TESTS AND PROCEDURES FOR ADULT MEDICINE
Step-by-Step: How Imaging Works

What to expect on your journey through the diagnostic imaging process.

GETTING STARTED

- You and your doctor need information to plan your care.
- Your doctor schedules an exam at one of our convenient locations.
- For safety, you may need a blood test if your exam will use contrast—a drink or injection that makes the image more vivid.
- A member of our expert staff reviews your case and carefully selects a protocol—a combination of equipment settings and exam steps—to ensure we capture the best possible images.

EXAM DAY

- You may need to refrain from eating or drinking before your appointment.
- Upon your arrival, we double-check safety information and review the exam with you.
- You receive contrast (if needed).
- Your technologist, the trained professional performing your exam, remains nearby and in communication throughout.
- We capture and store diagnostic-quality images in an electronic library.

YOUR RESULTS

- A radiologist examines the images.
- At Mass General Imaging, this radiologist is always a specialist—an expert in a particular area of the body or type of scan.
- The radiologist dictates a report including a diagnosis and recommendations.
- Your doctor receives the report and may also view your images.
- The information discovered through imaging helps your doctor plan the next steps in your care.

www.massgeneralimaging.org/howimagingworks
Welcome to Massachusetts General Hospital Imaging

Dedicated to delivering the clearest picture of your health.

- Eight community locations around Greater Boston
- Over 100 board-certified radiologists, each dedicated to an imaging subspecialty
- More than 600,000 imaging scans reviewed annually
- A full range of diagnostic imaging services and interventional procedures

When you come to Mass General Imaging you'll get expert diagnosis—and clarity on the right course of care.

THE SPECIALIST ADVANTAGE

Mass General Imaging’s radiologists all specialize in a certain part of the body or condition. A specialist is capable of seeing and understanding subtle things due to advanced training and singular focus. In addition to the training that all radiologists receive, a specialist has additional education, as well as extensive real-world experience in interpreting images for a particular body area or system.
MRI (MAGNETIC RESONANCE IMAGING)

Fundamentals:

• An MRI machine produces a strong magnetic field and radio waves. The atoms in your body respond to this energy in a certain way. The MRI detects this response and uses it to construct detailed images.

• MRI does not use X-ray radiation.

• MRI excels at imaging soft tissue; it is used to look at internal organs, the brain and spinal cord, and breasts, for example.

Specialty expertise:

• All of our MRI machines are state-of-the-art, and we offer the latest technologies, such as high-resolution 3T (Tesla) scanners.

• We use protocols—equipment settings plus exam steps—tailored to capture high-quality images for each case.

• Every scan is interpreted by a radiologist who specializes in MRI and the specific area of the body for your study.
What to expect:

• Exams typically take 45 minutes.

• Many exams involve contrast—an injection that makes the images more vivid and informative.

• If you are over 60 or have kidney disease, diabetes, lupus or multiple myeloma, a blood test before your exam is necessary to make sure the contrast is safe for you.

• Because of the strong magnet, we need to make absolutely sure you don’t have any metal objects with you. We also need to know about any implants in your body.

• The technologist performing your exam will be nearby and able to talk to you throughout the scan.

• MRI exams require that you lie still in a confined space. Most people have no problem, but talk to your doctor if you are concerned. Your doctor may prescribe a sedative (we cannot provide such medication).

More information:
www.massgeneralimaging.org/mri
CT (COMPUTED TOMOGRAPHY)

Fundamentals:

• A CT scanner rotates to take X-ray images from different angles all around your body. A computer puts these images together to form detailed, two-dimensional pictures.

• CT provides clearer, more detailed pictures than traditional X-rays.

• CT serves a wide range of purposes, and is especially effective at imaging the chest, abdomen and pelvis.

Specialty expertise:

• We pay special attention to minimizing radiation exposure—while still obtaining the highest quality images.

• We use the latest technology, including 64-slice and 128-slice CT scanners.

• A radiologist with special training in CT and the specific area of the body for your study will interpret your exam.

What to expect:

• Exams typically take 15 minutes in total; the actual scanning takes just minutes.

• Many exams involve contrast—a drink or injection that makes the images more vivid and informative.

