

C Workstream 3: High Level Operational Policies and Hospital Sizing

C.1 Definition

This section of the report defines the range of services to be provided in the NPH Tertiary Centre and the overall quantity of space required to deliver those services.

Section C1 considers high level operational policies on how services should be organised, and the key functional relationships between these and relationships to adult and potentially maternity services.

Section C2 translates these requirements into broad brush departmental and gross floor areas.

Section C3 considers the preferred configuration for the NPH Tertiary Centre on the Mater Site.

C1 High Level Operational Policies

C1.1 Overview

This section of the report outlines how the NPH Tertiary Centre is envisaged to operate in a tri-location context. Key questions to consider are –

What are the range of clinical and support services to be provided on the main NPH Tertiary Centre site?

In a tri-location context what services might be shared with adult and/or maternity services and what services should be dedicated to children?

In the context of the Mater Hospital main site and immediate locality, what services should be provided on site and what services could be provided off site?

How should key services be organised with the hospitals to promote effective and efficient delivery of services?

How will advances in technology impact on hospital operation and design in the future?

At this stage, this High Level Framework Brief can only outline the key principles around hospital operation and organisation. Our recommendations are based on –

- Stakeholder interviews including discussions with clinical and support staff at the three children's hospitals
- Evidence from our international advisers
- Evidence from international reference sites

Because of how our engagement with stakeholders was structured, the focus has been on specialty requirements and issues and individual perspectives of the three children's hospitals. At the next stage, it will be essential that the brief be developed around generic approaches adopting best practice across specialties and institutions. Specialty specific issues are outlined in Appendix 5. In this section we outline

operational policies on a service by service basis under the following generic headings –

- Parents and Families
- Inpatients
- Ambulatory Care
- Diagnostics and Treatment
- Clinical Support
- Administration and Staff Facilities
- Education and Research
- Back of House

C1.1.1 Range of Services

The NPH Tertiary Centre will provide a full range of tertiary services nationally and secondary services for the Greater Dublin area. The likely range of specialties included is listed in Table C1 below. Note that some of these – allergy and adolescents for example - represent service developments to be confirmed at the next stage.

Table C1 Specialty Range

Accident and Emergency	Maxillofacial
Adolescents	Metabolic Disorders
Allergy	Neonatal Intensive Care
Anaesthetics	Nephrology
Cardiology	Neurodisability
Cardiothoracic Surgery	Neurology
Clinical Genetics	Neurosurgery
Clinical Neurophysiology	Oncology
Community paediatrics	Ophthalmology
Dental Surgery	Oral Surgery
Dermatology	Orthopaedics
Endocrinology	Otolaryngology (ENT)
Gastroenterology, Hepatology and Nutrition	Paediatric Intensive Care
General Medicine	Pathology
General Paediatrics	Plastic Surgery
General Surgery	Respiratory Medicine incl Cystic Fibrosis
Gynaecology	Rheumatology
Haematology	Specialist child and adolescent mental health
Immunology	Urology
Infectious Diseases	

These clinical specialties will be supported by appropriate facilities and support services within the NPH Tertiary Centre –

Table C2 Clinical and Non Clinical Support Services

<p>Clinical support services will include –</p> <ul style="list-style-type: none"> Imaging Clinical Engineering Medical Records Infection Prevention and Control Phlebotomy and IV team Pharmacy, including ACU Medical Photography Sterile Services Palliative Care and Pain Management Pathology and Mortuary Theatres Hospital School Therapies Play Social Work Transport and Retrieval Service Special Feeds Unit Child Protection and Sexual Abuse 	<p>The range of administration services and staff facilities will include –</p> <ul style="list-style-type: none"> Corporate services Management administration Clinical offices Medical Records Patient Services Staff changing Occupational Health Recreation facilities Staff Crèche
<p>Related services include –</p> <ul style="list-style-type: none"> Research Education and Training National Centre for Medical Genetics Parents Accommodation 	<p>Non-clinical support services will include –</p> <ul style="list-style-type: none"> Parents facilities and support services Multi-faith facilities Voluntary services Technical services House-keeping Switchboard Transport and portering Catering Waste Management Materials Management Linen

(Note that different terminology is used across the 3 children’s hospitals to describe these services and different organisational models exist)

C1.2 Core and Shared Services

A question to be answered in this High Level Framework Brief is what services could be shared with adult and/or maternity services to optimise the benefits of co-location in terms of operational efficiencies and economies of scale. In their review of Corporate Services for the MMUH and CUH Deloitte’s ^(Ref: 55) noted that –

“The department / service that are most suited to be managed and operated on a conjoined basis are those where the extent of paediatric specific skills and competencies required by staff is low, and the commonality of functions / responsibilities is high.”

