

THE DICOM 2013 INTERNATIONAL CONFERENCE & SEMINAR

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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



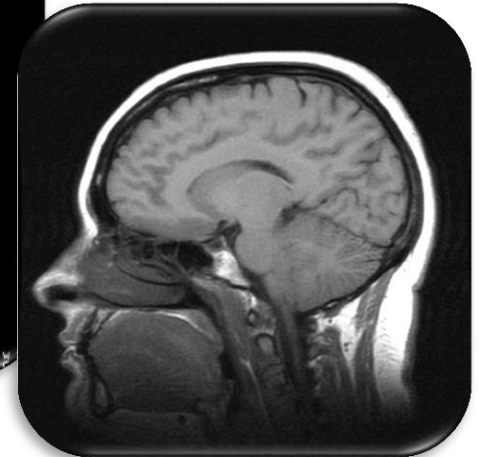
XA

Digital
Angiography



CT

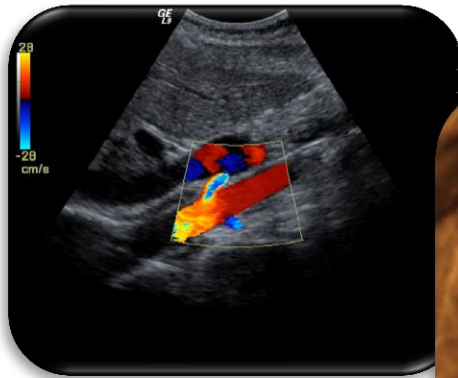
Computed
Tomography



MR

Magnetic
Resonance
Tomography

Well-known DICOM IODs



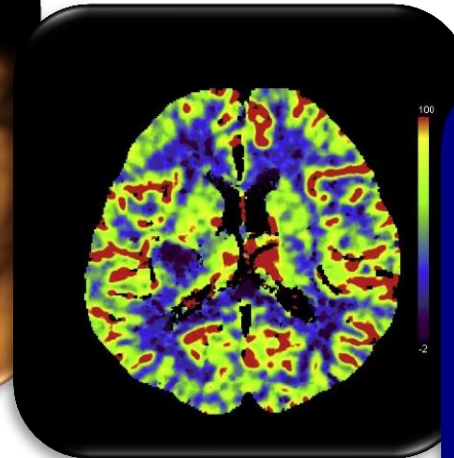
US

Ultrasound



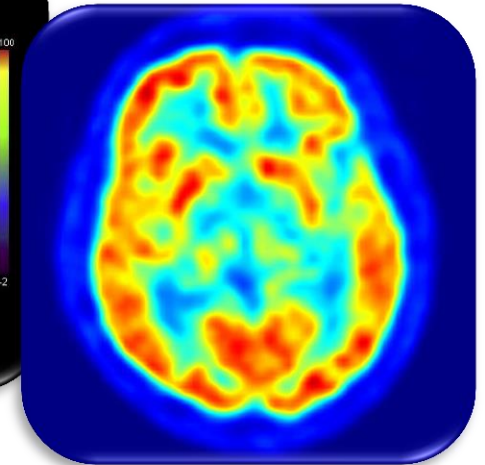
US

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

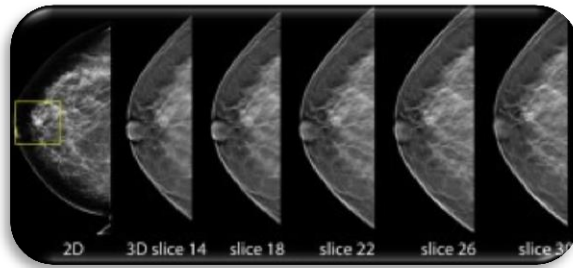
Encapsulates, e.g., PDF documents.

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.

