HL7® FHIR® DevDays

International Patient Summary Challenge 2025 – Lessons learned from a cross-boarder student exchange between Germany and Chile

Maximilian Kurscheidt, Heilbronn University of Applied Sciences

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Who am I?

- Maximilian
- Research Assistant at Heilbronn University, GECKO Institute for Medicine, Informatics and Economics
- Working in the Medical Informatics Initiative in the Data Sharing Framework Community Projekt
  - Passionate about interoperable health data infrastructures, open standards and processes
  - Data Sharing Framework (https://dsf.dev)
- DevDays Participant 2023, 2024 & 2025 – First Time Speaker

INTERNATIONAL PATIENT SUMMARY CHALLENGE 2025

HEILBRONN UNIVERISTY

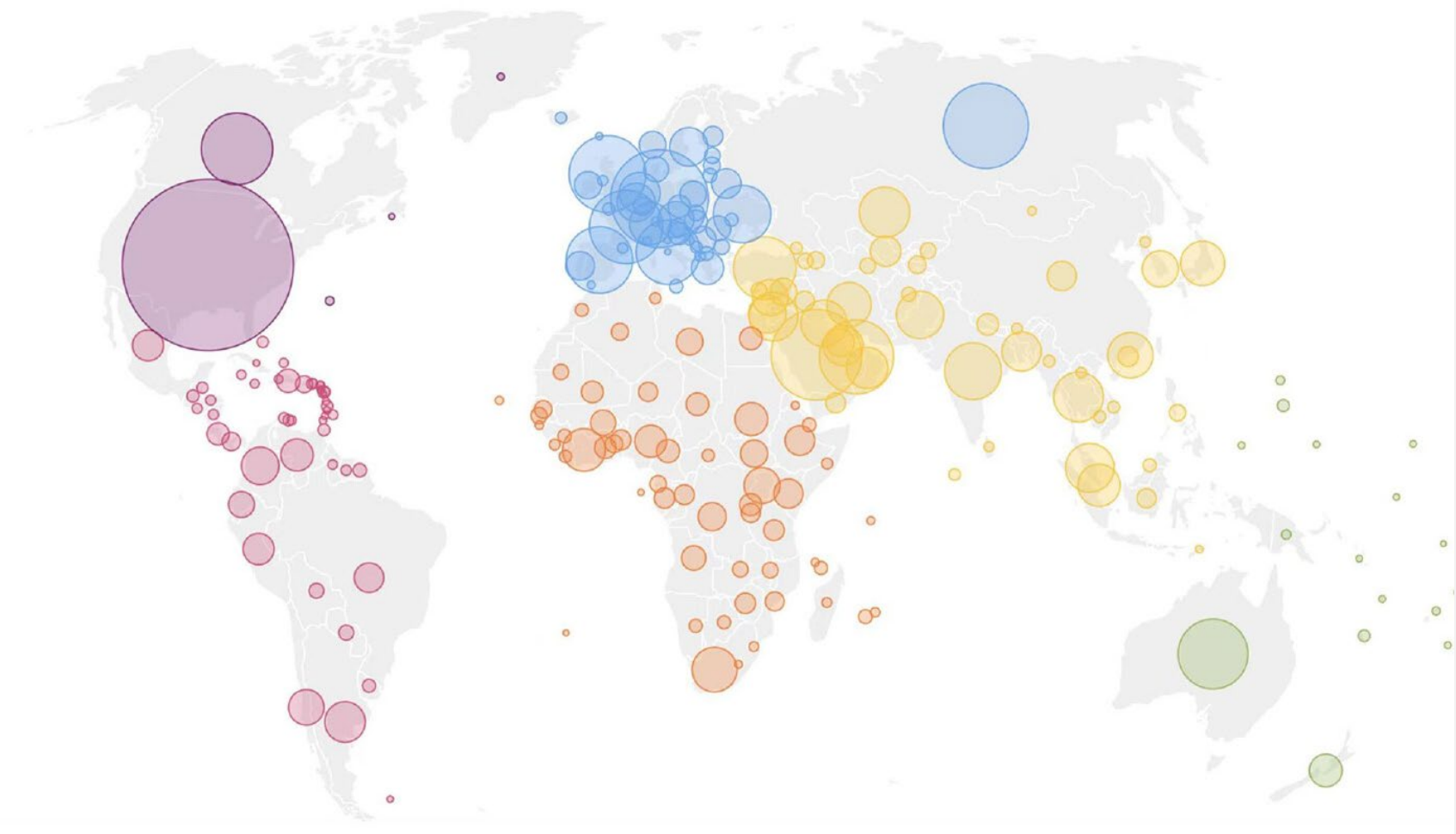
UNIVERSIDAD DE CHILE

- 20 students & 5 tutors
  - Prof. Christian Fegeler, Prof. Steffen Härtel, Dr. Stefan Sigle, Alonso Carvajal Moreno and Maximilian Kurscheidt
- 1 example FHIR IG & 5 Medical Use Cases
- 4 virtual meetings in 2 months
- 5 days Workshop in Chile in Jan 2025
- Symposium - Bridging borders: IPS and migration
- Presentations at the FHIR connectathon HL7 Chile 2025
- A lot of fun & many lessons to learn!

