

*“Even a minor event in the life of a child is an event of that child's world and thus a world event”.*

**Gaston Bachelard (1884-1962) French philosopher and poet**

## **PART TWO**

## A Workstream 1: Model of Care

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*‘An Ireland where children are respected as young citizens with a valued contribution to make and a voice of their own; where all children are cherished and supported by family and the wider society; where they enjoy a fulfilling childhood and realise their potential.’*

The Vision  
The National Children’s Strategy  
November 2000

### A.1 Definition of Childhood

The question of the appropriate age cut-off for children’s health services in the new NPH Tertiary Centre has been raised by a number of agencies and organisations.

The United Nations Convention on the Rights of the Child <sup>(Ref: 6)</sup> defines persons up to the age of 18 as children.

*“every human being below the age of eighteen years unless under the law applicable to the child, majority is attained earlier”*

UN Convention on the Rights of the Child  
Article 1

Adolescence is defined by the World Health Organisation as a distinct developmental period in the age group 10-19 years <sup>(Ref: 7)</sup>. The American Academy of Family Practice defines adolescents as 13-18 year olds <sup>(Ref: 8)</sup>. Recent Mental Health legislation in Ireland defines a child as a person who has not yet attained his or her 18th year unless he or she is or has been married. This brings the definition in line with the child care legislation and with the age of majority.

### **A.1.1 Current Cut off Age**

The three children's hospitals' formal policy on cut-off age is –

**CUH** The age of treatment in the Emergency Department is up to the eve of the child's 15<sup>th</sup> birthday and the same age cut-off applies to inpatient admission.

**NCH** The age of treatment in the Emergency Department is up to 16 years of age and inpatient admission is the same. It is recognised that exceptions occur.

**OLCHC** The age of treatment in the Emergency Department is up to 16 years of age and inpatient admission is up to 14 years of age (but with flexibility up to age 16).

In practice all three hospitals adopt a flexible approach depending on the young person's needs.

### **A.1.2 Comparison with other countries**

In leading children's hospitals including Boston Children's Hospital, Great Ormond Street Children's Hospital, Toronto Children's Hospital and Children's Hospital of Philadelphia adolescents are treated up to the age of 18-21 years. In these hospitals there are specialist adolescent consultants and services available.

The Council for Children's Hospitals Care produced a report on cut-off age <sup>(Ref: 9)</sup> which looked at current services in the Dublin children's hospitals and identified gaps in services for adolescents. It noted that in practice children with long-term conditions continued to be treated in the children's hospitals into their early 20's when services were not available in the adult sector. It also noted that for older children, the adult service did not make any specific provision for adolescents in the 14-16 age group.

### **A.1.3 Approach for the NPH Tertiary Centre**

A policy decision on the age cut-off point from the HSE will be required, however, it is widely acknowledged that flexibility is essential because a child's individual needs cannot be determined by age alone. The transition between ages is seamless and

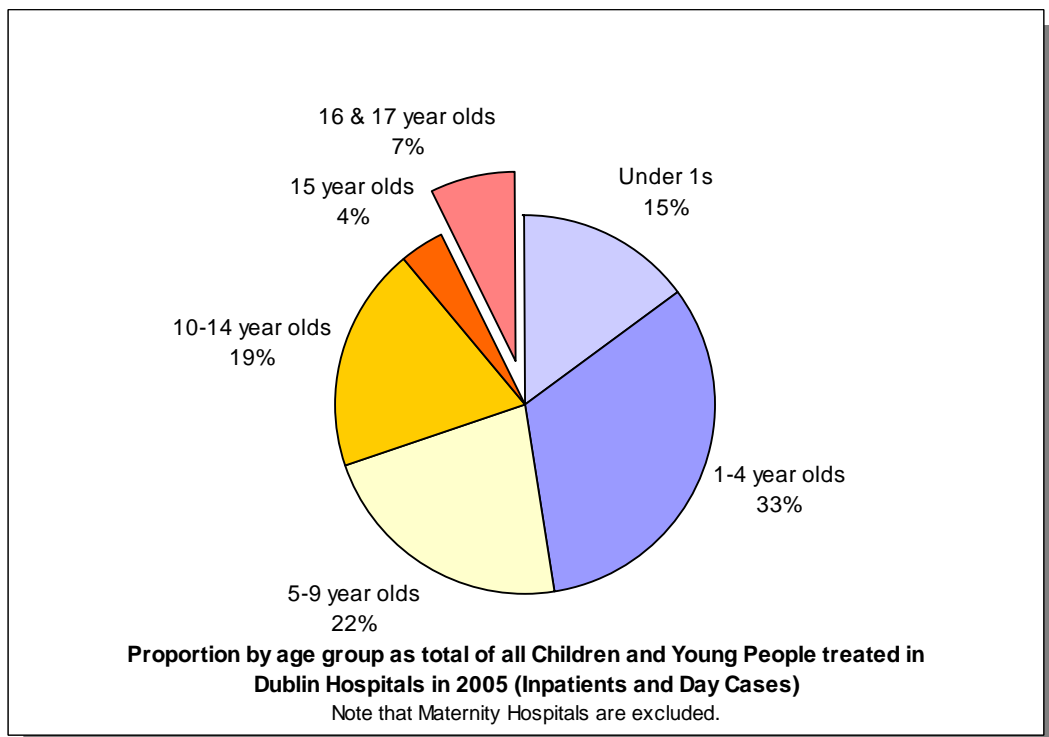
some children, particularly those who experience long or frequent admissions to hospital, are delayed in development or have sensory impairment. Equally, some children have needs in advance of their age. Flexibility based on an individual needs assessment is therefore the key to good practice.

The McKinsey Report <sup>(Ref:1)</sup> assumed a cut-off age of 16.

In modelling future capacity requirements we have taken the cut-off age at 16 years in line with McKinsey. Therefore children and young people in the age range from 14-16 years are accounted for in all estimates of future capacity requirements. Additionally, we have estimated separately the capacity requirements for young people in the age range from 16 up to 18 years of age, and our approach is detailed later in this report in Section B.

It will be important that the views of young people and their families on age cut-off are canvassed in the next stages of the project and that service and environments are tailored to the needs of all age groups.

Figure 5 Children and Young people by Age Group treated in Dublin hospitals in 2005



Source : HIPE Data 2005

## A.2 Principles for Caring for Children

*“Children have a status as child citizens’ and so have ‘the right to have their voices heard and to participate in any decision affecting their lives”.*

The Children Act, 2001 UK. (Ref: 10)

The following principles have been promoted by a number of agencies and are embedded in the Children’s National Service Framework in the UK (Ref:11). Care for children in hospital should be –

- **Centred on the needs of the young person.** The best interests of the child should be paramount, taking into account their wishes and feelings
- **High Quality.** Policies and services should aspire to, and attain, high standards for the benefit of children and young people
- **Family-orientated.** Full recognition must be given to family members – including extended and chosen family – who contribute significantly to the well-being of children and young people.
- **Equitable and non-discriminatory.** All children and young people should have access to services that they need, when they need them, and in a way which respects diversity and their individual needs.
- **Inclusive.** Policies and services should be sensitive to the individual needs and aspirations of every child and young person taking full account of their race/ethnicity, gender, sexual orientation, ability or disability.
- **Empowering.** Children and young people should have opportunities to play an effective role in the design and delivery of policies and services.
- **Results orientated and evidence-based.** High quality research, evaluation, monitoring and review should ensure that decisions that affect children and young people are well informed.
- **Coherent in design and delivery.** Services should be woven together in a coherent, integrated and cross-sector form where it is evident how progress and change expected for children and young people will be achieved.
- **Supportive and respectful.** Policies and services should be delivered in a manner that is respectful and supportive of children and young people and ambitious for their futures.

# A1 National Network

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***“The aim of paediatric surgery is to set a standard, not to seek a monopoly”***

Sir Denis Browne Paediatric Surgeon (1892 – 1967)

## A1.1 Introduction

The McKinsey Report referred to the NPH Tertiary Centre *“at the nexus of an integrated service (with) important outreach capability”*. This section considers the current configuration of children’s services in Ireland, how this is likely to change with the development of the NPH and related policy initiatives. A sustainable national network will be one with an appropriate balance between services provided within the National Paediatric Hospital and those in regional and local hospitals and other settings. A guiding principle for the national network will be the provision of **“safe services as locally as possible”**. (Ref: 12)

## A1.2 Current Configuration

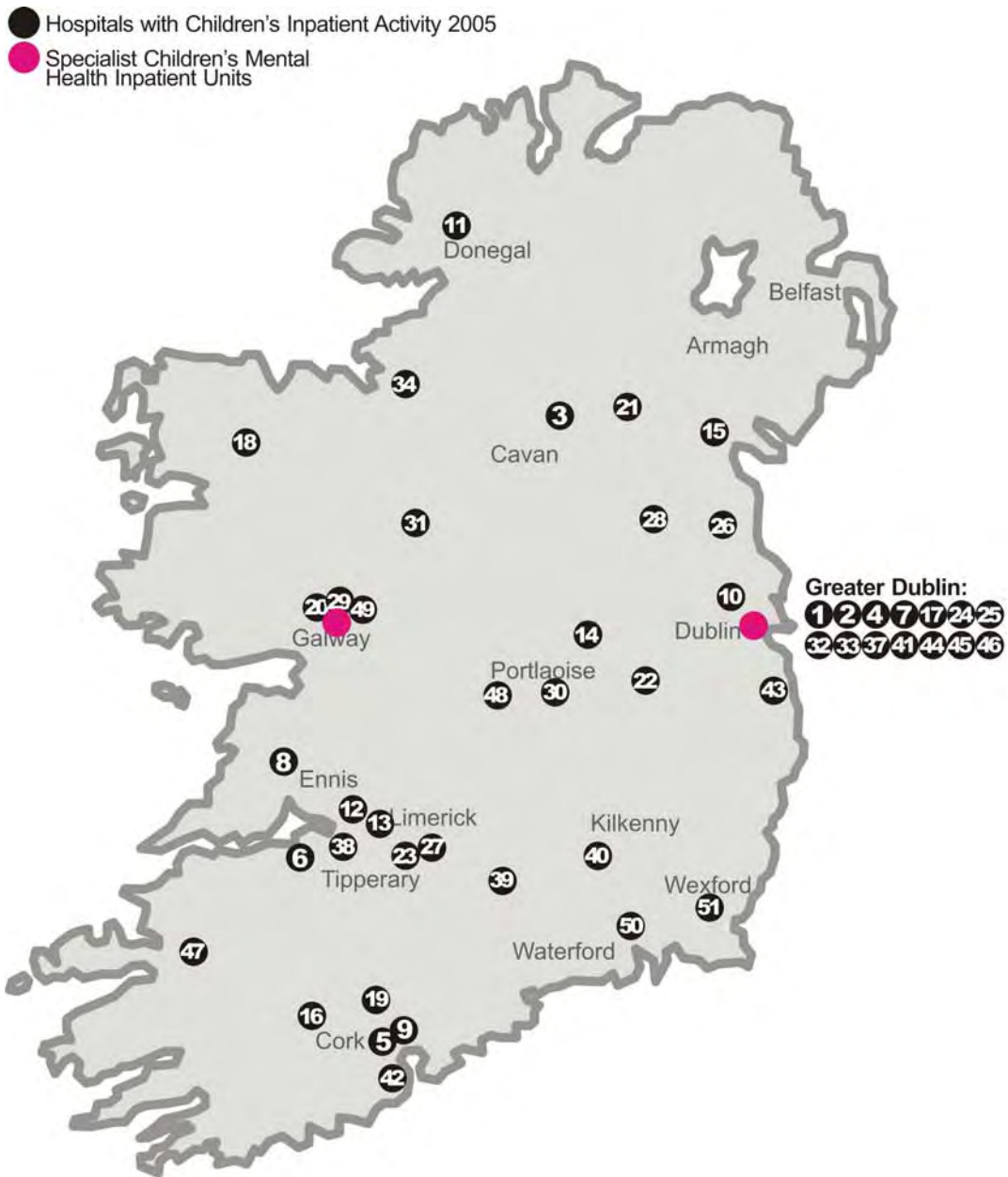
Table A1 illustrates the volume of paediatric inpatient and day case activity taking place in hospitals in Ireland in 2005. The locations of these hospitals are shown in Figure A1. It is clear that a significant amount of activity takes place in settings other than the three Dublin children’s hospitals and the overall distribution between Greater Dublin and non Dublin hospitals is similar to that identified from 2003 HIPE data by the McKinsey report. An apparent shift of tertiary activity (defined using McKinsey’s DRG based criteria) from non Dublin to Greater Dublin hospitals between 2003-05 is discussed in Section B. The activity shown in Table A1 includes that taking place in maternity hospitals.

Table A1 2005 HIPE IPDC Activity U16 all units

Hospital	IP	DC	Hospital	IP	DC
Beaumont	857	523	Not known	2	
Cappagh	114	119	OLL Drogheda	4,439	2,466
Cavan General	1,941	599	Our Lady's Cashel	314	124
Coombe Women's Hospital	1,431	7	Our Lady's Navan	68	21
Cork University	5,388	1,001	Portiuncula Ballinalisloe	2,100	564
Croom Orthopaedic	51	205	Portlaoise General	2,619	112
Crumlin Children's	10,729	11,196	Roscommon County	77	188
Ennis General	131	309	Rotunda	1,739	4
Erinville Maternity	283		Royal Victoria Eye and Ear	427	542
Hume Street	1		Sligo General	2,675	1,054
James Connolly Memorial	65	56	South Infirmary Victoria Cork	609	888
Letterkenny General	3,749	713	St Finbarr's Cork	1,217	1
Limerick Maternity	331		St James's	98	183
Limerick Regional	5,623	1,964	St John's Limerick	19	54
Longford Westmeath General	2,376	456	St Joseph's Clonmel	1,305	40
Loughlinstown	1	18	St Luke's Kilkenny	1,957	298
Lourdes Orthopaedic Kilcreene	1		St Luke's Rathgar	1	24
Louth County Dundalk	64	318	St Mary's Orthopaedic Cork	93	216
Mallow General	286	303	St Michael's Dunlaoghaire	17	24
Mater	75	141	St Vincent's Elm Park	107	51
Mayo General	2,662	878	Tallaght	5,375	3,589
Mercy Cork	1,807	1,115	Temple Street Children's	7,764	4,853
Merlin Park	512	147	Tralee General	2,893	295
Monaghan General	16	32	Tullamore General	993	969
Naas General	52	13	UCH Galway	3,847	1,999
Nenagh General	138	103	Waterford Regional	4,689	1,510
NMH Holles St	1,051		Wexford General	2,183	563
NMRC, Rochestown Avenue	94	355	All Ireland	87,456	41,203

Note: The HIPE 2005 data is from the Hospital Inpatient Enquiry Data collected by the HIPE and National Perinatal Reporting System (NPRS) Unit of the Economic and Social Research Institute.

Figure A1



- |                               |                                  |                                |
|-------------------------------|----------------------------------|--------------------------------|
| 1 Beaumont                    | 19 Mercy Cork                    | 37 St. James'                  |
| 2 Cappagh                     | 20 Merlin Park                   | 38 St. John's Limerick         |
| 3 Cavan General               | 21 Monaghan General              | 39 St. Joseph's Clonmel        |
| 4 Coombe Women's Hospital     | 22 Naas General                  | 40 St. Luke's Kilkenny         |
| 5 Cork University             | 23 Nenagh General                | 41 St. Luke's Rathgar          |
| 6 Croom Orthopaedic           | 24 NMH Holles St                 | 42 St. Mary's Orthopaedic Cork |
| 7 OLCCH                       | 25 NMRC, Rochestown Ave          | 43 St. Michael's Dunlaoghaire  |
| 8 Ennis General               | 26 OLL Drogheda                  | 44 St. Vincent's Elm Park      |
| 9 Erinville Maternity         | 27 Our Lady's Cashvel            | 45 AMNCH                       |
| 10 James Connolly Memorial    | 28 Our Lady's Navan              | 46 CUH                         |
| 11 Letterkenny General        | 29 Portiuncula Ballinasloe       | 47 Tralee General              |
| 12 Limerick Maternity         | 30 Portlaoise General            | 48 Tullamore General           |
| 13 Limerick Regional          | 31 Roscommon County              | 49 UCH Galway                  |
| 14 Longford Westmeath General | 32 Rotunda                       | 50 Waterford Regional          |
| 15 Louth County Dundalk       | 33 Royal Victoria Eye and Ear    | 51 Wexford General             |
| 16 Mallow General             | 34 Sligo General                 |                                |
| 17 Mater                      | 35 South Infirmary Victoria Cork |                                |
| 18 Mayo General               | 36 St. Finbarr's Cork            |                                |



## National Roles of the Children’s Hospitals

A wide range of **outreach arrangements** exist between the Dublin children’s hospitals and other hospitals and health care facilities throughout Ireland. Many of these have developed through local agreement rather than through formalised protocols and continue to evolve. These include consultant clinics, advice and telemedicine links and training support to local staff. A non-exhaustive summary of current outreach and network arrangements is provided in Table A2. At the same time, significant numbers of non-Dublin residents attend outpatient clinics at the Dublin hospitals (the figure for OLCHC is 30% and for AMNCH 8%). A comprehensive mapping exercise to identify current outreach arrangements and how these are expected to develop is recommended as part of the subsequent planning stages for the NPH.

Table A2 Examples of Current Network Arrangements

<b>Psychiatry</b>	Outreach services for eating disorders in Cork, Galway and Limerick. Links to community Mental Health services.
<b>Urology</b>	Initial appointments for complex Urology in Belfast.
<b>Respiratory Medicine</b>	Shared care with local hospitals for Cystic Fibrosis. Telephone clinic for asthma.
<b>Genetic Counselling</b>	Outreach clinics in Cork, Galway and Limerick.
<b>Neonatology</b>	Transfer of complex cases comes from local hospitals and non Dublin Maternity Hospitals for neonatal surgery.
<b>Haematology/ Oncology</b>	Shared care model with 16 units in Ireland. Liaison nurses provide domiciliary support and support to primary care.
<b>Neurology</b>	Outreach clinics (for example to CRC). Pilot telemedicine project with Cork. Telephone management of epilepsy. Video EEG services

<b>Rheumatology</b>	Shared care model. Telemedicine links with Cork and Galway. Planning networked clinics
<b>Transitional Care Unit</b>	Training and support to parents and local hospital and domiciliary care staff
<b>Emergency Department</b>	Community liaison nurses.
<b>Neurosurgery</b>	Teleconferencing monthly with units in Cavan and Kilkenny
<b>Ophthalmology</b>	Links to (newly appointed) community ophthalmologists.
<b>Burns / Plastics</b>	OLCHC / St James link to burns units in Cork and Galway. Cleft lip and palate outreach clinics in Sligo.
<b>Dermatology</b>	Planned national Epidermolysis Bullosa (EB) service with outreach to Maternity Units nationwide, home units and education for carers.
<b>Metabolic Medicine</b>	Proposals for outreach services to Cork, Limerick Waterford, Galway submitted to HSE

Examples of the three Dublin children's hospitals **national referral roles** are shown in Table A3. In addition to those which are formally designated, the hospitals fulfil de-facto national roles by virtue of their specialisation.

Table A3 National Referral Roles of the Children’s Hospitals

<p><b>OLCHC</b></p>	<p>National Centre for Medical Genetics (Adult and Children)  National Paediatric Burns Unit  National Eating Disorders Service  National Centre for Haematology/Oncology  Complex Airway Management  Children’s Liver Centre  Paediatric Bone Marrow Transplant  National referral role for Cardiac Surgery</p>
<p><b>AMNCH</b></p>	<p>National service for Diabetes  National Resource Centre for Downs Syndrome</p>
<p><b>CUH</b></p>	<p>National Centre for Inherited Metabolic Disorders  National Newborn Screening Centre  Meningococcal Reference Laboratory  Metabolic Reference Laboratory  National Paediatric Renal Transplant Unit  SIDA Register ( Sudden Infant Death Register )  National Paediatric Ophthalmic Centre  National Craniofacial Centre</p>

### Transition Services

Current arrangements for the transition of patients with chronic conditions from children’s to adult services vary with specialty and condition but, in general respond flexibility to individual needs rather than observing a fixed (and arbitrary) age threshold. The preferred model, in a national network, is for the transfer of care to the patient’s locality at the appropriate time. This is dependent upon the capability of local services to accept the responsibility which may be particularly challenging in the case of relatively uncommon conditions of which there may be limited local experience.

### National Policy Context and Initiatives

The development of the NPH is taking place at a time of significant change in the wider Irish health care system. Key initiatives which affect the NPH and its national network, both directly and indirectly, are summarised below.

**Quality and Fairness - A Health System for You** <sup>(Ref: 13)</sup> was announced by the Government in 2001 to provide vision and strategic direction for the health and personal social services. The Strategy set out the key objectives for the health system up to 2010 centred on four national goals -

- Better Health for Everyone
- Fair Access
- Responsive and Appropriate Care Delivery
- High Performance

The following areas were identified as core Frameworks for Change -

- Reforming the acute hospital system
- Funding the health system
- Strengthening primary care
- Developing human resources
- Organisational reform
- Developing information

**Primary Care - A New Direction** <sup>(Ref: 14)</sup> proposed to develop *“the capacity of primary care to meet the full range of existing and future health and personal social service needs which are appropriate to that setting (via) significantly enhanced commitment to the funding and infrastructural development of primary care (to) enable primary care to lessen the current reliance on specialist services and the hospital system.”*

### **Care of the Critically Ill Child in Ireland** <sup>(Ref: 15)</sup>

In 2005 a joint report by the Faculty of Paediatrics and the Irish Standing Committee, Association of Anaesthetists of Great Britain and Ireland noted that *“care of critically ill infants and children outside a paediatric hospital is a problematic area for hospital management, nurses, clinicians, paediatricians and general anaesthetists”*. The report's recommendation for a national paediatric retrieval service is currently being implemented.

### **Report of the Committee to Review Neurosurgical Services in Ireland** <sup>(Ref: 16)</sup>

The review recommended *“a two pronged approach for development of neurosurgical services - increased capacity in Dublin and Cork and improved access to neurosurgical units, including transport and telemedicine facilities for referring hospitals. There should be one comprehensive national tertiary referral neurosciences centre in Ireland and it should be located in Dublin”*

**A Vision for Change** <sup>(Ref: 17)</sup>, the report of the Expert Group on Mental Health Policy, sets out a comprehensive 10-year framework for mental health services. Specific recommendations for child and adolescent mental health services (CAMHS) include -

- Child and adolescent mental health services should provide services to all aged 0 -18 years
- Child and adolescent community mental health teams (CMHTs) should develop clear links with primary and community care services
- Urgent attention to be given to completion of planned 20 bed units in Cork, Limerick, Galway and Dublin

### **The HSE Transformation Programme** <sup>(Ref: 18)</sup>

A number of priority areas in the HSE's programme for 2007-2010 will have a direct relevance to how the NPH Tertiary Centre will operate in an all-Ireland context (see below). Taken together these initiatives aim to create an integrated healthcare system with strengthened local and primary and community services supported by information and communication technology.

#### **Integrated services across all stages of the care journey (Programme 1)**

Patients and clients will be able to move easily through the entire care system because we will have services that are well organised and connected seamlessly across the organisation. Integrated care will be at the heart of the way we work.