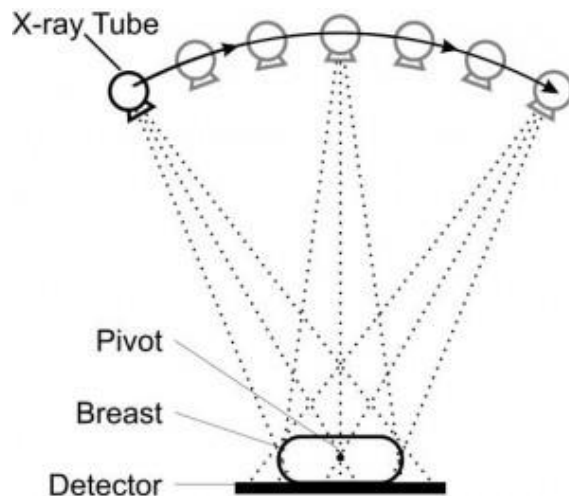


MG

Digital Mammography X-Ray

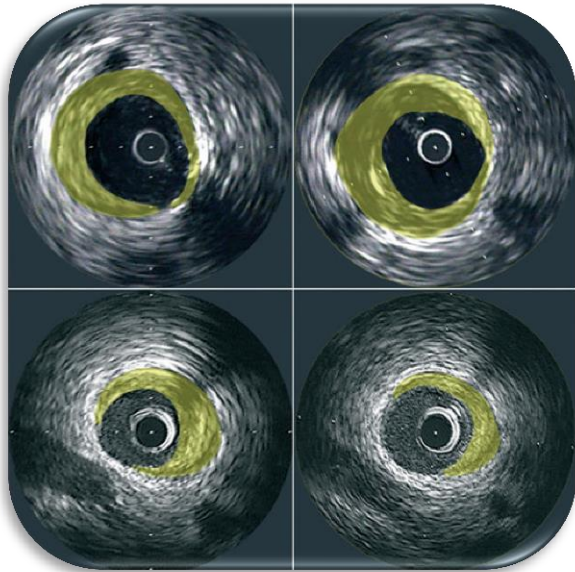
Breast Tomosynthesis

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



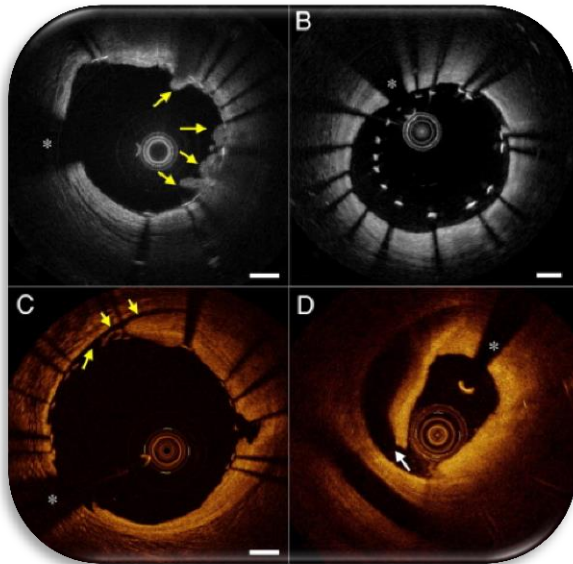
Mammography CAD SR

Used to convey mammography detection and analysis results, e.g., textual information, coded information, measurements, regions of interest and references to other IODs.



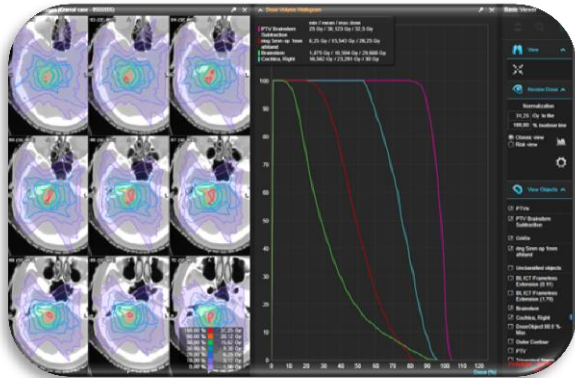
Intravascular Ultrasound (IVUS)

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.



