

RADIOLOGY RESEARCH

DICOM & IHE : An Update On

- the DICOM Standard
- the IHE Radiology Framework

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The DICOM Standard <http://medical.nema.org/>

DICOM
Digital Imaging and Communications in Medicine

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Search by keyword

2009 International Conference and Seminar

<p>PLANNING & FOUNDATION</p> <ul style="list-style-type: none"> • Standards Development & Technical Liaison • Research and DICOM Standards Implementation • National Workforce • DICOM Research • NEMA Medical 	<p>PROCESS</p> <ul style="list-style-type: none"> • DICOM Products • Medical Devices • Medical Software • Interoperability • Standards • Patient Satisfaction 	<p>PRODUCTS</p> <ul style="list-style-type: none"> • DICOM Software • Standardized Clinical Protocols • Standardized Reporting • Standard IT • Standard Workflows
<p>Technical Assistance</p> <ul style="list-style-type: none"> • DICOM Resources • DICOM Consensus Group • Technical Support of the DICOM Group • Technical Liaison Director 	<p>Administrative Assistance</p> <ul style="list-style-type: none"> • Contact the Website • Contact the Director • Member's Handbook 	

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DICOM Parts

- PS 3.1 Introduction and Overview
- PS 3.2 Conformance
- PS 3.3 Information Object Definitions
- PS 3.4 Service Class Specifications
- PS 3.5 Data Structures and Encoding
- PS 3.6 Data Dictionary
- PS 3.7 Message Exchange
- PS 3.8 Network Communication Support for Message Exchange
- PS 3.10 Media Storage and File Format for Data Interchange
- PS 3.11 Media Storage Application Profiles
- PS 3.12 Media Formats and Physical Media for Data Interchange
- PS 3.14 Grayscale Standard Display Function
- PS 3.15 Security Profiles
- PS 3.16 Content Mapping Resource
- PS 3.17 Explanatory Information
- PS 3.18 Web Access to DICOM Persistent Objects (WADO)

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DICOM Review

DICOM

- Utilizes an open standards development process that encourages the involvement and consensus of both vendors and users
- Specification of a conformance mechanism so that a user can decide whether or not devices are likely to interoperate

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DICOM Review

- **DICOM Standards Committee (DSC)**
 - DICOM's executive body whose members are imaging equipment manufacturers, physician organizations, and others
 - 27 manufacturer members
 - 17 users (professional societies)
 - 10 others (JIRA, NCI, CDRH, ...)
- DICOM's activities are coordinated through a general secretariat at MITA
 - formerly NEMA

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DICOM Standards Committee (DSC)

- Development of DICOM Standard is done through committees termed "Working Groups" (WG)
 - AAPM Members can participate in any WG to develop the Standard
- WG propose work items based on suggestions from members or at the direction of the DSC

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DICOM WGs 1-6

WG #	Working Group Name	Relevance to Radiology
1	Cardiac and Vascular Information	Cardiovascular imaging, stress nuclear cardiology structured reporting
2	Projection Radiography and Angiography	Development of enhanced x-ray and angiography information objects
3	Nuclear Medicine	Nuclear medicine and PET
4	Compression	Application of data compression standards, such as JPEG 2000 and JPIP
5**	Exchange Media	Distribution of images on CD-ROMs, DVDs, and USB "flash" drives
6	Base Standard	detailed technical evaluation of proposed additions or changes to the DICOM standard

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DICOM WGs 7-12

WG#	Working Group Name	Relevance to Radiology
7	Radiotherapy	Radiation therapy, including ion therapy
8	Structured Reporting	Standardized vocabularies, encoding of structured reports, and integration with
9	Ophthalmology	Ophthalmological measurements
10	Strategic Advisory	Long-range planning, coordination of DICOM with other international standards organizations
11	Display Function Standard	Presentation and display of images on workstations, i.e., "hanging protocols."
12	Ultrasound	Ultrasound imaging, including echocardiography; 3D/4D images
13	Visible Light	Color Management in Endoscopy

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DICOM WGs 14-18		
WG#	Working Group Name	Relevance to Radiology
14**	Security	Secure information exchange
15**	Digital Mammography and CAD	Breast imaging: structured reporting of computed-aided detection and diagnosis (CAD) results for mammography and CT colonography
16	Magnetic Resonance	MRI
17**	3D	Volumetric (multiframe) imaging modalities, including CT, MR, and ultrasound
18	Clinical Trials and Education	Application of imaging to clinical trials and medical education

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** Not currently active

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DICOM WGs 19-26		
WG#	Working Group Name	Relevance to Radiology
19**	Dermatology Standards	Dermatology
20	Integration of Imaging and Information Systems	Coordination of DICOM with Health Level Seven (HL7) standard for messaging between health information systems
21	Computed Tomography	CT imaging and dosimetry reporting
22	Dentistry	Dentistry
23**	Application Hosting	Develop specifications for interfaces between hosted application software
24**	DICOM in Surgery	Image-guided surgery and other surgical data
25**	Veterinary Applications	Veterinary
26	Pathology	Pathology Applications
27	Web Technology	Web service extensions

