PAEDIATRICS

A NATIONAL MODEL OF CARE FOR PAEDIATRIC HEALTHCARE SERVICES IN IRELAND

CHAPTER 21: PAEDIATRIC DENTISTRY

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Clinical Strategy and Programmes Division

ROYAL COLLEGE OF PHYSICIANS OF IRELAND

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21.0 INTRODUCTION

Oral health and dental care is medically necessary to prevent, manage and eliminate oro-facial disease, infection and pain; to restore the form and function of the dentition; and to correct facial disfigurement or dysfunction. Oral disease damages a child's self-esteem, school performance, and ability to eat, sleep and thrive (US Surgeon General Report on Oral Health, 2000). There is a growing body of evidence linking periodontal (gum) disease to major systemic conditions such as diabetes, respiratory and cardiovascular diseases, low birth weight and rheumatoid arthritis. Dental caries is the most common chronic disease of childhood in Ireland (O'Mullane et al., 2002; Whelton et al., 2006).

As an internationally recognised specialty of dentistry, paediatric dentistry (PD) is the practice and teaching of, and research into, the comprehensive and therapeutic oral health care of children from birth to adolescence, including care of children with special health care needs such as a physical, developmental, mental, sensory, behavioural, cognitive, or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialised services or programs. (AAPD, 2015). Most children will have simple dental needs and their care can be provided by a general dentist in the primary care setting. PD provides care beyond the scope of a general dentist. A paediatric dentist is best placed to coordinate or provide oral health care services for children with additional needs that require specialised knowledge arising from additional training, as well as increased awareness, adaptation and accommodation beyond that which is considered routine.

In Europe, in order to become a paediatric dentist, a dentist must successfully complete at least three years of additional training in an advanced education programme. In Ireland, as in most European Union (EU) countries, the only officially recognised specialties of dentistry are Oral Surgery and Orthodontics. The Dental Council supports the recognition of additional specialties, including PD, but the current Dental Act requires the approval of the Minister for Health to do so.

21.1 CURRENT SERVICE PROVISION

For the majority of children, the current service pathway consists of examination, followed by preventive care and advice for families and primary care for defects noted during screening. Defects include caries, traumatic dental injury, periodontal diseases or orthodontic problems.

21.1.1 Access

Children aged 15 and under in Ireland are eligible for state funded public dental services, provided by salaried dental staff employed through the Health Service Executive (HSE). Access to this service is resource dependent and varies throughout the country but children in certain classes, largely in primary school, are targeted for:

- Assessment
- Application of preventive measures
- Oral health education
- Fluoride mouth rinsing
- Fissure sealing of vulnerable molar (back) teeth

An emergency service is available to those not in the target classes, and this walk-in urgent care is the starting point on the care pathway for some children.

The need for dental treatment for children, both met and unmet, is overwhelming. The last comprehensive survey of children's oral health was in 2002, when 30% of 5 year old residents of fluoridated communities in the Republic of Ireland had one or more decayed, missing or filled teeth. In the non-fluoridated communities of the Republic and Northern Ireland, 47% of this age group had dental decay. Two thirds of 15 year olds were found to have decay in their permanent teeth. In general, the levels of caries are significantly higher among the less well off, and dental caries also tends to be polarised so that approximately 20% of the population carries 80% of the disease.

In addition to dental disease, traumatic injuries account for a significant proportion of dental need. It is estimated that, for every 1,000 fifteen year olds, 220 have at least one permanent front tooth damaged accidentally. This figure has not changed since 1984, and a large proportion of traumatised teeth remain untreated (O'Mullane et al., 2002). There are also many other conditions affecting the oral cavity that require management by the dental service such as inherited conditions of dentition.

21.1.2 Staffing

While an office-hours urgent care service is available for all eligible children, access to state funded dental examinations and treatment generally commences in primary school and is limited to specific 'target' classes. There is no other state-funded or state-subsidised dental service for children. There are a small number of senior dental surgeon positions in the HSE that are filled by dentists trained in PD, but formal care pathways are needed to improve access to specialist services nationally. Outside of that which is provided for children in the catchment areas of the children's hospitals, and Dublin and Cork University Dental Schools, publicly funded secondary care children's dental services need to be developed and extended. Much of the dentistry provided for children in Ireland is funded privately by parents, with a low level of private insurance cover.

