The Future of MRI Education in the United States

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Organization of Presentation

1. Some Background & History of MRI Education in the United States
2. ASRT/AEIRS/SMRT MRI Curriculum Revision Project (2013-2014)

ASRT = American Society of Radiologic Technologists
AEIRS = Association of Educators in Imaging and Radiologic Sciences
SMRT = Section for Magnetic Resonance Technologies of the International Society of Magnetic Resonance in Medicine (ISMRM)

Some Background & History of MRI Education in the United States

- Brief history of nuclear magnetic resonance (NMR) and magnetic resonance imaging (MRI)
- Previous MRI technologist education curricula
- JRCERT MRI programmatic accreditation
- ARRT MRI post primary & primary pathways
- Current numbers of listed MRI education programs in the United States
- Ongoing concerns, especially about MRI safety & relative lack of formal MRI technologist education in the United States

JRCERT = Joint Review Committee on Education in Radiologic Technology
ARRT = American Registry of Radiologic Technologists
Nuclear Magnetic Resonance (NMR)

- Nuclear Magnetic Resonance – was outgrowth of work done on radar preparatory to WWII at the Massachusetts Institute of Technology (MIT) Radiation Laboratory
- Nobel Prize in Physics: I.I. Rabi (1944) – NMR in molecular beams (1938)

Discovery of the Fundamental Principles of Hydrogen Proton MRI

There is a great deal of controversy concerning priority for the discovery of MRI:
- H. Carr (1952) – reported 1-D magnetic resonance image in his PhD thesis
- R. Damadian (1971) – reported that tumors can be distinguished by NMR; created a rudimentary MRI machine (1972)
- P. Lauterbur (1973) – published first 2-D "nuclear magnetic resonance image," using a back projection technique
- P. Mansfield (late 1970's) – fully utilized the concept of spatial encoding by gradient magnetic fields; developed a mathematical technique that allows MRI scans to be performed in seconds, rather than hours
- Nobel Prize in Physiology or Medicine (2003) – awarded to P. Lauterbur and P. Mansfield – for "discoveries concerning magnetic resonance imaging"

Clinical Use of MRI on Patients over the Recent Decades

- Clinical use of MRI on patients – 1980's
- Large increase in the variation of MRI clinical procedures on patients – 1990's
- Large increase in the numbers of MRI clinical procedures on patients – 2000's
Previous MRI Technologist Education Curricula

- ASRT (2001) – published an MRI curriculum, however this curriculum assumed technologist background in an imaging radiation modality
- ASRT/AEI/R/SMRT (2015) – first revision of the only nationally recognized MRI curriculum in the US

JRCERT MRI Programmatic Accreditation

- Implemented in 2003 (only USDE recognized MRI technologist education programmatic accreditation)
- Compared with over 600 radiography programs accredited by the JRCERT, there are currently only 6 MRI programs accredited by the JRCERT:
  1. Arkansas State University
  2. Morehead State University
  3. Rhode Island Hospital
  4. Thomas Jefferson University
  5. University of Nebraska Medical Center
  6. West Virginia University Hospitals
- Currently two JRCERT-MR applicant programs:
  (i) Owens Community College & (ii) University of Texas M. D. Anderson Cancer Center

ARRT - MRI Post Primary & Primary Pathways

- 1995 – “post-primary” ARRt MRI Certification Board Exam, with neither MRI clinical competency nor MRI safety competency requirement
- 2006 – MRI clinical competency required for “post-primary” ARRt MRI Certification Board Exam
- 2006 – ARRt MR “primary pathway” - recognition requires either JRCERT-MR programmatic accreditation or regional accreditation & meeting national MRI curriculum standards – i.e., requires both MRI didactic and MRI clinical courses, including MRI clinical competency and MRI safety competency (i.e., a formal MRI technologist education program)
- 2006: pre/Post ARRt MRI Certification Board Exam for “primary” and “post-primary”
- 2014 – “primary pathway” = 1st candidate, “post-primary pathway” = 2nd candidate
- 2014 – required documentation of MRI safety competency, as well as documentation of MRI clinical competency, for both the “post-primary” and “primary” MRI pathways
- 2016 – “structured education” requirement for the “post-primary” ARRt MRI Certification Board Exam – however, only 16 total hours of education is required
Current Numbers of Listed MRI Education Programs in the United States (April 2014)