IPS Challenge 2025: Goals

- Experimenting with cross-boarder use of the IPS in Chile and Germany
- Identifying interoperability challenges
- Students developed prototypes for different use cases
- Results were presented in poster sessions during the symposium
- Demonstrators and lessons learned presented on HL7 Chile connectathon

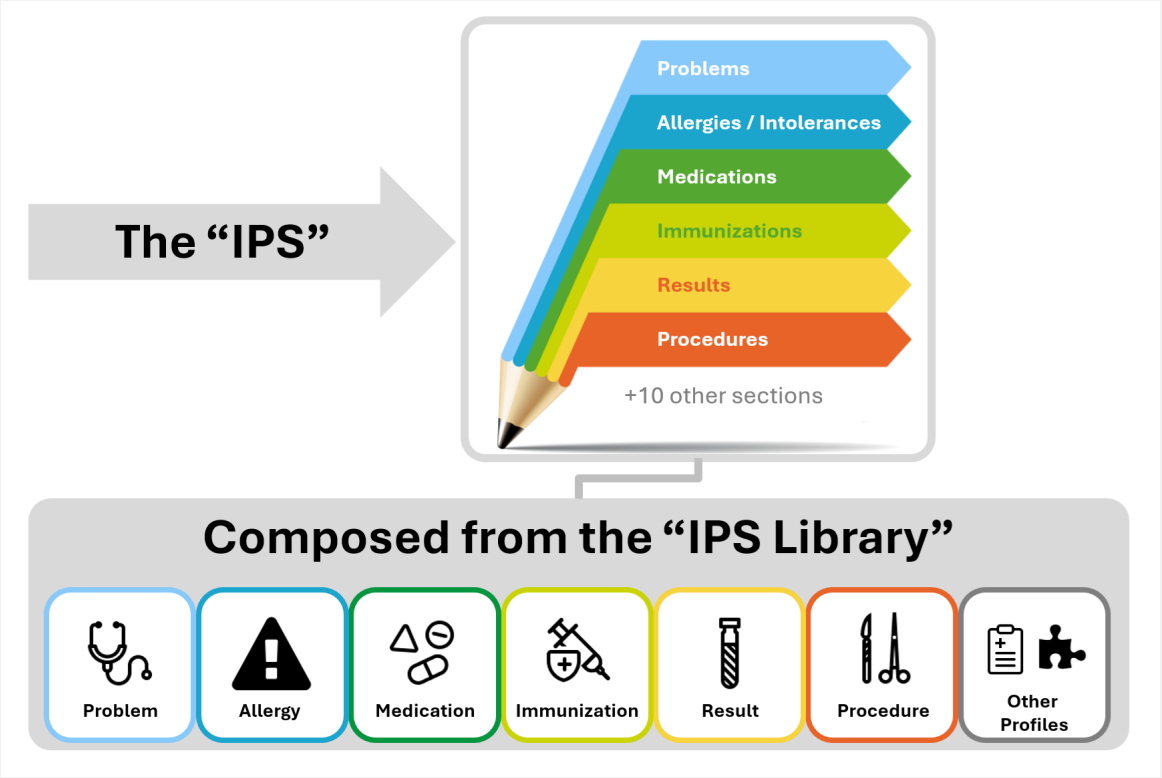
The Total Number of International Migrants



Source: Tang, Lingjie & Zhang, Chang'an. (2024). Analysis and Mapping of Scientific Literature on Cross-Cultural Adaptation of Global Immigrants (1963–2022). SAGE Open. 14. 10.1177/21582440241255684.

What ist the „International Patient Summary“?

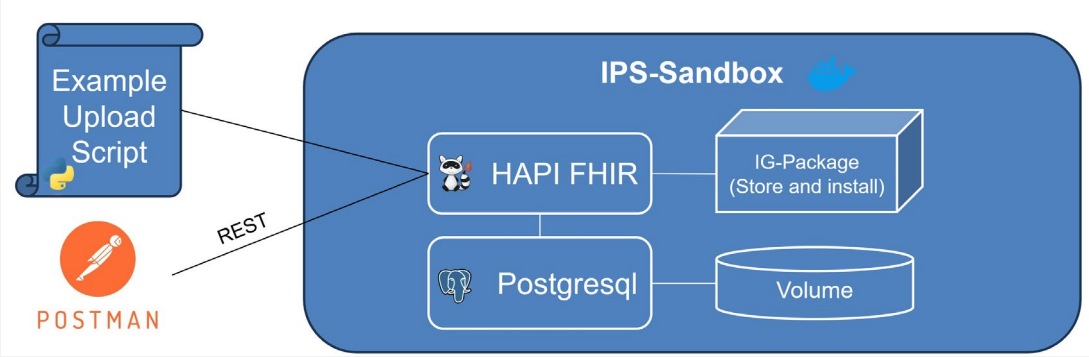
- Standardized collection of clinical and contextual information
  - A **minimal and non-exhaustive set of basic clinical data of a patient**
  - Snapshot of a patients current clinical status
  - Speciality-agnostic and condition-independent but clinically relevant
- Readily usable by all clinicians for **(cross-border) patient care**
- Designed to be simple and implementable