A subsequent report on Shared Services for the Department of Health and Children and the HSE Transition Group ^(Ref: 56) was prepared by the Strategic Director of the Mater Hospital, in January 2007. This report specifically looked at the potential for

sharing services across the Mater Hospital and the NPH Tertiary Centre. It considered a number of strategic options for shared services and reviewed international examples. A single management structure as a separate legal entity for all shared services was envisaged. Key recommendations from the report were that –

- It will be essential that all institutes support the principle that duplication of shared services should be eliminated where possible and demonstrate a capacity for significant savings and value for money
- Adults and children should not mix in the same environment and therefore core patient facing clinical services should not be shared with adults – except in rare cases where the costs of dedicated services cannot be justified
- The shared services model should be flexible so that new arrangements can be introduced gradually overtime
- The shared services model could be piloted for some services in advance of the new hospital being commissioned
- An important consideration is the requirement that all staff working within the Children's hospital be screened from a child protection perspective.

We would add that Children's care should be ***delivered by clinical staff with paediatric expertise*** – this includes laboratory and pharmacy services.

In addition each of the three children's hospitals and the three maternity hospitals in their submissions to the HSE in March 2006 set out their views on the potential for shared services ^(Refs:4,19,22,57,58,59). At that time there was broad agreement on the range of services that could be considered as candidates in a shared services context.

The Shared Services Report identifies the back of house service which are included in the **national initiative on shared services** including –

- Finance (including payroll)
- Human Resources
- Information Technology
- Procurement
- Corporate Services

In addition it identifies a number of **clinical and non-clinical support services** which should be considered as part of the shared services initiative –

- Pharmacy
- Occupational Health
- Clinical Engineering
- Medical Records
- Staff Training and Education
- Car parking
- Security and Cleaning
- Non clinical services (catering, household, portering etc)

The report suggests that consideration of pathology services be deferred.

There are clearly sensitivities around proposals for shared services and legitimate concerns have been highlighted around HR and IR issues and clinical outcomes. The focus of this Framework Brief is to identify services that could, rather than should be shared and the implications therefore for the preferred configuration on the Mater Site. The agenda for change in the new NPH Tertiary Centre model is significant in merging together the culture, practices and people across three organisations. As a principle, we would suggest that the initial focus should therefore be on integrating services for children in the first instance and then to explore the potential for merging with adult and/or maternity services as a next stage.

C1.2.1 Pharmacy Services

In looking at the scope for shared pharmacy services it is important to distinguish between the procurement and manufacturing component of the service and dispensing and administration of medicines. Within our range of reference sites there are no examples of the dispensing component of the service being outsourced or provided by an organisation with a separate governance arrangement from the children's hospital. However, there may be scope for sharing the procurement and manufacturing components and therefore we recommend a back to back arrangement with the adult service so that delivery points and potentially aseptic facilities could be shared. Co-location of aseptic facilities would offer some resilience in the event of shut down of either service.

C1.2.2 Pathology Services

Pathology services within the NPH Tertiary Centre and at the Mater Hospital will be subject to the outcome of the national review of Pathology services which is due to report shortly and therefore the future model for Pathology on the Mater site is uncertain. There have been major concerns expressed about the risk of dilution of paediatric expertise in a merged service ^(Ref: 60).

Across our reference sites, where pathology services are centrally managed for adults and children (most UK examples) separate paediatric pathology laboratories as a distinct discipline are retained for paediatric pathology (for example at Evelina and Manchester). In North America, with the exception of Vancouver, pathology services are dedicated to children.

For the purposes of this Framework Brief we would recommend that the paediatric pathology laboratories be co-located with the adult service with scope to include the maternity activity at a later stage – subject to the outcome of the national pathology review. The adult and children's service should follow a common design based on generic automated laboratory facilities with shared delivery and access points for materials management and deliveries. The design solution should provide flexibility in designation of adult and paediatric space over time.

