WEBINAR

OneAquaHealth IEEE Global Hackathon: Informatics, Technology & Standards

27.08.2026 17:00 PM CET Host: SYNYO GmbH

OneAquaHealth | GLOBAL VIRTUAL HACKATHON | HL7 Europe | SYNYO

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AGENDA

Key information

Time	Topic	Presenter
17:00 – 17:10	Welcome and introduction to the webinar	**Alexander Nikolov** SYNYO GmbH, Austria
17:10 – 17:30	What is Digital Health Informatics and Standards	**Gora Datta** HL7 Europe
17:30 – 18:00	Introducing OneAquaHealth OAH-FHIR Implementation Guide	**Stratos Kokolakis** HL7 Europe
18:00 – 18:20	Under the hood – OAH-FHIR IG explained	**Giorgio Cangioli** HL7 Europe
18:20 – 18:30	Playing with FHIR APIs in a Sandbox – a demo	**Pradyumna Kodgi** IEEE
18:30	**END OF THE WEBINAR**	

HOUSEKEEPING RULES

The session will be entirely recorded and published on the OneAquaHealth Open Information Hub.

All participants except speakers and moderators will be **muted by default**.

Feel free to post your questionsions in the **chat**.

If you would like to speak, raise your hand and wait for the moderator to give you the floor.

What's in a name!
"FHIR"
key health informatics standard

Gora DATTA, Fellow HL7, VS, SMIEEE, SMACM

- HL7 Standards Expert OneAquaHealth Project
- Co-Director, California Consortium for Public Health Informatics & Technology (CCPHIT)
- Engineering Faculty Advisor @ University of California Berkeley
- HL7 International Board Director [2025, 2026]
- (founding) Co-Chair HL7 Mobile Health
- (founding) Convenor ISO/TC215 WG#10: Traditional Medicine
- Board Member & Chair IEEE Blockchain Technical Community (BCTC)

KEY TERMS

INTEROPERABILITY

- "A Behind the Scenes Look at Standards and Skills"

STANDARDS >>> Health Informatics

HL7 – Standards Development Organization (SDO)

Types of HL7 Standards

FHIR

INTEROPERABILITY 101

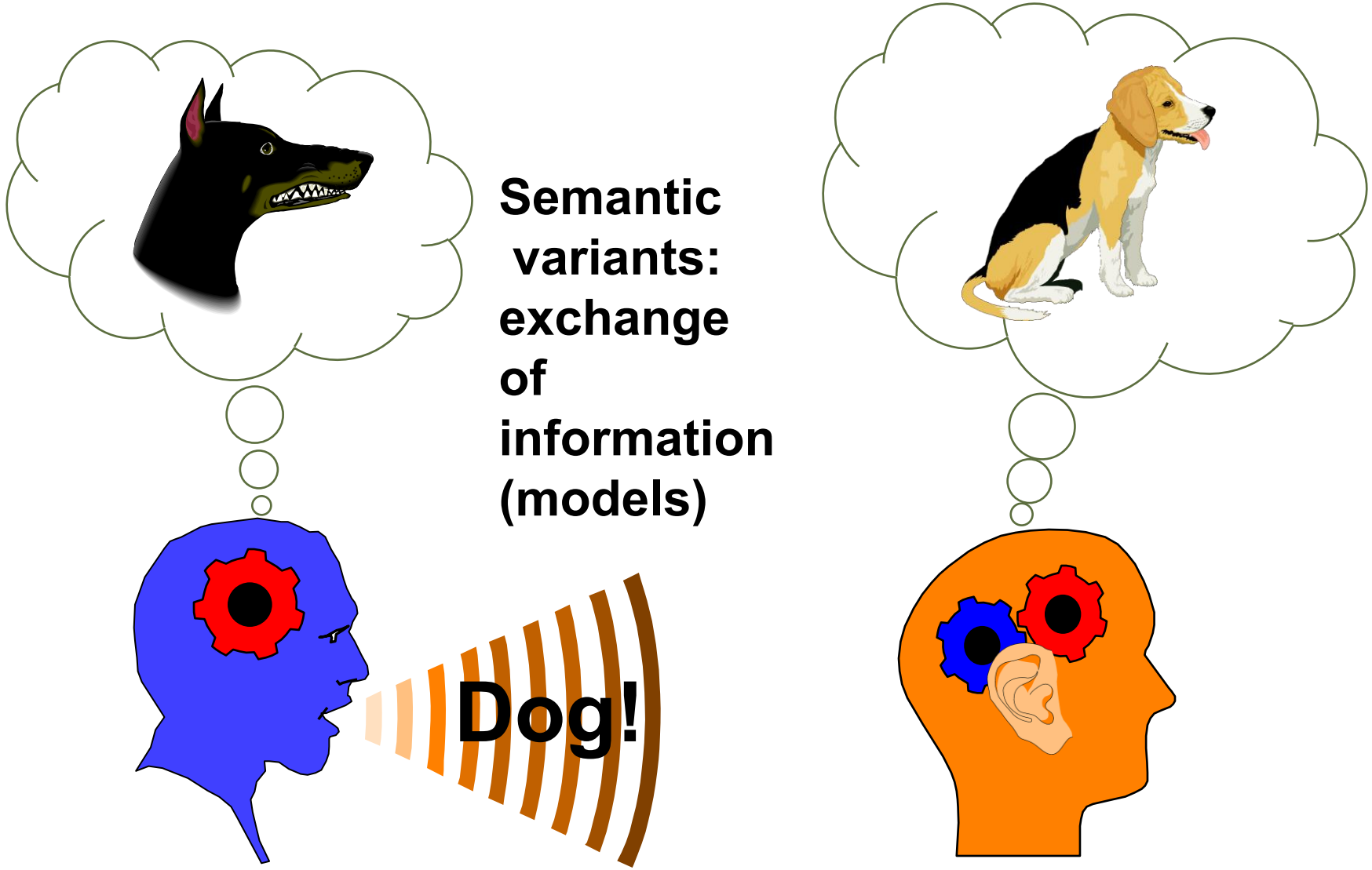
Interoperability

"Ability of two or more systems or components to exchange information and to use the information that has been exchanged"

- from the IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries, IEEE, 1990

- **Interoperability requires standards for both**:
  - Syntax (exchange)
  - Semantics (meaning)

Importance of Semantic Interoperability



Technical > Semantic > Process

Interoperability Classification

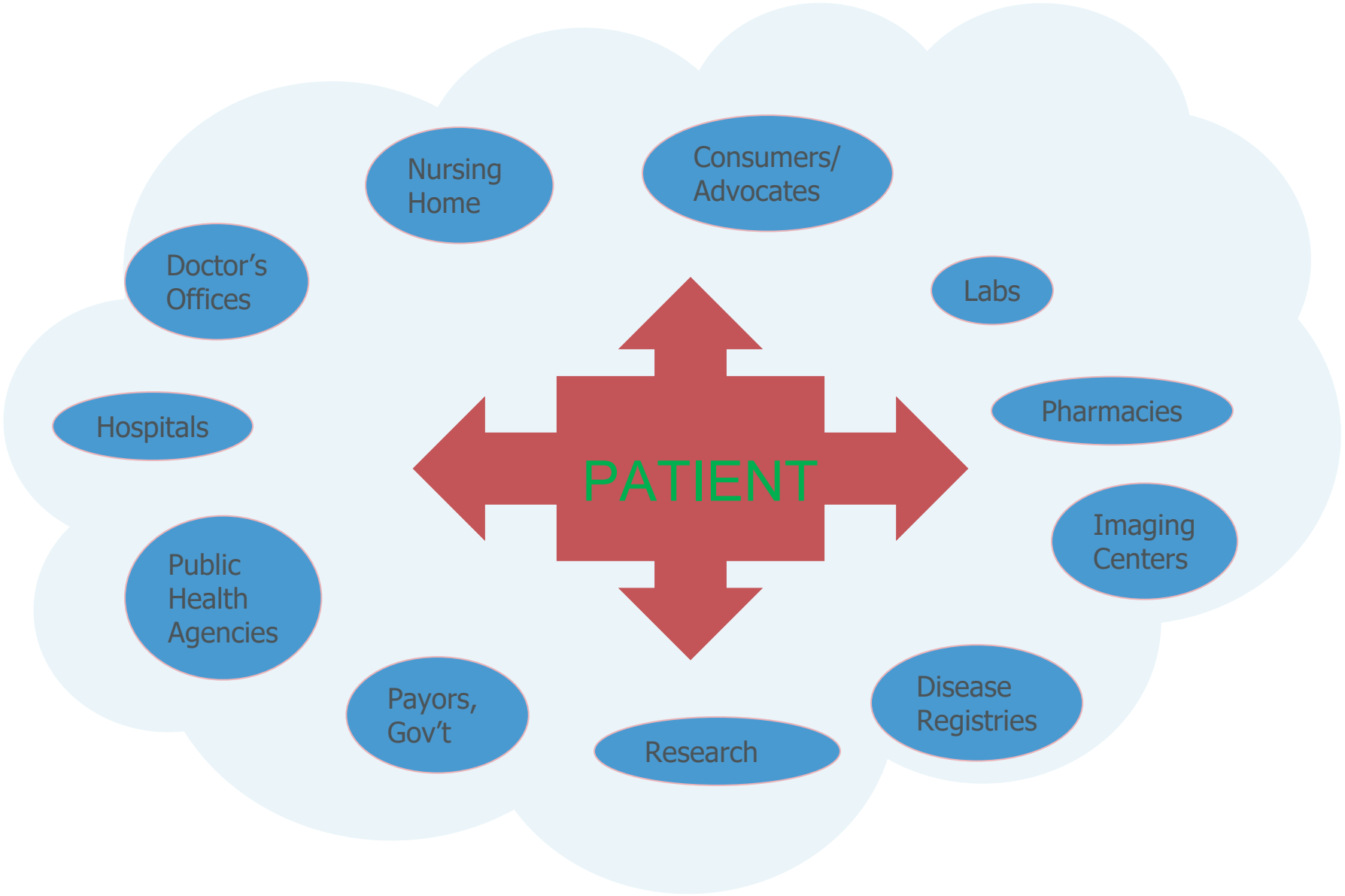
“ability of two or more systems or components to exchange information and to use the information that has been exchanged”

Technical : The information travels from one system to another

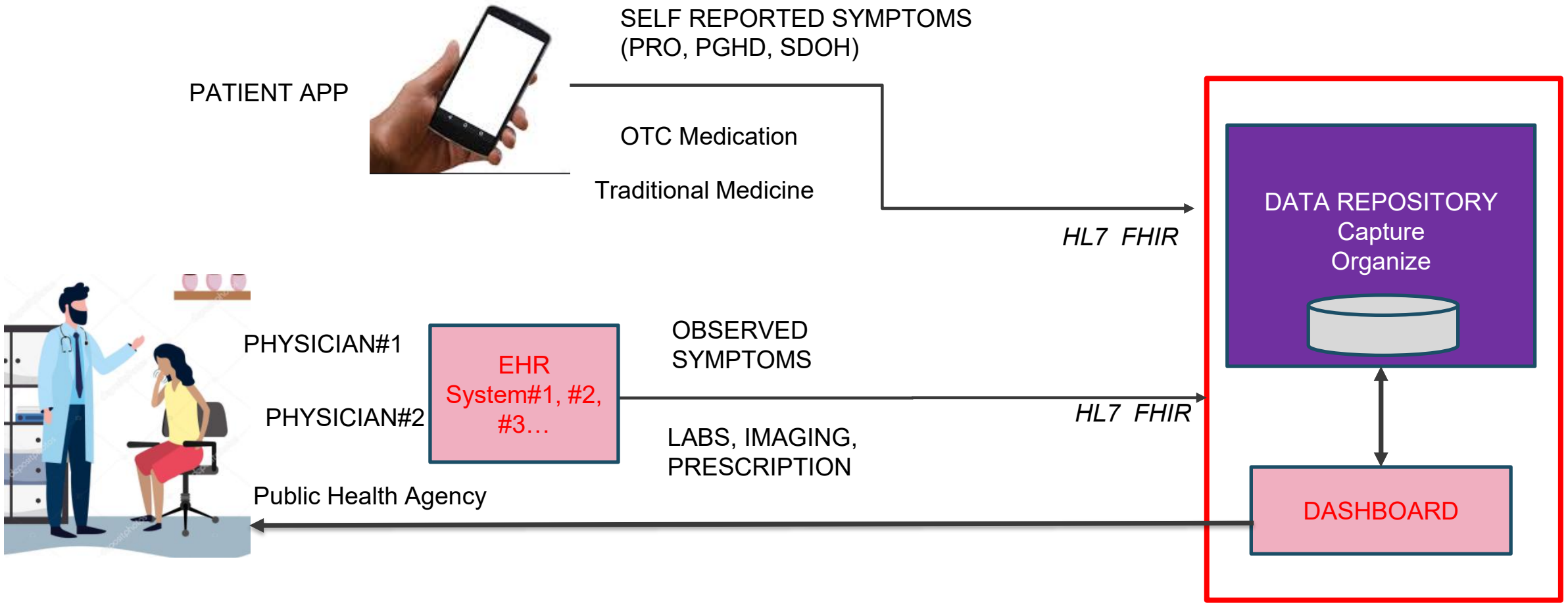
Semantical : The receiving system can use the received information for its own processing

Process: The interoperability improves the value for both systems: better workflow.

Healthcare Systems Interoperability goes beyond a single entity



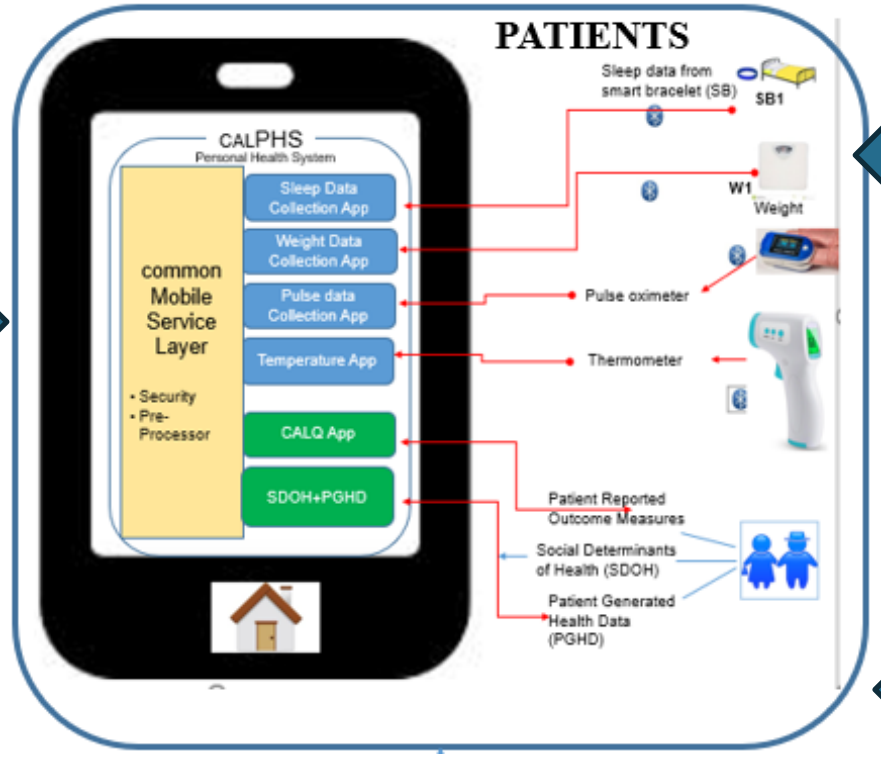
CALDR+: SYMPTOMS TRACKING, VACCINE ADVERSE EVENT REPORTING & PATIENT ENGAGEMENT: patient reported long COVID-19 symptoms data and existing treatment regimens + Vaccine Adverse event reporting.



PUBLIC HEALTH INTEROPERABILTY

STATE IMMUNIZATION REGISTRY

FHIR



"Your app"

PATIENT ACCESS FHIR APIs

EHR: Electronic Health Record System

Payer / Provider Data Exchange

PATIENT ACCESS FHIR APIs

HEALTHCARE PAYER

STANDARDS

a quick overview of Why HL7?

HL7 INTERNATIONAL

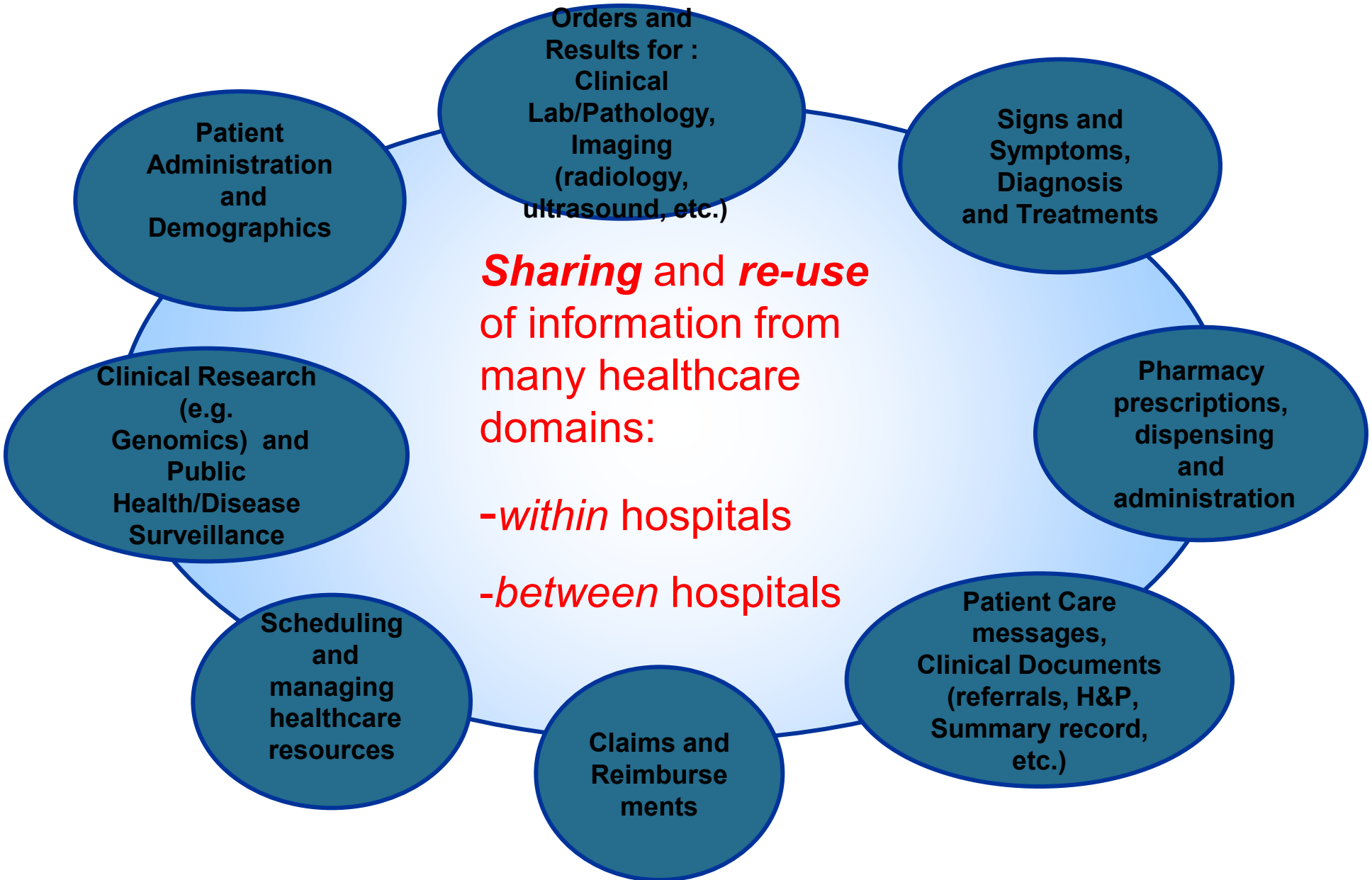
https://www.hl7.org/

Founded in 1987, Health Level Seven International (HL7) is a not-for-profit, ANSI-accredited **standards developing organization (SDO)** dedicated to providing a comprehensive framework and related standards for the exchange, integration, sharing, and retrieval of electronic health information that supports clinical practice and the management, delivery and evaluation of health services.

HL7 is supported by more than 1,600 members from over 50 countries, including 500+ corporate members representing healthcare providers, government stakeholders, payers, pharmaceutical companies, vendors/suppliers, and consulting firms.

