

International Patient Summary Testing (Introduction)

Steve Moore

moore.stephen.m@wustl.edu

IHE Technical Project Manager

Washington University School of Medicine in St. Louis

In General

- This is an overview and not training
- If I am speaking too quickly, please interrupt and ask me to slow down
- I will share a link to the slides. You might find it easier to view some slides on your computer.
 - There are a few figures that have too much small detail
- I will skip the first two sections
 - Previously covered

Agenda

Topic	Slides
IPS Motivation	0
IPS Collaborators	0
IPS Specification	12
IPS Testing Outline	4
IPS Testing Tools	9

International Patient Summary (IPS) - Moving from Specification to (Global) Implementation

Robert Hausam MD, Hausam Consulting LLC



HL7 FHIR DevDays 2021, Virtual Edition, June 7–10, 2021 | @HL7 | @FirelyTeam | #fhirdevdays | www.devdays.com

ORGANIZED BY



PARTNER



IPS: a focused Patient Summary



Provide a **healthcare summary** for a citizen at the point of care



It is **minimal** and **non-exhaustive**



It is **specialty-agnostic** and **condition-independent**.....but still **clinically relevant**

IPS: a focused Patient Summary



Designed to be **simple** and **implementable**



Usable **any time**, in **any place**; by **any one**



Multi-beneficiaries: Individuals, Healthcare Providers, Society

International Patient Summary

Health record extract

- Snapshot in time of a subject of care's health information and healthcare

International

- generic solutions for **global application** beyond a particular region or country.

Scoped

- Designed for **Unscheduled** (cross-border) **care**
- ...but it provides a **base-line usable also within other scheduled or planned care cases.**

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The Patient Summary journey...

Get to know the **Joint Initiative Council**

Making high-quality data available to the right people, at the right place and at the right time, for high-quality decisions and care.

Learn about the JIC at jointinitiativecouncil.org

cdisc | cen Health Informatics TC251 | DICOM | GS1 | HL7 International | IHE | Integrating the Healthcare Enterprise | ISO HEALTH ECONOMICS TC251 | LOINC

IPS

 2017-2021

Joint Initiative Council
Patient Summary Standards Set

GUIDANCE DOCUMENT
 JANUARY 2018 v1.0

Joint Initiative Council

cdisc | cen Health Informatics TC251 | DICOM | GS1 | HL7 International | IHE | Integrating the Healthcare Enterprise | ISO HEALTH ECONOMICS TC251 | LOINC



2017-2018

Development Timeline

2009 - 2016	Various European Initiatives	Individual European Specifications
2017 - 2018	Joint Initiative Council	Patient Summary Standards Set
2017 - 2021	HL7	IPS Implementation Guides
2017 - 2021	SNOMED	IPS Terminology
2017 - 2021	IHE	IPS Integration Profile

IPS Standards Artefacts

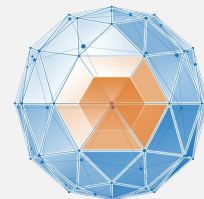
- **ISO/DIS 27269** approved
- **CEN/EN 17269** and **CEN/TS 17288** published
- **HL7 FHIR** and **CDA** Implementation Guides (**IG**) published as *“Standard for Trial Use”*
- **IHE IPS Profile** for both CDA and FHIR published for *“Trial Implementation”*
- **SNOMED CT** has published the free for use **“Global Patient Set (GPS)”** (including the IPS “free set”)

IPS Implementation Initiatives

- **Global Digital Health Partnership (GDHP)**

 - *Interoperability Work Stream - IPS Work Group*

 - Leadership from US/ONC
 - 31 countries & WHO
 - Goals
 - 10 countries implementing IPS in pilot project by end of 2021
 - 20 countries implementing IPS, with 10 in production use, by end of 2022



- **Global Consortium for eHealth Interoperability (GCeHI)**

 - HL7, IHE, HIMSS



Real World Initiatives

<https://international-patient-summary.net/implementations-across-the-globe>

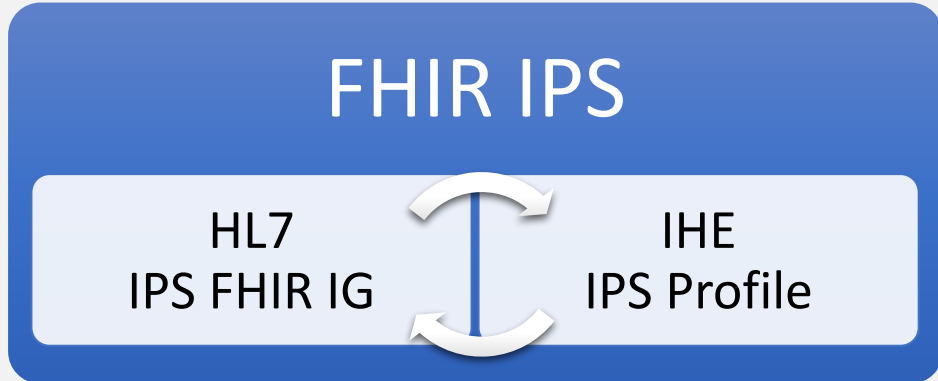
Argentina	New Zealand
Canada (standards@infoway-inforoute.ca)	United Kingdom
Netherlands	Vietnam
Global Digital Health Partnership	