C1.2.3 Sterile Services

The previous proposals for the Mater site were that the CUH and MMUH sterile services would merge. This could be extended to include the NPH Tertiary Centre and a maternity hospital in time. It is common practice in Europe and across the UK reference sites for a single service for adults and children. Within the UK, arising from European accreditation requirements, the trend is towards centralisation of sterile services covering multi sites and organisations. The space allocated to sterile services in Section C2 is an estimate of the additional area that would be required to extend the planned facility at the Mater to cover the NPH Tertiary Centre service. A dedicated paediatric service would require more space.

C1.2.4 Information Technology

The assumption underpinning the previous MMUH and CUH scheme was that IT services would be shared across adult and children's services in a shared services model. Currently, all three children's hospitals operate different and multiple IT systems. We would recommend that in the first instance the priority should be to focus on aligning systems across children's services in advance of the NPH Tertiary

Centre. It has been suggested that scope exists for merging adult and children's pathology IT systems. In time there should be a high level of commonality across all other children's, adult and maternity services.

C1.2.5 Facilities Management services

In the UK the common model is that a wide range of non-clinical support services are outsourced and in all the UK and European reference sites where children's and adult services are co-located, these services are shared. From a design perspective, it is important that these services are located centrally to serve both the adult and children's hospitals and potentially a maternity hospital, linking in to dedicated vertical distribution routes for each of the three hospitals.

C1.2.6 Clinical Engineering

It is recognised that there are significant differences in the procurement, maintenance and range of equipment for children compared to adults. However, there are advantages in co-location of workshops, decontamination facilities and equipment libraries in a shared services model. Much of the clinical interface involves training nursing and other staff to use the equipment at departmental level and this expertise should not be lost in a shared services model. Even in a conjoined model it is likely that staff will be designated to the paediatric service because a significant proportion of the work is carried out within clinical departments.

C1.2.7 Education and Training

The volumes of students and staff requiring education and training are substantial and likely to justify dedicated facilities. However, there is clearly scope for sharing between the adult and paediatric facilities for special events, conferences etc. The possibility of a shared booking system across the two services for meeting spaces may be considered provided priority allocation arrangements are agreed. Exchange and interaction between adult and paediatric education, training and research should be encouraged.

C1.2.8 Occupational Health

The overall management of the occupational health service might be integrated between the adult and paediatric hospitals. Discreet access for each staff group will be required.

C1.2.9 Medical Records

The introduction of the electronic patient record will have a very significant impact on the role of medical records in terms of the type of activities and space requirements on site in the future. There is a strong case for this function being closely aligned with IT. In time, the requirement for current records on site will diminish very significantly and the roles of medical records staff will be more focused within clinic settings.

C1.2.10 Services shared with a Maternity Service

Achieving the optimum physical interfaces between the maternity service and the children's hospital should be a core project objective to facilitate easy transfer of staff and patients across core clinical services including neonatology and neonatal intensive care, fetal medicine and fetal surgery. In addition there are further services which should be shared with a maternity service, including for example –

- Transfer and Retrieval Services
- Mortuary and Bereavement Facilities
- Interpretation services
- Parents' Resource Centre

C1.2.11 Other potential for sharing

The concept of sharing in a co-located physical environment can be extended to include access to facilities and amenities and in this context it is strongly recommended that consideration be given to sharing the following -

- Multi-faith facilities
- Family facilities
- Car parking
- Staff crèche
- Patient Hotel facilities
- Retail and Cafes
- External spaces
- Public Restaurants

and a coordinated plan will be required across all three hospitals.

C1.3 On and Off site Services

Our terms of reference for this Framework Brief were to consider what services for the NPH Tertiary Centre at the Mater site could be located off site and which services were essential to locate on the main MMUH site. Off-site locations include sites

within the medical campus local to Eccles Street and North Circular Road and potentially sites outside the immediate medical campus.

In considering what might be appropriate off site services it is useful to consider acceptability in the context of whether access would be –

- Undercover with a physical link
- Within a reasonable walking distance
- Requiring transport between sites.

