Message from the Editor

The recent International Conference on Radiation Protection in Medicine provided a timely review of the progress since the Bonn Conference and an opportunity for stakeholders to share experience, identify gaps and consider solutions towards further implementation of radiation protection actions in medicine worldwide. “More training, more awareness and more effective implementation of regulations are needed … participants … concluded.”

In addition to the updates from the ISRQSA, other organisations, agencies, campaigns, and professional bodies on their quality and safety activities, there is a link to a 2017 survey on the current implementation of radiology quality and safety programs in different regions.

Education and training are the most commonly used and tangible means to improve quality and safety in practice. Training evolves around justification, optimisation and incident reduction topics. Apart from open-access tools, there is a link to gain free access to ECR 2018!

The infrastructure supporting radiation protection in medicine has improved markedly in the last two decades with recommendations, publications, and regulations. It is paramount to maximise the benefits and minimise the risks when introducing new technology, e.g., artificial intelligence. These evidence-based recommendations and guidance tools are yet to be explored and fully implemented by many practitioners. Most practitioners prefer and find it more acceptable to use these tools on a voluntary basis rather than by regulation. Better connection between motivated end-users and between like-minded end-users and system-based efforts are two of the top priorities. The strengthening of end-user awareness and interest supports sustainable implementation.

It is gratifying to observe the growth in interest and participation in radiation protection sessions in recent years. However, only a handful of participants attended the “X-ray protection: Quality Control in Diagnostic Imaging” session held in Marrakech during the 25th International Congress of Radiology in 2008! We have come a long way since, but more and persisting efforts are needed.

Readers are familiar with the two recurring themes in this editorial: stakeholder collaboration and end-user implementation. These two intertwining elements underpin improvements in radiological quality and safety worldwide. The International Radiology Quality Network (IRQN) used “Collaboration is Strengthen” as its motto.

Collaboration is our future!!

Kindly forward the newsletter to colleagues with interest in radiological quality and safety and direct distribution or contribution queries to LSLAU@bigpond.net.au.

Lawrence Lau, FACR, FAMS, FRANZCR, FRCR
Editor, ISRQSA News
Advisor to the ISR President

IAEA Conference Identifies Challenges in Radiation Protection in Medicine
A MESSAGE FROM THE ISR PRESIDENT

I am pleased to contribute to the second edition of the ISRQSA newsletter ably edited by Dr. Lawrence Lau. The second half of 2017 was a busy period for the International Society of Radiology (ISR) and highly devoted to ISRQSA development and activities.

Indeed, last December at RSNA the traditional ISR Executive Committee meeting was held. The relationship with related societies, including International Society of Radiographers and Radiological Technologists (ISRRT) and International Organisation for Medical Physics (IOMP), was discussed with enthusiasm to further exchange views and explore potential avenues for collaboration.

The ISRQSA convened at the occasion to improve its activities and interaction with the International Atomic Energy Agency (IAEA) and the World Health Organisation (WHO) as well as discussing the topic of justification and clinical imaging guidelines from the perspective of the different regions.

In addition, in a specific refresher course during the RSNA: “The current Global Campaigns for Informed Use of Radiation in Medical Imaging” was presented. This has given great visibility to all the campaigns convened by ISRQSA to present an update on their quality and safety activities to a wider audience.

The ISR was also actively involved in the IAEA International Conference on Radiation Protection in Medicine: Achieving Change in Practice, held in Vienna, 11–15 December 2017. The conference aimed to review actions taken by all relevant parties since the 2012 Bonn conference. The ISR had the opportunity to organise a dedicated session entitled “Regional and national quality and safety campaigns driven by professional organisations – Bonn Call for Action turned into practice”. In this session the ISRQSA member campaigns from across the globe successfully presented highlights and challenges related to their radiation protection activities.

The virtual education program, as announced in the previous edition of this Newsletter, has been successfully launched with 5 published freely accessible modules centred on radiation and medical imaging in paediatrics including strategies and communication tools to help educate and empower both patients and their families. I hope that many readers have checked out this educational project and will contribute to help disseminate it across interested stakeholders.

In this Newsletter you will find more details about Quality and Safety worldwide and I am sure you will enjoy reading it as I have done it!