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The FHIR IPS

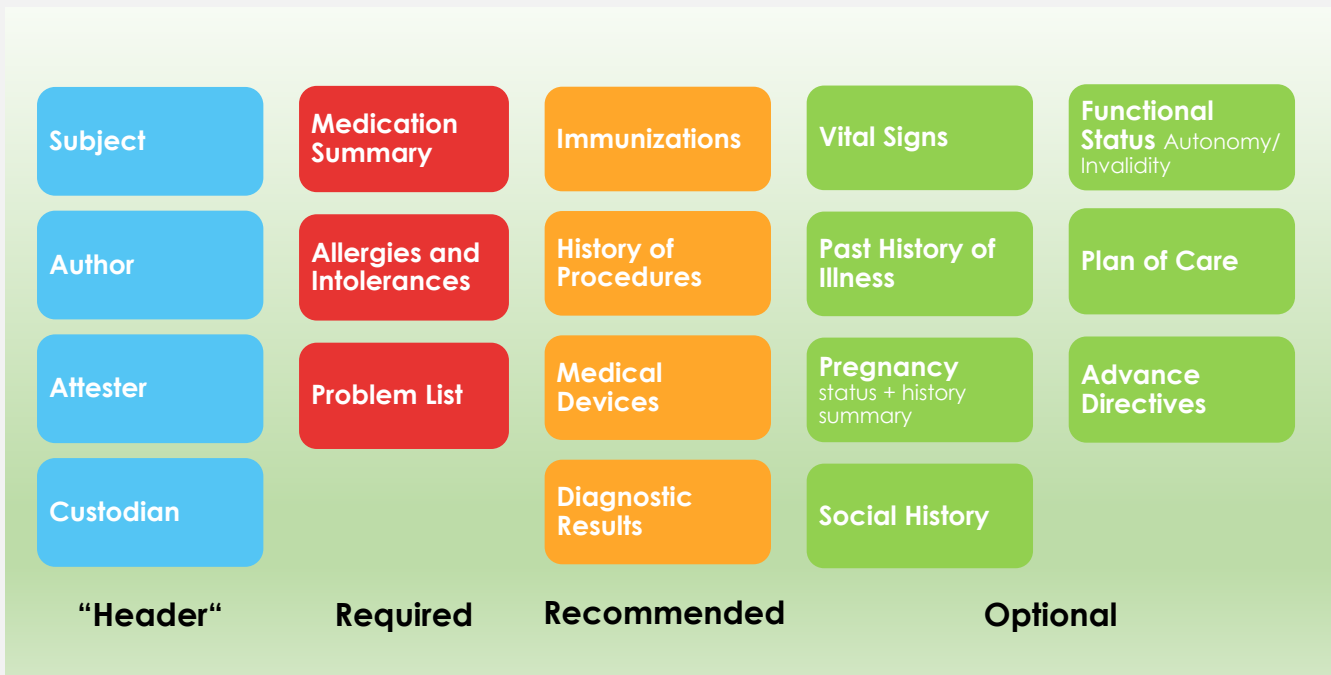
There is only one FHIR IPS !