Possible off-site locations suggested to date are discussed in Section C3. This section considers the potential for services to be located off the main site. It is important to acknowledge that from an operational perspective the ideal is that most services would be located on the main site - that does not mean that they have to be. Table C3 below lists those services identified as possible off-site services.

Whilst this section identifies in theory that there is a range of functions which could be located off the main NPH Tertiary Centre site this potential needs to be explored further in the context of the availability of suitable off-site locations consistent with the implementation timescales for the NPH Tertiary Centre.

Table C3

Service	What is achievable?	What is ideal?
Transfer and Retrieval Service	With good IT links the administrative base could be remote. Ambulance parking and equipment base is required on main site.	On-site next to Emergency Department
Child Protection and Sexual Abuse Service	Community paediatricians need access to facilities for child protection on site. Other elements of the service could be remote.	Child protection suite on site. Locality based Sexual Abuse Service off site.
Pathology Labs	There are numerous examples in the UK and Internationally of off-site Pathology services. Transportation of samples and turnaround times are key criteria for paediatrics as turnaround times are generally shorter than for adults. Hot lab facilities would be required on site.	Physically linked to the main site with mechanical transport systems for samples. Loss of interface with clinical services is cited as a disadvantage if the potential for day-to-day casual interaction is lost.
Pharmacy	There are some components of the service which could be located away from the clinical core, including procurement and distribution storage and drugs information.	Co-location of all Pharmacy services physically linked to the main site
Materials Management	Bulk storage could be remote from the main site with a 'just-in-time' system for deliveries locally.	'Just-in-time' models should be explored to reduce storage requirements on the main site.

Service	What is achievable?	What is ideal?
Sterile Services	There are many examples of sterile services provided off-site. Key issues centre around transportation and turnaround times and impact on instrumentation requirements, and requirements for local decontamination.	Site capacity should not dictate the preferred service model, but off site solutions are workable.
Catering	Currently CUH, OLCCH and MMUH provide a traditional catering service with all meals prepared and cooked on-site. Other systems including cook-chill allow meals to be prepared off-site and regenerated locally.	Site capacity should not dictate the preferred service model, but off site solutions are workable.
Technical Services	The technical services base could be off the main site but within walking distance of the centre. Some local workshop facility would be required.	Within the campus, within walking distance.
Staff Facilities (crèche, recreation and occupational health)	Crèche facilities for staff could be located away from the main site but within walking distance, or with a hospital shuttle bus service (see below).	Within the campus, within walking distance
Staff Car Park	Staff car park facilities could be off-site if appropriate transport arrangements were in place including a service for staff at night.	
Corporate Functions	Administrative functions where there is no face to face contact with parents or patients required could be located anywhere within the medical campus provided they were within walking distance.	Within the campus.
Medical Records	Medical records archives are currently and should continue to be located off-site and are not included in the Schedule of Accommodation. A local facility for storage of hard copy current records is required but this will diminish with the introduction of electronic patient records.	Current records within the campus and within walking distance.
Parents Accommodation (Ronald McDonald)	Within our reference sites there are many examples of parents accommodation provided off the main hospital site in some cases at a significant distance requiring vehicle transport.	Walking distance but away from the main building.
Education and Training & Research	Education and Training facilities and Research at the MMUH are currently located in the buildings along Eccles Street. Some embedded facilities will be required next to clinical services.	On the campus, within close walking distance.
National Centre for Medical Genetics (NCMG)	The NCMH is currently located in a stand alone building on the OLCCH site. Although the centre provides a service to adults as well as children it is an OLCCH service. In theory as it relates to both adults and children it could be located on any hospital site but there are close clinical links to paediatric and maternity services.	On campus but in a stand alone building (because adults will access the service)

C1.4 Key Services

This section of the report highlights key operating requirements under the following generic headings –

- C1.4.1 Services and facilities for Parents and Families
- C1.4.2 Inpatient Services
- C1.4.3 Ambulatory Services
- C1.4.4 Diagnostics and Treatment
- C1.4.5 Clinical Support Services
- C1.4.6 Administration and Staff Facilities
- C1.4.7 Education and Training
- C1.4.8 Back of House

The NPH Tertiary Centre Brand

The principles, quality standards and space provision highlighted in this section apply equally to the A/UCCs.