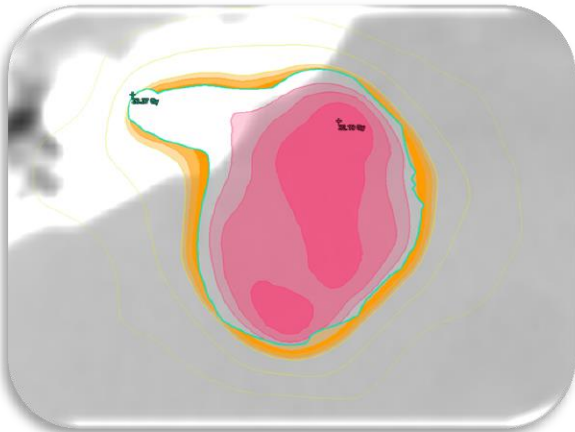
Intravascular Optical Coherence Tomography (IVOCT)

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



RT Dose

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

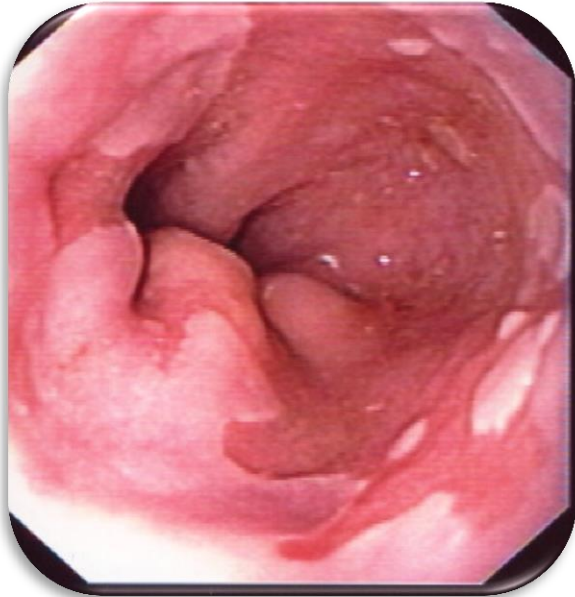


RT Structure Set

Structures derived from CT or MR images defining organs and target volumes.

