



Implementation Guidance for Ending Routine Gonadal Shielding During Abdominal and Pelvic Radiography

Companion to NCRP Statement No. 13, January 12, 2021

Introduction

Scientific evidence has led the National Council on Radiation Protection and Measurements (NCRP) to conclude that use of gonadal shielding (GS) is not justified as a routine part of radiological protection during abdominopelvic radiography. NCRP has determined that in most circumstances the use of GS in this examination does not contribute significantly to reducing the potential risks from radiation exposure. Further, GS use may have the unintended consequences of increased exposure and loss of valuable diagnostic information. This evidence and NCRP's recommendations are laid out in NCRP Statement No. 13, *NCRP Recommendations for Ending Routine Gonadal Shielding During Abdominal and Pelvic Radiography*.

The material in this document can be viewed as a companion to NCRP Statement No. 13. The purpose of this document is to provide guidance for a process to implement the Statement recommendations into clinical practice. Implementation efforts need to address differing strategies, language and formatting for audiences that include the public, patients, caregivers, technologists, and other medical professionals both within and outside the field of imaging. Since the new recommendations reverse longstanding and widely-accepted practice, resistance to change can be expected. While this document is a companion to NCRP Statement No. 13 and was reviewed and approved by the NCRP Board of Directors, it did not undergo the full Council review and approval that is required of NCRP statements.

Implementation Guidance

The recommendation to change the routine use of GS is based on our best scientific understanding, and this document is intended to guide implementation of the recommendations in NCRP Statement No. 13. The material in this companion document focuses on strategies for communicating changes in GS practice. Strategies are based on the universal desire among practitioners to manage radiation exposure, maintain image quality and increase the value that medical imaging provides to patient care. These strategies provide guidance that can be used by individual sites to formulate and implement policies and procedures. This document also offers approaches to implementation planning that may reduce redundancy in efforts and avoid gaps or inconsistencies that can hinder efficient and effective change. The ultimate objective is that the new recommendations for GS will become familiar and accepted. The suggested communication strategies are meant to be adapted to individual settings in ways that account for specific patient populations and practice environments. While adherence to these recommendations may reduce the radiation dose from a radiographic examination, this is not the principal basis for the change in practice. Instead, the motivation for change is that it will yield net benefits that far exceed any detriments. This consideration is the central pillar of the communication effort.

It is essential that personnel are supported throughout the implementation process, from initial conversations to policy changes and review, especially for those directly involved in performing radiography. This support includes introducing any new policies and procedures with a non-judgmental posture that avoids criticism of past GS practices that may be inconsistent with current recommendations.

The new NCRP recommendations are a substantial change to the long-standing, traditional practice of GS. For many who work in medical imaging, GS has been a key component of radiation safety practices throughout their schooling and for all of their professional lives. Further, the importance of GS has been reinforced by regulations that require or recommend the use of gonadal shields. Consequently, removing GS from routine clinical practice might seem reckless or a disregard for patient safety. Until very recently, there has been an expectation among medical professionals (including those within the imaging community), regulators, patients and their caregivers, and the public that GS should and will be used during radiographic imaging. Practice changes that remove GS from routine clinical use must include strategic approaches that anticipate

and mediate this expectation. It is natural to be skeptical of information that conflicts with long-standing practices. This response is often affected both by logic and emotion. Even if individuals understand and accept the reasoning behind the change, they may be reluctant to fully embrace it because instinctively it feels “wrong.” Here, it can be helpful to recognize the evolving nature of any clinical practice and appreciate that it takes time for the medical community to gather and assimilate scientific evidence and reach consensus on the best path forward.

Adoption of the new GS recommendations will vary within the imaging community. Recommendations to use GS may persist in some education, training and credentialing programs (e.g., through the American Board of Radiology, the American Registry of Radiologic Technologists, and the American Society of Radiologic Technologists). Currently, some state regulations still require the use of GS in certain circumstances. Communications should consider and recognize any barriers to adoption but also emphasize that major contributions to the new GS recommendations have been made or supported by many highly-regarded organizations involved in imaging and radiation protection, including the Image Gently® Alliance, Image Wisely®, American Association of Physicists in Medicine (AAPM), American College of Radiology, and NCRP.