HL7®

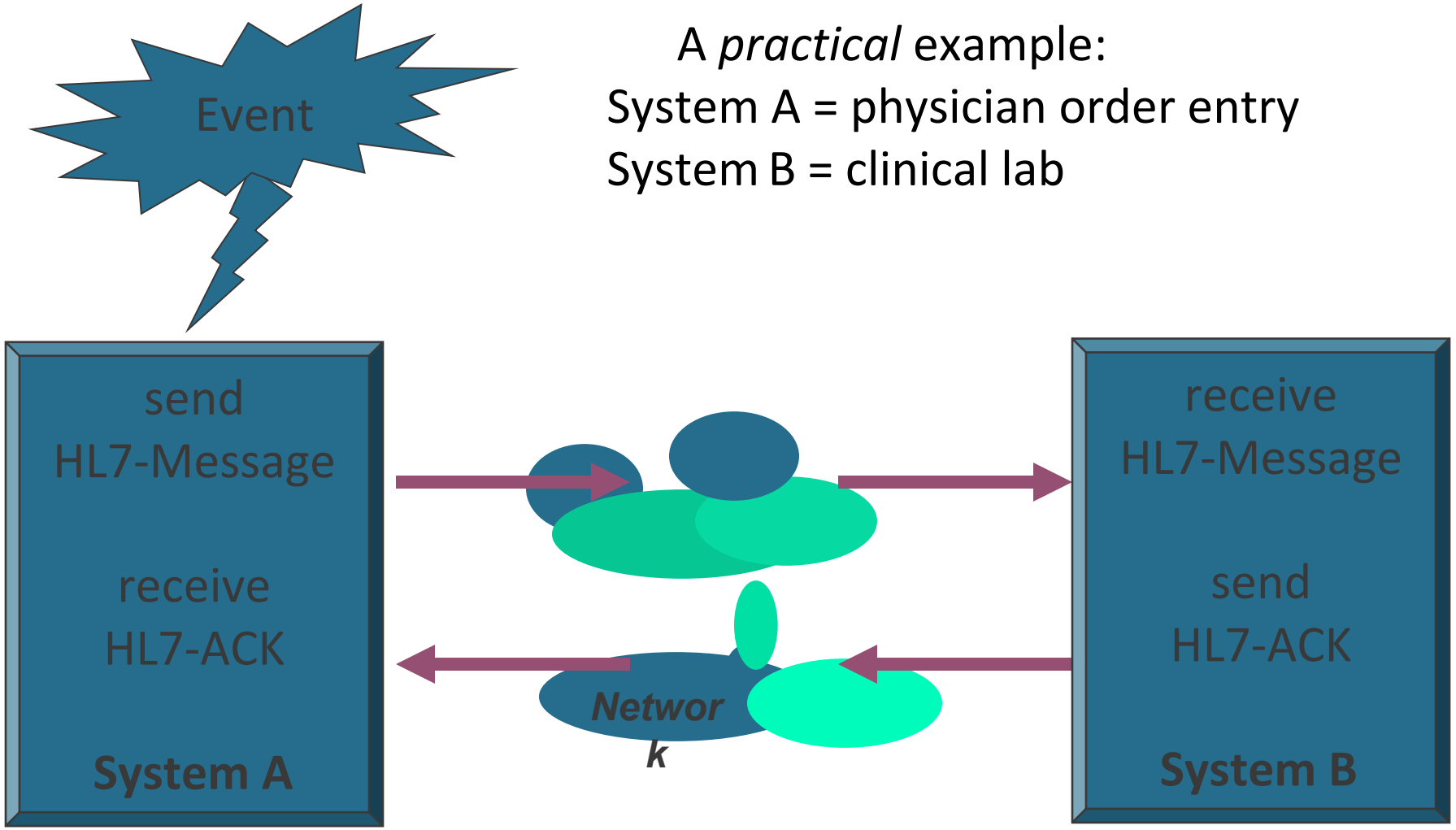
HL7 has produced a *family* of Standards for



Types of HL7 Standards

Paradigm	**HL7 Standards**	**From**	**Comments**
Messaging	HL7 v2.x, (V3)	1985…	App to App Exchange for Data Replication
Documents	HL7 CDA R2	2000…	Human Readable Artifacts
Services	CTS2, RLUS, EIS, DSS, PASS	2003…	SOA Approach. Good to understand the domains
Resources	FHIR	2012	Fast becoming the defacto interoperability standard

Basic principles of HL7 Messaging



A *practical* example:
System A = physician order entry
System B = clinical lab


MSH
- Message Header
OBR
OBX
ORC
NK1
PV1

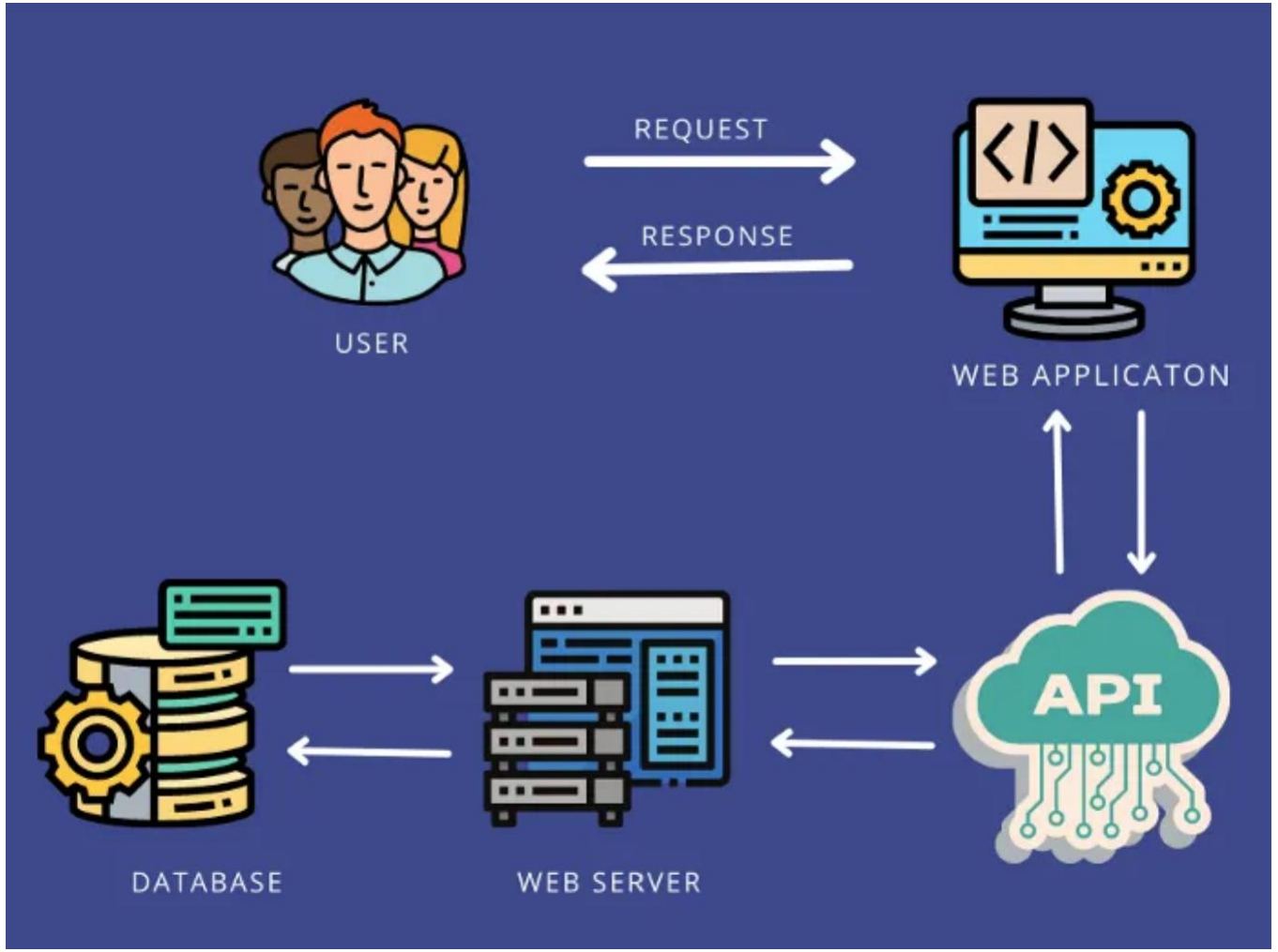
FHIR

FAST HEALTHCARE INTEROPERABILITY RESOURCES

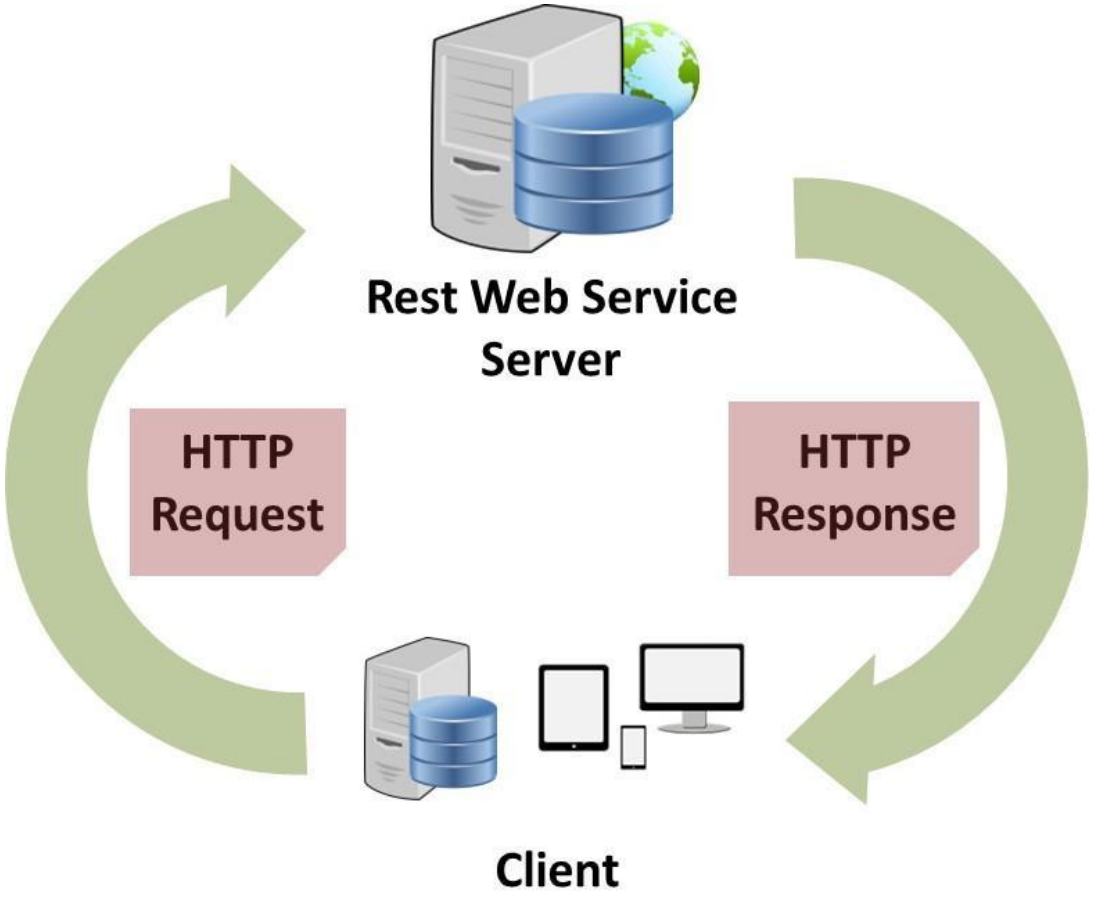
TWO KEY CONCEPTS

At its core, FHIR contains two primary components:

1. **Resources** - a collection of information models that define the data elements, constraints and relationships for the "business objects" most relevant to healthcare. See the formal definition.
2. **API**s – a collection of well-defined interfaces for interoperating between two applications. See details on FHIR RESTful interfaces.



What is REST?
Representational State Transfer



Definition:

REST is intended to evoke an image of how a well-designed Web application behaves: a network of web pages (a virtual state-machine), where the user progresses through an application by selecting links (state transitions), resulting in the next page (representing the next state of the application) being transferred to the user and rendered for their use.

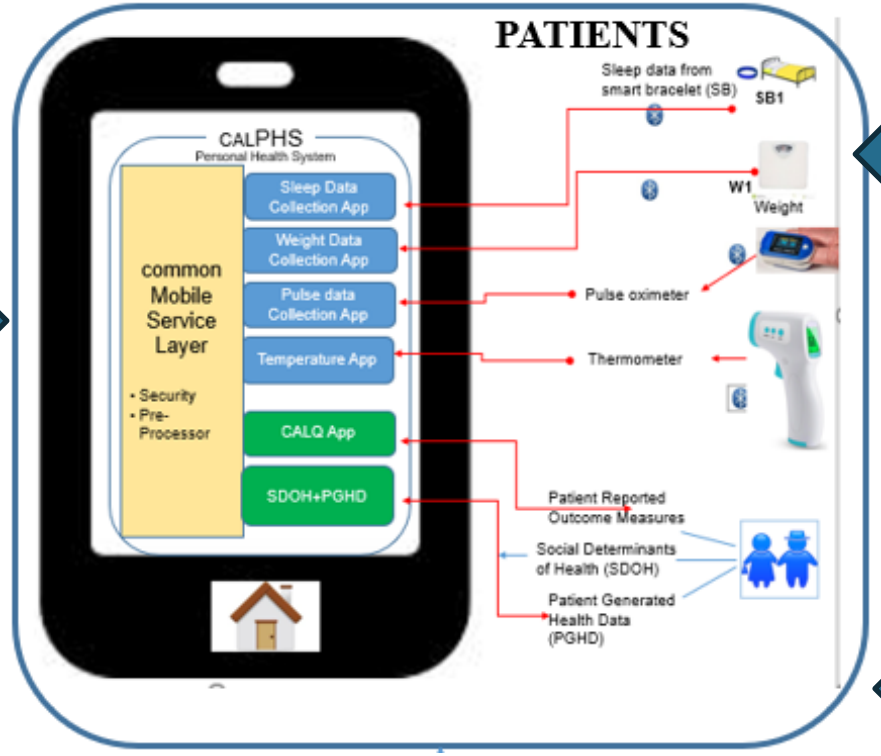
Roy Fielding, PhD Dissertation, UCI, 2000
Source: https://medium.com/@sagar.mane006/understanding-rest-representational-state-transfer-85256b9424aa

FHIR Client – Server Example

STATE IMMUNIZATION REGISTRY

FHIR Server

FHIR



"Your app"

PATIENT ACCESS FHIR APIs

EHR: Electronic Health Record System

FHIR Server

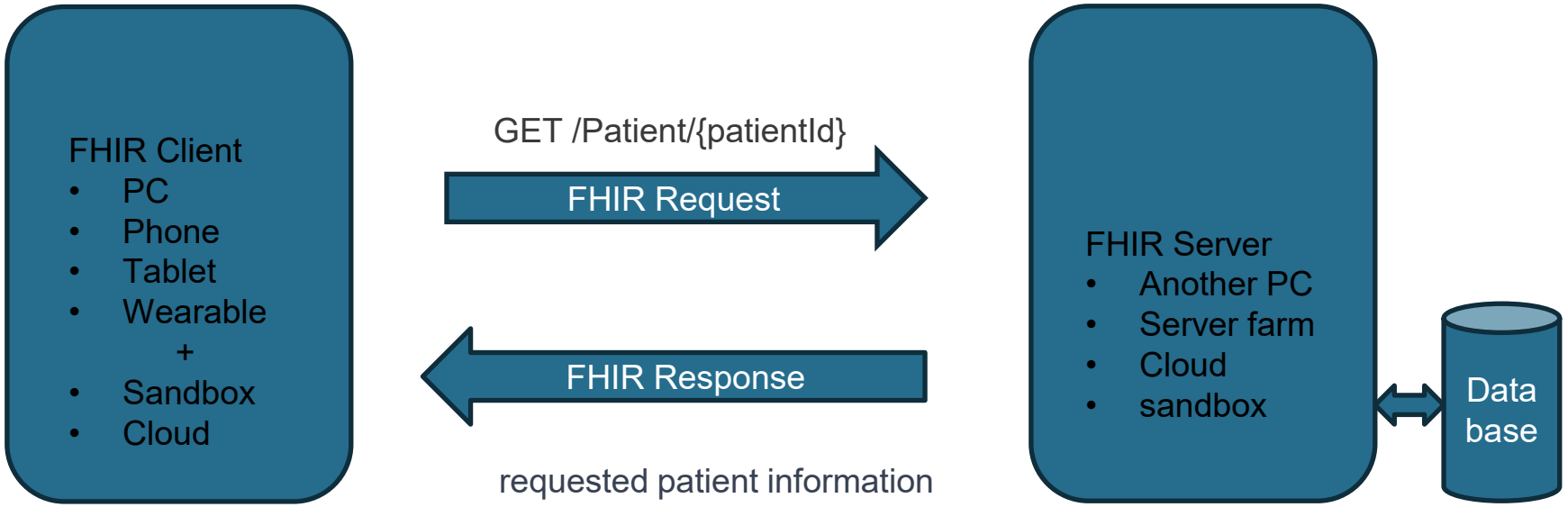
Payer / Provider Data Exchange

PATIENT ACCESS FHIR APIs

HEALTHCARE SYSTEM

FHIR Server

A SIMPLE FHIR transaction

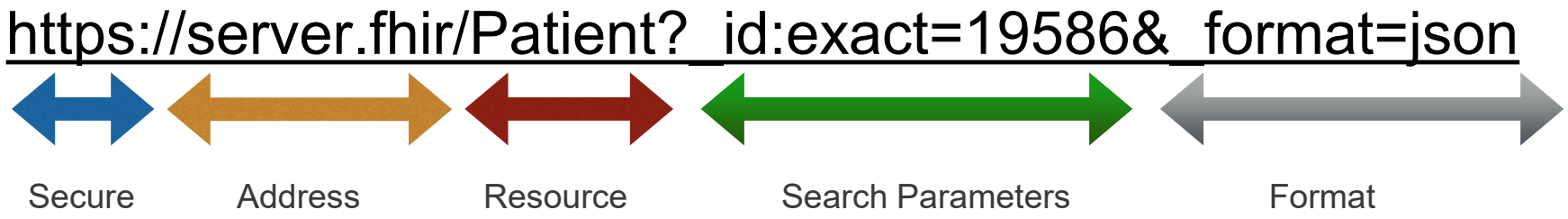


requested patient information in FHIR format, usually in JSON or XML.
The response includes various attributes of the patient, such as their name, gender, birthdate, and other relevant medical data.

URL Based API

Use REST to obtain the record for patient with id=19586, in json format

All the resources have an ’id’ (logical identifier)



FHIR OPERATIONS

CRUD operations

- **C**REATE
- **R**EAD
- **U**PDATE
- **D**ELETE

EXAMPLE: https://smilecdr.com/docs/fhir_standard/fhir_crud_operations.html

FHIR RESOURCES

HTTPS://WWW.HL7.ORG/FHIR/RESOURCELIST.HTML

157 of them

FHIR RESOURCES

Building blocks designed to be easily shareable

standardized structure, including attributes and relationships,

self-contained unit of information

- with a specific structure and
- defined set of elements that describe different attributes of the data

EXAMPLES

1. **Patient:** Represents a patient's demographic information, including their name, gender, date of birth, and contact details.
2. **Observation:** Represents the result of a clinical observation or measurement, such as a blood pressure reading, laboratory test result, or vital signs.
3. **Medication:** Represents a medication that a patient is prescribed, including details about the medication name, dosage, instructions, and route of administration.
4. **Condition:** Represents a patient's medical condition or diagnosis, along with relevant details such as onset date, severity, and status.
5. **Encounter:** Represents a healthcare encounter between a patient and a healthcare provider or facility, including information about the location, date, reason for the encounter, and participants involved.
6. **Procedure:** Represents a medical procedure or action performed on a patient, including details about the procedure type, date, and related participants.
7. **AllergyIntolerance:** Represents a patient's known allergies or intolerances to specific substances, medications, or foods.
8. **ImagingStudy:** Represents imaging studies like X-rays, MRIs, or CT scans, along with metadata about the study and the images produced.