RT Plan

Treatment plan



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

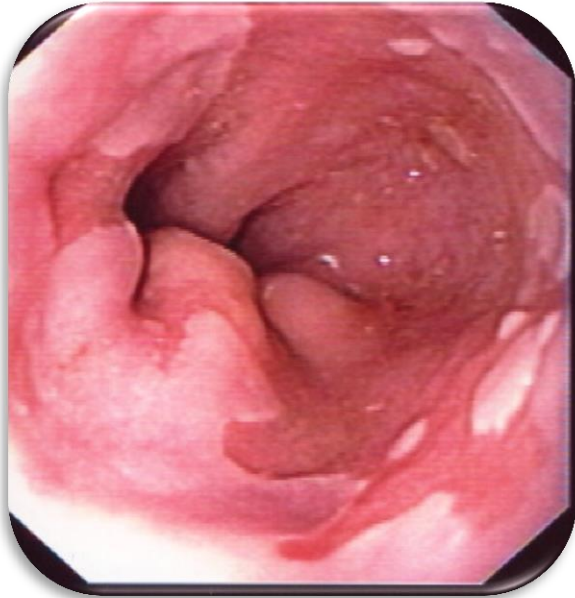
Rigid and flexible endoscopy equipment

Operation microscopes / colposcopes

Analysis microscopes

Ophthalmology equipment

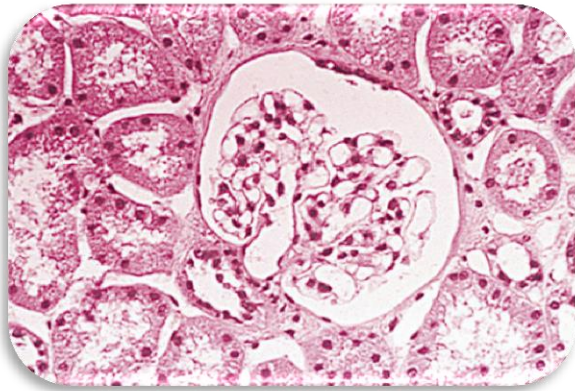
Digital or Video Cameras



Endoscopy

VL Endoscopic Image

Video Endoscopic Image



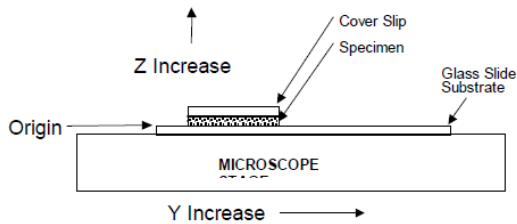
Pathology

VL Microscopic Image

VL Slide-Coordinates Microscopic Image

VL Whole Slide Microscopy

Video Microscopic Image

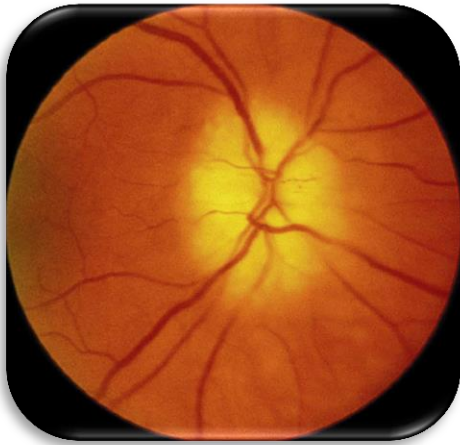




Dermatology

VL Photographic Image

Video Photographic Image



Ophthalmic Photography

Ophthalmic Tomography

Ophthalmic Refractive Measurements

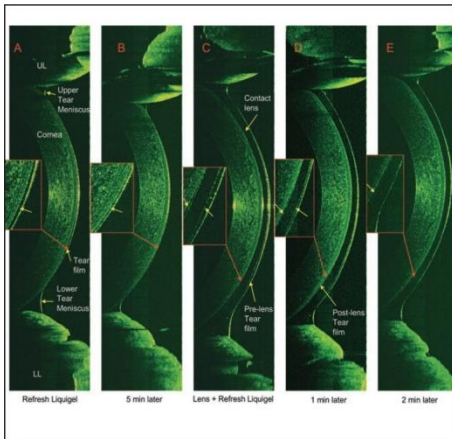
Lensometry Measurements

Autorefraction Measurements

Visual Acuity Measurements

Ophthalmic Axial Measurements

Intraocular Lens Calculations





Digital Intra-oral X-ray



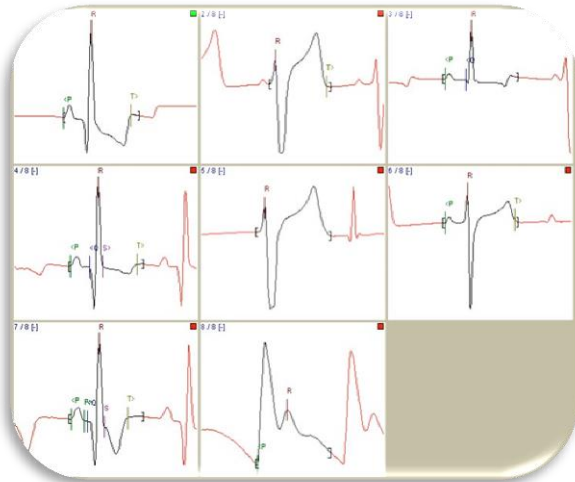
X-Ray 3D Angiography



Audio

Basic Voice Audio

General Voice Audio



Cardiac

12-Lead Electrocardiogram (ECG)

