



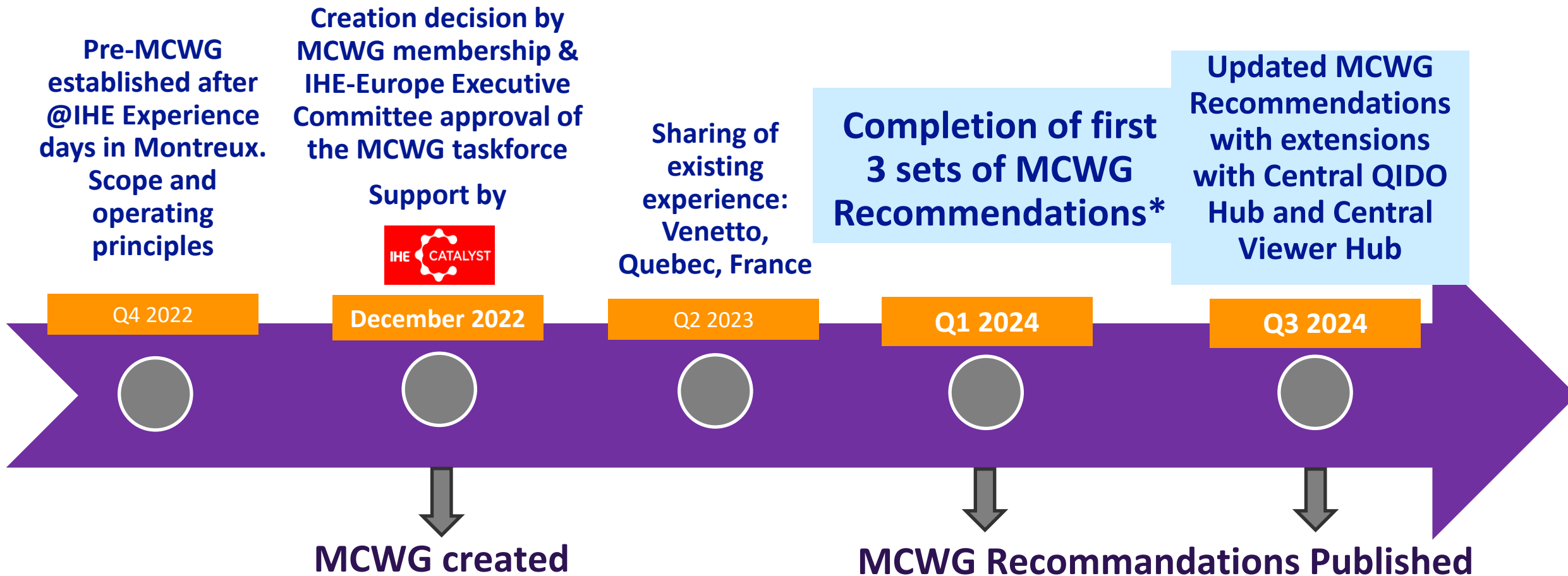
Integrating
the Healthcare
Enterprise



Multi-Country Working Group (MCWG) on Image Information Sharing

An IHE-Europe Taskforce

Multi-country Working Group (MCWG) Timeline



- MCWG Approved Recommendation on Imaging Information Sharing
<https://www.ihe-europe.net/multi-country-working-group-Imaging-Information-Sharing>

MCWG Scope and objectives

Scope:
Deployment of interoperability for
Imaging Exchange

- **National or regional level**
- Complementary to Cross-Border imaging exchange focus of EU Commission (eHN, JA9).

Goal:
Deliver design analysis for specific
extensions

- Extensions are needed to **effectively deploy IHE Profiles, DICOM, FHIR** and other standards within countries' ehealth services. Complementary to eHDSI for Cross-Border.

Benefits:
Pool expertise and resources

- **Direct engagement with active national deployments**
- Perform analysis of specific issues
- **Seek increased consistency** between such deployments.

Deliverables:
Analysis results as MCWG
recommendations.

