PAEDIATRICS

A NATIONAL MODEL OF CARE FOR PAEDIATRIC HEALTHCARE SERVICES IN IRELAND

CHAPTER 41: PAEDIATRIC RADIOLOGY

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ROYAL COLLEGE OF PHYSICIANS OF IRELAND

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41.0 INTRODUCTION

Radiology has a central and indispensible diagnostic and therapeutic intervention role in neonatology and paediatrics. The demand for paediatric radiology services has risen rapidly over the last decade, and there is every indication that its contribution to paediatrics will continue to grow.

Paediatric radiology poses a number of intrinsic challenges. The underlying spectrum of pathology varies significantly with the age of the child. The interpretation of radiology in young children with suspected non-accidental injury can be very challenging. There is a greater emphasis on minimising the dose of radiation exposure. Compared with adults, there is a greater use of ultrasound and less use of CT. Contrast fluoroscopy has decreased but the demand for MRI has risen rapidly. Interventional radiology services are still very poorly resourced in children. A proposal for interventional radiology is being developed for the new children's hospital.

Radiology trainees only get two months exposure during their pre-fellowship training. They find paediatric radiology a steep learning curve. The radiological interpretation is different to that encountered in adults. It requires a lot more understanding and patience in order to get the child's co-operation with the examination. There is a post-fellowship training programme in Ireland with three specialist registrar (SpR) posts. Those considering a career in paediatric radiology usually then go to the United States (US), Canada, Australia or the United Kingdom (UK) to obtain further training in the specialty.

Paediatric radiology services are patchy and fragmented outside of Dublin, and this paucity around the country is a major limiting factor in the delivery of care to children.
This document sets down how the current paediatric radiology service should be reconfigured and expanded. It sets down a vision for the future of imaging in children in advance of the amalgamation of the three children's hospitals in Dublin and the opening of the new national paediatric hospital.

Background

Historically, the standalone arrangement of the two Dublin paediatric hospitals created the right platform for the appointment of full-time paediatric radiologists. A service is also provided by paediatric radiologists in the Dublin maternity hospitals. Outside Dublin, all the paediatric units were sited within adult hospitals. The radiology services developed differently, with radiology for children being provided for by general radiologists with or without an interest in paediatrics. Over time paediatric radiology has become more complex and more extensive. Many general radiologists are uncomfortable taking on a substantial paediatric workload. As a result many paediatric units are only able to access a basic radiology service.
When the National Clinical Programme for Paediatrics and Neonatology clinical leads visited the paediatric units across the country, the scarcity of paediatric radiology outside of Dublin and Cork was commented on by most paediatricians. The difficulty in obtaining a diagnostic ultrasound was a frequent concern. In many instances, children have to travel long distances to Dublin just to get a radiological investigation, and especially after hours. Children are more sensitive to radiation than adults. Techniques to minimise radiation doses in CT and other radiological imaging need to be well understood by all who image children whether in a tertiary paediatric hospital, a regional hospital or a local hospital.

It was clear to us that paediatric radiology services needed an urgent review. The development of this model of care offers an opportunity to determine what is required to both improve the service and to make it more accessible to children. Within Dublin, the integration of the service needs to be addressed in terms of manpower, information technology, equipment and facilities. Standardisation of policies and procedures across all sites should be possible. Access to a national imaging system such as NIMIS is already available in Crumlin and in several hospitals across the country. This facilitates the transfer of imaging across sites when patients are transferred between hospitals or when second opinions are sought across hospitals for patient care. More cross-hospital access to imaging will improve patient care. Outside Dublin, services must be properly planned. If this does not happen, the drift of children into Dublin for investigations will be further exacerbated. The model needs to ensure that plain radiology, ultrasound and MRI can be performed locally. This is important not only for the undifferentiated child but also children with complex conditions such as cancer who require follow-up imaging. The model must be capable of integrating local services with a clear national vision.

41.1 CURRENT SERVICE PROVISION AND PROJECTED NEED

The numbers of paediatric radiologists nationally and projected needs are as follows:

Hospital	Current Paediatric Radiologists (WTE)	Projected need Paediatric Radiologists (WTE)
New children's hospital and urgent and ambulatory care centres in Blanchardstown and Tallaght - diagnostic	-	20
New children's hospital and urgent and ambulatory care centres in Blanchardstown and Tallaght – PIR	-	5
Temple Street Children's University Hospital	4.1	
Our Lady's Children's Hospital, Crumlin	5.7	
National Children's Hospital, Tallaght	2	
National Maternity Hospital, Holles St.	0.6	2
Rotunda Hospital	0.7	1
Coombe Women and Infants University Hospital	0.3	1
Cork University Hospital	0.8 (2 x 0.4 paediatric / 0.6 general)	2
Limerick University Hospital	0.4 (0.4 paediatric / 0.6 general)	2
Galway University Hospital	-	2
Waterford	-	2
Drogheda	1WTE	2
Total	13.6 WTE	39

There are 13.6 WTE paediatric radiologists in Ireland. The remainder of radiology services for children are dependent on general radiologists.

The projected need accounts for additional paediatric radiologists for the new children's hospital to reflect the workload involved in 3 to 5 additional MRI scanners, and up to four additional ultrasound scanners including the urgent and ambulatory care centres in Blanchardstown and Tallaght. The National Maternity Hospital projected need reflects the installation in 2015 of an MRI scanner. There is a growing need to staff the workforce implications of providing support and second opinions from the tertiary centre to other paediatric units around the country. To feed this workforce need there will have to be more paediatric radiology SpRs as well as research support structures. There will also be a need for anaesthetist cover for general anaesthetics especially for MRI and Paediatric Interventional Radiology (PIR). There will be a need for trained paediatric radiographers, clinical specialists and a team of skilled nurses particularly for sedation and for PIR. The Imaging department in the new children's hospital will need managers, ICT staff, data managers as well as administration staff. It will also need additional physicists.