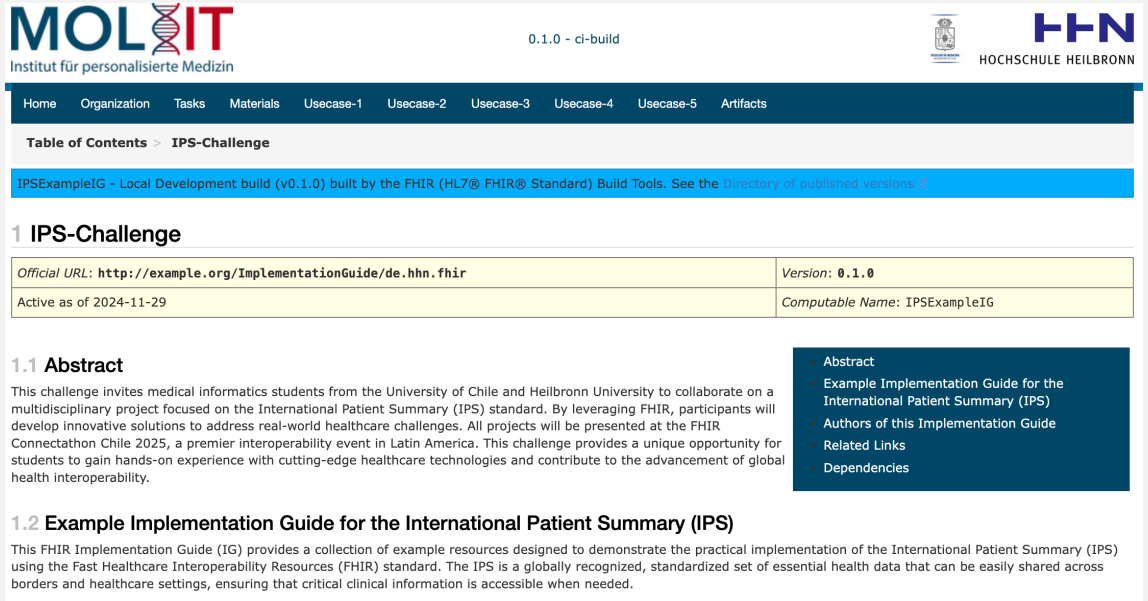


Source: https://hl7.org/fhir/uv/ips/

Example IG for the IPS with Use Cases

- FHIR IG provides a collection of example resources designed to demonstrate practical implementation of the IPS
- Contains 5 patients for 5 use cases with 192 FHIR resources

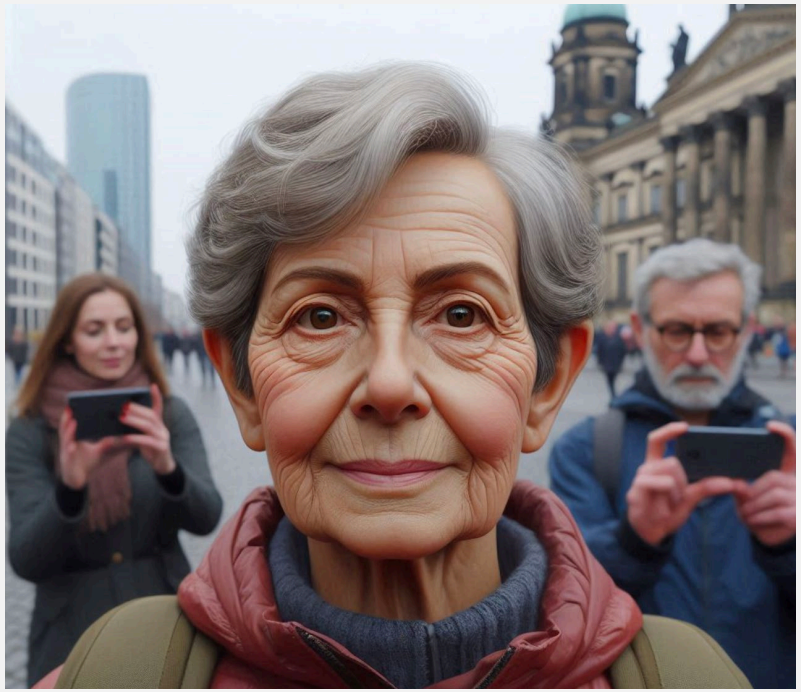




Check out, review and use the example IG!

IPS Challenge IG – Example of a Use Case

Marta Perez, a 65-year-old Chilean tourist from Villarrica with a history of diabetes, is on a guided tour in Berlin, Germany from March 1 to March 15, 2024. On March 10, 2024, **she becomes disoriented and faints due to hypoglycemia** near the Brandenburg Gate. Marta is taken to Charité – Universitätsmedizin Berlin, where the staff needs to manage her diabetes without access to her detailed medical records. The clinic accesses Marta's IPS, which provides her **diabetes management plan, including insulin regimen, recent blood sugar levels, and complications such as mild diabetic neuropathy**. The translated medical terminology concepts ensures the local healthcare providers can effectively stabilize her blood sugar levels and provide appropriate care, taking into account her complex medical history and recent changes in medication.



https://ips-challenge.pages-research.it.hs-heilbronn.de/ips-example-ig/usecase4.html