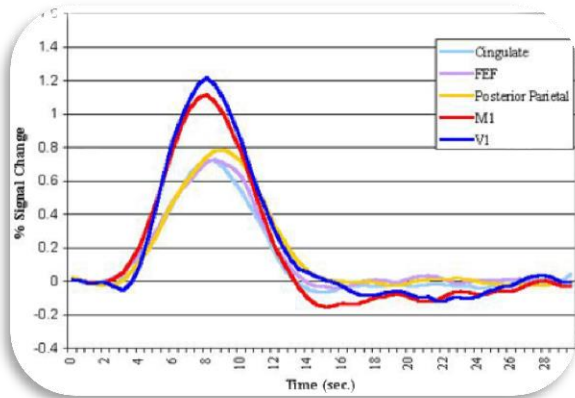
General ECG

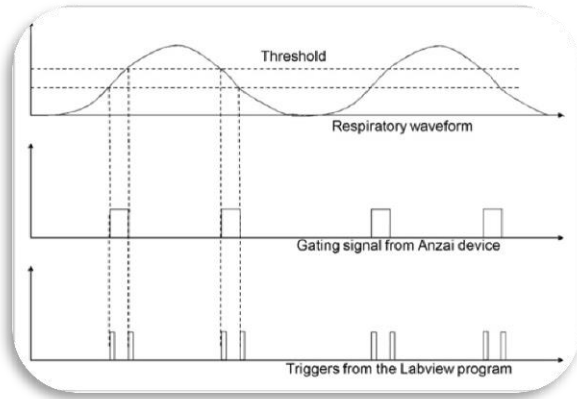
Ambulatory ECG

Hemodynamic

Basic Cardiac Electrophysiology

Arterial Pulse Waveform





Respiratory Waveform



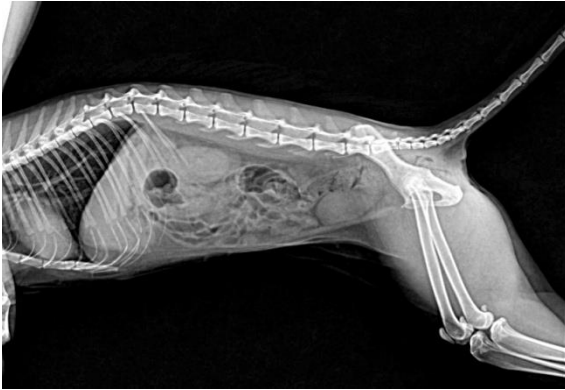
Implant Templates

Generic Implant Template

Implant Assembly Template

Implant Template Group

Implantation Plan SR Document



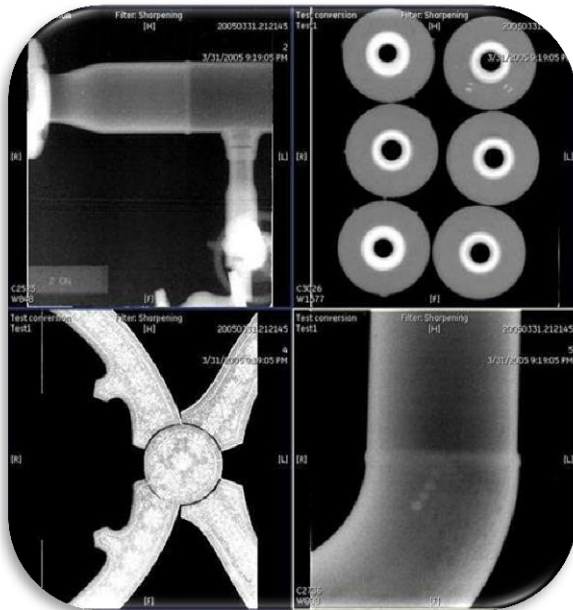
CP-643

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



Study Component ID, Component Name, Study ID, Serial #, ...

↳ **Series** Typically based on date/time stamp,
Series Description, ...

↳ **Instance** Image or Data

Study MyPart123, Casting, 20080403, 123-ABC

↳ **Series** 20080112, Ser1

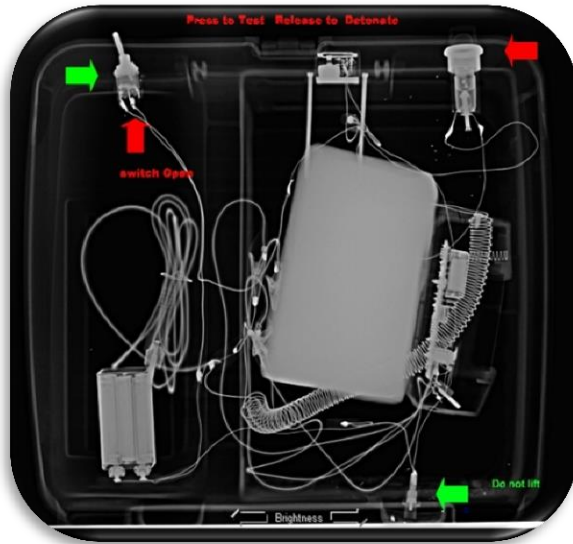
↳ **Instance** Tech1, Side, 90 kV, 3 mA, 5 sec

↳ **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.ndt.net/article/wcndt2008/papers/460.pdf>



<http://www.nema.org/>

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Thank you for your attention !