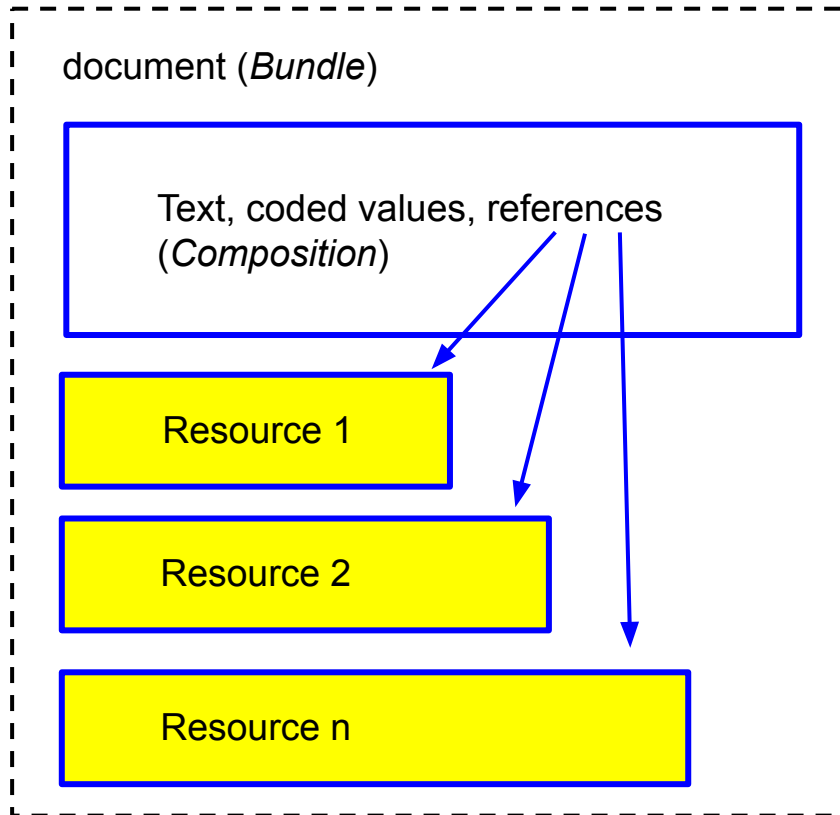
High Level Artifacts

Contribution	Contributor
FHIR IPS Implementation Guide (1.1.0)	HL7
CDA IPS Implementation Guide	HL7
Terminology	SNOMED
Document Exchange Model	IHE

IPS Content Sections



IPS Document Structure




IPS Composition (Teaser)

```
"type": {  
  "coding": [  
    {  
      "system": "http://loinc.org",  
      "code": "60591-5",  
      "display": "Patient summary Document"  
    }  
  ]  
},  
"subject": {  
  "reference": "Patient/AAA1234"  
},  
"date": "2021-05-03",  
"author": [  
  {  
    "reference": "Organization/aac808e1-56d0-42b6-ad8c-efec7a269066"  
  }  
],  
"title": "International Patient Summary",  
"confidentiality": "N",
```



Patient Resource (Referenced Previous Slide)

```
{  
  "fullUrl": "https://terminz.azurewebsites.net/fhir/Patient/AAA1234",  
  "resource": {  
    "resourceType": "Patient",  
    "id": "AAA1234",  
    "text": { [3 lines]  
    "identifier": [ [5 lines]  
    "name": [ [8 lines]  
    "telecom": [ [6 lines]  
    "gender": "male",  
    "birthDate": "1985-04-25",  
    "address": [ [18 lines]  
    "maritalStatus": { [8 lines]  
    "contact": [ [61 lines]  
    "communication": [ [6 lines]  
  }  
},
```



Patient Resource, slightly expanded

```
{
  "fullUrl": "https://terminz.azurewebsites.net/fhir/Patient/AAA1234",
  "resource": {
    "resourceType": "Patient",
    "id": "AAA1234",
    "text": { [3 lines]
    "identifier": [ [5 lines]
    "name": [
      {
        "use": "usual",
        "family": "Judge",
        "given": [
          "James"
        ]
      }
    ]
  }
  ],
  "telecom": [ [6 lines]
  "gender": "male",
  "birthDate": "1985-04-25",
  "address": [ [18 lines]
  "maritalStatus": { [8 lines]
  "contact": [ [61 lines]
  "communication": [ [6 lines]
},
}
```

Allergies and Intolerances Resource (v4.0.1)

9.1.3 Resource Content


Name	Flags	Card.	Type	Description & Constraints
AllergyIntolerance	I TU		DomainResource	Allergy or Intolerance (generally: Risk of adverse reaction to a substance) + Rule: AllergyIntolerance.clinicalStatus SHALL be present if verificationStatus is not entered-in-error. + Rule: AllergyIntolerance.clinicalStatus SHALL NOT be present if verification Status is entered-in-error Elements defined in Ancestors: id, meta, implicitRules, language, text, contained, extension, modifierExtension External ids for this item
identifier	Σ	0..*	Identifier	
clinicalStatus	?! Σ I	0..1	CodeableConcept	active inactive resolved AllergyIntolerance Clinical Status Codes (Required)
verificationStatus	?! Σ I	0..1	CodeableConcept	unconfirmed confirmed refuted entered-in-error AllergyIntolerance Verification Status Codes (Required)
type	Σ	0..1	code	allergy intolerance - Underlying mechanism (if known) AllergyIntoleranceType (Required)
category	Σ	0..*	code	food medication environment biologic AllergyIntoleranceCategory (Required)
criticality	Σ	0..1	code	low high unable-to-assess AllergyIntoleranceCriticality (Required)
code	Σ	0..1	CodeableConcept	Code that identifies the allergy or intolerance AllergyIntolerance Substance/Product, Condition and Negation Codes (Example)
patient	Σ	1..1	Reference(Patient)	Who the sensitivity is for
encounter		0..1	Reference(Encounter)	Encounter when the allergy or intolerance was asserted
onset[x]		0..1		When allergy or intolerance was identified
onsetDateTime			dateTime	
onsetAge			Age	
onsetPeriod			Period	
onsetRange			Range	
onsetString			string	

