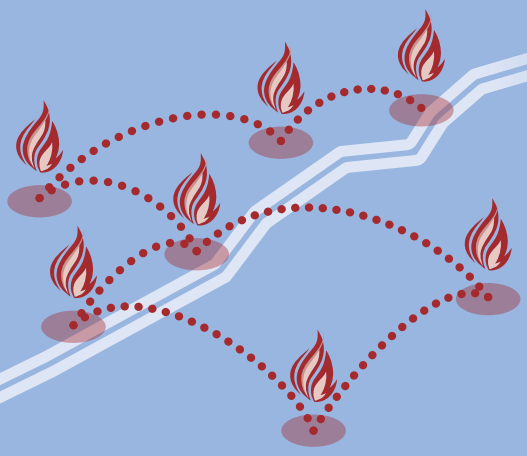
FHIR USE CASE



E17 ziekenhuis netwerk

# E17 Hospital Network on FHIR

## Clinical benchmarking as a steering tool for improved healthcare quality

The E17 Hospital Network is dedicated to consolidating and analysing data from the seven hospitals in its network in order to map out and improve the quality of care.

It is focusing on two key use cases – Mother & Child (Maternity Care) and HOST (Hospital Outbreak Support Teams) – to develop a structural and secure data sharing solution. By ensuring the solution is broadly applicable, the E17 Hospital Network will be able to conduct additional benchmarking studies.



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USE CASE 1

# Hospital Outbreak Support Teams (HOST)

## Background:

In the wake of the COVID-19 pandemic, the Belgian government launched the HOST (Hospital Outbreak Support Teams) initiative to foster knowledge- and expertise-sharing among hospitals on infection prevention and antibiotic policy.

To support this initiative, E17 aims to centralise, visualise, monitor and analyse microbiology data from the seven network hospitals. It will use this data to carry out epidemiological surveillance, identify priority needs in infection prevention, and define improvement actions for antimicrobial use.

**Short-term goals:**

The E17 Hospital Network aims to develop a structured solution that:

- Enables each hospital to automatically normalise and extract data from existing information flows, converting it into respective FHIR components that are ready for querying.
- Ensures data is GDPR-compliant and available in an interoperable format.
- Allows each E17 hospital to access data in an independent space.

## Challenges:

- **Defining data concepts:**
  From the outset, it is essential to define the data concepts in detail and establish consistent definitions across all hospitals. These definitions must then be modelled according to international standards to ensure uniform interpretation.
  - For example:
    - What exactly is considered day hospitalisation, and how is the term 'length of stay' defined?
    - Is the use of medication data based on medication administration or on prescriptions?
- **Uniform coding and processes:**
  In addition to ensuring codes are uniform and meet **international terminology standards**, processes also need to be standardised and widely supported.

  Effective communication and agreements with doctors and other stakeholders are therefore crucial.

CAS D'USAGE 2

# Mother & Child (Maternity Care)

## Background:

Based on data available in the (three different) EHRs of the seven E17 hospitals, the network seeks insights into maternity care practices at the facilities, including the rates of inductions, episiotomies, caesarean sections, epidurals, etc. At each E17 hospital, a defined dataset is pseudonymised and queried using HL7® FHIR®, and then made centrally available for statistical purposes (secondary data use).

## Challenges:

- **Uniform language requirement:**
  For efficient data processing, data must be available in a standardised language: SNOMED-CT. Since SNOMED-CT is not yet embedded in the EHRs of the seven hospitals, the data needs normalisation. For this use case, the E17 Hospital Network started from the data format required by the Flemish Study Centre for Perinatal Epidemiology (SPE). Experience indicates that it is best to translate data to SNOMED-CT directly from the source data rather than through pre-existing data formats.

- **Privacy considerations:**
  Since sensitive personal data is involved, it is crucial that data exchange respects patient privacy.