RESOURCES

Foundation

Conformance
- CapabilityStatement **N**
- StructureDefinition **N**
- ImplementationGuide 4
- SearchParameter 5
- MessageDefinition 1
- OperationDefinition **N**
- CompartmentDefinition 3
- StructureMap 4
- GraphDefinition 2

Terminology
- CodeSystem **N**
- ValueSet **N**
- ConceptMap 3
- NamingSystem 4
- TerminologyCapabilities 1

Security
- Provenance 4
- AuditEvent 4
- Permission 0
- Consent 2

Documents
- Composition 4
- DocumentReference 4

Other
- Basic 3
- Binary **N**
- Bundle **N**
- Linkage 0
- MessageHeader 4
- OperationOutcome **N**
- Parameters **N**
- Subscription 3
- SubscriptionStatus 2
- SubscriptionTopic 2

Base

Individuals
- Patient **N**
- Practitioner 5
- PractitionerRole 4
- RelatedPerson 5
- Person 4
- Group 3

Entities #1
- Organization 5
- OrganizationAffiliation 1
- HealthcareService 4
- Endpoint 2
- Location 5

Entities #2
- Substance 2
- BiologicallyDerivedProduct 2
- Device 2
- DeviceMetric 1
- NutritionProduct 1

Workflow
- Task 3
- Transport 1
- Appointment 3
- AppointmentResponse 3
- Schedule 3
- Slot 3
- VerificationResult 1

Management
- Encounter 4
- EncounterHistory 0
- EpisodeOfCare 2
- Flag 1
- List 4
- Library 4

Clinical

Summary
- AllergyIntolerance 3
- AdverseEvent 2
- Condition (Problem) 5
- Procedure 4
- FamilyMemberHistory 2
- ClinicalImpression 1
- DetectedIssue 2

Diagnostics
- Observation **N**
- DocumentReference 4
- DiagnosticReport 3
- Specimen 2
- BodyStructure 1
- ImagingSelection 1
- ImagingStudy 4
- QuestionnaireResponse 5
- MolecularSequence 1
- GenomicStudy 0

Medications
- MedicationRequest 4
- MedicationAdministration 2
- MedicationDispense 2
- MedicationStatement 4
- Medication 4
- MedicationKnowledge 1
- Immunization 5
- ImmunizationEvaluation 1
- ImmunizationRecommendation 1
- FormularyItem 0

Care Provision
- CarePlan 2
- CareTeam 2
- Goal 2
- ServiceRequest 4
- NutritionOrder 2
- NutritionIntake 1
- VisionPrescription 3
- RiskAssessment 2
- RequestOrchestration 4

Request & Response
- Communication 2
- CommunicationRequest 2
- DeviceRequest 1
- DeviceDispense 0
- DeviceAssociation 0
- DeviceUsage 1
- BiologicallyDerivedProductDispense 0
- GuidanceResponse 2
- SupplyRequest 1
- SupplyDelivery 1
- InventoryItem 0
- InventoryReport 0

RESOURCES (cont.)

Financial

Support

- Coverage 4
- CoverageEligibilityRequest 4
- CoverageEligibilityResponse 4
- EnrollmentRequest 0
- EnrollmentResponse 0

Billing

- Claim 2
- ClaimResponse 2
- Invoice 0

Payment

- PaymentNotice 4
- PaymentReconciliation 4

General

- Account 2
- ChargeItem 1
- ChargeItemDefinition 1
- Contract 1
- ExplanationOfBenefit 2
- InsurancePlan 0

Specialized

Public Health & Research

- ResearchStudy 0
- ResearchSubject 0

Definitional Artifacts

- ActivityDefinition 4
- ConditionDefinition 0
- DeviceDefinition 1
- EventDefinition 0
- ObservationDefinition 1
- PlanDefinition 4
- Questionnaire 5
- SpecimenDefinition 1
- ExampleScenario 1
- ActorDefinition 1
- Requirements 1

Evidence-Based Medicine

- ArtifactAssessment 1
- Citation 1
- Evidence 1
- EvidenceReport 0
- EvidenceVariable 1

Quality Reporting & Testing

- Measure 4
- MeasureReport 4
- TestPlan 0
- TestScript 4
- TestReport 1

Medication Definition

- MedicinalProductDefinition 3
- PackagedProductDefinition 2
- AdministrableProductDefinition 2
- ManufacturedItemDefinition 2
- Ingredient 2
- ClinicalUseDefinition 2
- RegulatedAuthorization 2
- SubstanceDefinition 1
- SubstanceNucleicAcid 0
- SubstancePolymer 0
- SubstanceProtein 0
- SubstanceReferenceInformation 0
- SubstanceSourceMaterial 0

An Resource Example: PATIENT…(1 of 2)

Structure | UML | XML | JSON | Turtle | R4 Diff | All

Structure

Name	Flags	Card.	Type	Description & Constraints
Patient	N		DomainResource	Information about an individual or animal receiving health care services Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension
identifier	Σ	0..*	Identifier	An identifier for this patient
active	?! Σ	0..1	boolean	Whether this patient's record is in active use
name	Σ	0..*	HumanName	A name associated with the patient
telecom	Σ	0..*	ContactPoint	A contact detail for the individual
gender	Σ	0..1	code	male | female | other | unknown Binding: AdministrativeGender (Required)
birthDate	Σ	0..1	date	The date of birth for the individual
deceased[x]	?! Σ	0..1		Indicates if the individual is deceased or not
deceasedBoolean			boolean	
deceasedDateTime			dateTime	
address	Σ	0..*	Address	An address for the individual
maritalStatus		0..1	CodeableConcept	Marital (civil) status of a patient Binding: Marital Status Codes (Extensible)
multipleBirth[x]		0..1		Whether patient is part of a multiple birth
multipleBirthBoolean			boolean	
multipleBirthInteger			integer	
photo		0..*	Attachment	Image of the patient

An Resource Example: PATIENT…(2 of 2)

contact	C	0..*	BackboneElement	A contact party (e.g. guardian, partner, friend) for the patient *+ Rule: SHALL at least contain a contact's details or a reference to an organization*
relationship		0..*	CodeableConcept	The kind of relationship Binding: Patient Contact Relationship (Extensible)
name	C	0..1	HumanName	A name associated with the contact person
telecom	C	0..*	ContactPoint	A contact detail for the person
address	C	0..1	Address	Address for the contact person
gender		0..1	code	male | female | other | unknown Binding: AdministrativeGender (Required)
organization	C	0..1	Reference(Organization)	Organization that is associated with the contact
period		0..1	Period	The period during which this contact person or organization is valid to be contacted relating to this patient
communication		0..*	BackboneElement	A language which may be used to communicate with the patient about his or her health
language		1..1	CodeableConcept	The language which can be used to communicate with the patient about his or her health Binding: All Languages (Required) **Additional Bindings** | Purpose Common Languages | Starter Set
preferred		0..1	boolean	Language preference indicator
generalPractitioner		0..*	Reference(Organization | Practitioner | PractitionerRole)	Patient's nominated primary care provider
managingOrganization	Σ	0..1	Reference(Organization)	Organization that is the custodian of the patient record
link	?! Σ	0..*	BackboneElement	Link to a Patient or RelatedPerson resource that concerns the same actual individual
other	Σ	1..1	Reference(Patient | RelatedPerson)	The other patient or related person resource that the link refers to
type	Σ	1..1	code	replaced-by | replaces | refer | seealso Binding: Link Type (Required)

Who is using FHIR?

- ✓ Some names that you may recognize:
  - Amazon
  - Apple
  - Google
  - IBM
  - Microsoft
  - Salesforce
- ✓ Companies that use FHIR: https://theirstack.com/en/technology/fhir
- ✓ Systems (in US) that are FHIR API enabled (as of Aug 2026: 330 systems)
  - https://chpl.healthit.gov/#/search

THANK YOU!

GORA DATTA. FHL7

GORA.DATTA@BERKELEY.EDU

Introducing OneAquaHealth OAH-FHIR Implementation Guide

Efstratios (Stratos) Kokolakis, MSc, PhD(c)
- PhD Researcher, Hellenic Mediterranean University
- Senior Research Associate, HL7 Europe
- Contributor to the EU Horizon Europe project OneAquaHealth

What is FHIR?

Fast Healthcare Interoperability Resources (FHIR) is a next-generation standard by HL7 International for exchanging healthcare data electronically.

Built on modern web standards (REST, JSON, XML), FHIR enables modular, composable resource types that can be profiled for domain-specific use.

R4 is the first release with normative content, providing stability guarantees for foundational resources and production implementations.

Why FHIR for Environment?

FHIR's Observation resource naturally maps to environmental measurements (temperature, pH, pollutants).

Location, Specimen, and Device resources model sampling sites, water samples, and IoT sensors.

Library and Bundle resources aggregate datasets into reusable, versioned collections.

Enabling Interoperability Between Health and Environmental Systems

OneAquaHealth

settings_input_component

Built on HL7 FHIR standards

The implementation Guide adopts HL7 FHIR to harmonize data from environmental monitoring systems, public health systems, public health records, and community reporting platforms.

layers

Modular and extensible design

The guide features a modular architecture specifically designed for aquatic ecosystem monitoring, encompassing water quality, biodiversity, and microbial indicators.

groups

Facilitates cross-sector collaboration

Enhances collaboration among environmental scientists, health professionals, and civic authorities, promoting a holistic approach to public health and environmental stewardship.

integration_instructions

Supports easy integration of collected data

The guide streamlines the integration of data collected from various sources, allowing for efficient aggregation and analysis across multiple domains.

OAH Indicators

OneAquaHealth

Unified Indicator Framework

Defines the complete structure for biological, hydromorphological, water-quality, bio-risk, and remote-sensing indicators.

Foundation of the OneAquaHealth Data Model

Serves as the conceptual backbone for how all environmental and health-risk indicators are represented in FHIR.

Consistent Semantics Across Domains

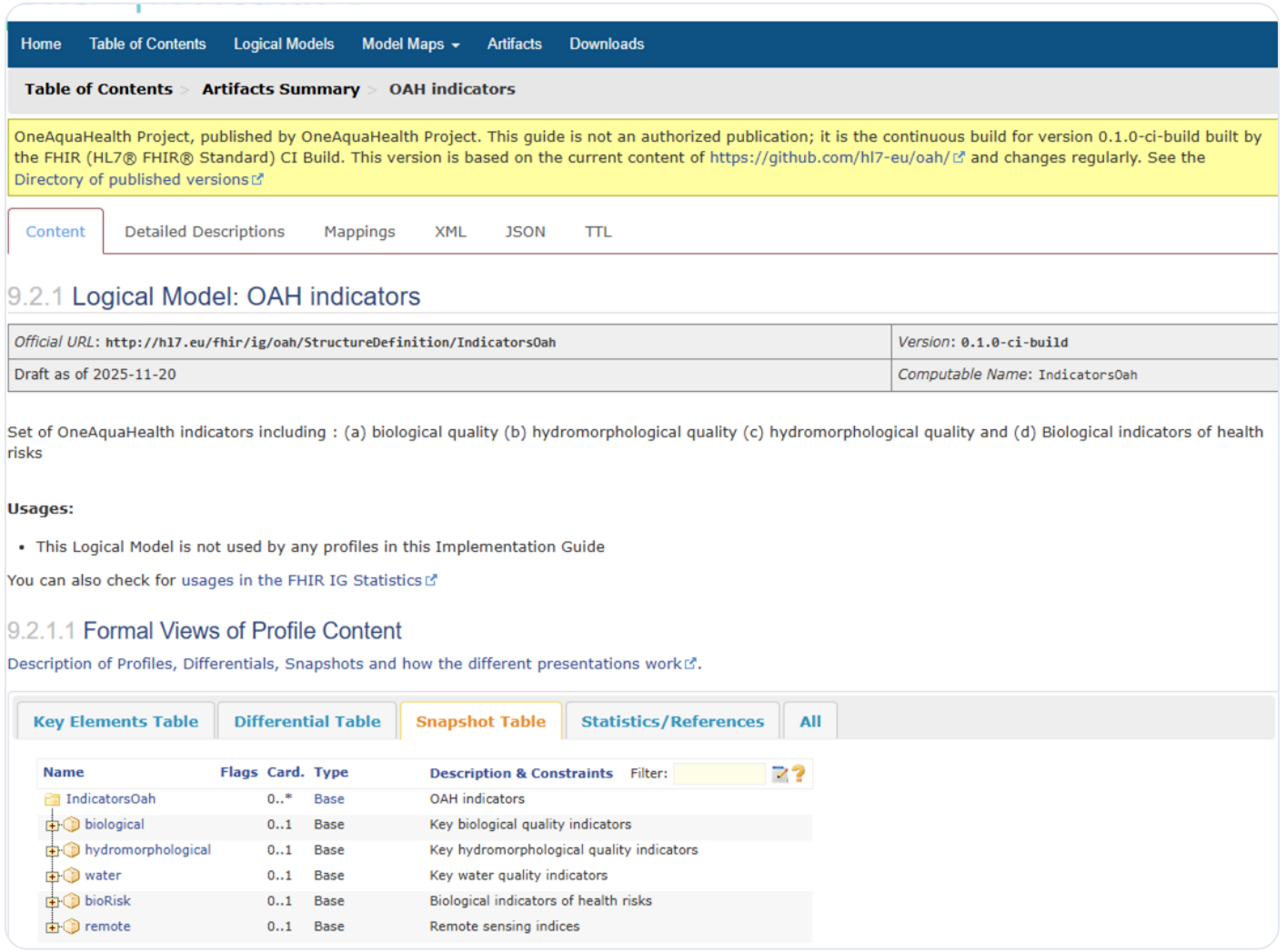
Ensures that field teams, laboratories, hydrologists, ecologists, and remote-sensing analysts speak the same data language.

Extensible, Future-Proof Design

Logical model supports easy expansion as new indicator categories or methodologies are introduced.

Machine-Readable & Interoperable

Includes formal differential and snapshot definitions, enabling automated validation and integration into analytics pipelines.



FHIR-Based Integration in OneAquaHealth

OneAquaHealth

settings_input_component

Data Sources

The architecture integrates water quality sensors, laboratory test results, and citizen-generated observations, standardizing them via FHIR profiles.

layers

Interoperability Layer

All data flows through a central interoperability layer based on HL7 FHIR, ensuring semantic consistency and secure exchange between domains.

eco

Custom Profiles

HL7 Europe developed specific FHIR profiles to represent ecological and hydrological indicators, enabling detailed modeling of aquatic health parameters.

extension

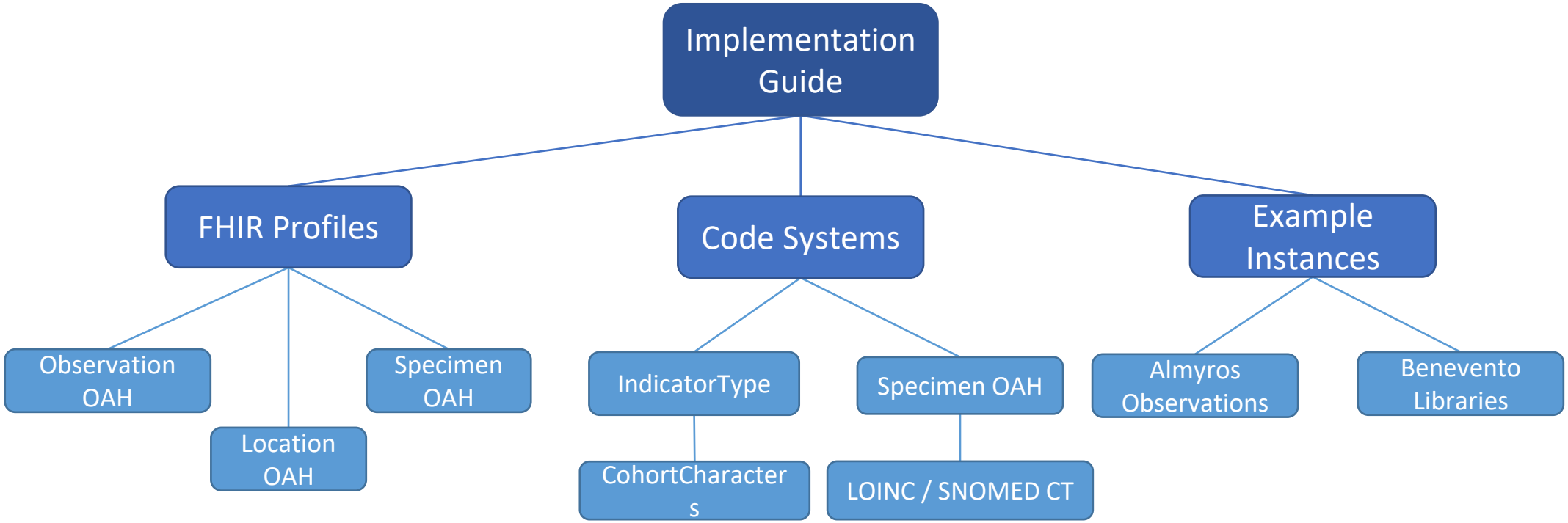
Reusable Artifacts

The IG includes structured terminologies and extensions tailored for ecosystem-health integration, promoting reuse and international alignment.

FHIR Resource Mapping in OneAquaHealth

OneAquaHealth

The IG organizes FHIR artifacts into profiles, terminologies, and example instances



Core IG Element

Category

Specific artifact

Seven Logical Models

OneAquaHealth

The conceptual backbone of the OneAquaHealth data architecture

01	**DataSet**	Dataset metadata, stewardship, versioning
02	**IndicatorsOah**	Environmental indicator collections by theme
03	**HealthIndicators**	Population health & wellness prevalence
04	**Sample**	Sampling site context and event details
05	**SimpleIndicator**	Single-value measurement representation
06	**StructuredIndicator**	Multi-component measurement capture
07	**HealthMeasure**	Individual health measurement with cohort

Each logical model maps to concrete FHIR resources via Structure Maps

IndicatorsOah: Environmental Indicator Taxonomy

OneAquaHealth

5 thematic groups covering 40+ individual indicators across ecological and health domains

Biological Quality

Macroinvertebrates, Diatoms, Fish, Macrophytes, Riparian Vegetation, Microbiomes

Hydromorphological

Morphology, Hydrology, Land Use, Habitat Connectivity

Water Quality

Nutrients, pH, DO, Temperature, Conductivity, Pharmaceuticals, Coliforms

Biorisk Indicators

Diptera, Ticks, Invasive Species, Diatom Teratology, Amphibians

Remote Sensing

NDCI, MCI, NDVI, NDWI, SAVI, LST, BLFEI, EBBI, IBI, PISI

HealthIndicators: Population Health Metrics

OneAquaHealth

Cardiometabolic & Lifestyle

- High blood pressure & hypertension treatment
- Obesity, BMI distribution bands
- High cholesterol (>=190/240 mg/dL)
- Diabetes prevalence and treatment rates
- Physical inactivity, mental health issues

Infectious Disease Prevalence

- Borrelia burgdorferi (Lyme disease)
- Campylobacter, Salmonella, E. coli
- Cryptosporidium, Giardia
- Chlamydia psittaci, Entamoeba
- Yersinia enterocolitica

Cohort-Based Structuring

Health indicators are grouped by population cohorts using FHIR Group resources. The IG defines groups stratified by city (Benevento, Oslo), gender (Male, Female), and age ranges (18-29, 30-39, 40-49, 50-59, 60-69, 70+), enabling granular epidemiological analysis linked to environmental exposure data.

Remote Sensing Indices in OAH

OneAquaHealth

Satellite-derived indices enable basin-scale assessments complementing in-situ measurements`

Chlorophyll & Vegetation

- NDCI Normalized Diff. Chlorophyll
- MCI Maximum Chlorophyll
- NDVI / mNDVI Vegetation Index
- SAVI / TSAVI Soil-Adjusted

Water & Moisture

- NDWI Water Index
- MNDWI / ANDWI Modified Water
- LWCI Leaf Water Content
- GVMI Global Vegetation Moisture

Thermal & Urban

- LST Land Surface Temperature
- BLFEI Built Land Feature
- EBBI Enhanced Built-Up
- IBI / PISI / UI Impervious Surface

Metadata: The Digital Catalog

OneAquaHealth

Metadata serves as the "library catalog" for the OAH ecosystem, describing the context of every dataset resource.

Core Semantic Elements

Identification

Persistent PIDs, titles, and versioning.

Stewardship

Publisher, author, and legal licensing terms.

Provenance

Historical creation and transformation logs.