Professor Ricardo Garcia  
President, International Society of Radiology

<table>
<thead>
<tr>
<th>CONTENT</th>
<th>FACULTY</th>
<th>TO VIEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective communication on radiation Safety</td>
<td>Prof. Donald Frush</td>
<td>Click here</td>
</tr>
<tr>
<td>Standardisation of administered radiopharmaceutical activity and image quality optimisation</td>
<td>Prof. S. Ted Treves, MD; Frederic H. Fahey, DSc</td>
<td>Click here</td>
</tr>
<tr>
<td>Optimisation of radiography in children - the case of chest radiographs</td>
<td>Prof. Kimberly E. Applegate; Prof. Hesta Friedrich-Nel and Ms. Beatris Kotze (Panelists)</td>
<td>Click here</td>
</tr>
<tr>
<td>Progress and challenges in CT education and advocacy</td>
<td>Prof. Kimberly E. Applegate; Mr. Dean Pekarovic; Ms. Henra Muller; Ms. Carin Swanepool</td>
<td>Click here</td>
</tr>
<tr>
<td>Radiation protection exposure in children with congenital and acquired heart disease - An overview of risks and strategies for multi-modality optimisation</td>
<td>Prof. Kevin Hill, MD</td>
<td>Click here</td>
</tr>
</tbody>
</table>
International Conference on Radiation Protection in Medicine

The International Conference on Radiation Protection in Medicine: Achieving Change in Practice took place in Vienna between 11th and 15th December 2017, organised by the International Atomic Energy Agency (IAEA), co-sponsored by World Health Organization (WHO) and Pan American Health Organization (PAHO). It was convened as a follow-up of the first similar Conference held in Malaga, Spain (2001) and the second one held in Bonn, Germany (2012), which identified 10 priority actions to improve radiation protection in medicine (RPM) in the following decade known as the “Bonn Call for Action”. Those 10 actions and related sub-actions were jointly published by the IAEA and WHO as the so-called “Bonn Call for Action”, and were adopted by many stakeholders all over the world as a benchmark for the development of national action plans and continental campaigns on RPM (e.g. Eurosafe, AfroSafe, LatinSafe, ArabSafe, Canada Safe, Japan Safe). This Conference gathered more than 550 participants from almost 100 countries and 16 cooperating organisations who reviewed the progress in the implementation of those actions and looked at how international organisations and other stakeholders can harmonise their actions for better impact. The Conference was opened by Dr. Juan Carlos Lento, IAEA Deputy Director General, Head of Department of Nuclear Safety and Security; Dr. María Nerea, WHO Director of the Department of Public Health, Environmental and Social Determinants of Health and Dr. Pablo Jimenez, PAHO Regional Advisor on Radiological Health. The Conference was then conducted in plenary sessions including:

• A briefing session in which all the different partners reported on their activities in support of the Bonn Call for Action;
• Eight topical sessions on (1) Justification in the use of radiation in medical imaging, (2) RP of patients and staff in diagnostic radiography, fluoroscopy and CT; (3) RP of patients and staff in radiotherapy; (4) RP of patients, staff and the public in nuclear medicine and hybrid imaging, (5) RP in medical exposures of children and pregnant women, (6) RP of patients and staff in interventional procedures, (7) Learning from unintended and accidental exposures in medicine, and (8) RP in mammography, dental and maxillofacial imaging and other diagnostic modalities;
• Four round tables on: (A) How are we strengthening radiation safety culture in healthcare?, (B) How are we meeting radiation protection challenges in design and implementation of new technologies?, (C) How are we fostering and improving the radiation benefit-risk dialogue?, and (D) How are we meeting challenges in patient dose recording, tracking and data management?
• Three breakout sessions on: (1) Advancement of RPM through regulation and guidance: the European experience, (2) UNSCEAR’s global surveys on radiation exposure: Implementation of action 6 of the Bonn Call for Action and (3) Regional and national quality and safety campaigns driven by professional organisations: Bonn Call for Action turned into practice.
• A Final Session combining a panel on “Mobilising for Future Effective Work” where international/global views were combined with country experiences/views and the summary and conclusions.

The main outcome of this Conference was the Bonn Call for Action Implementation Toolkit which will be further populated during 2018. The closing remarks were delivered by Dr. Yukiya Amano IAEA Director General, Dr. Jay St John, WHO Assistant Director-General for Climate and Other Determinants of Health, and Dr. Pablo Jimenez, PAHO Regional Advisor. The entire Conference was broadcasted as live video stream and in particular the Round Table C, which was also made available through Facebook, achieved the amazing amount of 25,000 followers.

