

# No-dose and low-dose radiation scoliosis screening locations in the U.S.

*Please note: this list is provided as a resource to families and is in no way an endorsement or recommendation*

## **NO-DOSE FONAR UPRIGHT MRI**

### **California**

- Campbell | Scoliosis Care Centers

## **LOW-DOSE EOS IMAGING**

### **Alabama**

- Birmingham | Children's of Alabama

### **Arizona**

- Phoenix | Phoenix Children's Hospital

### **Arkansas**

- Little Rock | University of Arkansas for Medical Sciences - Orthopedic Clinic

### **California**

- Emeryville | Stanford Children's Health Specialty Services
- Fresno | Valley Children's Medical Group
- Loma Linda | Loma Linda University Medical Center
- Los Angeles | Children's Hospital Los Angeles
- Los Angeles | Orthopaedic Institute for Children
- Pasadena | Shriners Hospitals for Children
- Redwood City | Stanford University Stroke Center
- Sacramento | Shriners Hospitals for Children - Northern California
- San Diego | Rady Children's Hospital

### **Colorado**

- Aurora | Children's Hospital Colorado
- Aurora | The Spine Center at University of Colorado Hospital
- Denver | Presbyterian St. Luke's Medical Center

### **Delaware**

- Wilmington | Nemours/Alfred I. duPont Hospital for Children

### **Florida**

- Gainesville | University of Florida - Orthopedics and Sports Medicine Institute
- Jacksonville | Nemours Children's Specialty Care
- Miami | Nicklaus Children's Hospital
- Miramar | Nicklaus Children's Miramar Outpatient Center
- Orlando | Arnold Palmer Hospital for Children - Center for Orthopedics
- Orlando | Nemours Children's Hospital
- Tampa | Shriners Hospitals for Children
- West Palm Beach | St. Mary's Medical Center

### **Georgia**

- Atlanta | Pediatric Orthopaedic Associates

### **Illinois**

- Chicago | Northwestern Memorial Hospital
- Chicago | Shriners Hospitals for Children
- Downers Grove | Advocate Medical Group Spine Care Center

### **Indiana**

- Indianapolis | Riley Hospital for Children at Indiana University Health

### **Iowa**

- Iowa City | University Of Iowa Hospitals & Clinics

### **Kansas**

- Kansas City | Children's Mercy Hospital -

Adele Hall Campus • Kansas City | University of Kansas

### **Kentucky**

- Lexington | Shriners Hospitals for Children

### **Louisiana**

- New Orleans | Ochsner Medical Center

### **Maryland**

- Baltimore | Johns Hopkins Outpatient Center
- Towson | National Scoliosis Center

### **Massachusetts**

- Boston | Boston Children's Hospital
- Boston | Massachusetts General Hospital - Yawkey Center For Outpatient Care
- Springfield | Shriners Hospitals for Children

### **Michigan**

- Ann Arbor | University of Michigan - A. Alfred Taubman Health Care Center
- Ann Arbor | University of Michigan - C.S. Mott Children's Hospital

### **Minnesota**

- Minneapolis | Shriners Hospitals for Children
- Minneapolis | University of Minnesota Health Clinics and Surgery Center
- Rochester | Mayo Clinic
- St Paul | Gillette Children's Specialty Healthcare

### **Mississippi**

- Jackson | University of Mississippi Medical Center

### **Missouri**

- St Louis | Barnes-Jewish Hospital Center for Advanced Medicine

### **New Jersey**

- Cedar Knolls | Advocare the Orthopedic Center
- New Brunswick | Saint Peter's University Hospital

### **New York**

- Lake Success | Cohen Children's Medical Center, Northwell Health
- New York City | Hospital for Special Surgery - Caspary Research Building
- New York City | Hospital for Special Surgery - Department of Radiology and Imaging
- New York City | Hospital for Special Surgery - Lerner Children's Pavilion
- New York City | New York-Presbyterian - Morgan Stanley Children's Hospital
- New York City | New York-Presbyterian - The Allen Hospital
- New York City | NYU Langone Medical Center
- New York City | NYU Langone Orthopedic Hospital
- Rochester | University of Rochester Medical Center - Clinton Crossing Medical Center

### **North Carolina**

- Charlotte | Carolinas HealthCare System - Morehead Medical Plaza
- Durham | Duke Health - Lenox Baker Children's Hospital
- Raleigh | Hey Clinic for Scoliosis & Spine Care

### **Ohio**

- Cincinnati | Cincinnati Children's Hospital - Burnet Campus
- Dayton | Children's Medical

Center (Dayton Children's Hospital) • Dublin | Nationwide Children's Hospital - Dublin Sport Medicine and Orthopedic Center

### **Oregon**

- Portland | Shriners Hospitals for Children

### **Pennsylvania**

- King of Prussia | Children's Hospital of Philadelphia - Specialty Care & Surgery Center
- Philadelphia | Children's Hospital of Philadelphia - Buerger Center for Advanced Pediatric Care
- Philadelphia | Pennsylvania Hospital
- Philadelphia | Shriners Hospitals for Children
- Pittsburgh | Children's Hospital of UPMC
- Wexford | Allegheny Health Network - Pediatric Orthopedic Institute