• If you are over 60 or have kidney disease, diabetes, lupus or multiple myeloma, you’ll need a blood test beforehand to make sure the contrast will be safe for you.
• The technologist performing your exam will be nearby and able to talk to you throughout the scan.
• CT exams require that you lie still in a confined space. But because the scanning time is so short, most people tolerate the experience well.

More information:
www.massgeneralimaging.org/ct

CT COLONOGRAPHY

An alternative to traditional optical colonoscopy, CT colonography is a special kind of CT exam that produces a 3D view of the colon in order to detect polyps and colorectal cancer. CT colonography is faster and less invasive than colonoscopy, requires less fasting beforehand, and does not require sedation. The American Cancer Society has endorsed CT Colonography as a screening test for colorectal cancer.
SCREENING & DIAGNOSTIC MAMMOGRAPHY

Fundamentals:

• Mammography is a special type of X-ray that is tuned to detect breast abnormalities.

• Mammography is performed both as a screening test (recommended annually for women over 40, and earlier in certain cases) and as a diagnostic test (when a closer look is needed or a specific clinical issue exists).

Specialty expertise:

• All mammography at Mass General Imaging is 100% digital, which translates to better detection of abnormalities in women with dense breast tissue.

• Your exam will be read by a specialty-trained breast radiologist.

What to expect:

• A screening mammogram takes about 15 minutes. A diagnostic exam will take longer and may include using ultrasound to get another view (see ultrasound section).

• Please do not use deodorants, antiperspirants, powders or ointments; they can show up and cause confusion in the images.

• The trained professional performing your exam, called a mammographer, will work with you to properly position and compress your breasts, which is crucial for obtaining high-quality images.
• The mammographer will check the images immediately for quality.
• For a screening mammogram, the results will be sent to you and your doctor.
• For a diagnostic mammogram, your results will be communicated to you following the exam, and, if needed, a multidisciplinary team will coordinate the next steps in your care.

More information:
www.massgeneralimaging.org/mammography

BREAST MRI

Breast MRI is complementary to mammography. It is recommended as a screening test for women who have specific risk factors for breast cancer. This includes, for example, women who have a specific genetic mutation or who have a first-degree relative with breast cancer. Breast MRI is also used to evaluate women with newly diagnosed breast cancer. At Mass General Imaging, every breast MRI is interpreted by a specialty-trained breast radiologist.
ULTRASOUND

Fundamentals:
- Ultrasound uses high-frequency sound waves to create images of internal body structures without X-ray radiation.
- An ultrasound exam may be ordered to look at internal organs like the liver, reproductive organs or blood vessels, for example.

Specialty expertise:
- State-of-the-art equipment ensures that the radiologist gets an ideal view and permits the making of 3D images, when needed.
- Your scan will be read by a Mass General radiologist specially trained in ultrasound imaging and dedicated to the specific area of the body for your study.

What to expect:
- Ultrasound exams typically take 30 minutes, however, certain exams take up to an hour.
- The exam is performed by a trained professional, called a sonographer, who will apply a clear gel then move a handheld wand, called a transducer, over the area to be scanned.
- You will feel pressure from the transducer, but ultrasound is painless and makes very little sound.
- Certain exams may require you to fast for a few hours beforehand, arrive with a full bladder, or change positions and hold your breath during the exam.

More information:
www.massgeneralimaging.org/ultrasound
BONE DENSITOMETRY

Fundamentals:

• A special kind of X-ray machine measures the amount of energy your bones absorb, which indicates the bones’ density and strength.

• The exam helps to diagnose and track the treatment of osteoporosis and other conditions that cause bone loss.

Specialty expertise:

• Our state-of-the-art equipment minimizes X-ray exposure.

• Your exam will be interpreted by a radiologist or endocrinologist specially trained in bone density.

• We use special software to compare your current and past bone-densitometry results to get an accurate picture of your bone density over time.

What to expect:

• The exam takes about 30 minutes.

• You will lie on a table, and the technologist performing your exam will take images of your hip and spine.

• You will need to lie still and may be asked to hold your breath for a few seconds while the pictures are being taken.

• The technologist will remain with you except for the brief times when the X-ray machine is active.