Earlier Diagnosis

Earlier Encounters

Vaccine status

Earlier Prescriptions

UC4-International Patient Summary Composition for Marta Perez	
UC4-Patient	Patient: Marta Perez
UC4-DiabetesDiagnosis2014	Type 2 Diabetes Mellitus Diagnosis
UC4-Encounter2020May	Encounter on May 20, 2020
UC4-Encounter2007October	Encounter on October 10, 2007
UC4-Encounter2014April	Emergency Encounter on April 20, 2014
UC4-Encounter2017July	Follow-up Encounter on July 10, 2017
UC4-Encounter2024January	Follow-up Encounter on January 17, 2024
UC4-Encounter2008May	
UC4-Encounter2009April	
UC4-Encounter2010July	
UC4-Encounter2011January	
UC4-Encounter2012February	
UC4-Encounter2013February	
UC4-Encounter2013September	
UC4-Encounter2014October	
UC4-Encounter2015March	
UC4-Encounter2015September	
UC4-Encounter2016December	
UC4-Encounter2016March	
UC4-Encounter2018February	
UC4-Encounter2019	
UC4-Encounter2020	
UC4-CovidVaccine1	COVID-19 Vaccine Dose 1
UC4-CovidVaccine2	COVID-19 Vaccine Dose 2
UC4-CovidVaccine3	COVID-19 Vaccine Booster 1
UC4-CovidVaccine4	COVID-19 Vaccine Booster 2
UC4-MedicationChange2017	Medication Change in 2017
UC4-DietPrescription2024	Diet Prescription in 2024
UC4-SmokingStatus2020	Smoking status in 2020
UC4-AlcoholUse2020	Alcohol use in 2020
UC4-PhysicalActivity2020	Physical activity in 2020

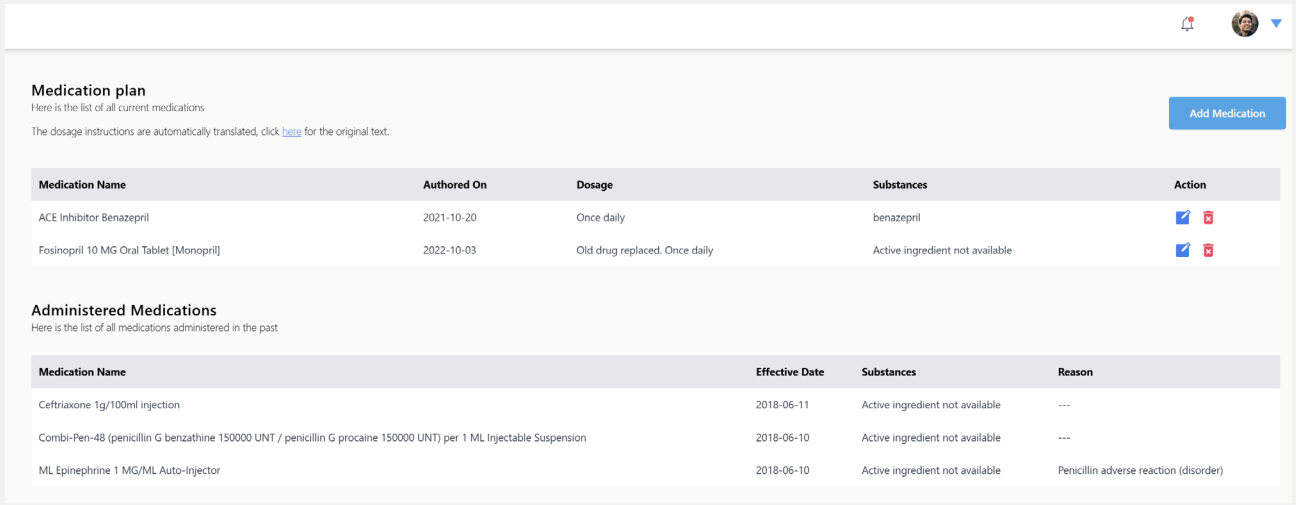
Other Measurements

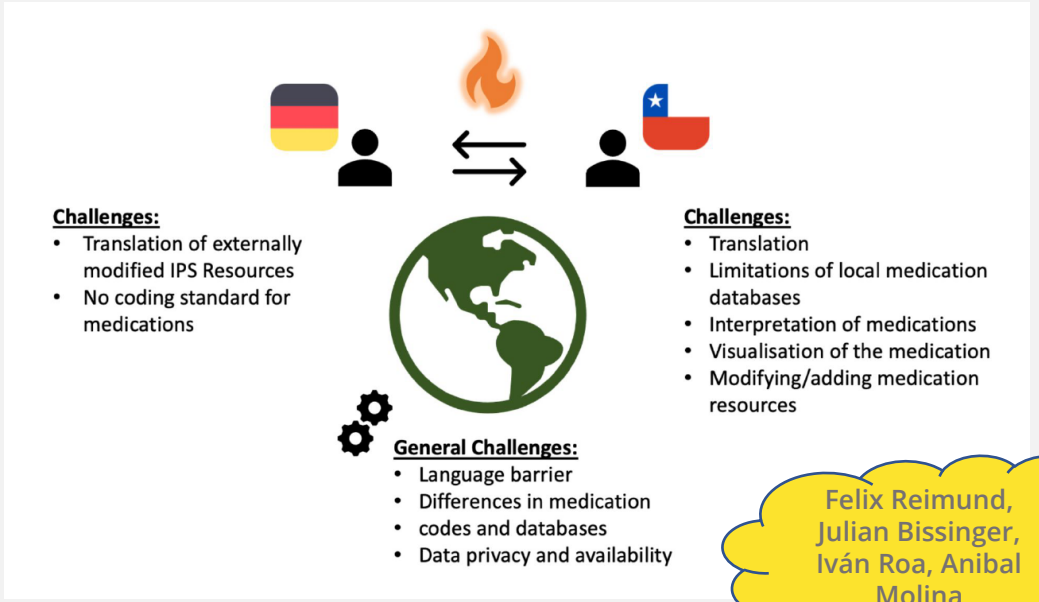
UC4-Weight2020	Weight in 2020
UC4-BMI2020	BMI in 2020
UC4-BloodPressure2020	Blood Pressure in 2020
UC4-RandomBloodSugarResult2007	Random Blood Sugar Test Result
UC4-GlucoseLevel2014	Glucose Level in Emergency
UC4-A1CTest2014	A1C Test Result
UC4-GlucoseLevel2017	Glucose Level in 2017
UC4-Weight2017	Weight in 2017
UC4-BloodPressure2017	Blood Pressure in 2017
UC4-A1CTest2024	A1C Test Result in 2024
UC4-GlucoseLevel2011	
UC4-GlucoseLevel2012	
UC4-GlucoseLevel2013	
UC4-GlucoseLevel2013-2	
UC4-GlucoseLevel2014-2	
UC4-RandomBloodSugarResult2010	
UC4-RandomBloodSugarResult2024	
UC4-HospitalVillarrica	Hospital de Villarrica
UC4-CentroSaludFamiliar	Centro de Salud Familiar Los Volcanes
UC4-ChariteBerlin	Charité – Universitätsmedizin Berlin
UC4-RandomBloodSugarTest2007	Random Blood Sugar Test Request
UC4-PhysicalActivityPrescription2024	Physical Activity Prescription in 2024

