



# Virtual Learning

# Medical Interventions

April 8, 2020



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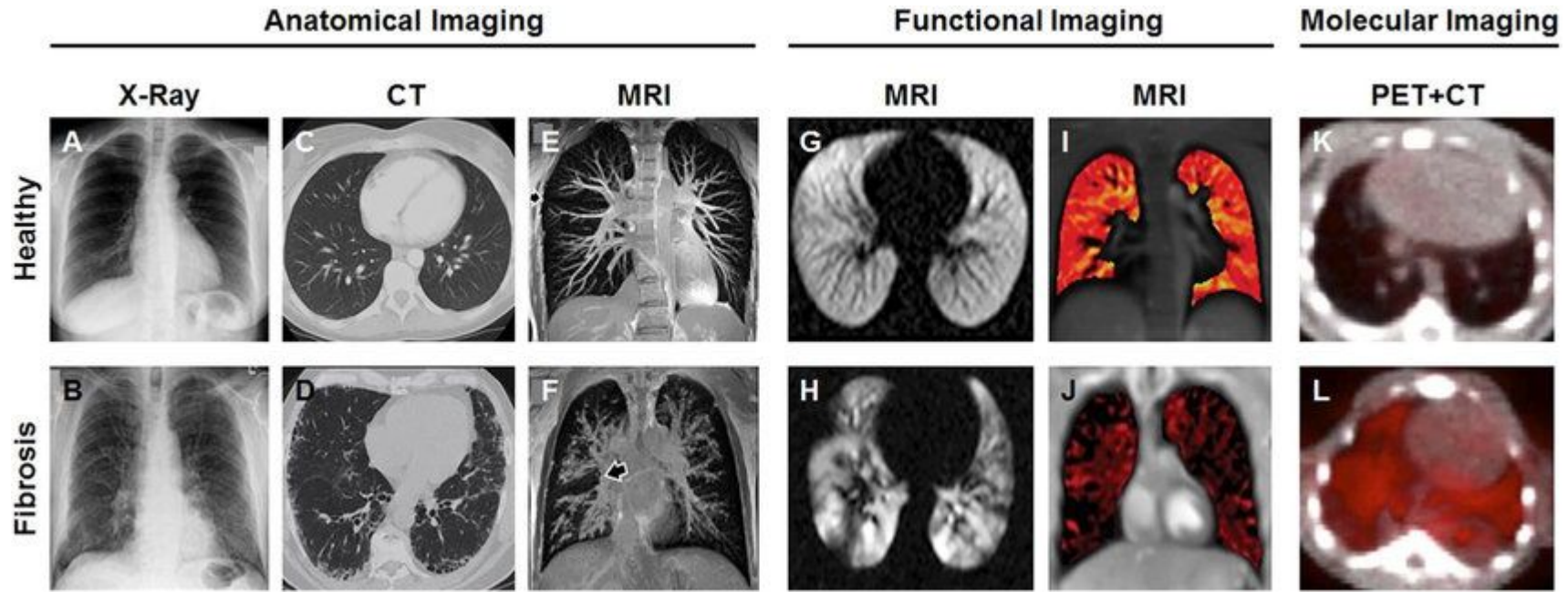
## Lesson: April 8, 2020

### **Objective/Learning Target:**

Describe the different uses for X-rays, CT scans, and MRIs as well as how each technology works. (3.1.2)

# Let's Get Started

1. The image below shows several diagnostic imaging techniques for lung fibrosis. What do you notice about the differences between each test?



**Answer:** Each test has different uses/advantages.

### Comparing medical imaging technologies

Type of technology



CT scan



Magnetic resonance imaging (MRI)



Ultrasound



X-ray

<b>Advantages</b>	Fast, detailed images in three dimensions.	Can be more detailed than CT and uses no radiation.	Cheaper than CT and uses no radiation.	Fast and cheap, with a relatively low radiation dose.
<b>Dis-advantages</b>	Requires the most radiation. A chest CT is equivalent to about 100 chest X-rays.	More expensive than CT. Requires patients to remain still for a half hour or more.	Lower image quality than CT, with effectiveness largely dependent on technician skill.	Provides only a 2-D image, with far less detail than other methods.
<b>Common uses</b>	Detecting solid tumors and other problems in the abdomen and chest.	Detecting brain abnormalities and diagnosing soft-tissue injuries.	Fetal ultrasound and diagnosing appendicitis in children.	Diagnosing broken bones, pneumonia and intestinal blockages.

Sources: Howstuffworks.com, New England Journal of Medicine, IMV Medical Information Division, Medical Imaging & Technology Alliance, Times reporting

PAUL DUGINSKI *Los Angeles Times*

2. Copy the uses of each in your notebooks or on a sheet of paper.

# Activity

For each of the 3 major types of diagnostic imaging tests (X-Ray, CT scan, MRI), describe the procedure for each diagnostic imaging test and how it works by using the website below and writing down your answers in your notebooks or on a sheet of paper:

- <https://www.rasmussen.edu/degrees/health-sciences/blog/types-of-diagnostic-imaging/>

# Activity - Answers

## 1. X-ray

- a. involve targeting a small amount of radiation toward the body where images are needed. To do this, the radiologic technologist needs to make sure the patient is not wearing jewelry or tight-fitting clothes that could impair the quality of the images. Then getting the patient in the correct position is necessary.

## 2. CT scan

- a. allow doctors to see cross-sections of the body which produce more detailed images than a conventional X-ray; often ordered when something suspicious appears on an X-ray. scanner is a large donut-shaped machine, in which the patient travels through the center as the scanner takes images. For certain tests, the patient may drink an oral contrast dye or receive an injection of contrast dye, which helps show what's happening inside the body.

## 3. MRI

- a. MRIs work well for imaging soft tissues such as organs and tendons and use radio waves with magnetic fields. Patients lay on a table that travels through a tube so that the area of the body being examined is placed over the magnet.

# Practice

For each of the following scenarios, which diagnostic imaging test should be used?

1. A patient with a fractured skull and possible brain damage
2. A patient complaining of pain in a tooth.
3. A patient needing to monitor the actions of the small intestine
4. A patient who has had a heart attack but has a pacemaker implant.
5. A patient needing to know the extent of a torn ligament in the knee

# Practice - Answers

1. MRI
2. X-Ray
3. CT scan
4. CT scan
5. MRI



# Additional Practice/Resources

Check your understanding by reviewing these [flashcards](#) to review the differences between each of these diagnostic imaging tests.

Curious about how these apply to Children's Mercy Hospital here in KC? Check out this link for how they are using these technologies and more:

<https://www.childrensmercy.org/departments-and-clinics/medical-imaging/>