



20 Years Anniversary of IHE Profile Cross Document Sharing (XDS)

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- Steering Committee Member of the Austrian National Healthrecord ELGA




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1. History of XDS-Development
2. XDS-Implementations in Europe & International
3. Summary & Outlook

XDS Milestones – The History

Year	Based Standards	IT-I	RAD				
2004	HL 7 V 2.x	Revision 1: <ul style="list-style-type: none">XDS, PIX, PDQ					
2007	HL 7 V 3.0	Revision 4: <ul style="list-style-type: none">XDS.b, PIXV3, PDQV3					
2008		1 st Tests on CAT for XDS.b					
2009		Last Tests on CAT for XDS.a					
2011		XCA and PIX V3 as Final Text	XDS-I as Final Text				
2012			XDS-I.b as Final Text				
2013			XCA-I, DICOM RESTful-Services				
2017		MHD	WIA Retirement of DICOM WS				
2023		Revision 20: <ul style="list-style-type: none">XDS.b, PIXV3, PDQV3PIXm, PDQm		Transaction	XDS.a HL 7 v 2.x	XDS.b HL 7 v 3.0	MHD FHIR
				Patient Identity Feed	[ITI-8]	[ITI-44]	[ITI-104]
				Provide and Register Document Set-b	[ITI-15]	[ITI-41]	[ITI-65]?
				Register Document Set-b	[ITI-14]	[ITI-42]	
				Registry Stored Query (Query Documents)	[ITI-16]	[ITI-16]	[ITI-66]
				Retrieve Document Set	[ITI-17]	[ITI-43]	[ITI-68]

Sharing is beyond Interchange

IT Infrastructure (IT-I):

Cross-**Enterprise**

Document Media Interchange (XDM)

Document Reliable Interchange (XDR)

Document Sharing (XDS.b)

Document Workflow (XDW)

Sharing of Scanned Documents (XDS-SD)

Cross-**Community**

Access (XCA)

Patient Discovery (XCPD)

Mobile Health Document Sharing (MHDS) {TI}

Patient Demographics Query for Mobile (PDQm)

Patient Identifier Cross-reference for Mobile (PIXm)

Pathology and Laboratory Medicine (PaLM)

- Sharing Laboratory Reports (XD-LAB)

Radiology (RAD)

- Cross-enterprise Document Sharing for Imaging (XDS-I) – Deprecated 2012-07-24 and replaced with XDS-I.b
- Cross-Community Access for Imaging (XCA-I) – Added 2013-09-16

