PHILIPS

Interoperability Solutions

White paper

IHE XDS: Sharing medical documents across enterprises

Index

I want to share my patient's medical documents. But how?
When you are planning to electronically exchange medical documents and images outside of your healthcare facility, you will want to be sure that no matter which method you use, it can provide true interoperability between healthcare enterprises – now and in the future. It needs to be simple, safe, secure, scalable, and above all standard. The method you choose should preferably be vendor independent, extensible, support the work processes of your organization, and give the patient sufficient control over who accesses their medical data.

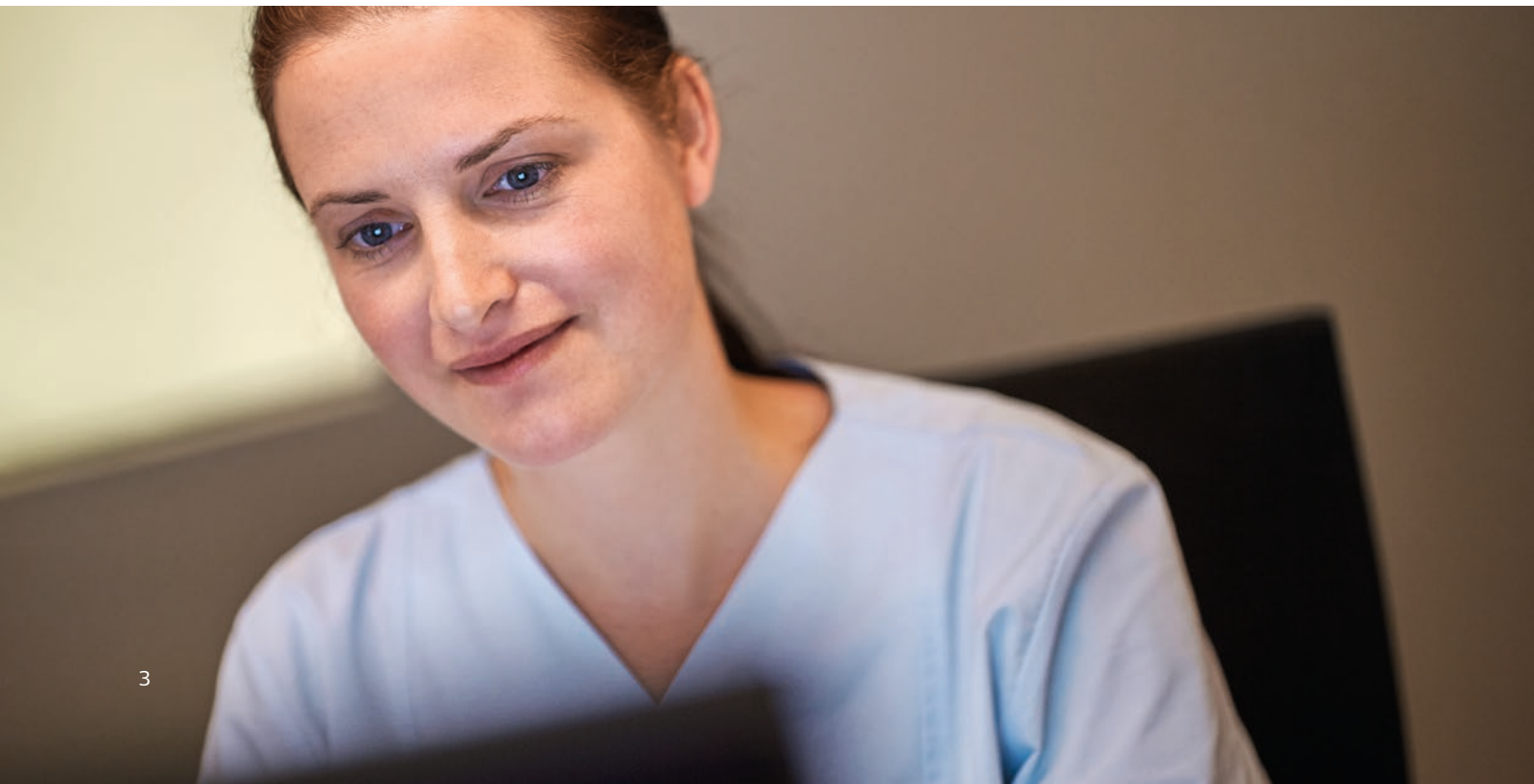
You may have heard about XDS, short for Cross Enterprise Document Sharing. IHE XDS is an interoperability profile that describes how to establish true interoperability between healthcare enterprises when exchanging patient information. This white paper summarizes the basics of IHE XDS and demonstrates that when combined with other IHE profiles, it provides a solution for exchanging sensitive data in the medical enterprise.