Improving radiation benefit-risk dialogue in medical imaging

One of the priorities identified in the Bonn Call for Action specifically refers to the improvement of the radiation benefit-risk dialogue in health care. There is a need to empower health professionals, as well as patients and their families, to make informed decisions about the use of radiation for medical imaging procedures, and this includes the development of tools for radiation risk communication. A Workshop on Radiation Risk Communication in Paediatric Imaging took place on Sunday 10th December 2017, jointly organised by the WHO and the International Society of Radiology (ISR), hosted by the European Society of Radiology (ESR) at its premises in Vienna, Austria. This workshop gathered 25 representatives from relevant stakeholders including professional societies, patients associations, and international organisations, including the IAEA. By working in plenary and breakout sessions the participants reviewed and edited a set of leaflets targeting patients, parents and families, based on a WHO report on Communicating Radiation Risks in Paediatric Imaging (WHO, 2016). They provided feedback on how to improve informational, motivational and persuasive messages tailored to different audiences, and helped identify gaps/needs in education and training in this field.

Contribution from Dr. María del Rosario Perez, Radiation Programme, WHO
An Update from the International Society of Radiology Quality and Safety Alliance

Ongoing Projects
1. Developing global network of FAQs related to radiation use in medical imaging
2. Survey on justification and use of imaging guidelines for Campaigns

RSNA 2017 Annual Meeting
“Around the World in 80 Minutes”: Current Global Campaigns for Informed Use of Radiation in Medical Imaging. This was the first time leaders from all campaigns were present in person to present updates of the various campaigns/Alliances. PDFs of each talk are on the ISRQSA website.

Objectives:
1. Provide unique aspects of the campaign/organisation
2. Review successes
3. Discuss current efforts and opportunities
4. Identify challenges

International Conference on Radiation Protection in Medicine: Achieving Change in Practice

International Society of Radiology (ISR) Lunchtime Session Thursday December 14th, 2017
Regional and national quality and safety campaigns driven by professional organisations – Bonn Call for Action turned into practice
Chairs: G. Frija (ISRQSA Co-Chair), D. Frush (ISRQSA Co-Chair), M. Perez (WHO)
12:10-12:15 Introduction: ISR and its Quality and Safety Alliance, L. Donoso, ISR President-Elect
12:15-12:23 Achieving justification in a LMIC: Example of Egypt by ArabSafe, D. Husseiny
12:23-12:31 Optimisation: A new concept for Diagnostic Reference Levels developed by EuroSafe Imaging, G. Frija
12:31-12:46 Importance of medical equipment quality for patient safety: Situation in North Africa by F-AFROSAFE, B. Mansouri; Situation in East Africa by E-AFROSAFE, M. Kawooya; Situation in West Africa by E.H. Niang
12:46-12:54 Imaging for children - good practices by Image Gently, D. Frush
12:54-13:02 Challenges and opportunities for implementing efficient radiation protection in Latin America by LATINSAFE, R. Mendonca
13:02-13:10 Discussion

From left to right: Monika Hierath, ISR Manager Europe; Renato Mendonca, ISR Treasurer; David Koff, CanadaSafe; Boudjema Mansouri, Arab Safe & AFROSAFE-FR; Dina Husseiny, Egypt; Guy Frija, EuroSafe Imaging; Donald Frush, Image Gently Alliance; Maria Perez, WHO; Michael Kawooya, AFROSAFE-EN; William Mayo-Smith, Image Wisely; Luis Donoso, ISR President-Elect, El Hadj Niang, Senegal.

Contribution from the International Society of Radiology Quality and Safety Alliance Co-Chairs Guy Frija MD, and Donald Frush MD.
ISRQSA NEWS

Image Gently® Year in Review

1. Addition of four steering committee members: Janet Reid MD, Edward Lee MD MPH, Alexander Towbin MD, and Sarah McKenney, PhD
2. Addition of the new Administrative Director, Robin Yurchuck (see following)
3. Journal of American College of Radiology commentaries, shared with Image Wisely
4. Continued review of agency/organisation reports and projects:
   a) International Commission on Radiological Protection: Occupational Radiological Protection for Physicians and Other Health Care Personnel Involved in Fluoroscopically-guided Interventions
   b) WHO Communication Radiation Risks in Paediatric Imaging
5. The Think A-Head Campaign
6. Have-A-Heart Campaign: May 2017 roll out