- JRCERT – 6 accredited MRI programs (compared with over 600 radiography programs)
- ARRT – 33 recognized MRI programs (compared with over 700 radiography programs)
- SMRT – 39 listed (not endorsed) MRI programs

Compare MRI = 6/33 = 0.18 = 1/6, with RAD = 600/700 = 0.86, so MRI/RAD = 0.21 = 1/5

Ongoing Concerns, Especially About MRI Safety & Relative Lack Of Formal MRI Technologist Education in the US

- ACR and IAC – currently only recommend, but do not require MR credentialed MRI technologists
- “MRI Safety Survey” – ASRT Foundation grant to survey Hospital MRI Department chief technologists currently held by R. Weening, R. Greenidge, and P. Natale (Thomas Jefferson University)

ASRT/AEIRS/SMRT MRI Curriculum Revision Project (2013-2014)

- Project volunteers
- Description of MRI curriculum revision logistics
- Description of MRI curriculum revision process
- Description of MRI curriculum revision
- Educator perspective of MRI curriculum revision process
ASRT/AEIRS/SMRT MRI Curriculum Revision Project Volunteers

ASRT Representatives:
- Rebecca Blankley, M.F.A., R.T.(R)(M)(CT) [University of New Mexico]
- Cynthia Gibbs, M.A., R.T.(R)(M)(CT)(MR) [Morehead State University]
- John Reyna, R.T.(R)(CT)(MR) [University of Kansas Medical Center]
- Tiffany Roman, M.Ed., R.T.(R)(CT)(MR) [University of Cincinnati/Blue Ash College]
- Loraine Zelna, M.S., R.T.(R)(MR) [Misericordia University]

AEIRS Representative:
- Richard Weening, Ph.D., R.T.(R)(CT)(MR), FAEIRS [Thomas Jefferson University]

SMRT Representatives:
- Maryanne Blaine, M.A., R.T.(R)(MR) [Brigham and Women’s Hospital]
- Maureen Hood, Ph.D., R.T.(R)(MR), FSMRT [Uniformed Services University]
- Barry (Gene) Southers, M.Ed., R.T.(R)(MR) [University of Cincinnati/College of Allied Health Sciences]

Description of MRI Curriculum Revision Logistics

Kevin Powers, Ed.D., RT(R), ASRT Director of Education – initiated and facilitated the MRI curriculum revision project process.

- The previous 2008 ASRT/AEIRS/SMRT MRI curriculum was distributed to all group members and was to be re-read carefully prior to traveling to ASRT Headquarters, in Albuquerque, NM.
- Several sections of the 2008 MRI curriculum were highlighted for our particular attention, along with our receiving some sections from other ASRT programmatic curricula for comparison.
- Many of us brought notes, books, or other useful information to the MRI curriculum revision project. Some useful information is effectively now also accessible on-line.
- We convened for two full days at ASRT headquarters, with most of us traveling the day before and after our meeting.
- The food and accommodations at ASRT were excellent!

Description of MRI Curriculum Revision Process

On the 1st meeting day, we split into small groups of three members, with each small group assigned several related sections of the MRI curriculum.

On the 2nd meeting day, we reconvened as a single large group, to discuss our proposed small group revisions to the various assigned sections. Thus everyone could ultimately make proposals or comments on any and all sections of the MRI curriculum.

We operated by consensus, both in the small and large group settings. If a group consensus could not be reached, then the issue was marked for further information gathering.

Thus we held multi-hour follow-up video/conference calls among the group members to resolve any outstanding issues with the MRI curriculum revision.

From our work, a draft revised MRI curriculum was then created at the ASRT headquarters and sent out to all group members for review and any suggestions for further revisions or comments.