- Mature and complete with multi-country consensus
- Offered for adoption and **easily included into national interoperability frameworks.**

Mode of Operation, Members & Recommendations

**MCWG plenary
meetings**
every two weeks, 1-hour T-con

- **All members engage in MCWG governance** (within rules of an IHE-Europe Task Force)
- **All members prioritize topics for recommendations.** Each topic is addressed by a dedicated Focus Group including 3-4 Members or designees, committed to deliver recommendations on the topic in less than two months
- **All members review and comment on draft recommendations and approve final recommendations**

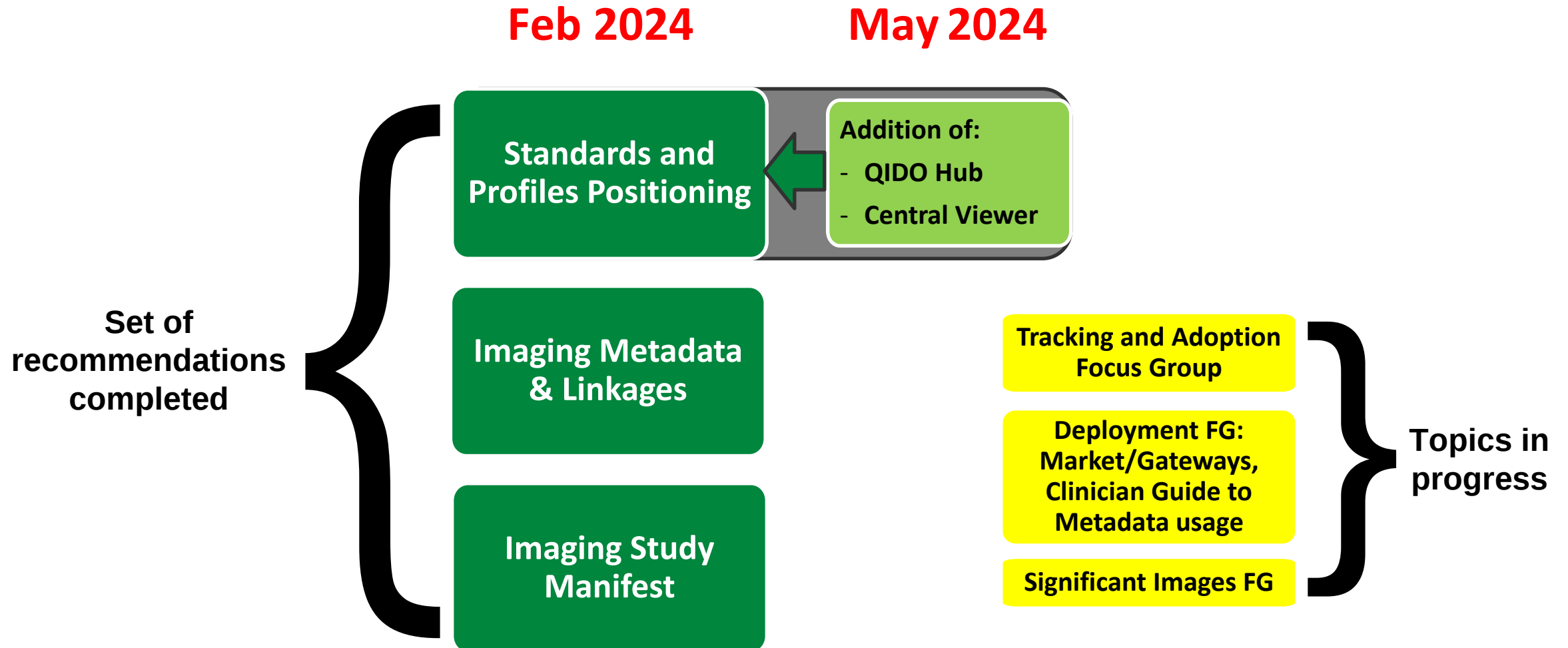
**Currently includes
representatives from
11 countries**

- **Austria, Belgium, Canada-Quebec, Czechia, Denmark, England, Finland, France, Netherlands, Norway and Spain**
- MCWG is working on expanding that list. **Other countries European and non-European are welcome**

**MCWG produced 3 sets
of recommendations
in four months**

- Each set of recommendations corresponds to a topic produced by a dedicated Focus Group.
- Recommendations **sufficiently mature, complete (multi country consensus) and stable to be offered for adoption into national interoperability frameworks.**
- The recommendations are initially delivered in a PowerPoint Slide Format.
- **Publicly available documents. MCWG members to ensure rapid feedback as they apply.**

MCWG Recommendations and work in progress



1. Standards and Profiles Positioning

Topic description and scope

Scope

Standards
and Profiles
Positioning

Tracking and
Adoption Focus
Group

Imaging
Metadata &
Linkages

Deployment FG:
Market/Gateways
Clinician Guide to
Metadata usage

Imaging
Study
Manifest

Significant Images
FG

Use Case aligned with the
eHN Guidelines on Medical imaging studies and reports :

https://health.ec.europa.eu/document/download/0079ad26-8f8f-435b-9472-3cd8625f4220_en?filename=ehn_mi_guidelines_en.pdf

