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STATEMENT

ESR statement on radiation protection: globalisation, personalised medicine and safety (the GPS approach)

European Society of Radiology

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Abstract
In keeping with its responsibility for the radiation protection of patients undergoing radiological examinations and procedures, as well as of staff who are getting exposed, and with due regard to requirements under European Directives, the European Society of Radiology (ESR) issues this statement. It provides a holistic approach, termed as Globalisation (indicating all the steps and involving all stakeholders), Personalisation (referring to patient-centric) and Safety—thus called GPS.

Main messages
- While being conscious that there is need to increase access of radiological imaging, ESR is aware about the increasing inappropriate medical exposures to ionising radiation and wide variation in patient doses for the same examination.
- The ESR is convinced that the different components of radiation protection are often interrelated and cannot be considered in isolation
- The ESR's GPS approach stands for: Globalisation (indicating all the steps and involving all stakeholders), Personalisation (referring to patient-centric) and Safety—thus called GPS
- It can be anticipated that enhanced protection of patients in Europe will result through the GPS approach.
- Although the focus is on patient safety, staff safety issues will find a place wherever pertinent.

Keywords Holistic approach · Medical radiation protection · Patient protection · Appropriateness · GPS approach

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Introduction

Radiation protection has become a worldwide issue and the European Society of Radiology (ESR) considers it as its responsibility to act. The ESR appreciates the requirements provided under European MED Directive (97/43 and the revised European Basic Safety Standards [BSS] that is under approval) [1, 2]. It realises the compelling need to act against the lack of adoption or adherence to requirements, as observed in a number of EC projects.

- EMAN (European Medical ALARA Network) that was directed at optimisation, http://www.eman-network.eu/
- MEDRAPET (MEDical RAdiation Protection Education and Training), http://www.medrapet.eu/
- Referral Guidelines project dealing with implementation of the MED requirement's on justification (appropriateness), http://www.myesr.org/cms/website.php?id=/en/eu_affairs/newfilename.htm

The ESR was either coordinator or partner in these three EC projects, together with professional and scientific partners, regulatory authorities and expert organisations. [Other organisations participating in the project were: European Organisation of Medical Physics (EFOMP), the European Federation of Radiographers Society (EFRS), the European Association of Nuclear Medicine (EANM), the European Society of Therapeutic Radiation Oncology (ESTRO), the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) and effective cooperation with the World Health Organisation (WHO), International Atomic Energy Agency (IAEA) and Heads of European Radiological Protection Competent Authorities (HERCA).]

The ESR is conscious that while, on the one hand, there is a need to increase access of radiological services to millions of needy patients, a trend of an increasing inappropriate medical exposure to ionising radiation has been observed [3–5]. Further,

there are vast variations in patient doses for the same radiological examination as evidenced by recent Dose DataMed II report [6].

It is these results that create a compelling situation to act with responsibility, as assigned to its profession through Directives and Standards. While conscious of the need to work in cooperation with related professions, ESR is proud of the experience that it has gained through successful cooperation in recent projects as listed above. In recent months the ESR has been having frequent meetings with another stakeholder European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry (COCIR). The ESR is well placed to launch new initiatives.

The ESR is an apolitical, non-profit organisation, dedicated to promoting and coordinating the scientific, philanthropic, intellectual and professional activities of Radiology in all European countries. The Society's mission at all times is to serve the healthcare needs of the public through the support of science, teaching and research, and the quality of clinical service in the field of radiology. The ESR is the European body representing the radiology profession with almost 54,000 individual members and acts as the umbrella organisation of all national radiological societies in Europe as well as Europe's subspecialty organisations (*see* https://www.myesr.org/cms/website.php?id=/en/membership/institutional_member_societies.htm) in the field of radiology. One of the important goals of the ESR is the improvement of safety and quality, for which radiation protection issues play a key role. The ESR's Committee structure includes Subcommittees on Radiation Protection, Audit and Standards and Management in Radiology, for example. The European Congress of Radiology (ECR) organised by the ESR attracts over 20,000 participants that include manufacturers/vendors of radiological, dosimetry and radiation protection equipment, in addition to radiologists, other imaging radiographers, medical physicists and regulators. Beyond the congress, the ESR organises a number of training events for imaging professionals. The ESR is organising a global summit on quality and safety jointly with the American College of Radiology and the International Society of Radiology in 2013.