Given these considerations, the following are recommended components of an effective practice change. Broadly, discussion will be grouped into design and development, implementation, and audit and modification phases.

Design and Development

The design and development phase should start with a review of the facility’s current GS policies/guidelines and of the new NCRP recommendations (Table 1). This will help identify what, if any, changes are needed in a specific facility, including the scope and magnitude of that change. In turn, this determines the required resources, including any associated costs such as personnel time, creation of printed or web-based information for patients and caregivers, and seminar or webinar training for imaging professionals and referring providers. This analysis will also help define the implementation timeline. The initial assessment and subsequent design and implementation of the new practice should be a collaborative effort with a team that includes radiologic technologists, medical and health physicists, and imaging physicians (*i.e.*, radiologists) familiar with clinical imaging. This core team should also solicit input from others, such as hospital administrators, managers, media professionals, communication experts, patient advocates, and compliance and medicolegal specialists. Additionally, initial facility- and enterprise-wide dialogue and counsel will help ensure that the change in shielding practice is consistently applied throughout departments and institutions within the enterprise.

There are many healthcare professionals outside of imaging departments who perform or prescribe x-ray exams. These include healthcare professionals in orthopedics, pediatrics, surgery, urology, emergency medicine, family medicine, dentistry, cardiology, and chiropractic care. These specialties may have different recommendations for the use of GS that are not in harmony with NCRP’s recommendations. These inconsistencies, along with any local regulatory requirements or guidelines, should be recognized and addressed.

Prior to implementation of GS practice changes, education should be provided to all healthcare professionals involved in imaging examinations. These professionals include those who work in areas outside of radiology, such as those listed above, and include those nursing staff who sometimes may be tasked with positioning or immobilizing patients during imaging exams. Educational content should include the background found in NCRP Statement No. 13 as well as general resources on the safe use of radiation. Communication should be tailored to each specific audience based on that audience’s background, experience, and clinical role. For example, medical providers who request examinations, such as pediatricians, have direct interactions with patients and caregivers but may lack specific knowledge about radiation risk. Consequently, they should be provided with background information about the change in GS practice as well as communication strategies for answering questions from patients and caregivers. Information provided to medical physicists, radiologists, and radiologic technologists may be more technical and detailed so that they fully understand the associated science. Resources that illustrate this individualization of communication include the responses to frequently asked questions on GS for technologists and parents/caregivers found in the AAPM CARES efforts (<https://www.aapm.org/CARES/>).

The method of delivery should ensure that educational materials are readily available to anyone who needs them, and that consistent messaging is employed, such as through a small number of trained personnel. Delivery may involve live presentations (either in-person or remote), pre-recorded presentations, or online written documents. To reach all imaging providers, it may be necessary to use a combination of these methods. Educational efforts should be designed to allow ample opportunity to effectively address questions

TABLE 1—*Considerations for implementation of NCRP recommendations for ending routine GS during abdominal and pelvic radiography.*^a

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- What are the practice's current policies/guidelines?
 - Should we change the practice's policies/guidelines?
 - What is the process for instituting a change in GS practice policies/guidelines?
 - How will we communicate this change to relevant staff and providers?
 - How will we communicate this change to our patients, parents and other caregivers? Considerations:
 - Before the time of examination performance
 - At the time and location of examination performance
 - What will be exceptions to following the current NCRP recommendations for GS?
 - What should a technologist do when a patient requests GS, but the exam does not warrant its use?
 - Should deviations from the policy be documented, and if so, how?
 - Have routine GS procedures/policies addressed considerations (including recommendations for conversations) for examinations for transgender or gender non-conforming individuals?
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^aIn part modified from the British Institute of Radiology: <https://www.bir.org.uk/education-and-events/patient-shielding-guidance.aspx>.

and concerns. This may be achieved through live question-and-answer sessions or by providing contact information for the trained designated personnel responsible for the educational component who can address any concerns in a timely manner.