#### **Configure Primary, Community and Continuing Care services to deliver optimal and cost effective results. (Programme 2)**

This will involve reconfiguring our resources to provide a significant range of client services within local communities. These will be provided as close as possible to people's homes, while maintaining high quality and safety standards. The emphasis will be on local delivery.

#### **Implement a model for the prevention and management of chronic illness. (Programme 4)**

We will have evidence based prevention programmes and treatments for people with chronic illnesses such as diabetes, chronic obstructive pulmonary disease and cardiovascular problems.

Our performance in reducing the risk factors for chronic illness and improving patient satisfaction will be measured. This will provide better outcomes and survival rates for people with chronic illness.

#### **Information and Communications Technology (Programme 10)**

Central to this programme is the development of a unified national ICT infrastructure and support services and the development of clinical and administrative systems. This will involve establishing national ICT governance structures, integration with shared services, ICT staff development and engagement with health professionals to drive ICT based transformation.

## A1.3 Stakeholder Consultation

### Introduction

The stakeholders who have been interviewed and/or submitted written submissions are detailed in Appendix 3. There is a broad consensus regarding the importance of defining the role of the NPH Tertiary Centre within an all-Ireland (and potentially all-island) network and regarding the issues to be addressed. There is also broad support for the principle that safe services should be provided as locally as possible but a range of views about how far this can be achieved and different perspectives on how far it will be possible to strengthen primary, community and local hospital services within current, and perceived future, constraints.

There is also some dissent from McKinsey principles such as the extent of centralisation of specialist services and the proposition that all greater Dublin secondary inpatient activity should take place within the NPH Tertiary Centre. Consideration of such options are outside the framework brief terms of reference.

At one end of the spectrum, is the view that there will be little or no change in the quality, scope or robustness of local services and that the resource constraints, which limit outreach from the centre, will prevail. This perspective would suggest a high degree of centralisation but carries the risk of self-fulfilment if resources committed to the NPH Tertiary Centre cannot be unlocked to support development of local services. The alternative viewpoint is that, with the requisite investment in workforce, primary and community services, local hospitals, education and training and information technology there is scope for a substantial re-balancing of care delivery. This is consistent with current national policy and international experience and is the premise on which the proposals in the Framework Brief are based.

### The Children's Hospitals' Perspectives

*"The Model of Care for Paediatrics must be developed in the interests of all children across the country (with) the development of integrated services across all stages of the care journey. Thus the model is based on a networked approach combining primary and community care (adopting innovative approaches such as hospital at home and children's home nursing where appropriate) with the National Paediatric Hospital providing relevant support to paediatric services throughout Ireland."*

**Children's University Hospital Submission to HSE January 2007**

(Ref: 4)

In “A World Class Tertiary Children’s Hospital for Ireland” <sup>(Ref:3)</sup>, **OLCHC** notes that –

*“the new hospital needs to be conceived in the context of a well thought out paediatric service plan with national, regional and local dimensions”*

*“the National Tertiary Specialty Hospital should provide the full range of clinical specialties and be networked appropriately for service delivery nationally as follows –*

- Range of shared care centres
- Clinical networks leading into local / regional paediatric units
- Ambulatory and outpatient units appropriately designated and locally available
- Telemedicine to promote shared care and specialist consultations with paediatric provides nationally and internationally
- Appropriate community paediatric support services
- A developed and supported paediatric primary care strategy.”

OLCHC submission to the Children’s Health First Task Group <sup>(Ref: 19)</sup>

In its Management Submission OLCHC note –

*“The primary, secondary and tertiary paediatric service context of the new hospital is crucial and must be considered integrally at national, regional and local level.” <sup>(ref 20)</sup>*

In their submission following the stakeholder meetings, OLCHC calls for clarification of the location, distribution and nature of services to be provided across the National Network <sup>(ref 21)</sup>.

In “Children’s Health Excellence of Care “ <sup>(Ref:22)</sup> **AMNCH** proposed that its site should be selected for the location of the NPH Tertiary Centre and notes that –

*“a detailed outreach programme will be required to provide tertiary paediatric clinics... in areas outside the hospitals immediate catchment area.... The context of the new hospital will be that of an integrated national paediatric service that will be entirely child centred”.*

AMNCH noted in a presentation to RKW (12 March 2007) that the national network for paediatric services was *“not well worked out to-date but vital to a co-ordinated service”*. The presentation also included a proposal for a *“single hospital two location ‘model’*. This suggestion is re-iterated in a submission from Professor Hilary Hoey <sup>(ref 23)</sup> following the stakeholder meetings. A two-site tertiary model is not consistent with McKinsey recommendations, Government policy or the views of the international clinical advisers.

### **Primary Care Perspective**

In a written submission, Professor Tom O’Dowd, Professor of General Practice at Trinity College, questions the strength of the case for *“having tertiary care, secondary care, Accident and Emergency all on one site”*.

*“The majority of care provided to children in Ireland is provided by general practitioners, practice nurses, public health nurses and area medical officers (while) paediatrics in Dublin has had a strong tradition of providing emergency care via A&E departments”*

*“Outreach services are the first to be cut back when the economy is doing less well and the hospital sector needs to retrench”.*

*“Models of care such as hospital at home have a bigger role to play.”*

*“There is a .... risk that models such as Urgent Care Centres and Outreach service will de-skill the primary care teams that the HSE is planning to develop.”*

Professor Tom O’Dowd

### **The Faculty of Paediatrics Perspective**

The Faculty of Paediatrics of the Royal College of Physicians in Ireland has cautioned against over centralising services in Dublin and in a written response to RKW (pending a formal submission) has made observations regarding a number of national network issues, noted below.

### **Children and Parents' Perspectives**

Ireland has particularly well developed mechanisms for consultation and engagement with children and young people in policy formulation through, for example, the Office of the Minister for Children, the Children’s Ombudsman, Children in Hospital in Ireland and Dail na nOg. So far these approaches have had limited exposure in healthcare and the development of the NPH provides the opportunity to ensure that



children and their families' voices are heard and have influence, not least with regard to the balance of services between the tertiary centre and the national network. Engagement with children with chronic conditions will be particularly valuable in informing decisions regarding the perceived costs and benefits of outreach services.

***“Children should be consulted early about the information they want, They won’t talk about car parking”.***

Emily Logan, Children’s Ombudsman

### **The IAEM Perspective**

The Irish Association of Emergency Medicine has considered options for the provision of emergency medical services in greater Dublin which are discussed in Section A2. Its preferred option is for two fully functional paediatric emergency departments in greater Dublin – one at the NPH Tertiary Centre, and the second providing secondary paediatric care including inpatient beds. While this model is specifically excluded from the McKinsey recommendations which set the terms of reference for this framework brief, the IAEM has pressed for its consideration.

### **Mental Health/Child Psychiatry**

*The NPH would be expected to have a specialised service... it would not be the only provider of inpatient child and adolescent psychiatry services. The unit in Galway may expand to cater for the Western/Northwestern region, and there are plans to redevelop the inpatient service in Cork... local Paediatric units should provide some acute inpatient services e.g. for deliberate overdose/eating disorders.*

### **Surgery in younger children (<five years)**

*All major and highly specialised surgery (should) be concentrated in the NPH. There is also concern that not all “routine” surgery in the “under fives” or “under twos” must be performed in Dublin and that the Regional units (not defined) should have the surgical and anaesthetic expertise to provide a service for the common surgical in younger children, conditions such as pyloric stenosis, intussusception, hernias, undescended testes, appendicitis. This implies considerable expansion of paediatric surgical services outside Dublin. The development of a paediatric surgical service in Cork should also be considered in this context.*

### **Eye/ENT and Orthopaedic surgery**

*There seems to be consensus too that the Regional Centres (again not defined) should continue to provide Eye, ENT and Orthopaedic surgery locally so that children and families do not have to travel long distances for services which are currently available and satisfactory.*

***Day case surgery** should be the norm for many conditions in the NPH, and throughout the country – in properly resourced centres.*

### **Long-term Ventilation**

*The needs for long term ventilation are increasing and will continue to. The NPH would be expected to have a major such unit and to take the lead in developing a national service including “satellite” units perhaps in Galway and Cork and a national home ventilation service.*

Written submission to RKW from the Faculty of Paediatrics RCPI

## A1.4 International Experience

*“Great health professionals do not make great healthcare. Great healthcare professionals interacting well with all the other elements of the healthcare system make great Healthcare.”*

(Donald Berwick, <sup>(Ref: 25)</sup> quoted in the Royal College of Paediatrics and Child Health ‘Guide to Understanding Pathways and Centralising Networks’)

Key tools for the successful development of the NPH Tertiary Centre in an all-Ireland context will be clinical networks and care pathways. The Scottish Office refers to networks as –

*“linked groups of health professionals and organisations from primary, secondary and tertiary care working in a co-ordinated manner, unconstrained by existing professional and organisational boundaries to ensure equitable provision of high quality and clinically effective services.”* <sup>(Ref: 24)</sup>

*“Networks offer a way of making the best use of scarce specialist expertise, standardising care, improving access and reducing any distance decay effects that can result from the concentration of specialist services in large centres.”*

Nigel Edwards, Director of Policy at the NHS Confederation <sup>(Ref: 26)</sup>

Successful applications of these approaches include those developed at **Toronto Children’s Hospital** (SickKids) in the mid 1990’s. Here a Child Health Network comprising five paediatric hospitals and lead by SickKids was established to manage and co-ordinate specialist paediatric care for a child population of 1-1.25 million.

## **Toronto's Child Health Network**

Case conferences via telemedicine across 5 hospitals  
Complex work triaged to the tertiary centre  
Training programmes for anaesthetists in local hospitals  
Outreach clinics with local staff working to SickKids protocols  
Paediatric general surgeons' rotation into the tertiary centre  
Advanced Nurse Practitioner led transport and retrieval service  
Joint appointments between tertiary and secondary care  
3 month training for radiology fellows from secondary hospitals at SickKids  
Development of Paediatric "Emergentologists" through cross training  
Training program of community paediatricians e.g. in cardiovascular surgery  
Advanced Nurse Practitioners supporting 150 children on ambulatory LTV

**The Children's Hospital of Philadelphia (CHOP)** also operates within a network, key features of which are shown below.

## **Children's Hospital of Philadelphia – Network Features**

8 specialty ambulatory care centres - 3 providing surgery and 2 providing haematology / oncology day care for children initially diagnosed at the main hospital  
36 primary care centres, staffed by family paediatricians, equipped for urgent care including nebulisation, suturing and fracture reduction  
Telephone triage from call centres operating 1700 – 0900 staffed by paediatric nurses using electronic decision support  
12 partner adult community hospitals through which CHOP paediatricians rotate  
Only 2 unscheduled transfers from ambulatory care centres to CHOP in 12 years  
Of 1m outpatient visits pa, 300,000 take place on the main campus

Both the SickKids and CHOP models have developed to achieve a balanced distribution of expertise and activity between the tertiary centre and local facilities. While both US and Canadian health care systems differ from Ireland's, the latter has similarities in terms of financial and economic incentives. In contrast, a driver for extensive outreach in the US may be to secure the income which accrues to referrals to the tertiary centre. Both the SickKids and CHOP systems make significant use of information technology and telemedicine which is more developed than that currently

available in Ireland but consistent with the HSE's medium term strategy. A distinctive feature of the US healthcare system is access to paediatric specialists at a primary care level. While the concept of the general practitioner with specialist interest (GPSI) could be a move in this direction, experience in the UK suggests that this is likely to be slow to develop.

*"Having consolidated its base, a children's centre can then raise standards in paediatrics throughout the country, not only through supporting teaching and research, but by developing outreach clinics and other shared activities including study days, training conferences, rotations."*

Richard Newton, Consultant Neurologist, Manchester Children's Hospital

## Hospital at Home

*"Hospitals are but an intermediate stage of civilisation... the ultimate objective is to nurse all sick at home."*

Florence Nightingale, The Times, London April 14 1879

While relatively underdeveloped in Ireland, hospital at home schemes are a significant feature of children's services internationally both as alternatives to acute admission and in supporting children with chronic conditions. The Children's Hospital of Philadelphia uses the term 'the Medical Home' to signal its objective of promoting care outside the hospital, in relationship with secondary, community and primary care providers.

Benefits of the hospital at home include –

- Comparable or better clinical outcomes
- Improved compliance with medical and therapy services
- Less discrimination in family, social and educational networks
- Development of patient and parent skills
- Reduced risk of hospital acquired infection

Hospital at home schemes cover a wide range of services including –

- Intravenous therapies
- Nutritional therapies
- Respiratory support
- Pain Management
- Chemotherapy (including oral chemotherapy currently developing for children in the US)
- Hydration and nasogastric feeding
- Training and education for patients and parents
- Palliative Care

### **A1.5 National Network – A Summary**

A sustainable **national network** of paediatric services will be one which provides an appropriate balance between services provided within the NPH Tertiary Centre and those delivered in local hospitals and other settings, supported from the centre via outreach, telemedicine, joint appointments and staff rotation and continuous professional development as described in Figure A2.

In determining the roles of regional and local hospitals it will be important to ensure that volumes of activity are sufficient to sustain viable staffing models as proposed, for example, by the British Association of Paediatric Surgeons. We understand that the issue of paediatric surgery is the subject of discussions between the Expert Advisory Group on Children and Families and the HSE.

This shows the NPH Tertiary Centre as the nexus of a national paediatric healthcare system containing –

- Designated regional hospitals providing secondary inpatient, day and outpatient care operating within specialty specific networks
- Regional, and designated local hospitals and other healthcare facilities hosting outreach clinics from the NPH Tertiary Centre
- Extended use of telemedicine from the NPH Tertiary Centre and from regional centres to provide expertise and advice to local care providers

- Periodic rotation of staff between the NPH Tertiary Centre and regional and local hospitals to develop, maintain and exchange skills
- Whole system protocols and patient care pathways supported by information technology, electronic patient records and decision support systems branded from the NPH Tertiary Centre to ensure consistent high quality local care
- A comprehensive transfer and retrieval service coordinated from the NPH
- Enabling effective, sensitive and flexible transition of patients to local Adult Services when they reach maturity and supporting local health services and carers via education and training, helplines and web-based information services
- Education and training networks aligned to the service model

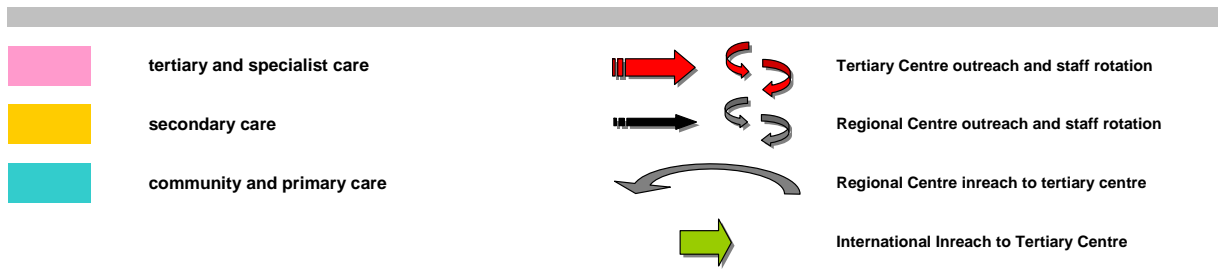
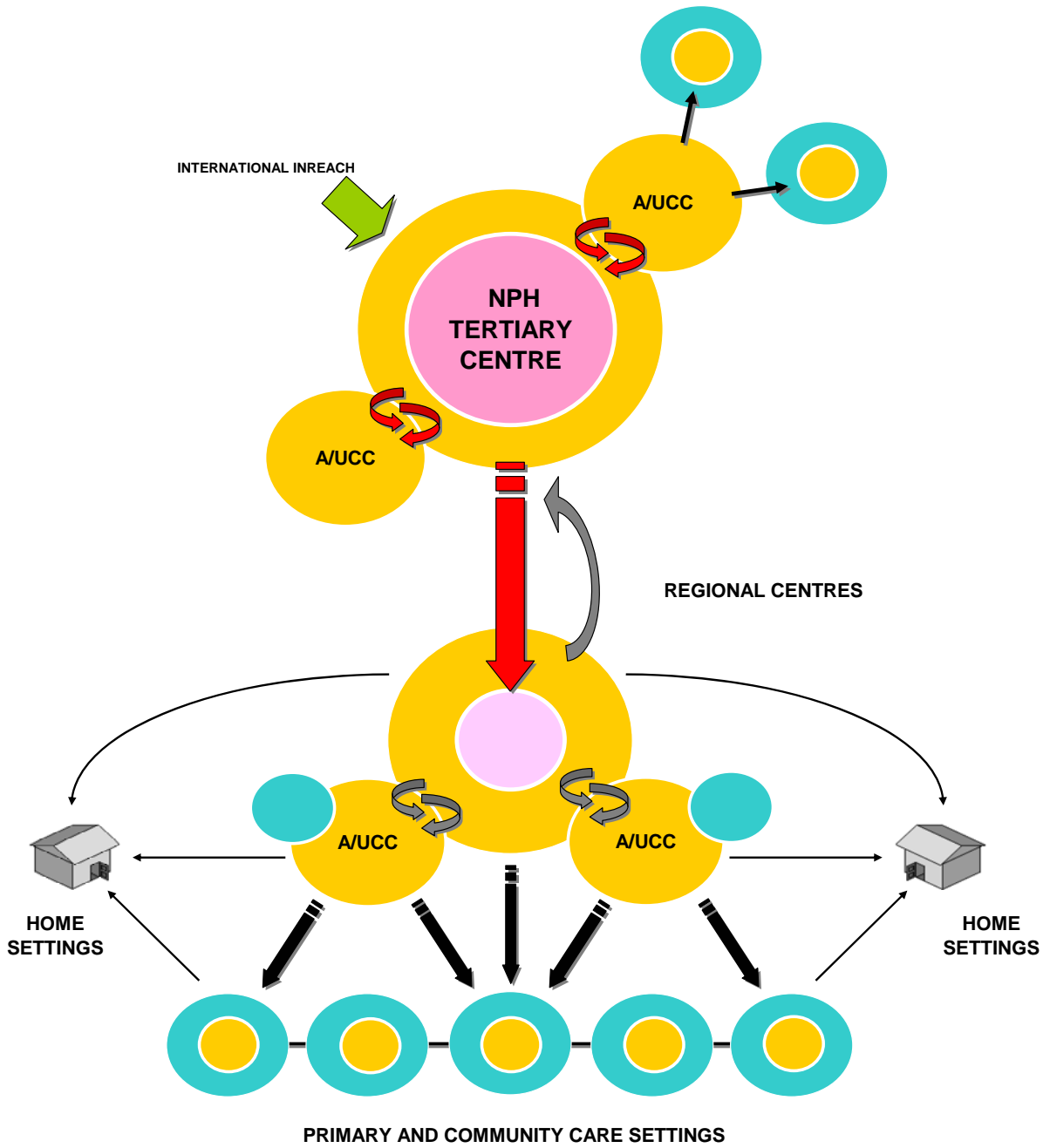
Further analysis of activity, workforce and infrastructure requirements will be necessary to determine the detailed configuration of services in the new model and a key challenge will be to avoid over centralising resources which would constrain the development of local services. Important considerations will include -

- The extent and pace at which general paediatrics and community paediatrics will develop and how this will influence the capability of local services
- How to develop and sustain local expertise and support for comparatively rare conditions which will occur infrequently in any locality
- The future location for surgery on children under 5 years of age
- The nature of Critical Care which can be appropriately provided in other hospitals
- Building local capabilities for earlier transfer of patients on long-term ventilation
- How far local day case services can substitute for those currently provided in the children's hospitals for non Dublin residents and whether there is scope for A/UCCs linked to regional hospitals
- More local day services, for example day chemotherapy

- The suitability of physical infrastructure in local hospitals to receive patients from the NPH Tertiary Centre, (for example the availability of single rooms to accommodate patients vulnerable to cross infection)
  
- Identifying the best practice elements of different outreach models operated by the current children's hospitals and integrating these into a cohesive network
  
- Ensuring that Ambulatory and Urgent Care Centres (A/UCCs) help support the development of primary and community paediatrics
  
- Workforce planning co-ordinated across the national networks to avoid competition between institutions and sectors for scarce skills.

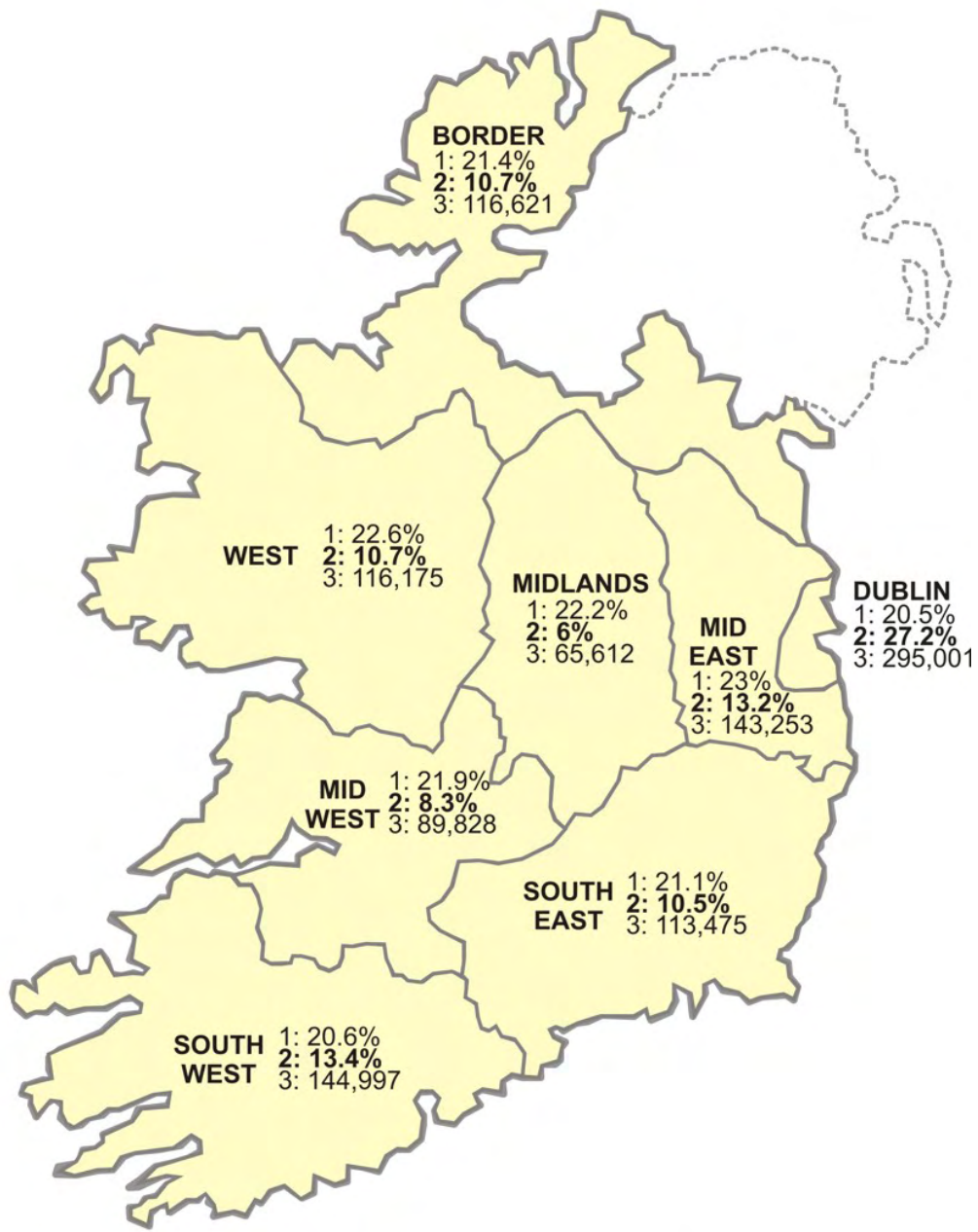


Figure A2 National Network



The map below illustrates the regional distribution of the under 16 population in 2021. This should inform decisions regarding regional centres and local hospitals.