The draft proposed ASRT/AEIRS/SMRT MRI curriculum revision is now available for viewing and public comment: http://www.asrt.org/educators/asrt-curricula/magnetic-resonance
Description of MRI Curriculum Revision

Some specific issues that arose in the MRI curriculum revision were:
1. Precedence & Status of MRI Curriculum
2. Repetition & Issue of Content vs. Courses
3. Additions & Subtractions
4. “Optional Content” Sections
5. Updated Resources

MRI Curriculum Revision: Precedence & Status

• In some ways, the national ASRT/AEIRS/SMRT MRI Curriculum takes precedence (has a somewhat superior status) in MRI education settings in the US, because this document is actually referenced by both the JRCERT and the ARRT in their accreditation and recognition procedures.
• However, we certainly also did look at what the JRCERT and ARRT had done in their recent revisions of MRI program standards or MRI certification exam content specifications and clinical competencies, as this is useful to keep in mind.
• In other words, what you put in any national curriculum is obviously very important, for many reasons, including that everyone in the field has to “live” with the choices made.

MRI Curriculum Revision: Repetition & Issue of Content vs. Courses

• We tried to streamline content from sections in order to eliminate some, but certainly not all, redundancy in the curriculum.
• It was deemed okay to have some repetition of content in sections, because that is neither uncommon nor useless in any actual curriculum, but it was also suggested that the level of detail of the repetition should not be the same in all content sections.
• The most detailed content should clearly be placed in the appropriate section of the curriculum.
• Also, some people interpret each section of the curriculum as requiring a separate course for the program. But this is clearly not necessary, as the curriculum is more concerned with content, rather than any particular breakdown of program courses.
MRI Curriculum Revision: Additions & Subtractions

• The field of MRI has very noticeably progressed since the previous MRI curriculum.
• We certainly maintained the core MRI content, for curriculum continuity.
• However, we also added and subtracted content to the revised MRI curriculum, as we deemed appropriate for the current state of entry-level MRI technologist education.

MRI Curriculum Revision: “Optional Content” Sections

• The use of “optional content” sections was seen to be a valuable tool in revising the MRI curriculum:
  1. Either to highlight content areas that some group members felt was still valuable to teach, even though, e.g., these procedures might have been eliminated from ARRT clinical competency lists.
  2. Or this was also seen as a useful method to include perhaps emerging content to the curriculum.
• In other words, the use of “optional content” was often very helpful in obtaining a group consensus.

MRI Curriculum Revision: Updated Resources

• The amount and kinds of resources (textbooks, journals, on-line modules, etc.) available to MRI educators and students has increased very noticeably since 2008, so this section certainly required updating.
Educator Perspective of MRI Curriculum Revision Process

Some of my thoughts about the MRI curriculum revision process:

1. **Responsibility** – I know that we all believed as a group that a really good MRI curriculum revision proposal needed to be produced.

2. **Professionalism** – I liked going to ASRT headquarters in New Mexico ("Land of Enchantment") – I got to see that my dues money is being well spent – MRI is a beautiful setting for our professional societies.

3. **Diversity** – it was extremely useful to have group members from different backgrounds and different parts of the country – you clearly learn about other people's successes and concerns this way.

4. **Collegiality** – I liked working with and getting to better know my colleagues, people who are very knowledgeable, passionate, and have strong opinions about what would be best for MRI education, as well as able to listen & build consensus, in order to move the field forward.

Consensus Report of MRI Program Directors (2013)

- 10 key issues affecting the future of MRI education in the United States
- Consensus Report “survey tool,” which includes positions of professional societies, such as the ASRT
- Outcomes – the YES or NO positions taken by the 25 MRI program directors on the 10 key issues (Note: a collective agreement > 3/5 = 60% was considered significant)
- Discussion – the comments made by the 25 MRI program directors on the 10 key issues

