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Hot Topics: Radiation Safety in Bulgaria

Interviewee

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Reporting

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Dr. Jenil Vassileva is a medical physicist working as head of the radiation protection & medical exposure department at the National Centre of Radiobiology and Radiation Protection (NCRRP) Institute at the Ministry of Health in Bulgaria. She is a regular contributor to international meetings on radiation protection and has strong involvement in the development of guidelines, and also lectures medical physics students and postgraduates on the physics of medical imaging and radiation protection. In this interview she shares her concerns about the management of safe and appropriate doses for patients undergoing medical imaging exams involving ionising radiation in Bulgaria.

What Drew You to the Field of Radiation Safety?

I am a physicist by profession and taught nuclear physics for more than 10 years. I helped develop the first Masters programme in medical physics in Bulgaria and defended a PhD on the optimisation of image quality and patient doses in radiography. When the implementation of European regulations started in Bulgaria I moved to Sofia to establish a new laboratory for quality control of radiological equipment. I always believed that QC is only an instrument for radiation protection and quality assurance and this became my credo over the next seven years while trying to look more globally at the process.

Tell Us About the National Centre for Radiobiology and Radiation Protection (NCRRP)

The National Centre for Radiobiology and Radiation Protection (NCRRP) was established in 1963 as a health research institution dealing with the matters of public health protection from ionising radiation. NCRRP ensures the official control of parameters for working and living environments, assessment and reduction of public exposure to sources of ionising radiation, dosimetry monitoring of staff from external and internal sources, and risk assessment for the Bulgarian population and for particular groups. NCRRP introduces the requirements of European directives in the field of radiation protection in Bulgaria. Research units in the NCRRP support methodological work and development of practical methods of radiation protection. NCRRP carries out postgraduate and doctoral training in radiobiology, radiation hygiene and medical radiological physics. In September 2010 we organised an international conference on radiation protection in medicine, attended by 280 participants from 55 countries worldwide. The proceedings of this conference are to be published as a special issue of the journal Radiation Protection Dosimetry.

What Research Projects are Currently Underway at the NCRRP?

NCRRP research groups are involved in the implementation of a number of national and international research projects, mostly in the field of the radiation effects of low doses and medical radiation protection: for example, within the Sixth Framework Programme "Safety and Efficacy for New Techniques" and "Imaging Using New Equipment to Support European Legislation" (SENTINEL) we developed new methodologies to guarantee quality and safety of new digital technologies replacing conventional film and fluoroscopy equipment. Our group was involved in the regional "International Atomic Energy Agency on Radiation Protection of Patients" project. One of its latest tasks is on optimisation of paediatric CT exams. The newest project just starting is on "European Population Doses From Medical Exposure" (Dose Datamed 2) financed by the EC, run by a consortium of five partners from Finland, Norway, Greece, Luxembourg and Bulgaria. NCRRP represents Bulgaria in this project.

You are Involved in the Recent Updates of Guidelines for Radiation Safety in Bulgaria –Tell Us About the Work That You Did?

National diagnostic reference levels (DRL) were initially set out in 2005, budid?t only a limited number (mostly for conventional radiography) were based on a first national survey. DRLs for most procedures were comparable to European levels, except chest radiography, which has a DRL three times higher, mostly because of the soft beam technique used here for this exam. Last year we completed the next national survey of patient doses in diagnostic radiology, covering conventional radiography, mammography, fluoroscopy, interventional radiology, and computed tomography. It was performed within the EC supported twinning project with the Finnish regulatory authority STUK as a partner of NCRRP. 1,600 patient measurements in 46 x-ray radiographic rooms were performed and found that doses are reducing compared to the previous survey,

mainly due to the introduction of more sensitive image detectors, but there are up to 18 percent variations in doses for the same x-ray procedure between departments. In mammography, measurements were done for 32 out of about 150 mammography units and the conclusion was that doses are comparable to those in other European countries but in many systems, problems in AEC settings and film processing were found to influence image quality. The dose survey in interventional radiology included 15 of about 23 systems in Bulgaria. New DRLs for CA, PCI and LLA were proposed that should support further dose optimisation. Patient doses for altogether 46 CT units have been determined, including almost all multi- slice units. This is about 30 percent of the total number (about 160) of CT units in Bulgaria. A report on the national survey with the new DRLs has been published, and feedback to hospitals sent with recommendations for procedure optimisation. This information is included in training courses for medical staff and promoted during meetings and conferences. We hope these actions will support the optimisation process.

Is Demand for CT Increasing in Bulgaria, as in the Rest of Europe?

The number of CT exams in Bulgaria is lower than in most developed countries – about 30 per 1,000 of population, but this is strongly increasing. CT has only 4.9 percent contribution to the total number of imaging exams performed but 30.1 percent of the collective radiation dose. The rates of CT here – 26.4 per million of population - is one of the highest in Europe – but only 22 percent are multi-slice CT, and the average equipment age is 10 - 12 years. One of the reasons for the increasing number of exams is improved image quality and diagnostic information provided to physicians, but there are two specific reasons for this in Bulgaria; the existing system of clinical pathways requiring examinations to be performed as a condition for reimbursement, and the inadequate number of MRI systems – only 45, forming only 22 percent of the number of CT. Our efforts are directed at alerting the medical society about the risk associated with CT and for strong justification of these high dose procedures, especially in children.

How will You Continue to Reduce Unnecessary Imaging Exams Where Radiation is Involved?

There is big potential for dose reduction by reduction of the number of unjustified procedures. In this respect, national appropriateness criteria are under development in Bulgaria. Also, dose reduction in Bulgaria would be improved by tackling the unnecessary x-ray exams prescribed as obligatory by clinical pathways and required by health insurance institutions for reimbursement. Radiologists and radiation protection specialists should work to improve awareness of referring physicians on risks associated with radiological procedures. This was in the focus of one of the panel discussions during the international conference on radiation protection in medicine, held in Varna, Bulgaria in September 2010. The recommendations were to educate physicians from university level, to provide easy access to referral guidelines and to monitor this via clinical audit. Our task is to use simple, understandable terms for doses. Mass screening of asymptomatic individuals is of special concern. Many efforts were made in Bulgaria to minimise chest fluorography as a screening tool for tuberculosis.

How are Nuclear Medicine and Other Radiation-Involved Imaging Exams Organised in Bulgaria? Are They Reimbursed by the National Healthcare System?

Yes, they are, but reimbursement does not always fully cover the real cost of the exam. Also, it doesn't depend on the quality of the exam, neither on the age of the equipment, and this does not stimulate equipment renewal, or support buying second- hand equipment.

What are the Essential Components of a Successful Quality Control Programme in a Medical Imaging Department?

The quality control programme should guarantee that radiological equipment is set in the best way; that it is optimised and continuously maintained. Many people, however, understand quality control as only technical checks of equipment, often performed by external services. This side of quality control is important but insufficient. Successful quality control programme should guarantee that all produced images are of enough quality and patient doses are kept as low as possible. Medical physicists play a key role in the quality control process but radiographers and radiologists should be also involved. Particularly in Bulgaria, the involvement of medical physics personnel is insufficient both because of lack of enough qualified physicists but also because of the inadequate understanding of their role by medical staff and hospital management.

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