Consultant-led specialist orthodontic treatment is available through the HSE, with eligibility based on the severity of the problem according to nationally agreed standardised criteria. This model of care for a dental subspecialty could serve as a template for other dental services for children in Ireland. There are approximately 24 paediatric dentists practicing currently in Ireland (full- and part-time). Eight of these are primarily hospital- and university-based, two are employed at non-specialist dental surgeon grades in the HSE, while the remainder are in 'fee per service' private practice settings largely without health insurance cover. Based on the 2011 census population data of 1,036,817 children aged 15 years and under, this equates to one paediatric dentist per 43,000 children.

Secondary, tertiary and quaternary care PD services are currently provided at Our Lady's Children's Hospital Crumlin (Crumlin), National Children's Hospital Tallaght (Tallaght), Children's University Hospital Temple Street (Temple Street), Dublin Dental University Hospital, Cork University Hospital and University College Cork Dental School and Hospital. Much of the workload involves providing dental care for children managed at the individual hospitals as part of their national programmes, e.g. in haematology, oncology, cardiology, respiratory, inherited metabolic disease, and cleft, craniofacial and orthodontic services. The dental services at Tallaght and Temple Street hospitals are grossly under-resourced, currently operating on a part-time basis with access limited to internal referrals only. There is no consultant led paediatric dental service in the nineteen other paediatric centres nationally. Equitable access to dental care for children nationwide is needed urgently.

21.1.3 Services and Activity

According to Hospital Inpatient Enquiry (HIPE) data from 2012, there were a total of 8,601 procedures recorded for the under 15 age group. Minor surgical procedures, such as extractions and/or restorative care under local anaesthesia, do not trigger an admission to hospital and as such are not recorded on HIPE. This figure of 8,601 is

second only to surgeries commonly attributable to Ear, Nose and Throat (ENT) surgery, e.g. ear, mastoid process, nose, mouth and pharynx (approximately 12,000 procedures). Unfortunately, much dental activity under general anaesthesia (GA) is not recorded on HIPE, so the recorded figures likely represent a gross under-representation, e.g. up to 2014, approximately 3,000 children annually were treated at the HSE GA dental extraction service located at St. James's Hospital without being recorded on HIPE. Data from 2009 (the most recent available data) showed that 48% of the total HSE Dental GA workload in 2009 was unrecorded on HIPE. The lack of accurate HIPE data leads to underfunding of services. Data on inpatient and day case waiting lists for regional services is generally not sent to the National Treatment Purchase Fund (NTPF). It is estimated that 1,000 children per year are able to avail of specialist care under GA in the private healthcare sector, with the private health insurers generally covering the cost of the hospital admission and the anaesthetist but not the dental care itself (this has to be paid for by the family).

Within the HSE, much of the dentistry for children that is provided under GA is without consultant cover, without access to radiographic examination intra-operatively, without access to restorative care (e.g. fillings, root canal therapy, crowns), and is in sites that have suboptimal conditions for the safe and appropriate day case surgery management of children. Children whose dental treatment is planned by specialists in PD are far less likely to require a repeat GA or further dental treatment. Lack of specialist and/or consultant cover delays care. Waiting lists are long for simple dental treatment under GA, and in some areas waiting lists are closed, but this data is not currently captured by the NTPF.

Challenges in the delivery of dental services for children in the community lie in:

- Lack of data (and data management) at a national level:
  - no adequate, up to date information regarding dental treatment needs – the last survey of child dental health was in 2002
  - no data regarding the behaviour guidance needs of the disease-burdened population (i.e. can treatment be provided under local anaesthetic alone, with local and sedation, or can it only be provided under GA)
  - no data on the levels of special health care needs of children, and their oral health needs
  - no system to evaluate current services and activity, capacity and future requirements
- Disparity in levels of service provision nationally
- Absence of early intervention and preventive programmes for infants and young children
- Insufficient resources to implement published guidelines on caries risk, assessment and prevention
- Insufficient training and continuing education resources for salaried dentists

Guidelines on the care pathway from referral to discharge for children and young people referred for dental extractions under GA are available from the Association of Paediatric Anaesthetists of Great Britain and Ireland, but have not yet been implemented in the Irish setting. A working group was established by the Clinical Lead in Oral Health to establish standards for dental treatment under GA in the HSE and these are now available for implementation.