MRI Consensus Report: Author List

- Pamela A. Andrews, R.T.(R)(MR), M.S. [University of Wisconsin–Milwaukee]
- Joan S. Estes, R.T.(R), M.S. [University of Texas–M.D. Anderson Cancer Center]
- Karen E. Bremner, M.S., R.T.(R)(MR) [University of Texas–M.D. Anderson Cancer Center]
- Charles C. Bell, R.T.(R), M.S. [Medical College of Georgia]
- Douglas G. Othmer, R.T.(R), M.S. [Northeast State Community College]
- William C. G. Price, R.T.(R), M.S. [Southern Illinois University]
- Mark A. Barnwell, R.T.(R), M.S. [El Centro College]
- Martha R. Cannon, M.S., R.T.(R)(MR) [University of Texas–M.D. Anderson Cancer Center]
- Robert A. Beier, R.T.(R), M.S. [El Centro College]
- Michael E. Madden, Ph.D., R.T.(R)(CT)(MR) [Fort Hays State University]
- Diana E. Mishler, M.B.A., R.T.(R)(S), ARDMS [Indiana University]
- Kerry T. Mohney, M.A., R.T.(R)(M) [Lake Michigan College]
- Lori A. Nugent, M.Ed., R.T.(R)(MR) [Massachusetts College of Pharmacy and Health Sciences]
- John Posh, R.T.(R)(MR) [Hospital of the University of Pennsylvania]
- Ashok Saraswat, M.S., B.Ed., R.T.(R)(MR) [The Ohio State University Wexner Medical Center]
- Monica R. Schneider, B.S., R.T.(R)(CT)(MR) [Rhode Island Hospital]
- Barry Southers, M.Ed., R.T.(R)(MR) [University of Cincinnati Medical Center]
- Adam J. Stevens, M.A., R.T.(R)(CT)(MR) [University of Nebraska Medical Center]
- Taryn Talbott, M.S., R.T.(R)(CT)(MR) [Kettering College]
- Angela E. Washington, Ph.D., R.T.(R)(CT)(MR) [Wake Technical Community College]
Description of 10 Key Issues Affecting the Future of MRI Education in the United States

- Issue #1: Should all MRI education programs be programmatically accredited?
- Issue #2: Should the entry level for MRI technologists be moved from the associate degree to the baccalaureate degree?
- Issue #3: Should MRI Program Directors hold a minimum of a master's degree?
- Issue #4: Should MRI Clinical Coordinators hold a minimum of a baccalaureate degree?
- Issue #5: Except in States with licensure laws for MRI technologists, should employer job descriptions remove licensure as a requirement for employment as an MRI technologist?
- Issue #6: Should employer job descriptions require that a magnetic resonance technologist be an ARRT Registered Technologist, R.T.(ARRT), rather than the job description requiring that a magnetic resonance technologist be certified in radiography, with a category designation of R.T.(R)(ARRT)?
- Issue #7: Should all MRI technologists hold certification in magnetic resonance?
- Issue #8: Should the American Registry of Magnetic Resonance Imaging Technologists (ARMRIT) certification be recognized in the same manner that the RT(MR)(ARRT) certification is recognized for magnetic resonance? [Or conversely, are there reasons to oppose recognition of the ARMRIT magnetic resonance certification?]
- Issue #9: In the future, should x-ray education programs be modified to combine the two ionizing radiation modalities radiography and computed tomography into single education programs?
- Issue #10: In the future, should the ARRT abolish the MRI post-primary pathway, maintaining only the MRI primary pathway, thus ensuring that all MRI technologists have successfully completed an appropriately accredited professional educational program in MRI?

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**Issue #1: Should all MRI education programs be programmatically accredited?**

- a. The ASRT supports professional programmatic peer review for all medical imaging and radiation therapy educational programs.
- b. The JRCERT is the only organization recognized by the United States Department of Education and the Council for Higher Education Accreditation for the accreditation of education programs in magnetic resonance.
- c. The ARRT recognizes MRI education programs via the method of regional accreditation, as well as programmatic accreditation.

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**Issue #1: Should all MRI education programs be programmatically accredited?**

YES = 14/25 = 56%

- "I am certainly for MRI education program accreditation in principle, so I am answering "yes." It is a principle with which I have no problem. I have concerns about MRI that they currently lack any expertise in MRI education. Of course, very few MRI programs even seek JRCERT MRI program accreditation. Right now, there's a bloating of requirements for the JRCERT to bear an accreditation specialist knowledge about MRI. In reality, it's a matter of the extent of the student training. What is more important, the way to break this cycle would be for the ARRT to require that all MRI Board Examination candidates must graduate from a recognized MRI program. This would bring about a greater desire for MRI education programs to seek programmatic accreditation.
- "While I maintain the belief that programs should be accredited, I think it is important for the accrediting bodies to be aware of the issues and make sure that they are appropriate for the programs they serve. The fact that the ARRT is not currently an accrediting body, and that the JRCERT is not currently an accrediting body, is a matter of concern. The problem with this is the accrediting bodies and their criteria. The issue is the accreditation of MRI programs, not necessarily the programs themselves.