7. Additional 2016-17 Image Gently publications
   • Frush DP. Reply to Dr. Andronikou: Holding on to informed use of diagnostic imaging using ionizing radiation. Pediatr Radiol October 14, 2016.
8. IAEA participation:
   • Technical Meeting on Preventing Unintended and Accidental Medical Exposures in Radiology
   • Draft Safety Report on Dental Imaging in Radiology
   • 5 webinars on radiation and imaging in children
9. Continued branding through presence at national and international sites 2016-17, including Dubai, the European Congress of Radiology, International Congress of Radiology in Buenos Aires, 8th International Conference on Children’s Health and the Environment (INCHES) in Barcelona, and Radiological Society of North America
10. Development and launch of two micro-sites
    • www.imagegentlyparents.org
    • www.imagegentlyproviders.org
11. Revision of cosponsored modules on CT through the American College of Radiology
12. Development through the International Society of Radiology Quality and Safety Alliance (ISRQSA) of educational modules based on the five IAEA webinars
13. Collaboration with Baytech for search engine optimisation for website and micro sites, as well as enhancement of social media
Image Gently® Year in Review

In 2018, activities will include further enhancements on the websites and micro sites, expanding efforts through social media, planning of the campaign for family medicine practitioners, continued involvement with a wide variety of national and international organisations all dedicated to informed use of medical imaging, exploration of additional educational organisation partnerships, expansion of patient advocacy efforts, and exploration of additional opportunities beyond radiation protection and safety in paediatric imaging.

New Executive Committee and Administrative Expertise

The Image Gently Alliance is dependent on strong leadership. While this is obviously recognised through the members of the Steering Committee, as well as the support from founding organisations and continued partnership of Alliance members now totalling more than a 100, the past successes of the Alliance also owes a great deal of gratitude to the organisational skills of the Administrative Director. Initially, Jennifer Boylan, followed by Coreen Bell and Shaniece Rigans handled the day-to-day operations and provided visions for the Alliance that have been essential and welcomed efforts.

The Alliance is fortunate to have Robin Yurchuck join as leader as the next Administrative Director, beginning responsibilities in July 2017. Ms. Yurchuck works with the Business and Finance Administration Office for the Radiology Department at Duke University Medical Centre. Throughout her career and now at Duke, she has developed organisation and implementation process skills and has worked in administrative and project management. Prior to coming on board at Duke in February 2017, she enjoyed a long and successful career as science, technology, engineering, and math (STEM) educator, staff development coach, trainer for the two largest schools in the state of Georgia, and successful grant applicant. These compliments are accentuated by a strong literary skill set, well-developed communication skills, creative mind, foundation in advocacy, strong organisational skills that are critically important with the networking requirements of the Alliance, and the firm conviction in the importance of caring for our children. In the short time, she has already made a huge difference in what we do and how we do it. She’s become a quick fixture and face for Image Gently.

She is available at robin.yurchuck@duke.edu and will be present at RSNA and SPR meetings. I know you join me in welcoming Robin to the Image Gently family!

AND….Congratulations!!!

2018 ACR Gold Medalist

Marilyn J. Goske, MD

Contribution from Donald Frush, MD, Chair, Image Gently Alliance.
Image Wisely® - Annual Pledging a Success

The Image Wisely® campaign is a collaborative effort of the American College of Radiology (ACR), the Radiological Society of North America (RSNA), the American Association of Physicists in Medicine (AAPM), and the American Society of Radiologic Technologists (ASRT). Image Wisely’s primary goals are raising awareness and providing information and educational material about the use of ionising radiation in medical imaging. The chief mechanism for distributing this information is a dedicated website www.imagewisely.org which provides resources and information for imaging professionals.

Annual Pledging to Image Wisely® is a Success

On January 1, 2017, Image Wisely® converted its pledge from a once-in-a-lifetime event to an annual renewal. All pledges made before December 31 of each year expire at midnight; all individual, facility, and association/educational program pledges are removed from the books, the counter is reset, and the honour rolls for facilities and associations/educational programs are erased. The two primary reasons for this conversion were to stimulate interest in visiting the Image Wisely® website and to provide those who pledge with a dated certificate which can be used as evidence of their awareness of and commitment to Image Wisely®.

After the first year of annual pledging, the new approach has been considered a success. Over 70% of the total individuals, facilities and association/educational groups pledging between 2010 and 2016 pledged during 2017. (This percentage may even be higher since we noticed much duplicate pledging prior to 2017.) This means that each pledger revisited the Image Wisely website and had the opportunity to view new content such as news, articles, regulations and standards updates and educational content.