+ more

Allergies and Intolerances Resource (IPS)

14.3.1 Resource Profile: Allergy Intolerance (IPS)

<i>Official URL:</i> http://hl7.org/fhir/uv/ips/StructureDefinition/AllergyIntolerance-uv-ips		<i>Version:</i> 1.1.0
<i>Standards status:</i> Trial-use	<i>Maturity Level:</i> 2	<i>Computable Name:</i> AllergyIntoleranceUvIps



This profile represents the constraints applied to the AllergyIntolerance resource by the International Patient Summary (IPS) FHIR Implementation Guide. A record of an allergy or intolerance is represented in the patient summary as an instance of an AllergyIntolerance resource constrained by this profile.

It documents the relevant allergies or intolerances (conditions) for a patient, describing the kind of reaction (e.g. rash, anaphylaxis,..); preferably the agents that cause it; and optionally the criticality and the certainty of the allergy.

This profile constrains the representation of a record of an allergy or intolerance of the patient, in the context of the international patient summary as specified by the IPS project of HL7 International.


Usage:

- Use this Resource Profile: [Bundle - IPS](#)
- Refer to this Resource Profile: [Bundle - IPS](#)

Allergies and Intolerances Resource (IPS)

14.3.1.1 Formal Views of Profile Content

Description of Profiles, Differentials, Snapshots and how the different presentations work.



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

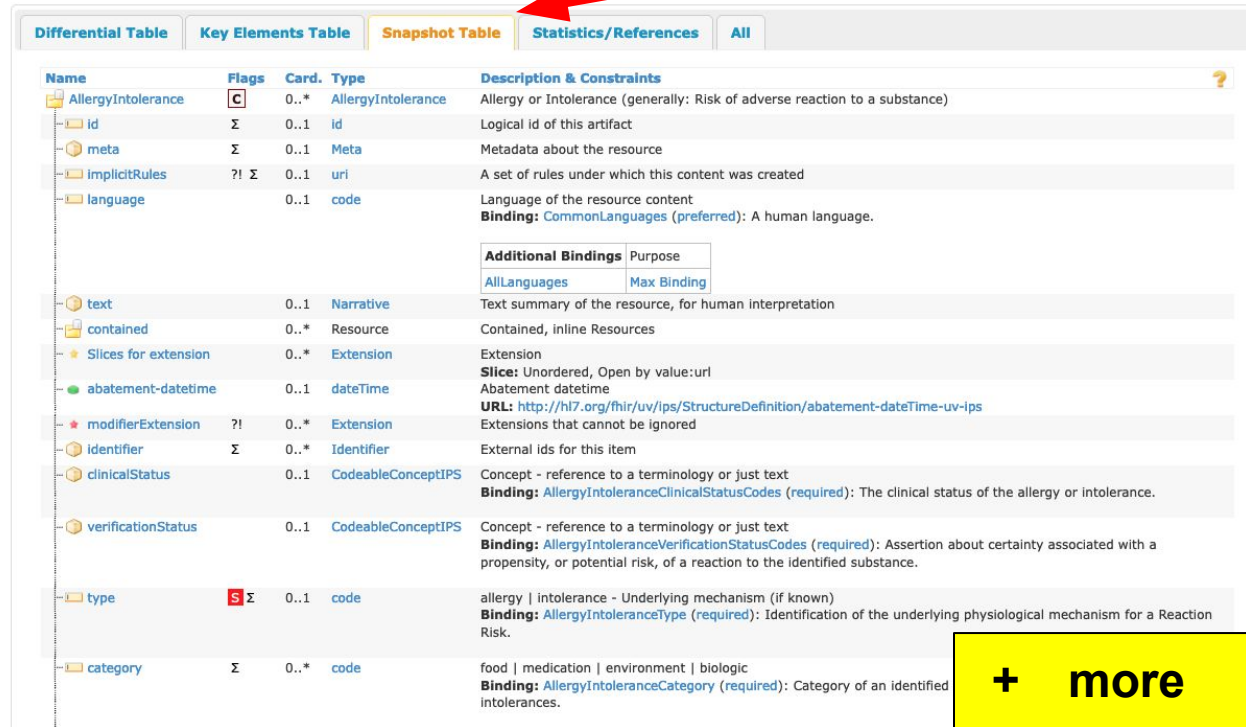
This structure is derived from [AllergyIntolerance](#)