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**Issue #1: Should all MRI education programs be programmatically accredited?**

**NO = 11/25 = 44%**

- "Regional accreditation works well at our school. The extra cost and time required for JRCERT would take away from student instruction."
- "I feel that if Program Directors are charged with having a MS degree then they should be capable to set standards and curriculum for their programs. The JRCERT in reality does nothing to enhance a program except charge fees which go up quite often. Our MRI program is doing well, curriculum is based on the ARRT exam, students are very happy with the education provided, clinical is 1:1, all without paying fees to the JRCERT."

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**Issue #2: Should the entry level for MRI technologists be moved from the associate degree to the baccalaureate degree?**

a. It is the position of the ASRT that the associate degree is the entry level for radiographers.

b. It is the position of the ASRT that the baccalaureate degree is the professional level of radiologic science education if it contains upper division coursework in radiologic science.

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**Issue #2: Should the entry level for MRI technologists be moved from the associate degree to the baccalaureate degree?**

**YES = 13/25 = 52%**

- "MRI is an advanced imaging modality and thus entry level should be moved towards the baccalaureate degree in the future. The transition from associate's degree entry level to baccalaureate degree entry level in MRI should be planned now and completed in the next decade."
- "Radiation therapists and radiologic science with upper division coursework both require a baccalaureate degree. MRI should be no different (along with Nuclear Medicine). The complexity and rapidly advancing technology in MRI necessitates the entry level being a baccalaureate degree."
Issue #2: Should the entry level for MRI technologists be moved from the associate degree to the baccalaureate degree?

NO = 12/25 = 48%

- "Just as sonographers and radiographers are not required to have a bachelor’s degree, nor should MRI set a bachelor degree minimum standard. Each imaging modality, while have some commonalities, requires a body of knowledge in and of itself, with some overlap in patient care and some basic imaging principles. Requiring a bachelor for MRI is no different of the issue of requiring bachelor’s for radiography. Each contains a body of knowledge in and of them that can be covered very adequately in an associate degree program."
- "I think that requiring an associate degree for all programs and eliminating certificate programs is the first step. It is a great option to offer a baccalaureate degree in MRI, but not require it, as of right now."

Issue #3: Should MRI Program Directors hold a minimum of a master’s degree?

a. It is the position of the ASRT that radiologic science program directors hold a minimum of a master’s degree.

b. JRCERT standards for an accredited educational program in magnetic resonance are that the program director holds, at a minimum, a master’s degree.

YES = 19/25 = 76%

- "It is important for the profession to maintain high standards and one way to do this to promote higher education requirements for its leaders. Also, students look to the program directors as mentors; thus by requiring program directors to hold a minimum of a master’s degree they are demonstrating the importance of higher education in the profession."
- "They should also be certified in MR."
Issue #3: Should MRI Program Directors hold a minimum of a master’s degree?

NO = 6/25 = 24%

- “I do not feel that having a master’s degree should be necessary for program directors of MRI programs. I currently work under my boss who holds a master’s degree. I feel that it is more appropriate to hold a master’s degree for her position rather than mine.”

Issue #4: Should MRI Clinical Coordinators hold a minimum of a baccalaureate degree?

a. It is the position of the ASRT that radiologic science clinical coordinators hold a minimum of a baccalaureate degree.

b. JRCERT standards for an accredited educational program in magnetic resonance are that the education coordinator holds, at a minimum, a baccalaureate degree.

YES = 21/25 = 84%

- “The baccalaureate degree academic standard for clinical coordinators is now recognized throughout the radiologic and imaging sciences community. As the standard for the ARRT primary pathway examination candidates is now a minimum of an associate’s degree, MRI clinical coordinators should be held to an academic standard that is higher than their program graduates.”

- “They should also be certified in MR.”
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**Issue #4: Should MRI Clinical Coordinators hold a minimum of a baccalaureate degree?**

*NO = 4/25 = 16%*

- "Ideally all clinical coordinators should have a baccalaureate degree and clinical experience. However, I would always consider a candidate who has an associate degree, clinical experience and the willingness to get their baccalaureate degree as a clinical coordinator."