More information:
www.massgeneralimaging.org/bone_d
CARDIAC STRESS TEST WITH IMAGING

Fundamentals:

• A stress test looks at blood flow to your heart both before and after you engage in exercise. (In some cases a medicine that speeds up the heart, called a pharmacologic stress agent, is used instead of exercise.)

• A stress test is a type of nuclear medicine exam: you receive a radioactive tracer that highlights your blood so a special camera can see it easily.

• A stress test is used to evaluate the cause of chest pain or measure the strength of your heart after a heart attack or surgery, for example.

Specialty expertise:

• We pay special attention to minimizing radiation exposure while still obtaining the highest quality images.

• All cardiac stress tests are jointly read by a radiologist and a cardiologist specially trained in nuclear medicine.

What to expect:

• You should not eat or drink anything for three hours before your test.

• You should not smoke or consume caffeine for 24 hours before your appointment.
• You should wear walking shoes and a comfortable two-piece outfit.

• An IV will be used to inject the tracer. You will also be attached to a heart monitor.

• We will inject the tracer and capture images two times: first while you are at rest and then either as you exercise by walking on a treadmill or after you take a medicine that speeds up the heart instead of exercise.

• The exam process takes two to three hours in total.

More information:
www.massgeneralimaging.org/stresstest
Register as a Patient

All patients need to register as Mass General patients. This is a quick process that can be done over the phone. Please call 866-211-6588.

Schedule an Exam

You may schedule a screening mammogram yourself by contacting our locations or online at www.massgeneralimaging.org/mymammo. For all other exams, a doctor's order is required. Your doctor can choose to order your test online or call the location directly. Talk to your doctor about which location might be most convenient for you.
Beyond Diagnosis

In addition to diagnostic imaging, Mass General Imaging offers several procedures that use imaging technology to treat specific conditions. Specialty trained doctors called interventional radiologists perform these minimally invasive, image-guided procedures.

**Uterine Fibroid Embolization (UFE):**
- Treats fibroid tumors of the uterus
- Precise delivery, via catheter, of small particles blocks blood flow to fibroids
- Shrinks fibroids, relieves pain and other symptoms, prevents recurrence

**Endovenous Laser Treatment (EVLT):**
- Treats varicose veins
- Uses laser energy to seal off problem veins
- Relieves leg pain and swelling, improves appearance

**Vertebroplasty:**
- Treats vertebral (spinal) fractures
- Injection of cement stabilizes the bone
- Reduces or eliminates pain, prevents further damage

**Kyphoplasty:**
- Similar to vertebroplasty, but uses a balloon to restore height and shape of compressed vertebra before cement is injected

**Percutaneous discectomy:**
- Treats pain from herniated discs
- Removes small amount of disc tissue to relieve pressure on nerves
- Reduces pain and restores mobility

**Spine/joint injection:**
- Treats back or joint pain
- Places medicine right at the source of pain
- Can provide immediate relief and help pinpoint cause of pain

More information:
www.massgeneralimaging.org/treatments
Mass General Imaging Locations

Mass General Imaging - Boston
55 Fruit Street
Boston, MA 02114
(617) 724–XRAY
(617) 724–9729

Mass General Imaging - Chelsea
80 Everett Avenue
Chelsea, MA 02150
(617) 887–3500

MGH Chelsea HealthCare Center
151 Everett Avenue
Chelsea, MA 02150
(617) 889–8510

Mass General Imaging - Charlestown
13th Street
Building 149
Charlestown, MA 02129
(617) 726–5701

Mass General West Imaging - Waltham
40 Second Avenue
Suites 100, 120, 130
Waltham, MA 02451
(800) 697–8296

MGH Revere HealthCare Center
300 Ocean Avenue
Revere, MA 02151
(781) 485–6180

Mass General Imaging - Chelmsford
43 Village Square
Suite B
Chelmsford, MA 01824
(978) 256–3553

Mass General/ North Shore Center for Outpatient Care
102 Endicott Street
Danvers, MA 01923
(978) 882–6161

Yawkey Center for Outpatient Care
55 Fruit Street
Boston MA 02114
(617) 724–XRAY

© 2010 Massachusetts General Hospital.

WWW.MASSGENERALIMAGING.ORG