- search and select imaging studies of interest
- access to images
 - **links in report to server-side or centrally hosted image viewer**
 - **to native DICOM images by a requester-side viewer/processor.**

Choice of profiles and standards

- Position the role of HL7 FHIR in the sharing of imaging information architectures
- **Select profiles and standards for the use case** (FHIR/MHD, IHE/XDS-I, IHE/XCA-I, DICOM WADO-RS)

1. Standards and Profiles Positioning

Recommendation Highlights

Recommendations

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Three different
deployment architectures
may coexist (See Note) :

- A. Country (or stand-alone Region) with a **central document registry** both with distributed PACS/VNAs
- B. Country with **federated document registries & regions** with distributed PACS/VNAs
- C. Country (or region) with a **central document registry and a central VNA**

Note: Manifest Document Repositories whether centralized or distributed is possible in all three architectures.

Imaging Study Manifest
(DICOM KOS) used in all
deployment architectures.

Transactions are from the
following profiles:

- A, B or C: **IHE MHD** (FHIR based with document reference resource) + **DICOM WADO-RS** (Rest)
- A or C: **IHE XDS-I** (WS SOAP-Based) + **DICOM WADO-RS** (Rest)
- B : **XCA-I** (WS SOAP based) + **DICOM WADO-RS** (Rest)

2. Imaging Metadata & Linkages

Topic description and scope

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Ensuring effective sharing with linkages

- **For clinician as well as for imaging production**
- Both for imaging reports and imaging studies.
- Linkages with clinical orders and imaging procedure requests

Defining a robust imaging metadata strategy

- **For filtering access in queries** (key filtering elements) for imaging studies.
- **For selecting** among filtered imaging studies returned

2. Imaging Metadata & Linkages

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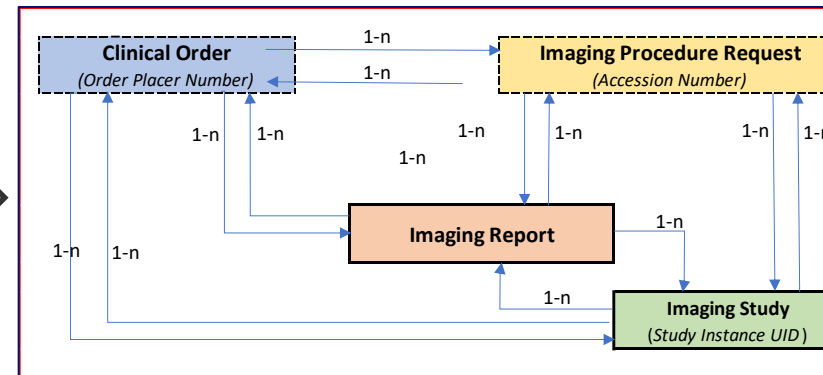
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Filtering in queries :

Criteria needed for health
professionals (imaging and
others) when exploring a
patient imaging records:

Linkages for relationships
between various entities

Metadata element	Description	Query level
Anatomical Regions	Set by RIS per each imaging procedure code	1 (or 2)
Study level modality	Set by RIS per each imaging procedure code	1 (or 2)
Study Instance UID	Set by RIS (sometimes by modality)	2 (or 1)
Accession number	RIS generated imaging procedure request identifier	2 (or 1)
Order Placer number	From ordering module EHR/EMR	2 (or 1)
Imaging Procedure Code	Set by RIS per each performed procedure code	2



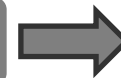
- Initial filtering request (level 1)
- Subsequent selection (level 2) among the list of responses to initial request

Use of Display Names and Codes Value Sets



- Imaging Procedure
- Laterality

Non-imaging specific metadata



- Document Classes: Imaging or Report
- Practice Setting (source Specialty=)

Workflow



- Publication trigger
- Imaging reports header data

3. Imaging Study Manifest

Topic description and scope

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Definition of Imaging Study Manifest

- Based on [eHN Guidelines on Medical imaging studies and reports](#)
- Consistent with DICOM and IHE XDS-I

Analysis of the detailed content of the imaging manifest (KOS)

- National and local patient IDs,
- Accession numbers,
- Additional content in study/series/instance descriptions for technical or clinical efficiency.