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**Issue #5: Except in States with licensure laws for MRI technologists, should employer job descriptions remove licensure as a requirement for employment as an MRI technologist?**

a. Thirty-nine (39) states license Radiography, while only three (3) states license MRI: New Mexico, Oregon and West Virginia.

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**Issue #5: Except in States with licensure laws for MRI technologists, should employer job descriptions remove licensure as a requirement for employment as an MRI technologist?**

*YES = 13/25 = 52%*

- "If there were licensure for MRI Technologists within all states, then I would answer "yes" to this issue, but since that is definitely not the case, I feel requiring licensure for all employees is unnecessary at this time. As previously mentioned, there are a number of highly trained, ARRT-certified individuals in MRI that come from either nationally or regionally accredited programs who are not Radiographers, and in those instances, licensure is not needed."

- "States with licensure laws should remove licensure as a requirement for employment as an MRI technologist. Primary pathway MRI technologists are not qualified to dispense radiation, so it is not practicable to require radiography licensure for them. This requirement may also be causing a significant number of highly trained, ARRT-certified MRI Technologists for gaining employment with employers that address this requirement."

- "Maybe states should license MRI, because of the significant safety issues involved with the magnetic field environment, but that doesn’t seem to be the issue in question here."

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**Issue #5: Except in States with licensure laws for MRI technologists, should employer job descriptions remove licensure as a requirement for employment as an MRI technologist?**

*NO = 12/25 = 48%*

- "Licensure should be required for all MRI technologists. Even though MRI doesn’t use ionizing radiation, it still has the potential to cause harm to patients. Adding state licensure would be another step toward promoting professional standards and keeping CEU records on MRI technologists."
- "MRI safety is of greatest concern and therefore affects patient’s safety. It is critical that MRI technologists across the board are educated with the same level of knowledge and this requirement is a wonderful way to accomplish this outcome."

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**Issue #6: Should employer job descriptions require that a magnetic resonance technologist be an ARRT Registered Technologist, R.T.(ARRT), rather than the job description requiring that a magnetic resonance technologist be certified in radiography, with a category designation of R.T.(R)(ARRT)?**

**YES = 16/25 = 64%**

- "MRI education requires a completely different didactic and clinical education than that of radiography. It is time for MRI to be recognized as its own modality outside of the radiography umbrella, just as ultrasound and nuclear medicine has done."
- "All MRI technologists should be ARRT registered technologists, but the registration requirement should be RT(MR), not RT(R). Being registered in radiography should be irrelevant for MRI technologists, so job descriptions for MRI technologists should not require RT(R), as knowledge of radiography should not qualify a technologist to work in the MRI area."

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**Issue #6:** Should employer job descriptions require that a magnetic resonance technologist be an ARRT Registered Technologist, R.T.(ARRT), rather than the job description requiring that a magnetic resonance technologist be certified in radiography, with a category designation of R.T.(R)(ARRT)?

**NO = 9/25 = 36%**

- “I believe there is room for both - and most employers want multi-credentialed technologists. In our area, someone who is only capable of doing MR would have trouble finding work.”
- “We are seeing more hospitals hire employees that are multi-modality registered. It would be of great benefit to have technologists that can be flexible with their modalities. The radiography degree also allows the student to start working in the field developing better patient care, and critical thinking skills. These skills are very important once in MRI. The patient can be claustrophobic or larger than the coil; therefore these skills come in handy when working in the MRI field.”

**Issue #7:** Should all MRI technologists hold certification in magnetic resonance?

*a.* The ASRT opposes the employment of utilization of uncertified or unlicensed individuals to administer ionizing or nonionizing radiation for diagnostic or therapeutic procedures. This is a breach of responsibility of the health care industry in providing quality patient care.

*b.* ASRT believes that MR technologists should be certified in MR by the ARRT.

**YES = 25/25 = 100%**

- “MRI technologists working in the profession should be credentialed in MR in order to practice. There are many safety issues related to MR that require a true understanding of the profession. There is a misconception that anyone can be taught to push buttons. For the sake of patient care and image quality all practicing MRI technologists should have at least a basic educational foundation that is supported by passing the ARRT examination.”
- “MRI technology is increasingly difficult. MRI exams are more complex than ever. Diagnoses depend on the technologist knowing what he/she is doing – when to add sequences, when to question an exam with a diagnosis, when to include contrast, when to do anything out of the ‘normal’ protocol. An education in this area leading to successful completion of the registry helps to ensure standardization and quality of care.”