https://ips-challenge.pages-research.it.hs-heilbronn.de/ips-example-ig/artifacts.html

Hypertension Use Case

- SMART on FHIR application
  - App for HCP and patients
  - Project could be extended for integrating further IPS ressources
  - Docker stack for deployment
- Coding standards for medication
  - Fetching from SNOMED and RxNorm APIs
- Automated and offline „free-text“ translation

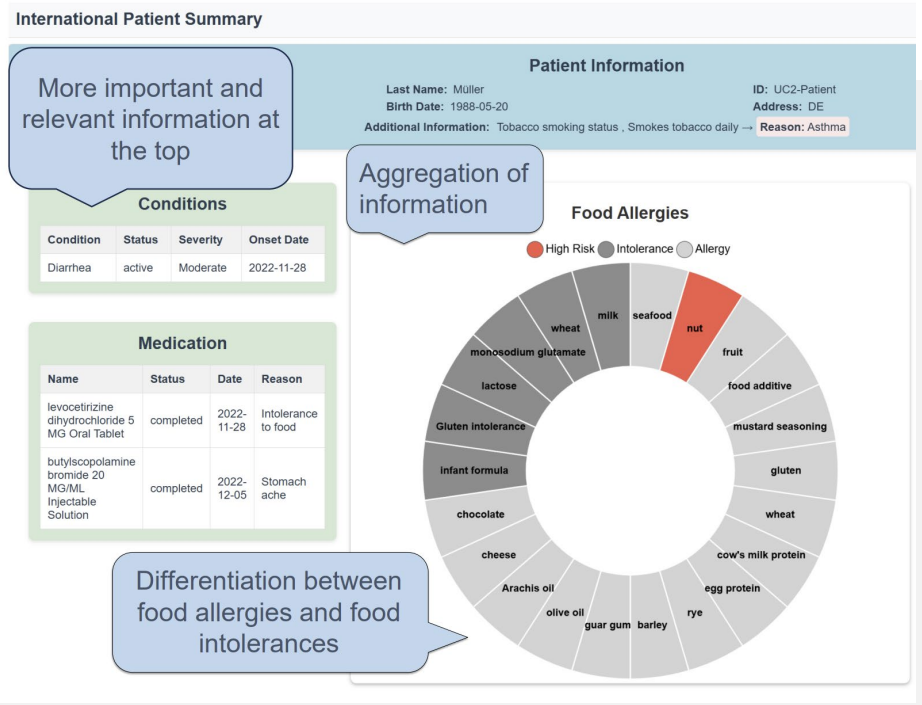


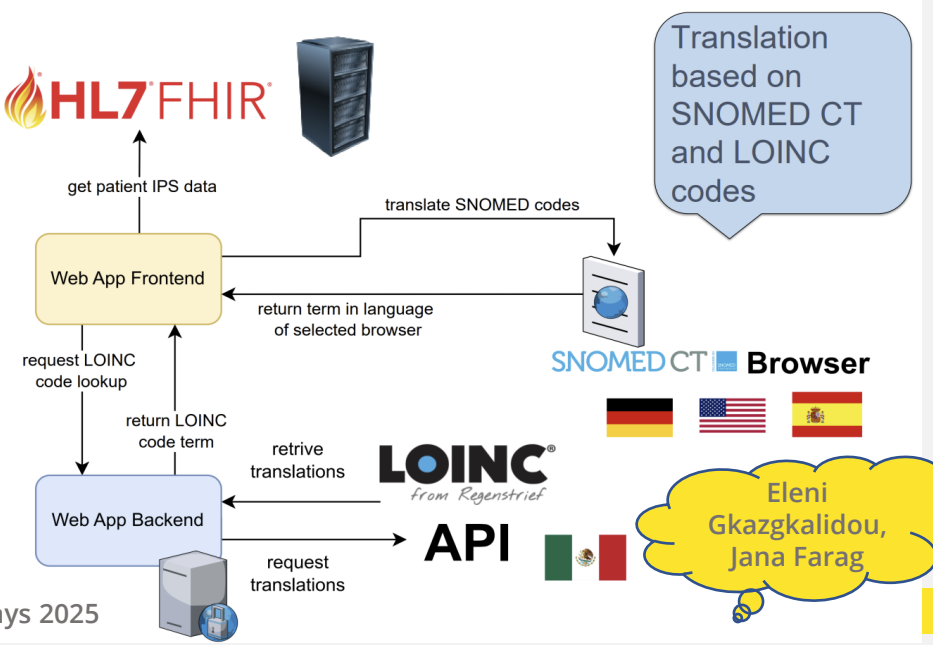


Felix Reimund, Julian Bissinger, Iván Roa, Anibal Molina

Food Intolerance Use Case

- Health care provider dashboard for food Intolerance and allergies
  - Integrated knowledge base with IPS patient data
- Differentiation between food allergies and intolerances
- Terminology integration: LOINC API and SNOMED browser
- Limited translation of German SNOMED codes

