

## **ALARA BASED POLICY RECOMMENDATIONS FOR MEDICAL PRACTICES IN BELGIUM**

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Since 10 years the Belgian Health Council is trying to improve radiation protection in medical practices applying ionising radiation, through the edition of regular policy reflections and recommendations. New developments in radiology and nuclear medicine receive a systematic follow-up through high level networking of a broad scope of expertise. The physical agents section of the Health Council, which covers radiation, plans advisory work in advance based on expected protection needs in the hospital field.

The implementation of the triple protection philosophy of radiation protection essentially requires a basic rational concern on potential effects of low doses of ionising radiation. This risk concern is usually rather low among medical practitioners, but the balanced contribution of as well leading academic medical specialists as hospital physicists and radiation protection officers has allowed developing common views. This three party stakeholder involvement applied in the Health Council has proven to be successful for reaching consensus among experts, also in practical recommendations. The procedure still allows the expression of minority positions if required. The involvement of patients could not be organised yet, but media amplification of small incidents with patients has put some issues on the agenda, for example, the incineration of radioactive corpses. Growing union attention for risk management in hospitals has been noticed but was not influencing the science based advisory work in this forum up to now.

The risk base for ionising radiation was discussed regularly in order to establish and understand the scientific foundation of the ALARA principle. New developments in epidemiological knowledge and the progress in molecular biology, yielding new insights in genetic susceptibility, have allowed broadening the scope of dose effect discussions from single factor causality to multi factorial exposure impact on cancer process factors. Particular attention was given to foetal sensitivity which requires specific radiation protection measures.

Higher dose exposure which occurred numerous times at international level in medical practices, such as interventional radiology, increased risk awareness. ICRP progress in this field was discussed and increased the ALARA interest in the Health Council policy for those specific exposed groups.

We also had to face the double paradox in perception of radiation risk where medical staff as well as patients express few concern for increasing doses in medical exposure. It was put forward in the environmental reporting of the government that CT exposure became a dominant factor in the evolution of public exposure to ionising radiation in Belgium. Also the effective dose as risk indicator received increasing criticism. The perception issue was considered through expert inquiries and by using PISA results of the IRSN risk barometer adapted to and applied in the Belgian context. Considering some evidence and accompanying uncertainties in the risk base, policy recommendations focussed on justification and optimisation with particular attention for practical issues and specific exposure conditions of staff and patients.

In radiology, justification was addressed in a generic way since specific or case based justification should remain the full competence of the medical practitioner. Radiation protection could have been much better integrated in the judgement capacity of both prescribers and clinicians through guidance and training. Each of them should at least make a justification exercise integrating risk without impact on the essential medical requirements. In order to limit exposure to what is medically required, a reduction of procedures and images can be needed for sufficient diagnosis as well as an optimal choice in medical imaging techniques (compared to MRI, US, etc.). The diagnostic capacity should take the lead on excessive image quality requirements possible with the resolution opportunities offered by

new technologies. Particular attention was given to justification of new trends in the market such as total check up by CT. This commercial practice from the USA is an ethical problem often lacking medical evidence. It could create increasing collective doses and cause problems in cost management of health care. Vascular brachytherapy was given attention in the Health Council too, but non nuclear new technologies replaced it soon.

Optimisation of exposure and protection in justified practices was developed in depth and supported by results of field research at PhD level. The focus was on the interventional radiology, in particular cardiology, during the last years. Recommendations have first addressed the need for dosimetric insight in as well patient as staff exposure and the derivation of dose reference levels, as aiding tool in Quality Assurance protocols. The Health Council recommended a multi-centre dose survey by experienced hospital physicists. The regulator FANC/AFCN financed a two year study leading to results discussed in detail. The use of a better estimation of average effective dose was further recommended in order to support ALARA studies. Moreover the authorities were recommended to consider specific epidemiological follow up of specific groups such as prematures (also recommended earlier in France by V. Lefaire) and medical staff in interventional radiology. A side aspect allowed clarifying the use of double dosimetry for staff in interventional radiology. As cataract represents a health challenge for this group and as it is no longer for sure that a threshold exists, specific dosimetry efforts will be required as well for the lens of the eye as for skin dose in IR. Specific recommendations for optimisation of patient protection were developed for different aspects of interventional radiology, giving particular attention to registration of DAP measurements and to pay attention to parameters such as copper filtration. Extra training was also suggested including procedures for optimisation.

A second focus of the Health Council was CT where particular attention was given to pediatric exposures. Considerable opportunities exist for justification. Optimisation was again considered at PhD level in support of recommendations. Bad practices were identified. A final report is expected for June 2006.

A third focus was the justification and optimisation of protection of patients and staff in nuclear medicine where contamination presents an additional challenge. Precise criteria for patient handling were developed, optimising the exposure of relatives as well as patients with particular attention for children and pregnancy. Some acute problem of staff exposure at extremities will be considered in new PET practices where refined dosimetry allows optimisation of protection. The radioactive contamination of patients in palliative practices received separate attention and lead to a recommendation on handling radioactive corpses in different funeral practices.

Finally the production and handling of biomedical and hospital waste was considered, leading to successful 'storage for decay' policies in Belgian universities. This was developed as optimised solution, such as originally set up by Shapiro at Harvard.

The ALARA principle and its application through justification and optimisation were framed within the general discussion of precaution in health in collaboration with the Dutch Health Council. As the ALARA principle can be considered as a precursor of the precautionary principle, cornerstone of sustainability at UN level, optimisation can be seen as a precautionary approach extending regulatory developed prevention in the context of uncertainty. A sociological case study was made on the implementation of this principle within the Health Council policy recommendations on radiation protection. Results are discussed.

The driving impact of the Health Council on optimisation practices in medicine mainly attempts to stimulate a cultural change on risk awareness, *conditio sine qua non* for improving protection practice. The controversies negating low dose effects, as supported by the French Academy, are considered in Belgium by a lot of experts as counterproductive for ALARA dynamics.