As expected, the vast majority of pledgers in 2017 were imaging technologists (radiography, CT, nuclear medicine) followed by radiologists and administrators. Most pledgers were from community hospitals, followed by academic/university practices and private offices/imaging centres.

Image Wisely has developed an international following with professionals in Canada, India and Brazil providing the greatest number of pledgers.

Interest in Image Wisely® Remains High

At the time we composed this article, only 4 days into the new year, over 1,800 individuals renewed their pledges for 2018. Soon we will be emailing pledge reminders to all who pledged in 2017.

Contribution from Priscilla Butler, MS, Richard Morin, PhD, and Elliot Fishman, MD

Do You Image Wisely? Your pledge has expired!

RENEW your pledge today »
International Conference on Radiation Protection in Medicine: Achieving Change in Practice - an Account from the ISRRT

The International Conference was held this past Dec 11-15, cosponsored by IAEA, WHO, and PAHO. There were 534 participants representing 97 countries and 16 organisations. The conference reviewed actions and developments with focus on progress made by stakeholders on Bonn Call for Action (BCA). Participants reviewed and discussed overall approaches that impacted radiation protection. All areas of radiology were covered with a one-track system to allow stakeholders to engage in the panel discussion with the strategy of the conference to develop a toolkit which will contribute to the success of the BCA by 2022.

Donna Newman, Director of Professional Practice International Society of Radiographers and Radiological Technologists (ISRRT) presented the ISRRT’s activities that had influenced the BCA and its implementation during the opening briefing session of the International Conference.

As the global voice for 500,000 radiographers and radiologic technologists, the ISRRT shares the responsibility for strengthening radiation protection of patients, health care professionals, and the general public and reaffirmed their commitment to the BCA during their briefing. The ISRRT presented a global promotion for Quality and Safety in the use of Radiation in Medicine through the ISRRT Response to the BCA that the ISRRT had incorporated the BCA into the ISRRT’s strategic plan. All documents and initiatives are housed on the ISRRT’s new website.

**Action 1:** Enhance Implementation of Principle of Justification.

The ISRRT has developed a position statement to ensure that no duplicate studies are performed along with a web-based decision tool on justification and authorisation for everyday use. It can also be used as a teaching tool to ensure that all radiographers understand justification. ISRRT phase two is underway partnering in a pilot study on incorporating the role of justification in a team approach and helping radiographers understand their role.

**Action 2:** Enhance Implementation of Principle of Optimisation of Protection and Safety.

The ISRRT developed a position statement on the team approach to optimisation for radiographers to use to ensure that the dose to the patient is always appropriate. The ISRRT committed to a radiation safety workshop at their world congress in Seoul Korea where we educated our members on the BCA. Another workshop on radiation safety and BCA is scheduled at our World Congress in April.

**Action 4:** Strengthen Radiation Protection Education and Training of Health Professionals.

The ISRRT has focused their global workshop on the components of the BCA. The ISRRT has also committed to an article on the BCA in every issue of their newsletter to educate its members. As a global stakeholder, the ISRRT shares the responsibility with other non-governmental agencies, regulatory agencies, and professional societies to strengthen radiation protection.

Key goals were established in the ISRRT’s Strategic plan that will contribute to the success of the BCA. One such goal is the collaborate to develop and promote international standards and promote safety culture. Projects include:

- WHO - Priority Medical Devices for Cancer Management
- Safety Guide Radiation Protection and Safety in Medical Uses of Ionising Radiation
- WHO - Communication Radiation Risk in Paediatric Imaging
- WHO - High Level Commission on Health Employment and Economic Growth

Contribution from Donna Newman B.A. RT (R) CNMT FASRT, Director of Professional Practice, International Society of Radiographers and Radiological Technologists.
The International Organisation for Medical Physics (IOMP) represents about 25,000 medical physicists worldwide in 86 adhering National Member Organisations. The main publications of IOMP are the Newsletter eMedical Physics World and the e-Journal Medical Physics International. Medical physicists have important role in contemporary medicine, associated with the effective and safe clinical application of all medical imaging and radiotherapy equipment. A specific field of medical physicists is related to Patient and Staff Radiation Safety.

Continuing with actions of IOMP in the area of Quality and Safety, it is worthwhile mentioning recent activity that is part of ongoing joint activity of IOMP with IRPA and WHO on radiation safety culture. It was held on 8-10 November 2017 at National Cancer Centre, Putrajaya, Malaysia as 5th workshop.

