

**Summary and Recommendations of the 6th European ALARA Network Workshop on
"Occupational Exposure optimisation in the Medical and Radiopharmaceutical
sectors",
Madrid - Spain, October 2002**

Some 80 participants from 12 European countries attended the 6th EAN Workshop on "Occupational Exposure Optimisation in the Medical and Radiopharmaceutical Sectors". There were 31 oral presentations and 20 poster presentations. In addition to a scene setting session there were sessions on

- Exposure from new technologies in nuclear medicine,
- Exposure from new technologies in radiotherapy and radiology,
- Production, transport and distribution of radiopharmaceuticals,
- Dose monitoring equipment and strategies,
- How to encourage a positive safety culture,
- Training and exchange of information.

The opening paper provided an overview of medical occupational exposure, both in terms of national dose profiles and some of the underlying driving forces. This also identified a series of issues and questions to provide a starting point for the discussions in the Working Group sessions. There were two such sessions where the participants were split into 8 Working Groups tasked with addressing specific issues. The reports from these groups were presented and discussed in the final session in order to identify the key targeted findings and recommendations.

Findings and Recommendations

Workers exposed in the medical sector form a very significant percentage of the European workforce that is occupationally exposed to radiation. The average annual individual doses, for all monitored and measurably exposed workers, varies from country to country by up to about a factor of 10. These differences are also evident in the numbers of people in the higher dose bands. This indicates either significantly different monitoring practices, or different types of work undertaken, or different levels of implementation of the radiological protection system.

Only limited data is available on the breakdown of the sectors of use where the doses are most significant (both in radiology and nuclear medicine). Whilst some of the higher doses are in the traditional general diagnostic area, the dose data and presentations at the Workshop indicate that the major areas of concern are in areas involving new technologies such as in interventional radiology and cardiology.

Different countries and even different medical establishments within countries have different monitoring practices. For example recorded doses may be taken from personal monitoring badges under or on top of lead protective aprons, or from an algorithm using data from both. Similarly for new techniques monitoring protocols may be poorly defined and less rigorously followed by staff who may have previously not been involved in radiological procedures.

Recommendation 1

In order to avoid confounding factors and provide dose data that will be useful in identifying trends and areas of concern, there would be value in harmonised guidance at a European level on personal monitoring protocols.

The European Basic Safety Standard (BSS) are now largely implemented in the legislation of the Member States. However the Workshop identified some areas where the intent of the BSS was not being manifested in the practical implementation of radiological protection: in particular in Prior Risk Assessment, the encouragement of an appropriate Safety Culture, implementing an appropriate training programme and involvement of Qualified Experts.

The concept of Prior Risk Assessment is generally well understood with respect to general safety issues in the medical sector but it was noted that radiological protection risks are often not included. This appears to be particularly so for new procedures and new technologies.

Recommendation 2

Regulatory and professional bodies should influence managers and others responsible for safety to systematically include the consideration of radiological risks into prior risk assessments: particularly where new technologies or procedures are being used.

The carrying out of appropriate Prior Risk Assessments is one manifestation of a good safety culture. The way Regulators encourage and/or enforce regulatory requirements can set the tone for safety cultures but it requires the involvement of all stakeholders to be a success.

Recommendation 3

- a) Management, whether of a large medical establishment or a smaller clinic, should actively seek the involvement of workers; in particular workers experience should be harnessed;
- b) Professional bodies have the infrastructure and mechanisms to influence practical radiological protection. They are encouraged to use them to maximum effect;
- c) When providing new equipment or supplies, manufacturers and suppliers have a golden opportunity to influence the practical implementation of radiological protection. They are encouraged to not only provide safety information but to actively engage in dialogue with customers to further this end.