Name	Flags	Card.	Type	Description & Constraints								
AllergyIntolerance		0..*	AllergyIntolerance	Allergy or Intolerance (generally: Risk of adverse reaction to a substance)								
abatement-datetime		0..1	dateTime	Abatement datetime URL: http://hl7.org/fhir/uv/ips/StructureDefinition/abatement-dateTime-uv-ips								
clinicalStatus		0..1	CodeableConceptIPS	Concept - reference to a terminology or just text								
verificationStatus		0..1	CodeableConceptIPS	Concept - reference to a terminology or just text								
type	S	0..1	code	allergy intolerance - Underlying mechanism (if known)								
criticality		0..1	code	low high unable-to-assess								
code	S	0..1	CodeableConceptIPS	Concept - reference to a terminology or just text Binding: Allergy Intolerance - IPS (preferred): Type of the substance/product, allergy or intolerance condition or a code for absent/unknown allergy.								
				<table border="1"><thead><tr><th>Additional Bindings</th><th>Purpose</th></tr></thead><tbody><tr><td>Allergy Intolerance - SNOMED CT IPS Free Set</td><td>Candidate Validation Binding</td></tr><tr><td>WHO ATC - IPS</td><td>Candidate Validation Binding</td></tr><tr><td>Absent or Unknown Allergies - IPS</td><td>Candidate Validation Binding</td></tr></tbody></table>	Additional Bindings	Purpose	Allergy Intolerance - SNOMED CT IPS Free Set	Candidate Validation Binding	WHO ATC - IPS	Candidate Validation Binding	Absent or Unknown Allergies - IPS	Candidate Validation Binding
Additional Bindings	Purpose											
Allergy Intolerance - SNOMED CT IPS Free Set	Candidate Validation Binding											
WHO ATC - IPS	Candidate Validation Binding											
Absent or Unknown Allergies - IPS	Candidate Validation Binding											
patient	S	1..1	Reference(Patient (IPS))	Who the sensitivity is for								
reference	S	1..1	string	Literal reference, Relative, internal or absolute URL								
onset[x]	S	0..1		When allergy or intolerance was identified								
onsetDateTime			dateTime S									
onsetAge			Age									
onsetPeriod			Period									
onsetRange			Range									
onsetString			string									
reaction	S	0..*	BackboneElement	Adverse Reaction Events linked to exposure to substance								
manifestation	S	1..*	CodeableConceptIPS	Concept - reference to a terminology or just text Binding: Allergy Reaction - SNOMED CT IPS Free Set (preferred): Code for the allergy or intolerance reaction manifestation from the SNOMED International Patient Set (IPS) subset of SNOMED CT (IPS Free Set).								
severity	S	0..1	code	mild moderate severe (of event as a whole)								

Allergies and Intolerances Resource (IPS)

14.3.1.1 Formal Views of Profile Content

Description of Profiles, Differentials, Snapshots and how the different presentations work³.









Name	Flags	Card.	Type	Description & Constraints
AllergyIntolerance	C	0..*	AllergyIntolerance	Allergy or Intolerance (generally: Risk of adverse reaction to a substance)
id	Σ	0..1	id	Logical id of this artifact
meta	Σ	0..1	Meta	Metadata about the resource
implicitRules	?! Σ	0..1	uri	A set of rules under which this content was created
language		0..1	code	Language of the resource content Binding: CommonLanguages (preferred): A human language.
text		0..1	Narrative	Text summary of the resource, for human interpretation
contained		0..*	Resource	Contained, inline Resources
Slices for extension		0..*	Extension	Extension Slice: Unordered, Open by value:url
abatement-datetime		0..1	dateTime	Abatement datetime URL: http://hl7.org/fhir/uv/ips/StructureDefinition/abatement-dateTime-uv-ips
modifierExtension	?!	0..*	Extension	Extensions that cannot be ignored
identifier	Σ	0..*	Identifier	External ids for this item
clinicalStatus		0..1	CodeableConceptIPS	Concept - reference to a terminology or just text Binding: AllergyIntoleranceClinicalStatusCodes (required): The clinical status of the allergy or intolerance.
verificationStatus		0..1	CodeableConceptIPS	Concept - reference to a terminology or just text Binding: AllergyIntoleranceVerificationStatusCodes (required): Assertion about certainty associated with a propensity, or potential risk, of a reaction to the identified substance.
type	S Σ	0..1	code	allergy intolerance - Underlying mechanism (if known) Binding: AllergyIntoleranceType (required): Identification of the underlying physiological mechanism for a Reaction Risk.
category	Σ	0..*	code	food medication environment biologic Binding: AllergyIntoleranceCategory (required): Category of an identified intolerances.

