



PAEDIATRICS

A NATIONAL MODEL OF CARE FOR PAEDIATRIC HEALTHCARE SERVICES IN IRELAND

CHAPTER 10: PAEDIATRIC RESEARCH



Féidhmeannacht na Seirbhíse Sláinte
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**ROYAL
COLLEGE OF
PHYSICIANS
OF IRELAND**

BUILDING A NEW FRAMEWORK FOR PAEDIATRIC RESEARCH

Changing The Culture

The biggest challenge facing paediatrics in Ireland is how to develop a national research culture. In this context, culture means a system of widely shared and strongly held beliefs about research. Culture provides a supportive context in which research is expected, encouraged, discussed, and valued. A productive research environment requires good governance, good leadership, and committed research staff. Essential services include mentoring programmes, continuing education courses, grant writing support, research funding, and encouragement for the attainment of higher degrees. The drivers of the research culture include seminars on grant preparation, grant writing, data analysis, manuscript development, literature review, and manuscript preparation. There needs to be a culture of producing high quality research that is rigorous, accurate, original, honest, and transparent.

Surveys have found that the factor with the most negative effect on research culture is inadequate funding. Young researchers quickly become disillusioned after spending a lot of time unsuccessfully applying to grant-giving bodies that have a small and shrinking pot of money. In these circumstances, trainee doctors quickly conclude that scientific research is a futile career option, and they revert to the safer clinical care path. At a Royal College of Physicians of Ireland (RCPI) trainee day on research and publication in October 2015, many attendees stated that they had negative associations with research. This is in contrast with their basic specialist training (BST) and higher specialist training (HST), which they find supportive, encouraging, and rewarding. The image of research needs a 'makeover' otherwise there will continue to be recruitment problems. Expansion of the consultant workforce will mean that applicants will no longer need a body of research in order to secure a post. Research will be an 'optional extra' rather than a career necessity, as has been the case in the United Kingdom (UK) for many years. Research requires clear pathways for prospective trainees. Trainees are unimpressed by insecure, partial funding which may run out midway through the project.

Irish paediatric research has gone through a difficult decade due to the financial crisis and the reduction in healthcare expenditure. Funding, however, is not the only issue. Lack of protected time is a significant barrier to clinicians undertaking research. The standard of research being proposed and undertaken needs to increase in order to compete for large national and international funding calls. In the future, there needs to be a co-ordinated national approach to paediatric research. A central group or director (i.e. chief academic officer) should be appointed to establish and drive research nationally. This is consistent with the vision for the new children's hospital. A proportion of consultant research posts should also be created with 50% of their time ring-fenced for leading research programmes. In addition, nurses and health and social care professionals should be supported to undertake research in addition to clinical roles. An integrated strategy for research will allow researchers to share scarce resources such as nursing support, statistical advice, laboratory tests and imaging facilities.

The Importance of Research

The executive summary of the Nuffield Council on Bioethics Report on Children and Clinical Research (2015) states that "the time has come to protect children through research, not from research". Evidence based on research undertaken on adults is not sufficient, because disease affects children differently due to their unique and immature physiology. Clinical research that involves children is necessary in order to improve the understanding of childhood diseases, and to inform on how best to manage them. It needs to be more widely known that many medicines prescribed to children have not been tested in children. The evidence available as to how children may respond to

medications, and the most appropriate dosages, are necessarily limited. Without well-conducted research, there is no prospect of improving healthcare for children now or in the future, and there is a real risk that children will be harmed by procedures and medicines that are ill-adapted for children. The starting point should be that scientifically valid and ethically robust research, addressing questions of importance to the health of children and young people, is seen as intrinsically good.

In addition, many adult chronic diseases originate in childhood. Paediatric research must address this, generating evidence to improve the quality of the health care services provided and informing service planning. Good clinical practice and the development of new treatments for children is underpinned by research – today’s research is tomorrow’s standard of care. It is acknowledged internationally that the best paediatric hospitals are those that are research active. Research must be a primary focus of both the new children’s hospital and this national model of care for paediatrics and neonatology, and there is a unique opportunity to drive excellence in paediatric research in Ireland through integration with patient care and education. The new children’s hospital will concentrate paediatric expertise in one site, helping to achieve critical mass of both patients and staff at subspecialty level, and there will be numerous additional benefits arising from co-location with an adult hospital.