The ESR's global approach to radiation protection

The ESR is convinced that the different components of radiation protection are often interrelated and cannot be considered in isolation and independently, something that tends to be overlooked by many. Impacting on steps in preparing a referral for imaging by physician, appropriate decision-making for a particular study, scheduling, standardised imaging protocol, optimisation in conduct of examination and procedure by radiographer, involvement of medical physicist for oversight in imaging with minimum dose and desired image quality, recording of doses, QC and, finally, reporting of the study provide a holistic and overall approach (referred to as "global" here, covering the various steps in the chain and involving all stakeholders). In addition, coverage of a larger population through tele-radiology, using methodology of campaign, incentive policies, involvement of medical board, regulators and industry through COCIR for technological developments, education and training, communication as well as clinical audit, provides a complete coverage. There has been growing realisation that regulations alone are insufficient. The purpose is to have appropriate tools and support of medical community and stakeholders.

Personalised medicine (patient-centric radiation protection

The ESR's vision: personalised medicine with patient-centricity in clinical settings. Personalised medicine is a development in the whole field of medicine. Unlike optimisation, where scores of successful examples of patient-centricity can be found, there is a paucity of streamlined actions on patient-centric appropriateness (justification at levels 2 and 3). The ESR plans to have a phased program supported by an electronic "Clinical Decision Support" (CDS) system, with initial emphasis on CT, paediatrics, women and interventional radiology. In primary care for example (ambulatory care) mainly general practitioners (GPs) are involved with a very low-scale IT environment and mostly dealing with non-vital diseases. However, in this setting there can be overuse and misuse of imaging. For the ESR, this is also an issue of awareness, besides making available guidelines. There are typically five to ten known situations with the highest number of CT scans. For secondary care, appropriateness in hospitals is totally different from that in primary care settings. A focus on emergency departments would be efficient, selecting also here typical scenarios with overuse of imaging (pulmonary embolism, head trauma, abdominal pain, etc.). For tertiary care (specialised surgery, interventional radiology) needs are again to be seen in a totally different context. It relates to specialties with a therapeutic approach where risk/benefit has a sense and with true patient contact. In this setting, it will be important to have a holistic approach, and optimisation (including staff protection) becomes most important. Personalised medicine also involves considerations of difference in risks for children, aged persons, persons with chronic and oncological disease, and those with genetic variations increasing radiosensitivity.

Safety

Radiation protection is an important pillar of the safety culture in radiology. Besides optimisation, justification,

clinical audits and education, diagnostic reference levels (DRLs) are valuable tools. The ESR wishes to promote establishment of dose repositories to support dose management and clinical audit to document improvement. Technology holds the key to developments in patient and staff radiation safety [7], and thus developing and utilising dose management tools has the greatest potential. Sub-mSv dose of CT of any body part (head, chest, abdomen, pelvic), dose alerts to avoid overexposures, alert when higher than reference levels are going to be given, communication of dose indices across European countries, dose tracking of an individual patient [8], web-based dose information access to physicians—including on mobile devices, individualised patient-protection-based dose repository, dose maps for the individual patient, eye lens dose estimations and dose maps for patient dose shall provide the needed actions to achieve a high level of safety.

Planned actions and mechanism

1. Clinical Decision Support (CDS) project: a high priority project to provide a European model of IT tools for implementing personalised medicine and patient-centric appropriateness
2. Radiation protection training with certification
3. Clinical audit: a service to be provided by the ESR
4. Patient and referrer information: to strengthen contacts to the partners, mainly through the website
5. Radiation protection campaign: to be launched at the ECR in March 2014, with a wide impact
6. CT (as a first step) dose recording in Europe and dose repositories
7. The drafting of ESR position papers and statements in the field of radiation protection on topical issues such as the imaging of healthy persons
8. Inclusion of a radiation protection column in Newsletter of the ESR
9. Follow-up actions on EC projects EMAN, MEDRAPET and Appropriateness. Further research and development as well as new EC projects.
10. Orientation of radiology leadership towards radiation protection

Expected scenario in the coming years

It can be anticipated that the CDS system will allow the protection of patients in Europe through appropriateness, optimisation actions through technological improvements, dose recording and dose management using DRLs, awareness through website and newsletters and training with certification will all converge to patient safety and will provide a holistic (global) approach. Although the focus is on patient safety, staff safety issues will find a place wherever pertinent.

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