**Distribution of <16 population 2021**



1: <16 as % of regional population  
 2: <16 as % all Ireland <16  
 3: Projected <16 2021

## **A1.6 Next Steps**

We recommend that the new Model of Care should be implemented in advance of the NPH Tertiary Centre, building upon current good practice. This needs to be co-ordinated and managed across the three children's hospitals to ensure that the best of breed is adopted in the new model.

A comprehensive mapping of current, often informal, outreach arrangements should be undertaken.

A systematic evaluation, co-ordination across the three children's hospitals should identify the good practice, sustainable examples of current practice and their potential for wider application.

The future roles of local and regional hospitals in the provision of paediatric services should be determined against agreed criteria in terms of critical mass, staffing requirements and infrastructure.

## Extracts from **State of the Nation's Children, Ireland 2006**

- The number of children under 18 in Ireland in 2004 was just over 1 million – 25% of the population
- The child mortality rate in 2004 was 4.6 deaths per 10,000 children
- 86% of children live with both parents
- Traveller children account for 1.2% of the child population. Non-Irish national children account for 3.9% of the child population
- In 2003 5.1% of Irish babies were born live at low birth weight compared to an EU average of 6.4%
- In 2005 over 7,000 children were registered as having a physical or sensory disability
- In 2002 20% of 15-17 year olds reported smoking cigarettes every day. 40% aged 15 reported to have used illicit drugs, 57% age 15 reported to have had 5 or more alcoholic drinks in the last 30 days
- 51% of children 8-11 reported to always feel happy compared to 25% of 12-17 year olds. In 2004 there were 18 suicides among children under 18
- In 2005 there were 333 admissions to hospital for psychiatric care. 86% of these admissions were 15-17 year olds
- In 2004 22.7% of children under 18 were considered to be at risk of poverty, higher than the EU average of 20%
- In 2004 the level of uptake of immunisation was 89% for infants aged up to 24 months

## **A2            Ambulatory and Urgent Care Centres**

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### **A2.1            Introduction**

Analyses and recommendations with regard to the number and locations of **Ambulatory and Urgent Care Centres (A/UCCs)** in the Greater Dublin area are detailed in a separate report which, in response to the terms of reference, was prepared in advance of the main framework brief. This section summarises only the principal findings of the Ambulatory and Urgent Care Centre report, together with stakeholder feedback from the engagement workshops.

### **A2.2            Methodology**

Firstly, a review of international approaches to ambulatory and urgent care was conducted via interviews with International clinical advisers and information provided from a further 14 reference sites. The suitability of Ambulatory and Urgent Care Centres for Greater Dublin was explored through analysis of activity data, identification of locations with the potential to improve access and consultation with local stakeholders. A range of scenarios with different site combinations was evaluated in terms of access, staffing viability, critical mass and available infrastructure to identify a preferred option and an implementation strategy.

### **A2.3            International Experience**

Tertiary paediatric centres worldwide have successfully devolved ambulatory and urgent care to both free-standing and adult hospital sites. Examples of the sites reviewed are shown below.

The Children's Hospital of Philadelphia (CHOP)  
The Hospital for Sick Children (SickKids) Toronto  
Cincinnati Children's Hospital  
Denver Children's Hospital  
Starship Children's Hospital, Auckland, New Zealand  
Homerton Hospital London

The international experience reflects a range of approaches to paediatric ambulatory and urgent care in which no single model predominates but which all reflect a continuing trend towards the delivery of care in ambulatory settings.

## **A2.4 Ambulatory and Urgent Care Activity Projections**

The projected distribution of urgent care, day case and outpatient activity between the NPH tertiary centre and A/UCCs in 2021 is shown in Table A4.

Table A4

<b>2021 Projected activity distribution</b>	<b>NPH Tertiary Centre</b>	<b>A/UCCs</b>	<b>Total</b>
<b>Day Cases</b>	10,956	17,744	<b>28,700</b>
<b>Outpatients</b>	80,700	116,000	<b>196,700</b>
<b>A&amp;E Attendances</b>	14,567	95,733	<b>110,300</b>

Note: of the total outpatient attendances at the Tertiary Centre a proportion of this will be outreach outside Greater Dublin

It should be noted that the distribution of day case and outpatient activity, is projected at this stage at a high level, which should be explored in further detail to determine which specialties should be provided where and how often.

### **Paediatric Population in Greater Dublin 2021**

Potential locations for A/UCCs were considered in relation to the distribution of the under 16-population as projected to 2021 for Greater Dublin including Wicklow, Kildare and Meath. This is based upon the Central Statistics Office (CSO) estimate using the MIF2 population growth scenario which assumes high external migration.

### **A/UCC Scenarios**

Scenarios were generated by considering a range of 2 - 4 centre options and site combinations, as shown in Table A5.

In each of the A/UCC location scenarios it has been assumed that patients will attend their nearest centre. On this basis the total volume of activity has been distributed across the centres in each of the scenarios.

Each A/UCC scenario has been considered against the following criteria –

- Access and Travel Times
- Critical Mass
- Staffing Implications
- Available Infrastructure

Table A5 A/UCC Scenarios

<b>A/UCC SCENARIOS</b>	<b>Mater Hospital Site</b>	<b>Tallaght Hospital</b>	<b>Loughlinstown</b>	<b>St Vincent's</b>	<b>North County Dublin</b>	<b>Beaumont</b>	<b>Blanchardstown</b>
<b>2 Centre Model</b>	●	●					
<b>3 Centre Model 1</b>	●	●	●				
<b>3 Centre Model 2</b>	●	●		●			
<b>3 Centre Model 3</b>	●	●			●		
<b>3 Centre Model 4</b>	●	●				●	
<b>3 Centre Model 5</b>	●	●					●
<b>4 Centre Model 1</b>	●	●	●		●		
<b>4 Centre Model 2</b>	●	●	●				●

## A2.5 Local Stakeholder Consultations

Views expressed regarding the deliverability and feasibility of A/UCCs range across a spectrum from support in principle to reservations about their feasibility and concerns that they could dilute the tertiary centre’s critical mass. The latter perspective is exemplified in OLCHC’s management submission (OLCHC, Framework Brief Management Submission 19/04/2006 <sup>(ref 27)</sup> which expresses -

*“...reservations concerning the ability of this urgent care model to function in the specific Irish / Dublin context and is also concerned about the efficacy and efficiency*

of the elective components.” This view is reiterated in the hospitals submission following the stakeholder meetings. <sup>(ref 28)</sup>

The Irish Association of Emergency Medicine (IAEM) considers Urgent Care Centres as one of a number of options, but concludes that the *“best model ... would be for Paediatric Emergency Medicine to be delivered at two fully functional Paediatric Emergency Departments”* <sup>(ref 29)</sup>. This is re-emphasised in a further submission following the stakeholder meetings <sup>(ref 30)</sup> which notes concerns about the lack of detailed consideration of the needs of secondary paediatric care in Greater Dublin. The IAEM's preferred option (see below), a two-site model each supported by secondary inpatient beds, is outside the terms of reference for this framework brief as set by the McKinsey recommendations. A submission from Drs Martin and McKay (Consultants in Emergency Medicine at AMNCH and CUH respectively) endorses a model of urgent care centres without overnight stay beds.

#### **A Second Paediatric Emergency Department providing Secondary Paediatric Care (IAEM Preferred Option)**

*“It involves having a second fully functioning Paediatric Emergency Department on an alternative location in the Greater Dublin area offering a 24-hour service. Such a unit would have to have access to on-site secondary paediatric care. Collaboration between senior doctors and nurses in the ED and the in-patient children’s services would ensure optimal functioning of such units. This unit should have the back up of in-patient and short stay paediatric beds.”*

**Paediatric Emergency Services for the Greater Dublin Area. June 2007**

*“While it is essential to deliver services to children as close to home as possible, children who are admitted to hospital overnight should be in a unit that can provide the full back up of in-house Paediatrics, surgery, anaesthetics and ICU care..... we fully support the development of the new Children’s Hospital and feel it is essential to provide paediatric services, including emergency services in additional sites we feel it is not in the interest of children to put in place overnight beds in such places.”*

**Submission from Drs Martin and McKay October 2007**



There is widespread agreement that a critical success factor will be the availability of appropriately skilled staff both based in the centres and rotating from the Tertiary Centre. There is a consensus that this is likely to require additional resources and investment in education and training to generate supply.

Stakeholders emphasised the importance of –

- Comparability between the units and the NPH Tertiary Centre
- Staff rotation and integrated professional development between the A/UCCs and the NPH Tertiary Centre
- Clear protocols regarding A/UCC and the NPH Tertiary Centre roles

## **A2.6 Recommendations**

On the basis of access, paediatric population density and projected activity there is a case for an A/UCC in **Tallaght**. On the same grounds, a centre serving North West Dublin in **Blanchardstown** would also be justified. There is also a case for consultant led outpatients in **Loughlinstown** and consideration may be given to a nurse led minor injuries service. However, notwithstanding international experience of A/UCCs operating successfully within paediatric networks, strong reservations have been expressed regarding the introduction of an unfamiliar model into the Irish context, particularly at a time of radical change within the health care system. These views were strongly represented at the stakeholder workshops. Accordingly it is recommended that the key steps in developing the A/UCCs should include establishment of a cross-hospital planning forum with responsibility for leading –

- Development of care pathways and protocols
- Activity modelling, to identify in detail which specialties and procedures will be undertaken in A/UCCs
- Detailed scheduling of functional content and area requirements
- Workforce planning and development of staffing models
- Integration of information technology with links ultimately to the NPH Tertiary Centre and in the initial phase to the existing children's hospitals

- Liaison with primary and community services and other agencies to build local interfaces
- Liaison with academic partners regarding education and training requirements
- Cost benefit analysis including capital and revenue consideration.

Subject to the outcome of this work it is recommended that an A/UCC should be developed in **Tallaght** as a prototype..

A/UCCs should be **dedicated children's facilities** with an environment of the same quality and standards as the NPH Tertiary Centre and, operating within its staffing and management structure, provide high quality care for significant numbers of patients in local settings.

**Transfer and retrieval services** should have been established and be fully functioning in advance of the A/UCCs.

Early implementation of **Electronic Patient Records** and **Telemedicine** including digital transfer of images will be essential.

The development of further A/UCCs in greater Dublin should be considered when the Tallaght model has been evaluated, when workforce viability has been established and demand and capacity requirements confirmed.

It should be noted that capacity and area analyses in subsequent sections of this report assume the ultimate development of full A/UCCs at Tallaght and Blanchardstown and the modified model in Loughlinstown. Subject to the evaluation of the Tallaght prototype it may be necessary to augment provision at the NPH Tertiary Centre if less outreach occurs.

## A3 Model of Care: NPH Tertiary Centre

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*“In order to implement the RCH philosophy of care on which the future model of care is based, RCH will need to change from its current medical specialty model to a model which is far more focused on the needs of the patient and provides a flexible, streamlined, seamless approach to the provision of a program of care for patients and their families’*

Royal Children’s Hospital, Melbourne Service Plan, May 2004 (Ref: 31)

### A3.1 Definition

The model of care for the NPH Tertiary Centre will encompass the philosophy of how care should be delivered in the future and will define how core clinical services should be arranged in relation to each other, and to non-clinical and support services. The model should reflect the principles and values of the service and provide a framework for evaluating subsequent service and design options in terms of clinical adjacencies, staff, patient and material flows and provision for growth and change. The model of care will be informed, but should not be determined by international evidence and the views of local stakeholders – both professional and non-professional. Crucially it should respond to the needs and views of children, who should be actively involved in the process of developing the model in subsequent project stages. Establishing structures to develop the model of care should be a priority for the Development Board.

### A3.2 Key Questions to be answered

***What is the range of services to be provided at the NPH Tertiary Centre site?***

***How should services be arranged consistent with achieving best clinical outcomes, child and family centred services and staffing efficiencies and effectiveness?***

***How can services be arranged to promote effective use of staffing, equipment and facilities resources and provide maximum flexibility over time?***

### **A3.3 Principles**

Clinical services within the hospital should be arranged -

- To support the best clinical practice which minimises risk to patients
- To achieve the objective of child and family centred care
- To promote multidisciplinary and cross-specialty working
- To make efficient use of resources – staff, equipment and facilities
- To ensure future flexibility to respond to changes in service range and volume.

### **A3.4 Key Themes and International Best Practice**

This section of the report considers international approaches to how services may be grouped physically and organisationally within a tertiary children's hospital environment. At the next stage of this project further work will be required to examine models of care and care pathways at a more detailed level in relation to key patient groups, including for example – Ambulatory Care, Chronic Care and Long-term Illness, Short-term Acute Care and Critical Care.

How services are arranged and grouped varies from hospital to hospital and will depend on the balance between primary, secondary and tertiary or quaternary services; the balance of emergency and elective work; volumes of activity and the quantity of ambulatory services relative to any satellite units. Local issues which will influence the optimum arrangement include staffing levels, degree of ICT integration and, where appropriate, clinical preference. Across our reference sites there is no one single model that predominates, but some recurrent and emerging themes in hospital organisation are listed in the table below.

#### **NPH Tertiary Centre Model of Care: Hospital Organisation – Different approaches to how services are grouped**

- Specialty based
- Clinical aggregations
- Care groups (transplantation, cancer)
- Planned / Unplanned services differentiation
- Hospital at Night zoning
- Dependency graduated care
- Quaternary, tertiary, secondary differentiation
- Well Children versus Sick Children

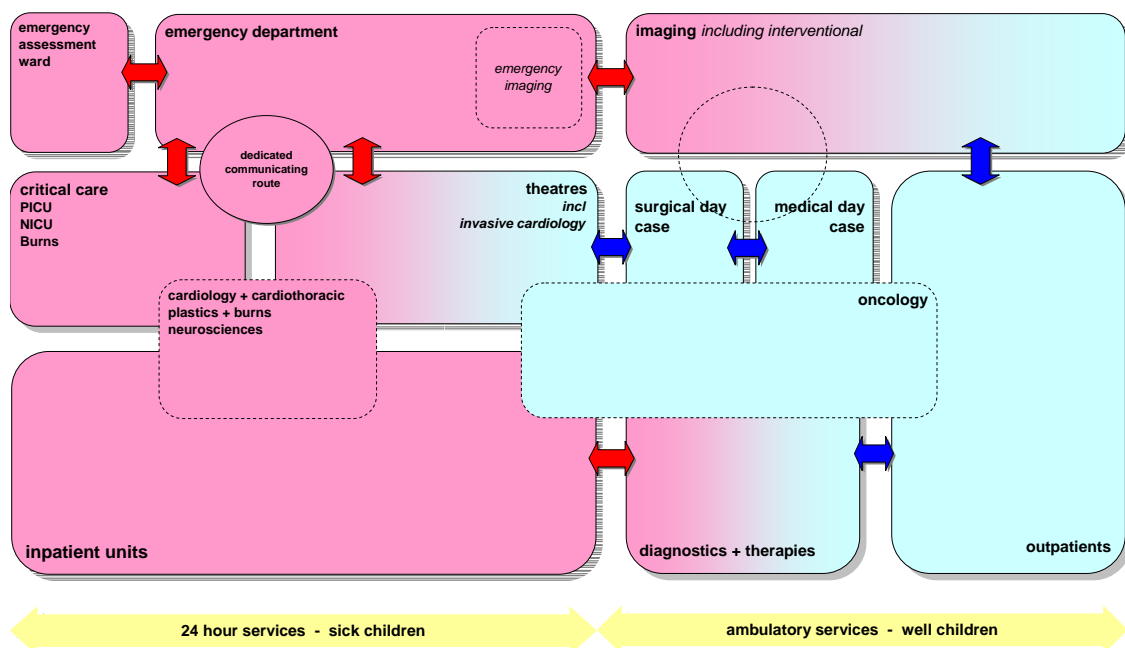
In reviewing the models across our Reference Sites, three generic approaches emerge which are also evident in adult hospital organisation. These are illustrated graphically in Figures A3 to A5. Common to all models is the close physical and functional relationship between emergency services, critical care and theatres.

The **Centralised Model** as illustrated in Figure A3 is the common model in the UK and Europe and in hospitals with a high secondary proportion of overall activity. In this model outpatients, diagnostics, inpatients and theatres for most specialties are centralised. Examples are the hospitals currently being planned in Glasgow, Liverpool and Manchester and Starship in New Zealand. The key advantage of this model is flexibility and adaptability as capacity is not locked in to any one patient group. Some specialist services, for different reasons, do not fit this central organisation. These include oncology and malignant haematology, cardiology and cardiothoracic services and neurosciences.

For haematology and oncology, the prevailing view across the reference sites is that the service should be as self-contained as possible because patients are immunocompromised and sharing facilities carries the risk of infection. From a cardiothoracic and neurosurgery perspective, the care pathway for tertiary services requires high risk patients to transfer across theatres, imaging, intensive care and high dependency and therefore these specialties have a close affinity with critical care services.

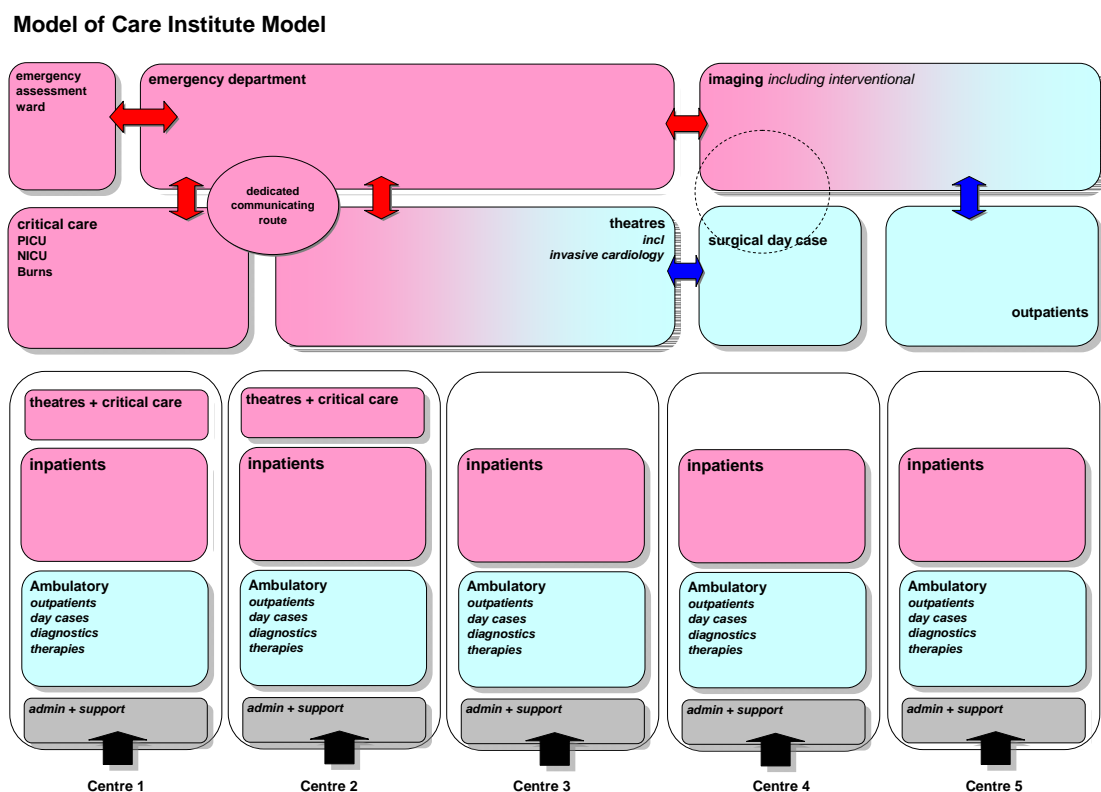
Figure A3

**Model of Care Traditional Model**



The **Institute Model** is the other end of the spectrum and is more typical in North America. Its key characteristic is an organisational, and potentially physical grouping, of all services relating to a single specialty or care group including ambulatory care, inpatients, theatres and critical care, diagnostics and administration. Examples of hospitals with elements of this model include Cincinnati, Stanford, Houston, Texas and Great Ormond Street in the UK. These hospitals have dedicated facilities for cancer and blood diseases and children's heart centres for example. Some level of centralisation is necessary for emergency services and secondary paediatrics. A large critical mass or tertiary component is required to justify this high level of designation. This approach is consistent with patient centred care, and providing flexibility across ambulatory and inpatient facilities for a specialty or patient care group. A disadvantage is that capacity becomes dedicated to a single specialty or care group and cannot easily be released if demands change. Specialty identity is a strong characteristic of this model.

Figure A4

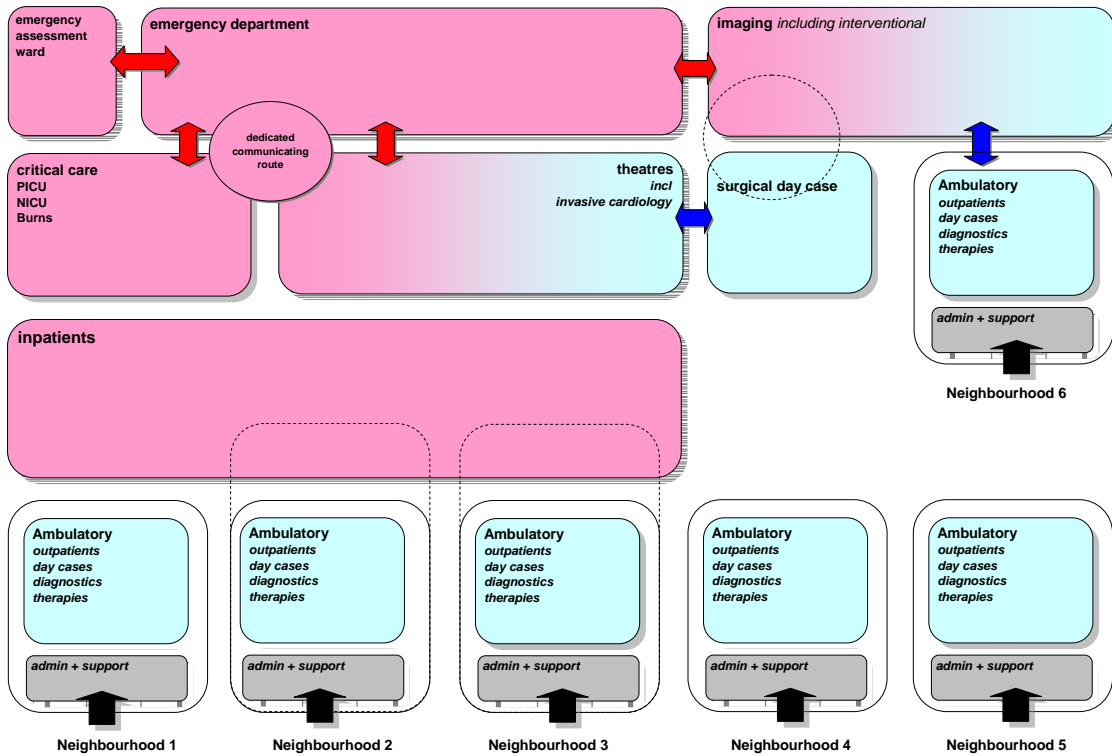


The third model is the **Neighbourhood** or **Cluster Model** where ambulatory services are grouped together for aggregations of specialties or services with close clinical linkages. Inpatient services remain predominantly centralised. Examples of this model include CHOP (Children's Hospital of Philadelphia) and Melbourne. The advantage of this model over the institute model is that inpatient capacity remains

centralised and therefore 24 hour services can be zoned together for efficiency. Neighbourhoods can be conjoined to ensure flexibility over time.

