BY COLM SAIDLÉAR

Dose management in paediatric radiology – where to next?

Carers, patients, staff and the public are more and more concerned with the radiation doses that children receive while in our healthcare setting.

Why is it different this time to the previous episode of care, which may have occurred in a different location; why are protocols and therefore doses not the same; what does that mean for me and the outcome of my particular diagnostic interaction, and also, in the long term, with regard to cancer risks? These are challenging questions to us individually and as organisations. Can we confidently, and from a position of confidence, answer these questions in a manner that is reassuring, and do we have the evidence to back up what we are saying?

Though risk benefit assessment should be scientific and evidence-based, it inevitably includes social, ethical, cultural, and individual preference. The recent ICRP 2018 publication 138 on 'Ethical foundation of the system of radiological protection' states that 'Procedural values such as accountability, transparency and inclusiveness, reflect the importance of allocating responsibilities to those involved in the radiological process (the radiology team including physicists) and also of preserving the autonomy and dignity of the individuals potentially or actually exposed to radiation'. A demonstrative audit tool has been proposed by Malone and Zolzer that incorporates a five value-based system, which provides an ethical framework to help judge and analyse situations that arouse ethical concerns in radiology.

Individual radiology departments and staff are always cautious about using radiation especially in high dose procedures, and indeed investigate and propose alternative non-ionising solutions where possible. In the last decade, enormous strides have been made to support this position, not just by individuals, but also by entire organisations. Where imaging involving ionising radiation is required and justified, the wider radiology community and various international bodies have produced guidance and regulatory documents supporting and establishing the above basic principle in detail. Implementation of the ICRP concepts of incorporating risk, justification and optimisation into the imaging process has led to the concept of keeping dose as low as reasonably achievable while producing appropriate diagnostic images. This has come full circle and has been consolidated under the Council Directive 2013/59/Euratom (Basic Safety Standards) and specifically in paediatrics with 'The Safety Report No. 71 of the IAEA 2012' which highlights and requires the ICRP concepts to be addressed. That is taking a holistic view of the patient's journey from referrer to specialist care, including their entire healthcare journey. Recent work by Kirk et al (EPOS 2018 poster) demonstrated the positive impact that information leaflets have on reducing parental anxiety and satisfaction. Further initiatives include the book 'The Gentle Way' published on the occasion of the International Day of Radiology (IDoR) 2015 by the European Society of Radiology, and more recently RP 185 (European Guidelines on Diagnostic Reference Levels for Paediatric Imaging) by the European commission (2018) and the ESR EuroSafe Imaging campaign in Europe. These have all enabled and empowered departments and entire healthcare communities to consolidate their policies, procedures, protocols and guidelines while at the same time providing international benchmarking tools and dose reference levels.

This is an agenda item close to my own heart as in Ireland we are currently amalgamating the three existing children's hospitals in Dublin into one single organisation, Children's Health Ireland (CHI). CHI will have responsibility for all paediatric care all over the island of Ireland; that is, all paediatric patients who have a complicated and serious illness and need specialist and complex care. A hub-and-spoke model is currently being established that will initially be concentrated in Dublin, where a new digital children's hospital and two new paediatric urgent care and out-patient satellite units will be located on the periphery of the city, north and south. These are currently under construction. The primary principle of this network is to conveniently deliver the most acute paediatric services locally, with regional units clearly identified and supported from the centre, with all highly specialised and national services consolidated in one children's hospital.