End-to-End Data Pipeline

OneAquaHealth

1

Data Collection

IoT sensors, lab analysis, handheld devices, citizen platforms

2

Transformation

Raw data mapped to FHIR Observation, Location, Specimen resources

3

Validation

IG profiles enforce cardinality, code bindings, UCUM units

4

Aggregation

Library resources bundle observations into asset collections

5

Publication

CI build publishes IG with XML/JSON/TTL artifacts on GitHub

FHIR Library: Asset Collection Pattern

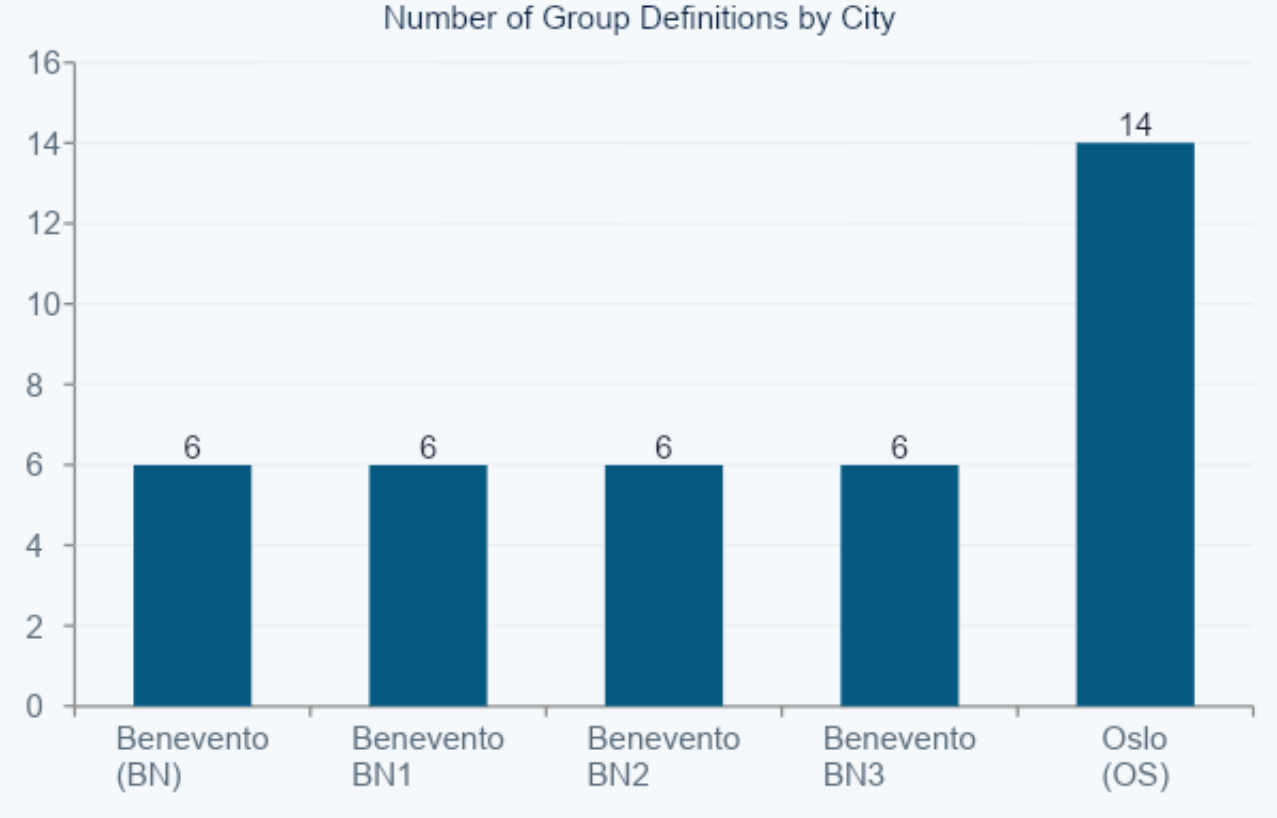
OneAquaHealth

Each Library includes: official URL, version, computable name, publisher, date, and typed metadata

AlmyrosFullResults	Almyros observations (2013-2025)	135 obs
AlmyrosIndicators	Almyros indicators (2024-2025)	Temp, EC
BeneventoAll	Benevento all sites (01-12)	103 obs
Benevento01..12	Per-site annual summaries	12 libraries
GiofyrosIndicators	Giofyros indicator dataset	Active
OsloAll	Oslo health data collection	New

Group Resource: Population Cohort Definitions

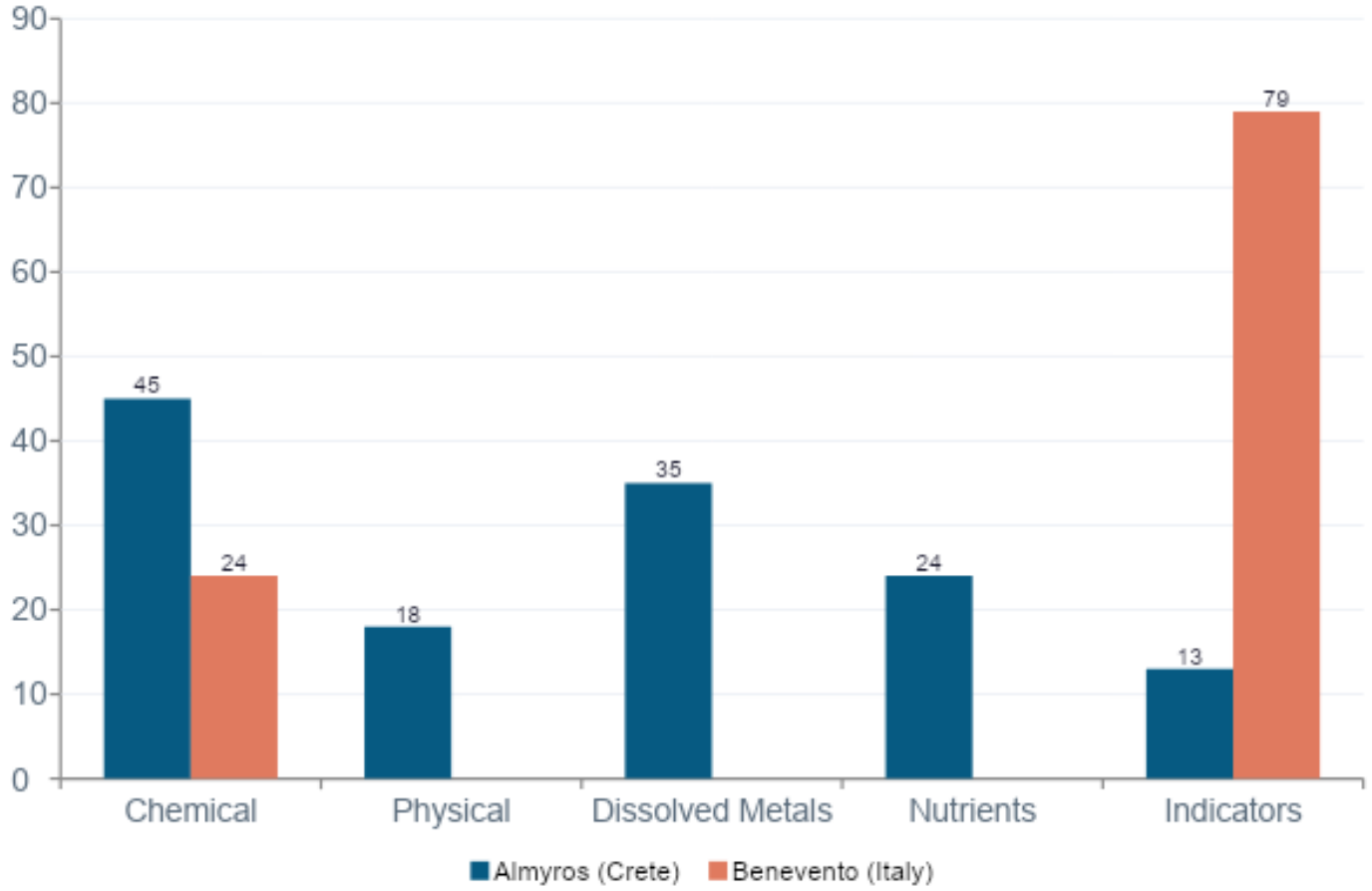
45 Group definitions enable fine-grained epidemiological analysis



Stratification Axes

- Gender: Male, Female, All
- Age: 18-29, 30-39, 40-49, 50-59, 60-69, 70+, 35-74
- Location: Per monitoring site
- Total: 45 Group instances defined in the IG
- Uses OAH Cohort Characteristic CodeVS for coded stratification

Observation Count by Site and Type



Summary

135 Almyros observations (2013 - 2025)

103 Benevento observations (sites 01-12)

238+ Total FHIR Observation instances in IG

5 pollutant types monitored across Benevento: Benzene, NO2, O3, PM10, PM2.5

Use Case: Benevento - Multisite Monitoring with FHIR-Based Integration

OneAquaHealth

Sites 01–12 across Benevento

The pilot integrated 103 observations from 12 distinct monitoring sites, assessing urban pollution and environmental stressors.

Standardized Observations

Data included benzene, NO_2, PM10, and water parameters, modeled using HL7 FHIR Observation resources with ecosystem-focused profiles.

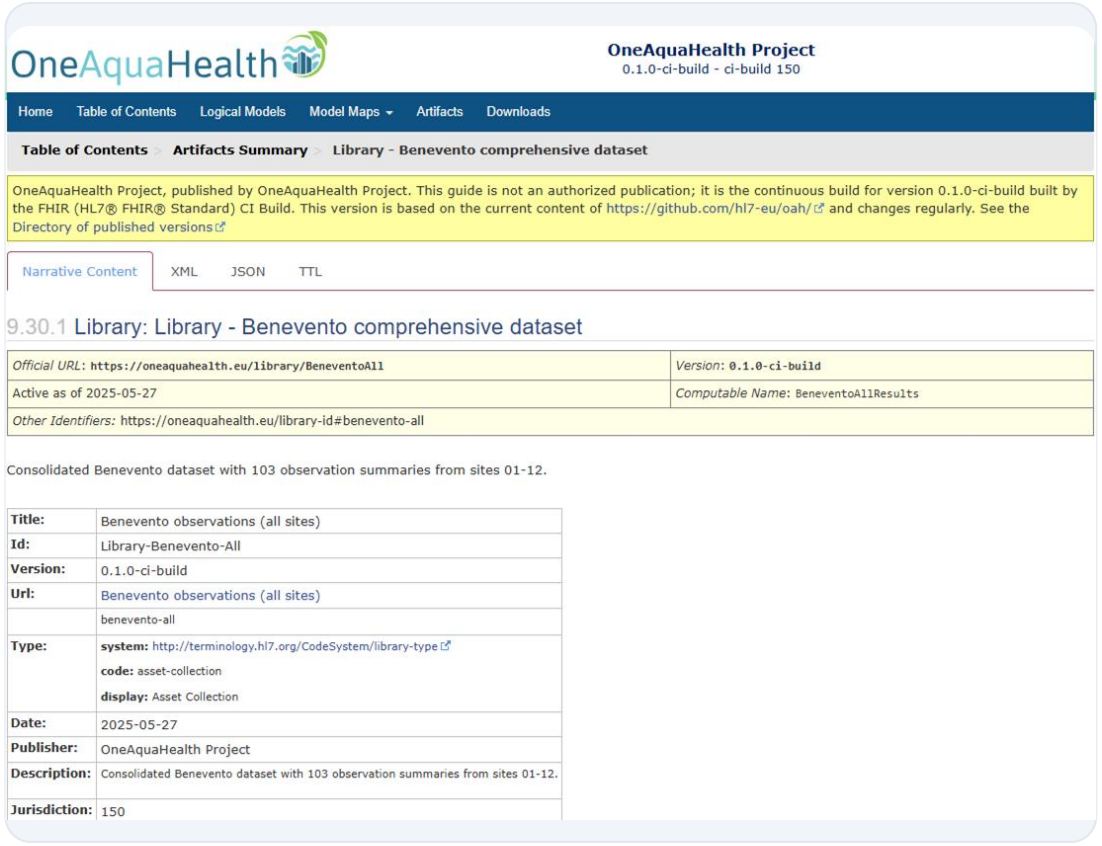
Consolidated Digital Artifact

The full dataset is encapsulated in 'Library-Benevento-All'—available through the FHIR Implementation Guide site.

Regional Decision-Making

Standardized reporting across sites provides a harmonized view of local environmental risks, supporting informed interventions.

Use Case: Benevento - Multisite Monitoring



OneAquaHealth

OneAquaHealth Project
0.1.0-ci-build - ci-build 150

Home | Table of Contents | Logical Models | Model Maps | Artifacts | Downloads

Table of Contents > Artifacts Summary > Library - Benevento comprehensive dataset

OneAquaHealth Project, published by OneAquaHealth Project. This guide is not an authorized publication; it is the continuous build for version 0.1.0-ci-build built by the FHIR (HL7® FHIR® Standard) CI Build. This version is based on the current content of https://github.com/hl7-eu/oah/ and changes regularly. See the Directory of published versions

Narrative Content | XML | JSON | TTL

9.30.1 Library: Library - Benevento comprehensive dataset

Official URL: https://oneaquahealth.eu/library/BeneventoAll	*Version*: 0.1.0-ci-build
Active as of 2025-05-27	*Computable Name*: BeneventoAllResults
Other Identifiers: https://oneaquahealth.eu/library-id#benevento-all	

Consolidated Benevento dataset with 103 observation summaries from sites 01-12.

Title:	Benevento observations (all sites)
Id:	Library-Benevento-All
Version:	0.1.0-ci-build
Url:	Benevento observations (all sites)
	benevento-all
Type:	**system:** http://terminology.hl7.org/CodeSystem/library-type **code:** asset-collection **display:** Asset Collection
Date:	2025-05-27
Publisher:	OneAquaHealth Project
Description:	Consolidated Benevento dataset with 103 observation summaries from sites 01-12.
Jurisdiction:	150

Integrated Multi-Site Dataset

Consolidates 103 observation summaries across Benevento sites 01–12 into a single, harmonized FHIR Asset Collection.

Standardized Environmental Reporting

Uses HL7® FHIR® to structure field and laboratory data for consistent interpretation and cross-regional comparison.

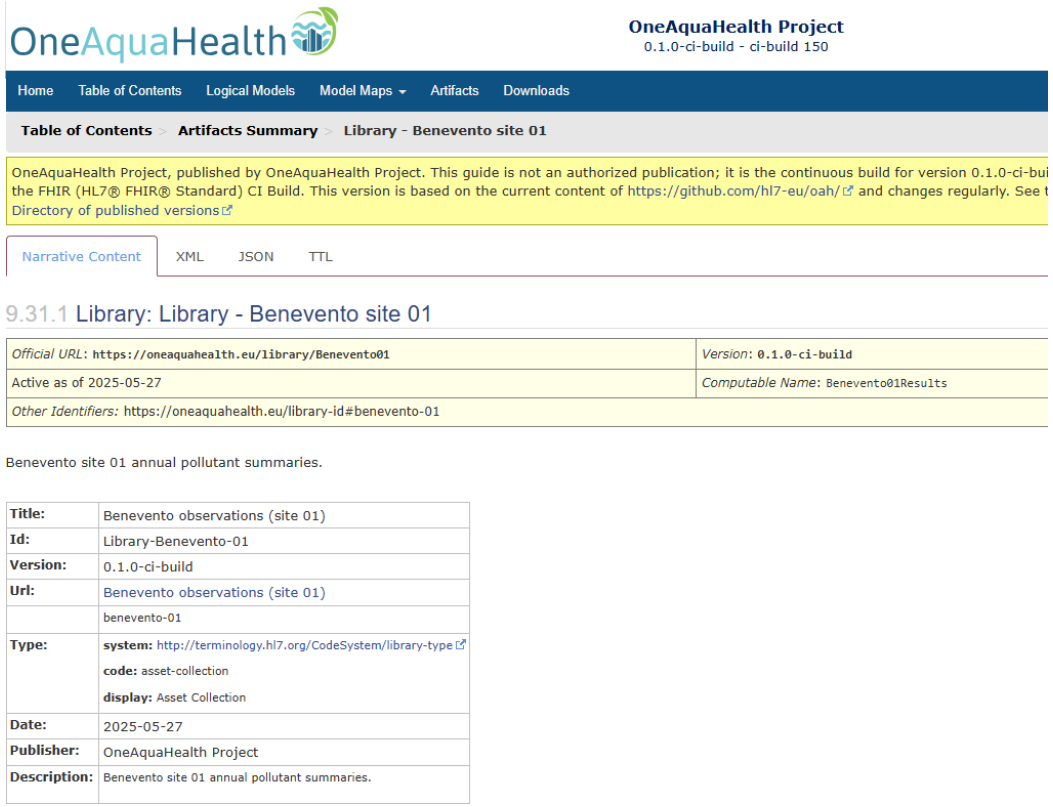
Transparent & Versioned

Publicly accessible with stable URLs, computable identifiers, and continuous build updates for guaranteed traceability.

Supports Comparative Ecosystem Analysis

Enables cross-site evaluation of water quality, ecological trends, and health-risk indicators.

Benevento Example Location: Site 01



Site-Specific Annual Pollutant Summary

Provides a focused dataset capturing the yearly pollutant trends for Benevento Site 01.

Standardized Using HL7® FHIR®

Published as an Asset Collection, ensuring interoperability with analytical tools, dashboards, and multi-region comparisons.

Transparent & Traceable Publication

Includes stable URLs, computable names, and continuous build updates for reliable long-term referencing.

Supports Localised Environmental Assessment

Enables precise monitoring of site-level water quality and pollutant dynamics within the Benevento network.

Benevento Example Observation: Benzene

code: Benzene

subject: Location Benevento monitoring site 02

effective: 2018-01-01 --> 2018-12-31

performer: Organization Agenzia Regionale per la Protezione dell'Ambiente della Campania

> **component**
>
> **code**: Average
>
> **value**: 1.07 microgram per cubic meter (Details: UCUM codeug/m3 = 'ug/m3')

> **component**
>
> **code**: Maximum
>
> **value**: 4.1 microgram per cubic meter (Details: UCUM codeug/m3 = 'ug/m3')

> **component**
>
> **code**: Minimum
>
> **value**: 0.1 microgram per cubic meter (Details: UCUM codeug/m3 = 'ug/m3')

> **component**
>
> **code**: Standard Deviation
>
> **value**: 0.62 microgram per cubic meter (Details: UCUM codeug/m3 = 'ug/m3')

Rich, Multi-Value Environmental Observation

Captures pollutant measurements (e.g., benzene) with full statistical components: average, max, min, standard deviation, and median.

Supports Advanced Analytics

Provides ready-to-use statistical summaries, reducing preprocessing effort for data scientists.

Clear Temporal & Spatial Context

Includes exact sampling period (effective dates) and explicit site location (e.g., Benevento site 02).

Authoritative Data Provenance

Performer metadata links results to the official regional environmental agency.

FHIR-Native Structuring

Uses the Observation.component pattern to encode multiple related values in a single resource.

Interoperable Pollutant Reporting

Units follow UCUM standards, ensuring compatibility with modelling pipelines and regulatory dashboards.

Reusable Across Domains

Enables integration into broader ecosystem health assessments and decision-support tools.