Figure A5

**Model of Care: Neighbourhood Model**



In practice hospitals are likely to include elements of all three approaches.

**A3.5 Application to Irish Context and Stakeholder Consultation**

Emerging models of care are yet to be debated across a representative group for the three children’s hospitals and considerable emphasis should be placed on this at the next stage to ensure that the opportunity to reconfigure services for patient benefit, with significant capital investment as a catalyst for change, is fully grasped.

The previous Outline Development Control Plan (ODCP) for OLCHC was based predominantly on a specialty based model for tertiary activity, with inpatient services remaining centralised with beds dedicated to specialties. The previous plans for CUH relocating to the Mater Hospital site were, again, based on a centralised approach but with dedicated facilities for some specialties, including metabolic medicine. A strong preference remains from a stakeholder perspective for facilities and other resources to be dedicated on a specialty basis, especially for tertiary services with

co-location of outpatients, day cases and clinical offices and specialty specific investigations.

#### **Enablers of Change**

- Information and communications systems
- Workforce Planning and development of new workforce models
- Capital development as a catalyst for change
- More effective funding of services
- Commitment to develop and implement a joint change agenda

This would lead to inflexibility over time and therefore our recommendation is that a neighbourhood or cluster model, which would group specialties with close affinities in one location, with some sharing of resources, be explored at the next stage (see Figure 6). This would provide the sense of identity which is important to clinicians and patients whilst allowing flexibility in capacity over time. Examples of neighbourhood approaches from RCH Melbourne and CHOP are illustrated in Figures A7 - A8.



Figure A6

### Model of Care: Emerging NPH Model

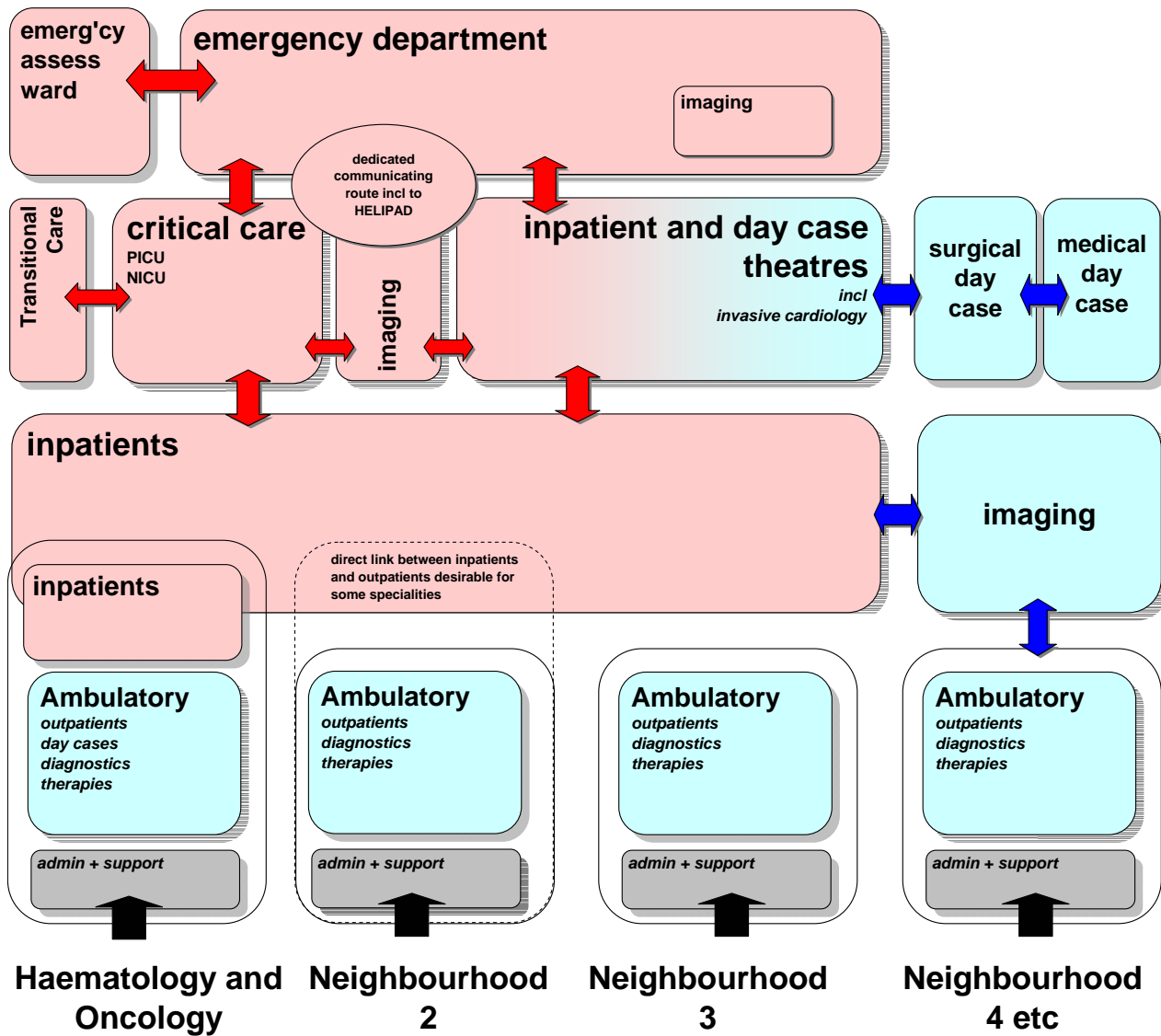


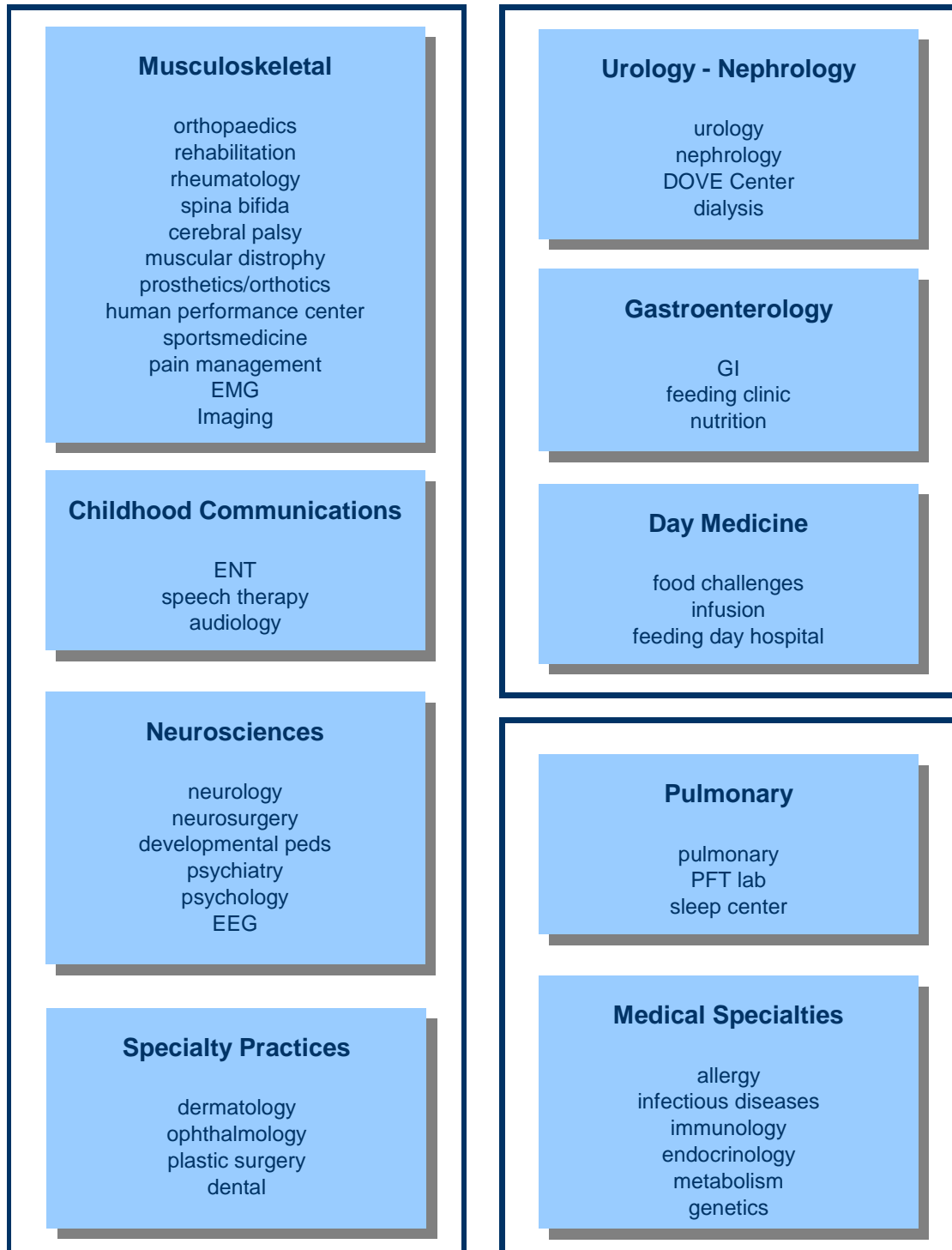
Figure A7

## Royal Children's Hospital Melbourne, Neighbourhood Model for Ambulatory Care



Figure A8

## CHOP, Neighbourhood Model for Ambulatory Care



### **A3.6 Specialty Models and Issues**

A number of areas where alternative models of care are being debated and issues requiring resolution have emerged from stakeholder discussions. This is to be expected at this stage and examples are noted in Appendix 5, to herald the discussions that will form part of the project's development at the next stage. A number of submissions and papers provide further detail of current thinking. These are listed in Appendix 4.

*"Putting the needs of our patients first, our future 'model of care' will keep hospital-based treatment to a minimum, and where possible will look to treat greater numbers of patients on a day basis. This approach is particularly innovative given the complex and serious medical conditions of the children we care for and as well as allowing us to treat greater numbers of children it also reduces the stress and anxieties associated with a child's visit to hospital"*

Great Ormond Street Hospital, London, UK

(Ref: 32)

### **A3.7 Quality Environments for Children and their Families**

*"Play is a natural part of childhood, and a vital factor in the mental, social and emotional growth of children"*

National Association of Hospital Play Staff, UK

(Ref: 33)

A number of submissions from stakeholders, and in particular the submissions from the Children in Hospital Ireland organisation, and the Cleft Lip and Palate organisation refer to key design requisites for the NPH Tertiary Centre.

Also, The Hospice Friendly Hospitals Project is an initiative of the Irish Hospice Foundation. One of the key themes of the Programme is 'Design and Dignity' and the outcome will be a comprehensive standards framework which should feed into the design brief for the NPH Tertiary Centre in the next stages.

While a design brief will follow this Framework Brief, it is appropriate to comment here on some important design considerations which reflect the aspirations of the HSE and the Department of Health for this development.

'Environments for Children and Young People' <sup>(Ref:34)</sup> published by NHS Estates, UK in 2004 made a number of recommendations summarised below. The environment should support the differing needs of children and young people of all ages -

- The needs of **babies and young children** centre on eating and drinking, playing and sleeping. The design should provide a variety of opportunities for socialising
- Young children are unable to differentiate between a safe and unsafe environment and consequently require constant supervision. Curiosity is normal and therefore security, safety observation are key considerations in designing facilities
- Young children learn mainly through play and it is therefore a critical part of their development. The provision of facilities for play is therefore essential
- Young children prefer a routine and a hospital visit may disrupt their routine completely, so it is important that a hospital is as welcoming and comfortable as possible within the constraints of a clinical environment
- For children and **young people** in hospital, whether long-stay, short-stay or recurrent admissions, it is important to minimise the disruption to normal schooling by continuing education as normally as possible. The provision of facilities for education is therefore another key consideration
- As children grow older they have an increasing concern for privacy and autonomy. **Adolescents** develop physically and emotionally at different rates. The separate needs of adolescents may be best met by providing separate facilities.

*Children with disabilities, as outpatients or inpatients, should be treated in line with the principles of mainstreaming of services and supports*

Disability Federation of Ireland

Ease of arrival at, and easy access to, healthcare facilities should be a primary consideration. Adequate provision should be made for pram and buggy parking and circulation. There should be WCs and nappy-changing facilities immediately inside the main entrance and also at regular intervals and to cater for children of all ages.

Entrances should be welcoming and friendly in a way that will interest and stimulate children. The décor chosen should be acceptable, interesting and stimulating to children and young people of all ages and every culture.

The journey to departments should not be stressful and thought should be given to the sights and experiences children will be exposed to on route. The directions and entrances to each department, ward or public facility should be signposted clearly. Consideration should be given to the element of control it is possible to give children over their environment. Pictorial signposting can enable a child to master wayfinding.

A balance needs to be struck between creating an 'open' environment and ensuring the safety and security patients, including preventing the risk of abduction. Minimising the risk of accidents in the healthcare environment is essential.

Babies, children and young people have as much right to their privacy and dignity as the adult population. Consideration should be given to differing cultural requirements regarding, for example, access to bath or shower facilities. Procedures such as clinical examination of the ear, nose or throat or the taking of a blood sample should not be undertaken in a hospital corridor or general circulating area. Children should be supervised and chaperoned at all times when they are being examined.

Studies <sup>(Ref:35)</sup> clearly show that the design of spaces, together with sensitive lighting, colour, sound attenuation, texture and material specification are essential to the child's immediate well-being, healing process and ultimate outcome.

Children and their parents should be fully involved at the subsequent project stages.

*"We know that children's early experience of health care affects their attitude to the health service for the rest of their lives"*

Professor Al Aynsley-Green the National Clinical Director for Children, UK

## A4 Education & Training and Research

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*What is the appropriate model for the large volumes of students and staff who will engage in education and training activities in the NPH Tertiary Centre?*

*What role will ambulatory and urgent care centres, operating as part of the NPH Tertiary Centre have in education, training and research?*

*What is the most appropriate model to develop synergies between research and service delivery, and to ensure the translation of research findings into practice?*

*How can the NPH Tertiary Centre support paediatric education, training and research throughout Ireland?*

### A4.1 Introduction

The National Paediatric Hospital “*at the nexus of a national network of paediatric services*” (Ref: 1, page 58) will be the lead centre for paediatric education and training and research. In addition, through these activities, the NPH Tertiary Centre will have a key role in generating the workforce which it, and other paediatric services require, and creating the intellectual environment which will help to attract, retain and develop high quality staff across all disciplines.

This section considers how these roles may be fulfilled in the context of national policies, international experience and local stakeholder opinion.

Education for patients and for parents and carers is not specifically considered here (see Section C1.4), but shared access to the facilities provided for professional education and training by other users would be consistent with the principle of education as a central role for the NPH.

## A4.2 Context

The national context for education training and research is set by a number of policy statements and initiatives.

### Medical Education

The policy framework for medical education has been set by two key reviews, the Fottrell and Buttimer reports which make recommendations for undergraduate and postgraduate education respectively. <sup>(Refs: 36, 37)</sup>

*“(there is) a critical lack of capacity in clinical training (settings)”*

*“Radical reform of the quality and capacity of clinical training (is) one of the key issues.”*

*“Inadequate experience (of medical students) to community care .....public health medicine and general medicine” and a future curriculum that “demands (in the future) a diversity of clinical locations and supporting infrastructure (including) technology support staff, clinical skills laboratories, libraries, tutorial and lecture facilities on health service sites”.*

*“significant additional investment in undergraduate medical education .... and integrated and shared approach to create critical mass, reduce duplication, encourage specialist action and the effective use of resources.”*

Fottrell Report, 2006

(Ref: 36)

*“In many ways the changes to the delivery of medical education and training underpin the whole (health service reform) process.”*

*“...the HSE should work with the training bodies ..... to develop agreed standards for medical education, training and research facilities on-site, including provision for their utilisation by multidisciplinary training.”*

Buttimer Report, 2006

(Ref: 37)

The **Medical Education, Training and Research Committee** of the Health Services Executive (METR) is currently developing strategies for the future delivery of education, training and research within healthcare. This has included a detailed



inventory of existing educational infrastructure and it is anticipated that major capital investment to address current defects will be recommended. A paper on the proposed approach to research is to be issued in September 2007.

### **Midwifery and Children's Nursing**

Reporting in December 2004, the Expert Group Midwifery and Children's Nursing Education, <sup>(Ref: 38)</sup> noted a concern regarding –

*“the capacity of the current system of education to provide an adequate supply of midwives and children's nurses to respond to existing and future needs within a changing health service”.*

The group concluded that –

*“a new model of midwifery and children nursing education was required” and recommended “the development of a pre-registration children's / general nursing degree programme in partnership with a number of clinical level institutions.”*

The Healthcare Skills Monitoring Review <sup>(Ref: 32)</sup> observed that *“the introduction of the integrated general and children's nursing course should alleviate the long term supply needs of this occupation provided the number of places increase (to approximately 200 annually).”*

Together these policies underline the central importance of education and training – for all disciplines – in ensuring the sustainability of the NPH and its national network.

### **Research**

A collaboration between the Health Research Board (HRB), the HSE and the Department of Enterprise, Trade and Employment drives to promote research via direct government funding and through the attraction of inward investment. In its Corporate Strategy for 2007-2011 the HRB describes the vision of *“a world class health system in Ireland through excellence in research and to contribute actively to the knowledge economy”* <sup>(Ref: 40)</sup>. Of particular relevance to the NPH Tertiary Centre are the following elements of the HRB's action plan –

- Promote the alignment of health service and academic research strategies
- Provide a best practice research culture in the health and personal social services
- Develop infrastructure to provide clinical research

An important component in promoting translational research is the development of clinical research within hospitals. This is relatively underdeveloped in Ireland but important to create a receptive culture for the results of laboratory based research. For some stakeholders this is as at least as important as whether basic research should take place on hospital sites. Clinical research centres will be the focus for training programmes to develop the clinical scientists of the future.

### **A4.3 Stakeholder Consultation**

Stakeholders consulted in developing the Framework Brief are shown in Appendix 3. Those with a particular interest in education training and research who were consulted are shown in Table A6

Table A6

#### **Stakeholders – Education, Training and Research**

Irish Association of Children's Nurses

Faculty of Paediatrics, Royal College of Physicians of Ireland

Professors of Paediatrics – University College Dublin, Trinity College Dublin, Royal College of Surgeons, Ireland

Council of Deans of Faculties with Medical Schools in Ireland

Professor M Fitzgerald, Chair METR Committee

Children's Research Centre, Crumlin

Conway Institute, University College Dublin

Across all stakeholders there is a strong consensus regarding the importance of education, training and research which is reflected in OLCHC's view of *"the new hospital ... (as)... an integrated academic health science centre"* <sup>(Ref: 3)</sup>. There is broad agreement that –

- Education, training and research should be integral to the NPH Tertiary centre
- The model should maximise opportunities for interdisciplinary learning
- Central education and learning facilities should be easily accessible to staff from their workplace and there should be local facilities within or close to each clinical area which could be shared by all disciplines
- The NPH Tertiary Centre would create a unique opportunity for research – laboratory based, translational and clinical

- The education function within the hospital should include support for children and their parents and carers, in management of their conditions, particularly where those are long term
- Information technology - enabled learning and communications will become increasingly widespread with requirements for local access, both within the hospital and elsewhere to data, images and real time teleconferencing.

From discussions with the Faculty of Paediatrics, the Council of Deans of Medical Schools in Ireland and the Professors of Paediatrics in the Dublin Medical Schools we understand that approximately 600-650 medical students will spend time in the NPH Tertiary Centre, with a peak load of approximately 150 <sup>(Ref:41)</sup>. We understand that work is underway to harmonise curricula for paediatric medical training and there is clearly an opportunity to develop this further when all three streams come together in the NPH Tertiary Centre. This, it has been suggested, may also allow further innovation in medical education including earlier introduction of students to the clinical environment and alternatives to the traditional block structure. The graduate intake programme, starting this year, is also likely to influence educational delivery models. The value of A/UCCs in providing students with exposure to the full spectrum of disease was noted by a number of stakeholders.

The Centre for Children’s Nurse Education at OLGHC, in association with DCU, UCD and TCD, provides education and training to approximately 250 nurses per annum. There are similar numbers at CUH and a smaller volume at AMNCH. The projected future peak load in the NPH Tertiary Centre is estimated at approximately 150.

In addition the education and training functions in the new hospital will include –

- Continuous professional development for all staff
- Clinical skills laboratories
- Education programmes for visiting staff

## **Research**

There is a strong consensus amongst stakeholders (supported by national policy and international experience) regarding the importance of research for the NPH Tertiary Centre and the importance of NPH Tertiary Centre for research. In many cases this is accompanied by the view that this requires that research both basic and clinical, should be physically within or very close to, the Hospital. This case is strongly presented by the Children’s Research Centre in its ‘Vision for the Future’ <sup>(Ref: 42)</sup>. Concluding that *“the new tertiary Children’s Hospital presents a unique and*

*unprecedented opportunity to establish a research institution focused exclusively on childhood illness and disease”, the Vision calls for “an existing dedicated research institute with labs and teaching facilities on or adjacent to the new Children’s Hospital”. (The Vision also makes proposals regarding the organisation and governance of research within the new hospital which will be for consideration by the NPH Development Board in subsequent project stages.)*

Some respondents suggest that while physical co-location of basic science, clinical science and clinical practice may be advantageous, there are other factors of equal or higher importance for bench to bedside success. These include -

- Ensuring a critical mass and interdisciplinary exchange amongst basic scientists
- Developing and strengthening a culture of clinical research across disciplines
- Increasing the number of joint academic / clinical appointments
- Promoting recruitment to clinical trials
- Enabling cross fertilisation between adult and paediatric research activity.