# A shared approach for both use cases:

## Data harmonisation and semantic translation to meet terminology standards:

The E17 Hospital Network has chosen to store data in a uniform language, using **SNOMED-CT**, **LOINC** and **ATC** terminology systems.

- For the Mother & Child use case, this means aligning each SPE variable with SNOMED-CT.
- For the HOST use case, SNOMED-CT codes are standardised across hospitals, along with certain LOINC codes.

## Establishing connections with existing information flows:

- For the Mother & Child use case, this involves connections with the EHRs used across the E17 hospitals.
- For the HOST use case, this involves the hospital information systems (HIS) that record patient movements, laboratory information systems (LIS) and EHRs.

It is essential to specify in detail which fields are required for each data-sharing project.

## Data storage in FHIR format:

Data retrieved from the hospitals' information systems is mapped in FHIR format – the international standard that ensures the interoperability of medical data.

To enable benchmarking queries, the necessary data elements are automatically extracted via CSV files and converted into queryable FHIR components, using FHIR Questionnaire, FHIR Questionnaire Responses, FHIR Encounters, FHIR Observations, FHIR Medication Line, etc.

The FHIR data is stored in a structured way in the hospitals' **FHIR repositories**, either the Amaron **FHIR Box** or another FHIR repository.

There is also a direct link with the LIS and the HIS (for patient movements).

## Secure, structured data querying:

Each E17 hospital is installing an Amaron **FHIR Station** to ensure secure access to data from the FHIR repositories for querying. The FHIR Station also performs necessary checks, for example verifying whether the data is delivered in compliance with security rules.

For each data-sharing project, the hospitals can locally control with their FHIR Station what data will be released. If necessary, they may also choose to provide the data in an anonymised and/or pseudonymised form.

## Federated data exchange:

E17 has installed an Amaron **FHIR Station Hub** at the network level, providing a cloud-based solution for targeted queries of the FHIR sources across the connected healthcare institutions, while adhering to the security rules in force. The Hub consolidates the retrieved data, enabling E17 to perform the desired network-level analyses.

## Developing and automating the governance process

The E17 Hospital Network is well aware of the need to securely protect the sensitive patient data involved in this benchmarking project. Consequently, an automated process for approving each data-sharing project will be implemented. This digital process

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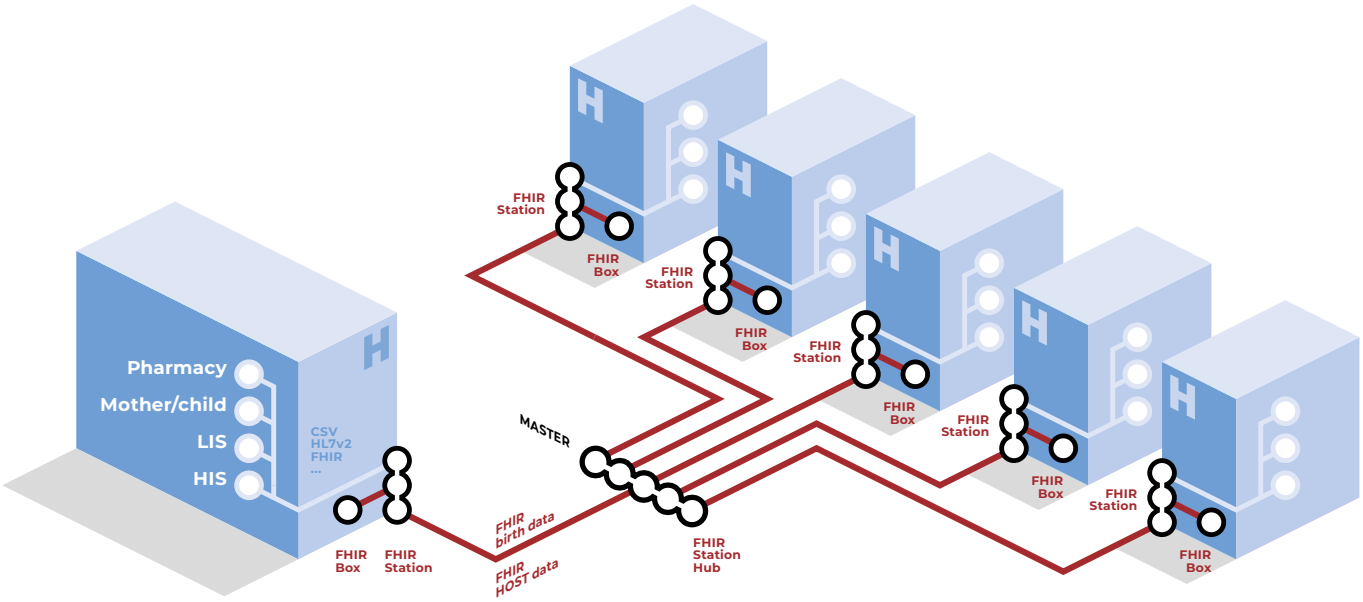