+ more

Required vs Must Support

- Required:
 - Your document is not legal if you omit this data
- Must Support:
 - Your system has to be able to accept it
 - When the data are entered, you must include it in the document

Name	Flags	Card.	Type
 Patient	N		DomainResource
 identifier	Σ	0..*	Identifier
 active	?! Σ	0..1	boolean
 name	Σ	0..*	HumanName
 telecom	Σ	0..*	ContactPoint
 gender	Σ	0..1	code
 birthDate	Σ	0..1	date

 identifier	S Σ	0..*	Identifier
 active	?! Σ	0..1	boolean
 name	S Σ C	1..*	HumanName
 telecom	S Σ	0..*	ContactPoint
 gender	S Σ	0..1	code
 birthDate	S Σ	1..1	date

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IPS Big Picture

- **Creator: Can I create and share an IPS document that can be**
 - Imported by a different system?
 - Viewed by a patient or care provider?
 - Be used to provide care?
- **Consumer: Can I accept or retrieve an IPS document:**
 - To provide care?
 - Care includes providing information to a different provider and/or different system.

Creator: Conformance

Conformance Question: Can I ...	Mechanism
Create a conformant IPS document? <ul style="list-style-type: none"><li>● Includes proper coded values	Validation Tool
Submit my IPS document to a standard FHIR server?	Simulator Tool
Submit my IPS document using an IHE Document Sharing Transaction?	Simulator Tool
Respond to search queries and retrieve requests so someone can retrieve an IPS?	Simulator Tool

Consumer: Conformance

Conformance Question: Can I ...	Mechanism
Process conformant IPS documents? <ul style="list-style-type: none">● Use as input for providing care● Import into my system like other records● Export an updated version● Translate to different language or coded values	Sample files
Process non-conformant documents? (Bonus points)	Sample files
Retrieve an IPS document from a standard FHIR server?	Simulator Tool
Obtain an IPS document using an IHE Document Sharing Transaction? (accept, retrieve)	Simulator Tool

Creator - Consumer: Interoperability

Interoperability Question
Can we exchange documents?
Can consumer parse and import content?
Can we support a clinical a clinical scenario? <ul style="list-style-type: none">● Unscheduled office visit for patient travelling● Import summary, add content, export● Translate document to different language● Map coded values to different vocabulary
Can we collaborate at the individual resource level?

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Known Tools

Gazelle EVS Client	Provides Web UI for message / resource validation	Kereval / IHE Catalyst
Matchbox	IG based validation as an extension to HAPI FHIR	Oliver Egger
Sample Files		Various
IPS Viewer	Web software to render an IPS	John D'Amore
Inferno	Retrieves / validates (IPS) data from FHIR servers. SMART on FHIR testing	MITRE
XDS Toolkit	IHE Document Sharing test tool (XDS.b, XCA)	NIST: Sunil Bhaskarla
NIST FHIR Toolkit	Tests IHE Mobile Access to Health Documents (MHD) profile	NIST: Sunil Bhaskarla