#### **A4.4 International Experience and Applicability to Ireland**

***“What are the key ingredients for successful integration of teaching and research in a tertiary hospital?”***

*“The gold standard must be to do away with split site working... physical proximity allows good communication and liaison on an informal unplanned basis. The resulting co-locations allow ready access to discuss clinical cases, plan post-graduate activity and to develop research ideas”*

Richard Newton, Manchester Children’s Hospital

*“most important is the recognition that innovation is the primary pillar of a world class paediatric academic health centre. Innovation stems not only from research into the mechanisms for preservation of health and prevention of disease, their fundamental mechanism and effective clinical therapy, but also into other areas of the institution including administrative and scholarly activities. An embedded integration of clinical care, teaching and research is extremely important.”*

Hugh O’Brodivich, SickKids , Toronto

*“...international standards in medical education describe a model that involves considerably more emphasis on intensive small group interaction, including problem-based and group learning, with at most 12-20 students per group. In this new model...there will be more students, more diverse educational delivery settings, and more small-group work and interaction, including enhanced mentoring procedures and more inter-disciplinary contact... The benefit will be graduates more fit-for-purpose and possessing greater professional versatility, enabling them to deliver the modern, multi-disciplinary, patient-centric health service Ireland needs and deserves.”*

The Fottrell Report, 2006

(Ref: 36)

## **A4.5 Recommendations**

International experience, national policy and local stakeholder opinion converge in supporting the integration of education and research activity within the NPH Tertiary Centre. It is clear that the NPH Tertiary Centre will have the leading role in providing clinical experience for a large number and wide range of students, post-graduates and hospital staff and should include both a multi-disciplinary education centre and learning and resource facilities localised within clinical areas. The A/UCCs which, it is recommended are developed as part of the NPH Tertiary Centre service should also include, or have access to, appropriate facilities of comparable quality.

Information technology and teleconferencing will be crucially important in linking areas within the tertiary acute centre, between it, its academic partners, the A/UCCs and other hospitals.

Within the timescale for the development of the NPH Tertiary Centre it is likely that arrangements for specification, funding and accreditation between the health service and its academic partners will have been formalised and a structure for engaging the different institutions in this process should form part of the project management structure for development of the NPH Tertiary Centre.

The bringing together of the three children's hospitals, each with its own research traditions, provides the opportunity to determine the future model for research, building on the best of current practice and informed by international experience. It is recommended that this process should begin now within a forum which includes academic partner and HRB representation.

It is recommended that the central facility should incorporate provision for research activity and an area for this has been included within the schedule of accommodation (see Section C2).

## **B Workstream 2: Capacity Modelling**

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This section of the Framework Brief considers future capacity requirements for the NPH Tertiary Centre for the next 15 years to 2021 which is the timeframe adopted in the Mc Kinsey Report. Our Terms of Reference for this High Level Framework Brief were to –

- Review and update the McKinsey bed projections as outlined in ‘*Children’s Health First*’ (Ref:1)
- Forecast future requirements for other key functional content including Emergency Department attendances, outpatient consulting suites and operating theatres and procedure rooms.

This section is divided into the following sub sections –

- B1 Baseline Data
- B2 Inpatient and Day Cases
- B3 Outpatients
- B4 Operating Theatres and Procedures
- B5 Imaging
- B6 Future Flexibility

Future Emergency Department attendances are covered in Appendix 5: Ambulatory and Urgent Care Centres for Greater Dublin.

### **B.1 Baseline Data**

Future capacity requirements have been modelled on the data samples outlined in this section.

#### **B.1.1 Definition of Paediatric Patients**

In order to retain consistency with the initial scoping exercise undertaken by McKinsey in 2004, RKW has used the definition of paediatric patients as being aged between 0 and 15 years inclusive: that is, patients aged 16 and over were excluded. However, a number of patients continue to be treated by paediatric services after reaching the age of 16, usually either due to an ongoing course of treatment or because no equivalent adult or adolescent service exists. In 2005 young people aged

between 16 years and 18 years nationally accounted for a total of 20,426 inpatient and day case encounters.

### B.1.2 Patient Origins

The methodology adopted by McKinsey in their report distinguishes between ‘Dublin’ and ‘Non-Dublin’ activity. This has been reflected where appropriate in this analysis, with ‘Dublin’ being taken to be represented by the Greater Dublin area covering Dublin County, plus Kildare, Meath and Wicklow. Unless otherwise stated, reference to ‘Dublin’ means this Greater Dublin population.

### B.1.3 Inpatients and Day Cases

The 2005 HIPE dataset, excluding any patient’s identifiable data (such as admission and discharge dates) but including patient origin and location of treatment was provided to RKW. The data provided were for all-Ireland activity, and indicated key fields such as hospital attended, an indicator of an inpatient stay involving ITU and whether a surgical or medical procedure was included. An indication of the total activity for all-Ireland including secondary and tertiary encounters for <16’s in 2005 is given in Table B1 below. Note that these numbers exclude neonatal activity in Maternity Hospitals but include activity in specialist hospitals. <sup>3</sup>

Table B1: IPDC Base Activity (2005) All Ireland Secondary and Tertiary <16

Category	Inpatient	Daycase	Total
Elective	13,979	41,192	55,171
Emergency	69,256		69,256
<b>TOTAL</b>	<b>83,235</b>	<b>41,192</b>	<b>124,427</b>

Source: HIPE Data 2005

On commencement of this work in January 2007 the data for 2006 were not yet available for inpatient and day case activity (IPDC) activity, therefore 2005 data were used, however, 2006 high level data have subsequently been provided by each of the children’s hospitals.

<sup>3</sup> Specialist hospitals include Cappagh Orthopaedic and the Royal Eye and Ear.



We have verified the data for 2005 held nationally against local estimates to check validity. This has been confirmed as accurate by CUH. Compared to local estimates at OLCHC the HIPE data reports a 1% difference in encounters (HIPE overcount) and less than 1% difference in occupied bed days (HIPE undercount). These differences are immaterial at this stage. At the time of writing AMNCH numbers have not yet been confirmed.

Data have been sorted on a specialty level basis, however, this has been taken as a guide only of the level of activity by specialty, as coding discrepancies have been reported by local stakeholders and a significant amount of specialist work appears to be coded under general paediatrics, **however the total activity for 2005 has been confirmed as correct by the children's hospitals.** It is therefore not possible to be specific about the overall future predicted activity and capacity requirements for an individual specialty as some of the activity may be counted elsewhere but will not have been omitted.

In addition, each hospital was asked to provide activity on inpatient and day cases for 2006, for comparison against the 2005 HIPE Data as noted in Table B2 below. This indicates an increase of 4% in inpatient activity over the year, most of which was experienced in AMNCH which had an 18% increase in inpatient activity. Day case activity increased by 11% overall. The growth in day cases at AMNCH at 2% was significantly lower than at the other two hospitals.

Table B2 2005 vs. 2006 Local IPDC Activity U16 all units

2005 HIPE vs 2006 Local IPDC Activity U16 all units	2005 HIPE			2006 Hospital Data		
	IP	DC	IPDC	IP	DC	IPDC
Hospitals						
OLCHC	10,729	11,196	21,925	10,883	12,588	23,471
AMNCH	5,375	3,589	8,964	6,320	3,675	9,995
CUH	7,764	4,853	12,617	7,595	5,485	13,080
All Dublin Children's Hospitals	23,868	19,638	43,506	24,798	21,748	46,546

Source: HIPE Data 2005 and data provided by NCH, OLCHC and CUH for 2006

#### B.1.4 Outpatients

Centrally held data for the period 2003 – 2006 was provided for the three Dublin children's hospitals. The data indicated New, Return and 'Did Not Attend' (DNA)

activity by specialty. In addition, data were provided on paediatric outpatient activity that currently takes place in all other hospitals in Dublin as noted in Table B3 below. These data were verified against information provided individually by the children's hospitals. At CUH and NCH datasets identified additional outpatient activity in the order of 10% relating to nurse-led and AHP activity undertaken in outpatient settings. This has therefore been factored into future capacity projections.

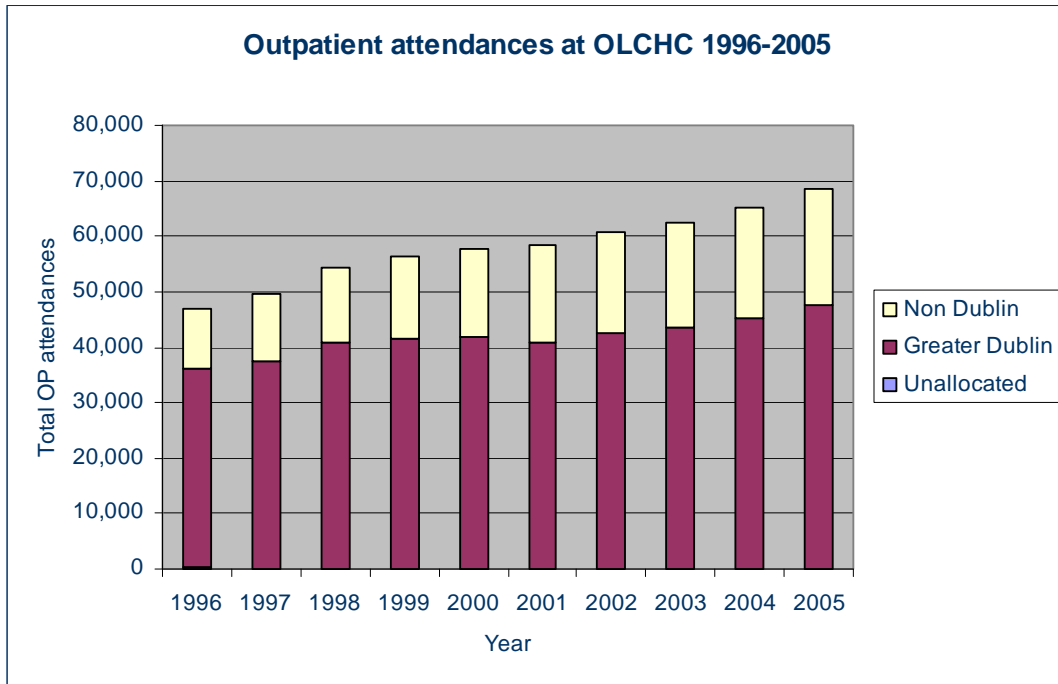
Table B3 OP Attendances 2006 Summary

<b>OP Attendances 2006 Summary</b>	<b>New</b>	<b>Return</b>	<b>DNA</b>	<b>Total</b>
<b>OLCHC</b>	21,447	51,355	20,139	92,941
<b>CUH</b>	13,486	33,503	11,887	58,876
<b>AMNCH</b>	9,637	20,460	5,700	35,797
<b>Dublin Children's Hospitals</b>	<b>44,570</b>	<b>105,318</b>	<b>37,726</b>	<b>187,614</b>
<b>Other Hospitals</b>	1,923	4,376	1,288	7,587
<b>TOTAL 2006</b>	<b>46,493</b>	<b>109,694</b>	<b>39,014</b>	<b>195,201</b>

Source: HSE supplied data for consultant clinics only

Data provided by the HSE did not include an indication of patient origin. However, data provided by NCH indicated that 8% of their outpatients in 2005 and 2006 were from outside the Dublin area. At OLCHC the corresponding figure for 2005 was 31%, and at CUH 23%. Figure B1 illustrates the changing profile of outpatient attendances (new and return) at OLCHC over 10 years. In 1996 23% of their outpatients were from outside Greater Dublin.

Figure B1 OP Attendances OLC HC 1996-2005



Source: Data supplied by OLC HC

### B.1.5 Emergency Department Attendances

The three children’s hospitals also provided data for Emergency Department attendances for the period 2003-2006 as shown in Table B4. These data were provided with a breakdown between New and Return attendances, with an indication also given of the number of admissions from the Emergency Department. In addition, Tallaght and CUH also provided a breakdown for new attendances across six triage categories, and OLC HC has provided a comparable breakdown. Further details are included in the separate A/UCC report.

Table B4 Emergency Department Attendances 2006 Summary

A&E Attendances 2006 Summary	New	Return	Total	Admissions
<b>OLCHC</b>	26,809	2,085	28,894	4,832
<b>CUH</b>	43,069	6,625	49,694	4,962
<b>AMNCH</b>	30,336	1,410	31,746	6,238
<b>TOTAL 2006</b>	<b>100,214</b>	<b>10,120</b>	<b>110,334</b>	<b>16,032</b>

## B2 Inpatient and Day Case Bed Capacity

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### B2.1 Summary of McKinsey Findings and Methodology

Figure B2 summarises the modelling approach for inpatients and day cases which we have adopted in this high level Framework Brief.

**McKinsey concluded that the bed demand in 2020 for the Dublin based tertiary centre including national referred and Greater Dublin tertiary care, combined with Dublin secondary care needs generated a demand for a total of 380 beds of which 339 were inpatient beds and 41 were day case beds.**

This was based on population growth with high external immigration and high impact in terms of health service reform and productivity gains. McKinsey also illustrated the impact of high population growth and low impact change to establish an upper limit in projected bed demand. In this scenario, the **total** tertiary requirement for all-Ireland including tertiary workload outside Dublin which is **not** currently referred was included. This resulted in a future demand of 585 beds of which 544 were inpatient beds and 41 were day beds. It is important to emphasise that this upper figure was **not** a statement of future flexibility requirements, it merely illustrated the impact of not achieving moderate productivity gains and reform coupled with the assumption that **all** tertiary work would migrate to Dublin.

To arrive at their conclusions, McKinsey adopted a 4-stage methodology which we have also followed to provide as close a comparison as possible for this High Level Framework Brief.

**Step 1 :** Review bed capacity requirements for all of Dublin Secondary and National Tertiary activity assuming current performance in terms of length of stay and day case percentages and assuming bed occupancy of 80% for children under 16 years.

**Step 2 :** Review the impact of demographic changes on this current activity and bed demand to 2021 using MIF2 Scenario.<sup>4</sup>

**Step 3 :** Factor in the impact of health service reform and productivity gains, McKinsey assessed that this would result in an overall reduction in bed demand of 15%. At this stage also, the proportion of Critical Care to general acute beds is reviewed in line with international best practice.

**Step 4 :** Subtract from this outcome the activity and related bed-days that relate to tertiary work outside Greater Dublin which is **not** currently referred to Dublin Hospitals on the assumption that this would remain the case.

In arriving at a future bed demand projection we have added two further steps –

**Step 5 :** We have factored in service developments which would have been substantially undercounted or excluded in the 2003 HIPE data including mental health, long-term ventilation, Under 5's surgery and work currently undertaken in specialist hospitals in Dublin.

**Step 6 :** We have reviewed the distribution of day beds across the main NPH Tertiary Centre site and the A/UCCs in line with the recommended option detailed in the separate A/UCC report.

The McKinsey work excluded neonatal activity that currently takes place in Dublin Maternity Hospitals. This Framework Brief exercise also excludes that activity.

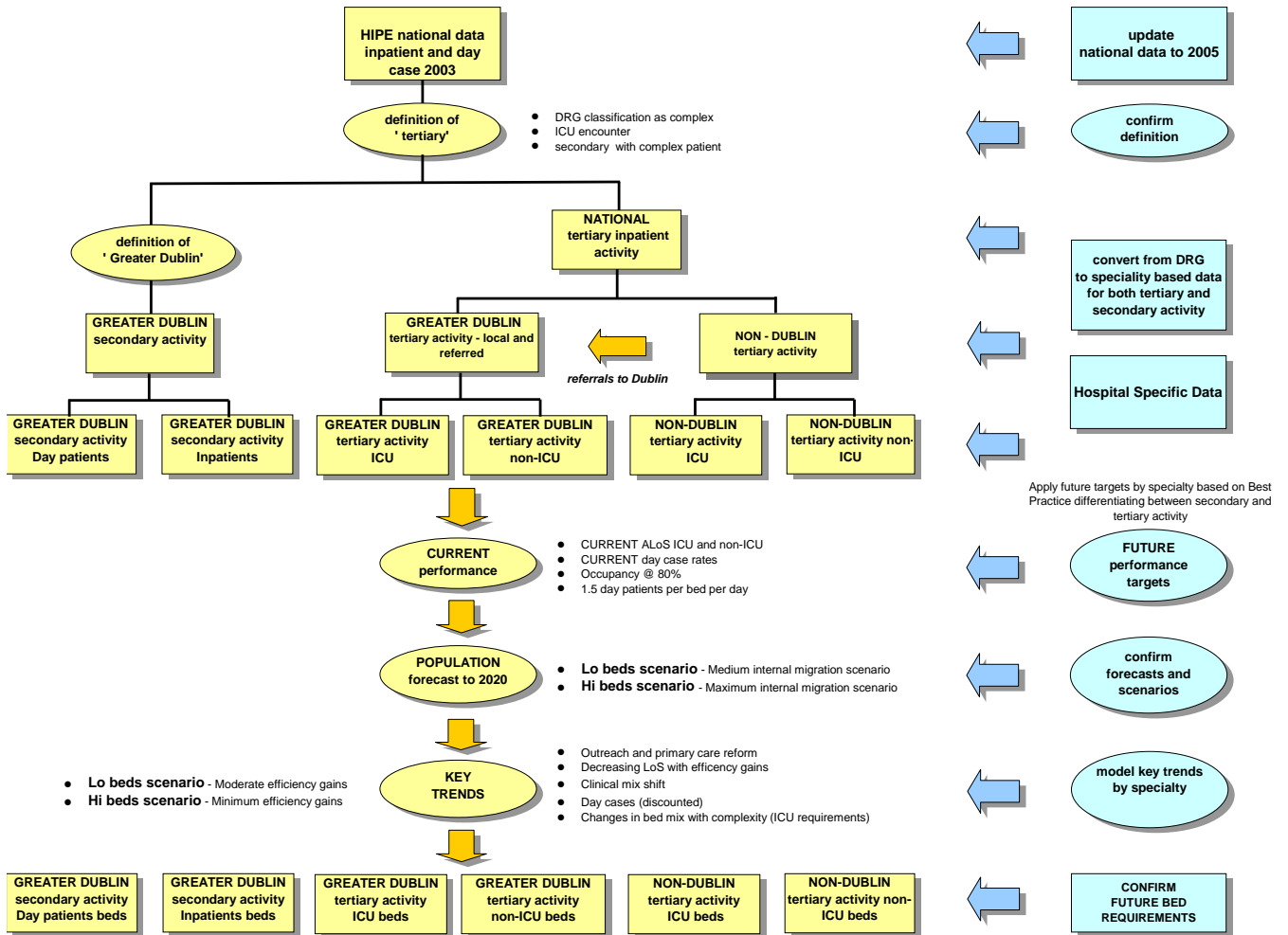
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<sup>4</sup> This scenario combines high Migration ("M1") and moderate Fertility/birth rate ("F2"), and at the time this report was commissioned in January 2007 was deemed to be the most likely growth scenario by the CSO.

Figure B2 Summary Methodology

Mc Kinsey Report : Activity and Capacity Modelling Methodology for Inpatients and Day Case

RKW Methodology



## B2.2 Summary of RKW bed demand projections

The outcome of this exercise is detailed by step in Figure B3 and further detail on a step by step basis follows.

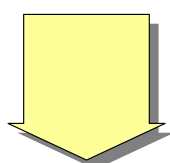
**This indicates a requirement of 446 beds at the NPH Tertiary Centre in 2021 (excluding observation beds) of which 37 are day beds.**

These projections are made on the basis of the high external immigration scenario from CSO statistics coupled with productivity gains measured against **current** international best practice and known changes in demand for specific specialties.

These projections assume moderate performance improvements in line with McKinsey. A sensitivity analysis has been undertaken in Section B.2.9 to test the impact of achieving higher performance improvements. This identifies that a reduction of 50 beds is plausible if higher performance targets on admission avoidance are achieved. If the most challenging performance targets were adopted the impact on beds is a reduction in the order of 100.

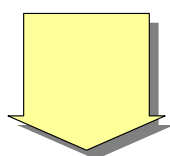
Figure B3 Summary of Bed Capacity Calculations

**Step 1 : Greater Dublin and National Tertiary Bed Demand based on 2005 HIPE activity**



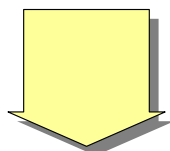
• Inpatient beds	396
• critical care beds	29
• day beds	62
• TOTAL	487

**Step 2 : Future Bed Demand based on 2021 Demographics**



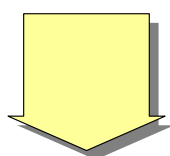
• Inpatient beds	470
• critical care beds	34
• day beds	74
• TOTAL	578

**Step 3 : Bed Demand 2021 with Enhanced Productivity and Redistributed Critical Care**



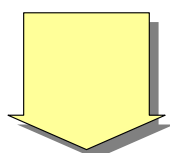
• Inpatient beds	368
• critical care beds	75
• day beds	60
• TOTAL	503

**Step 4 : Bed Demand 2021 excluding Tertiary workload not referred to Dublin**



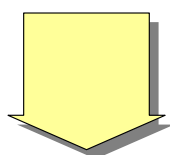
• Inpatient beds	304
• critical care beds	64
• day beds	60
• TOTAL	428

**Step 5 : Bed Demand with additional beds not included in McKinsey calculations**



• Inpatient beds	344
• critical care beds	65
• day beds	65
• TOTAL	474 <i>(Excluding 21 Observation Beds)</i>

**Step 6 : Allocation of Daycase beds across the NPH main site and A/UCCs at NPH Tertiary Centre**



• Inpatient beds	344
• critical care beds	65
• day beds	37
• TOTAL	446 <i>(Excluding 8 Observation Beds)</i>

We have been careful to apply benchmarks relevant to the local context and would suggest caution in making any comparisons of capacity against other hospitals, health systems or populations for a number of reasons including the following variables –

- Demographics : Paediatric population as a percentage of total population and projected growth or decline
- The availability of secondary beds outside the tertiary centre
- The number of centres providing tertiary or quaternary care.

## **B2.3 Step 1: Current bed demand for all Greater Dublin Secondary and all National Tertiary**

### **National Secondary and Tertiary Workload**

The total number of <16 years secondary and tertiary encounters nationally in 2005 was 82,600 encounters compared to 79,000 encounters in 2003 <sup>(Ref: 1 p32)</sup>. This represents an overall increase in admissions nationally of 4.6% over a 2 year timescale.

Table B5

<b>National and Secondary Tertiary IP encounters 2005</b>	<b>HIPE DATA 2005</b>	<b>HIPE DATA 2003 (McKinsey)</b>
	<b>Inpatient encounters</b>	<b>Inpatient encounters</b>
<b>Secondary</b>	67,285	67,000
<b>Tertiary</b>	15,315	12,000
<b>TOTAL 2005</b>	<b>82,600</b>	<b>79,000</b>

Source HIPE data 2005 .Excludes neonatal activity in Maternity Hospitals and specialist hospitals.

As can be seen from Table B5 the number of encounters classified as tertiary has increased from 12,000 to 15,315 cases. Our classification of tertiary is consistent with McKinsey, based on a combination of three factors –

- Presence of an ITU stay in the encounter, or
- Presence of a ‘with complications and co-morbidities’ flag in the DRG description,  
or



- The encounter being coded as a DRG considered to be 'tertiary'.

Whilst a direct comparison with the McKinsey 2003 data is not possible this shift to more tertiary work is most likely attributed to a change in the DRG model used in Ireland from 2005 where procedures previously classified as secondary are now considered tertiary. It may also reflect an element of a more complex workload.

McKinsey identified that of the total national workload considered as tertiary, that 33% took place outside Dublin. The corresponding figure in the 2005 HIPE data is 29%, which suggests an increase in referrals to Dublin over the two year period.

### **Greater Dublin Secondary and Tertiary workload**

Of the national secondary requirement 17,190 encounters related to the Greater Dublin area and this generated 45,800 occupied bed days. The number of encounters from McKinsey 2003 analysis is not available for comparison. However, their analysis generated a requirement of 54,900 bed days based on 2003 analysis, which indicates a reduction of 17% in OBDs over 2 years. This could be explained by a combination of a number of factors including –

- Successful admission avoidance
- Further shifts to day care; and/or
- Reductions of overall length of stay.