I have heard about IHE, but don't know exactly what it is
Integrating the Healthcare Enterprise (IHE) is an initiative of both users and vendors of medical information systems. Companies large and small joined forces with their users to draft use cases, that describe which and how information travels within a business process in the medical enterprise, and which of the existing standards to use in what way to cater to those use cases.

This results in interoperability profiles. IHE not only drafts them in close cooperation with users and vendors, but also puts these profiles to the test in periodically organized one-week live events called Connectathons. During a Connectathon, vendors meet and connect their medical information systems to one another, and replay the usage scenarios that have led to the IHE profiles.

By drafting and testing profiles that make use of existing standards instead of developing a new standard, IHE describes work processes rather than regulating peer-to-peer communication. IHE started out with profiles in the radiology domain, describing for instance the typical work process that leads to an X-ray report, starting with the physician's referral and ending with completion and filing of the images and report.

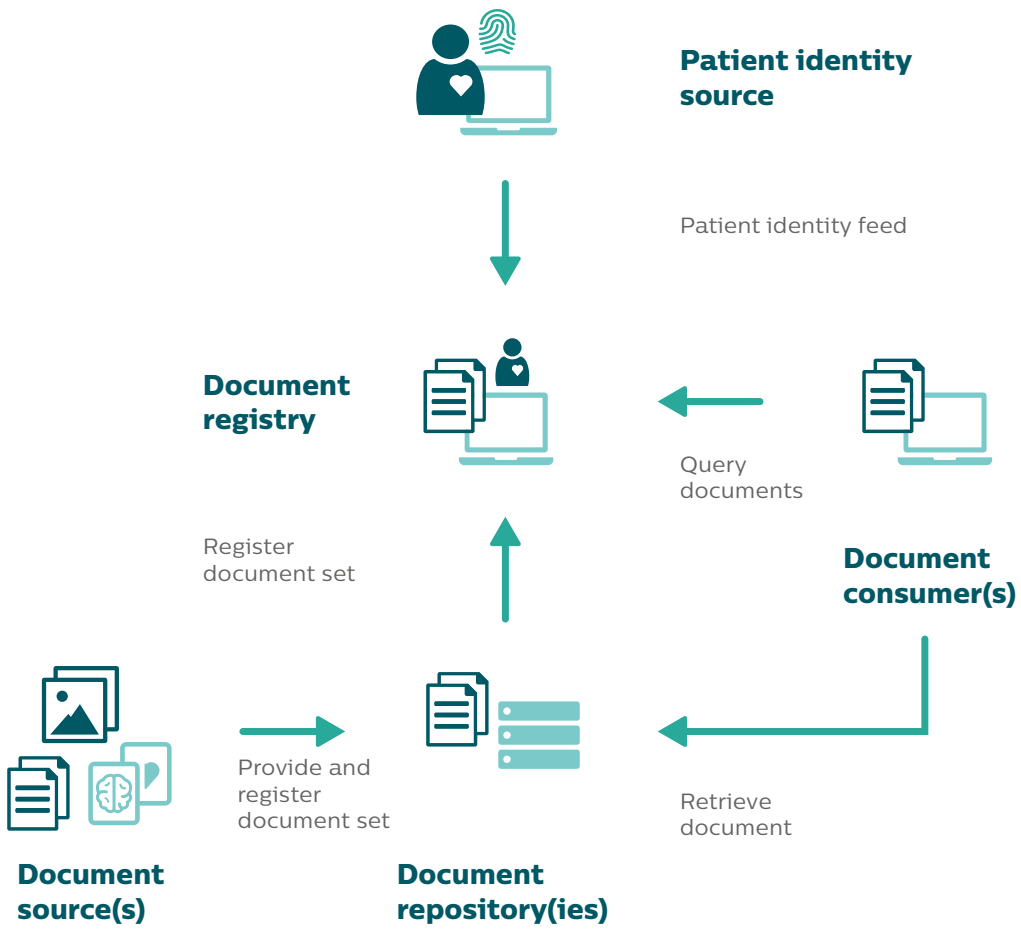
So IHE is not a standard, rather its profiles form a kind of 'operating manual' on how to use existing standards in real-life situations.



What is XDS?

IHE also addresses the process of exchanging medical information with peers in other institutions. Even now, this is still often handled with analog techniques such as faxing documents or shipping DVDs. To improve the information exchange, IHE has developed the XDS profile.