EVS Client

External Validation Service Front-end



Home

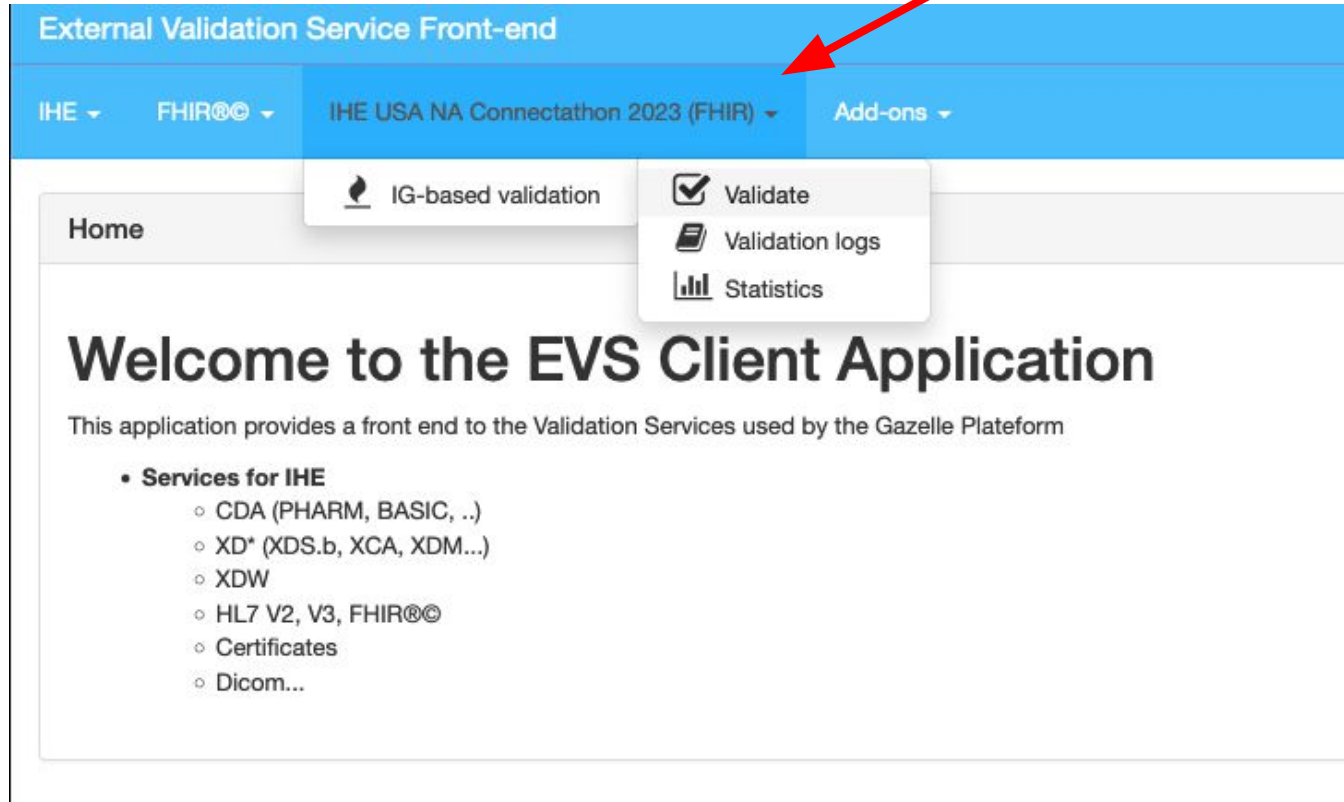
Welcome to the EVS Client Application

This application provides a front end to the Validation Services used by the Gazelle Platform

- **Services for IHE**

- CDA (PHARM, BASIC, ..)
- XD* (XDS.b, XCA, XDM...)
- XDW
- HL7 V2, V3, FHIR®©
- Certificates
- Dicom...

EVS Client



External Validation Service Front-end

IHE ▾ FHIR® ▾ IHE USA NA Connectathon 2023 (FHIR) ▾ Add-ons ▾

IG-based validation

Validate

Validation logs

Statistics

Home

Welcome to the EVS Client Application

This application provides a front end to the Validation Services used by the Gazelle Platform

- **Services for IHE**
 - CDA (PHARM, BASIC, ..)
 - XD* (XDS.b, XCA, XDM...)
 - XDW
 - HL7 V2, V3, FHIR®
 - Certificates
 - Dicom...

EVS Client

External Validation Service Front-end

IHE ▾ FHIR® ▾ IHE-D ▾ Add-ons ▾

Validate FHIR resources and requests

Information

File Name	bundle-minimal.json 📄
OID	1.3.6.1.4.1.12559.11.1.2.1.4.1.1675060
Schematron	N/A (Version 4.1.6)
Schematron Validation ...	N/A
Validation Date	4/11/22 9:52:45 PM (CEST GMT+0200)
Model Based Validator	FHIR Resource (F4) (Version 4.1.6) (Tool Version N/A)
Model Based Validation...	PASSED 📄
Permanent link	https://gazelle.ihe.net/EVSCClient/detailedResult.seam?type=FHIR&oid=1.3.6.1.4.1.12559.11.1.2.1.4.1.1675060
Data Visibility	Public

[Validate again](#) [Perform another validation](#)

Validation Results

Model based validation

Well-formedness **PASSED**

The document you have validated is supposed to be a well-formed document. The validator has checked if it is well-formed, results of this validation are gathered in this section.

The document is well-formed

Schema Validation detailed Result **PASSED**

Your document has been validated with the appropriate schema, here is the detail of the validation outcome.

The document is valid regarding the schema

IPS Viewer

International Patient Summary (IPS) Viewer for Connectathon

Links to [published Implementation Guide](#) and the [latest CI build](#)

Please note that this tool is an open-source project under development. It only renders the following sections of IPS bundles: Allergies, Immunizations, Medications, Problems and Results

Submit Data

This is for test data only. **Please do not submit PHI.**

Paste your IPS here:

Try a sample

[Repository of IPS Samples](#)