Benevento Example Observation: Benzene

code: Benzene

subject: Location Benevento monitoring site 02

effective: 2018-01-01 --> 2018-12-31

performer: Organization Agenzia Regionale per la Protezione dell'Ambiente della Campania

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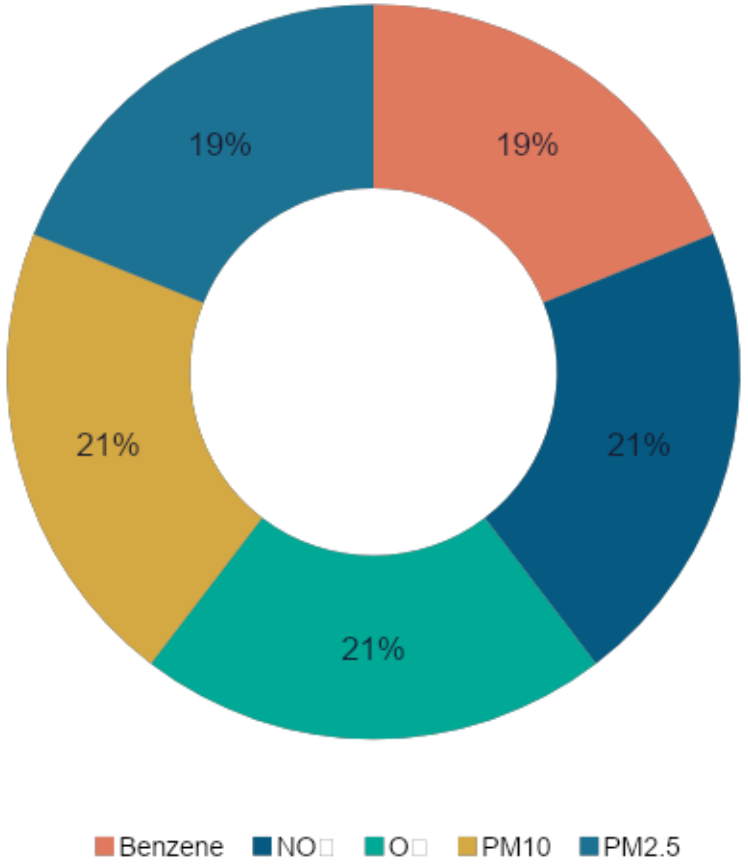
Benevento Pollutant Distribution Across Sites



Air Quality Parameters

- Benzene: Carcinogenic VOC from traffic and industry
- NO_2: Respiratory irritant from combustion sources
- O_3: Ground-level ozone, secondary pollutant
- PM10 / PM2.5: Particulate matter linked to cardiovascular and respiratory disease
- All values encoded with UCUM units (ug/m3) and statistical components (avg, max, min, SD, median)

Use Case: Heraklion, Crete - Almyros Stream Monitoring

OneAquaHealth

Place

Site: Almyros River

Monitoring focused on Almyros river, a key freshwater resource in Crete. Environmental indicators were collected to evaluate ecological health and early-warning potential.

Assessment

135 Observations

A consolidated dataset (2013–2025) captured water quality metrics across years, including chemical summaries, handheld sampling, and sensor-based campaigns.

Account_tree

FHIR Structuring

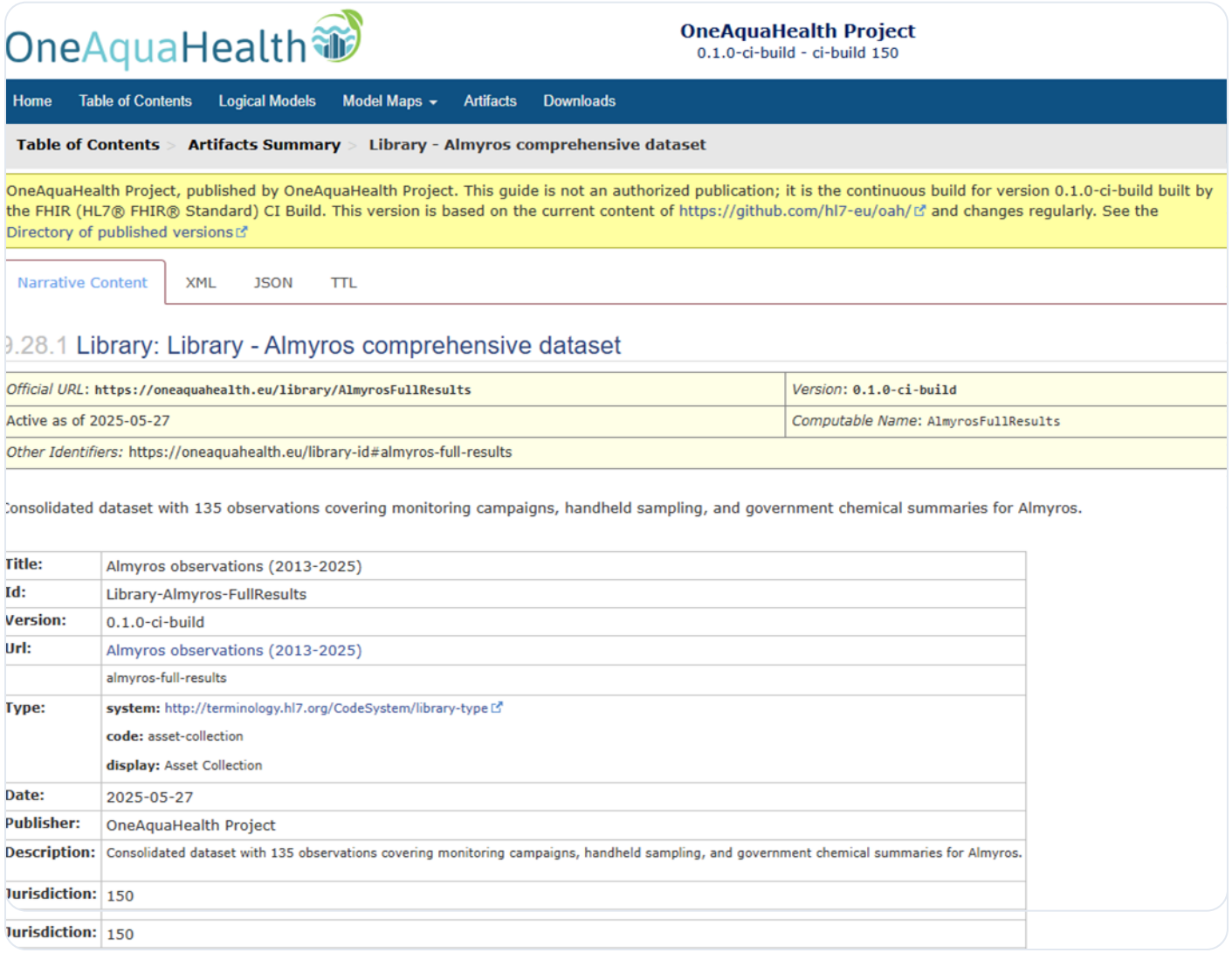
The dataset was modeled using HL7 FHIR Library, Observation, and Asset Collection resources to promote semantic clarity and cross-domain reuse.

Cloud_done

Digital Artifacts

Results published via the IG (Library-Almyros-FullResults) enhance transparency and foster reuse by other health-environmental projects.

Use Case: Heraklion, Crete - Almyros River



OneAquaHealth

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Narrative Content | XML | JSON | TTL

9.28.1 Library: Library - Almyros comprehensive dataset

Official URL: `https://oneaquahealth.eu/library/AlmyrosFullResults`	*Version*: `0.1.0-ci-build`
Active as of 2025-05-27	*Computable Name*: `AlmyrosFullResults`
Other Identifiers: https://oneaquahealth.eu/library-id#almyros-full-results	

Consolidated dataset with 135 observations covering monitoring campaigns, handheld sampling, and government chemical summaries for Almyros.

Title:	Almyros observations (2013-2025)
Id:	Library-Almyros-FullResults
Version:	0.1.0-ci-build
Url:	Almyros observations (2013-2025)
	almyros-full-results
Type:	**system:** http://terminology.hl7.org/CodeSystem/library-type **code:** asset-collection **display:** Asset Collection
Date:	2025-05-27
Publisher:	OneAquaHealth Project
Description:	Consolidated dataset with 135 observations covering monitoring campaigns, handheld sampling, and government chemical summaries for Almyros.
Jurisdiction:	150
Jurisdiction:	150

Unified Environmental Dataset

Integrates 135+ observations from monitoring campaigns, handheld sampling, and government reports for the Almyros stream.

Standardized Using HL7® FHIR®

Ensures interoperability, data quality, and reuse across environmental, health, and research systems.

Dynamic, Updated Build

Automatically regenerated from the open-source HL7 EU repository to keep content current.

Semantic Clarity & Traceability

Each Library entry includes computable identifiers, typed metadata, and machine-readable formats (XML/JSON/TTL).

Almyros Observation: Water Temperature

Profile: Location: OAH Indicators

identifier: `https://oneaquahealth.eu/location-id` /giofyros-2

name: Giofyros monitoring reach (lower)

description: Downstream Giofyros segment sampled for OAH monitoring

mode: Instance

type: River

9.59.1.1 Positions

Longitude	Latitude
25.10458	35.2623

partOf: Location Giofyros

- **Precise Geospatial Definition:** Each monitoring reach is encoded with exact latitude/longitude, enabling spatial analysis, mapping, and GIS integration.
- **Clear Environmental Context:** Identifies the type (e.g., River) and describes the specific segment monitored, improving interpretability.
- **Stable, Persistent Identifier:** Each Location has a globally unique, resolvable URL to ensure long-term traceability.
- **Consistent Across All Sites:** Uses a uniform structure for river segments, sites, and reaches, supporting scalable monitoring networks.
- **Foundation for Observation Linking:** Serves as the anchor for pollutant, ecological, and remote-sensing observations within the IG.
- **Supports Multi-Resolution Analysis:** Allows combining site-specific and reach-level data for detailed environmental assessments.

Key Features Supporting Environmental and Health Data Integration

OneAquaHealth

Domain-specific FHIR profiles

Tailored profiles like WaterObservation, WaterBody, and WaterSamplingFeature capture ecosystem-specific variables with clinical-grade interoperability.

Semantic interoperability across domains

Enables shared understanding between environmental agencies, health systems, and citizen science platforms using common terminologies and value sets.

Support for temporal and spatial metadata

Profiles include structured metadata for timestamps, geolocation, and device specifications to track sampling context and reliability.

Reusable digital assets

Datasets are published as structured FHIR Libraries and Bundles (e.g., Almyros and Benevento collections), facilitating cross-site reuse and validation.

Partner City Profiles

OneAquaHealth

Coimbra, Portugal

Mondego river basin with Mediterranean-Atlantic transitional ecology. Rich biodiversity and university-linked research infrastructure.

Ghent, Belgium

Dense canal network in urban Flanders. Industrialized waterways with complex pollutant profiles requiring multi-parameter monitoring.

Oslo, Norway

Nordic urban freshwater systems including the Akerselva river. Already contributing health indicator data (Nordre Aker district cohorts).

Toulouse, France

Garonne river corridor with agricultural runoff and urban stormwater challenges. Strong remote sensing capabilities via CNES.

Each city contributes unique ecological contexts that enrich the pan-European framework

Oslo: Health Data Integration Spotlight

OneAquaHealth

Nordre Aker District Cohorts

Oslo contributes the most granular population health cohort data in the IG, with 21 Group definitions stratified by:

- Gender: Male, Female, All
- Age bands: 18-29, 30-39, 40-49, 50-59, 60-69, 70+
- Combined gender + age intersections
- LOINC-coded characteristics

HealthMeasure Model Applied

The HealthMeasure logical model captures individual health measurements with full context. For Oslo, this includes:

- Site identification (Nordre Aker district)
- Required measurement date/period
- Performer (health authority)
- Type + result (prevalence %)
- Cohort group (required linkage)

European Policy Alignment

OneAquaHealth

Water Framework Directive (2000/60/EC)	Establishes a framework for EU water policy. OAH indicators for ecological status (biological, hydromorphological, physicochemical quality elements) directly align with WFD classification requirements.
Environmental Quality Standards Directive (2008/105/EC)	Sets maximum pollutant concentrations in surface waters. OAH dissolved metal observations (Cd, As, Cr, Al) and chemical indicators are structured to support EQS compliance reporting.
One Health Approach (WHO/EU)	Recognizes the interconnection between human, animal, and environmental health. OAH bridges environmental surveillance with population health indicators in a single interoperable framework.
EU Horizon Europe Programme	OneAquaHealth is EU-funded under Horizon Europe, contributing to the European Green Deal's goal of zero pollution and healthy ecosystems for resilient urban environments.

Citizen Science & Participatory Governance

OneAquaHealth

OneAquaHealth integrates citizen-generated observations alongside professional monitoring data. The FHIR architecture treats all data sources uniformly — IoT sensors, laboratory analysis, and citizen reports share the same Observation profiles, value sets, and validation rules. This data model ensures community contributions are scientifically comparable and policy-relevant.

Transparency

All datasets published openly with stable URLs and version history

Accountability

Performer metadata traces every observation to its source organization

Reproducibility

Machine-readable formats (XML/JSON/TTL) enable independent validation

Scalability & Replication Framework

OneAquaHealth

1	**Assess Local Context**	Identify freshwater systems, existing monitoring infrastructure, and health data sources in your municipality.
2	**Adopt IG Profiles**	Import the OneAquaHealth FHIR package. Configure local Observation, Location, and Specimen resources using OAH profiles.
3	**Map Local Indicators**	Align local environmental parameters with the IndicatorsOah taxonomy. Extend value sets for region-specific metrics.
4	**Integrate Health Data**	Define population Group cohorts using the OAH Cohort Characteristic codes. Connect to local health registries.
5	**Publish & Validate**	Use the FHIR IG Publisher toolchain. Submit datasets as Library asset collections. Validate against IG constraints.

Leveraging the OneAquaHealth IG for Smart Environmental Governance

Proactive urban ecosystem management

- By integrating early-warning signals from freshwater systems, cities can respond to ecological stressors before they impact public health or infrastructure.

Evidence-based decision support

- Standardized data via FHIR enables reliable, transparent, and comparable insights for urban planning, policy evaluation, and cross-sector collaboration.

Enhanced citizen and stakeholder trust

- Open and structured environmental reporting increases accountability and supports participatory governance across municipalities.

Scalability across regions

- The reusable nature of the IG means cities can replicate and adapt implementations with minimal custom effort, facilitating regional policy alignment.

Expanding and Deepening OneAquaHealth Implementation

OneAquaHealth

Full rollout to all project cities

The initiative will extend its reach to include partner cities Coimbra, Ghent, Oslo, and Toulouse, each contributing unique ecological and policy contexts.

Incorporation of advanced indicators

Future phases will integrate environmental health metrics like Remote Sensing Indices to enhance analytical capabilities.

Deepening FHIR data integration

Additional biological datasets will be modeled within the FHIR Implementation Guide alongside existing chemical data.

Alignment with OneHealth

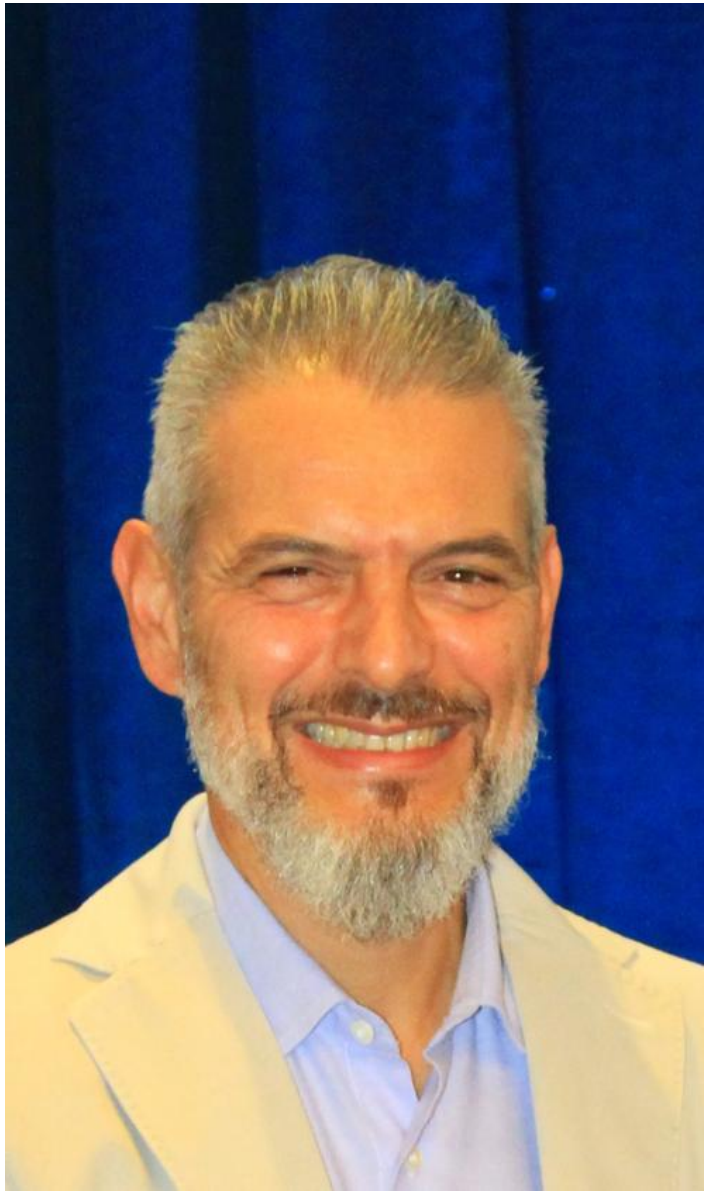
Ensures methodologies are in sync with the OneHealth framework, promoting a holistic approach to human and animal health.

OneAquaHealth

Under the hood

The OAH FHIR IG explained

Who am I



Giorgio Cangioli, PhD FHL7

- *Senior Consultant*
- *Technical Lead and Board member, HL7 Europe*
- *Technical Steering Commitee member, HL7 International*
- *Chair of the eHMSEG STF Architecture WG*
- Facilitator and/or *Author of several global and European standards and specifications. E.g.*

  ISO 27269 (IPS); HL7 FHIR and CDA IPS IGs;

  FHIR for FAIR FHIR IG

  HL7 Europe FHIR IGs

  MyHealth@EU CDA and FHIR specifications

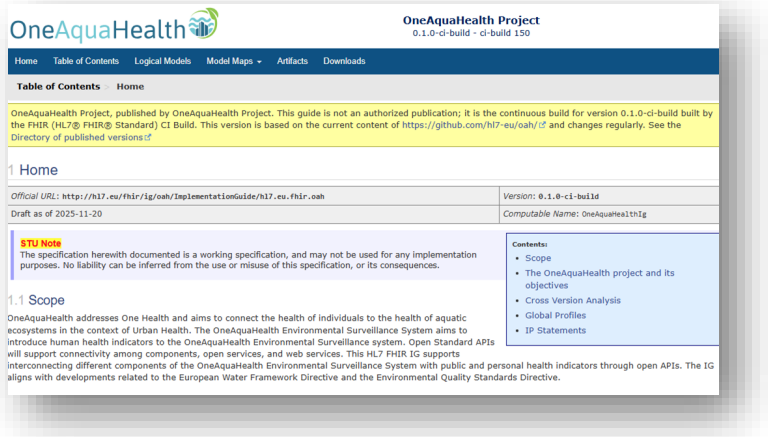
The HL7 FHIR Implementation Guide (IG)

OneAquaHealth

HL7 FHIR IG

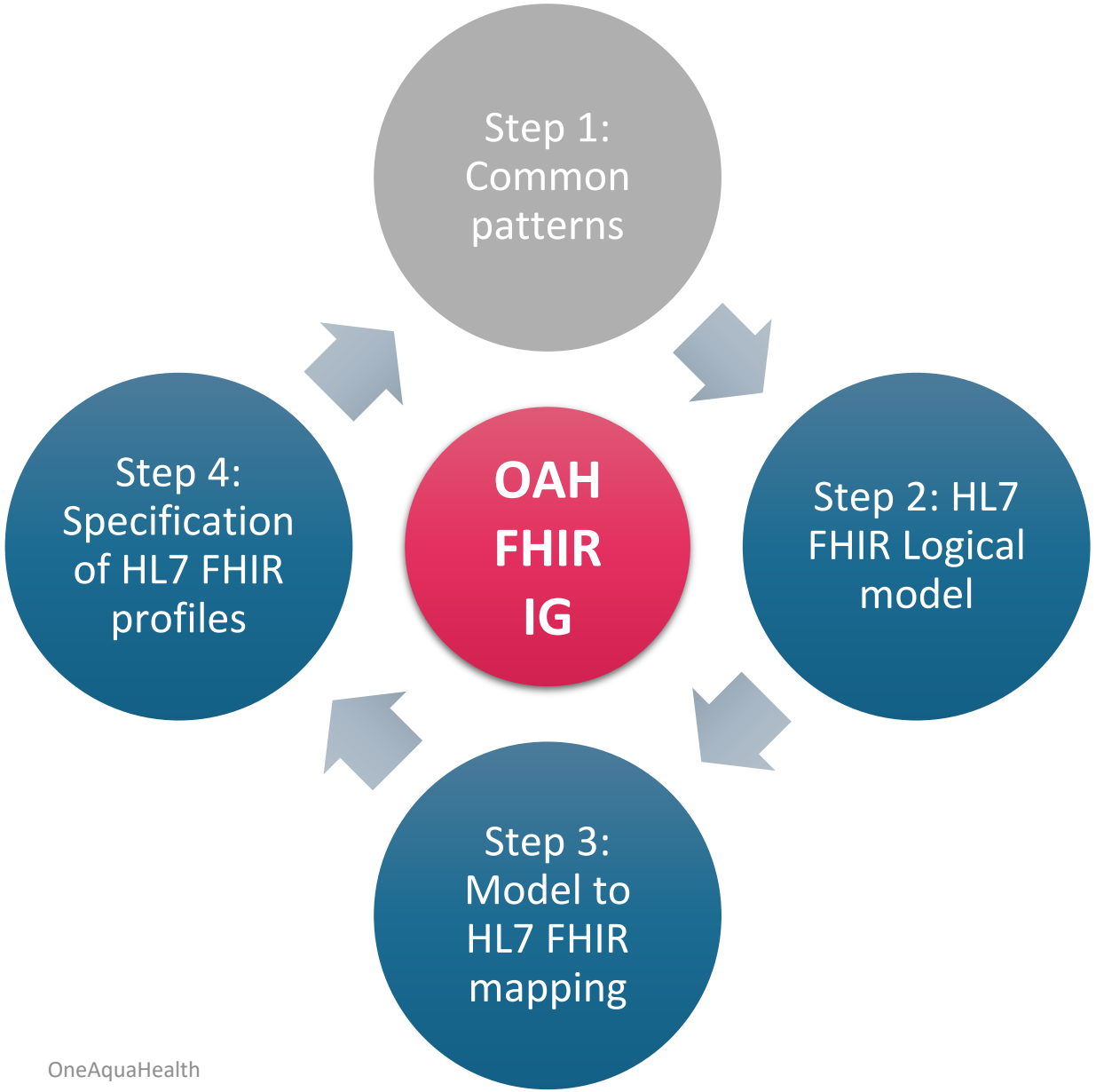
Set of rules about how FHIR resources are used (or should be used) to solve a particular problem, with associated documentation to support and clarify the usage.

