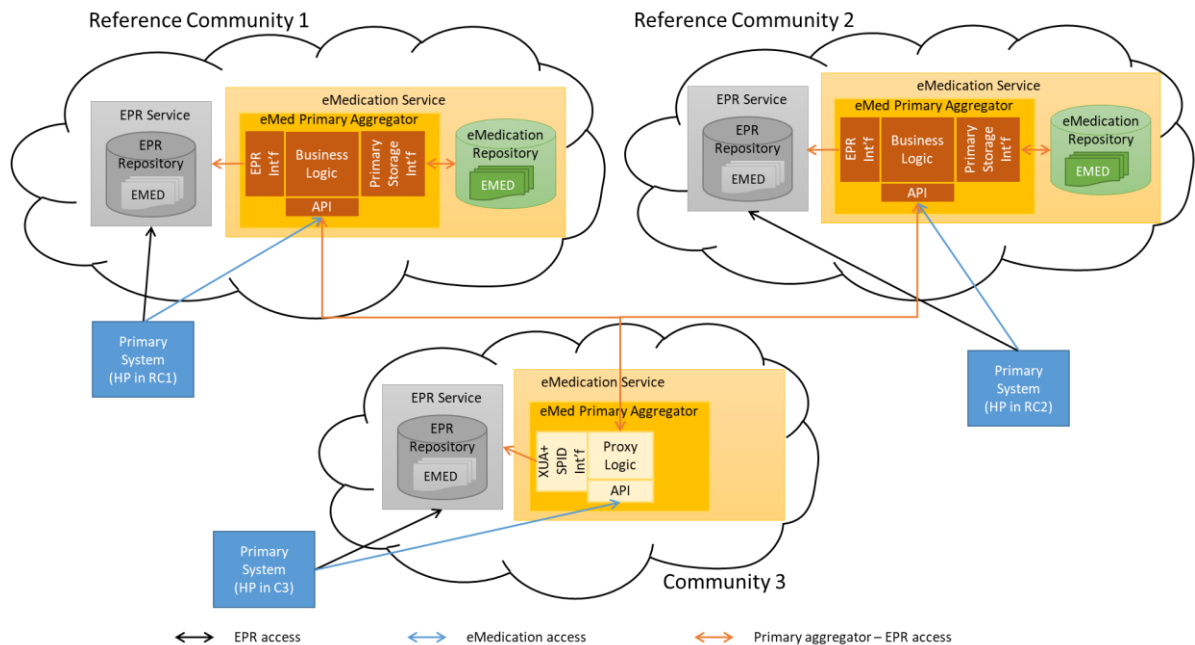
All pros, cons and selection criteria are described in details in the full report.

The rest of this summary addresses only the approved architecture.

4 eMedication Service Architecture

The eMedication Service Architecture is detailed in the figure below:

Architecture



As we can see in the figure, every community implements its own eMedication Service: primary systems connect therefore only to endpoints of the community they are affiliated to.

Every eMedication Service implements the following capabilities:

- Reception and validation of a request;
- Validation of the user by using own community's services ("XUA+SPID Int'f" in Community 3, "EPR Int'f" in Communities 1 and 2);
- Mapping between local patient ID and EPR-SPID by using own community's services ("XUA+SPID Int'f" in Community 3, "EPR Int'f" in Communities 1 and 2);
- Determination of the reference community of the patient, by using community's own services.

In addition, eMedication Services not connected to a reference community implement the following additional capability:

- Proxy functionality for transferring the request towards the eMedication Service of the reference community of the patient.

eMedication Services connected to a reference community implement the following additional capabilities:

- Business logic for implementing the request;
- Management of patient's consent;
- Local eMedication Repository for keeping a local copy of all eMedication documents and Consent documents of the patient;
- Publication of eMedication documents into the patient's reference community (secondary storage).

As described above, there is no central repository of all eMedication documents. There is however an important difference between the distributed storage of the EPR service and the distributed storage of the eMedication service:

- EPR distributed storage is healthcare provider centric, i.e. each document published by a specific healthcare professional are stored into the repository of the community he/she is affiliated to;
- eMedication distributed storage is patient centric, i.e. each eMedication document published for a specific patient has a primary copy into the eMedication repository of the reference community the patient is affiliated to. The secondary copy is published into the patient's reference community.

Two different distributed storage paradigms

The selected architecture offers several key advantages, reason for which is has been preferred over the 4 others:

- Simplicity of use by primary systems: the eMedication Service is like any access point for primary systems. Indeed each EPR platform already offers several entry points (e.g. MPI access, documents access, etc). No need therefore to select the "right" eMedication service – it is the one of the community of affiliation;
- Performance: by accessing a single local eMedication Repository, the business logic has an immediate access to the exhaustive content of the shared medication treatment plan;
- Dedicated access rights management: by dissociating the repository for EPR documents and for eMedication documents, it is possible to dissociate access rules to the eMedication domain from access rules to the EPR domain without over complexifying the access rights management of the EPR platform;
- Patients can opt in / opt out specifically for the eMedication service;
- There is no central repository of all eMedication documents;
- Architecture should ease the use of FHIR-based access by avoiding the implementation of distributed FHIR repositories.

Key advantages

Indeed splitting EPR services and eMedication services (or any further additional service) may introduce complexity for the patient, especially regarding management of access rights. It is however considered that a good user interface for access right managements is of nature of overcoming this drawback.

5 Key recommendations

The eMedication Service Concept makes a certain number of recommendations out of which the key ones are the following:

R1	An eMedication Service implements an eMedication Primary Aggregator and in case it is connected to a Reference Community an eMedication Repository.	eMedication Service
R2	Reference Communities have to implement a full eMedication Service which includes an eMedication Repository. Communities have to implement a limited eMedication Service without the eMedication Repository.	Full eMedication service for reference communities. Proxy for other communities
R3	Primary systems willing to contribute to or access the shared medication treatment plan shall interact with the eMedication Primary Aggregator of their community.	Mandatory use of eMedication service for eMedication
R5	The eMedication Repository is patient centric, i.e. all eMedication documents of one specific patient are stored into the eMedication Repository of the reference community (s)he is affiliated to.	Repository is patient centric
R6	The processing (aggregation and related verifications and validations) of eMedication requests is performed by the eMedication Primary Aggregator of the reference community of the patient.	Business logic in the primary aggregator of the reference community of the patient
R7	A secondary storage for eMedication documents may be implemented. The detailed specifications of the eMedication Service will describe which documents are published into the EPR-XDS.b infrastructure and by which eMedication Service.	Secondary storage for eMedication Documents

R8	eMedication documents (except current medication list document and prescriptions documents) available in the EPR should not be listed by default by the portals but only if the user explicitly asks for getting them. Current medication list document has to be listed by default.	Visibility by default in the EPR for eMedication documents
R11	When a healthcare professional is documenting eMedication information on behalf of another healthcare professional, it shall be documented properly in the published document (author of the medical information versus the person who entered the information into the system) so that the two authors can be clearly identified and distinguished.	Documenting information produced by another healthcare professional
R12	Responsibility of a healthcare professional with regard to medications documented in the shared medication treatment plan by other healthcare professionals shall be clarified in order to establish a safe legal environment for the use of such a collaborative tool.	Responsibility when documenting other's information
R14	Extend the user interface for the access rights management available in the EPR platform in order to support the possibility for the patient to define access rights associated to the users of an external application or service. Access rights definitions are then dispatched to and stored by each responsible component (EPR for EPR access rights, eMedication Service for eMedication access rights, etc.).	Extended access rights management