DICOM Fields of Use

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This presentation provides a journey through the world of DICOM Information Object Definitions.

It’s not complete
It only touches the surface
It goes beyond DICOM
Well-known DICOM IODs

CR
Digital X-Ray

XA
Digital Angiography

CT
Computed Tomography

MR
Magnetic Resonance Tomography
Well-known DICOM IODs

US
Ultrasound

US
3D Ultrasound

NM
e.g., Single-photon Emission Computed Tomography

PET
Positron Emission Tomography
Presentation States
Annotations, shutters, overlays, regions of interest, flipping, rotation, zoom, windowing, device independent display.

Segmentation
Either provides a binary classification of pixels or a polygonal representation of a 3D surface, e.g., defining organs.

Registration
Rigid or deformable spatial relationship between images in one or more frame of references.
Encapsulated Document
Encapsulates, e.g., PDF documents.

Structured Report
Representation of reports with a hierarchical structure containing text, measurements and references.

Key Object Selection Document
Flags or relates one or more (significant) images, waveforms or other composite IODs.
Mammography

MG
Digital Mammography X-Ray

Breast Tomosynthesis
High-resolution limited-angle tomography at mammographic dose levels.

Mammography CAD SR
Used to convey mammography detection and analysis results, e.g., textual information, coded information, measurements, regions of interest and references to other IODs.
Intravascular Ultrasound (IVUS)

A catheter-based imaging modality with a miniaturized ultrasound probe. It allows images from inside blood vessels out through the surrounding blood column, visualizing the endothelium (inner wall) of blood vessels in living individuals.
Intravascular Optical Coherence Tomography (IVOCT)

A high resolution catheter-based imaging modality upon low coherence interferometry to visualize coronary artery lesions.
Radiotherapy

**RT Dose**
Dose distributions and dose volume histograms calculated by radiotherapy treatment planning systems.

**RT Structure Set**
Structures derived from CT or MR images defining organs and target volumes.

**RT Plan**
Treatment plan
Visible Light Images

VL
The Visible Light IODs specify images that are acquired by means of a camera or other sensors for visible or near-visible light.

Equipment Examples
Rigid and flexible endoscopy equipment
Operation microscopes / colposcopes
Analysis microscopes
Ophthalmology equipment
Digital or Video Cameras
Endoscopy
VL Endoscopic Image
Video Endoscopic Image
Pathology

VL Microscopic Image
VL Slide-Coordinates Microscopic Image
VL Whole Slide Microscopy
Video Microscopic Image
Visible Light Images

Dermatology
VL Photographic Image
Video Photographic Image
Ophthalmic Photography

Ophthalmic Tomography

Ophthalmic Refractive Measurements

Lensometry Measurements
Autorefraction Measurements
Visual Acuity Measurements
Ophthalmic Axial Measurements
Intraocular Lens Calculations
Dental Images

Digital Intra-oral X-ray

X-Ray 3D Angiography
Waveforms

Audio

Basic Voice Audio
General Voice Audio
Waveforms

Cardiac
12-Lead Electrocardiogram (ECG)
General ECG
Ambulatory ECG
Hemodynamic
Basic Cardiac Electrophysiology
Arterial Pulse Waveform
Respiratory Waveform
Implant Templates

Generic Implant Template
Implant Assembly Template
Implant Template Group

Implantation Plan SR Document
Veterinary IODs require additional identifying attributes to define the owner as well as characteristics of the species and breed.
Digital Imaging and Communication in Nondestructive Evaluation

A standard by ASTM International:
E2339  General DICONDE Standard
E2663  DICONDE for Ultrasonic Test Methods
E2699  DICONDE for Digital Radiographic (DR) Test Methods
E2738  DICONDE for Computed Radiography (CR) Test Methods
E2767  DICONDE for X-ray Computed Tomography (CT) Test Methods
DICOM Fields of Use

- **Study**: Component ID, Component Name, Study ID, Serial #, ...
- **Series**: Typically based on date/time stamp, Series Description, ...
- **Instance**: Image or Data

Example:

**Study**
- **MyPart123**, Casting, 20080403, 123-ABC
  - **Series**
    - 20080112, Ser1
      - **Instance**
        - Tech1, Side, 90 kV, 3 mA, 5 sec
      - **Instance**
        - Tech2, Top, 80 kV, 4 mA, 5 sec
  - **Series**
    - 20080403, Ser2
      - **Instance**
        - Tech1, Side, 90 kV, 3 mA, 5 sec
      - **Instance**
        - Tech2, Top, 80 kV, 4 mA, 5 sec
Digital Imaging and Communications in Security

Facilitates data information interchange (demographic information, x-ray radiographs, CT images, material specific information, trace detection signatures, threat assessment, ...) of objects of inspection (checked luggage, carry-on luggage, parcels, personnel, ...) for security screening applications.
References

http://dicom.nema.org/

http://www.astm.org/


http://www.nema.org/
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Thank you for your attention !