For 2005 data and assuming an average bed occupancy of 80% this level of activity generates a requirement of 425 inpatient beds. This is illustrated in Table B6 and a comparison is provided with McKinsey 2003 figures.

Table B6 Bed demand based on 2005 IP encounters

<b>Bed demand based on 2005 IP encounters</b>	<b>Step 1: HIPE DATA 2005 (RKW)</b>	<b>HIPE DATA 2003 (McKinsey)</b>
<b>Greater Dublin Secondary</b>	157	188
<b>National Tertiary (non-ICU)</b>	239	199
<b>National Tertiary (ICU)</b>	29	32
<b>TOTAL</b>	<b>425</b>	<b>419</b>

Note that this requirement should not be compared against the current bed capacity in the four hospitals in Dublin with dedicated paediatric beds as it includes all national tertiary work, including that activity not referred to Dublin. It is also based on a cut-off age of <16, however, two of the three children's hospitals currently operate a lower cut-off age for admissions. The 2005 HIPE activity for OLCHC, NCH, CUH and Beaumont suggests the following bed requirement for that year at occupancy of 80%.

Table B7

	2005 IP Encounters	2005 Occupied Bed Days	Beds at 80% Occupancy	Actual Beds
<b>OLCHC</b>	11,017	54,229	186	205
<b>CUH</b>	7,831	30,326	104	132
<b>AMNCH</b>	5,891	15,073	52	61
<b>BEAUMONT</b>	1,298	5,960	20	28
<b>TOTAL</b>	<b>26,037</b>	<b>105,588</b>	<b>362</b>	<b>426</b>

Source: HIPE Data 2005

Table B8 shows the proportions of tertiary and secondary activity in each Dublin hospital for the <16 age group in 2005, of the total tertiary work in Dublin 59% was delivered by OLCHC.

Table B8: Percentage split Tertiary and Secondary IP Encounters (U16) 2005 by Dublin Hospital

Hospital	Tertiary	Secondary
<b>Beaumont</b>	23%	77%
<b>OLCHC</b>	43%	57%
<b>CUH</b>	26%	74%
<b>AMNCH</b>	18%	82%
<b>Other Dublin Hospitals</b>	26%	74%
<b>All Dublin Hospitals</b>	<b>31%</b>	<b>69%</b>

Source: HIPE Data 2005

### Day Case Beds

The McKinsey report considered day case beds in the context of Dublin patients only. Based on 2003 data this was 17,000 encounters and McKinsey calculated a requirement of 31 day beds to meet that level of activity. However, there is a significant quantity of day case work that is classed as tertiary which currently takes place in Dublin and includes children from outside Dublin – examples include chemotherapy and haemodialysis. Therefore in 2005, the total day case workload taking place in Dublin hospitals was –

Table B9

Day Case activity 2005 in Dublin Hospitals	Day Case Encounters	Day Beds
Dublin Secondary	12,375	37
National Referred Tertiary	9,075	25
<b>TOTAL</b>	<b>21,450</b>	<b>62</b>

Source: HIPE data 2005. Not that National referred excludes patients treated outside Dublin

Day beds are calculated on the basis of 250 days available per year and 1.5 patients per bed per day in line with McKinsey. We have also assumed an occupancy of 90% which was not factored into the McKinsey calculations.

### ***Step 1: Summary baseline inpatients and day cases 2005***

In summary therefore, overall calculated **bed demand for 2005** based on current performance in terms of ALoS and at occupancy of 80% for inpatients and 90% for day cases is **487 beds** – 425 inpatient beds plus 62 day beds. This can be compared to the McKinsey estimates for 2003 of 450 beds (419 inpatient beds plus 31 day beds).

## **B2.4 Step 2: Demographic Change**

In order to project forward to 2021 demographic projections using data collated by the Central Statistics Office (CSO) were applied to the base activity data. A number of projections were available, with different combinations of growth factors for internal and external migration, and also for general population growth. In line with the approach taken by McKinsey, the M1F2 Medium population growth scenario was used, with **high** external migration a key feature.

Data were available from the CSO at either a national level, with detailed breakdowns of growth by patient age and year (but not area), or at a Regional level, with more localised activity projections but with less detailed age and year breakdowns. A key factor in the data modelling was to reflect the differentiation between Tertiary activity (much of which is from outside Dublin) and Secondary activity (generally from within the Dublin area). Given that areas outside Dublin illustrate very different patterns of population growth to those in Dublin, it was felt that

using an area-based analysis was most appropriate. Therefore it was decided to use the Regional growth factors. However, as noted above, the data were more limited in the scope of predicted future years and age ranges for which data were available. Therefore a Regional level factor was applied that projected change in activity between 2006 and 2021 for 0-14 year olds, with a single, pan-Ireland factor added in for 15 year olds. The percentage change in population for <15's to 2021 by region is illustrated in Table B10.

Table B10: Demographic Change Factors for 0-15 year

Region	Growth 0-15 year olds 2006-2021
Border	11.2%
Dublin	21.0%
Mid-East	26.1%
Mid-West	12.0%
South-East	12.9%
South-West	9.3%
West	9.8%
<b>State Average</b>	<b>17.4%</b>

After applying these demographic growth assumptions, and assuming current performance in terms of ALoS and day case rates, and at 80% occupancy for inpatient beds and 90% occupancy for day cases, the resulting bed projections are 578 inpatient and day case beds as shown in Table B11. This represents the requirement with demographic change **if** performance improvements and system reform were not realised and if **all** national tertiary work was undertaken in Dublin.

Table B11 bed demand at current performance for 2021 compared to 2005 (<16)

Bed demand at current performance for 2021 compared to 2005 (<16)	Step 1 2005	Step 2 2021	McKinsey 2020
<b>Greater Dublin Secondary</b>	157	190	222
<b>National Tertiary (non-ICU)</b>	239	280	229
<b>National Tertiary (ICU)</b>	29	34	37
<b>TOTAL INPATIENTS</b>	<b>425</b>	<b>504</b>	<b>488</b>
<b>Daycases</b>	62	74	41
<b>TOTAL INPATIENT AND DAY CASE</b>	<b>487</b>	<b>578</b>	<b>529</b>

## **Step 2: Summary inpatient and day beds with demographic change to 2021**

When **demographic change** to 2021 is taken into account the resulting bed projections are **578 inpatient and day case beds**. This number can be compared against a McKinsey projection to 2020 at this stage of 529 inpatient and day case beds

### **B2.5 Step 3: System Reform and Enhanced Productivity**

This step considered several factors beyond population growth which will have an impact on total bed demand, including system reform, enhanced productivity and specialty specific factors. System reform includes for example, outreach programmes, hospital at home models and developments in primary and community care. Productivity factors include reductions in average length of stay, occupancy targets, day case rates and admission avoidance measures. As stated in McKinsey (Ref: 1 p49) a significant amount of judgement is required which will require further validation as the project progresses. The Mc Kinsey Report assumed a productivity gain of 15%. At this stage we have reviewed –

- Emergency admissions
- Day Case rates
- Average Length of Stay
- Throughput and Occupancy

#### **B2.5.1 Emergency Admissions**

For the Greater Dublin population emergency admissions accounted for 72% of all secondary admissions. In addition there were 4,200 emergency encounters relating to tertiary work. 43% of all encounters are emergencies. Evidence (Ref: 43) suggests that emergency admissions can be avoided via better management of patients before conditions escalate (via hospital at home, closer monitoring, telephone triage etc) and with more pro-active management of patients who present at Emergency Department. It is anticipated that a combination of better primary care, A/UCCs together with assessment / observation beds within the Emergency Department will play an important role in admissions avoidance. We have assumed therefore that 20%-25% of all emergency admissions for most specialties could be deferred in the future with better management. This equates to 50% of emergency patients with a length of stay <48 hours. At Alder Hey hospital in Liverpool (Ref: 44) the recent

introduction of a short stay (up to 48 hrs) Acute Assessment Unit has resulted in an average reduction in emergency ALoS of 0.5 days in less than a year, with a reduction of 1 day for some patient types.

*We had a very efficient short-stay unit within our emergency department wherein children with problems such as acute asthma, dehydration from GI infections, etc. could be treated for 4 – 12 hours and then sent home. Prior to the establishment of the short-stay unit, these children were admitted to hospital for 24 – 72 hours and “lowered” our average LOS for general paediatrics. The 3.2 day LOS for General Paediatrics (HIPE data) suggests that there are either no short-stay units within paediatric emergency departments, or they are not “robust” in their ability.*

Hugh O Brodovich  
SickKids Toronto

### **B2.5.2 Day Case rates**

The average day case rate across all specialties in 2005 was 73% of elective work, which is in line with current international performance standards, as noted below.

*The proportion of children suitable for day care surgery will vary depending on the speciality and the case mix of a particular hospital, but in general should account for 50-70% of the elective paediatric surgical workload in a specialist centre, and 60-80% for paediatric general surgery in a DGH*

Paediatric Surgery: Standards of Care 2002  
British Association of Paediatric Surgery

McKinsey considered that there was little scope to improve day case rates beyond the 2003 level. We have reviewed day case rates on a specialty by specialty basis against international benchmarks and have taken advice from our international advisers. On the basis of that review we would suggest that day case rates could be improved in relation to secondary elective care for the those specialties shown in Table B12.

Table B12 Specialties with Scope for Improved Day Case Rates

Specialties with Scope for Improved Day Case Rates	Current Day Case Rate	Proposed Day Case Rate
ENT	51%	70%
Neurosurgery	58%	70%
Ophthalmology	59%	70%

Source: HIPE Data 2005

We have not factored in any change to tertiary day case rates. The impact of this is a reduction in inpatient elective encounters of 10.5%.

*Two examples of shifts from in-patient to ambulatory treatment would be as follows: virtually all ophthalmologic surgery is now done as day-care surgery. Endocrine completely changed the delivery care model for diabetes by being done on an ambulatory basis. Children are only admitted to hospital for diabetes when they are in severe diabetic ketoacidosis and no education or dietary manipulations are done on an in-patient basis.*

Hugh O Brodovich  
SickKids Toronto

From an ophthalmology perspective our understanding from local discussions is that the comparatively low rate reflects operational issues (rather than clinical barriers) because of afternoon lists, day unit closing at 1800hrs and a tendency to admit children from outside Dublin overnight. We understand that (secondary) day case rates for tonsillectomies are affected by currently underdeveloped community services.

**When emergency admissions avoidance and shifts to day case are taken into account the growth in secondary inpatients associated with demographic change of 21% is more than cancelled by productivity enhancements with a projected reduction of 2.2% compared to the 2005 baseline.**

### **B2.5.3 Average Length of Stay**

The average length of stay across all Dublin secondary and national tertiary in 2005 was 3.8 days. For the three Dublin children's hospitals combined the ALoS was 4.2 days. ALoS by specialty has been benchmarked against UK best practice standards

and we have also taken the advice of our international experts. On that basis we have factored in some reductions in ALoS for the following specialties –

- Endocrinology
- Gastroenterology
- Neurology
- Orthopaedics
- General Paediatrics
- Plastic Surgery

The impact of these changes was small - in the order of 5 beds.

*I have already alluded to each specialty developing work of ever increasing complexity, for example laryngeal work in some children with congenital deformities, skeletal work in children with inherited metabolic disease, bladder reconstructions. All these developments will lead to a relatively small number of children needing ever increasing lengths of stay in a hospital to replace some of the higher volume but lower complexity work.*

Richard Newton  
Manchester

#### **B2.5.4 Occupancy and day case throughput**

For steps 1 and 2 we have adopted the McKinsey assumption of 80% occupancy across elective and emergency and critical care beds. We understand that the current working assumption in Ireland for the adult sector is 85%, which is in line with the UK National Bed Inquiry <sup>(Ref: 45)</sup> recommendation in 2000 of 83.5%. Traditionally, paediatric bed capacity has been modelled on much lower occupancy percentages because of assumed wide seasonal variation in demand. This is not supported by the evidence and history of emergency admissions to the three children's hospitals in Dublin where there is little seasonal variation <sup>(Ref:46)</sup>. It is common in the UK to differentiate between target occupancy for elective and emergency admissions. We would suggest that, as elective inpatient capacity can be more easily managed, that this should be modelled at a target of 85% on the assumption that beds are not ring-fenced on a specialty basis. For comparison, Alder Hey hospital in Liverpool has forecast future elective inpatient bed requirements at occupancy of 90% <sup>(Ref: 44)</sup>. The Service Plan at RCH, Melbourne <sup>(Ref: 31)</sup> also assumes a 90% occupancy.

For emergency activity, with a larger bed complement it is possible to operate on a higher occupancy than 80% - however, 75% <sup>(Ref: 47)</sup> is more appropriate in planning for



critical care and therefore we have adopted a target of 80% average across these two categories.

For steps 1 and 2 we have worked on the McKinsey assumption of a throughput of 1.5 day patients per bed per day. However, we understand that a higher throughput is already being achieved and therefore at this stage we have altered this target to 2 patients per bed per day. It has been suggested that an extended opening time for day units would also facilitate improvements in day case rates.

### **B2.5.5 Specialty Specific Change Factors**

McKinsey concluded that for high-volume secondary care service lines, little change was anticipated in long-standing common ailments and therefore volumes would remain stable into the future with the notable exception of admissions for viral gastroenteritis <sup>(Ref:1 p51)</sup>. We have not factored in any further decrease in activity for GI Medicine as this is likely to be already picked up in the assumption of 20% - 25% reduction in emergency admissions. In terms of tertiary services, McKinsey also concluded that volumes for specialties would remain stable with the exception of ethnicity related haematology encounters <sup>(Ref: 1 p51)</sup>.

A number of known service developments have been highlighted in the course of preparing this Framework Brief and these have been specifically accounted for in future projections and are described below. There will be other pressures leading to increased demand for hospital care as noted in Figure B4, however, it is anticipated that these will be off-set by developments in out-of-hospital care and further productivity gains in addition to those already accounted for above.

#### **Haematology**

OLCHC has reported a repeated increase of 10-15% in haematology activity per annum. Between 2005 and 2006 the increase was 11%. It is anticipated that this will flatten as the impact of immigration stabilises however it would be prudent to make provision for an increase in haematology bed requirements over and above the impact of demographics. In addition, there is a possibility that leukaemia cases will accrue from Northern Ireland. The working assumption in this Framework Brief is an increase of 50% to 2021 in addition to demographic growth.

#### **Cardiothoracic Surgery**

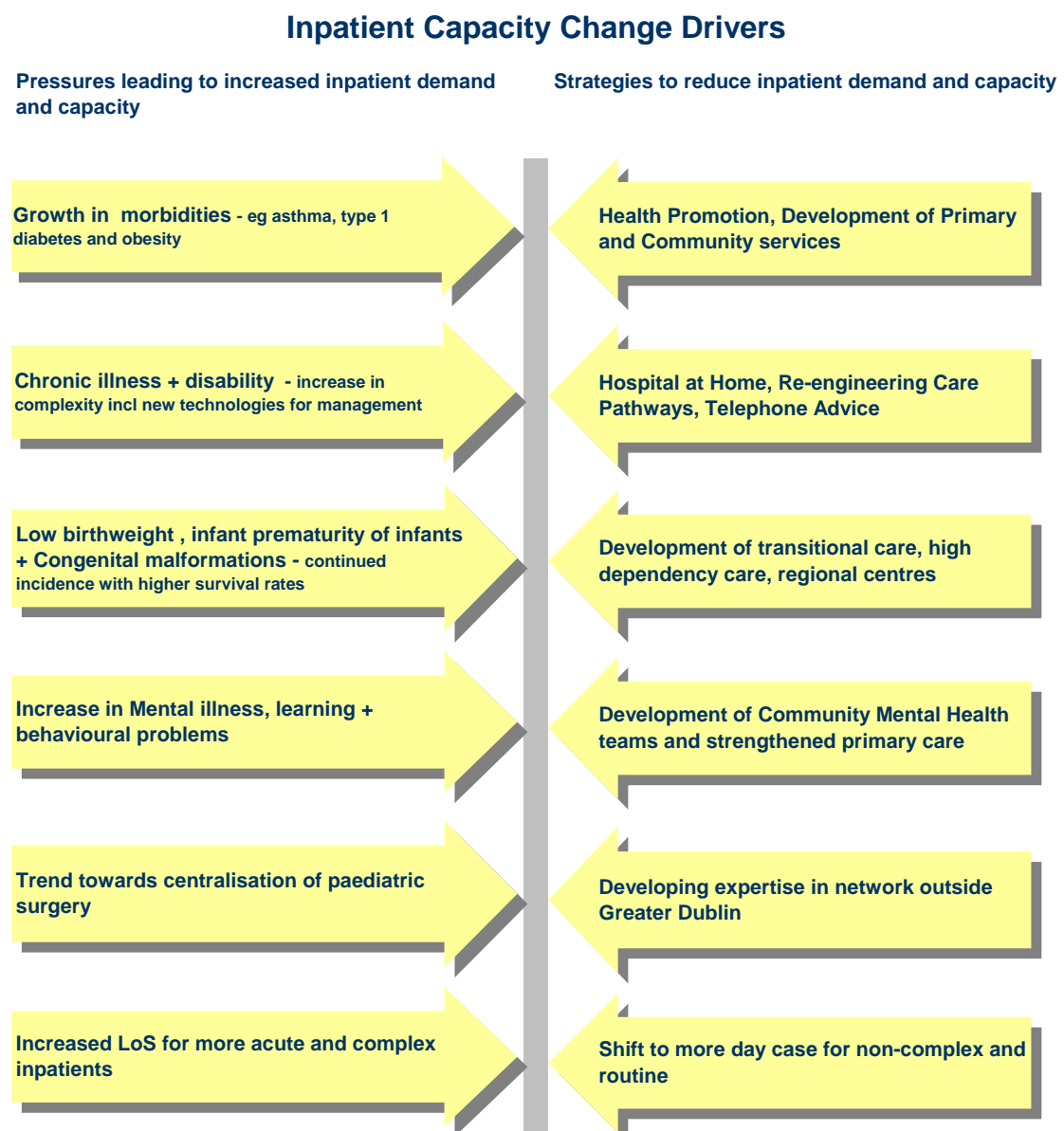
We have factored in an additional 100 encounters per annum relating to the anticipated workload from Northern Ireland, on the assumption that this would be

undertaken in Dublin. However, in the longer term the preferred model may be that the Dublin NPH Tertiary Centre team outreach to Northern Ireland. Therefore, this assumption is subject to further review.

### Complex Urology

The current model is that children from Northern Ireland with complex urology needs receive their first outpatient consultation locally with follow-up and annual check-up in Dublin. In terms of volume, a steady state of 7 inpatients per annum with a length of stay of 2 weeks has been suggested. This has been factored into the bed capacity model and the impact on overall bed numbers is negligible.

Figure B4 Inpatient Capacity Change Drivers



### Step 3: Summary Bed Demand including performance enhancements

After applying these enhanced productivity and system reform assumptions and taking account of specialty specific requirements the projected bed demand for Greater Dublin Secondary and all National Tertiary is **503 beds** of which 443 are inpatient beds and 60 are day case beds.

Table B13 2021 Bed demand with performance enhancements

2021 Bed Demand with performance enhancements	Step 2 2021 projections	Step 3 2021 projections with performance enhancements
Greater Dublin Secondary	190	152
National Tertiary (non-ICU)	280	257
National Tertiary (ICU)	34	34
<b>TOTAL INPATIENTS</b>	<b>504</b>	<b>443</b>
<b>Critical Care as total of IP</b>	<b>6.75%</b>	<b>7.8%</b>
<b>Day beds</b>	<b>74</b>	<b>60</b>
<b>TOTAL</b>	<b>578</b>	<b>503</b>

#### B2.5.6 Critical Care Beds

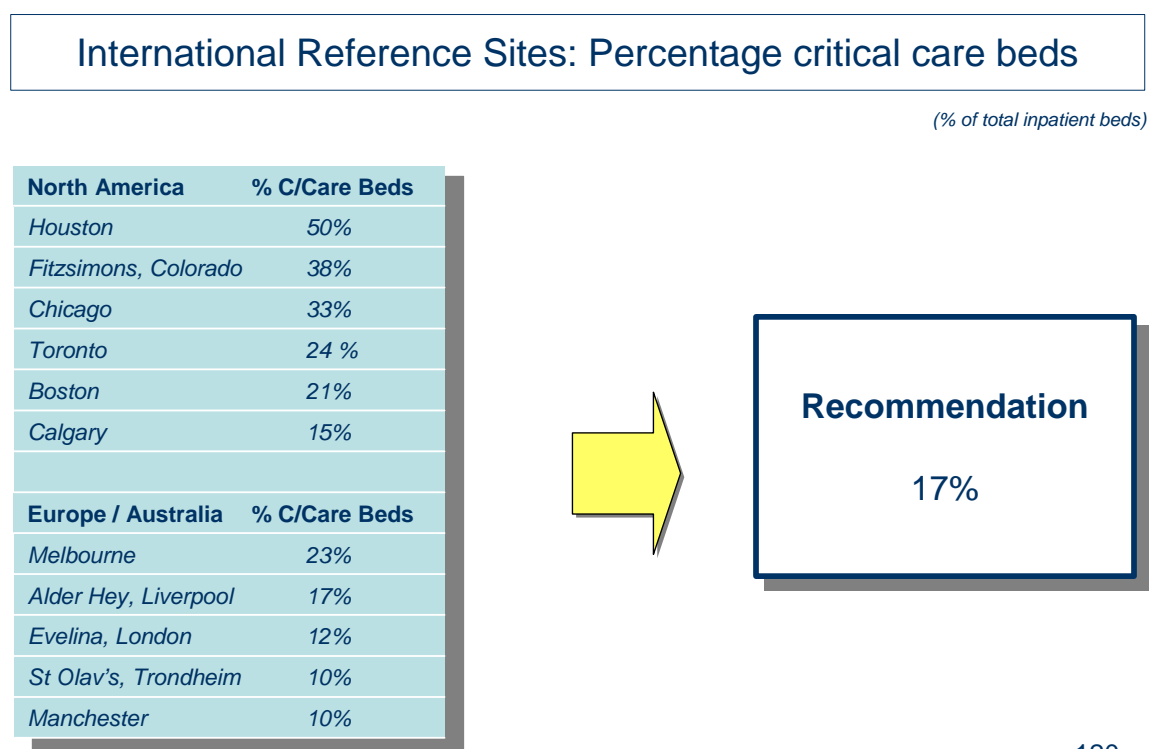
The projected ICU beds above have been derived from current levels of provision adapted for demographic change. They relate to intensive care encounters and therefore will exclude high dependency care, where international best practice suggests that these should be co-located.<sup>5</sup> These numbers will include neonatal intensive care encounters which currently take place at OLCHC and CUH. Demand for critical care beds will increase in the future with increased complexity of care – relating to for example enhancement of clinical capabilities and the proportion of babies and children with complex conditions surviving birth. Based on the projections thus far, ICU beds account for just 6 – 8% of total inpatient capacity in 2021.

<sup>5</sup> All of our reference sites include HDU Level 2 in critical care, occasionally there are separate 'step down' units for some specialties, for example , neonatology.