**Issue #7:** Should all MRI technologists hold certification in magnetic resonance?

**YES = 25/25 = 100%**

- “MRI technologists working in the profession should be credentialed in MR in order to practice. There are many safety issues related to MR that require a true understanding of the profession. There is a misconception that anyone can be taught to push buttons. For the sake of patient care and image quality all practicing MRI technologists should have at least a basic educational foundation that is supported by passing the ARRT examination.”
- “MRI technology is increasingly difficult. MRI exams are more complex than ever. Diagnoses depend on the technologist knowing what he/she is doing – when to add sequences, when to question an exam with a diagnosis, when to include contrast, when to do anything out of the ‘normal’ protocol. An education in this area leading to successful completion of the registry helps to ensure standardization and quality of care.”
**Issue #7: Should all MRI technologists hold certification in magnetic resonance?**

**NO = 0/25 = 0%**

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**Issue #8: Should the American Registry of Magnetic Resonance Imaging Technologists (ARMRIT)* certification be recognized in the same manner that the RT(MR)(ARRT) certification is recognized for magnetic resonance? [Or conversely, are there reasons to oppose recognition of the ARMRIT magnetic resonance certification?]

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a. It is the position of the American Society of Radiologic Technologists that radiologic technologists practicing radiography, sonography, nuclear medicine, radiation therapy and other imaging disciplines or specialties in all health care facilities are certified by agencies such as the American Registry of Radiologic Technologists, American Registry for Diagnostic Medical Sonography, Nuclear Medicine Technology Certification Board, Medical Dosimetrist Certification Board or meet state licensure requirements.

b. For Professional Education, the ARRT Standards for Recognition of Educational Accrediting Agencies include: (A) The accrediting agency must be recognized by the Council for Higher Education Accreditation or the United States Department of Education as an accrediting agency that includes radiography or other health, and (B) The accrediting agency must evaluate education using standards adopted by ARRT. The standards adopted by ARRT are summarized in the ARRT Primary Indicators of Appropriate Educational Preparation Guide.

c. ARMRIT MRI Programs are accredited by the Commission on Accreditation (COA) of the American Registry of Magnetic Resonance Imaging Technologists.

d. The American College of Radiology recognizes both the certifications RT(MR) (ARRT) or ARMRIT as meeting the ACR MRI Accreditation Program Requirements for personnel qualifications of registered MR technologists.

e. The Intersocietal Accreditation Commission recognizes RT(MR) (ARRT) as meeting the standard for technical staff in The IAC Standards and Guidelines for MRI Accreditation. The IAC recognizes ARMRIT certification plus 12 months full-time post-graduate clinical MRI experience as meeting the IAC Accreditation Standards for technical staff.

*There are 18 ARMRIT MRI schools listed on their website: [http://www.armrit.org/schools.shtml](http://www.armrit.org/schools.shtml)

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**Issue #8: Should the American Registry of Magnetic Resonance Imaging Technologists (ARMRIT) certification be recognized in the same manner that the RT(MR)(ARRT) certification is recognized for magnetic resonance? [Or conversely, are there reasons to oppose recognition of the ARMRIT magnetic resonance certification?]

**YES = 18/25 = 72% (oppose recognition)**

- “My experience with ARMRIT technologists suggests that many do not have the professional knowledge to pass the ARRT MRI Board examination, although this is clearly dependent on the individual technologist. ARMRIT education programs also do not appear to meet the same US Department of Education standards as ARRT recognized education programs. However, it would be good for the MRI field if the ARMRIT standards were increased to eventually allow the ARRT to recognize the ARMRIT magnetic resonance credential, in the same kind of way that the ARRT recognizes the NMTCB credential for nuclear medicine technologists. Having a universally agreed standard for MRI technologists in the United States would be a good thing for the field.”
Issue #8: Should the American Registry of Magnetic Resonance Imaging Technologists (ARMRIT) certification be recognized in the same manner that the RT(MR)(ARRT) certification is recognized for magnetic resonance? [Or conversely, are there reasons to oppose recognition of the ARMRIT magnetic resonance certification?]