allows control over which data may be shared, the duration of data access, whether pseudonymisation is required, and who is authorised to view and analyse the data.

After **extensive testing** of both use cases, the E17 Hospital Network plans to expand the solution for additional, similar benchmarking studies.

## Project "E17 on FHIR" in brief:

**Participants:**

- The seven E17 Hospital Network partner hospitals: az Glorieux, az groeninge, AZ Maria Middelares, AZ Sint-Elisabeth, AZ Sint-Vincentius Deinze, O.L.V. van Lourdes Ziekenhuis Waregem, Sint-Jozefskliniek Izegem.
- The coordinating institution: az groeninge Kortrijk.

**Objective:**

To develop a structural and secure solution for clinical benchmarking (on the operational reuse of data), based on two use cases – Mother & Child (Maternity Care) and HOST (Hospital Outbreak Support Teams).

**Data to be shared:**

- ADT (Admission, Transfer, and Discharge), laboratory, medication and birth data.

# Advantages of the Amaron solution:

## Ease of use of the FHIR Station:

The central user interface allows you to easily and precisely determine who has access to which sources and information, for each of your FHIR projects.

## Pseudonymisation of data:



Personal data that is traceable to a specific patient can be anonymised if necessary. Afterwards, the pseudonym can be linked back to the patient through a unique key, if required and with the appropriate permissions.

## Federation:

You can query multiple sources simultaneously, both from the same type of source (e.g., different EHRs) and from diverse sources (e.g., EHR, HIS, LIS). You receive a consolidated result.

## Insight:

The convenient portal provides you with a global overview of all projects and project-specific dashboards highlighting the security rules applied throughout the process.

## Security:

Each interaction is logged; you can verify who accessed the data and when in the ATNA-based audit repository. Any irregular activity can trigger immediate intervention.

## Governance:

You can outline, automate and document the approval process for each data-sharing project.

## Scalability:

The solution grows with your organisation's needs: as more data-sharing projects are launched, the solution can be scaled to match the requirements.

## Knowledge and experience:


Amaron has extensive knowledge of the sector, with 15 years of experience in healthcare interoperability on a national and international scale.

> Thanks to the E17 on FHIR project, we can explore how FHIR can be integrated into our data infrastructure and what opportunities it offers for both primary and secondary data use. This pilot project is enabling us to align the technical capabilities with practical needs.

**Lieselot Cool**
Data Scientist
at az groeninge Kortrijk

**Nicky Van Der Vekens**
Staff Officer to
the CEO at Maria
Middelares Ghent


## Data capability project

"E17 on FHIR" is a data capability project financially supported by the Belgian government using European funds. These projects aim to use available, structured data in a meaningful way for decision-making in healthcare contexts. This initiative emphasises data reuse and the transformation of raw data into valuable information – a process that begins with data collection and management.

The long-term goal is to incorporate successful projects into the Belgian Meaningful Use Criteria (BMUC) funding model, enabling the entire hospital sector to benefit from these achievements.

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