Patients and caregivers may not be aware of changes in GS practice prior to their imaging exam, thus placing much of the communication burden on radiologic technologists. The development phase must include preparing and supporting frontline providers — typically radiologic technologists — to have these conversations. Establishing communication and support mechanisms prior to the implementation phase will help ensure that patients and caregivers receive consistent and accurate information. Different communication approaches, including both the content and modes of communication, will be needed across the spectrum of pediatric ages and for adult patients. The development phase of a communications program should include deciding the content and delivery mechanism for information provided to patients and caregivers. These resources, including contact information for an imaging specialist, may also be made available to specialties outside of radiology that perform or refer patients for imaging exams.

Implementation

The first component of an effective communication strategy is to anticipate patients' and caregivers' concerns. One approach is to develop signage and messaging that is visible to patients prior to their exam. This may include signs placed in waiting areas or changing rooms. An introductory script may also help to preemptively address implicit or explicit concern over the change in shielding practice. An example is provided below:

“I am going to be taking an x ray of your (your child's) abdomen. In the past you may have had a lead shield or apron, but the latest medical guidance is that the best way to get a good picture is not to use a shield. I know this may seem odd, so I am happy to provide you with more information (e.g., fact sheet) if you would like.”

Another way to prepare staff for patient conversations is to develop scripted, bullet point responses to anticipated patient or caregiver questions (see “Message Mapping,” Tables 2 and 3). Some examples are also available through AAPM CARES.

The second component is a pathway that supports radiologic technologists when patients and caregivers have additional questions or concerns. There should be clear procedures for directing these patients to relevant imaging professionals, such as physicists or imaging physicians. This may be needed when parents have more detailed questions about the scientific rationale for the change in GS, if patients or caregivers become particularly dissatisfied, or in any other situation in which technologists do not feel that they can adequately address the patient's or caregiver's questions.

TABLE 2—*Message mapping example for radiologic technologist.*

Anticipated Question: Why is my facility changing the GS policy?	
<i>Key Message 1</i>	<i>The dose to the gonads from an x-ray exam is too low to cause harm.</i>
Supporting Point	Dose to the gonads from an abdominal x ray is 5% of what it was when GS was introduced in the 1950s.
Supporting Point	The gonads are considered to be less sensitive to radiation than was previously thought, and evidence strongly suggests that risk of a radiation-induced hereditary effect is remote.
<i>Key Message 2</i>	<i>Shielding can cover up clinically-relevant anatomy.</i>
Supporting Point	There is no way to diagnose abnormalities in shielded/covered areas or to ensure that this anatomy is normal.
Supporting Point	The position of the gonads varies considerably among patients, making accurate positioning of shields challenging. GS covers relevant anatomy or fails to fully cover the gonads in 52% of male patients and 85% of female patients during x-ray imaging of the pelvis.
<i>Key Message 3</i>	<i>GS can negatively affect the function of Automatic Exposure Control (AEC).</i>
Supporting Point	If a shield partially or completely covers an AEC sensor, exposure time is extended and dose to unshielded abdominal organs may be substantially increased.
Supporting Point	AEC is a very effective tool for producing a diagnostic quality image at a well-managed dose. GS can negate its benefit.

TABLE 3—*Message mapping example for patient or caregiver.*

Anticipated Question: Why aren't we using a shield for this exam? They used one last time I had this procedure.	
<i>Key Message 1</i>	<i>The medical community has recently reviewed the use of GS and determined that it not as effective as once thought.</i>
Supporting Point	Better technology means that today's medical imaging equipment can make high quality images using only very small amounts of radiation.
Supporting Point	Scientists found that the gonads are much less sensitive to radiation than previously thought
<i>Key Message 2</i>	<i>Shields can cover up parts of the body that your doctor needs to see.</i>
Supporting Point	If this happens then the exam may need to be repeated, causing additional radiation exposure.
Supporting Point	We make every effort to not use more radiation than is necessary
<i>Key Message 3</i>	<i>The decision to stop shielding patients was made after extensive review and agreement by doctors, technologists, and scientists.</i>
Supporting Point	Many national and international organizations support discontinuing routine GS.
Supporting Point	We now know that the best way to safely image you or your child is to not use shields.