For comparability with the McKinsey report we have considered critical care beds as a percentage of total inpatient beds which, it is recognised, provides only a broad indication of capacity requirements which should be subject to more detailed, activity based analysis in subsequent project stages . It should be noted that normative approaches which relate bed numbers to population are also only indicative and subject to internationally varying definitions.

Figure B5 illustrates the range in terms of percentage of critical care beds across our reference site. The range for recent developments in North America is 15% – 50%, whereas in Europe the range is 10% - 17%. For this Framework Brief we have assumed 17% which represents the higher end of the UK range. This is a provisional figure which should be subject to validation as the project progresses, based upon bottom-up activity modelling. Note that these figures exclude potential additional requirements in relation to transitional care which follow in section B2.6.3. As noted above, the critical care definition includes high dependency and neonatal intensive care and comparisons are highly sensitive to the model for each of these services within the hospital and health economy. Application of the Toronto planning assumption of 2.5 level 3 PICU beds per 100,000 children would suggest a requirement of 32 beds, excluding high dependency and NICU for the NPH Tertiary Centre in 2021.

Figure B5



As noted in section B6, the trend into the future is an increase in critical care requirements with a corresponding decrease in acute beds, therefore, it will be important that generic acute beds are designed to facilitate easy conversion to critical care standards.

### **Neonatal Beds**

McKinsey in their report <sup>(Ref: 1 p20)</sup> concluded that across their reference sites between 25%-40% of total beds are designated as critical care (including HDU), with the US examples reflecting the high end of the range. It is unclear whether total beds include day beds or not. The range for NICU beds was between 13% and 22% of total beds. Across the reference sites in this study (see Table B14) the range for critical care is from 6% (York Hill, Glasgow and St Olav's, Trondheim) to 50% (at Houston, Texas). The range for NICU is between 0% to 50% (at Melbourne). The numbers are highly sensitive to the models for maternity care, specifically around whether neonatal care resides with the Maternity Services rather than the Children's Hospital (as is the case at Liverpool and Trondheim) or not (as is the case in Melbourne and many US examples). Toronto planning norms would suggest a total of 150 level 3 NICU beds for Ireland in 2021. The British Association of Per-Natal Medicine (BAPM) <sup>(ref: 48)</sup> recommends determination of NICU provision using the following ratios per 1000 births –

Intensive care	0.75
High Dependency Care	0.70
Special Care	4.4

Again this underlines the need for detailed activity modelling to confirm functional content requirements as the project proceeds and once the maternity review has been completed.

The neonatal team's submission to RKW defines the best practice model as a "*NICU within a complex housing both the National Children's Hospital and a Maternity Hospital*" and suggests a requirement for 60 beds, noting that "*this is an approximation and further analysis is needed to assess how many level 3 and 2 NICU beds are required*" <sup>(Ref:49)</sup>. It is worth reiterating at this point that our data-set in line with McKinsey excludes neonatal intensive care activity currently undertaken in the Maternity Hospitals in Dublin and that future requirements cannot be determined until the Maternity Review has reported. Of the total ICU activity that is currently

undertaken at OLCCH and CUH, 20% of ICU occupied bed days relates to babies <30 days old.

Based on the assumption of 17% beds being designated as critical care, the revised distribution is as follows in Table B14.

Table B14 Bed Demand 2021 with system reform and redistributed Critical Care

Bed Demand 2021 with System Reform and redistributed Critical Care	Step 3a 2021 with system reform	Step 3b 2021 projections with system reform and redistributed	Step 3 2020 McKinsey
Non ICU beds	409	368	350
ICU beds	34	75	65
<b>TOTAL INPATIENTS</b>	<b>443</b>	<b>443</b>	<b>415</b>
Critical Care as total of IP	7.8%	17%	15%
Day beds	60	60	41
<b>TOTAL</b>	<b>503</b>	<b>503</b>	<b>456</b>

## B2.6 Step 4: Excluded tertiary workload not referred to Dublin

As the last step of their methodology McKinsey excluded activity classed as ‘tertiary’ that is not currently referred to Dublin, on the basis that effective triage and referral to Dublin was already taking place. In line with McKinsey it is assumed that this work classified as tertiary will continue to operate from Regional Centres. This assumption requires validation as part of the process to determine the shape of the National Network. The final bed demand projections in comparison with McKinsey is as follows –

Table B15 Final Bed Demand 2021 for Greater Dublin Secondary and Referred National Tertiary

Final Bed Demand 2021 for Greater Dublin Secondary and Referred National Tertiary	Step 3 2021 including all National Tertiary	Step 4 2021 excluding Tertiary not referred to Dublin	Step 4 2021 McKinsey
Non ICU Beds	368	304	285
ICU Beds	75	64	54
<b>TOTAL INPATIENTS</b>	<b>443</b>	<b>368</b>	<b>339</b>
Day beds	60	60	41
<b>TOTAL IP and DC</b>	<b>503</b>	<b>428</b>	<b>380</b>

(note that any minor discrepancies relate to rounding up of numbers)

Note that total bed numbers in this final analysis assume that the level of ICU and tertiary work outside Greater Dublin that is not referred to Dublin would continue to be undertaken in the Regional Centres outside the NPH. It has been suggested that in the future, that any ICU encounter with an anticipated LoS over 24 hours should be transferred to Dublin. We have looked at the impact of this and it would amount to an additional overall requirement for 2-3 beds. This is not currently factored into our calculations.

When tertiary workload not referred to Dublin is excluded our estimate of bed demand in 2021 is **428 beds** of which 368 are inpatient beds and 60 are day case beds. This is a **direct** comparison with McKinsey estimates of 380 beds of which 339 were inpatient beds and 41 were day case beds.

## **B2.7 Step 5: Additional beds not included in McKinsey calculations**

### **B2.7.1 Specialist Hospitals**

The McKinsey work explicitly excluded activity in specialist hospitals in Dublin, including Cappagh Orthopaedic Hospital, the Royal Eye and Ear Hospital and The National Medical Rehabilitation Centre in Dun Laoghaire. In line with the principle that all acute paediatric work should be undertaken in the NPH Tertiary Centre we have included the workload for Cappagh Hospital and the Eye and Ear in our calculations. This amounts in 2021 to an additional 4 inpatient beds and 2 day beds. Our understanding is that the range of orthopaedic work currently undertaken in Cappagh is similar to that undertaken in both CUH and OLCHC and there is therefore no reason why this could not transfer to the NPH Tertiary Centre. From ophthalmology perspective the Royal Eye and Ear provides 24 hour emergency paediatric cover for Dublin, together with some very specialist elective surgery. It is anticipated that a 24 hour service would be developed at the NPH Tertiary Centre and external consultants would have visiting sessions for any specialist work.

### **B2.7.2 Under 5's surgery**

There is evidence of increased centralisation to Dublin Hospitals for surgery on pre-school children. This is in line with a trend towards centralisation internationally <sup>(Ref 50)</sup>, arising because of concerns relating to critical mass and clinical risk. It may also be

attributed locally to the impact of retiring clinicians and lack of anaesthetic cover. The recommended future model is that all paediatric surgery for this age group, including secondary care, should be centralised at the Regional Centres. Discussions are commencing between the HSE and Expert Advisory Group on Children and Families regarding this issue and the number and role of regional centres is yet to be determined while a recently issued paper suggests three paediatric surgical units – in Belfast, Dublin and Limerick or Cork.<sup>6</sup> In such a model the Dublin NPH Tertiary Centre would pick up approximately 28% of this workload which in 2021 equates to an additional 7 inpatient beds and 3 day case beds. It should be noted that all **tertiary** surgery for under 5's is assumed to take place at the NPH Tertiary Centre.

### **B2.7.3 Long-term Ventilation**

Transitional Care Units (TCUs) for children with long-term ventilation needs have recently been established at both OLCHC and CUH. A key role of these units is to prevent bed-blocking in Critical Care as these children have a very long length of stay, some in excess of a year. The model of care centres on empowering parents progressively to take responsibility for their child's care with support from the NPH Tertiary Centre. As more children with complex needs survive birth, the demand for these beds will continue to increase beyond demographic trends. We would expect in time that this hospital care could be substituted with hospital at home models and it has been suggested that the unit could operate as a satellite centre.

*".....all patients (on chronic ventilation support) unless acutely ill are cared for on an ambulatory basis. Presently, the respiratory medicine service cares for approximately 120 infants and children on chronic ventilation support."*

Hugh O Brodovich  
Toronto

The current TCU at OLCHC has a complement of 5 beds (including one respite) and that planned at CUH will have 4 places. As much of this workload is substituting for ICU care, a proportion of this activity will already have been included in 2005 activity, albeit under represented in bed numbers because of the extended LoS of these patients.<sup>7</sup> For this High Level Framework Brief we have added an additional 8 beds

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<sup>6</sup> General Paediatric Surgery in Ireland – A crisis in Evolution; Coakley D ,Grace P July 2007

<sup>7</sup> As our bed modelling is based on data for a single calendar year patients with a long length of stay may straddle years and will therefore be undercounted



to the total bed numbers to account for demand beyond demographic change for this care group. However, more detailed analysis is required as the project is progressed. It has been suggested locally that a bed complement of 16 beds would be required in 2021. This includes an element of respite which is a service currently not offered.

#### **B2.7.4 Mental Health**

The policy document *A Vision for Change* <sup>(Ref:17)</sup> envisages an additional 100 inpatient beds for child and adolescent mental health of which 20 would be developed in Dublin. From our discussions with stakeholders this suggests a future requirement for an eating disorders unit of 6 – 8 beds and a generic unit of 10 – 12 beds. Further discussion with mental health service providers will determine the distribution of these beds between the NPH and other Dublin sites (eg St Vincent's).

Current practice in line with UK NICE guidelines <sup>(Ref: 51)</sup> is that all children and young people who self harm be admitted to a hospital bed for assessment. At present, there is an unmet need for children 'in crisis' who are in danger of self harm. Some of this activity is already accommodated on general paediatric wards and will already therefore have been factored into the projected bed numbers, however, there is a substantial unmet need and under the Mental Health Act <sup>(Ref:52)</sup>, the unit will cater for young people up to 18 years of age. Therefore we have assumed a net increase of 12 beds on the overall bed numbers at this stage which should be the subject of review as the Vision for Change recommendations are developed. It is not possible to identify the activity relating to patients admitted to wards who would be admitted in the future to the mental health beds as they are counted under general paediatrics. Notwithstanding the availability of a dedicated mental health unit in the future, children with an immediate need for medical care (for example severe self harm) will continue to require access to general paediatric beds.

#### **B2.7.5 16 – 18 year olds**

The issues surrounding the admission of 16 – 18 year olds are discussed earlier in Section A1. In 2005 the number of admissions in this age group at OLCHC and CUH combined equated to 7 inpatient beds in terms of capacity. It is also acknowledged that there are some young people admitted over the age of 18. At AMNCH, the 16 – 18 year old group represented another 7 beds in 2005 in terms of capacity – although it is not possible to say how many were admitted to the paediatric wards. A significant proportion of these would present with a mental health need and it is assumed that their needs are already covered by the mental health unit described above.

For Greater Dublin secondary and Dublin based tertiary activity the projected bed demand for 2021 for the 16 – 18 year old age group is in the order of 50 beds. It is assumed that the majority of that age group will choose to access adult services – however, this assumption should be validated via consultation with children and young people at the next stage. An assumption of 10 additional beds is included in this Framework Brief to cater for this age group.

The impact of these additional beds is summarised in Table B16.

Table B16 Final Bed Demand including patient groups excluded from McKinsey

Final Bed Demand including patient groups excluded from McKinsey	Inpatient (non ICU)	Critical Care	Day Case	Total
Step 4 2021	304	64	60	428
Specialist Hospitals	4		2	6
Under 5 surgery	6	1	3	10
LTV	8			8
Mental Health	12			12
16 - 18 year olds	10			10
<b>Total</b>	<b>344</b>	<b>65</b>	<b>65</b>	<b>474</b>

### Summary Step 5

When additional service developments not included in the McKinsey remit are taken into account the total projected bed requirement for 2021 is **474 beds** of which 65 are day beds and 409 are inpatient beds.

### B2.7.6 Emergency Department and Urgent Care Assessment Beds

Both CUH and OLCHC (and AMNCH until recently) have short-stay observation beds within the Emergency Department. Internationally these beds are routinely counted in overall bed numbers and play an essential role in admission prevention. Emergency encounters with less than one day length of stay are not included in HIPE data, and therefore this activity is not included in the projected bed requirements thus far. The total number of day assessment places required across the NPH Tertiary Centre and the A/UCCs is forecast at 21 places. Some of this is a substitution relating to the assumption of 20% of avoided admissions but some will relate to activity not included

in the HIPE data set. These are additional to the 474 beds resulting from Step 5, which brings the total number of beds including assessment / observation places to **495 beds**.

## **B2.8 Step 6: Allocation of day case beds across the NPH main site and A/UCCs**

The last step is to consider the distribution of day beds and Emergency Department observation places across the main NPH Tertiary Centre site and the potential A/UCCs. The methodology adopted in arriving at the activity and capacity requirements in the A/UCCs is outlined in the separate A/UCC report. This identified that by 2021 there would be sufficient activity to justify 19 day case beds and 9 day case beds at Tallaght and Blanchardstown respectively.<sup>8</sup> The balance of day beds remaining at the NPH Tertiary Centre is therefore 37. Of the 21 Emergency Department observation and assessment places 13 would be provided at the A/UCC satellites and 8 at the Tertiary Centre. The resultant overall bed numbers on each site are summarised in Table B17 below. It is recommended that the extent and pace of development of the A/UCCs should be subject to evaluation of the Tallaght prototype. Depending upon this and subject to confirmation of activity projections, capacity currently allocated to A/UCCs may need to be transferred to the NPH Tertiary Centre.

Table B17

	<b>NPH</b>	<b>A/UCC Tallaght</b>	<b>A/UCC Blanch'town</b>	<b>A/UCC Lough'town</b>	<b>TOTAL</b>
<b>Acute non Critical Care</b>	336				336
<b>Critical Care and TCU</b>	73				73
<b>Day Case</b>	37	19	9		65
<b>Total Beds</b>	<b>446</b>	<b>19</b>	<b>9</b>		<b>474</b>
Note: These figures are rounded					
<b>A&amp;E Observation Day places</b>	8	7	4	2	21
<b>Total IP &amp; DC plus Observation</b>	<b>454</b>	<b>26</b>	<b>13</b>	<b>2</b>	<b>495</b>

<sup>8</sup> These numbers have been rounded up in the final analysis in the separate A/UCC report to 20 beds at Tallaght and 10 beds at Blanchardstown.

## B.2.9 Sensitivity Analysis

The bed numbers identified in this section have been derived from moderate assumptions in line with McKinsey's "enhanced performance".

McKinsey <sup>(Ref:1 pg 50)</sup> identified that .....

*"Benchmarking against other countries....., while keeping length of stay in check, one could potentially reduce inpatient utilisation from 6 – 23%".*

McKinsey opted for the mean international target level which *"implied a decreased utilisation of 15% for Ireland by 2020"*.

Table B18 sets out performance assumptions in McKinsey bed projections and those underpinning the earlier analysis in section B.2.2 – B.2.6 of this Framework Brief. Two additional scenarios have been included to demonstrate the impact of achieving greater "enhanced performance" through system redesign consistent with the direction of HSE strategy. The impact in terms of bed demand and reduction in inpatient encounters has been compared against the growth projections arising from demographics and other growth (no other growth was included in McKinsey projections).

**High Scenario 1** assumes the following –

- That 75% of emergency admissions with a length of stay <48hrs can be avoided. (The moderate scenario assumes 50%). The impact of this is a reduction of 42 beds.
- A further 7% of elective admissions<sup>9</sup> can be avoided by better management of patients outside the acute setting. The impact of this is a further reduction of 8 beds.

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<sup>9</sup> In 'Healthcare for London May 2007' Mc Kinsey identified that 7%-8% of elective surgery for <17 could be avoided or 'Not done' based on recent research by London Health Observatory 'Save to Invest', 15 Feb 2007 where 'access criteria' indicates a potential reduction in procedures carried out.

- These combined would result in an overall reduction in inpatient encounters of 25%.

In addition **High Scenario 2** adopts more challenging “enhanced performance” targets, as follows –

- 75% of emergency admissions <48 hrs length of stay and 50% of <72 hrs length of stay are avoided. The impact of this is a further reduction by 26 beds
- Day case rates increased to 80% which results in a reduction of 18% on elective admissions. This is the highest end identified by the British Association of Paediatric Surgery noted earlier. The impact is a reduction of 20 inpatient beds and an increase of 3 day case beds
- Elective inpatient occupancy assumed at 90% which as noted earlier is being adopted by schemes elsewhere. The impact of this is a reduction by a further 9 beds.

Table B19 summarise overall bed numbers – including observation places – by scenario and site.

As noted earlier Ireland’s health service is undergoing a transformation programme with investment targeted to achieving the sorts of “enhanced performance” described above. What is not clear at this stage is how far this process will result in net reductions in inpatient capacity and it is important to recognise that paediatric services already operate from a lower bed base than adult services.

It is our view that the most plausible planning assumption is likely to be somewhere between the moderate and high scenario projections, and that achieving all the targets with High Scenario 2 is unlikely within the timescale envisaged.

It should also be recognised that “enhanced performance” will only be achieved through sustained performance management, system re-design and highly focused benefits realisation strategies.

The sensitivity testing may have a knock on impact on other capacity requirements including support services. A key priority for the Development Board will be early clarification of capacity assumptions.

Table B 18

	Mc Kinsey	Framework Brief		
<b>Baseline bed demand for CURRENT performance and activity Dublin Secondary and Referred Tertiary</b>	389	409		
<b>Impact of Demographic Growth 2021</b>				
Tertiary IP beds	177	257		
Secondary IP beds	222	160		
Day beds	41	74		
<b>Total</b>	<b>440</b>	<b>491</b>		
Other growth IPDC %	none	1%		
Other growth IPDC beds		10		
<b>Total projected beds with growth 2021</b>	<b>440</b>	<b>501</b>		
<b>Performance Improvements + System Redesign</b>				
	<b>Moderate</b>	<b>Moderate</b>	<b>High Scenario 1</b>	<b>High Scenario 2</b>
Elective IP Occupancy	80%	85%	85%	90%
Emergency IP Occupancy	80%	80%	80%	80%
Day Case throughput (patients per bed per day)	1.5	2	2	2
Emergency admissions avoidance	assumptions not known	-20.7%	-30%	-40%
Elective admissions avoidance			-7%	-7%
Elective admissions reduction as a result of improved day case rates		-10.5%	-10.5%	-18%
Day case rates		no change	76%	77%
<b>Impact on IP encounters compared to demographic change</b>	<b>-15%</b>	<b>-17%</b>	<b>-25%</b>	<b>-35%</b>
<b>Final Projected bed demand (Dublin Based)</b>				
Tertiary IP beds	150	216	184	149
Secondary IP beds	189	152	134	114
Day beds	41	60	60	63
<b>Total IPDC beds</b>	<b>380</b>	<b>428</b>	<b>377</b>	<b>326</b>
<b>Impact on inpatient bed numbers compared to growth demand</b>	<b>-60</b>	<b>-73</b>	<b>-124</b>	<b>-175</b>
	<b>-14%</b>	<b>-15%</b>	<b>-25%</b>	<b>-35%</b>

Note that to allow direct comparison with Mc Kinsey, these numbers exclude activity from specialist hospitals and additional beds identified under Section B.2.7

Table B19

		Moderate	High 1	High 2
<b>NPH</b>	Inpatient	409	359	304
	Day Case	37	37	40
	Observation	8	8	8
	<b>Subtotal</b>	<b>454</b>	<b>404</b>	<b>352</b>
<b>Tallaght</b>	Day Case	19	19	19
	Observation	7	7	7
	<b>Subtotal</b>	<b>26</b>	<b>26</b>	<b>26</b>
<b>Blanchardstown</b>	Day Case	9	9	9
	Observation	4	4	4
	<b>Subtotal</b>	<b>13</b>	<b>13</b>	<b>13</b>
<b>Loughlinstown</b>	Observation	2	2	2
	<b>Subtotal</b>	<b>2</b>	<b>2</b>	<b>2</b>
<b>Grand Total</b>		<b>495</b>	<b>445</b>	<b>393</b>

## **B3**            **Outpatients Capacity**

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The approach adopted in assessing future demand for outpatient capacity is illustrated in the flow diagram in Figure B6 and follows closely the methodology adopted for inpatient services. Key steps in the process included –

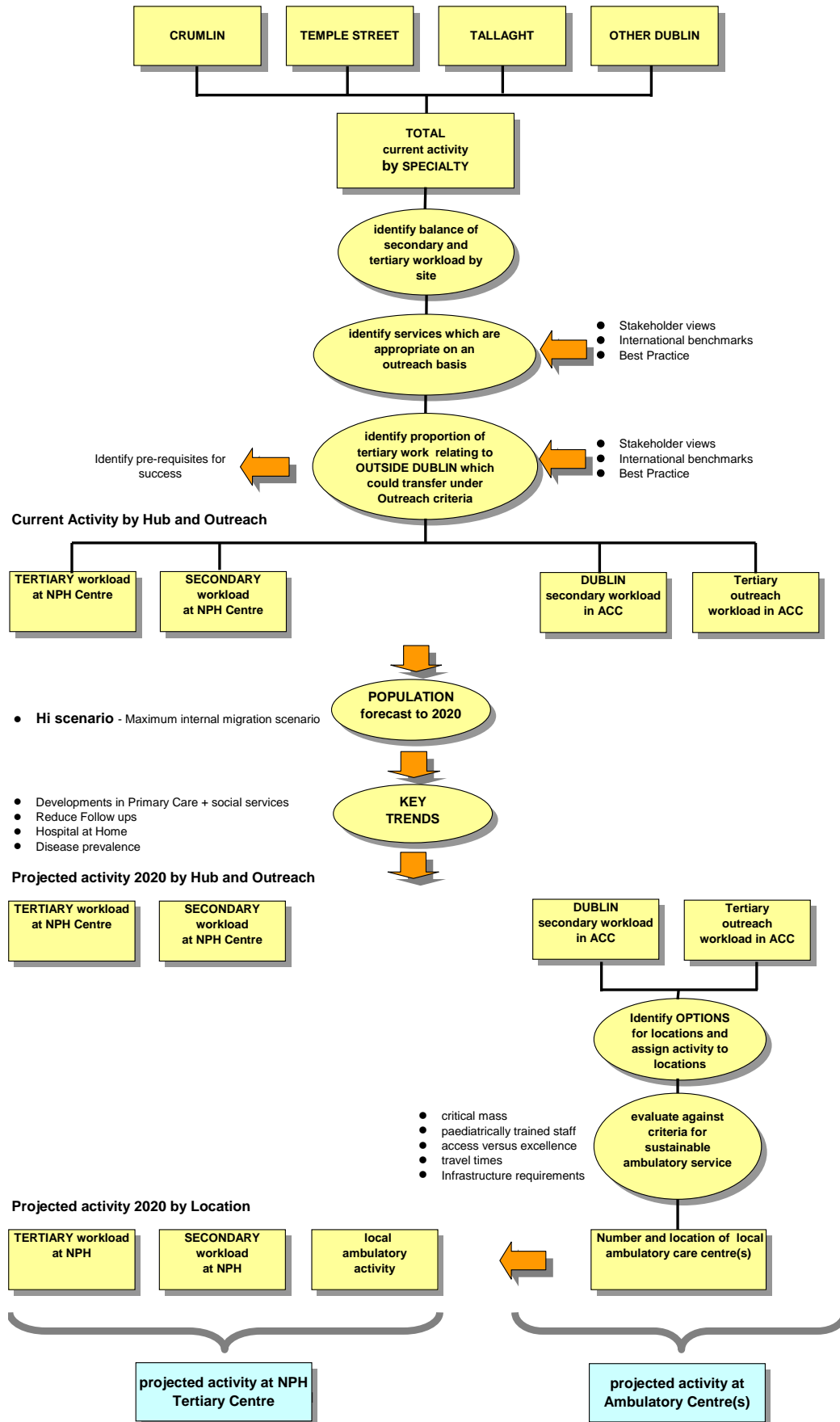
- Step 1:** Identify on the basis of 2006 activity the quantity of current activity relevant to the NPH Tertiary Centre main site and the A/UCC settings.
  