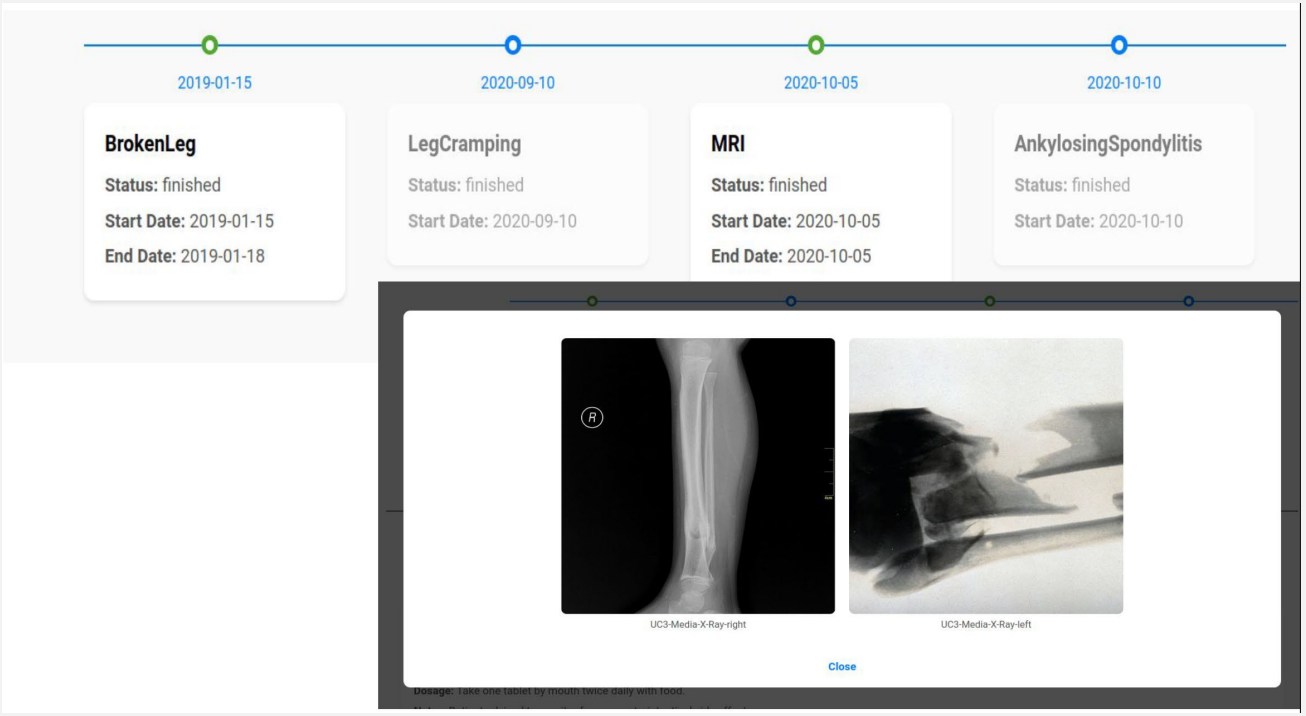




Surgery Use Case

- Medical history retrieved from IPS
  - Visualization of encounter history and integration of a DICOM viewer
- Images not part of IPS: Dealing with DICOM images
  - Images stored as „media resources“ referenced to encounter => Work around

=> How to deal with images stored on clinical PACs systems?



Need: Process for accessing information references but not part of the IPS!