This Cross Enterprise Document Sharing profile describes a working method for electronically sharing medical information with peers – whether that be one or many. The philosophy behind XDS is that patient data is made available from the source system. Medical documents are indexed in a registry using a set of well-defined attributes. A physician who wants to view a document can search the index and retrieve the document for viewing from the appropriate repository.



What exactly can I share with XDS?
Whether referral/discharge letters, medication lists, a simple physical exam note or patient history, lab results, scanned documents, medical images, continuity of care records – XDS provides a means to share any type of medical document. In fact, XDS does not have access to the content of a document, just some of its metadata.

Can I go out and buy any XDS-capable system then?
Although a dog is an animal, not all animals are dogs. So when you go out to buy "an animal" you may end up with something that meows when you expected it to bark. This demonstrates why you need to be specific when you buy something – what do you want that particular system to do in the XDS network?

In an XDS network, there are five types of systems called 'actors' in IHE terminology – a document source, a document consumer, a repository, a registry and a patient identity source. A vendor providing one of these actors may claim to be XDS compliant (stating that "these are all animals") for one or more of these actors. The IHE XDS profile defines the responsibilities each of these actors have in great detail. You can ask your vendor to show you their IHE compliance by reviewing, for instance, their Connectathon results and IHE integration profiles.

But there is more. Besides XDS, IHE has described additional profiles that add to security, accountability, patient consent, and many more aspects that together form a mesh with the aim of making an exchange infrastructure which is safe, secure, scalable and above all standard. Please consider if these additional profiles are supported by any solution that you buy.

What additional IHE profiles do I require to build a solid XDS solution?

Cross Enterprise Document Sharing for Images (XDS-I) is an IHE profile that describes a method of sharing medical images across enterprises. With XDS-I the XDS repository only holds basic information on the image series, and full-quality image retrieval is done from source PACS to consumer workstation directly, using web-safe methods.

Cross Enterprise User Assertion (XUA) is an IHE profile that governs the exchange of user information in order to grant or deny access to patient information based on the user's role or affiliation. When XUA is used in an XDS network, the hospitals that take part in the network can each use their own existing user registries (e.g. Active Directory, LDAP service) so there is no need for a specific XDS user database.

Audit Trail and Node Authentication (ATNA) is an IHE profile that secures communication between systems in an XDS network and provides accountability by logging every action in the XDS network. Nowadays, implementation of the ATNA is mandatory in any XDS network.

Basic Patient Privacy Consent (BPPC) is an IHE profile that provides a means for the patient to give or withdraw consent for the use of his/her patient data. The implementation of BPPC can be coarse or very fine-grained, giving simple or very sophisticated control over who can access what documents at which point in time.

Cross Community Access (XCA) is an IHE profile that enables several XDS-networks (also known as affinity domains) to be connected to one another. This profile allows for exchanging patient information across communities of XDS implementation.

Consistent Time (CT) is an IHE profile that basically describes how to keep the clocks of the information systems taking part in the XDS network synchronized. CT is indispensable for implementing ATNA and BPPC.

Other profiles to look for: Patient Identifier Cross Referencing (PIX) to match your local ID's with regional, state or national ID's, Patient Demographics Query (PDQ) to be able to find a patient's ID based on demographic data, and Cross-Community Patient Discovery (XCPD) to locate your patient in other communities.

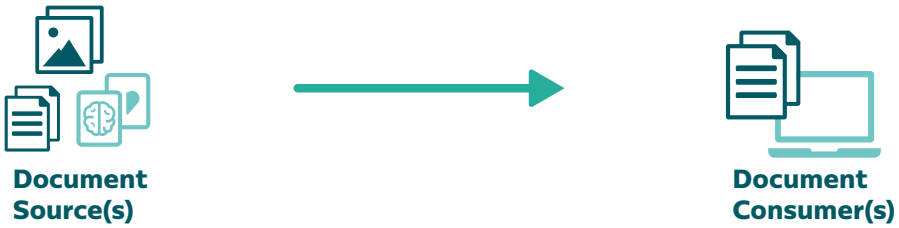
Can't I just use my EMR vendor's sharing solution?
Although that might seem simpler in the short term, it also just might lock you in with your vendor and prevents you from freely exchanging information with other peers in the future. You might want to check if your EMR vendor supports all the profiles that can be used in an XDS network solution. And preferably, that EMR vendor has a proven track record on XDS implementations.