- Step 2:** Apply demographic projections to predict impact of population growth to 2021.
  
- Step 3:** Review potential for enhanced performance including reduction in return attendances and hospital at home.
  
- Step 4:** Review potential for outreach to Regional Centres and/or A/UCCs in the Greater Dublin area
  
- Step 5:** Calculate future capacity requirements, that is the number of consult and examination rooms required taking into account any requirements for designation by specialty.



Figure B6

Methodology : Outpatient Activity

Hospital Specific Data : Outpatient Activity by Hospital (Including referrals from outside Dublin)



### B3.1 Current activity relevant to NPH Tertiary Centre Network

Activity for 2006 provided by the HSE from Central Statistics is summarised in Table B20 for each of the three children’s hospitals. Total new and return attendances were 149,888. Note that this activity relates to consultant outpatient clinic appointments and therefore excludes nurse led and AHP activity undertaken in an outpatient setting. It is also likely to exclude current ward attendances and ‘drop-in’ services.

Table B20 2006 Outpatient Activity by Site

2006 Outpatient Activity by Site	New	Return	DNA	New / Return Ration
<b>OLCHC</b>	21,447	51,355	20,139	1 : 2.4
<b>CUH</b>	13,486	33,503	11,887	1 : 2.5
<b>Tallaght</b>	9,637	20,460	5,700	1 : 2.1
<b>TOTAL</b>	<b>44,570</b>	<b>105,318</b>	<b>37,726</b>	<b>1 : 2.3</b>

Source: Data provided by HSE

In addition, a quantity of outpatient activity including the Cleft Lip and Palate service and Cochlear Implant, currently takes place in adult hospitals across Dublin. In 2006 this represented 1,923 new and 4,376 return attendances.

Examination of outpatient data supplied by AMNCH and CUH indicated that an additional 10% of activity undertaken in an outpatient setting relates to non-consultant led activity, including nurse specialists and AHPs (for example dieticians and speech therapists). Whilst nurse led activity is anticipated to grow beyond demographic projections in the future, this should be partly off-set by outreach services, including hospital at home initiatives.

A notable feature of the activity is the volume of DNA (did not attend) activity which represents 20% of total appointments in 2006, a trend carried over from previous years. It is unlikely that this represents actual demand, and can be attributed to a large extent to patients making multiple appointments at different hospitals. It is assumed that active measures will be implemented to manage this number downwards in the future.

When these three factors are taken into account the total 2006 outpatient activity is as follows–

Table B21

<b>Total Outpatient Activity including non consultant and other Dublin Hospitals</b>	<b>New</b>	<b>Return</b>	<b>Total</b>
<b>Consultant Led Clinics</b>	44,570	105,318	149,888
<b>Activity in Adult Hospitals</b>	1,923	4,376	6,299
<b>Allowance for 10% non-consultant clinic activity</b>	4,649	10,969	15,619
<b>TOTAL 2006</b>	<b>51,142</b>	<b>120,663</b>	<b>171,806</b>

Source: Data provided by HIPE, AMNCH and CUH

### **B3.2 Impact of Demographics**

The base data provided for outpatients did not included a breakdown of patient by origin although it is recognised that all three sites will include patients from outside the Greater Dublin area as noted in Section B1. At this stage we have taken a conservative view and have applied the higher Dublin demographic growth of 21% across all outpatients in projecting future outpatient activity.

### **B3.3 Future Demand Changes by Specialty**

Changes in inpatient demand, beyond demographic growth are discussed in section B2.5.5. We have carried forward the impact of these changes into outpatient demand modelling for these specialties. In addition we have factored in an additional allowance of 5-6% of total outpatient activity to account for growth in nurse specialist and AHP clinics in the future and to compensate for undercounting of outpatient activity currently (for example ward attendances). When these factors including demography are taken into account the projected demand is 218,900 attendances.

### B3.4 New and Return Ratios

The current average new to return ratio across the three children's hospitals in Dublin is 1:2.3. However, the range varies significantly across specialties. Table B22 ranks new:return ratios for the 15 highest specialties in terms of volume based on 2006 data (note that this excludes nurse specialist activity). We have benchmarked return ratios against international best practice and reviewed these with our international advisers. On that basis we have focused on those specialties with a return ratio >2.5 on the basis that system reform will have been implemented by 2021 to enable reductions in returns. The average outcome ratio projected for 2021 is therefore 1:2 - a moderate reduction of 15%.

Table B22 Return attendances to new from  
Top 15 Specialties by Volume

Specialty	Returns to New Attendances
Oncology	69.9
Metabolic Medicine	7.4
Neonatology	7.3
Endocrinology	7.3
Psychiatry	7.0
Anaesthetics	5.8
Plastic Surgery	5.4
Nephrology	5.4
Respiratory Medicine	5.3
Neurosurgery	5.3
Haematology	5.2
Rheumatology	3.6
Ophthalmology	3.6
Maxillofacial	3.4
General Medicine	3.2

It has been reported that new attendances for oncology are undercounted as tertiary referrals are admitted on the same day and are recorded as inpatients which skews the return ratio. 85% of new patients in 2005 were not recorded as new outpatients.

### B3.5 Projected Outpatient Activity

On the basis of demographic, other growth and enhanced performance assumptions outlined above the projected outpatient growth to 2021 **before** outreach to local hospitals outside Dublin and the Greater Dublin A/UCCs is –

Table B23

Projected Outpatient Attendancies to 2021	2021 New	2021 Return	2021 Total
Consultant Led Clinics	56,860	109,923	166,783
Non Consultant Led Clinics (incl. growth)	8,891	20,976	29,867
<b>TOTAL 2021</b>	<b>65,751</b>	<b>130,899</b>	<b>196,650</b>

### B3.6 Potential to outreach to local hospitals and A/UCCs

In our discussions with stakeholders there was strong support for the principle of outreach clinics as part of the National Network, in line with the principle that safe care should be developed as close to home as possible. Constraints and concerns highlighted included –

- Limitations imposed by the need to access specialist equipment and diagnostic technology not available in satellite locations
- Requirement for full multi-disciplinary teams for some clinics
- Concerns that the benefit to patients and staff arising from centralisation in one tertiary centre will be diluted if activity is then dispersed.

In assessing the potential for outreach we have adopted the following assumptions –

- In the absence of detailed data, outpatient activity has been split between secondary referrals and tertiary on a pro-rata basis with inpatient activity (for Dublin paediatric patients)
- For secondary outpatient activity we have assumed that –
  - 50-100% of new attendances for most specialties could be seen at the outreach centres in Dublin
  - That 100% of most returns (with some exceptions) could be seen at the A/UCCs

- The outturn outreach component of the secondary activity is 72%, but of this 31% will be provided at the NPH Tertiary Centre for the local population
- For tertiary activity we have assumed that –
  - All new appointments would take place at the main NPH Tertiary Centre site with the exception of general paediatrics and surgery and psychiatry
  - For return attendances 50-100% could be undertaken in a satellite location, or other outreach nationally for a limited number of specialties
  - The outturn overall outreach estimate for tertiary new and return activity is 38% of total activity classified as tertiary, but as before 31% will be provided at the NPH Tertiary Centre for the local population.

Taking outreach into account the split between NPH Tertiary Centre main site activity and that which could be distributed to Ambulatory settings (including the NPH Tertiary Centre for the local population) is as follows –

Table B24

2021 Activity split between NPH Tertiary Centre and A/UCCs	2021 New NPH	2021 Return NPH	2021 New A/UCCs	2021 Return A/UCCs	TOTAL
<b>Consultant Led Clinics</b>	31,008	44,893	25,852	65,031	166,783
<b>Non-Consultant Led Activity</b>	4,874		4,016	20,976	29,867
<b>TOTAL 2021</b>	<b>35,882</b>	<b>44,893</b>	<b>29,868</b>	<b>86,007</b>	<b>196,650</b>
	<b>80,775</b>		<b>115,875</b>		<b>196,650</b>

## B3.7 Future capacity requirements

### B3.7.1 Availability Assumptions

Future capacity requirements, that is numbers of consult exam rooms, have been estimated on the basis of the following availability assumptions –

- 2 sessions per day, 5 days a week, 48 weeks per year
- Session length of 3.5- 4.0 hours (210-240 minutes)
- Target utilisation of 75-80%

This represents a moderate view of utilisation as extended working days and/or weekend working in the future are not factored in. Progress towards extended

operational hours will generate further additional capacity. The 75-80% utilisation factor is considered to be achievable if designation of rooms on a specialty basis is minimised and DNAs are managed downwards.

- *Our satellite sites operate in a similar way to a hotel. Sub-specialty services rent space and use only what they reserve. Each day the space flexes and is shared by multiple specialties. We do have some subspecialties that require very specific space design such as ophthalmology.*
- *On main campus we have dedicated space but we are trying to move to a model of shared space*
- *We are trying to get to 65% exam room utilization on main campus and 75-80% at our satellite locations*

Madeleine Bell  
CHOP

### **B3.7.2 Consulting Times / Booking Intervals**

Calculation of capacity is based on an assumption of the following consulting times for consultant led clinics -

- 30 minutes new appointment
- 20 minutes return appointment

These allowances represent the total time a patient occupies the room including time for changing etc. Whilst it is recognised that actual consulting time will vary from specialty to specialty and from clinic to clinic within specialties, this is not factored in at this stage. However, the allowances above based on our experience should be sufficient to accommodate any rebalancing across specialties at the next stage and clinicians have indicated much higher throughputs for some specialties, including ophthalmology and orthopaedics as examples.

### **B3.7.3 Future Capacity Requirements : No Designation**

On this basis our calculation of generic consulting and examination room capacity is 53, with 24 rooms allocated to activity in the main NPH Tertiary Centre site and 29 rooms allocated to A/UCCs (including activity local to the NPH Tertiary Centre main site). Capacity will be utilised most efficiently and flexibly if consulting rooms are shared and not designated on a specialty basis. This assumption is the basis for the target occupancy level of 75-80%.

### **B3.7.4 Capacity Designation by Specialty**

However, it is recognised that some designation of capacity will be required for a number of patient groups. Children with suppressed immune systems or infectious diseases will need to be segregated from other children. This includes children with cystic fibrosis and haematology and oncology patients. Also, some specialties have very specific equipment needs which dictates that their outpatient consulting activity cannot be undertaken in a generic room – specialties included here are dental and oral surgery, maxillofacial services, ENT and ophthalmology - and therefore some level of designation is included for these specialties.

Lastly, there are some clinics where children will return frequently, often on a ‘drop-in’ basis and out of hours, for example diabetes and endocrinology and nephrology, and some degree of designation may be appropriate. It is worth noting however that the future model for diabetes assumes that as far as possible children will be seen locally in a number of centres across the county and therefore there should be a decline in Dublin based activity in the future.

### **B3.7.5 Future Capacity Requirements : With Designation**

On this basis our calculation for generic consulting and examination rooms capacity with some level of designation is 76 rooms, with 43 rooms allocated to activity on the main NPH Tertiary Centre site (where the requirement for dedication is likely to be located) and 33 rooms allocated to A/UCCs.

Table B25 Projected Capacity Requirements for Outpatient Consulting Suites 2021

<b>2021 Outpatient Consulting Suite Capacity</b>	<b>No Designation</b>	<b>Some Designation</b>
<b>NPH Tertiary Centre</b>	24	43
<b>A/UCCs</b>	29	33
<b>Total</b>	<b>53</b>	<b>76</b>



### **B3.7.6 Capacity requirements at the Mater Hospital site**

In line with the preferred model for the A/UCCs outlined in the separate A/UCC report the NPH Tertiary Centre will consume 31% of the total A/UCC activity for the local population. The projected consulting room capacity at the NPH Tertiary Centre is therefore –

Table B26 Projected Capacity Requirements for  
Outpatient Consulting rooms

<b>NPH Tertiary Centre Mater Site Projected Capacity (rooms)</b>	
NPH Tertiary Centre	43
A/UCCs	10
<b>Total</b>	<b>53</b>

## B4 Operating Theatres

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### B4.1 Baseline Activity 2005

The total number of procedures requiring anaesthetic undertaken for Greater Dublin secondary and national referred tertiary in the under 16 age group in 2005 was 22,200 procedures. A breakdown across elective and emergency work and secondary/tertiary split is provided in table B27. Of this just over half, 53%, relates to day case work. Note that this activity excludes the specialist hospitals, under 5 surgery and 16-18 year olds.

Table B27 Breakdown of 2005 procedures

2005 Procedures	Inpatients	Day Cases
Secondary Elective	3,661	9,368
Tertiary Dublin Elective	757	1,369
Tertiary Non-Dublin Elective	683	945
Secondary Emergency	4,165	
Tertiary Dublin Emergency	1,054	
Tertiary Non-Dublin Emergency	208	
<b>TOTAL</b>	<b>10,528</b>	<b>11,682</b>
	<b>22,210</b>	

Of the total inpatient theatre activity in 2005 53% related to emergency work and emergency work represented 26% of total theatre workload. Our understanding from discussions with clinicians locally is that a very high proportion of emergency theatre work is undertaken outside normal working hours. A number of reasons for this have been suggested, including lack of dedicated emergency theatres or sessions coupled with consultant capacity and availability. In its 2003 report, the NCEPOD (National Confidential Enquiry into Patient Outcome and Death) reported that *“the institution of day time lists for emergency operating has been a major improvement in the quality of care delivered to surgical patients”* (Ref:53).

In projecting forward future requirement our recommendation is that dedicated scheduled emergency and/or trauma lists should be included which would reduce the quantity of surgery undertaken outside standard working hours. These sessions will operate at a lower utilisation factor than elective sessions.

## B4.2 Projected Activity 2021

The projected activity taking account of demographics, system reform and enhanced performance and specialty casemix change, is detailed in Table B28 below. When, specialist hospitals, under 5 surgery and a proportion 16-18 year olds are included, the total projected number of procedures in 2021 is 13,150 inpatient cases and 17,050 day cases.

Table B28 Breakdown of projected 2021 procedures

Projected 2021 Procedures	Inpatients	Day Cases
Secondary Elective	3,503	12,163
Tertiary Dublin Elective	929	1,677
Tertiary Non-Dublin Elective	888	898
Secondary Emergency	4,005	
Tertiary Dublin Emergency	1,080	
Tertiary Non-Dublin Emergency	212	
<b>TOTAL IP</b>	<b>10,617</b>	<b>14,738</b>
Specialist hospitals	424	878
Under 5 Surgery	747	1348
16 - 18 year olds	1356	88
<b>TOTAL PROJECTED PROCEDURES</b>	<b>13,144</b>	<b>17,052</b>

## B4.3 Utilisation Assumptions

In calculating future operating theatre and major procedure room capacity requirements we have made the following assumptions –

- 24 hour emergency theatre availability with 50% of total emergency work undertaken outside standard working hours

- Standard operating hours, 3.5 hour sessions, 10 sessions per week
- Elective theatres operate 48 weeks per annum
- Emergency theatres available 52 weeks per annum
- Elective theatre occupancy target of 77% of total available time
- Emergency theatre occupancy target of 60%

Occupancy targets are based on the UK Audit Commission Report 2004 recommendations <sup>(Ref:54)</sup>. Note that the lower occupancy target for emergency theatres allows the availability of dedicated emergency theatre capacity at all times. In terms of throughput, our calculations assume 6 day cases per session or 3 inpatient cases per session. Across all of the children's hospitals the common practice is to mix day and inpatient cases on lists. We have adopted a moderate approach to utilisation levels at this stage. Further additional capacity would be generated in moving towards extended day and/or weekend working and full-day sessions.

## B4.4 Future Capacity Requirements

Based on the activity projections and utilisation assumptions outlined above, the calculated number of operating theatres, interventional suites and major procedure rooms required is 17 suites, with the following breakdown –

Table B29 Projected Theatre Capacity Requirements 2021

2021 Projected Theatre Capacity	Inpatients		Day Case	Total
	Elective	Emergency		
Greater Dublin Secondary	3.00	2.13	5.48	10.61
Tertiary Dublin	0.86	0.59	0.76	2.21
Referred Non-Dublin	0.89	0.30	0.32	1.51
Specialist	0.31	0.03	0.40	0.74
Under <5 Surgery	0.78		0.60	1.38
16 - 18 year olds	0.20			0.20
<b>Total</b>	<b>6.04</b>	<b>3.05</b>	<b>7.56</b>	<b>16.65</b>

Note that the theatre workload will include activity relating to the catheterisation lab and any other interventional work classed as a procedure. It will also include any MRI

or CT undertaken under anaesthetic. Therefore the capacity projections above include an imaging component.

#### **B4.4.1 Distribution of theatres across main NPH site and A/UCCs**

These projections also include day case work to be undertaken at the A/UCCs as discussed in the separate A/UCC report. The distribution across the main NPH Tertiary Centre site and A/UCCs is as shown in Table B30. In addition we have factored in an additional 2 suites for development of image guided therapy or hybrid suites in the future. This provision will be subject to review as the project progresses.

Table B30

	<b>NPH Tertiary Centre</b>	<b>Tallaght</b>	<b>Blanchardstown</b>	<b>Total</b>
<b>Inpatient</b>	9.09	0.00	0.00	<b>9.09</b>
<b>Day Case</b>	3.36	2.90	1.30	<b>7.56</b>
<b>TOTAL modelled</b>	<b>12.45</b>	<b>2.90</b>	<b>1.30</b>	<b>16.65</b>
<b>Rounded</b>	<b>13</b>	<b>3</b>	<b>2</b>	<b>18</b>
<b>Future expansion / technologies</b>	<b>2</b>			<b>2</b>
<b>TOTAL</b>	<b>15</b>	<b>3</b>	<b>2</b>	<b>20</b>

## B5 Imaging

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Imaging capacity has not been modelled from an activity basis as part of this Framework Brief. We understand that the current level of provision across the 3 children's hospitals is 20 imaging rooms (excluding the Catheterisation Lab at OLCHC). Some economies of scale should be expected in combining the 3 hospitals.

Submissions from stakeholders suggest a significant further increase in MRI capacity of up to 5 MRIs including some dedicated to cardiology. The requirement for dedicated paediatric PET has also been suggested. This capacity has not been factored and will be subject to more detailed assessment of future trends and activity and detailed modelling of imaging requirements at the next stage.

We have made an assumption of future imaging capacity requirement of 26 rooms by applying an assumption of growth in excess of demographic change to current capacity. In addition, we have made allowance for 2 additional suites located with theatres subject to confirmation at the next stage. The distribution by modality across the NPH Tertiary Centre and A/UCCs is shown in Table B31. As the imaging department is a core function, highly sensitive to technological change and throughput we recommend that a specific workstream is established to determine future requirements.

*"I would recommend a spin-off project for radiology, for example, I would recommend (inclusion) of PET/CT and MEG"*

**Madeline Bell**

Table B31

Imaging Capacity Modality	Current (3 sites)	NPH Tertiary Centre		A/UCCs	Total
		Main Department	Emergency		
Plain Xray & Fluroscopy	8	5	1	4	10
Ultrasound	5	5	1	2	8
CT	2	1			1
MRI	2	2			2
Nuclear Medicine	2	2			2
Dexa Scanner	1	1			1
Interventional/other		2			2
<b>TOTAL</b>	<b>20</b>	<b>18</b>	<b>2</b>	<b>6</b>	<b>26</b>

Note : These numbers exclude cardiac catheterisation lab and provisional allowance of 2 suites with theatres.

## B6 Future Flexibility and Expansion

The projected capacity requirements identified in Sections B2-B5 are summarised in Table B31 below. Whilst a direct comparison with current capacity across the three children’s hospitals plus Beaumont is not possible, the table below gives some indication of the extent of provision required in 2021 compared to now –

Table B32

	2005 Children's Hospitals	2021 projected
<b>Inpatient Beds</b>	426	409
of which <b>Critical Care Beds</b>	33	73
<b>Day Beds</b>	55	65
<b>A&amp;E Observation</b>		21
<b>Operating Theatres</b>	12	20*
<b>Imaging</b>	20	26

Critical Care beds TCU additional bed provision

\* Includes expansion of 2 suites for new technologies. Note that current capacity is undercounted as some activity at AMNCH, Beaumont and the specialist hospitals is undertaken in adult theatres. 2 additional suites for imaging have also been included with theatres.

As capacity is projected to 2021 it is likely that not all of it will be required when the building is first commissioned.

### Inpatient and Day Beds

The projected number of beds is broadly similar to current levels of provision across the 4 sites with dedicated children’s beds, although the data suggest that the current bed complement operates at a significantly lower average occupancy (68% - refer to table B7) than the target of 80-85%. The impact of growth in terms of demographics over the timescale should be off-set by a corresponding reduction in hospital inpatient based activity as a result of developments in primary and community care and enhanced performance in line with the Transformation Programme. Phased implementation of the A/UCCs will add additional day places into the system over time. The recommendation is that the unit at Tallaght be implemented first with Blanchardstown following at a later date.



## **Critical Care**

The projected requirement for critical care beds including transitional care for 2021 is 73 beds – subject to the requirement for TCU beds being monitored and confirmed as the model of care for the future is refined. This is a significant increase on the 33 ITU and HDU beds currently available at OLCHC, CUH and AMNCH but is in line with International trends. Staffing this increase in beds will be a challenge and it is likely that not all of these beds would be available as critical care when the NPH Tertiary Centre is initially commissioned.

*We originally planned a smaller percentage of ICU beds. We are now at 30% of total beds and we plan to convert a further 30 acute beds to ICU over the next 5 years .....always under construction!*

Madeleine Bell  
CHOP

As noted above the trend into the future is an increase in critical care requirements with a corresponding decrease in acute beds. Therefore our recommendation is that generic acute beds should be designed to facilitate easy conversion and use as ICU or HDU beds beyond 2021.

## **Operating Theatres and Procedure Rooms**

In reviewing further requirements for operating theatres we have adopted moderate utilisation assumptions - a standard 2 session day of 3.5 hours per session, 5 days a week and moderate occupancy assumptions. There is already evidence of extended working day practices across the 3 children's hospitals, including single day lists and extended day sessions and weekend working. We have also added future provision for 2 additional suites for new technologies and 2 provisional imaging suites.

## **Outpatient Capacity**

As with operating theatres, additional capacity of up to 30% could be generated by changes in working practices including extended working days and some weekend sessions. In addition, the phased implementation of the A/UCC model allows additional capacity to be added to the NPH Tertiary Centre network over time and this can be re-evaluated at appropriate intervals to reduce any risk of under or over capacity.