This provided opportunity to have a joint celebration of the International Day of Radiology (IDoR) on 8th November and the International Day of Medical Physics (IDMP) on 7th November at Kuala Lumpur. The opening of joint activities was done by the Director General Health, Malaysia Datuk Dr Noor Hisham Abdullah on 8th November wherein more than 250 professionals participated.

IDMP is an activity that is celebrated all over the world by various countries and the theme for 2017 IDMP was Medical Physics: Providing a Holistic Approach to Women Patient and Women Staff Safety in Radiation Medicine. Please visit IDMP webpage for information about several events each year. The choice of 7th November for IDMP itself is based on birthday of Marie Curie (7th November 1867). This year was a special year as it marked 150th year of Marie Curie’s birth and hence the theme on Women.

ISRQSA NEWS
News from the International Organisation for Medical Physics (IOMP)

The 17th Asia-Oceania Congress of Medical Physics (4 -7 November 2017, Jaipur, India) also incorporated wide celebrations of the IDMP which culminated in a rally through the city to help raising awareness of the important role of medical physicists in healthcare. The Congress during the IDMP was marked with the distribution of the annual IOMP Awards and Honours of the Organisation.

The latest issue (December 2017) of the eMedical Physics World contains articles on IDMP celebrations around the world. IOMP works closely with International Atomic Energy Agency (IAEA) and this same issue of eMPW includes also information on the IOMP’s participation in IAEA Conference on Radiation Protection in Medicine: Achieving Change in Practice.

Contribution from Prof. Madan Rehani, Vice President and Prof. Slavik Tabakov, President, International Organisation for Medical Physics.
International Commission on Radiological Protection (ICRP) holds its 4th International Symposium in Conjunction with the European Radiation Protection Research Week

The International Commission on Radiological Protection (ICRP) develops policy to prevent cancer and other diseases and effects associated with exposure to ionising radiation, and to protect the environment. Committee 3 (Protection in Medicine) is concerned with the protection of persons and unborn children when ionising radiation is used in medical diagnosis, therapy, and biomedical research, as well as protection in veterinary medicine. The C3 provides user-friendly guidance for:

- Patients, staff, public, and animals
- Radiation protection (RP) needs related to emerging technologies

The meeting of Committee 3 was held jointly with other committees and in conjunction with ICRP Symposium in Paris, October, 2017. Special liaison representatives from IAEA, IRPA, and WHO were invited. Various policy discussions and documents were reviewed, including:

- "Diagnostic reference levels for diagnostic and interventional imaging" is now published as ICRP P135
- The revised document on "Occupational protection issues in interventional procedures" is pending publication
- The document "Radiological Protection in Therapy with Radiopharmaceuticals" which is under review by the ICRP Main Commission members
- The name of the joint Task Group 36 of committees 2 and 3 on "Doses to patients from radiopharmaceuticals" was changed to "Radiation doses to patients from diagnostic nuclear medicine" with planned revisions for publication target date of 2020. A new version of the software based on Publication 128, IDAC 2.1 will be available for free download from www.idac-dose.org
- The inputs of C3 on a revised draft of "The Use of Effective Dose as a Risk-related Radiological Protection Quantity" have been provided to the Main Commission for review.

During the week, several new Task Groups or Work Parties (TG/WP) were nominated for development. A TG requires a budget and must be voted for approval by the Main Commission; it consists of members outside of the committee. A WP may be limited to the committee or ICRP members for early development phase until a TG is warranted. Proposed work includes:

a) Optimisation in medical imaging
b) Joint C3-C4 TG on Radiation protection in veterinary radiology
c) Joint C3-C4 TG on ethical aspects in medical exposure
d) WP on Radiological protection in PET/CT.

Contribution from Prof. Kimberly E. Applegate, MD, MS, FAAP, FACR, as a member of the Main Commission of the ICRP and Chair of Committee 3,
The Current Laws and Regulations on Radiation Safety and Radiation Protection in China

1. Regulations on the Safety and Protection of Radioisotopes and Radiation Equipment

The rationale for the regulation is to strengthen the supervision and administration of the safety and protection of radioactive isotopes and radiation equipment, and to promote the safe application of radioisotopes and radiation equipment, and to safeguard human health and protect the environment. The production, sale and use of radioisotopes and radiation devices within the territory of the People’s Republic of China and the assignment, import or export of radioisotopes shall comply with this Regulation. Radioactive isotopes referred to in this Regulation include radioactive sources and unsealed radioactive materials. This regulation is mandatory.