Clear

View IPS

Displaying Entries ▾

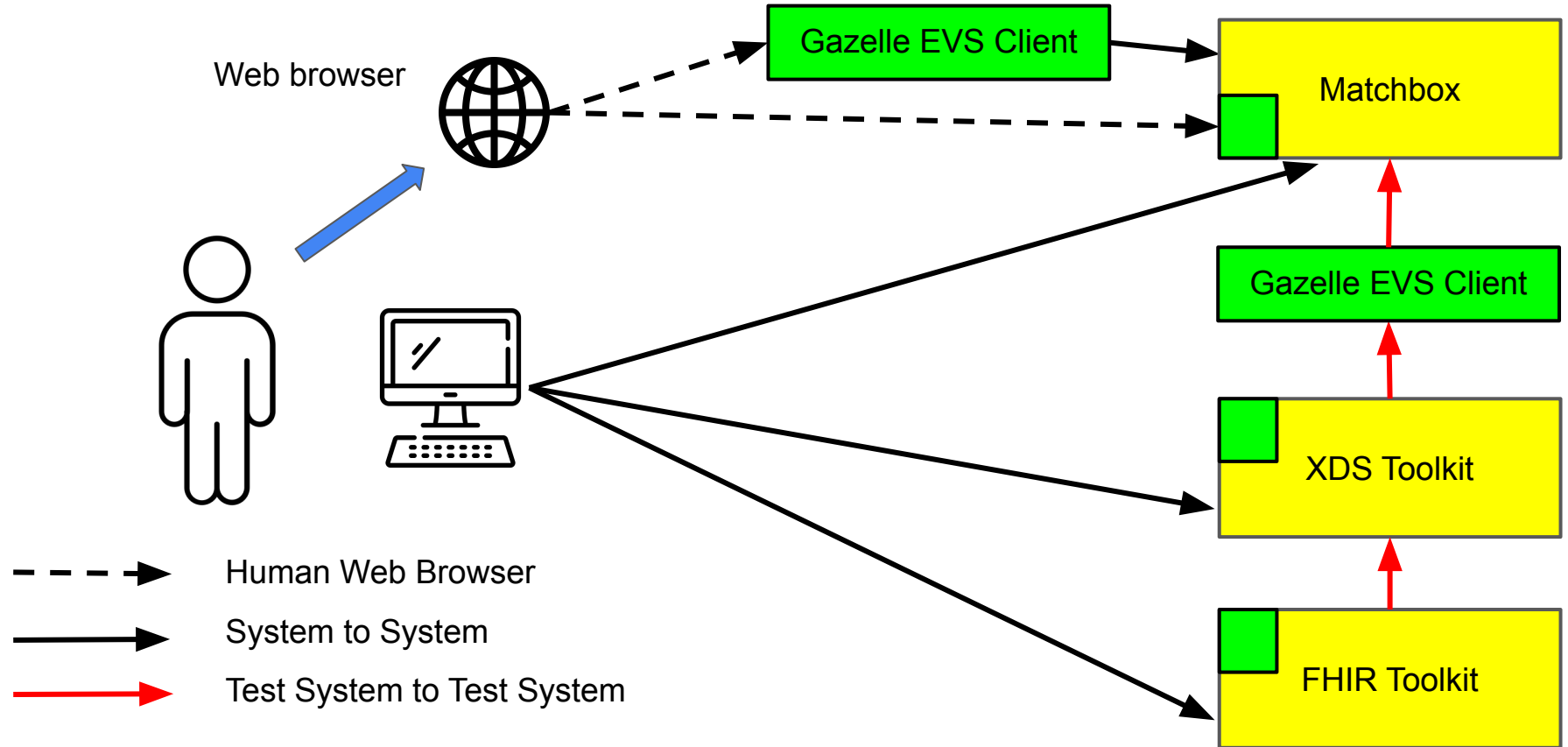
View IPS

IPS Viewer

View IPS

<p>Header ▼</p> <p>Patient Summary as of December 11, 2020 14:30 Summary Date: 2020-12-11T14:30:00+01:00</p>	<p>Patient ▼</p> <p>Birth Date: 1972-05-01 Name: Martha, DeLarosa</p>
<p>Allergies and Intolerances ▼</p> <p>allergy - medication - Criticality: High Substance with penicillin structure and antibacterial mechanism of action (substance) (373270004)</p>	
<p>Active problems / Diagnosis ▼</p> <p>2015 Menopausal flushing (finding) (198436008)</p>	
<p>Current Medications ▼</p> <p>http://snomed.info/sct Product containing anastrozole (medicinal product) (108774000) urn:oid:2.16.840.1.113883.2.4.4.1 ANASTROZOL 1MG TABLET (99872) urn:oid:2.16.840.1.113883.2.4.4.7 ANASTROZOL CF TABLET FILMOMHULD 1MG (2076667) http://www.whocc.no/atc anastrozole (L02BG03)</p>	

Testing (FHIR) Document Structure



Reference Material

[IPS - Moving from Specification to \(Global\) Implementation](#)

[International Patient Summary Overview Web Page](#)

[HL7 FHIR Home Page](#)

[Resource Formats](#) (help with interpreting resource documentation)

[HL7 FHIR IPS Implementation Guide](#)

[HL7 CDA IPS Implementation Guide](#)

[FHIR R4: AllergyIntolerance Resource](#)

[IPS: AllergyIntolerance Resource](#)

Reference Material

[External Validation Service \(EVS\) Client / Front End](#)

IPS Viewer

- [Public web site](#)
- [GitHub repository](#)

IPS Samples

- [FHIR Implementation Guide Samples](#)