MRI/CT of the brain

- MRI is generally the most sensitive study for imaging intracranial processes, excluding fresh blood (e.g. acute subdural hematoma).
- MRI is the study of choice for imaging multiple sclerosis plaques.
- Adults with migraines generally do not require routine neuroimaging unless they develop focal findings or a significant change in the pattern of the headaches, not explained by medication failure.
- Neuroimaging is never indicated prior to completing an in-depth neurologic physical exam.
- CT and MRI of the brain are rarely, if ever, indicated in the outpatient evaluation of syncope without seizure activity and only after full cardiovascular and metabolic workups have proved negative.

MRI of the spine

- A 4-6 week course of conservative management is appropriate prior to imaging most cases of neck or back pain.
- MRI is generally the most sensitive study for imaging the spine in patients' radicular symptoms.
- Low back pain symptoms resolve spontaneously in 90% of sufferers within two months, regardless of treatment.
- When therapy fails or a serious underlying condition is suspected referral to a specialist prior to imaging may be indicated.
- CT and MRI of the spine have a high false positive rate and should be reserved for patients with persistent neurologic findings despite conservative therapy who are potential surgical candidates.
- Spine imaging is indicated only when the results of such studies are likely to result in a change in patient management.

CT and US of abdomen & pelvis

- Ultrasound is exquisitely sensitive in evaluating the right upper quadrant of the abdomen, particularly when looking for disease of the gallbladder, liver or pancreatic head.
- It is appropriate to order combined CT abdomen and pelvis only when the disease to be imaged is likely to span both anatomical areas.
- Most colon cancer is intraluminal, with subtle findings on CT. Barium enema and/or endoscopy are more appropriate first steps when colon cancer is suspected and endoscopy also allows for diagnostic biopsy.
- Ultrasound of the pelvis is superior to CT scanning in evaluating the uterus and adnexa, especially given the availability of endovaginal techniques.
- CT scanning of the abdomen and pelvis exposes patients to significant amounts of radiation and should never be ordered unless the results are likely to impact patient management.
- Advances in ultrasound technology have significantly improved its sensitivity in identifying diseases of the pancreas.
- Most obese patients can be adequately imaged using ultrasound technology.
- CT scanning is rarely indicated in the initial workup of asymptomatic elevations in liver function tests in patients with no history of malignancy, prior to repeat testing (off alcohol and hepatotoxic medications) and checking ferritin levels and viral serologies (e.g. hepatitis, EBV).

CT scanning of the sinuses

Indicated to evaluate sinusitis under the following circumstances:

- Recurrent or chronic sinus disease when surgery is being considered because patient failed to respond to intensive medical treatment
- Complicated rhinosinusitis with signs of extension beyond the bony sinus
- Bony changes of chronic inflammation from osteitis
- Recurrent or persistent mucoceles
- Large polyps on physical exam
- Sinus tumors/malignancy.
- Neck CT
- Ultrasound is the preferred technique to detect enlarged parathyroid glands located near the thyroid gland. Radionucleotide subtraction imaging may also be used to evaluate potential parathyroid adenomas.
- CT scan is not the initial study of choice to evaluate thyroid nodules.
- CT and MRI usually cannot distinguish between benign and malignant neck masses. Definitive diagnosis generally requires microscopic analysis of tissue obtained during biopsy, although CT or MRI may help outline the extent of disease.
- MRI is superior to CT scanning evaluating and staging most head and neck malignancies due to its sensitivity in imaging mucosal surfaces.

Chest CT

In screening situations. In the face of a normal chest x-ray and no compelling history such as a positive sputum cytology or hemoptysis, there is no evidence that CT has any advantage over standard chest x-ray. There is no evidence that the examination would be worth the radiation exposure or cost. The question as to efficacy in lung cancer screening for high-risk smokers' etc. is under extensive study with no conclusions to date.

Indications:

- Persistent infiltrate/ pneumonia despite 4-6 wks antibiotic therapy
- Coin lesion mass or other suggestive abnormality on chest x-ray
- Mediastinal widening or hilar mass
- Suspected or known asbestosis / pleural-based lesions
- Periodic follow-up known malignancy / metastasis
- To accompany lung biopsy
- Possible aortic dissection or traumatic aortic injury
- Pre- or post operative evaluation
- Pulmonary fibrosis or pneumoconiosis
- Sputum cytology positive for malignancy
- Coughing up blood / hemoptysis
- Known interstitial fibrosis or emphysema
- Suspected pulmonary embolus

MRI of joints

A 4-6 week course of conservative management is appropriate prior to imaging most cases of shoulder, elbow, wrist, hip, ankle or knee pain.

- Most shoulder pain is secondary to rotator cuff tendonitis or an impingement syndrome and will resolve with conservative management that may include nsaids and physical therapy.
- Medical and lateral epicondylitis are high on the differential for elbow pain, these can be diagnosed clinically and generally resolve following conservative management.
- Plain film is the study of choice to look for osteoarthritis.
- MRI is the imaging procedure of choice in evaluating ligamentous injury, locking or and joint instability.
- MRI may detect early changes of aseptic necrosis even though plain film and bone scan are normal.
- When therapy fails or a serious underlying condition is suspected referral to a specialist prior to imaging may be indicated.

Nuclear Cardiology

Nuclear cardiology studies are not indicated in patients with a low pretest probability of cardiac disease and are more likely to lead to false positive findings in such patients with the subsequent risks of invasive procedures such as angiography.

Typical indications:

- Stress echocardiogram contraindicated due to cardiac rhythm disturbance
- Chest pain with known cad* or past history of mi
- (*cad on prior catheterization, past cabg/angioplasty)
- Symptoms of ischemia / angina with a past history of heart attack, ischemia / infarction on EKG or new onset heart failure
- Classic angina symptoms and a normal stress EKG
- Evaluation prior to chemotherapy (usually a MUGA scan)
- Risk factors for cad despite normal screening studies for ischemia