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** Not currently active

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- DICOM "workflow"
- Work items are divided into Supplements and Change Orders
 - Supplements define new objects, content or structure
 - Change Orders modify the existing Standard
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- DICOM "workflow"
- Output of any work item is submitted to the Base Standards Working Group (WG6) for review throughout the process
 - WG6 may request changes or clarification to the work item to ensure it complies with Standard
 - Once the work item is complete WG6 petitions the DSC to approve work item and send out for public comment
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DICOM "workflow"

- After public comment and all issues listed in the comments are responded to, the DSC authorizes the work item for letter ballot by DICOM members
- Change proposals do not require the same rigorous review process and are often "batched" for public comment and letter ballot,
 - Some Change proposals can be instituted without comment or ballot if the change is required to reduce potential patient care issues or it is typographical or trivial in nature

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Changes to Standard

- Currently over 100 approved Supplements incorporated into Standard
 - Over 20 in progress or in comment stage
- Currently over 1000 Change Proposals incorporated into Standard
 - Ongoing process with changes being reviewed at every WG6 meeting

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Recent DICOM Enhancements that are important to Medical Physicists

- Clinical Trial De-identification Profiles,
- Surface Segmentation Storage SOP Class,
- CT Radiation Dose Reporting (Dose SR),
- Tomosynthesis Image Storage SOP Class,
- JPEG 2000 Transfer Syntaxes and Interactive Protocol
- Enhanced CT and MR Image Storage SOP Class.

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Questions?

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IHE <http://www.ihe.net/>

What's New in IHE?
 Contact Us for
 Contribution Proposals
 IHE Tools/Approach
 Informational
 IHE Technical Framework
 Support and other
 areas of public concern
 IHESS and IHE Blog
 Interoperability
 Informational
 to enhance and link to
 More news...

Learn More:

Developers of Healthcare IT Systems

- Process
- Profiles
- Technical Frameworks
- Data Models
- Communications
- Standards

Users of Healthcare IT Systems

- Process
- Profiles
- Integration Statements
- User Directories
- Transactions
- Interoperability, Showcase, Technical Tools

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IHE

IHE: Integrating the Healthcare Enterprise

- "IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information."
- "IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical need in support of optimal patient care."
- "Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively."

<http://www.ihe.net/>

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IHE Member Organizations

IHE: 447 Member Organizations

- 58 Healthcare Professional Associations
 AAPM, ASTRO, RSNA, SNM ...
- 298 Healthcare companies
- 16 Government Agencies
 CDC, NIST, VA ...
- 7 Standards Organizations
- 18 Healthcare provider organizations
- 31 Healthcare education & research orgs.

<http://www.ihe.net/>

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IHE Domains

IHE: Active Domains

- Anatomic Pathology
- Cardiology
- Eye Care
- IT Infrastructure
- Laboratory
- Patient Care Coordination
- Patient Care Devices
- Quality
- Radiation Oncology
- Radiology
 - Mammography
 - Nuclear Medicine

<http://wiki.ihe.net/>

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Recent IHE Profiles

IHE Profiles relevant to Medical Physics

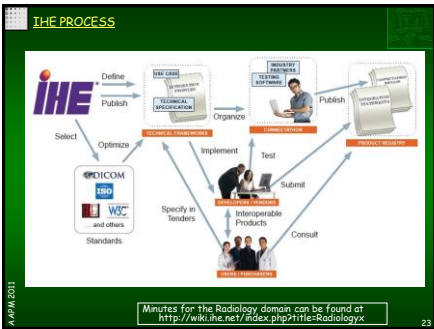
- [NTPL-S] Normal Treatment Planning-Simple
- [MMR-RO] Multimodality Registration, Rad. Onc.
- [TRWF] RT Treatment Workflow
- [PWF] Post-Processing Workflow
- [NM] Nuclear Medicine Image
- [FUS] Image Fusion (in Trial)
- [REM] Radiation Exposure Monitoring
- [MAMMO] Mammography Image
- [PDI] Portable Data for Imaging

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Recent IHE Enhancements that are important to Medical Physicists

- Radiation exposure monitoring (REM),
- Mammography acquisition workflow (MAWF),
- Extensions to the Portable Data for Imaging (PDI) integration profile,
- Basic Image Review Profile (BIR),
- MR Diffusion Imaging (MDI), and
- CT/MR Perfusion Imaging with Contrast (PIC).

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connectathon-results.ihe-europe.net

Result Matrix For integration_profile: "Radiation Exposure Monitoring"

	Image Manager	Acquisition Modality	Information Consumer	Information Reporter	Data Register
AGFA Healthcare					
American College of Radiology					
Asahi Inc					
Canon Corporation					
GE					
GE Healthcare					
GE Healthcare Online					
Hitachi Ltd					
IMPACT					
Infoc Health					
Integrus AG					
Integrus GmbH					
MedicaCommunications					
Philips Medical Systems					
Siemens AG					
SIEMENS Medical Solutions					
SOFTWARE MEDICAL					
Sony Medical AG					
TELELAB S.A.					
Varian Medical Systems					
VOIS Technology Transfer GmbH					

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DICOM Standards Committee

&

Integrating the Healthcare Enterprise (IHE) International
Memorandum of Understanding

Effective Date: May 15, 2009

- The DSC will become a member of IHE International and appoint a liaison representative. Likewise, IHE International will become a member of the DSC and appoint one voting representative
- Each organization must execute the other's Intellectual Property Agreement.