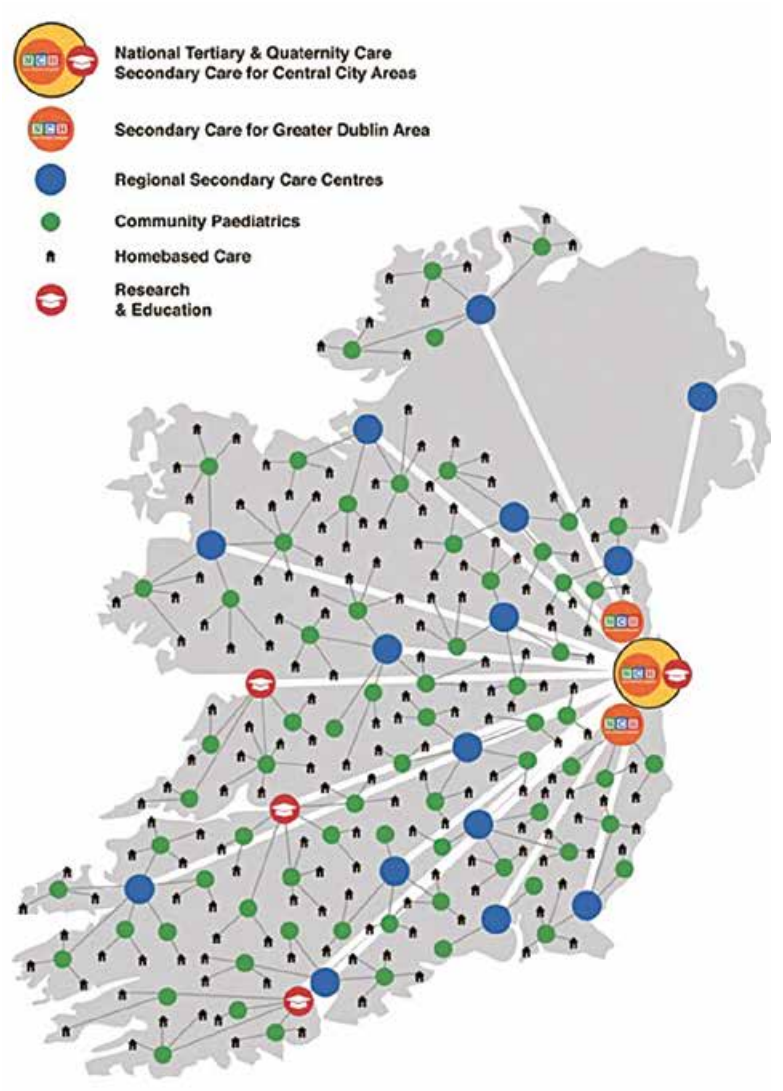
This is a unique opportunity for radiology to influence and standardise paediatric dose management, not just in the main hospital, but also in other hospitals in Ireland that carry out paediatric imaging procedures.

We are currently standardising our protocols and procedures and implementing a single PACS incident across the paediatric network in Dublin to facilitate seamless data transfer and access to patient data from any location in a fully digital solution. This will allow us to establish cross hospital protocols, DRL's, standard of care and operating procedures which will then be benchmarked against international best practice.

Through a process of local and cross-hospital audits from the current paediatric hospitals, a national paediatric DRL will be established (see EPOS 2018 poster by Moran et al). This is in alignment with the vision for acute children's healthcare in Ireland; that is, "The re-configuration of paediatric service within other Hospital Groups to reflect the paediatric population served, keeping appropriate services local and supported by outreach from the new children's hospital."

Physics refresher course RC 1313 today on paediatric radiography, interventional radiography, CT and neonatal imaging will highlight dose management in paediatric radiology and that it is the responsibility of all to ensure that the radiation dose that we are exposing children to is appropriate and justified, adequate and optimised for the specific purpose intended, producing diagnostic images that will contribute to effective patient care and management.

Colm Saidléar is lead imaging and radiation protection physicist for Children Health Ireland and Temple Street Children's University Hospital in Dublin, Ireland.



Hub & Spoke Model, delivering the right care in the right place, Children's Health Ireland

Refresher Course: Physics in Medical Imaging

Saturday, March 2, 08:30–10:00, Room G

RC 1313 Dose management in paediatric radiology

- **Chairperson's introduction**
  C. Saidléar; Dublin/IE
- **A. The special case of the paediatric patient: risks and justification**
  C. Owens; London/UK
- **B. Optimisation and technology in paediatric projection radiography, interventional and CT scanning**
  V. Tsapaki; Athens/GR
- **C. Optimisation in the neonate**
  H. Delis; Vienna/AT
- **Panel discussion: Paediatric dose management: are we doing enough for the next generation?**

This session is part of the EuroSafe Imaging campaign.