21.2 PROPOSED MODEL OF CARE

In the United Kingdom (UK), dental services are commissioned by the National Health Service (NHS) Commissioning Board. In their model for dentistry Securing Excellence in Commissioning NHS Dental Services (2013) clinicians within local dental networks will work within area teams to implement the national model pathways as they emerge and are validated. They will work with local partners, including patients, established

wider dental networks and specialist groups, to implement pathways that meet local needs. In Ireland a similar oral health service is, as yet, undeveloped.

Classification of complexity levels can be achieved as follows:

1. Based on the procedure/condition
2. Based on the competency of the dental care professional or dentist
3. Based on the setting where the procedure is performed or the condition managed, which may be primary care or secondary care settings (there is a legal requirement that GA can only be provided in secondary care).

The proposed model of care for paediatric dentistry is a blend of all three options, based on the established HSE orthodontic model of care.

21.2.1 Primary Care

A 'dental home' should be established for all children by age one (AAPD, 2012). The majority of dental care for children can be provided by appropriately resourced general dental surgeons working either within the HSE at local health clinics and primary care centres, or within private practice settings on a fee-per-service or capitation basis. Care pathways and clinical guidelines will help with planning treatment and making decisions.

21.2.2 Secondary Care

Children whose needs surpass the knowledge, skills and resources of the general dental surgeon should be referred to specialist paediatric dentists, employed in the salaried service or in specialist private practice. These specialists would be able to offer:

- Advanced behaviour guidance methods, including sedation and general anaesthesia in appropriate settings
- Advanced restorative care for children with extensive dental disease or developmental defects of their dentition
- Emergency management of oro-facial infection
- Interceptive orthodontics for younger children
- Acute and long term management of dental trauma and its sequelae

Specialist paediatric dentists would have a significant hospital-based component of their roles to provide a much needed level of dental service cover to regional hospital paediatric services, with regular access to fully resourced day case theatre sessions. The regional orthodontic units would be supported by specialists in paediatric dentistry who could participate in the interdisciplinary care required for some complex cases. The specialist paediatric dentists would also have a role in formal continuing education, and on-going support for their network of general dental surgeon colleagues and medical colleagues in the nineteen paediatric centres. Research strategies at national level would be implemented by paediatric dentists both regionally (in the HSE) and at the dental schools.

In keeping with the current orthodontic model of care, teams of specialist paediatric dentists in the HSE service would be led and supported by regional consultant paediatric dental surgeons, who would be responsible for overall service provision, management and development, and who would liaise directly with the existing consultant paediatric dental surgeons at the new children's hospital and the dental schools in Cork and Dublin.

21.2.3 Tertiary Care

Consultant paediatric dental surgeons at the new children's hospital would provide services for children at tertiary level, including those children attending supra-regional services such as haematology, oncology, cardiology, neurology, respiratory medicine, nephrology, solid organ transplantation, metabolic medicine, endocrinology, cleft and craniofacial services. Some children with highly specialised dental care needs would also require treatment at the new children's hospital.

At all levels of the service, auxiliary dental workers, e.g. dental hygienists, orthodontic therapists, dental nurses and clinical dental technicians, and administrative support including secretaries and data managers, need to be in place to support the clinical and administrative roles of the dental team. Patient flow will be supported by formal networks and care pathways via a shared care model.

21.2.4 Prevention and Self-Management

The majority of dental and periodontal disease is preventable (see Appendix 1 for some simple measures that can be established at home to reduce the risk of dental disease). Early identification and treatment of dental disease requires appropriate periodic examination, complemented by radiographic examination as needed. Evidence indicates that early visits can save money for taxpayers and families by reducing disease and the need for future care (see Table 21.1).