C1.4.1 Services and Facilities for Parents and Families

This section of the brief covers a number of key family social support and information support services and amenities. Key principles –

- Parents and/or guardians should be supported in caring for their child in hospital
- Operational policies and design should allow the parent to be with their child at all times – except when it may not be in their best interests
- Parents with siblings away from home should be supported in continuing as normal a family or working life as possible
- The needs of siblings should be recognised - a hospital stay can be very disruptive to their routine
- Operational policies must be socially inclusive- the design should not unintentionally exclude any group including people with disabilities.

Within the Tertiary Centre patients will have multiple tests and assessments over the course of the day and therefore variety in waiting areas and amenities is important. One of the advantages of an inner city location is the range of facilities and social opportunities that will be available off site.

The design of the hospital must include facilities for baby feeding, nappy changing, family friendly retail and catering facilities and access and storage space for prams and buggies at appropriate intervals throughout the hospital. Parent lounge areas should be provided in all inpatient areas and play spaces should be accessible to siblings under the care of their parent(s).

Each inpatient unit has a dedicated playroom for children and dedicated kitchen, laundry and family lounge and or resource room

We also have a large family resource room with lockers, laundry facility, kitchen, family library, teaching simulation center.

Each Specialty Care center has a family resource center

We have two welcome centers, one for inpatients and one for outpatients with computers, maps of the area, plasma screens with information for families, quiet rooms, lockers and wheel chair storage

Madeleine Bell

CHOP

**When asked are there any issues that are important in the New Children's Hospital?
Parents replied:**

"More liaisons with parents who are living far from hospital"
"Staff and parent's should be consulted on location and design"
"My children have always missed their siblings while in hospital. Seeing them aids recovery"
"Parents do not bring sick children to hospital by public transport, need good road access and good car parking"
"Hygiene, Bug Free"
"easily to public transport"
"Yes staff and doctors should be taken into account, their opinion counts"
"transportation needs"
"Access, size, ground-level not high rise"
"the government are not taken parents and children's feeling into consideration"
"I feel strongly that the location must be accessible to parents NATIONALLY"
"Waiting times in A&E to be reduced. All services to be available for greater periods"
"Bath / showers in the children's rooms, heavier blankets"
"A caring and comfortable environment to assist a speedy recovery"
"That we will soon have a new hospital!!"
"Adequate staffing levels, adequate qualified specialists, best practices deployed"
"A new hospital must be able to provide state of the art medical facilities, with as much staffing as is necessary to ensure efficient delivery of services"

When asked what design features would you like to see in the New Children's Hospital? Parents replied:

"More modern..... Easy access..... Environmentally friendly..... Open & spacious"
"Gardens and outdoor play areas..... Shops..... Health food..... Less congested"
"Ensuite rooms..... Swimming pool..... Colourful and interesting for kids"
"Bright and airy..... playrooms..... a kitchen dining area..... Large play areas"
"Bid feeders outside windows..... Plenty of open spaces..... Areas for older kids"
"walled gardens with benches.....Football.....Plenty of room at bedside"
"Kitchens on each ward for use by parents to make coffee, sandwiches etc"
"Professional architectural design – futuristic.....Learning facilities.....open plan"
"Good natural lighting and well ventilated.....Plenty of toys and stuff to help from being bored.....Restaurants shops and playgrounds.....Clean, hygienic wards. Comfort"
"All treatment facilities should be available on one site....Nice warm colours of places to see like the zoo or different countries..... Children need safety, comfort, reassurance and a fearless environment.....Access to patient records on line etc"
"Less congested layout, not having to go through other facilities or units to reach clinic (this would reduce infection spread too). Quiet area (for parents to work on laptops etc)"
"More ventilation in wards, better facilities for parents. More room in isolation wards, more storage facilities....Games room to develop and improve mind and physical abilities"

Source: OLCH Parents Survey regarding New National Children's Hospital in Ireland
April 2007

Family Resource Centre

The Family Resource Centre will be a key part of the NPH Tertiary Centre family centred approach to care providing a retreat and resource for families and care givers of inpatients and outpatients. The centre will allow families to take time out away from the inpatient wards and will include facilities for –

- Training parents and carers in caring for their child when discharged
- Business centre for working parents away from work
- Information centre for children and their families, including health promotion and child health and safety
- A base for interpretation services
- Personal care for disabled children and adolescents, including showers, and adolescent nappy changing
- Lounge and dining area
- Volunteer services
- Social work services

Families accessing the Maternity Services would also benefit from the range of services in the Family Resource Centre and consideration should be given to the extent to which these services could be shared with a maternity service.

