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Putting Medical Radiation **Protection First**

Summary: How a European Society of Radiology flagship initiative is addressing quality and safety in medical imaging.

EUROSAFE IMAGING has celebrated five years of success in its mission to support and strengthen medical radiation protection across Europe. Through its Stars network, EUROSAFE IMAGING makes efforts to give radiation protection greater visibility with a holistic, inclusive approach, while simultaneously having a positive impact on clinical practice. The flagship initiative, created by the European Society of Radiology, continues its vital mission of promoting quality and safety in medical imaging and to support and strengthen medical radiation protection across Europe. HealthManagement.org talked with Professor Guy Frija, Chair of EUROSAFE IMAGING on the success of the initiative and what plans are in the works for the future.

How have you seen EuroSafe Imaging develop, what important milestones have you reached in the establishment of the diagnostic reference levels and what challenges have you encountered?

We have finished the data collection of the EUCLID project and it's already a great achievement. As far as our survey is concerned, we knew that having the same understanding about the indications for which we establish clinical DRLs was very important. There was strong participation from the scientific advisory board and other experts to select the indications and prepare the surveys to collect data from the participating centres. I would like to mention, although we did manage to do it, it was not easy. It is extremely difficult work, and several centres experienced difficulties getting the ethical authorisation from their committees as we are managing health data. The issues arising are now more complex, especially with the establishment of the EU General Data Protection Regulation (GDPR). Due to GDPR, it is now far more time consuming when we undertake a new clinical study.

> "EUROSAFE PROVIDES 'TRANSLATION' OF LEGISLATION TO SUPPORT WORK OF CLINICAL PRACTITIONERS"

How has EuroSafe Imaging expanded, developed and gone cross –border?

When we started, we were in contact with other countries. We would let them know that EUROSAFE IMAGING would like to launch some "safe campaigns." The EuroSafe Imaging call for action provides radiologists with a simple tool and specific actions to follow for successful implementation for other campaigns worldwide. We supported Africa in developing a radiation protection (AFROSAFE) campaign, followed by Canada (CANADA SAFE) and Japan (JAPAN SAFE). Through EUROSAFE IMAGING we were able to explain the main challenges of radiation protection, which is one of the main areas of the EUROSAFE IMAGING campaign. In addition, during the European Congress of Radiology (ECR 2019), we saw an increasing interest in radiation protection topics. For example, the number of posters submitted for the EUROSAFE IMAGING exhibition and accepted for presentation at ECR 2019, demonstrated an exponential increase breaking previous records. This year we welcomed over 120 posters from experts worldwide, while last year, we had fewer than 90 and the year before only 70. The interest among professionals on the issues of radiation protection has grown. It's a matter of fact that, parallel to EUROSAFE IMAGING, there has been a strong increase of presentations related to medical radiation protection topics at ECR.

The Euratom Basic Safety Standards Directive (Council directive 2013) lays down Basic Safety Standards (BSS) to guard against the dangers arising from exposure to ionising radiation. The requirements of the BSS Directive affect healthcare professionals in radiology in all aspects related to the safety and quality of procedures using ionising radiation. Thus, the BSS Directive provides the legal

framework for most criteria of the EuroSafe Imaging Stars self-assessment. However, many of the criteria used in the self-assessment go beyond the BSS Directive's explicit requirements, which have had to be observed by all imaging departments in the European Union since February 2018. It is important to understand that the EUROSAFE IMAGING Call for Action is not the BSS Directive. With EUROSAFE we provide a 'translation' of the legislation into concrete actions, which are very much in stride within the clinical activity of clinical practitioners.

You chaired the open forum access to medical physics experts in the imaging department: use cases. How will this reinforce the goal to bring the radiologist into the centre of care?

I think it is extremely important to have access to medical physicists. There is a strong shortage of medical physicists in Europe and other countries. It is important to listen to professionals who are working in centres with medical physicists, professionals who are working without medical physicists, and also some companies that are providing medical physicist services. I invited one company like that from my country, France, and showed the attendees that if you don't have access to medical physicists because there is a shortage in your country, you could try to buy medical physicist services.

How do you see Artificial Intelligence (AI) can help reduce the doses for imaging procedures that rely on ionising radiation?

I believe AI is a starting point. It is not only a tool for radiation protection, but it is also a tool for improving quality and safety at large. This is very important. We can address some aspects with AI, which are very important but completely overlooked. Consider the radiologist interpretation of variability. You can take what they learn from a paper published in the last 5 years, comparing radiologists - for example, heart radiologists assisting in developing a new sequence - and we see a very wide variation between each of them. This variability is a non-quality factor, and by using AI, you smooth this variation out. Then, you'll have no variation as the AI system response is always the same, and this is a very important aspect. One other important aspect is the radiology workflow. The workflow is like working in a kind of cockpit. You are not always aware of what is happening in the working room; in particular, you are not aware of emergencies. It is extremely important to have a system which connects with the emergency and which puts this emergency on top of a working list for the radiologists. Our top priority is quality and safety, and AI can help, because you can significantly reduce radiation dosage with AI tools. There are several papers that examine where dosing has been reduced by at least 50% in CT scans. If you consider digital breast tomosynthesis imaging cases, you could reduce the dose by as much as 70%. It is clear AI will help to reduce the dose and can help deal with the difficulty of dose exposure, but also help to reduce the dose of contrast agent, which is extremely important. There is very interesting work from researchers in Stanford that has shown administering an MRI using a 10% dose of gadolinium, provides the same contrast as the full dose. For the moment, there is nothing about CT, but I'm sure it will come.

What other advantages can this technology offer?

AI is a vehicle for improving patient outcomes, and thus it will change the practice of radiology in the next few years and will enhance radiation protection in medical imaging. AI will be a method of demonstrating the clinical value of radiology and will allow for faster and more accurate image assessment and hence diagnosis. AI will also support the training of radiologists, improve clinical knowledge, and contribute to research in medical imaging. Furthermore, AI could have knock-on impacts on radiation protection by reducing the incidence of unnecessary procedures, reducing the doses administered, increasing the image quality, and improving patient safety in general. The transformative potential of AI for the radiology profession cannot be ignored: rather practitioners must be prepared to embrace it. ■

KEY POINTS

- The EUROSAFE IMAGING "safe campaigns" launch is the role model for other campaigns worldwide
- EUROSAFE IMAGING Call for Action provides radiologists with a simple tool and specific actions to follow so that its implementation can be more successful
- The transformative potential of AI for the radiology profession cannot be ignored: rather practitioners must be prepared to embrace it
- Artificial intelligence (AI) is a vehicle for improving patient outcomes, and thus it will change the practice of radiology in the future