Human Readable (Web Browsable)

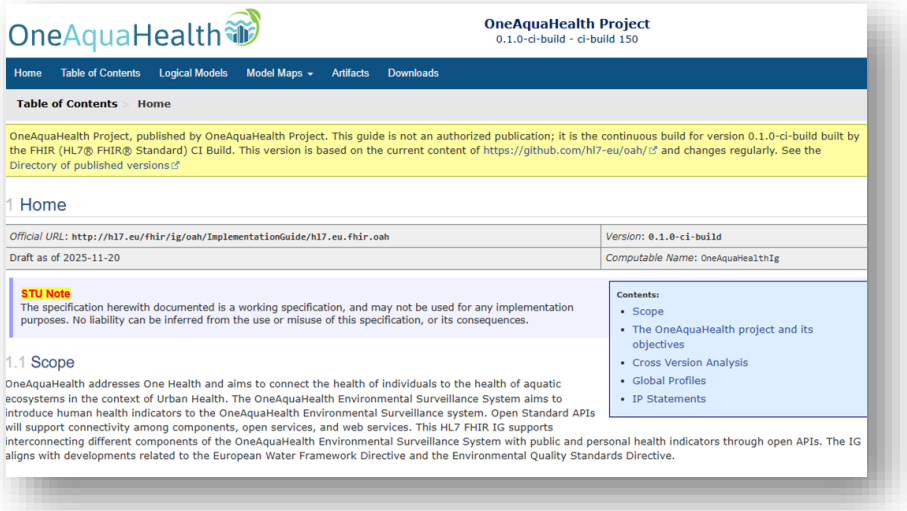


Formal Computable (FHIR Resources)

How the OAH FHIR IG has been built



- **Step 1**: bottom-up approach
  - Analyze existing data
  - Identify common patterns for health and wellness indicators
- **Step 2**: Formalize as **HL7 FHIR Logical model**
- **Step 3**: Define model to HL7 FHIR Profiles forward **mapping**
- **Step 4:** Specify **HL7 FHIR profiles**



The main OAH FHIR IG “components”

https://build.fhir.org/ig/hl7-eu/oah/

HL7 FHIR Logical model

Which data have to be represented

Model to HL7 FHIR mapping

How those elements are represented in HL7 FHIR

HL7 FHIR profiles

Rules to be applied to the HL7 FHIR Resources

The OAH FHIR IG “components”

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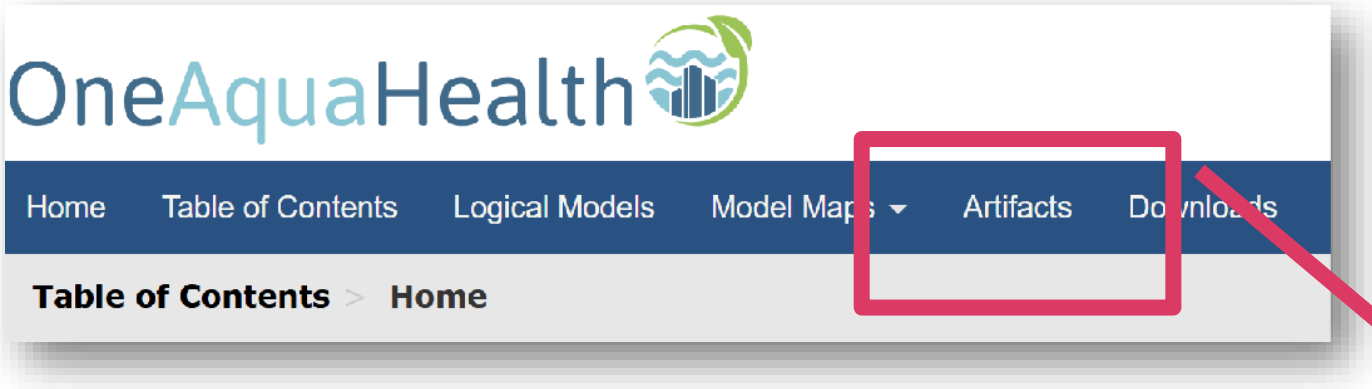

HL7 FHIR Logical model

Which data have to be represented

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Rules to be applied to the HL7 FHIR Resources

The OAH FHIR IG “components”: logical models

OneAquaHealth

Environmental Indicators

Key Elements Table | Differential Table | Snapshot Table | Statistics/References | All

Name	Flags	Card.	Type	Description & Constraints
IndicatorsOah		0..*	Base	OAH indicators
biological		0..1	Base	Key biological quality indicators
macroinvertebreates		0..*	SimpleIndicator	Benthic Macroinvertebrates
diatomes		0..*	SimpleIndicator	Diatoms (microalgae/phytobenthos)
fishes		0..*	SimpleIndicator	Fish
macrophytes		0..*	StructuredIndicator	Macrophytes (aquatic plants)
riparianVegetation		0..*	StructuredIndicator	Riparian vegetation
microbiomes		0..*	Base	Microbiomes/Biofilms
hydromorphological		0..1	Base	Key hydromorphological quality indicators
morphology		0..*	Base	Morphology of the streams

Name	Flags	Card.	Type	Description & Constraints
SimpleIndicator		0..*	Base	Simple Indicator
sampleDetails		1..1	Sample	Sample
type		1..1	CodeableConcept	What is measured
date		1..*	dateTime	Observation date
performer[x]		1..*		Who made the measure
performerPractitionerRole			PractitionerRole	
performerOrganization			Organization	
result[x]		1..1		Result
resultCodeableConcept			CodeableConcept	
resultQuantity			Quantity	

Name	Flags	Card.	Type	Description & Constraints
StructuredIndicator		0..*	Base	Structured Indicator
sampleDetails		1..1	Sample	Sample
type		1..1	CodeableConcept	What is measured
date		1..*	dateTime	Observation date
performer[x]		1..*		Who made the measure
performerPractitionerRole			PractitionerRole	
performerOrganization			Organization	
component		1..*	Base	Component
type		1..1	CodeableConcept	What is measured
result[x]		1..1		Result
resultCodeableConcept			CodeableConcept	
resultQuantity			Quantity	
resultString			string	

HL7 FHIR Logical model

The OAH FHIR IG “components”: model maps

Environmental Indicators

OneAquaHealth

Model

Name	Flags	Card.	Type	Description & Constraints
StructuredIndicator		0..*	Base	Structured Indicator
sampleDetails		1..1	Sample	Sample
type		1..1	CodeableConcept	What is measured
date		1..*	dateTime	Observation date
performer[x]		1..*		Who made the measure
performerPractitionerRole			PractitionerRole	
performerOrganization			Organization	
component		1..*	Base	Component
type		1..1	CodeableConcept	What is measured
result[x]		1..1		Result
resultCodeableConcept			CodeableConcept	
resultQuantity			Quantity	
resultString			string	

HL7 FHIR Profile

Name	Flags	Card.	Type	Description & Constraints
Observation		0..*	ObservationIndicatorsOah	Measurements and simple assertions
code		1..1	CodeableConcept	Type of observation (code / type) **Binding:** OAH Observation Type with Components (extensible)
~~value[x]~~		~~0..0~~		*OAH Indicator value*
Slices for component		*1..**	*BackboneElement*	*Slice per type of measure* ***Slice:*** *Unordered, Open by value:code*
component:macrophytes		0..1	BackboneElement	Component results
code		1..1	CodeableConcept	Type of component observation (code / type) **Binding:** OAH Macrophytes Indicator Codes (required)
value[x]		1..1	CodeableConcept	OAH Indicator component value **Binding:** OAH Macrophytes Indicator Values (required)
component:nonNativeMacrophytes		0..1	BackboneElement	Component results
code		1..1	CodeableConcept	Type of component observation (code / type) **Binding:** OAH Macrophytes Indicator Codes (Non-Native) (required)
value[x]		1..1	string	OAH Indicator component value
component:riparianVegetation		0..1	BackboneElement	Component results
code		1..1	CodeableConcept	Type of component observation (code / type) **Binding:** OAH Riparian Vegetation Indicator Codes (required)
value[x]		1..1	CodeableConcept	OAH Indicator component value **Binding:** OAH Riparian Vegetation Indicator Values (required)

HL7 FHIR Logical model

Source Code	Relationship	Target Code
sampleDetails (Sample)	is related to	Observation
sampleDetails (Sample)	is related to	Observation.subject
sampleDetails (Sample)	is related to	Observation.specimen
type (What is measured)	is equivalent to	Observation.code
date (Observation date)	is equivalent to	Observation.effectiveDateTime
performer[x] (Who made the measure)	is equivalent to	Observation.performer[x]
component	is related to	Observation.component
component.type (What is measured)	is equivalent to	Observation.component.code
component.result[x] (Result)	is equivalent to	Observation.component.value[x]

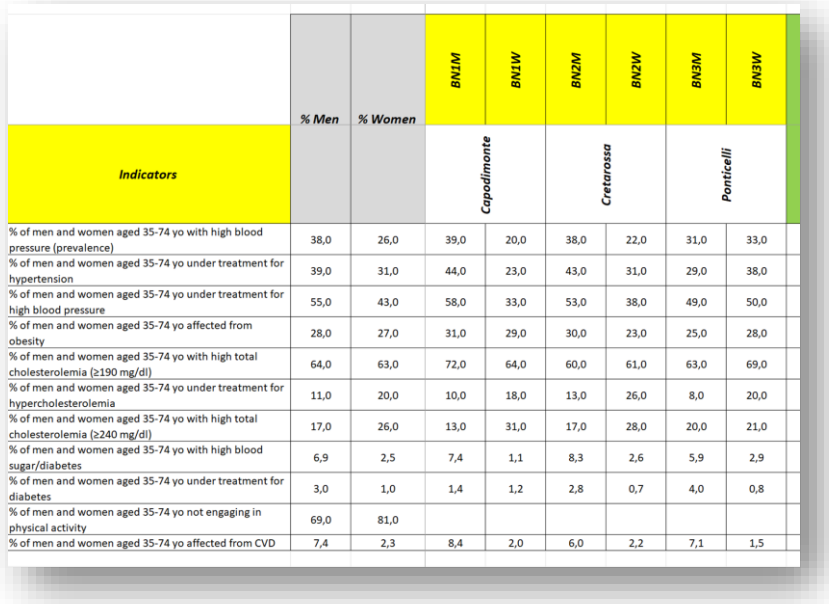
HL7 FHIR profiles

Model to HL7 FHIR Profile Map

Health and well-being indicators explained

OneAquaHealth

Health Indicators



Indicators	% Men	% Women	BN1M	BN1W	BN2M	BN2W	BN3M	BN3W
			Capodimonte		Cretarossa		Ponticelli	
% of men and women aged 35-74 yo with high blood pressure (prevalence)	38,0	26,0	39,0	20,0	38,0	22,0	31,0	33,0
% of men and women aged 35-74 yo under treatment for hypertension	39,0	31,0	44,0	23,0	43,0	31,0	29,0	38,0
% of men and women aged 35-74 yo under treatment for high blood pressure	55,0	43,0	58,0	33,0	53,0	38,0	49,0	50,0
% of men and women aged 35-74 yo affected from obesity	28,0	27,0	31,0	29,0	30,0	23,0	25,0	28,0
% of men and women aged 35-74 yo with high total cholesterolemia (≥190 mg/dl)	64,0	63,0	72,0	64,0	60,0	61,0	63,0	69,0
% of men and women aged 35-74 yo under treatment for hypercholesterolemia	11,0	20,0	10,0	18,0	13,0	26,0	8,0	20,0
% of men and women aged 35-74 yo with high total cholesterolemia (≥240 mg/dl)	17,0	26,0	13,0	31,0	17,0	28,0	20,0	21,0
% of men and women aged 35-74 yo with high blood sugar/diabetes	6,9	2,5	7,4	1,1	8,3	2,6	5,9	2,9
% of men and women aged 35-74 yo under treatment for diabetes	3,0	1,0	1,4	1,2	2,8	0,7	4,0	0,8
% of men and women aged 35-74 yo not engaging in physical activity	69,0	81,0						
% of men and women aged 35-74 yo affected from CVD	7,4	2,3	8,4	2,0	6,0	2,2	7,1	1,5

Health and well-being indicators originating from different countries and research sites are characterised by varying levels of granularity, population definitions, and reporting practices

Identified common “parts”:

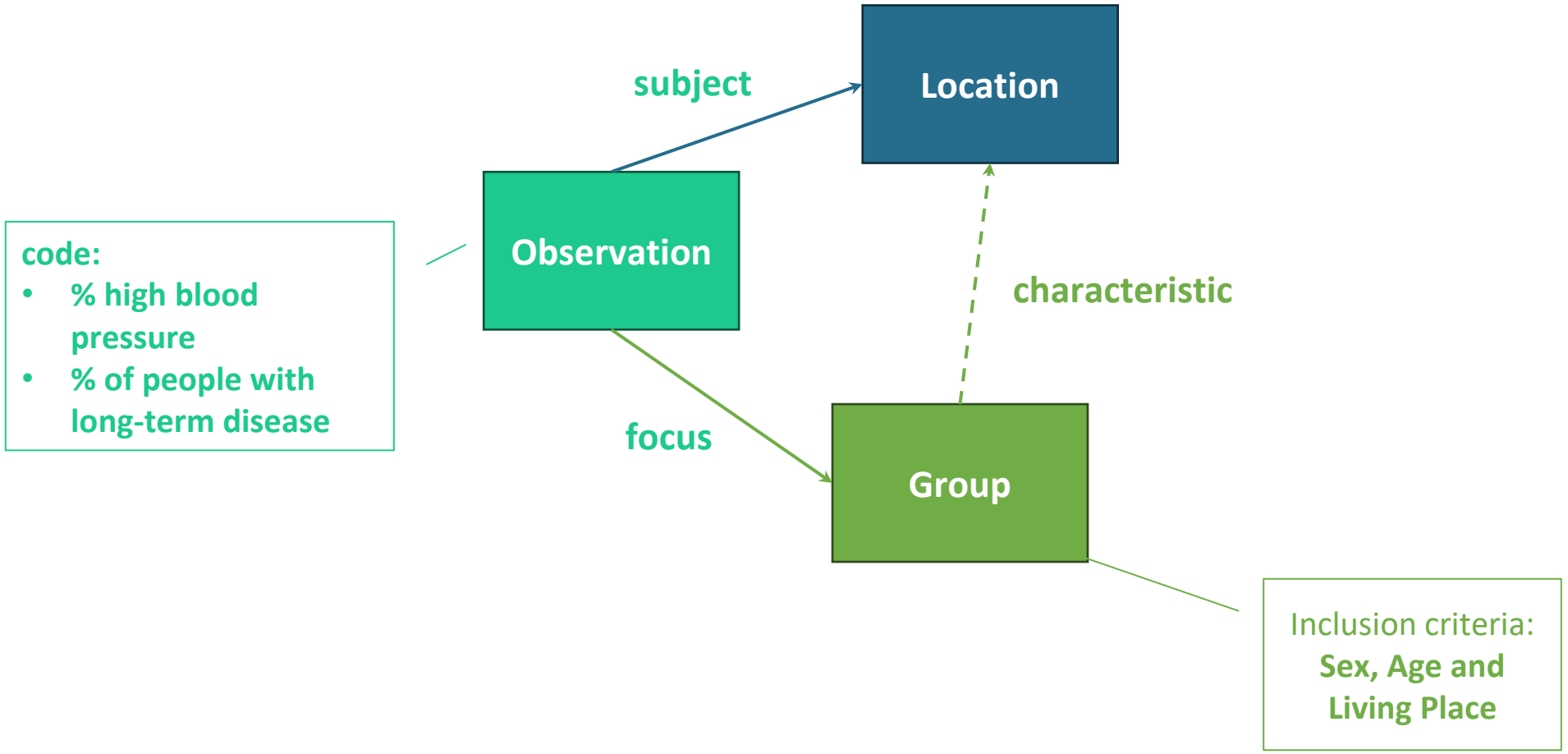
- the **measure** itself (what is being observed);
- the **inclusion criteria** defining the population to which the measure applies (e.g. sex, age, site);
- the **observed value**.
- Where the measure has been taken (the **site**)

Measure	Other Details	Value
% of men and women aged 35-74 yo with high blood pressure (prevalence)	Male in Benevento site 1	39%
% of people with long-term disease.	18-29 years old Male and Female in Nordre Aker	40 %

Health and well-being indicators explained

Health Indicators

OneAquaHealth



Environmental Indicators explained

Environmental Indicators

OneAquaHealth

Key Elements Table | Differential Table | Snapshot Table | Statistics/References | All

Name	Flags	Card.	Type	Description & Constraints
IndicatorsOah		0..*	Base	OAH indicators
biological		0..1	Base	Key biological quality indicators
macroinvertebreates		0..*	SimpleIndicator	Benthic Macroinvertebrates
diatomes		0..*	SimpleIndicator	Diatoms (microalgae/phytobenthos)
fishes		0..*	SimpleIndicator	Fish
macrophytes		0..*	StructuredIndicator	Macrophytes (aquatic plants)
riparianVegetation		0..*	StructuredIndicator	Riparian vegetation
microbiomes		0..*	Base	Microbiomes/Biofilms
hydromorphological		0..1	Base	Key hydromorphological quality indicators
morphology		0..*	Base	Morphology of the streams

Name	Flags	Card.	Type	Description & Constraints
SimpleIndicator		0..*	Base	Simple Indicator
sampleDetails		1..1	Sample	Sample
type		1..1	CodeableConcept	What is measured
date		1..*	dateTime	Observation date
performer[x]		1..*		Who made the measure
performerPractitionerRole			PractitionerRole	
performerOrganization			Organization	
result[x]		1..1		Result
resultCodeableConcept			CodeableConcept	
resultQuantity			Quantity	