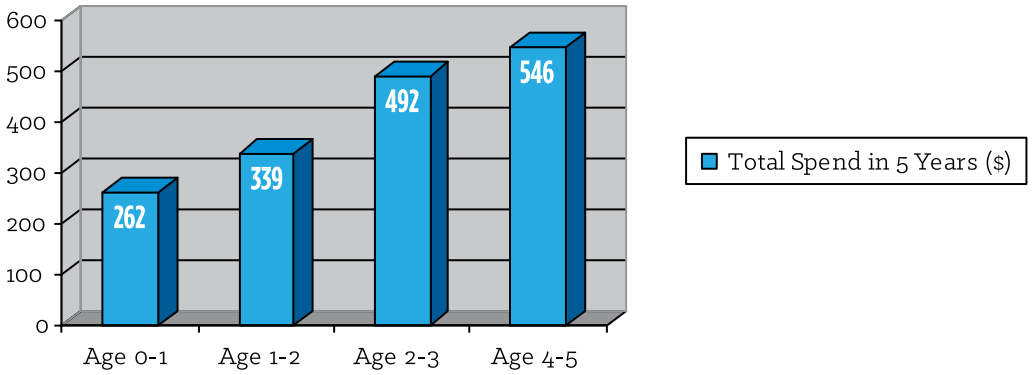

Table 21.1: Spending on dental services according to age of first dental visit (reproduced from Lee et al., 2006)

Worldwide, many successful programmes are in place to address preventive aspects of oral health for children at community level. They rely on identifying barriers to care experienced by the community and addressing each in turn. Improving access to preventive professional dental care is effective. Training existing providers at general dental surgeon level and future providers at undergraduate level, as well as training the wider healthcare professional community, in dental health promotion is also beneficial in broadening access to simple dental preventive care. Optimising the number of paediatric dentists in Ireland is a key part of increasing access.

21.3 REQUIREMENTS FOR SUCCESSFUL IMPLEMENTATION OF MODEL OF CARE

Designing a comprehensive dental service for children in Ireland requires input from specialists in public health dentistry, paediatric dentistry, allied dental health professionals including hygienists and dental nurses, paediatricians, general practitioners, public health nurses, educators, health service managers and economists, and as such the scope is much wider than this document. The service outlined above is based on the consensus and experiences of a group of consultants in paediatric dentistry. A service model based on need as assessed by consistent standards and criteria with comparable costs and coding; consistent capture of complexity of referrals, treatment needs and activity; and shared information about patient outcomes and services, to allow patients and their healthcare providers to make informed choices would be preferable.

The most crucial element of delivering the service outlined is access to, and provision of, adequate primary care dentistry for children and secondary care specialist paediatric dentistry as part of any service plan developed on foot of a new national oral health policy. Without support at primary and secondary levels, this service will not be achievable. Priority should be given to the appointment of regional consultants in paediatric dentistry (as in orthodontic model) with regular hospital access and services, and appropriate resources.

Referral data from the UK suggests that approximately 1% of the child population will need to see a paediatric dentist in any one year (i.e. approximately 10,368 children in Ireland). Based on the known numbers of children with impairments, a guide is that one specialist paediatric dentist at community level is needed for every 20,000 children. This is echoed by the European Academy of Paediatric Dentistry, who provide the ratio 1:20,000 as their benchmark for workforce evaluation.

Current Population	Estimated Annual OPD Visits	Current Number of Paediatric Dentists	Estimated Workforce Requirement
1,036,817 1% = 10,368	6 per child = 62,208	24 (not WTEs, some on part-time schedules)	52WTE (providing 1,196 OPD visits per year each)

Oral health team members should include dental hygienists, oral health promoters, clinical nurse specialists and advanced nurse practitioners to maximise available specialist and consultant resources. Adequate administrative support is also required for managing clinics and appointments.