3. Imaging Study Manifest Recommendation Highlights

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- DICOM KOS vs FHIR Document bundle (incl. Imaging Studies Resource). Choice of standard: DICOM KOS



DICOM KOS is a better use case match

- Neutral: Content match 90+% covered – Both are missing only a few standard attributes:
- **Imaging SW Alignment for consumption with 80% created from Imaging Data**
- **Much wider Adoption** – 84 vendors passed Connectathon testing of KOS Manifests (XDS-I). Over 100 sharing environments (Hospital, Regional, national) deployed in Europe
- Transaction to support sharing of manifests and workflows variants
- Key requirements on SOP Classes retrieved by WADO-RS
- Detailed recommendations for manifest content (what needs to be added, why and how)
 - Patient Identification,
 - Study Information,
 - Workflow/identifiers,
 - Series and Instance Information
- Retrieval
 - Locating the Referenced Studies, Series and Instances.
 - Management of retrieve URL and location OIDs
- Selection of Significant Images (IHE KIN)

Tracking and Adoption of Recommendations

On-going work

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**Created and maintain
tools and strategy for
survey of adoption**

- Created a survey/checklist document listing the recommendations elements with brief explanations
- 6 surveys are integrated into an MCWG Dashboard. 6 countries in progress.
- Provide Dashboard for MCWG Plenary Adoption and publication.

**Point of contact for
change proposals on
current
recommendations.**

- Update MCWG Overview presentation
- Meetings with representants of new member countries/jurisdictions
- Collects, filters, tracks processing of submitted Change Proposals

Tracking and Adoption of Recommendations

Draft Adoption Dashboard

MCWG Recommendations Adoption Dashboard



1 Adoption of MCWG Standards Positioning Recommendations

Deployment Architecture Used

Regional or National

1.2.1 Use deployment architecture A.
A Country (or a single stand-alone Region) with a central document registry both with distributed PACS and/or VNAs.



1.2.2 Use deployment architecture C.
A Country (or region) with a central document registry and a central VNA.



1.2.3 Use IHE XDS-I with your deployment architecture.



1.2.4 Use IHE MHD (FHIR document reference) with your deployment architecture.



1.2.5 Use IHE XCA-I with deployment architecture B.
A Country with federated regional document registries and regions with distributed PACS and/or VNAs.



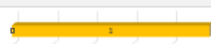
Image Study Access/Viewing

1.7.1 Use Requestor Viewing
Allows the requesting system to request that copies of image instances available remotely be copied with the full information richness of a native acquired format in the requester's environment for further processing.



Server-Side Viewing

1.7.2 Use Central Hub Option for Server-Side Viewing
Allows the requesting system, with a simple web browser, to request that a centrally hosted viewer renders the images by accessing copies of the images from the source PACS/VNA.



1.7.3 Use Source Server Option for Server-Side Viewing
Allows the requesting system, with a simple web browser, to request that the server where the imaging study is stored renders the images in the simplest way based on a local integration with the source PACS/VNA.



1.8 Use WIA Facade Option
This WIA Facade option is used to access to the content of KDS Manifest of imaging studies per the IHE Profile WIA Use Case 4 design.



Query / Filtering

1.1 Use two level approach to query (filter) for Reports and/or Study Manifests:
Broad query using coarse-grained based value sets as query keys.
Refined query or user selection based on returned metadata attribute values from the broad query.



2 Adoption of MCWG Metadata / Linkage Recommendations

Imaging Report/Study Manifest Query and Selection

Level 1 Query

2.1 Use Anatomical Region/Body Part as broad query key (level 1)
(used as eventCodeList metadata attributes)
MCWG recommended SNOMED-CT code-granular Anatomical Region value set (10 values).



2.2 Use Study Level (Acquisition) Modality as broad query key (level 1)
(used as eventCodeList metadata attributes)



Level 2 Selection

2.5 Use Imaging Procedure Code - Display Name
For selecting among query responses before retrieving (level 2)
(used as eventCodeList metadata attributes)



2.6 Use pre-coordinated (including Laterality) Imaging Procedure Code values sets
(used as eventCodeList metadata attributes)



Targeted Query

2.8 Use Accession Number as targeted query key
(used as referencedList - urn:theIHE:2013:accession metadata attribute)

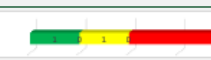


2.9 Use Study Instance UID as targeted query key
(used as referencedList - urn:theIHE:2016:studyinstanceUID metadata attribute)



Imaging Report/Study Manifest Linkage

2.14 Use referencedList attributes to exploit all relationships (m - n) between Order Placer Number(s), Accession Number(s) and Study Instance UID(s)
(used as referencedList - urn:theIHE:2013:order, urn:theIHE:2013:accession and urn:theIHE:2016:studyinstanceUID metadata attributes)



Imaging Report/Study Manifest Publication Strategy

2.17 Use one of the two publication strategies for the Imaging Study Manifest:
Case A: Validated Imaging Report used as trigger to publish the imaging manifest.
Case B: Imaging Manifest published before the Imaging Report is validated and published.