How can IHE support the cooperation we have with nearby hospitals?
Good question. Making documents available using XDS basically just lists them in a registry. Although that supports the care processes, it doesn't drive the cross-enterprise workflow. For that you need pro-active signaling of steps completed and documents waiting.

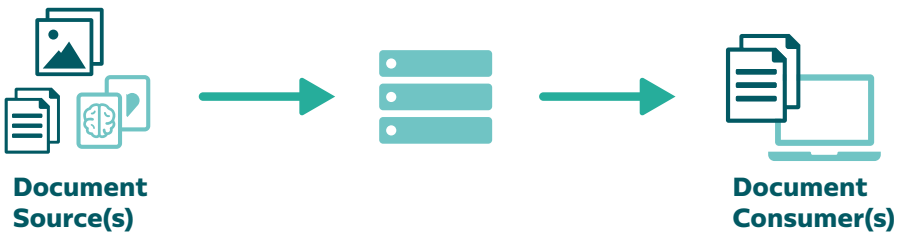
IHE has recognized this and has created the Cross Enterprise Document Workflow profile, or XDW for short. Combined with XDS, it drives the workflow, making your colleagues aware of available patient information, reporting on the progress of, for example, a multidisciplinary meeting or patient referral, and signaling process completion. All of this is intended to fit with your day-to-day processes and integrate with your information system.

The XDS profile in a nutshell

Integrating the Healthcare Enterprise (IHE) uses the concept of actors that engage in transactions in order to achieve a business process. For the use case of exchanging medical documents across healthcare enterprises, the document consumer actor (e.g. a medical workstation) accesses information that is supplied by a document source (e.g. a laboratory information system or PACS).