The third component of a communication strategy is to provide patients with additional information they can access after their imaging exam. This may include videos, websites, or written brochures that explain the change in GS practice and provide information on whom to contact with questions or concerns about the policy change. This provides the opportunity for an open, enduring communication pathway between patients and caregivers and imaging professionals. It also provides patients with information that they can reference even after their exam has ended and removes the burden of having to remember the details of conversations that took place during their exam. Information given to patients and caregivers should focus on their specific

concerns and questions. These resources, including contact information for designated imaging specialist(s), should also be made available to specialties outside of radiology that perform or refer patients for imaging exams.

The new NCRP recommendations do not support the routine use of GS. However, contemporary practice should include criteria for those exceptional circumstances when shielding may be used. Situations that are exceptions to the NCRP recommendations for GS should be defined within a policy or procedure and should include a requirement for documentation of the reason for the use of GS. Policies and procedures should include the actions/steps technologists are expected to take if a patient or caregiver requests that GS be used during an x-ray exam. This will provide clear guidance to radiologic technologists and facilitate audits of practice compliance. Documentation methods could include annotation on the image, submission of an accompanying information image (e.g., scanned paperwork) with the examination, an accompanying note on a picture archiving and communication system or within a hospital information system, and/or inclusion of the deviation from standard practice in the final report for the examination.

During implementation, any practice modifications should be synchronized across all areas in the practice enterprise, including satellite imaging facilities, to minimize inconsistencies. Changes should be planned to have the least possible impact on workflow. For example, patient scripting may be added to other pre-exam actions such as asking for patient identifiers and providing information about the exam that will be performed. Managers and administrators should recognize that as with any practice change, workflow efficiency may temporarily decrease. Any sustained effect on workflow, however, should be addressed during the audit and modification phase.

Audit and Modification

Establishment of a contemporary GS program should include an expectation and ability to address any issues that may arise from inconsistencies in GS practice. These could include activities at satellite imaging facilities, or with use by different imaging specialists within a community (e.g., dentists or chiropractors). Modifications of the original design and implementation approach will likely need to be made following audit of GS practice at regular intervals. Such audits are advised in order to detect needed changes in a timely manner and minimize the impact of poor processes on acceptance and standardization of changes in GS. Those responsible for implementing the change in GS practice should also anticipate that there will be questions and even resistance to moving away from routine shielding if the change has been relatively recent. Tracking problems as they arise can help in developing methods for addressing them in a timely fashion.

During the audit and modification phase it is necessary to continue to provide support and encouragement to frontline providers, as there will almost certainly be challenging engagements between individuals, often involving patients and caregivers, that arise from the change in GS policy and practice. The greatest friction is likely to be felt at the time of radiographic imaging. Support mechanisms should be in place for technologists, who must follow institutional policies and procedures and are also trying to adhere to their professional standards and training. Encouragement of frequent feedback from technologists should be paired with procedures for mitigating potentially stressful encounters. Authoritative pathways are needed for the rapid escalation of management of these encounters to imaging physicians. Guidance should also be available for other interactions, such as with physicians who may not be familiar with and may resist the change in GS policy. Finally, the audit process should entail review and decisions about incorporation of appropriate new information, especially when controversial, regarding the use of shielding, to assure guidelines and policies remain timely and informed.

By following relevant strategic approaches and associated tactics that follow NCRP recommendations for shielding practice during abdominopelvic radiography, the ultimate objective is that the new limited use of GS will become both familiar and accepted.

Additional Resources

American Association of Physicists in Medicine. Patient Gonadal and Fetal Shielding in Diagnostic Imaging. Frequently Asked Questions

(https://www.aapm.org/org/policies/documents/CARES_FAQs_Patient_Shielding.pdf).

British Institute of Radiology (<https://www.bir.org.uk/education-and-events/patient-shielding-guidance.aspx>).

International Atomic Energy Agency (<https://www.iaea.org/topics/radiation-protection>).

World Health Organization

(https://www.who.int/ionizing_radiation/medical_radiation_exposure/paediatric-care/en/).

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