3 Adoption of DICOM KOS Imaging Manifest Recommendations

Imaging Study Manifest Type

1.4 Use a DICOM KOS based manifest [rather than a FHIR Imaging Study resource].



Publication Variant

3.2.1 Use Publication Variant A (When associated Imaging report is validated)



3.2.2 Use Publication Variant B (When Imaging Study acquisition is completed)



Patient Identification

3.4 Use the National (or Regional) Patient Identifier as the primary Patient ID
(0010,0020) attribute (with the corresponding issuer of Patient ID (0010,0021))
for the KOS object instance



KOS Attribute Extensions

3.5 Study Level Extension
Use the Modalities In Study (0008,0061) attribute [as a study level extension of the Current Requested Procedure Evidence Sequence (0040,A375)]



3.6.4 Series Level Extension
Use the Series Description (0008,103E) attribute [as a series level extension of the Current Requested Procedure Evidence Sequence (0040,A375)]



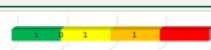
Locating Referenced Study

3.9.2 Use the Retrieve URL (0008,1190) attribute to define the WADO-RS retrieve URL that can be used to retrieve the instances of the series where the Retrieve URL is placed in the tree of references



Significant (Key) Image Identification

3.11 Use the IHE KIN Profile to identify the selection of significant images in the imaging study. The KIN will be included in the KOS Manifest as a referenced instance



Deployment Focus Group

On-going work

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Market Readiness & Deployment Tools

- Based on MCWG Recommendation assess readiness of RIS & PACS Products on the market
- Identify the critical tools necessary for deployment and focus on the role of an Imaging Gateway to adapt existing RIS/PACS.

Clinician Guide to using Metadata to search for imaging studies

- Develop a quick guide for clinician on the use of the MCWG Recommended Metadata (level 1 & level 2).

Significant Images Focus Group

On-going work

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Use Case and Challenges

A significant image in an imaging study is an image that has been identified as being relevant for a specific reason or purpose. More than one significant image within an imaging study may be identified for the same reason (code plus optional free text).

Why enhancements to the KOS Manifest to leverage IHE KIN Profile ?

Four challenges to leverage IHE KIN:

1. Need to explore the imaging study to retrieve all instances in series of modality KO and filter KOS/KIN.
2. To retrieve only the significant images, then the KOS/KIN needs to be retrieved to explore them.
3. Tedious to check the KOS/KIN(s) in order to flag on the display significant images of a retrieved series.
4. A baseline interoperability between creator and consumer has to be guaranteed when images are marked as being significant in a general sense.

NEXT STEPS AND TIMELINE

Standards and
Profiles Positioning

✓ Updated May 2024

Imaging Metadata
& Linkages

✓ Finalized Feb 2024

Imaging Study
Manifest

✓ Finalized Feb 2024

Tracking and
Adoption FG

In
progress

Deployment FG:
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In
progress

Significant Images FG

In progress

The Multi-Country Working Group on Imaging Information Sharing is well established and has delivered valuable refinements to the available standards and profiles for a consistent deployment across multiple countries.

These companion recommendations are compact and assemble significant technical, imaging expertise with more than 15 years of standards deployment experience.

... Possible Future Topics such as: DICOMweb with XCA-I, Image compression, URL Mgt, Security/Privacy, Imaging Report, Reformat Recommendations, etc.

CONCLUSION



IHE MCWG welcomes additional countries and looks forward to further collaborations with eHN groups and projects

*Questions, Comments and Suggestions are welcome
and should be sent to the IHE-Europe Secretariat: secretariat@IHE-Europe.net*

IHE MCWG keen to develop operational relationships across the world:

- **IHE and XpanDH EU Project on EHDS have signed an agreement to have MCWG operate as Community of Doers (CoD)**
- **Future Specifications for EHDS cross-border and national imaging information sharing specified in EU Joint Action (Health Ministries and eHealth Agencies in Europe) by a majority of MCWG representatives.**