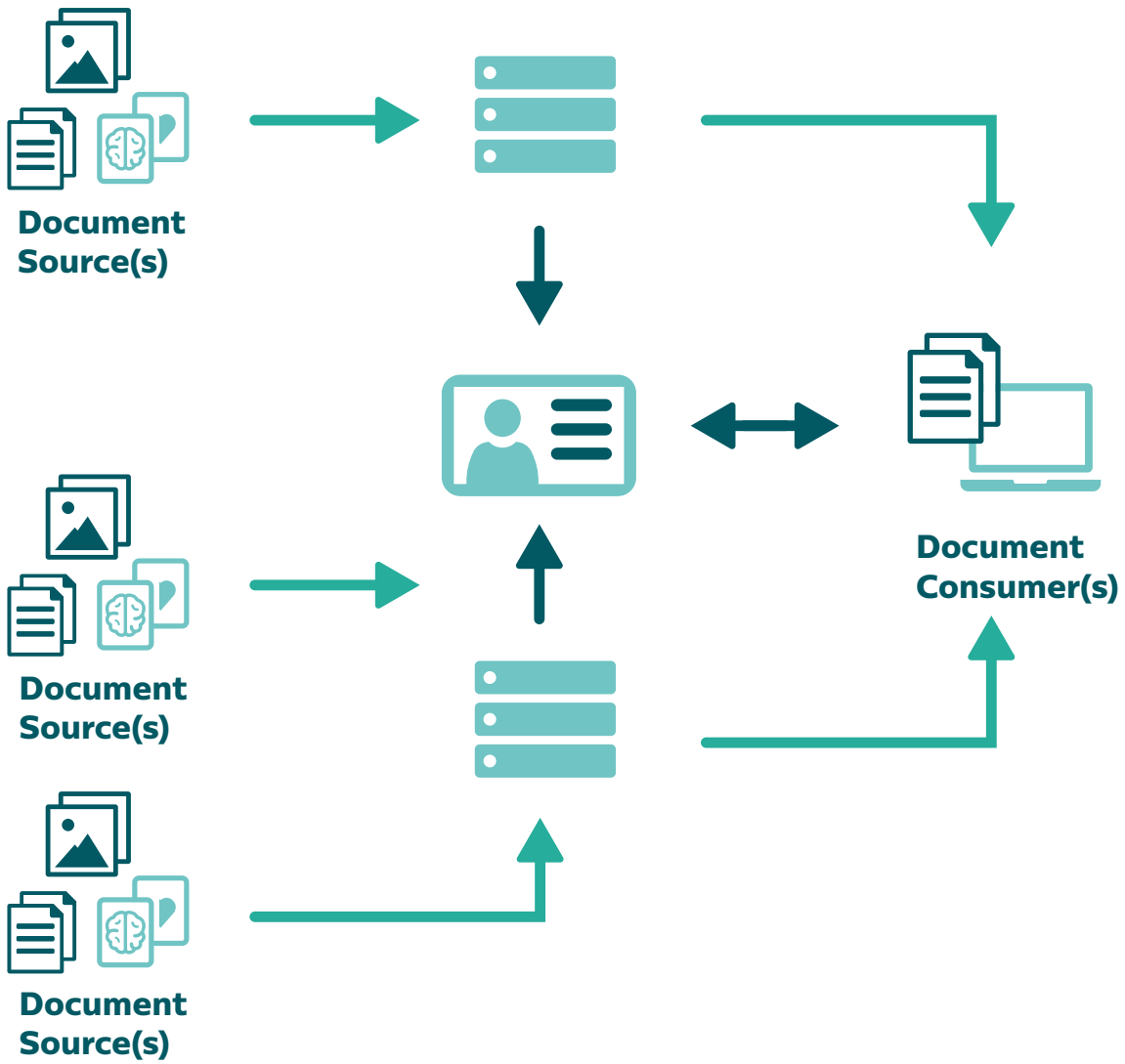


This diagram depicts a peer-to-peer situation (a single doctor's workstation accessing a source system), whereas in everyday practice multiple document consumers may access the documents provided by the document source (three doctors accessing lab information). And a document consumer wants to access multiple document sources (e.g. a doctor accessing a patient summary, lab results, and a radiology report). Having a document repository in the middle makes all that possible.



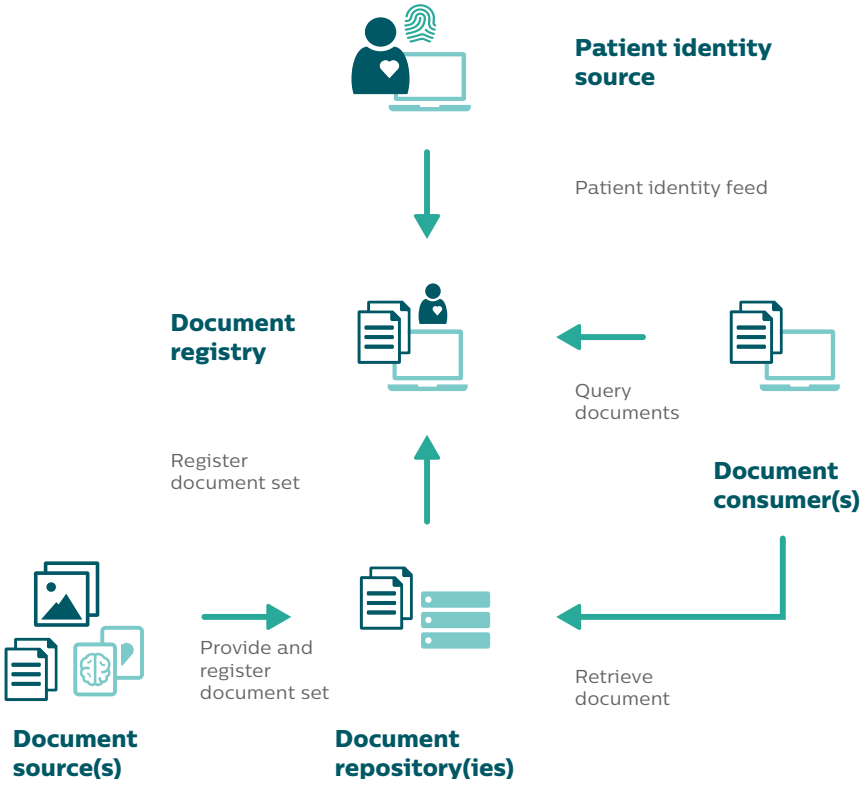
One of the prerequisites of effective medical information sharing is to prevent replication of medical data, thus keeping the data at the source. In other words: the document source is the document repository, unless that document source is a system that is intermittently connected to the hospital network. What is needed on a central level is a catalog of all the available documents in multiple repositories: a document registry.

In this diagram, a document consumer consults the registry for available patients and their documents. In a second step, a consumer retrieves the documents of interest at the repositories where these reside. To make sure that both consumer and source refer to the same patient, there needs to be an actor that somehow validates the patient identity. The fifth actor, called the patient identity source, secures that.



The patient identity source provides patient demographic information to the document registry by using a patient ID that identifies the patient uniquely across the enterprises. A document source cannot publish any document unless the patient identity is fed into the registry first.

Together these actors form the sharing network also known as the XDS affinity domain.



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- Consider and document patient consent when deciding who can access medical records
- Allow secure access to clinical documents
- Support secure processes with a separate audit log for transactions involving medical data

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