### **Rhode Island**

- East Providence | University Orthopedics

### **South Carolina**

- Greenville | Shriners Hospitals for Children

### **Tennessee**

- Memphis | Le Bonheur Children's Hospital Outpatient Center

### **Texas**

- Austin | St David's Medical Center
- Dallas | Texas Scottish Rite Hospital for Children
- Fort Worth | Cook Children's Dodson Specialty Clinics
- Houston | Houston Methodist Hospital - Outpatient Center
- Houston | Texas Children's Hospital
- Plano | Children's Medical Center
- Plano | Medical City
- Plano | Texas Health Presbyterian Hospital
- Temple | Scott & White Roney Bone & Joint Institute

### **Utah**

- Salt Lake City | Primary Children's Hospital - University of Utah
- Salt Lake City | Shriners Hospitals for Children
- Salt Lake City | University of Utah Health - University Orthopaedic Center

### **Virginia**

- Charlottesville | University Of Virginia Health System - Spine Center
- Chesapeake | Children's Hospital of The King's Daughters - Health Center at Oakbrooke
- Fairfax | National Scoliosis Center
- Newport News | Children's Hospital of The King's Daughters - Health and Surgery Center at Oyster Point

### **Washington**

- Seattle | Seattle Children's Hospital
- Spokane | Shriners Hospitals for Children

### **Washington, DC**

- Children's National Health System

### **West Virginia**

- Morgantown | West Virginia University Medicine - Ruby Memorial Hospital

### **Wisconsin**

- Milwaukee | Children's Hospital of Wisconsin

List accurate as of August 2021

**What is scoliosis?**

Scoliosis is a sideways curvature of the spine greater than 10°, which is measured by the Cobb angle. Curvature less than 10° is considered normal variation.

**When should my child be screened for scoliosis?**

There are variety of different guidelines, but the Adams forward bend test is typically added to well visits starting at age 9-10 for girls, and 11-12 for boys. If there is a family history of scoliosis, screening should begin earlier.

**What happens during a screening test?**

During scoliosis screening, the doctor looks for shoulder blade asymmetry, waistline asymmetry and trunk shift. On the Adams forward bend test, a scoliometer is used to detect thoracic or lumbar rotation, and the presence of any rib prominence is noted.

**Can the Adams forward bend test be performed at home?**

Yes, you can find instructions for performing the Adams forward bend test on Youtube, scoliometers can be purchased online, there are free scoliometer apps, and a scoliometer can even be made out of a water bottle. Any positive findings at home should be verified by your primary care provider, as they will need to provide a referral for imaging

**How accurate are scoliometer readings?**

Scoliometer readings measure scoliosis rotation, also known as vertebral rotation, or angle of trunk rotation (ATR), and do not always correspond to Cobb angle. It is possible to have mild scoliosis with a large degree of rotation, or severe scoliosis with a small degree of rotation. Recent studies have also shown that scoliosis is increasingly being missed in obese children. In some cases, scoliosis that measures over 40° presents with a scoliometer reading of only 7° in an obese child. Imaging is required to confirm a diagnosis of scoliosis.

**What findings warrant an imaging referral?**

The generally accepted guideline is to refer to X-ray imaging when the scoliometer reads 7° or greater. For no-dose upright MRI, a scoliometer reading is not required for a referral.

**Why is no-dose or low-dose imaging important for children with scoliosis?**

For children and teens who require frequent imaging to monitor progress of scoliosis, multiple doses of radiation from standard X-rays results in an increase in their life-long radiation exposure. Increased radiation for scoliosis patients has been shown to increase the risk of developing cancer later in life, especially endometrial and breast cancer. Radiation-free or low-radiation imaging is therefore recommended for frequent monitoring of scoliosis in children and adolescents.

**What if my child is not a patient at a no-dose or low-dose imaging facility?**

You do not have to be a patient at the facility to have imaging done there. Contact the facility directly and they will provide you with a referral form for your pediatrician.

**How long does no-dose or low-dose scoliosis imaging take? Are you standing up during imaging?**

Imaging is done standing up (weight-bearing) and usually takes less than 5 minutes.

**Incidence of cancer in adolescent idiopathic scoliosis patients treated 25 years previously.** Simony A, Hansen EJ, Christensen SB, Carreon LY, Andersen MO. *Eur Spine J.* 2016 <https://pubmed.ncbi.nlm.nih.gov/27592106>

Scoliosis monitoring using traditional X-ray imaging may increase the risk of developing cancer up to 5 times. The overall cancer rate in this AIS cohort was 4.3 % which is five times higher than compared to the age-matched Danish population, and endometrial and breast cancer was most frequent. The radiation dose applied to the patients in this study, is comparable to modern equipment. This is to our knowledge the first study to report increased rates of endometrial cancers in a cohort of AIS patients, and future attention is needed to reduce the radiation dose distributed to the AIS patients both pre-operatively and during surgery.

**Cancer and mortality risks of patients with scoliosis from radiation exposure: a systematic review and meta-analysis.** Luan FJ, Wan Y, Mak KC, Ma CJ, Wang HQ. *Eur Spine J.* 2020 <https://pubmed.ncbi.nlm.nih.gov/32852591>

Based on 35,641 participants with over 20 years' observations from 1912 to 1990, repeated radiographs and pertaining cumulative radiation dose resulted in elevated rates of cancer, breast cancer and cancer mortality for children/adolescents with scoliosis in comparison with matched general population. It is recommended that low-radiation or radiation-free and efficient methods should be used to monitor the evolution of children/adolescents with scoliosis.