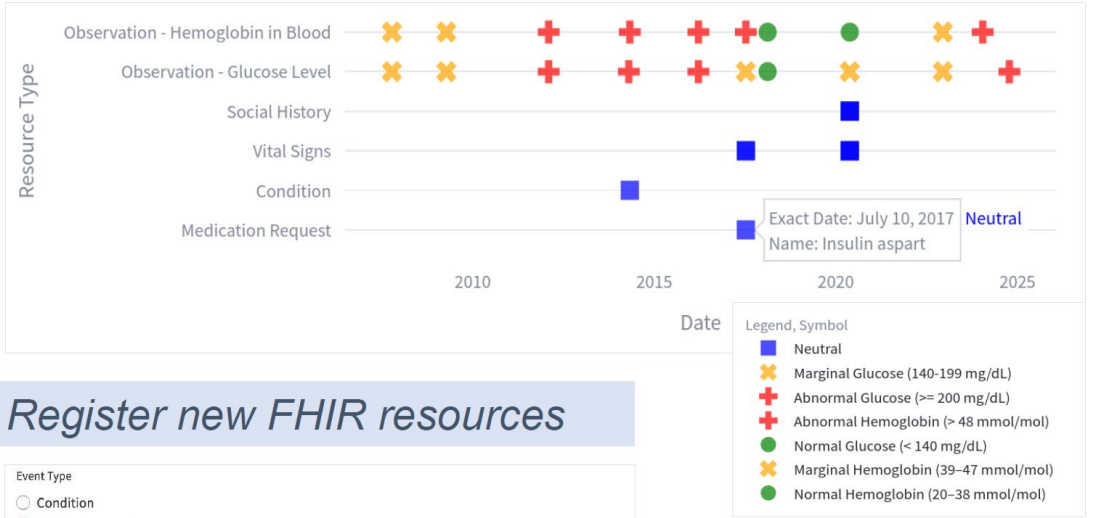
Robert Nickel, Leona Gu

Diabetes Use Case

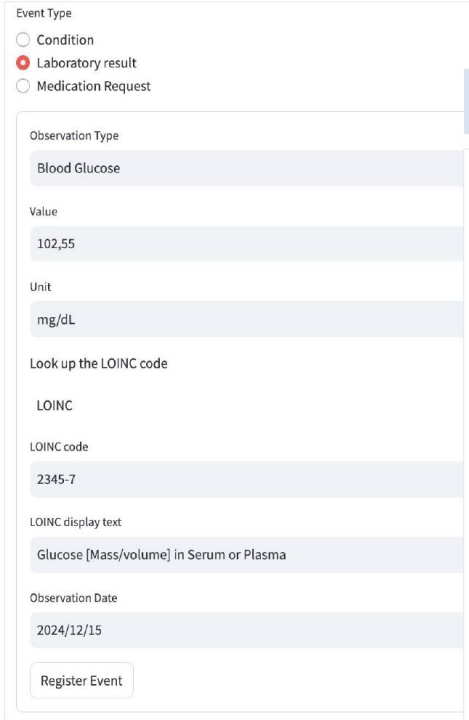
- Medical history visualized
  - Timeline with encounter, observations and medication requests
  - Diagnostic and laboratory values visualized over time
  - Retrieving complex composition resources
- Resources added to the IPS
- Authentication mechanism through a QR code workflow
  - Consent process for generating an QR code