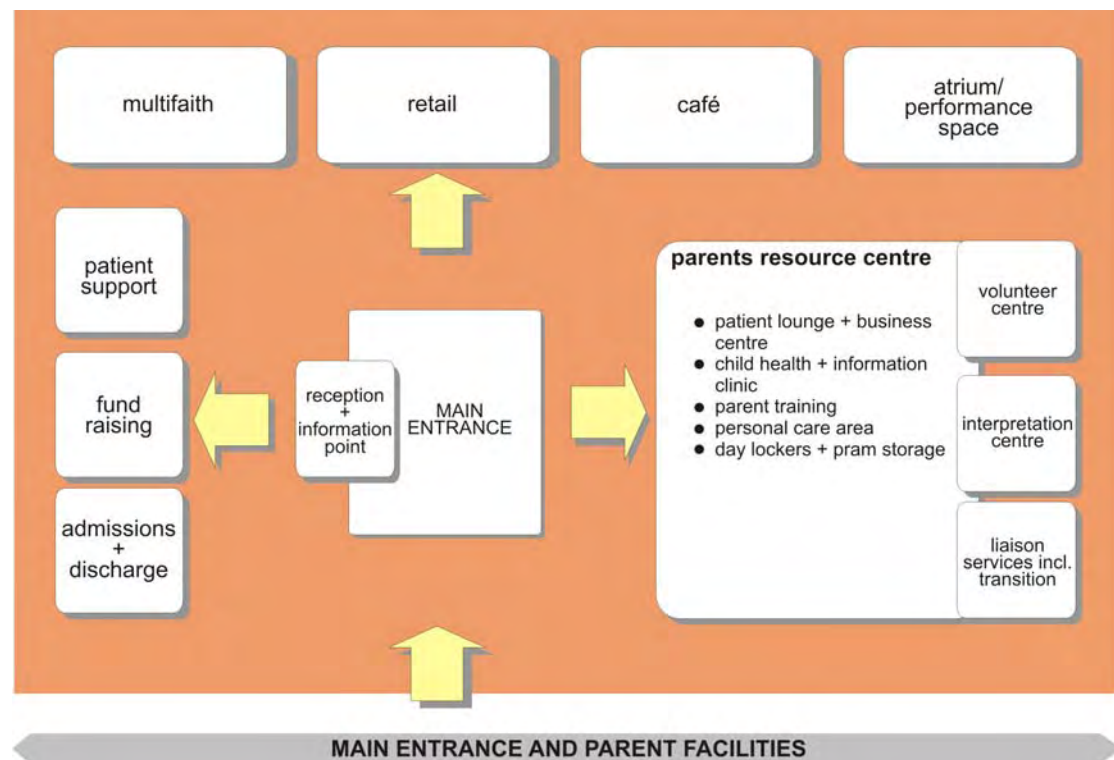
Pastoral Care and Multi Faith Centre

This service will provide multi-denominational and pastoral care to all families and staff in the hospital. The multi faith centre will provide space for individual prayer and quiet reflection and facilities to meet the specific needs of Muslims. The design should also include some external spaces for quiet reflection and the design of public spaces should include an area for larger festive public gatherings. This is reflected in the communications space allowances in Section C2.

In a tri-located model, consideration should be given to the scope for shared facilities and/or shared access to pastoral facilities across the Mater Hospital site to avoid duplication but also to provide a variety in locations.

Figure C1 suggests a front-of-house arrangement of parent's facilities.

Figure C1



Parents' Overnight Accommodation

A key principle is that every parent or nominated carer should be facilitated in staying with their child overnight. In line with international best practice, every bed space including critical care should facilitate one parent sleeping with their child. Parents should have access to en-suite facilities from the bedroom, or, where en-suites are not provided as in critical care, central showering facilities for parents should be available. Lounge facilities and laundry facilities should also be available at ward level.