There are many types of child health research (RCPC, 2012):

- Descriptive studies (epidemiology of disease, health indicator monitoring)
- Elucidation of aetiology and mechanisms of disease (pre-clinical and clinical research)
- Development of interventions (medications, health technologies, preventive strategies)
- Efficacy studies (clinical trials)
- Effectiveness research (phase III clinical trials, health services research, quality improvement programmes and case reviews, policy evaluation)
- Qualitative research
- Policy research (primary and evidence synthesis)

There are a number of research work streams that can be readily developed:

- Examination of the relationship between health-related behaviour and conditions such as obesity
- Normal child development and how it is altered by neurological disorders
- Patterns of diseases and how they evolve
- Prevalence of childhood conditions
- How new treatments or interventions may work
- How medical conditions affect a child’s life
- Studies of patients or ‘service user’ experience of the healthcare provided
- Development of a properly funded, sustainable paediatric basic science programme

There should be greater resources and support for those willing to undertake studies on medicines in children. Ethically based co-operation between investigators and the pharmaceutical industry can be beneficial for children both in understanding how a drug works and in determining the optimal dose. Phase I trials are the first human studies that are undertaken in a small group of volunteers in order to check safety. Phase II trials determine how effective the drug is in a controlled environment and involves approximately 100 people. Phase III trials study the efficacy of the medication compared with another drug or a placebo. Phase IV trials take place after the drug has received a license. They are undertaken to check safety and effectiveness. Phase I and II trials are mostly carried out on adults but phase III and IV trials can be undertaken in children. While there are some clinical trials on-going in both Temple Street Children’s University Hospital and Our Lady’s Children’s Hospital Crumlin, it is to be hoped that more studies will be undertaken in children in the future.

Paediatric Research Bodies in Ireland

In Ireland, research in child health and disease is carried out in a variety of settings by a range of institutions, groups and individuals. There is currently no national paediatric research strategy. The National Children's Research Centre (NCRC) has developed a strategy for research funding, while research priorities have been developed for children's nursing in Ireland (Brenner et al., 2014) and for health and social care professionals (McKenna et al., 2010).

The NCRC is the largest paediatric research institute in Ireland, with over €30million committed to paediatric research over the last six years. Funding from the Children's Medical Research Foundation is awarded on the basis of competitive peer review (national and international expert reviewers) to the priority areas of immunology/infectious diseases, congenital malformations, gastroenterology, obesity/diabetes and paediatric cancer. Research is conducted principally in Our Lady's Children's Hospital Crumlin (Crumlin) with associated universities (UCD, TCD, RCSI, UCC and UL) and partner hospitals:

- Temple Street Children's University Hospital (Temple Street)
- National Maternity Hospital Holles Street
- Coombe Women and Infants University Hospital
- Rotunda Hospital
- Tallaght Hospital
- Cork University Hospital
- University Hospital Limerick

Representatives from the NCRC, Tallaght Hospital and Temple Street formed the Dublin Paediatric Research Forum as paediatric tertiary services are fragmented across three sites, which has compromised the development of paediatric research. This group has identified areas of overlap in research interests, which may form the basis for joint strategy in the future.

A Department of Research was established in Temple Street in 2010, which has improved the research culture there. Data from 2013 showed 57% of consultants were involved in a research project, and the number of publications has increased annually. The aim is to encourage and facilitate investigators to find new diagnostics, treatments and cures for childhood diseases, and to set new standards of paediatric care by improving clinical effectiveness, patient outcomes and children's experience of healthcare. Research in Temple Street is largely funded by the Temple Street Foundation. The National Children's Hospital Fund also supports research and equipment in Tallaght hospital. Other sources of funding for Irish research include the Health Research Board, Science Foundation Ireland, the Medical Charities Research Group, government departments (longitudinal Growing Up in Ireland study), charities, industry and other international groups.

The Irish Centre for Fetal and Neonatal Translational Research (INFANT) is a perinatal research centre (<http://www.infantcentre.ie>) funded by Science Foundation Ireland and based at Cork University Maternity Hospital. INFANT is developing solutions to address the unmet worldwide clinical need for effective screening tests for the most common complications of pregnancy and the most significant problems for newborn babies. INFANT is leading the way to create next-generation devices that will facilitate both point-of-care and remote monitoring and diagnostics. INFANT hosts a number of international perinatal clinical trials of medicinal products and medical devices including the EU FP7-funded projects IMPROVED, NEMO and HIP, and the Wellcome Trust-funded ANSeR study. The INFANT Biobank is also home to one of the world's largest and best phenotyped longitudinal pregnancy cohorts SCOPE and Ireland's first birth cohort BASELINE. In addition, the recently established Health Research Board Perinatal Clinical Trials Network coordinates national multi-centre trials of therapies, technologies and diagnostics.

