Step-by-Step: How Imaging Works
What to expect on your child’s 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 images 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, a doctor trained to interpret radiological studies, examines the images.
- 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.

Welcome to Massachusetts General Hospital Imaging

Dedicated to delivering the clearest picture of your health.

- Convenient access to eight community locations for imaging tests
- 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.

www.massgeneralimaging.org/howimagingworks
Here’s a brief introduction to each kind of test or treatment your child might need: How it works, why we use it, and what to expect.

**X-RAY AND FLUOROSCOPY**

**Fundamentals:**
- An X-ray machine makes a picture by exposing a part of the body to a small dose of radiation.
- In addition to the bones, X-rays are used to image many body parts including the lungs and joints.
- Special equipment can use X-rays to create live video images; this is called fluoroscopy, and it is used in studies of the digestive system, for example.

**Specialty expertise:**
- We use the latest digital X-ray equipment, which uses less radiation than older film-based equipment.
- We pay special attention to minimizing radiation exposure.
- Every exam is interpreted by a radiologist who specializes in pediatrics or in the specific area of the body under study.

**What to expect:**
- Routine X-rays require no special preparation.
- Digestive studies, such as an upper GI series, require that your child fast before the exam; you will receive specific instructions when the exam is scheduled.
- Certain studies may also involve contrast, a drink or injection that makes the images more vivid; you will receive information for your child's specific type of exam beforehand.

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

**Fundamentals:**
- A CT scanner rotates to take X-ray images from different angles all around the 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, such as diagnosing bone fractures and preparing for orthopedic surgery.

**Specialty expertise:**
- We pay special attention to minimizing X-ray exposure—without giving up image quality.
- We use the latest technology, including 64-slice CT scanners.
- A radiologist with special training in pediatrics or the area of the body for the study will interpret your child’s exam.

**What to expect:**
- Exams typically take 15 minutes in total; the actual scanning takes just minutes.
- Your child will need to remain still during the scanning. Our leading-edge equipment obtains images quickly, but for some small children, sedation may be necessary. We will discuss this with you in detail before the exam.

- Many exams involve contrast—a drink or injection that makes the images more informative. If your child has certain conditions, a blood test beforehand will be required to make sure the contrast will be safe for them.
- The technologist performing the exam will be nearby and able to talk to your child throughout the scan.
- You will be able to remain in the scanner room with your child, wearing lead shielding, if you wish.

More information:
www.massgeneralimaging.org/ct

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**MINIMIZING YOUR CHILD’S RADIATION DOSE**

Massachusetts General Hospital Imaging is committed to minimizing radiation exposure for all patients, but especially for children. In addition to multiple safeguards to prevent accidental exposure, we strive to continually improve the protocols that govern each type of scan—so that we can use less radiation but still obtain images sufficient for accurate diagnoses. For example, for a typical pediatric CT scan we may use less than half as much radiation as in an adult scan (and our levels for adult scans already are lower than the recommendations of the American College of Radiology). Our physicians are nationally recognized as leaders on this issue.
ULTRASOUND

Fundamentals:
• Ultrasound uses high-frequency sound waves to create images of internal body structures.
• An ultrasound exam may be ordered to look at internal organs like the liver or appendix, 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.
• Your child’s scan will be read by a Mass General pediatric radiologist specially trained in ultrasound imaging and dedicated to the specific area of the body of the study.

What to expect:
• Ultrasound exams typically take 30 minutes.
• 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.
• Your child will feel pressure from the transducer, but ultrasound is painless and does not use X-ray radiation.
• For certain exams, your child may have to change positions, hold his or her breath, or have a full bladder.

More information:
www.massgeneralimaging.org/ultrasound

BONE DENSITOMETRY

Fundamentals:
• A special kind of X-ray machine measures the amount of energy the bones absorb, which indicates the bones’ density and strength.
• The exam helps to diagnose and track the treatment of conditions such as osteoporosis and vitamin D deficiency.

Specialty expertise:
• Our state-of-the-art equipment minimizes X-ray exposure.
• Your child's exam will be interpreted by a radiologist or endocrinologist specially trained in bone density.
• We use special software to compare current and past bone-density results, to get an accurate picture of your child’s progress.

What to expect:
• The exam takes about 30 minutes.
• Your child will lie on a table, and the technologist performing the exam will take images of your child’s hip and spine.
• Your child will need to lie still and may be asked not to breathe for a few seconds while the pictures are being taken.
• The technologist will remain with your child except for the brief times when the X-ray machine is active.

More information:
www.massgeneralimaging.org/bone_d
MRI (MAGNETIC RESONANCE IMAGING)

Fundamentals:
• An MRI machine produces a strong magnetic field and radio waves. Atoms in the 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 including the internal organs, the brain and spinal cord, muscles, ligaments, and blood vessels.

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 pediatrics or the specific area of the body being examined.

What to expect:
• Exams typically take 45 minutes.
• Many exams involve contrast—a drink or injection that makes the images more informative. If your child has certain conditions, a blood test beforehand will be required to make sure the contrast will be safe.
• Because of the strong magnet, we need to make absolutely sure your child does not bring any metal objects into the exam room, and we also need to know details about any implants in your child's body.

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
A doctor’s order is required to schedule an exam. 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.
Mass General Imaging Locations

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<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Phone Numbers</th>
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<tbody>
<tr>
<td>Mass General Imaging - Boston</td>
<td>55 Fruit Street, Boston, MA 02114</td>
<td>(617) 724-8940</td>
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<tr>
<td>Mass General Imaging - Worcester</td>
<td>385 Grove Street, Worcester, MA 01605</td>
<td>(508) 849-5000</td>
</tr>
<tr>
<td>MGH Chelsea HealthCare Center</td>
<td>151 Everett Avenue, Chelsea, MA 02150</td>
<td>(617) 889-8510</td>
</tr>
<tr>
<td>Mass General Imaging - Chelmsford</td>
<td>43 Village Square, Suite B, Chelmsford, MA 01824</td>
<td>(978) 256-3553</td>
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<tr>
<td>Mass General Imaging - Waltham</td>
<td>40 Second Avenue, Suites 100, 120, 130, Waltham, MA 02451</td>
<td>(800) 697-8296</td>
</tr>
<tr>
<td>MGH Revere HealthCare Center</td>
<td>300 Ocean Avenue, Revere, MA 02151</td>
<td>(781) 485-6180</td>
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<tr>
<td>Mass General Imaging - Chelsea</td>
<td>80 Everett Avenue, Chelsea, MA 02150</td>
<td>(617) 887-3500</td>
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<tr>
<td>Mass General/ North Shore Center for Outpatient Care</td>
<td>102 Endicott Street, Danvers, MA 01923</td>
<td>(978) 882-6161</td>
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<tr>
<td>Yawkey Center for Outpatient Care</td>
<td>55 Fruit Street, Boston, MA 02114</td>
<td>(617) 724-XRAY</td>
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