NO = 7/25 = 28% (recognize)

- “I do feel the ARMRIT and ARRT should work on a collaborative standardized examination, or at least collaborate on incorporating standards for both examinations, such as the SMRT, AEIRS, and ASRT have done for a unified MR Curriculum. This way, employers can hire with confidence regardless of certification. I know very little about the ARMRIT certification examination, but feel strongly in having similar standards in place for both ARMRIT and ARRT.”

- “Provided that accreditation and certification requirements are at a minimum the same level as the ARRT. For example, sonography and nuclear medicine have other certification bodies.”

Issue #9: In the future, should x-ray education programs be modified to combine the two ionizing radiation modalities radiography and computed tomography into single education programs?

YES = 12/25 = 48%

- “With the continued increased use of CT as a mechanism of medical imaging and diagnosis the CT practitioner needs to be instructed in the theoretical aspects of CT (equipment, procedures, radiation protection, etc.) rather than just on the job training that may not result in obtaining relevant information that will lend a technologist to be able to problem solve in a critical fashion.”

- “This would make sense. Historically, there have not been any formal education requirements for CT individuals.”

- “It is interesting that we are split on CT to be a part of radiography. I think it is inevitable that we will be required to incorporate CT in radiography (at least to some degree).”
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**Issue # 9: In the future, should x-ray education programs be modified to combine the two ionizing radiation modalities radiography and computed tomography into single education programs?**

**NO = 13/25 = 52%**

- "There is too much information to add CT to an already busy radiography program. CT should require additional education beyond a radiography program."

- "If CT should continue to be offered as an advanced certification for registered radiographers. Two years is not a lot of time for a student to learn radiography, let alone CT. Also, programs would have to find a way to provide a clinical education to their students in order for them to meet the competency requirements set by the ARRT."

- "At this point I would say no. However, I feel that perhaps CT should require additional didactic education requirements before individuals are allowed to 'sit' for the boards."

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**Issue # 10: In the future, should the ARRT abolish the MRI post-primary pathway, maintaining only the MRI primary pathway, thus ensuring that all MRI technologists have successfully completed an appropriately accredited professional educational program in MRI?**

**YES = 15/25 = 60%**

- "The post-primary pathway makes us look like untrained button pushers."

- "It does not work to have two sets of educational criteria to become an MRI technologist. For example, being certified in Radiography does not qualify someone to be a Radiation Therapist. When a technologist holds a primary certification in Radiography and chooses to become a Radiation Therapist she must complete an educational program. There is one set of criteria to be met to sit for and earn a Radiation Therapy credential. It should be the same with MRI. Further, the notion that completing Radiography training provides patient care experience, and is a rite of passage to become an MRI Technologist does not hold up in the marketplace any more than it does for Radiation Therapists. The end result is that students take Radiography programs simply to be able to take an MRI program, and upon graduation they go to work in the MRI department. Two years are spent training these students in radiographic skills that they do not put into practice in the workplace. It is time to shift the educational model to allow these students additional time to develop the skills in the discipline that they will practice on patients each day."

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Issue #10: In the future, should the ARRT abolish the MRI post-primary pathway, maintaining only the MRI primary pathway, thus ensuring that all MRI technologists have successfully completed an appropriately accredited professional educational program in MRI?

**NO = 10/25 = 40%**

- "I think the post-primary pathway works very effectively. I would instead mandate that all MRI techs be formally trained and eliminate the 'On-the-Job-Training' possibility. Proper training, be it primary or post-primary is the key."
- "As an educator, I would like to see all MRI technologists complete an appropriate credentialed educational program in Magnetic Resonance Imaging. Due to the limited number of educational programs and faculty willing to teach in this area, I think it would be hard to maintain only the MRI primary pathway with the ARRT."

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**PROGRAM DIRECTOR RESPONSE:**

- "There will always be a so-called 'lack of primary pathway MRI programs,' unless and until the ARRT sets a date certain for the elimination of the MR post-primary pathway."

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Collective Agreement between the 25 MRI Program Directors for the 10 Key Issues Affecting the Future of MRI Education in the United States