Appropriate training of staff, at all levels, is a fundamental building block in the attainment of good radiological protection culture. Many mainstream professions that have involvement with well-established uses in the medical sector e.g., radiologists and radiographers, include radiological protection training in their professional training curriculae. This introduction of new equipment and procedures provides challenges that require positive updating training provision. However new equipment and procedures often widen the scope beyond those that have had radiation protection training as an element in their professional training. The Workshop identified that these groups of staff are a particular area of concern, often starting

to use radiation without any training – Something that an appropriate risk assessment should identify.

Recommendation 4

National Authorities, in consultation with professional bodies should:

- a) Periodically review the radiological protection content of professional training course to ensure it meets appropriate standards;
- b) Give advice on the need for refresher training and “Continued Professional Development”(CPD); and
- c) Ensuring that prior risk assessments address the training requirements for those involved in new procedures.

The BSS requires the appointment of Qualified Experts (QE). The professional input on radiological protection that a QE can provide, can be a major factor in the implementation of many of the above issues. However it is clear from the Workshop that there were very significant differences between Member States in:

- a) the perceived role of a QE in the medical sector; and
- b) the training and attributes of a QE.

The standards appeared to vary from a QE having one week’s training and little power or influence, to someone having to have significant radiological protection training plus 3 years practical experience before taking on the QE function, often with the ability to directly influence senior management. A Working Group of the Article 31 Group established under the Euratom Treaty is looking at harmonising standards for Qualified Experts.

Recommendation 5

The Workshop recognised that the participation of appropriately Qualified Experts in the development and implementation of radiological protection programmes was crucial. The EC should request the Article 31 Working Group to give priority to clarifying advice on (a) the role of QEs, and(b) training and qualifications required.

During presentations and discussions at the Workshop it became clear that professional bodies, national authorities and international bodies had developed a range of guidance documents on different subjects, but that their existence was not widely known.

Recommendation 6

In order to provide a focus and a means of avoiding groups “re-inventing the wheel”, the EAN should make arrangements to have a section of its website devoted to listing (and providing links to) existing guidance documents in the medical sector.

It is also important that when accidents and incidents occur, they are appropriately reported so that others can learn the lessons from these events.

Recommendation 7

Professional bodies, national authorities and international bodies should liaise to ensure that there are appropriate mechanisms in place for the reporting of accidents and incidents, and the dissemination of lessons learned.

Several presentations covered the relatively high whole body doses associated with new techniques particularly in interventional radiology and nuclear medicine. It was also noted that these situations also result in high extremity doses, not just to the hands, but to the legs of interventional radiologist. A number of papers focussed on methods for assessing extremity doses, including electronic that can enable the pattern of exposure from individual actions to be examined and the data to be available as soon as the procedure has been completed. This immediate feedback can be used to improve specific procedures but also has a secondary but important function of raising awareness of radiation protection issues and good practice.

Recommendation 8

The EU and national authorities should support research into the development and use of electronic dosimetry systems.

Papers were presented on the expanding range of isotopes and their uses in nuclear medicine. However it appeared that the methodologies for appropriate dose assessments were not keeping pace with these developments.

Recommendation 9

The EU could provide a useful focus for developing and implementing appropriate methodologies for internal dose assessments.

It was identified that there can be strong links between the profiles of patient doses and occupational exposure. The establishment and use of Reference Doses for standard procedures have been shown to be of significant value in focussing attention on radiation protection issues and optimising both patient doses and occupational exposure.

Recommendation 10

The EU and national authorities should take measures to encourage the development of Reference Doses for new procedures.

There was considerable discussion of approaches to controlling the occupational exposure of pregnant women. Whilst national regulations are based on Article 10 of the BSS Directive there appeared to be considerable variation in the national guidance and practices; often reflecting underlying social cultures. Whilst the issue transcends the medical sector, the scale

of medical procedures and the high proportion of women in the occupationally exposed group, make the medical sector important.

Recommendation 11

There would be value in international organisations developing harmonised approaches to

- a) Dosimetric assessment of doses to the embryo/foetus;
- b) Practical criteria for identifying work activities that pregnant women should not undertake;
- c) Administrative procedures for the declaration of pregnancy.