2. Law of the People’s Republic of China on Prevention and Control of Radioactive Pollution

The rationale for the law is to prevent and control radioactive pollution, to protect the environment, and to safeguard human health and promote the development and peaceful utilization of nuclear energy and nuclear technology. This law shall apply to the prevention and control of radioactive pollution occurring in the process of site selection, construction, operation, and nuclear technology; uranium (thorium) mining and associated radioactive utilization in nuclear power facilities in the territory under the jurisdiction of the People’s Republic of China activity. This law is mandatory.

3. Law of the People’s Republic of China on Environmental Impact Assessment

The law is to implement the strategy of sustainable development, to prevent the adverse impact on the environment caused by the implementation of planning and construction projects, and to promote the coordinated development of economy, society and environment. This law is mandatory.

4. People’s Republic of China Administrative Licensing Law

The rationale for the law is to regulate the establishment and implementation of administrative licensing, protect the lawful rights and interests of citizens, legal persons and other organisations, safeguard the public interest and social order; safeguard and supervise the effective implementation of administrative management by administrative organs and make this law in accordance with the Constitution. This law is mandatory.

5. Law of the People’s Republic of China on Administrative Punishment

The rationale for the law is to regulate the establishment and implementation of administrative penalties, safeguard and supervise the effective implementation of administrative organs by administrative organs, safeguard public interest and social order; protect the lawful rights and interests of citizens, legal persons and other organisations, and make this law in accordance with the Constitution. This law is mandatory.


The rationale for the law is to prevent, control and eliminate occupational hazards, to prevent occupational diseases, and to protect the health of workers and their related rights and interests, and to promote economic and social development. This law is enacted according to the Constitution. This law applies to occupational disease prevention and control activities in the territory of the People’s Republic of China. This law is mandatory.

7. People’s Republic of China Foreign Trade Law

The rationale for the law is to expand the opening up to the outside world, develop foreign trade, safeguard the order of foreign trade, protect the lawful rights and interests of foreign trade operators, and promote the healthy development of the socialist market economy. This law shall apply to foreign trade and the protection of intellectual property relating to foreign trade. This law is mandatory.

8. Criminal Law of the People’s Republic of China

The rationale for the law is to punish the crimes and protect the people. This law is enacted in accordance with the Constitution and in the light of the specific experience and actual conditions in our struggle against crime. This law shall apply to use penalties to fight against all criminal acts in order to defend the national security, safeguard the people’s democratic dictatorship and the socialist system; protect the state-owned property, the collective property owned by the working people, and the private property owned by citizens; protect the personal rights, democratic rights and other rights of citizens; safeguard the social and economic order; and ensure the smooth progress of the socialist construction. This law is mandatory.

9. Radioisotopes and Radiological Equipment Safety Permit Management Approach

These measures are formulated to implement radiation safety permission stipulated in the Regulations on the Safety and Protection of Radioisotopes and Radiological Equipment. The producers, sellers and users of radioisotopes and radiation devices within the territory of the People’s Republic of China shall obtain a radiation safety license (hereinafter referred to as the “permit”) in accordance with these Measures. The import and transfer of radioisotopes, radiotrace field tests, should be submitted in accordance with the provisions of this approach. Export radioisotopes shall go through the relevant formalities in accordance with the provisions of these Measures. When radioisotopes are transferred to another province, an autonomous region or municipality directly under the Central Government, it shall file a record in accordance with the provisions of these Measures. This regulation is mandatory.
10. Basic Standards for Protection Against Ionising Radiation and for the Safety of Radiation Sources

The criteria specify the basic requirements for ionising radiation protection and safety of radiation sources. The criteria do not apply to protect the health of workers to non-ionising radiation (such as microwaves, ultraviolet light, visible light and infrared radiation, etc.). This regulation is mandatory.

11. Code of Conduct on the Safety and Security of Radioactive Sources

The rationale for the code of conduct is to ensure the safety of radiation sources and radioactive materials. It is intended primarily for regulatory agencies, but it also provides guidance to producers, suppliers, and users of radioactive sources. This regulation is mandatory.


The objective of this guidance is to improve the safety and security of imports and exports of radioactive sources in accordance with the provisions laid down in paragraphs 23–29 of the Code. With this objective in mind, this guidance is not intended to impede international cooperation or commerce, as long as these do not contribute to the use of such sources for purposes that threaten safety and security. Exporting and importing States should aim to follow this Guidance on the Import and Export of Radioactive Sources when deciding whether or not to authorise exports and imports of Category 1 and 2 sources. States should consider this guidance in a manner consistent with their national legislation and relevant international commitments.