21.3.1 Interdependencies

Increased availability of day case GA for dentistry is needed but data are lacking with regard to the volume of the current service, and as much of the service is provided only for emergency care the volume of unmet need that should be managed electively is entirely unknown. Dependency on GA in achieving dental care for many children requires support from the National Clinical Programme in Anaesthesia, as the manpower implications are significant if the unmet needs are to be addressed. Further integration of dental services with emergency medicine, especially at the regional hospital level, is necessary to improve immediate and long term management of oro-facial trauma and acute oro-facial infection.

21.3.2 Care Pathways and Clinical Guidelines

Nationally agreed care pathways and guidelines are required for managing oral conditions, focusing on prevention and primary care, and with adequate resources made available to enable their implementation.

The Oral Health Services Guideline Initiative has been established to develop evidence-based guidelines for the public dental service in Ireland. The initiative is funded by a strategic health research award from the Health Research Board, and is a collaboration between the Oral Health Services Research Centre in Cork, the HSE, and the Cochrane Centre in Oxford in the UK. The guideline initiative builds on earlier research commissioned by the Department of Health and Children, which indicated that the approaches taken by the public dental service to providing screening and preventive services to children may not be in line with best practice.

The Oral Health Services Guideline Initiative aims to provide evidence-based guidance to those involved in planning and providing public dental services for children and adolescents in Ireland, in order to improve the quality, effectiveness and efficiency of dental services. The focus of the guidelines is on caries prevention in children and adolescents, and the promotion of good oral health. Topics selected are:

1. Oral health assessment
2. Pit and fissure sealants
3. Prevention of dental caries in children and adolescents
4. Topical fluorides

Where guidelines are not developed in relation to certain aspects of oral and dental care, then appropriate evidence-based published guidelines from other sources may be adopted or guidelines may need to be developed by the HSE.

21.3.3 Education and Training

A review of funding and expenditure for dental education is on-going nationally, and is being undertaken by the Higher Education Authority together with the Departments of Education and Skills and Health. The results will shape the future provision of dental education in Ireland. Requirements for the service outlined above, with adequate numbers of PD specialists and consultants, will require a doubling in numbers of qualified paediatric dentists in Ireland with additional post-specialty training for those taking up consultant posts. There is currently one approved training programme in Dublin; however the current available teaching staff and academic input would be unable to meet the demand envisaged. Training abroad has been undertaken by many of the cohort of current specialists and consultants – this may be seen as a positive resource as they bring skills, knowledge and expertise from other settings, and developing the international network is crucial to support such a small specialty. Educational support would need to be significantly increased at a high level to allow training of appropriate numbers of graduates in Ireland.

Continuing professional development (CPD) will be important for all clinicians to support the delivery of a high quality dental service for children. Targeted continuing professional education for community-based dentists required increased resources, particularly in light of likely change to the CPD requirements in a new dental act, which is imminent. This, combined with regional presence of specialists and consultants, will provide opportunities for the general dentist to update and upskill. The paediatric dentists in the HSE, in liaison with colleagues in the Dublin and Cork University Dental Hospitals, should advise on relevant courses and conferences for clinicians to attend. Education and research in paediatric dentistry have no agreed national strategy, and again will rely on new policy to guide resource streams.

21.4 PROGRAMME METRICS AND EVALUATION

Appropriate paediatric dental care involves a continued provision of oral health care services along the spectrum of primary, secondary and tertiary/quaternary oral health care, with individual patients moving between points on that spectrum when needed. This makes it difficult to assess programme quality, particularly given the chronic, relatively slowly-progressing nature of oral diseases, and the long-term treatment approaches that are employed to manage them.

In paediatric dentistry, there is relatively little consensus on a set of quality and performance measures to inform programme development and evaluation. The American Dental Association has developed a "starter set" of outcome measures to serve as starting point to determine definitive quality measures (ADA Dental Quality Alliance Mission, 2012).

This starter set of quality measure concepts includes:

- utilisation of services,
- usual source of services,
- care continuity/regular source of care,
- evaluation,
- prevention, and
- treatment.