1. History of XDS-Development

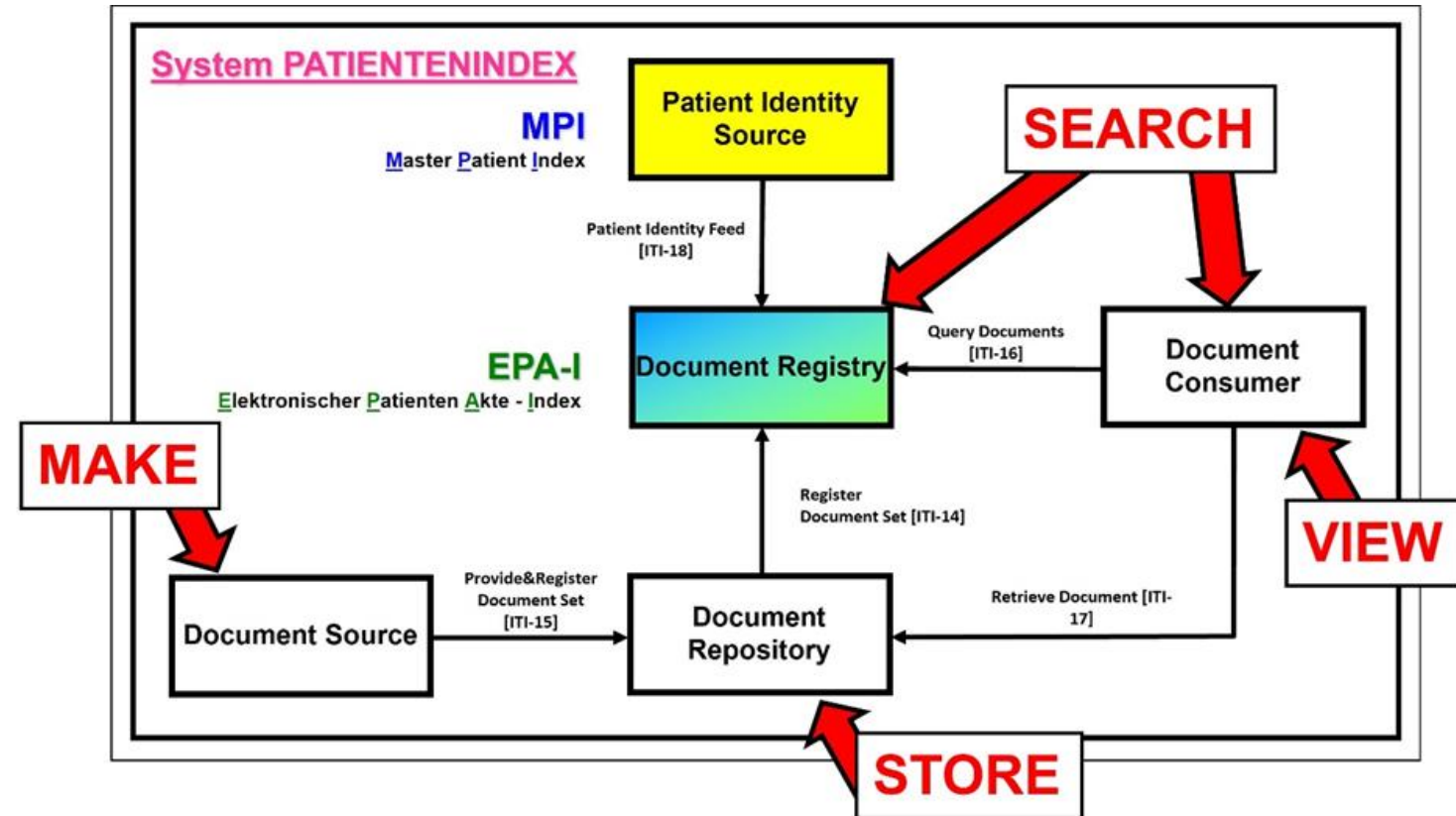
2. XDS-Implementations in Europe & International

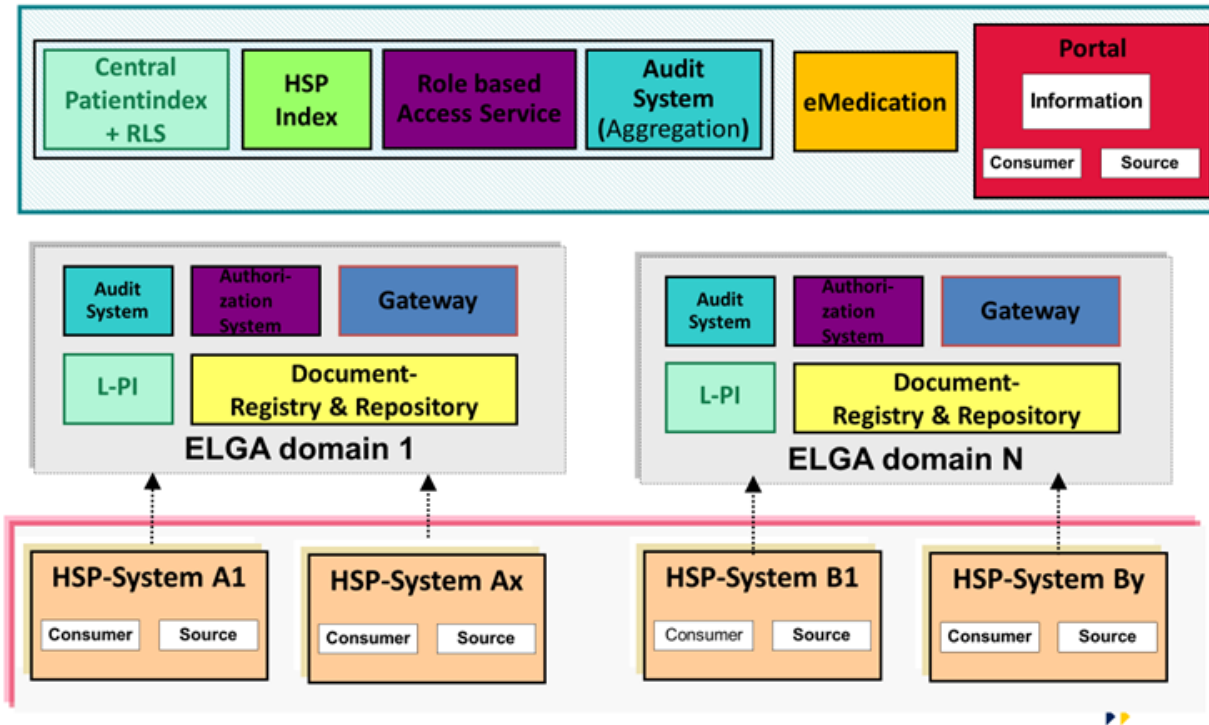
- a. Austria
- b. Canada
- c. Germany
- d. Italy
- e. Swiss
- f. United Kingdom
- g. ...