Growing up in Ireland is a study following the progress of almost 20,000 children across Ireland to collect a host of information to help improve our understanding of all aspects of children and their development (<http://www.growingup.ie>).

Training in Research

Most trainees first exposure to research is during their two year BST rotation. One of their study days is devoted to research design and how to critically assess a scientific paper. They are all encouraged to undertake an audit. This, however, is arbitrary, and no record or registry is kept of these activities.

Higher specialist trainees receive some instruction on research methodology. They are expected to undertake research alongside their clinical work. This is challenging, and requires good time management. Their best opportunity is during the first two years when they have 12 months rotations in neonatology and general paediatrics. During the latter three years the rotations are of six months duration, which can be too short a time to undertake a meaningful project. A number of trainees have taken two or three years out of programme at HST level in order to undertake a body of research leading to a higher degree MD or PhD. Other trainees get an opportunity to undertake studies while doing fellowships overseas, usually Canada, the United States, Australia, or the UK.

Overcoming Barriers to Research

While paediatric research in Ireland lags behind research in adults, it has developed in recent years. The Medical Charities Research Group report 'The Health Research Landscape in Ireland' (2014) identified the following barriers to medical research in Ireland:

- Lack of protected research time for clinicians and other healthcare workers
- Limited support for researchers at mid-stage in their research careers
- Lack of prioritisation at national level

Modi et al. (2013) reported falling numbers of academic paediatricians in the United Kingdom, trainees lacking in core research skills, and most newly appointed consultant paediatricians having little or no research experience. This report, on behalf of the RCPCH, made a number of recommendations to improve paediatric research on a national level, including:

1. The formation of multidisciplinary, cross-institutional groups of clinical and non-clinical child health researchers and their access to diagnostic and laboratory facilities suitable for children;
2. A unified children's research network for drug studies and non-drug studies;
3. Regulatory assessment of research that is proportionate and based on consistent national criteria;
4. An expansion of research posts;
5. Support for parents' and young people's advocacy;
6. Collaboration between children's research charities;
7. Improved research training for paediatric trainees;
8. Closer integration of child health research with core health service activities.

These recommendations will almost certainly be relevant to the Irish context, which lags behind the UK in terms of developing paediatric research capability. There needs to be a shared national vision and agenda for paediatric research, with collaboration between hospitals, universities and industry. Research programmes need to be patient-oriented and relevant to clinical care, and there needs to be engagement with patients and their families. There needs

to be a means of capturing activity and reporting on paediatric research outputs nationally, as well as implementation and reporting on quality improvement projects in hospitals. The base of researchers performing quality paediatric research should be broadened, to include all healthcare professionals across all subspecialties.

Conclusions and Key Recommendations:

- Irish paediatric research is facing significant challenges.
- A research culture needs to be interwoven into day to day paediatric clinical care.
- The culture should be welcoming and supportive both to the researchers, the children and their families.
- It should be uniformly accepted that research is important for the care of children.
- It should be constantly emphasised that research protects children, and that it is the only way that better, more effective care can be provided into the future.
- All those involved in the care of children should be provided with a greater understanding of the important role of research.
- A series of research workshops should be undertaken nationally in the large paediatric centres.
- A national central structure should be established to co-ordinate existing research and to foster additional projects.
- Funding is a continuing problem that needs to be addressed, a larger and more sustainable funding vehicle needs to be set up. All sources of potential funding should be explored including partnership with industry.
- Protected time and resources for clinicians to undertake research is necessary.
- Mechanisms need to be put in place to benchmark Irish paediatric research against that of other countries.
- Research needs to be made more attractive, attainable, and secure for paediatricians in training.
- Consultant research posts should be created to lead on research programmes.

Abbreviations

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| BST | Basic Specialist Training |
| DCU | Dublin City University |
| HST | Higher Specialist Training |
| NCRC | National Children's Research Centre |
| OLCHC | Our Lady's Children's Hospital Crumlin |
| RCPCH | Royal College of Paediatrics and Child Health |
| RCPI | Royal College of Physicians of Ireland |
| RCSI | Royal College of Surgeons of Ireland |
| TCD | Trinity College Dublin |
| TSCUH | Temple Street Children's University Hospital |
| UCC | University College Cork |
| UCD | University College Dublin |
| UL | University of Limerick |
| UK | United Kingdom |

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