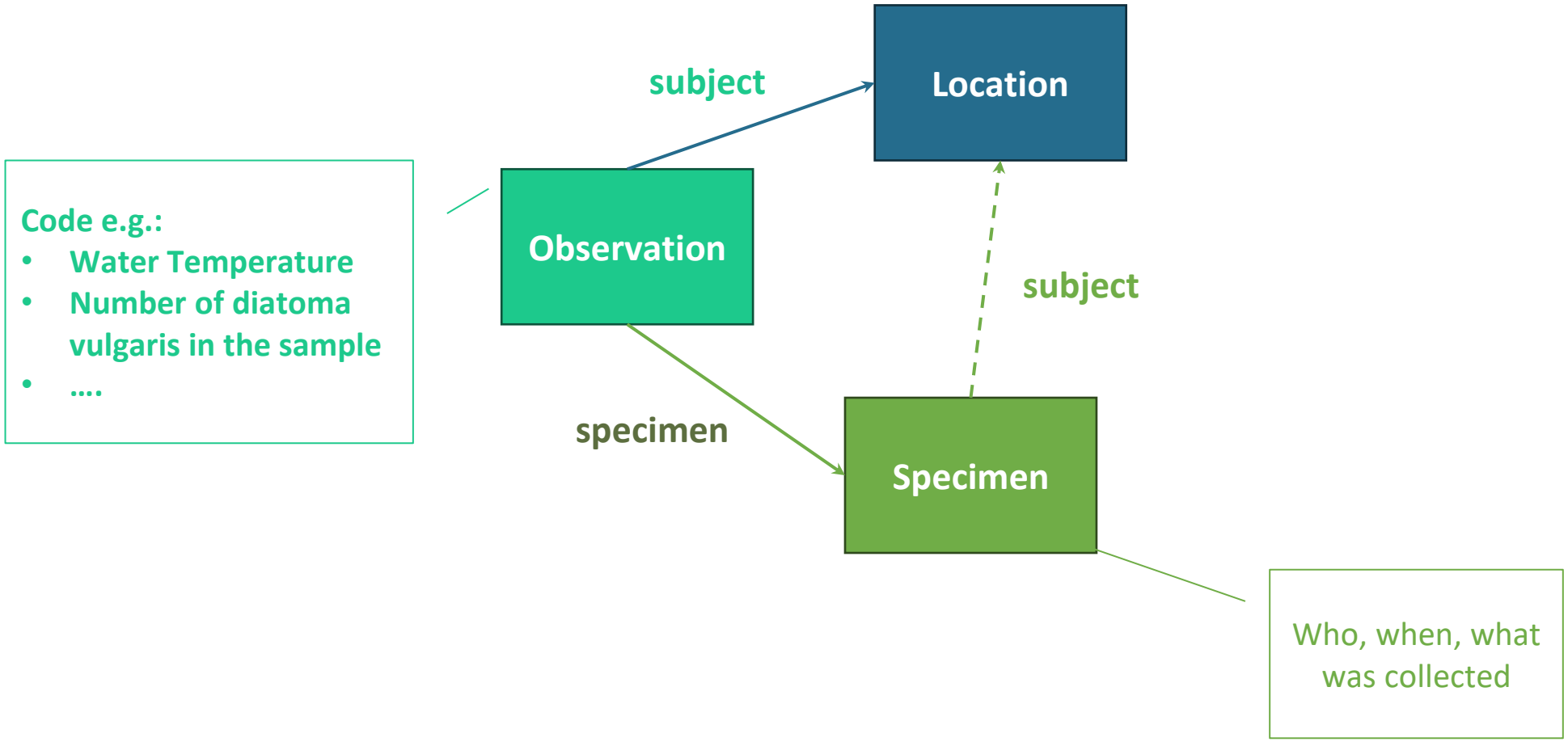
Name	Flags	Card.	Type	Description & Constraints
StructuredIndicator		0..*	Base	Structured Indicator
sampleDetails		1..1	Sample	Sample
type		1..1	CodeableConcept	What is measured
date		1..*	dateTime	Observation date
performer[x]		1..*		Who made the measure
performerPractitionerRole			PractitionerRole	
performerOrganization			Organization	
component		1..*	Base	Component
type		1..1	CodeableConcept	What is measured
result[x]		1..1		Result
resultCodeableConcept			CodeableConcept	
resultQuantity			Quantity	
resultString			string	

HL7 FHIR Logical model

Environmental Indicators explained

Health Indicators

OneAquaHealth



The main OAH FHIR IG “components”

https://build.fhir.org/ig/hl7-eu/oah/

HL7 FHIR Logical model

Which data have to be represented

Model to HL7 FHIR mapping

How those elements are represented in HL7 FHIR

HL7 FHIR profiles

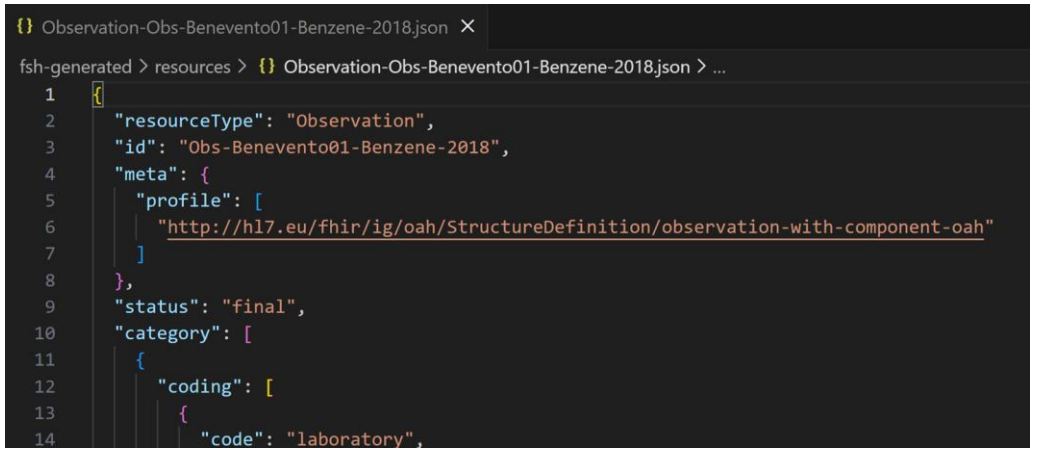
Rules to be applied to the HL7 FHIR Resources

The main OAH FHIR IG “components”

https://build.fhir.org/ig/hl7-eu/oah/

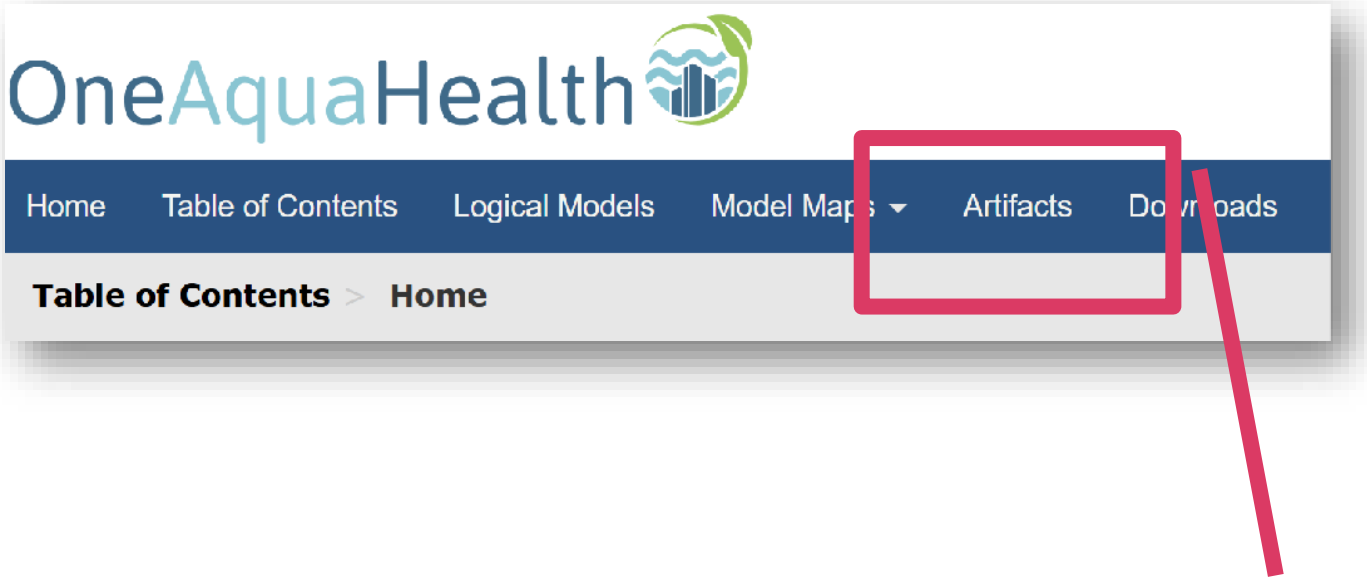
HL7 FHIR profiles

Examples



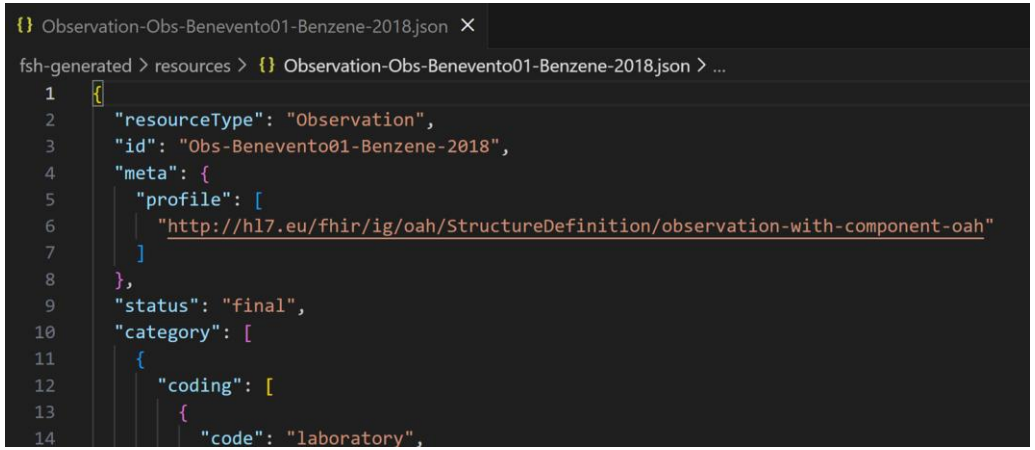
Rules to be applied to the HL7 FHIR Resources

The OAH FHIR IG “components”: the examples



HL7 FHIR profiles

Examples



Rules to be applied to the HL7 FHIR Resources

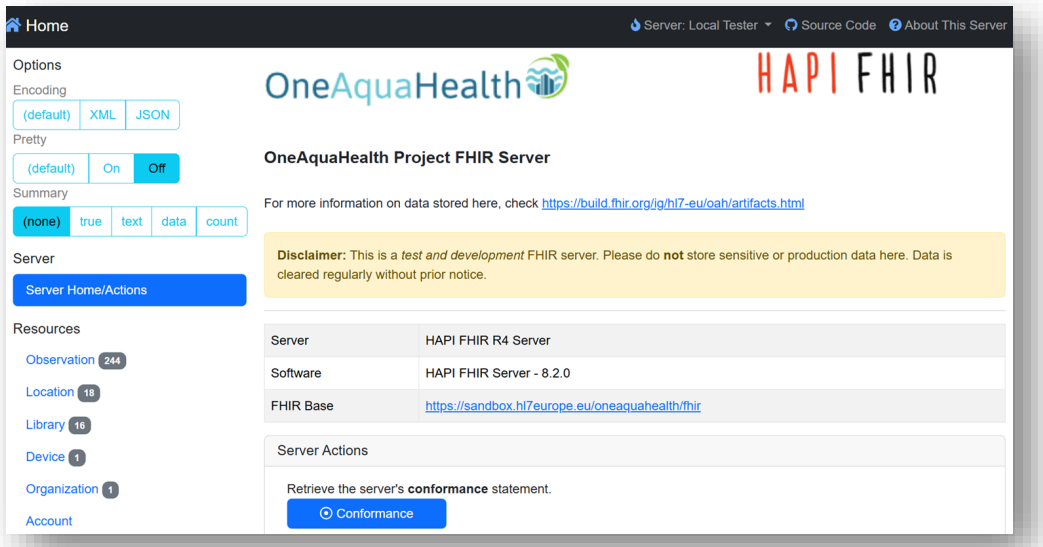
The OAH FHIR IG “components”: the examples

163 (both)

135 (env.)

81 (health)

OAH FHIR Sandbox



A total of 504 FHIR resources

Standards in action !

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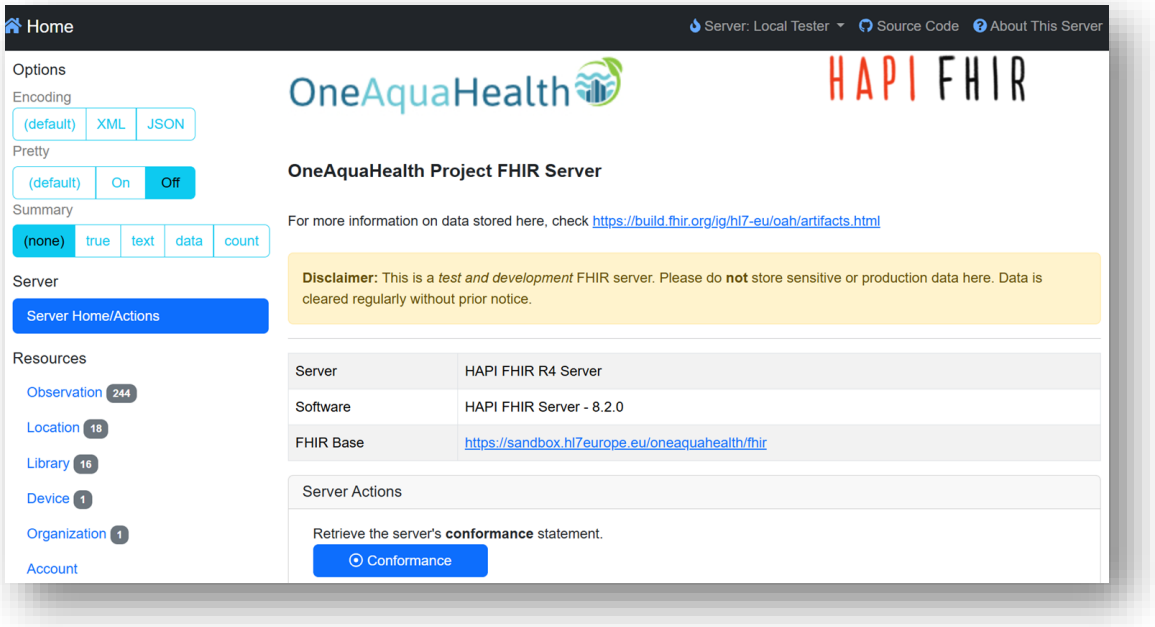
https://sandbox.hl7europe.eu/oneaquahealth/



From Specifications to Hands-On Examples

Not only indicators: data FAIRification

OneAquaHealth

https://build.fhir.org/ig/hl7-eu/oah/

HL7 FHIR Logical model

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Data FAIRification with HL7 FHIR

OneAquaHealth

Benevento Samples

Benevento pollutant 01-summary.csv

_samples > benevento > Benevento pollutant 01-summary.csv > data

```
Year;Parameter;Unit;AVERAGE;MAX;MIN;STDEV;MEDIAN
2018;Benzene;µg/m³;1,54;7,10;0,20;1,19;1,20
2018;NO2;µg/m³;28,11;104,90;1,70;16,50;23,80
2018;O3;µg/m³;20,84;84,20;0,00;22,22;10,90
2018;PM10;µg/m³;26,19;185,20;0,00;22,44;23,90
2018;PM2.5;µg/m³;27,69;164,50;0,00;19,89;21,90
2019;Benzene;µg/m³;1,20;4,10;0,10;0,85;0,90
2019;NO2;µg/m³;24,48;109,50;0,50;18,20;19,50
2019;O3;µg/m³;42,27;89,70;0,00;26,01;42,50
;PM10;µg/m³;20,26;113,00;0,00;17,30;17,10
M2.5;µg/m³;21,59;89,20;0,00;16,77;18,10
```

- Observation-Obs-Benevento01-Benzene-2018.json
- Observation-Obs-Benevento01-Benzene-2019.json
- Observation-Obs-Benevento01-No2-2018.json
- Observation-Obs-Benevento01-No2-2019.json
- Observation-Obs-Benevento01-O3-2018.json
- Observation-Obs-Benevento01-O3-2019.json
- Observation-Obs-Benevento01-Pm10-2018.json
- Observation-Obs-Benevento01-Pm10-2019.json
- Observation-Obs-Benevento01-Pm25-2018.json
- Observation-Obs-Benevento01-Pm25-2019.json

Observation-Obs-Benevento01-Benzene-2018.json

fsh-generated > resources > Observation-Obs-Benevento01-Benzene-2018.json > ...

```
{
  "resourceType": "Observation",
  "id": "Obs-Benevento01-Benzene-2018",
  "meta": {
    "profile": [
      "http://hl7.eu/fhir/ig/oah/StructureDefinition/observation-with-component-oah"
    ]
  },
  "status": "final",
  "category": [
    {
      "coding": [
        {
          "code": "laboratory",
          "system": "http://terminology.hl7.org/CodeSystem/observation-category",
          "display": "Laboratory"
        }
      ]
    }
  ],
  "code": {
    "coding": [
      {
        "code": "benzene",
        "system": "https://oneaquahealth.eu/air-parameters",
        "display": "Benzene"
      }
    ],
    "text": "Benzene"
  },
```

FHIR Library: Asset Collection Pattern

AlmyrosFullResults	Almyros observations (2013-2025)	135 obs
AlmyrosIndicators	Almyros indicators (2024-2025)	Temp, EC
BeneventoAll	Benevento all sites (01-12)	103 obs
Benevento01..12	Per-site annual summaries	12 libraries
GiofyrosIndicators	Giofyros indicator dataset	Active
OsloAll	Oslo health data collection	New

Each Library includes: official URL, version, computable name, publisher, date, and typed metadata

Standards in action !

Try it !

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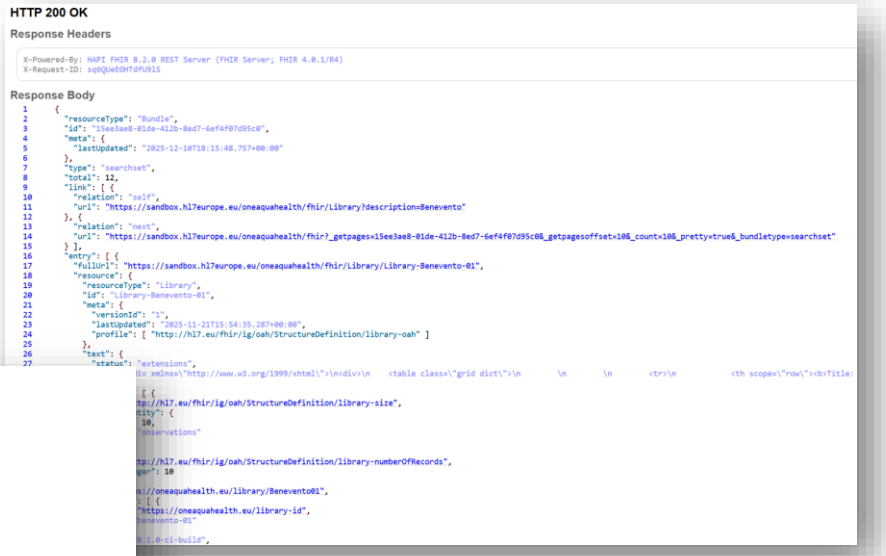
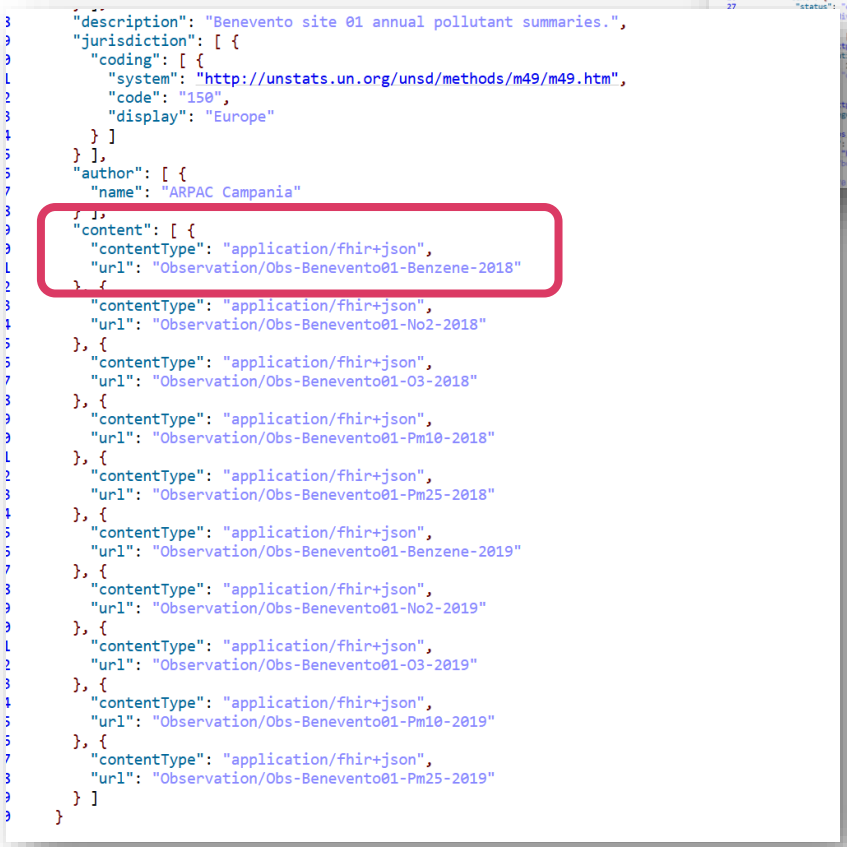
Give me all Data Set having “Benevento” in the description:

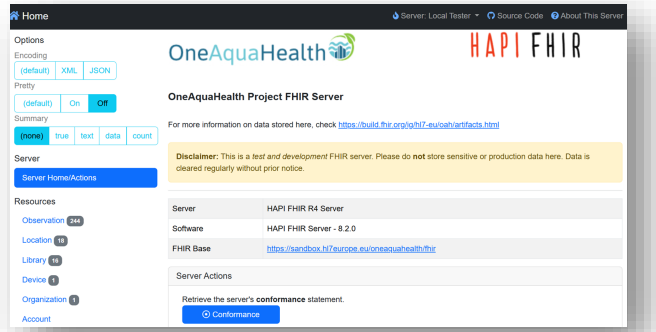
- https://sandbox.hl7europe.eu/oneaquahealth/fhir/Library?description=Benevento

Give me that result from the data set:

- https://sandbox.hl7europe.eu/oneaquahealth/fhir/Observation/Obs-Benevento01-Benzene-2018







Different possible deployment solutions supported

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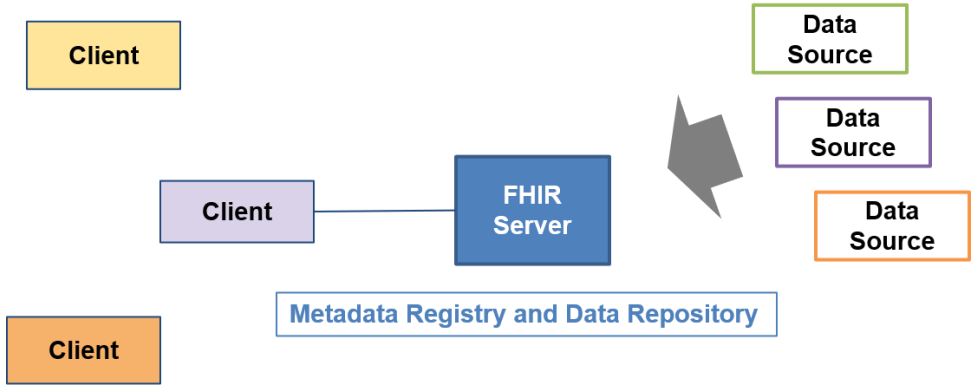
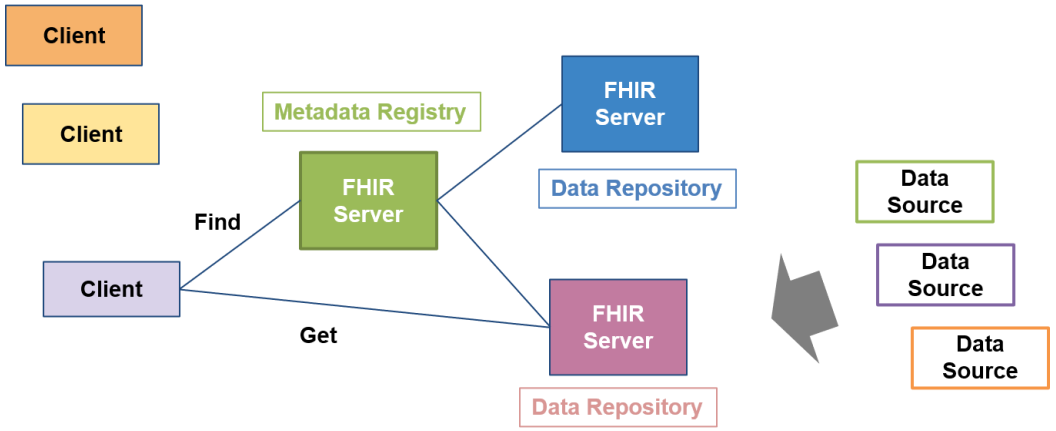
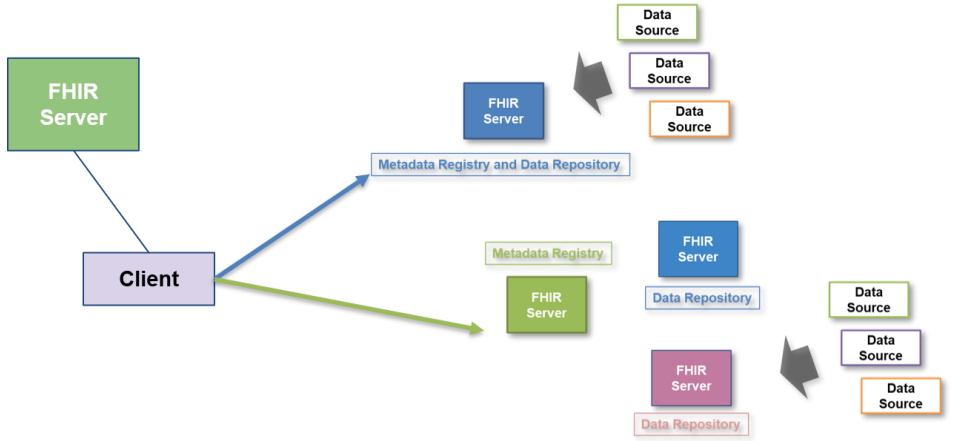




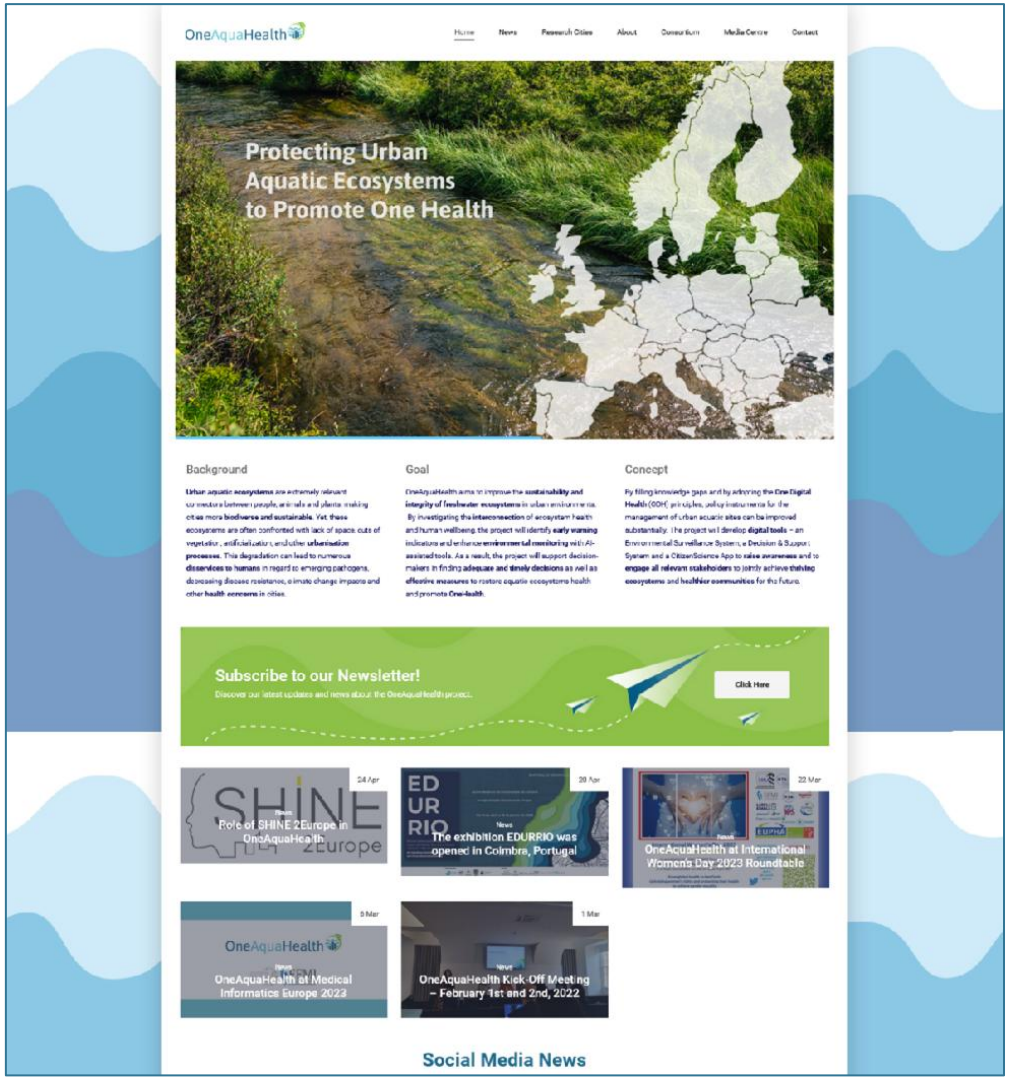


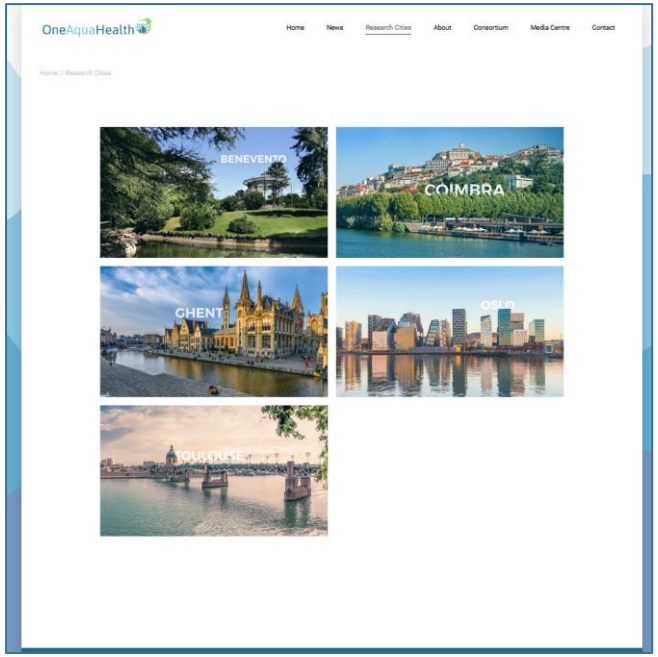
See: https://hl7.org/fhir/uv/fhir-for-fair/deployment.html

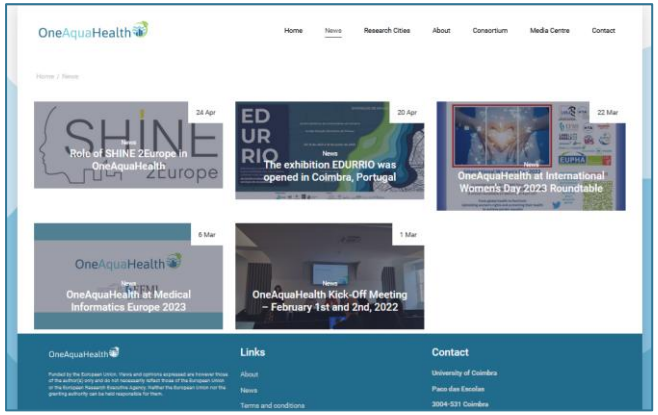
Questions & Answers

DISSIMINATION & COMMUNICATION

Open Information Hub | www.oneaquahealth.eu







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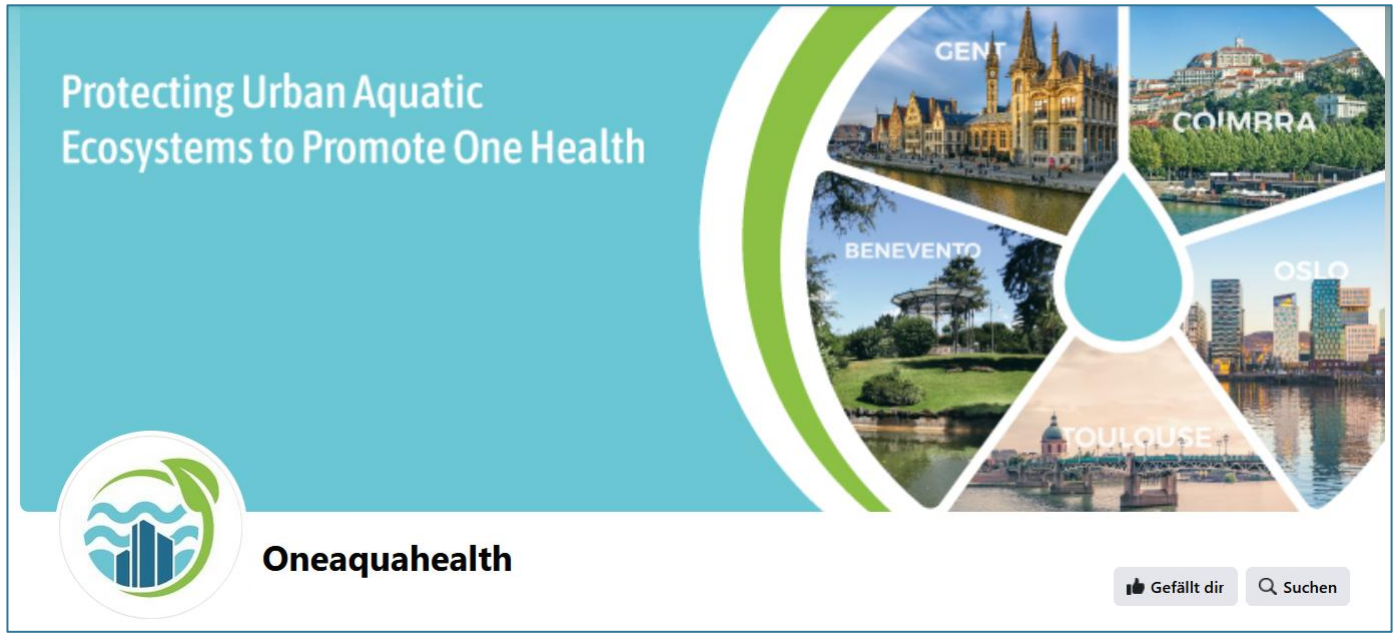

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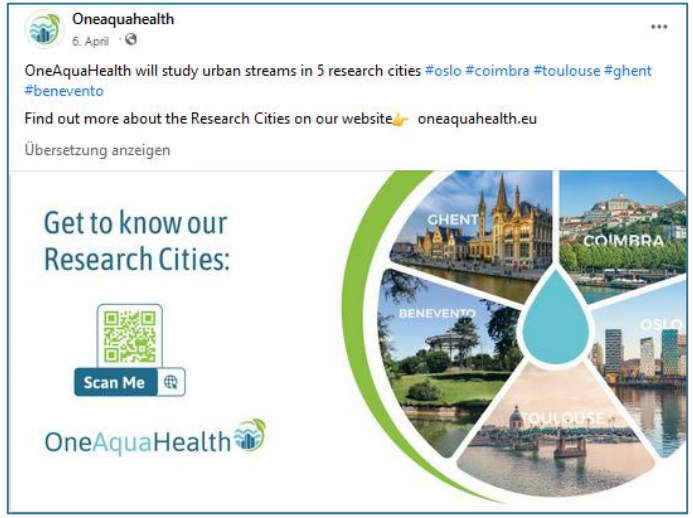

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LinkedIn account|https://www.linkedin.com/company/oneaquahealth/

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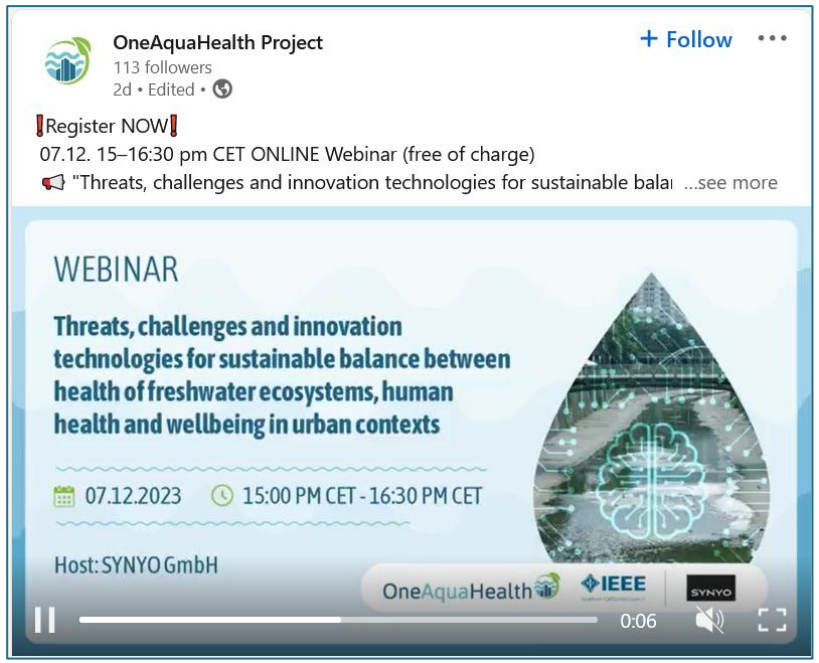

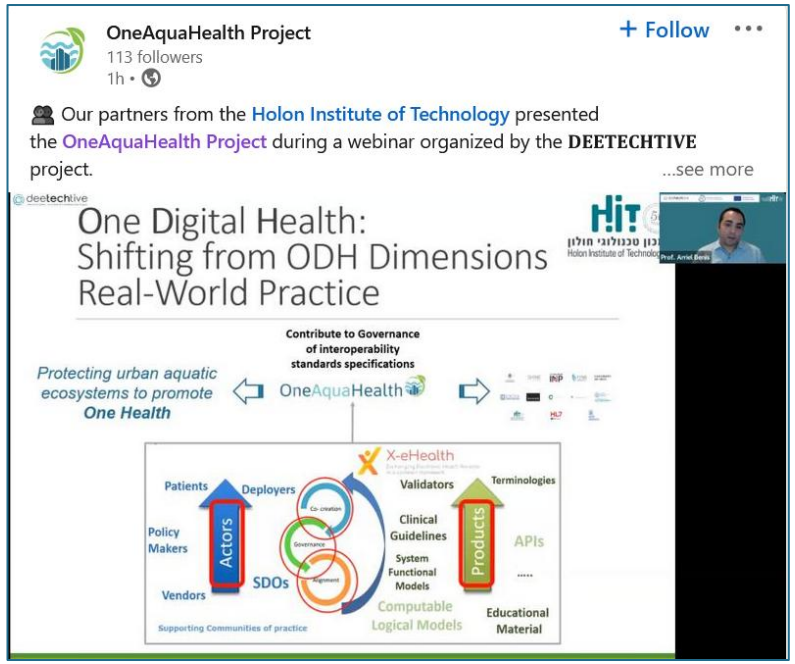

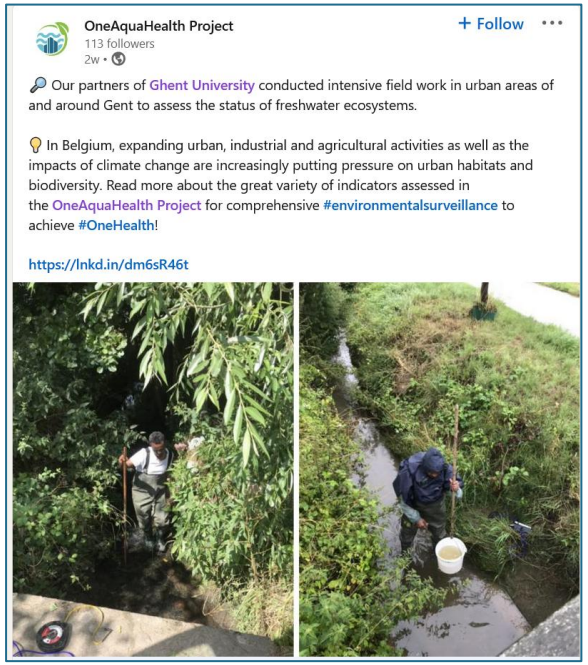

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Contact us, get involved, stay updated:

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