

EHR in people's hands across Europe



IEHR 1ST ESB MEETING – NOVEMBER 7TH 2019, BERLIN

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> This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 826106



SUMMARY

- GOAL & State of the art
- InteropEHRate EU Architecture
- InteropEHRate Framework



GOAL

cross-border exchange of health data



CURRENT DIGITAL HEALTH DATA ACCESS IN EU

- Citizens use
 - country specific apps to download/send pdf/structured health data from/to national EHRs.
 - different web apps to download (pdf) documents from/to different hospitals/labs.
 - different mobile apps to download/send structured data from/to different hospitals/labs.
- Citizens and HCPs cannot access to health data produced in foreign countries
- Usually third party health data cannot be accessed without internet





HEALTH DATA ACCESS IN USA

• With **Blue Button¹ functionality** (from 2010)

• Citizens can access to their health claims as human readable files from the web sites of many health service providers

¹ Blue Button is a mark of the U.S. Department of Health and Human Services

- With CMS² Blue Button API 2.0 based on SMART on FHIR/OAuth 2.0 (likely mandatory from 2020)
 - Citizens can access their health claims as structured (FHIR) data using any registered app that supports FHIR API
 - Citizens can provide to other applications, services, and research programs access to their health claims data
 - CARIM² Blue Button® data model (30 July 2019) covers more than 240 claim elements
 - Only data produced by Medicare patients can be accessed

² Centers for Medicare and Medicaid Services: a USA federal agency
³ A private alliance including HL7 Argonaut, Apple, Microsoft, Google...

- HCPs cannot access without internet
- HCPs access relay on (centralised) CMS support
- Of course, supports only English

NEW CROSS-BORDER INTEROPERABILITY UNDER TESTING IN **EU**

System Architecture Specification v3.0.0, DG SANTE, CEF eHealth DSI, 2019



<u>eHealth DSI* overall picture</u> **A circle of trust is built between NCP**** in the "eHealth DSI abstract space", the only way a country can exchange with another country.

***eHDSI**: The eHealth Digital Service Infrastructure (eHDSI or eHealth DSI) is the initial deployment and operation of services for cross-border health data exchange under the Connecting Europe Facility (CEF)

**NCP: National Contact Point as referred to in Article 6 of Directive 2011/24/EU

Organisations delegated by each participating Country, acting as a bidirectional way of interfacing between the existing different national functions provided by the national IT infrastructures and those provided by the common European infrastructure, created in eHDSI.

NCPeH: National Contact Point for eHealth, which may act as an organisational and technical gateway for the provision of eHealth Cross-Border Information Services.

NEW CROSS-BORDER INTEROPERABILITY UNDER TESTING IN **EU**

System Architecture Specification v3.0.0, DG SANTE, CEF eHealth DSI, 2019



NEW CROSS-BORDER INTEROPERABILITY UNDER TESTING IN **EU**

With eHDSI

• Every EU country will expose **NCPeH** (National Contact Points for eHealth) to offer to other countries the cross border exchange of **ePrescriptions** and **Patient Summaries**

Limits

- HCPs cannot access to health data produced in foreign countries without internet
- Citizens cannot access to health data produced in foreign countries
- Citizens have no control on health data exchange
- There is limited support for translation
- Based on yet another API





IEHR GOAL To extend eHDSI Architecture to support cross-border exchange of personal health data between Citizens and Institutions



MAIN RESULTS OF InteropEHRate (IEHR)

1. InteropEHRate open specification

Definition of v<u>endor independent</u> technologies that we propose as <u>future EU standard</u> for Citizen Centred <u>mobile interoperability</u>.

2. InteropEHRate Framework The <u>reference implementation</u> of the InteropEHRate Framework.





- 1. FHIR profiles for EHR interoperability
- 2 S-EHR conformance levels

3. Remote protocol for healthcare

4. D2D protocol for healthcare

exchange among two near devices, on encrypted short range channel (e.g. Bluetooth).

5. Remote Protocol for Research

exchange of health data, on internet, between the S-EHR mobile and Research Centre.





