PACS and its purpose:

Medical imaging technology used in healthcare to store and digitally transmit electronic images and CR (Clinically relevant) reports. PACS eliminates the need to manually file and store, retrieve and send sensitive information, films and reports. This minimizes a patient's information from being misfiled that can result in misdiagnosis or worse. Therefore, by using PACS software, workstations and mobile devices, images and information can be accessed anywhere. PACS was built for radiologists because they were trying to report from tech Workstations, and the patient throughput was slow, this created the need for a system that was dedicated to them. PACS gives the user the ability to generate a list of patient names and exams. The list is available at two points in the examination process. The first is prior to the examination when a technologist chooses the correct patient name and exam type to attach the data to the digital image (This creates a work order for the patient and the patient is also billed in the process). The second, at the PACS workstations, allows the user to review the images. A database of this type also features the ability to ask, or query, for the specific status of a patient's examination record. Technologists can retrieve images from computer storage.

What PACS should do?

Verify the digital image data and the patient's ID as a checkpoint before storing the image file. RIS generates the patient ID's and shares the same network resources as the PACS. When an examination is ordered, the patient ID's are provided to the equipment, the site of image capture, the PACS and worklist server.

Why use PACS?

PACS integrates Patient information, modalities, storage and display monitors all through a connect computer network allowing for easy communication between nodes/data.

PACS and its responsibilities?

· PACS determines how images will be produced (What modality needs to be used)
· PACS determines how images are analyzed (What is shown on the display monitors)
· PACS determines how images are distributed (Computer communications)

·   PACS determines how images are Stored (Stored in electronic format)

Main parts of PACS:

1.   Image acquisition (*learning/reading images)
2.   Display Workstation (Output to display monitors)
3.   Archive Servers (Storing a patient's information)

Other Important Stuff:

·   PACS has a communication/networking infrastructure
·   File and Image management
·   Image Analysis

How does communication work in PACS?

Components talk to one another via Computer Networks, Two or more objects that share data, resources, information with one another. (Examples of this is a computer and a server both talk to one another through a network based interface)

How is the Network established? (Key Components)
Fiber optic cables provide the backbone for the network and provide fast speeds to transmit data at long distances. Bridge, which connects two different networks used to segment a larger network into smaller pieces (this increase efficiency of the network). Controls where information is sent.
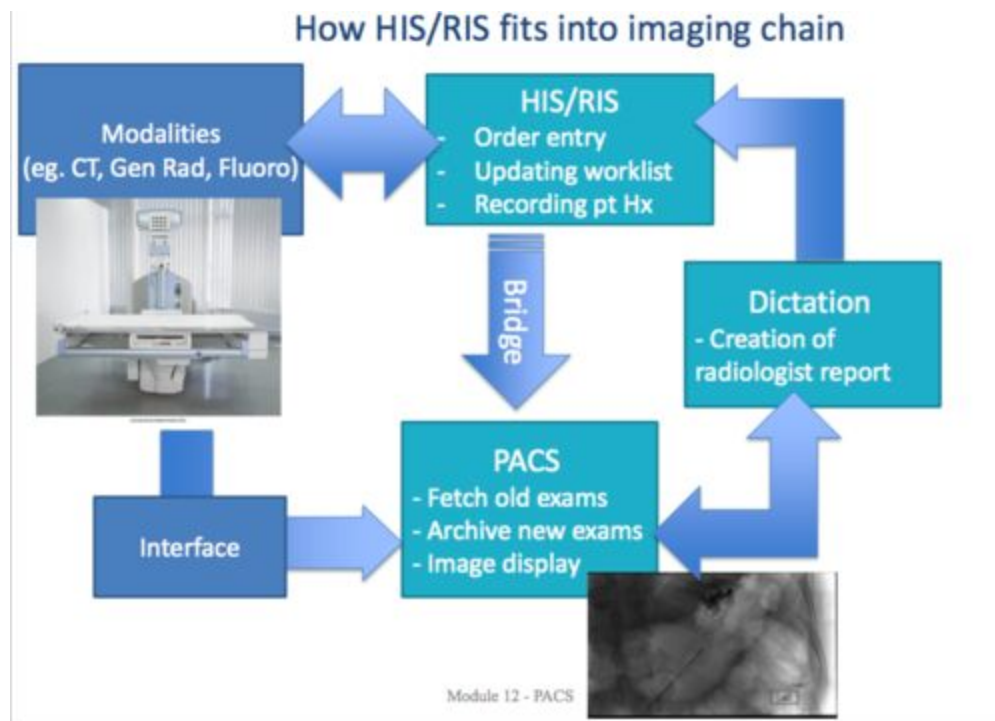
Useful to know when setting up a PACS?
IT knowledge on network types are important.

PACS is Web based:

Information an application held centrally, there is no special software needed to access the data. Allow users to access the data remotely. Pros of using web based; Client computers need to be able to support web browsers. Disadvantage, the speed of the network is limited to bandwidth of the network.

RIS

Radiology information System, holds radiology specific text data. This system is use to Select a patient from the worklist that is automatically updated which appears on the modality monitor. Patient tracking and fetching previous patient images from PACS. RIS is also used for Creating radiologist reports, transcriptions, communicating with PACS to find images and film archiving. Each component talks to one another through Digital imaging and communication in medicine (DICOM) and Health Level-7 (HL7).

Key processes of RIS to point out:

- Allows staff to make appointments for patients
- Patient Tracking
- Report results
- Billing

DICOM and its impact: (Address the communication of images)

Used to manage medical images and data, provides easier access for doctors to images and reports. Not all medical images follow the DICOM format. Image is from a medical scan from a CT scan,MRI or ultrasound.
· 	Image storage/retrieval
· 	Printing
· 	Generate worklist

· Standardized patient information in the image header to include their personal information along with the name of the doctor (RP)

· Transfer reports to one another

· Service class provider (SCP) Provides a service [Patient]

· Service class user (SCU) User of the service [Technician]

Revisiting HL7 (Address textual data)

· Common Language between RIS/HIS

· Sets the format for textual data

· Order entry

· Generated message when a patient is admitted *This is more for HIS

Effects used in PACS:

- Adding annotations to images

- Magnify

- Change images orientation

- Update demographics

  Image Server (The Bridge between PACS and HIS /RIS)

- Knows what to archive

- Houses patients information such has DOB, docs name, ID, etc. (Allows for easy finding of an image)

- Does NOT store the image data

PACS administrator: (Another Actor that <u>may</u> need to be added into the Use Case)

● Usually an IT personnel

● System maintenance

● Image and Information management

● Project management

DICOM Plug-Ins

http://people.cas.sc.edu/rorden/dicom/index.html#intro- Contains DICOM servers, readers, and toolkits

Radiology Department Procedures (taken from Emory as an example)

- Breast & Women's Imaging
- Cardiac Imaging
- CT (computed tomography)
- Interventional Neuroradiology
- MRI (magnetic resonance imaging)
- Nuclear Medicine & Molecular Imaging
- PET (positron-emission tomography)
- Ultrasound
- X-ray

Imaging and radiology

Radiology is a branch of medicine that uses imaging technology to diagnose and treat disease. Radiology may be divided into two different areas, diagnostic radiology and interventional radiology. Doctors who specialize in radiology are called radiologists.

Two types of radiology: Diagnostic and Interventional

- The above radiology processes are examples of diagnostic radiology

Definitions/words to know:
*To be added as they come along majority of the vocab that was used has been defined.