




# MSI PREVENTION BULLETIN 1

## General X-ray Technologist

**General X-ray technologists** are exposed to many different musculoskeletal injury (MSI) risk factors. This bulletin provides information regarding the typical musculoskeletal issues faced by these workers and some possible risk control measures to either eliminate or minimize the MSI risk. This information is only a guideline, and employers must still complete an MSI risk assessment to accurately determine the risks and appropriate control measures applicable to their worksite and work activities.

<b>MSI Issue: Bringing a Patient into the X-ray Room</b>	<b>Possible Risk Control Measures</b>
<ul style="list-style-type: none"> <li>• Holding doors open while pushing stretchers or wheelchairs through opening.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide an automatic door-opening device.</li> <li>• Open the doors to the X-ray room and then bring in the patient. Close the doors once the patient is in the room.</li> </ul>
<b>MSI Issue: Handling a Patient</b>	<b>Possible Risk Control Measures</b>
<ul style="list-style-type: none"> <li>• Non-height-adjustable tables make patient transfers more difficult for technologists.</li> <li>• Technologists handling patients alone or when in awkward postures.</li> <li>• Employers overlooking patient handling training for technologists out of the mainstream care areas.</li> <li>• Limited availability of transfer aids encourages technologists to transfer patients outside of recommended safe work practice guidelines.</li> <li>• Technologists sustaining a stooped posture over the X-ray table when adjusting patients between X-rays.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide a height-adjustable X-ray table.</li> <li>• Consider the type and frequency of patient handling. Have two workers perform patient transfers that require two people.</li> <li>• Train technologists on safe patient handling techniques. Document these safe work procedures.</li> <li>• Ensure transfer aids and mechanical lift assists are available.</li> <li>• Reduce stooping by working from the side of the table requiring less reach.</li> </ul>
<b>MSI Issue: Positioning the X-ray Tube</b>	<b>Possible Risk Control Measures</b>
<div style="display: flex; align-items: flex-start;">  <div style="margin-left: 10px;"> <ul style="list-style-type: none"> <li>• X-ray tube controls require awkward shoulder and wrist posture.</li> <li>• The heavy X-ray tube gains momentum when being moved and thus takes force to slow and stop the tube in a precise location over the bucky.</li> </ul> </div> </div>	<ul style="list-style-type: none"> <li>• Provide mechanical assistance with remote controls to move the X-ray tube.</li> <li>• Move the X-ray tube at a slow, steady rate to minimize the momentum generated when the tube is accelerated over a distance.</li> <li>• Lower the tube before moving it into position, whenever possible.</li> </ul> <div style="text-align: right;">  </div>

MSI Issue: Positioning the X-ray Tube <i>(continued)</i>	Possible Risk Control Measures
<ul style="list-style-type: none"> <li>• X-ray tubes with audible alignment indicators are often very sensitive and won't allow the X-ray to be taken until the tube is exactly aligned. Subsequently, repeated positioning of the tube above the bucky is needed.</li> <li>• Over time X-ray tube equipment can require more force to move depending on maintenance and design features. Cable-style X-ray tubes over time can require more effort to move compared to other styles.</li> <li>• Technologists use a pinch grip with an awkward wrist posture when grasping the X-ray table. Technologists push or pull the tabletop into position with the patient on it.</li> </ul>	<ul style="list-style-type: none"> <li>• Maximize the positioning boundary areas to reduce the precision required when positioning the tube.</li> <li>• Ensure proper equipment maintenance. When replacing machines choose a brand that provides mechanical assistance to move the X-ray tube or equipment with the least resistance to tube movement.</li> <li>• Use automatic tables, if possible since they eliminate pinch gripping. On manual tables, foldaway handles designed to allow for a power grip (versus a pinch grip) are preferable.</li> </ul>
MSI Issue: Handling X-ray Cassettes and Developing X-ray Film	Possible Risk Control Measures
<ul style="list-style-type: none"> <li>• Holding the cassette horizontally before it is drawn into a daylight X-ray development machine requires a sustained pinch grip.</li> <li>• Using a pinch grip, with one hand, repeatedly throughout the shift to handle X-ray cassettes (2–5 lb.)</li> </ul>  <ul style="list-style-type: none"> <li>• Loading chest cassettes (largest) into an upright bucky requires high hand forces.</li> <li>• Opening and closing cassettes with difficult opening or closing mechanisms after manually processing the film.</li> <li>• Lifting and carrying chemical bottles to the dark room.</li> <li>• Lifting racks out of the film processor for cleaning requires an awkward posture.</li> </ul>	<ul style="list-style-type: none"> <li>• Add a platform to the feed location of the developing machine to eliminate a sustained pinch grip.</li> <li>• Ensure the cassette storage location is close to the development area to reduce pinch grip carrying distance.</li> <li>• Use two hands to handle cassettes. If possible, choose cassettes that weigh less.</li> <li>• Use cassettes with indentations or handles if possible.</li> <li>• Design a support external to the upright bucky to reduce time spent holding cassettes in a pinch grip.</li> <li>• Choose cassettes whose design and weight minimize the force and the finger/hand/wrist posture needed to open and close them. Use two hands to grasp cassette.</li> <li>• Use a cart to transport chemicals.</li> <li>• Choose processors that allow for easy access to the racks for cleaning.</li> </ul>



<b>MSI Issue: Handling X-ray Cassettes and Developing X-ray Film (continued)</b>	<b>Possible Risk Control Measures</b>
<ul style="list-style-type: none"> <li>• Viewing X-ray film can contribute to stooping if the viewing station is too low or reaching overhead if the cabinet lamp switch is too high.</li> <li>• Low height of pass-box or obstructions contributes to reaching.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase height of viewing station to elbow level to accommodate standing. Ensure light switch does not require over-reaching.</li> <li>• Use anti-fatigue mats and foot-rails for areas with prolonged standing.</li> <li>• Increase pass-box height and avoid obstructions such as tables placed in front of pass-box to reduce reaching.</li> </ul>
<b>MSI Issue: Filing or Administrative Tasks</b>	<b>Possible Risk Control Measures</b>
<ul style="list-style-type: none"> <li>• Poor computer workstation set-up can lead to awkward wrist, shoulder, neck, and back postures.</li> <li>• Lack of space to store patient files between knee and shoulder height contributes to reaching overhead and stooping.</li> <li>• Busy travel route through a storage area prohibits safe use of stools to stand or sit on when handling patient files.</li> <li>• Pinch gripping patient files with one hand.</li> <li>• Higher pinch forces necessary when files are stored tightly together.</li> <li>• Transferring files from active areas to storage areas can produce significantly higher physical demands.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure that the monitor and the keyboard height allow workers to sit in comfortable, neutral postures.</li> <li>• Relocate storage to a space that has better storage heights.</li> <li>• Provide step stools to reduce reaching and squatting when retrieving files.</li> <li>• Redesign the travel route to avoid excessive traffic through file storage area.</li> <li>• Use two hands when handling files.</li> <li>• Split thick files to reduce the weight.</li> <li>• Don't overload sections of shelving—use dividers to maintain adequate spacing.</li> <li>• When relocating files to storage ensure adequate work rate, recovery, and task variety for workers to avoid unusually high job demands.</li> </ul>