IEHR ARCHITECTURE V.1



IEHR EU ARCHITECTURE V.1: COMPONENT VIEW





IEHR EU ARCHITECTURE V.1: NEW KIND OF APPLICATIONS

IEHR architecture includes eHDSI, eIDAS network, health organisation systems and two kinds of <u>new products offered to Citizens</u>

Citizens may chose among products offered by different (public or private) providers. Both products must fulfil the S-EHR conformance levels.

- **S-EHR(s)**: mobile applications used by the Citizen, to store and exchange in a secure way any personal health data, using the InteropEHRate protocols.
- S-EHR Cloud(s): optional cloud services
 - for remote storage/backup of personal health data,
 - allowing HCPs to access to health data in case there is an emergency and the Citizen S-EHR is not available.



IEHR EU ARCHITECTURE V.1: 4 FHIR BASED APIS

Interface	Offered By	Description
MD2DI Mobile Device to Device Interface	Citizen's S-EHR (Any mobile app that fulfils the S-EHR conformance levels)	Used by any application of HCPs to exchange health data with citizen's S-EHRs at short distance, without using internet (i.e. using the D2D protocol).
TD2DI Terminal Device to Device Interface	HealthCare Organization IS	Used by the Citizen's S-EHR to exchange health data with any application of HCPs at short distance, without using internet (i.e. using the D2D protocol).
R2DI Remote to device interface	HealthCare Organization IS	Used by the Citizen's S-EHR to exchange health data with the HCO by means of internet (according to the R2D protocol).
RSI Research Interface	Research Centre IS	Used by the Citizen's S-EHR to obtain descriptions of medical research initiatives and to send health data and consent for usage (according to the IEHR research protocol).



IEHR FRAMEWORK V.1: EXAMPLE



IEHR FRAMEWORK: DEPLOYMENT VIEW



IEHR FRAMEWORK: COMPONENT VIEW



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IEHR FRAMEWORK: REFERENCE IMPLEMENTATION OF PROTOCOLS

1. Security libraries:

- a. Mobile R2D Security Management, Terminal R2D Security Management, Server R2D Security Management.
- b. Mobile D2D Security Management, Terminal D2D Security Management.

- c. (Y2) Mobile Encrypted Storage.
- d. (Y2) Mobile Encrypted Communication,
 (Y2) Terminal Encrypted Communication,
 (Y2) Server Encrypted Communication.

IEHR Framework: reference implementation of IEHR protocols

2. Libraries for D2D and R2D protocols

- a. Mobile R2D HR Exchange, Terminal R2D HR Exchange, Server R2D HR Exchange.
- b. Mobile D2D HR Exchange, Terminal D2D HR Exchange.

- **3.** (Y2) Libraries for research protocol
 - a. Mobile Research Data Sharing, Server Research Data Sharing

IEHR Framework: Reference implementation of new products

- 1. **S-EHR mobile app (Andaman)**: prototype of mobile app fulfilling the *S-EHR conformance levels*, able to import/share data from/with EHRs and with research centres.
- 2. HCP App (Nicubar): prototype of secure app, used by the Health Care Professionals (HCPs) to securely exchange health data with any S-EHR or S-EHR Cloud.
- 3. InteropEHRate Health Services (IHS): prototype of Healthcare Interoperability Services, implementing *D2D* and remote protocols.
- 4. (Y2) InteropEHRate Research Services (IRS): prototype of a Research Interoperability Service, implementing *protocol for research*.



IEHR FRAMEWORK: IEHR HEALTH TOOLS & INTEROPERABILITY LEVELS

Level	Conversion & Translation Services		
Secure	No conversion		
Syntactic	Conversion of structured data to FHIR.		
Semantic	Conversion of local codes to standard ones.		
	Semantic extraction from NL.		
	Translation of attribute names; human-readable definitions for coded values in multiple languages.		
	Free-text translation of code labels.		
	Free-text translation of entire S-EHR.		



More details about expected Y1 results in next presentations

- 1. Scenarios and user requirements
- 2. Semantic Mapping Tools
- 3. IEHR protocols
 - a. Security
 - b. R2D
 - c. D2D
- 4. Citizen S-EHR and HCP App



THANK YOU

Q&A TIME.



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InteropEHRate project is co-funded by the European Union (EU) Horizon 2020 program under Grant number 826106

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