By evaluating these aspects of care, disparities in care can be identified and used to improve quality of care (ADA Pediatric Oral Health Quality and Performance Measures Concept Set, 2012). However, there is little evidence base to support these measures and further research is needed to develop measurements that represent quality outcomes. Furthermore, these measures include only those seen from the perspective of the healthcare provider. Patient-centred quality measures are lacking.

At present, in the Irish context, use of programme metrics to evaluate paediatric dentistry lacks sufficient evidence-base to be recommended.

21.5 GOVERNANCE

High quality, safe dental services should be planned and delivered to all children in Ireland within the financial constraints of the publicly-funded health system. There should be equity of access for all children, and access should not be dependent on geographic location. Individual patients, and their parents/guardians, should be involved in their own care, have their individual needs taken into account, be kept fully informed, have their concerns and those of their parents/guardians addressed, and should be treated with respect and dignity in a safe environment based on best international practice.

There is a need to ensure safe, high quality, accessible paediatric dental day case services for the timely management of children who require dental treatment under GA. There should be equity of access irrespective of geographic location. Children should receive this treatment on a planned elective basis with appropriate pre-treatment assessment. Formal admission policies are required to ensure that medical and dental records are maintained, and data should be recorded in HIPE. The service in each hospital should be led by a consultant anaesthetist, and

there should be appropriate training for general nursing and dental staff involved. Formal transfer policies are needed where children require subsequent overnight stay due to medical / surgical / anaesthetic complications post-treatment. Complex cases and children under two should not be treated where there is no on site paediatric service. The support of a paediatrician is required for pre- and post-assessment of medically complex children. On-going audit and review of all services should be undertaken.

21.6 KEY RECOMMENDATIONS

- There is a significant unmet dental treatment need for severely medically compromised children, children with significant intellectual / developmental / behavioural / psychosocial disabilities, children with complex inherited and acquired dental conditions and children with complex dental trauma who require treatment in a paediatric hospital. An increase from 2WTE to 6WTE consultant paediatric dentists is required at the new children's hospital.
- The appointment of consultant paediatric dentists at secondary care level in the regional paediatric units is strongly recommended to allow planning, organisation and provision of a coordinated paediatric dental service for children throughout the country in collaboration with the community primary care dental services.
- To support this model, the training of paediatric dentists should be prioritised.
- The integration of primary, secondary and tertiary care dental services with the National Clinical Programme for Paediatrics and Neonatology would be envisaged as an important component of the design of such a multidisciplinary team service model.
- Data concerning all children who are awaiting, and who have, dental treatment provided under GA in public hospitals must be recorded on the inpatient and day case waiting lists and on the HIPE system.
- Data concerning the number of children who are treated under GA in the private sector on referral (with funding) from the HSE dental services, and procedures undertaken, should be recorded to inform future development and planning of a national dental service for children.

21.7 ABBREVIATIONS AND ACRONYMS

AAPD	American Academy of Paediatric Dentistry
CPD	Continuing Professional Development
ENT	Ear, Nose and Throat
EU	European Union
GA	General Anaesthetic
HIPE	Hospital Inpatient Enquiry
HSE	Health Service Executive
NHS	National Health Service
NTPF	National Treatment Purchase Fund
PD	Paediatric Dentistry
UK	United Kingdom

21.8 REFERENCES

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21.9 APPENDICES

Appendix 1 At Home Dental and Periodontal Disease Prevention Measures, and Effective Interventions in Early Childhood Caries

- Brushing twice daily to remove plaque
- Avoidance of night-time or nap-time consumption of sugar-containing fluids (including milk) from a bottle or beaker
- Use of a small amount of 1000-1450ppm fluoride toothpaste twice daily for all children over 2 years, without rinsing after brushing
- Adhering to a healthy diet, with regard to both content and frequency of meals, snacks and drinks
- Interdental cleaning as appropriate for age and dental development
- Drinking fluoridated tap water where possible

Effective interventions in early childhood caries include:

- Fluoride interventions (e.g. community water fluoridation, fluoride varnish application)
- Xylitol interventions in children
- Clinical caries treatment and prevention of recurrence
- Motivational interviewing
- Combination interventions