3. Summary & Outlook

Startingpoint 2004

- Integration of existing systems
 - Document Source
 - Document Consumer
- Avoid Vendor lock-in by separation of:
 - Document Source
 - Document Repository → New Version
 - Document Registry → New
 - Document Consumer
 - Patient Identity Source → New
- Used for Regional Healthrecord
 - 27 Hospitals
 - 54 Nursing Homes
- Centralized approach
 - 1 Affinity Domain for Lower Austria (since 12/2005)
 - 1 Affintiy Domain for ELGA (since 01/2017)





Startingpoints

- ARGE ELGA starts planning: 09/2006
 - Sharing based on IHE XDS
 - Content based on CDA
Discharge Summary, Lab- & Rad-Reports
 - Federated approach
- ELGA GMBH continues planning: 01/2010
 - EHR-Law (GTeIG) in place: 01/2013
 - Central Patientindex & Portal in place: 01/2014
- ELGA went operational
 - 2 Affinity Domains in Austria (Vienna & Styria): 12/2015
 - 14 Affinity Domains: 03/2017
 - Rollout eMedication: 09/2019
 - Vaccination-Pass 12/2020
 - Image Sharing 05/2024
 - myHealth@EU / ePRE / eDIS 12/2024

Numbers with XDS in Austria

	Lower Austria	Austria	Austria ELGA	Retention Time
	Internal	ELGA Part	[Mio]	[Years]
Patient-Datasets	4 844 179			
Linkgroups / unique Patients	2 651 059		9 100 000	
Opt-Out			280 000	
Public Hospitals			100%	
Pharmacies			97%	
GPs & Specialists (financed by Social insurance)			85%	
Discharge Summary		2 117 684	9 960 000	10
Laboratory-Reports		8 095 713	33 560 000	10
Radiology-Reports		4 033 091	16 940 000	10
Documents Sum	65 456 121		85 000 000	
KOS-Objects	25 751 836			
eMedikation			150 000 000	1,5
eVaccination			28 000 000	120

Adoption by:

- Government – National Electronic Health-Record ELGA
- Healthcare Providers
 - All public Hospitals are connected, Consumer-usage only with deep EPR integration
 - GPs & Specialists are connected via eMedikation (as Source)
 - Radiologists and Laboratories are still not connected
- Industry
 - EPR Platforms (3 different provider, some variations of implementation)
 - Few primary systems with a deep integration of ELGA (XDS-Consumer- and Source-Systems)
 - Adaptors facilitating integration:
 - XDS-Source-Systems: MDM-Transactions to [ITI-15], CDA-Generators, ..
 - XDS-Consumer: Portal as part of Affinity Domain: No acceptance by user!

Mindset:

- From Exchange to Sharing is a new experience!

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XDS in Canada



Derek Ritz, P.Eng., CPHIMS-CA

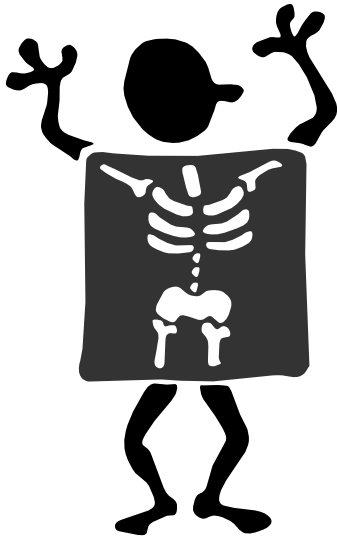


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Used for:

- Digital Imaging (a lot)
- Patient Summary (a bit)



Approach:

- Centralized (DIR)...
- ...*and* Federated!