Chris Görner, Celina Seelinger, Felipe Carrasco, Michelle Pacheco

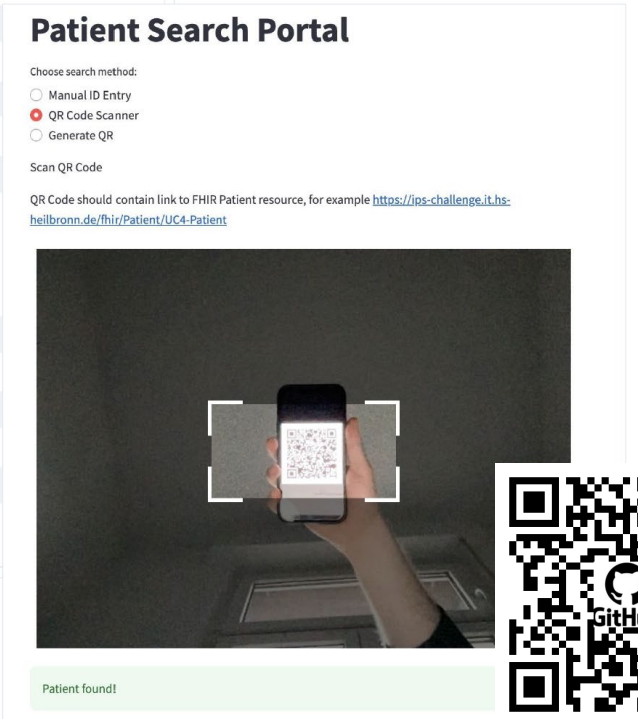
Clinical timeline



Register new FHIR resources



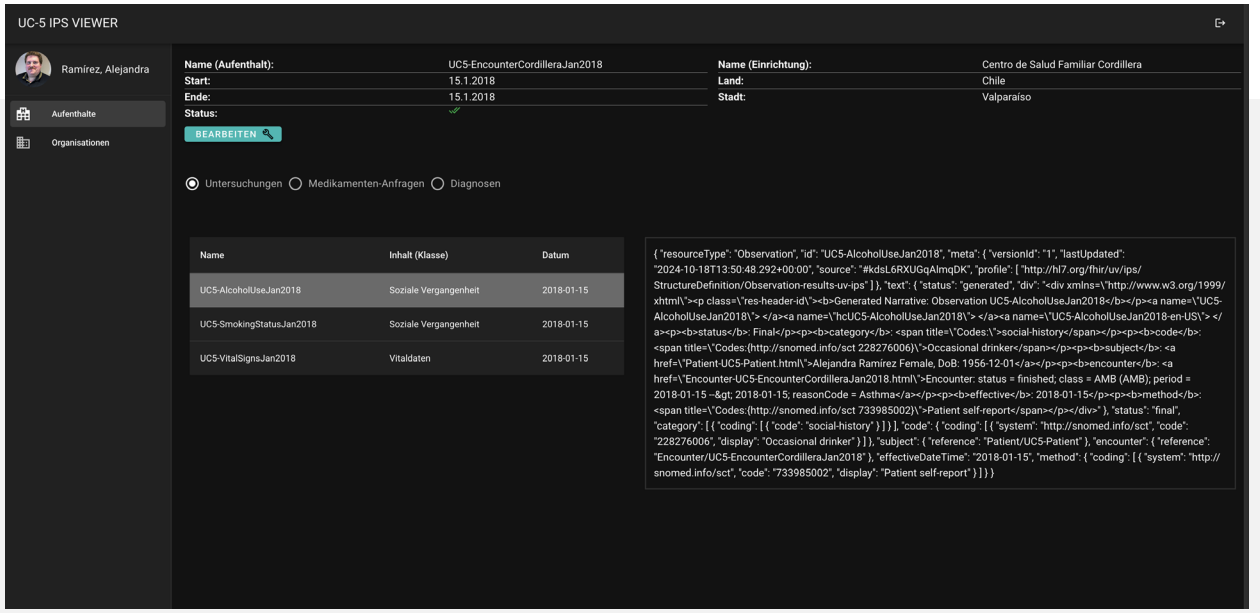
QR code scanner

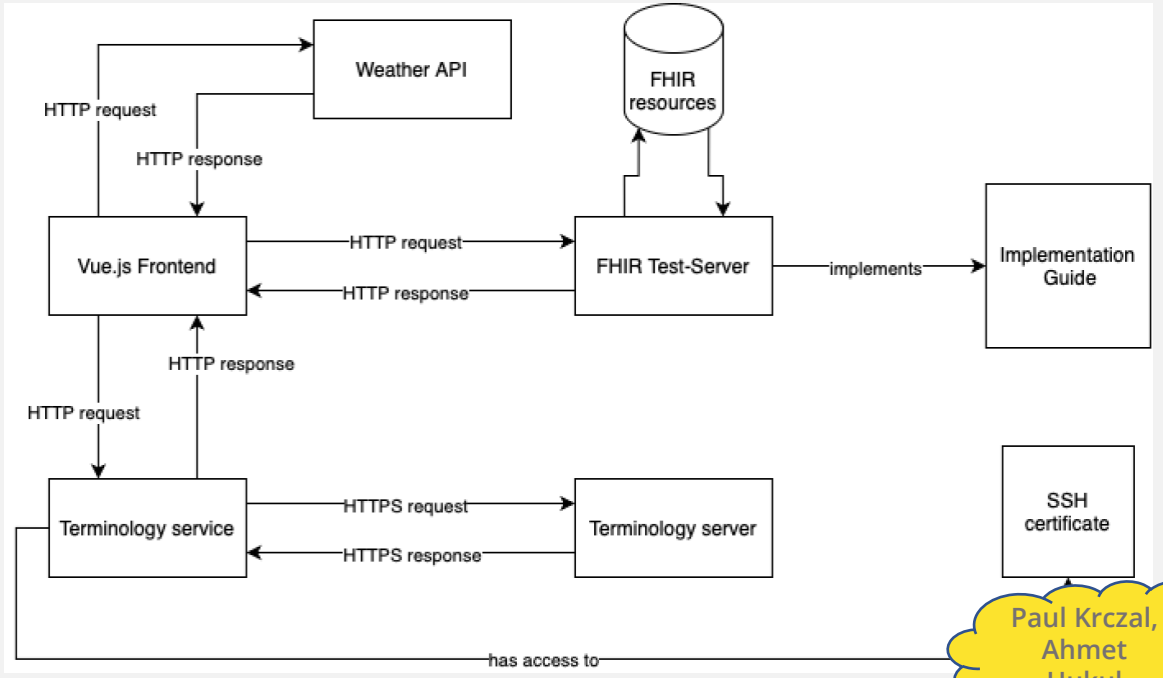


Asthma Use Case

GitHub

- Prototype of a semantically interoperable web application using FHIR and the IPS minimal data set
- Generic approach in terms of exchangeable FHIR servers and terminology APIs
  - Integrated external weather API
- Data from the IPS dataset must be placed in the correct context
- Add new data points to the IPS





Lessons learned

- IPS challenge was a huge success!
  - 5 functional demonstrators were developed in a short time (approx. 2 months)
  - Challenge as methodology proved successful:
    bridging interdisciplinary, multi-cultural teams to solve interoperability challenges!
- IPS specification allows heterogeneous implementation approaches and allows the usage in various contexts for various target groups
  - Generic vs. specific IPS viewer and applications
  - Example IG providing connected resources for a use case is really helpful
- Sharing data across boarders is not “easy” and requires connected interoperable non-hierarchical infrastructure e.g. mesh architectures
  - FHIR Servers, Terminology Servers, Mapping Services of Codesystems, Translation Services, Authentication and Authorization, …
  - **We need to think about connecting infrastructures across countries, where IPS data is stored with authentication and authorization!**

Lessons learned

- Different use cases presented various interoperability challenges
  - (Local) terminologies that were not mappable and sometimes not accessible or specified in the IPS
  - Translation of medical codes and “descriptions” is a problem
  - Providing access to IPS data is challenging especially across health care systems
    - Authorization and authentication “barriers”
    - Where is data located and stored? -> strongly depends on the use case
  - Accessing further resources such as images
    - => Need for interoperable processes of retrieving further information based on the IPS
    - => Possibility to store images directly in the IPS?
  - Validation of resources and terminologies

Thank you!

- Contact Information
  - Maximilian Kurscheidt
    - maximilian.kurscheidt@hs-heilbronn.de
  - Dr. Stefan Sigle
    - stefan.sigle@molit.eu
  - Prof. Christian Fegeler
    - christian.fegeler@hs-heilbronn.de
  - Alonso Carvajal Moreno
    - alonsocarvajal@ug.uchile.cl
  - Prof. Steffen Härtel
    - shartel@uchile.cl

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HEILBRONN UNIVERISTY
UNIVERSIDAD DE CHILE

MOLIT
Institut für personalisierte Medizin

UNIVERSIDAD DE CHILE

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