In the OLCHC Parents Survey (April 2007) 90% of parents thought it very important to be able to stay with their children overnight.

There will be some instances when it may not be advisable or appropriate for parents to room in with their children but where parents may desire to be within 'dressing gown' walking distance. This includes –

- A second parent
- Parents of adolescent and older children

- Parents of some critical care patients
- In a multi-bed environment (for example if some of critical care is open plan)

Therefore, a central suite of rooms should be available within the hospital and close to critical care. OLCHC currently provides approximately 45 rooms for which parents pay a nominal charge. This level of provision reflects the lack of appropriate facilities at the bedside. In addition two houses off site provide a further 16 places. At AMNCH there is a suite of 5-6 rooms which are underutilised, possibly reflecting the lower level of acuity and lower ALoS of the patient case mix. CUH have 15 rooms available for parents.

Across our reference sites, most hospitals provide some facilities within the hospital. There is a direct correlation between the percentage of single rooms (both acute and critical care) and the provision of additional facilities *within* the hospital (see Appendix 1). Based on the evidence from our reference sites we would propose a central facility of 15 rooms. This assumes that a Ronald McDonald type facility of sufficient capacity is available outside the hospital but within walking distance to the site.

Ronald McDonald House

The Ronald McDonald House, operated by RMCC Ireland currently provides a 16 room unit on the OLCHC site. It provides overnight accommodation to families (of up to 4 people) of children with long-term illness and patient hotel type accommodation for patients and their families who do not require an overnight stay in hospital. Many of these patients are oncology patients. Parents pay a fee and the service operates to capacity and is oversubscribed.

The charity has confirmed its willingness to provide family accommodation wherever the new NPH Tertiary Centre is located. Within a city centre location there are more options available for parents for overnight stays – although cost is an issue. The size and siting of any facility at the NPH Tertiary Centre will be determined by RMCC. Based on the capacity profiles across the reference sites, the working assumption for this Framework Brief is 45 places, which includes some single room accommodation.

Facilities for Siblings

In a recent Parent Survey (April 2007) undertaken by OLCCH 67% of parents stated that there should be facilities for siblings.

It has been suggested by a number of stakeholders and interest groups that crèche facilities for siblings are provided with the NPH Tertiary Centre. Support for development of this service is not universal and there are concerns relating to parental responsibility, likely uptake of the service and funding. Within the new development for RCH at Melbourne 10 places for siblings / occasional care will be provided as part of the staff crèche facilities. The views of parents should be sought as part of the consultation process at the next stage. A Department of Education policy is required on the education of siblings of children in hospital. At CUH siblings are enrolled on an exception basis, at OLCCH siblings staying in Ronald McDonald House can attend the Hospital School.

Key functional relationships -

- Family Resource Centre should be located close to the main entrance for orientation and way-finding and away from the wards
- Parents central overnight accommodation within the hospital should be close to PICU and NICU
- Ronald McDonald facility should be in a separate environment, but within safe walking distance from the hospital
- Multi-faith facilities should be easily accessible by all.

Relationship to Adult Services -

- Consideration should be given to co-location of any patient hotel type facilities for all patient groups within the medical campus to maximise flexibility in capacity over time

Relationship to Maternity Service -

- Consideration should be given to sharing Family Resource Centre facilities and Multi-Faith facilities with Maternity services.

C1.4.2

Inpatient Services

As outlined in Section B the NPH Tertiary Centre will provide 409 inpatient beds of which 73 relate to Critical Care and TCU. Critical Care includes both Neonatal Intensive Care that currently takes place at OLCHC and CUH and Paediatric Intensive Care and Transitional Care.