How was XDS-I *scaled* in Canada?

- Canada Health **Infoway** (national digital health agency) convened a “Standards Collaborative”. This governance body established a set of consensus standards for digital health. **XDS-I** was adopted as a pan-Canadian standard.
- Infoway (leveraged **funding** as an accelerator for adoption of pan-Canadian standards-based digital health solutions. Initially (2006): ~\$310M CAD available to **co-fund** jurisdictional DI systems (RIS/PACS, DIR).
- Adoption **toolkits** were developed and made freely available.
- To leverage the co-funding from Infoway, Jurisdictions named standards-conformance as an **RFP requirement** for their “HIE” implementations.
- Good news was shared. Infoway conducted and published a **DI Benefits Evaluation** that detailed the improvements in provider workflow and patient outcomes.

Transition / evolution...

- IHE Canada members are active in DICOM and in the IHE Radiology technical committee. Lots of contribution to new DI profiles (FHIR, AI, etc.).
- Infoway is leading a national “Roadmap” effort that is broadly adopting FHIR-based patient summaries. A national specification (CA:FeX) is helping move from MHD to “pure FHIR” document exchange.



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XDS in Germany

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Martin Staemmler
University of Applied Sciences, Stralsund, Germany

Used for:

- National Health Record („Telematik infrastruktur) – opt-in based
 - centralized and patient moderated
 - available to insured ones within the compulsory sickness insurance (ca. 90%)
 - rather limited use, since obligation to provide data for in- and out-patients had been cancelled with the beginn of the last legislative period (~ spring 2022)



source: <https://www.gematik.de/telematikinfrastruktur/ti-dashboard> (last access 31.5.2024)

- National Health Record – relaunch begin 2025 „Record for All“, opt-out based

Used for:

- HDP health data platform (across multiple organizations)
IOP interoperability platform (with an organization)
IPP interoperable patient portal
- | <i>name</i> | <i>status</i> | <i>spread</i> |
|---|----------------------|-------------------|
| - Ostwestfalen Lippe (IOPs and HDP) | operational | regional |
| - Rheinland-Pfalz (IOPs and HDP) | implementation | regional |
| - Hospital groups (central HDP) | operat. / implement. | regional |
| - Health Harbor Hamburg H ³ (IOP and HDP) | planning | regional, federal |
| - federal platform (IOP and HDP) | planning | federal |
| - Mein-Krankenhaus.Bayern (IPP) | implementation | federal |
| - multiple single or cooperating hospitals (IOP, HDP) | all | local, regional |
- newer projects usually in combination with a FHIR based CDR
 - IHE XDS for unstructured data and KOS,
 - CDR for structured data and references to unstructured data (DocumentReference, ImagingStudy)

Adoption by:

- | | |
|------------------------------------|---|
| • Government | „Telematikinfrasturktur“ |
| • Healthcare Provider | |
| ○ single Hospitals | yes |
| ○ Hospital groups | yes |
| ○ General Practitioner | no, only per portal, not properly integrated |
| ○ Specialists | partially, per portal, images via DICOM functions |
| • Industry | |
| ○ XDS-Infrastructure | DMS vendors, solution / integration provider |
| ○ XDS-based Vendor Neutral Archive | PACS provider |
| ○ XDS-Consumer- and Source-Systems | very few HIS, DMS (some prohibitively expensive) |
-
- | | |
|----------------------------|---|
| Mindset: | |
| ○ From Exchange to Sharing | rather difficult to allow for access by external partners |

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XDS in Italy

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Claudio Saccavini, IHE Italy



Used for:

- National Healthrecord
- Regional Healthrecord
- Hospital EHR

Approach:

- Federated

Content	Format [PDF, CDA, ..]	Operational since	Number of Reports / Studies
Discharge Summary	PDF	2016	60%
Lab-Reports	CDA	2012	100%
Radiology-Reports	PDF/CDA	2014	80%
Images	no		
Medication	CDA	2014	100%
ER.- Reports	PDF	2016	100%



Adoption by:

- Government
- Healthcare Provider (used in RFPs)
 - Hospitals
 - General Practitioner
 - Specialists
- Industrie
 - XDS-Infrastructure
 - XDS-based Vendor Neutral Archive
 - XDS-Consumer- and Source-Systems

Mindset:

- From Exchange to Sharing



- XDS-to-FHIR transition (in FSE 2.0)
- CDA to FHIR transition (in FSE 2.0)
- Multidomain-Support in FHIR?