41.2 PROPOSED MODEL OF CARE

Radiology services for children should be provided on a 3-tier structure based in local, regional and tertiary hospitals:

1. The local hospital radiology service is provided by general radiologists and radiographers. Ideally at least one of the radiologists will have a special interest in paediatric radiology. The department will provide the following: plain radiology, basic ultrasound, limited fluoroscopy and emergency CT/ MRI scanning. It should have a well developed PACS system that is closely integrated with the tertiary radiology department.
2. The regional hospital should be capable of providing a wider range of radiology services for both the hospital itself and the surrounding local hospitals. The department should have one full-time paediatric radiologist and preferably at least one radiologist with a special interest in paediatrics. The department should have a number of radiographers who have trained in a recognised paediatric radiology centre. The services provided should be: plain radiology, ultrasound, and fluoroscopy of the upper gastrointestinal tract, emergency CT and MRI scans.
3. The tertiary hospital (including neonatal units of maternity hospitals) should provide the full range of paediatric radiology investigations as follows:
    - Plain radiology
    - Ultrasound (including ultrasound of the neonatal hip)
    - Fluoroscopy (including feeding studies and intussusception reduction)
    - CT and MRI scanning
    - Radio-isotope scanning

In addition, the tertiary unit should provide a range of intervention services. PIR is currently a particularly poorly resourced area of paediatric radiology. The principle is that it should not be acceptable for children to be treated by open surgery when they could be treated with a minimally invasive percutaneous image-guided therapy. Common PIR procedures include:

- Aspiration and drainage of fluid collections
- Nephrostomy and urological intervention
- Gastrostomy, oesophageal dilatation, transgastric jejunal tubes
- Image guided biopsy

A PIR service requires a planned infrastructure with the following components:

1. Ring fenced sessions for the paediatric radiologist
2. Nurses and radiographers with training in PIR procedures
3. Anaesthetic cover to support the sedation and general anaesthesia for invasive procedures
4. A designated area that is appropriately equipped

In Dublin there is a need to expand and develop paediatric interventional radiology. A team needs to be formally developed in Temple Street and Crumlin in order that the service is fully operational at the time the national paediatric hospital opens.

41.3 REQUIREMENTS FOR SUCCESSFUL IMPLEMENTATION OF MODEL OF CARE STAFFING

It is clear that the number of paediatric radiologists needs to be increased particularly outside Dublin. The regional centres at Cork, Limerick and Galway need consultant appointments in paediatric radiology. The issue is particularly pressing for Galway. The strengthening of paediatric radiology services in regional centres will be beneficial to the local hospitals as well. We would recommend the appointment of two paediatric radiologists each at Cork, Limerick and Galway.

Education and Training

Ireland has an excellent general paediatric fellowship training programme that is highly regarded internationally. Consideration should be given to increasing the trainee exposure from 2 to 3 months. Periods of training in paediatric radiology should be expanded for trainees in their fifth year. It is appreciated that the level of interest expressed by trainees in paediatric radiology will be dependent on the job opportunities in the specialty. The development and expansion of paediatric intervention radiology will contribute to the training opportunities.

In local hospitals the routine radiology services for children will continue to be provided by general radiologists. In the future new appointees should have additional training in paediatrics. During the 5 year programme trainees should have the paediatric radiology module increased from to 2 to 3 months. An option for interested trainees to do six months paediatric radiology during their pre-fellowship training should be considered. During the post fellowship pre-CCST year, further opportunities for training in paediatric radiology are available. Currently there are three such posts between Temple Street and Crumlin.

41.4 GOVERNANCE, PROGRAMME METRICS AND EVALUATION

The governance and structure of paediatric radiology services depends on the size and extent of the service. In Temple Street and Crumlin there are designated paediatric radiology departments with a chairman. In both hospitals data on activity and number of investigations is readily available. In all the other hospitals paediatric radiology is part of the general radiology department. The general and paediatric data tends to be combined. It is more difficult to extract the paediatric procedure numbers. Into the future there will need to be a national

perspective for paediatric radiology. To begin with it will be necessary to know the total number of paediatric radiology investigations undertaken on children throughout the country. The model will need to specifically set down what services are to be provided by local, regional and tertiary children's hospitals.

41.5 KEY RECOMMENDATIONS

- Increase the number of consultant paediatric radiologists, particularly outside Dublin. Two consultant paediatric radiologists each should be appointed to Cork, Limerick and Galway.
- The number of higher specialist trainees in paediatric radiology should be increased, and during the 5 year higher specialist training programme the paediatric radiology module should increase from to 2 to 3 months.
- In Dublin, there is a need to expand and develop paediatric interventional radiology.
- At least one general radiologist working in a local paediatric unit should have a special interest in paediatric radiology.

41.6 ABBREVIATIONS AND ACRONYMS

CCST	Certificate of Completion of Specialist Training
CT	Computer-aided Tomography
MRI	Magnetic Resonance Imaging
PACS	Picture Archiving and Communication System
PIR	Paediatric Intervention Radiology
SpR	Specialist Registrar
UK	United Kingdom
US	United States

41.7 REFERENCES

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