13. Radioactive Sources Classification Approach

Radioactive sources are classified as Class I, II, III, IV, and V based on their radiation risk on human health and the environment. Class I is an extremely dangerous radioactive source which causes death in minutes to an hour under the absence of protection. Class II is a dangerous radioactive source which causes death within a few days under the absence of protection. Class III is a high risk radioactive source which causes permanent injury within a few hours and death in days to weeks under the absence of protection. Class IV is a low-risk radiation source, which usually will not cause permanent radiation injury, but may cause recoverable injury to the people closely exposed for a long period of time. Class V is an extremely low-risk radiation source, which usually will not cause permanent radiation injury. This regulation is mandatory.

14. Radiation Equipment Classification

Medical irradiation devices are classified as Class I, II or III, based on their radiation risk on human health and the environment. Class I is a high-risk radiation device which can cause serious radiation damage or even death to persons exposed to radiation for a short period of time in the event of an accident or have a serious impact on the environment. Class II is a medium-risk radiation device and Class III is a low-risk radiation device, which usually will not cause radiation injury to the exposed personnel in the event of an accident.

These laws and regulations support the implementation of the Basic Safety Standards and Bonn Call-for-Action. Dr. Liang Wang and colleagues have been working to inform local practitioners and stakeholders about these Bonn Call-for-Action activities, including an article in the Chinese Journal of Radiology. The Bonn Call-for-Action activities have strengthened the regulatory framework towards more appropriate use of medical radiation in China.

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The use of artificial intelligence (AI) in medicine including radiology may be within touching distance. AI is expected to offer opportunities to improve the speed, accuracy, efficiency, and quality of radiology practice. Amid numerous dizzy talks of hopes, hypes, and risks of commercial exploitations about AI as well as some unfounded shallow “predictions” of AI replacing radiologists in the near future, what seems not receiving its due attention is patients. We, especially as medical professionals, must not forget that the ultimate purpose of introducing AI into medicine is to achieve better, safer care for our patients.

Improved speed and efficiency in the workflow that compromises accuracy or patient outcomes would be unethical. In this article, we want to explain efforts of the Korean Society of Radiology (KSR) to ensure the safety and benefit of patients in this coming era of AI in radiology. First, we believe that proper, robust clinical validation of AI tools is a core step for assuring patient safety and quality of care in the era of AI in medicine, which can only be achieved by the active participation of medical professionals. KSR has been emphasising the importance of thorough clinical validation of AI and has been educating how to achieve it through a subsidiary organisation named Radiology Imaging Network of Korea (RINK) (Figure 1). In fact, some core members of RINK have recently published an article in Radiology “A comprehensive methodologic guide for clinical validation of AI technology for medical diagnosis and prediction” [1]. This article is most relevant to, among different AI methods, high-dimensional / overparameterised classification algorithms built with supervised deep learning (such as analysis of radiologic images using the convolutional neural network), which underpin personalised medicine and precision healthcare using data-driven predictions in the AI era. The article highlights the importance of proper external validation using datasets that were obtained prospectively, in proper clinical settings, at multiple institutions to represent real-world practice adequately while avoiding pitfalls. It further explains the fact that the ultimate validation of clinical utility of AI tools requires demonstration of their value through positive impact on patient outcomes, beyond performance metrics, which can be evaluated with clinical trials or well-designed observational outcome research. Also, the article suggests that a system to prospectively register the research plans (including data collection) for clinical validation of AI, similar to the registration of clinical trials of drugs (e.g., clinicaltrials.gov), would give greater transparency for the validation and, therefore, would facilitate linking technological developments to clinical practice.

Secondly, KSR is focusing on the education of AI itself. Unless radiologists have adequate knowledge of AI, it would be difficult for them to use it effectively in the best interest of patients. KSR plans to develop a KSR-sponsored curriculum to teach basic principles of deep learning to radiology residents, which may be added to the existing KSR-sponsored “Physics Course” or provided as a separate course.

Last but not least, KSR is carefully observing related activities performed by other organisations, notably the Data Science Institute of the American College of Radiology (ACR) that is showing an extraordinary leadership regarding AI in radiology. In fact, representatives of KSR met with ACR leaders during RSNA 2017 meeting and have learned more about ACR Data Science Institute. We are in full agreement with its missions. KSR will keep in touch and collaborate with ACR to improve patient safety and quality of radiology practice in the coming era of AI.

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