XDS in Switzerland

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Stéphane Spahni, PhD, University Hospitals of Geneva, Switzerland

Used for:

- National EPR
- Hospital backbone

Approach:

- Federated (7 communities)
- Internal / private

Content	Format [PDF, CDA, ..]	Operational since	Number of Reports / Studies
Non standardized documents	PDF	2021	> 99%
CH EMED (eMedication)	FHIR (was CDA)	2024 (2020)	
CH VACD (eVaccination)	FHIR (was CDA)	2024 (2021)	
CH eTOC (CH eTransition of Care)	FHIR	2024 (2022)	
CH AllergyIntolerance (Allergy & Intolerance)	FHIR	2024 (2022)	
CH ORF (Order & Referral by Form)	FHIR	2024 (2022)	
CH LAB-Order (Laboratory Order)	FHIR	2023 (2022)	
CH RAD-Order (Radiology Order)	FHIR	2022	

Adoption by:

- Government – included in EPR law specifications
- Healthcare Providers
 - Few Hospitals for images & archives, potentially in relation with EPR integration
- Industry
 - EPR Platforms (3 different implementations)
 - Primary systems with a deep integration of EPR access (XDS-Consumer- and Source-Systems)
 - Connectors facilitating deep integration of EPR access (XDS-Consumer- and Source-Systems)

Mindset:

- Archives (hospitals), archive / distributed sharing (EPR)

- Move from unstructured (PDF) to structured data
 - Use of FHIR for structured data
 - Possibility to use XDS for storing structured data as documents
- Availability of REST-based transactions
 - MHD-based national specifications in progress
 - IUA support
- Proposal for a national repository for structured data
 - Avoiding federated / multi-communities FHIR servers
 - May be concurrent to XDS-based infrastructure

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XDS in UK

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Dewinder Bhachu
UK

Name	Description	Key Contributors	Dates
LPRES	Lancashire and Preston Regional HIE – focus on Primary Care Records sharing into Secondary Care, linked to Cheshire and Merseyside with XCA. Linked to NRLS.	Lancashire and Preston Hospitals Tiani Spirit	Since 2014
Cheshire and Merseyside	Regional HIE – focus on linking Secondary Care Trusts (25 hospitals) and linked to GPs, sharing patient documents (Discharge Summaries, Lab Results, Radiology Imaging ..) also linked to LPRES with XCA	Alder Hey and the Royal Liverpool Hospitals. Forcare	Since March 2017
SWASH	Southampton Winchester Solent Hampshire regional radiology solution uses XDS for sharing and patient privacy/consent management. Similarly to Cheltenham/Gloucester and Surrey/Sussex regional image sharing solutions	Southampton and Winchester hospitals, Philips/Forcare	Since 2012

Name	Description	Key Contributors	Dates
One London	Cerner - Pan London Hub. Linking 7 STP based Health Information Exchanges (HIEs). Each HIE is linked to the Hub using XCA	NW London STP; NC London STP; NE London STP; SE London STP; SW London STP	In test; Live Projected 2020
Wessex LHCR	Wessex has Orion based installation for both Hampshire Isle of Wight and Dorset. The Dorset instance has been live since 2018	Hampshire IoW (CHIE) and Dorset DCR	Dorset Live. CHIE live 2020
Manchester	Greater Manchester LHCR has implemented MHD as a FHIR interface for document sharing.	Greater Manchester LHCR.	Projected 2020
North West London Radiology	An IHE based Radiology Image Sharing system covering 6 major NHS Trusts across North West London. This uses the IHE Radiology Technical Framework alongside some DICOM image movement to federate radiology imaging across the region.	London NW, Imperial, Marsden, Hillingdon, Brompton, Chelsea and Westminster. Soliton IT	Projected 2020

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Word wrap

- There is still no alternative to XDS in place!
- Start interoperability on the source-side and you get it for free at the consumer-side?
- Technology-change brings no benefit for medical users.
- Take each opportunity (Procurement & major-releases) to implement new technology / standards.
- ...

Thank you for
your attention!

Let's celebrate!