Key principles which should underpin the organisation of inpatient services in the future are –

- Wards should be generic in organisation and layout as far as possible with standard operational policies
- Ward design should facilitate flexible bed allocation by specialty, age or dependency
- Nursing units should be sized to maximise staffing efficiencies with sub units to facilitate smaller cohorts of patients
- Ward design should take into account the child's personal, medical and social needs
- Design and Operational Policies should reflect parents needs as joint partners in their child's care

There are some exceptions to the generic layout, these include –

- Critical Care
- Transitional Care (Long-Term Ventilation)
- Burns
- Bone Marrow Transplant and Renal Transplant
- Immunocompromised patients including Haematology / Oncology and Cystic Fibrosis
- Airborne Infectious Diseases Unit (All Unit)
- Mental Health

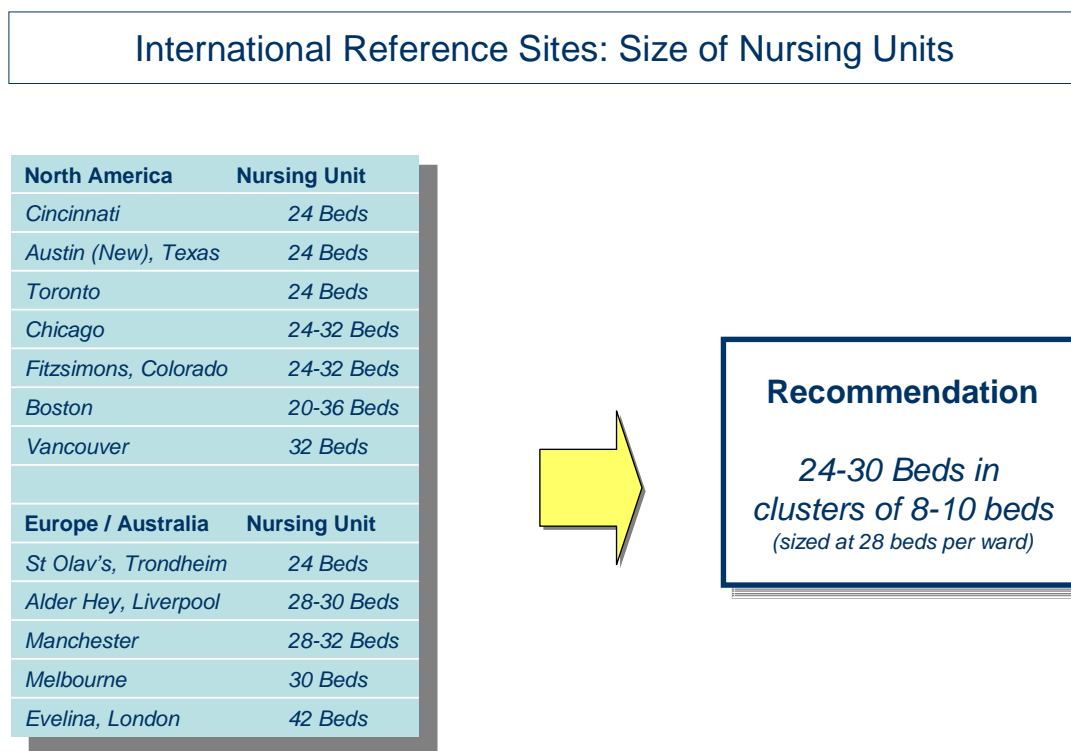
There is a case for restricted access policies to wards where children with infectious or suppressed immune systems should not mix with other patients, (haematology

and oncology, renal transplant and cystic fibrosis). In addition the nephrology ward has specific engineering requirements in relation to dialysis.

Size of Nursing Units

The evidence from the reference sites is that nursing units should be sized between 24 and 36 beds (as shown in Figure C2). For the purposes of hospital sizing we have assumed 28 bed units, sub-divided into sub-units of 8-10 beds. The cluster arrangement facilitates designation by specialty, age or dependency and features in many of our international examples.

Figure C2



Note that Evelina is an 'outlier' where each floor rather than ward has 42 beds

Percentage of Single Rooms

All of the children's hospital submissions ^(Ref: 3, 4, 22) supported the provision of 100% single rooms. In subsequent discussions with nursing and clinical staff it is evident that this view is not universally supported, although there is a consensus that a very high proportion of beds should be in single rooms. The benefits of single rooms have been widely debated and include –

- Privacy for the child and his / her family
- Control of infection

- Flexibility in designation (gender, age or specialty) leading to higher utilisation
- Ability to nurse children with higher dependency needs at ward level.

Disadvantages cited include –

- Lost opportunities for socialising and play which is important for children
- Increased pressure on nursing resources as observation is more difficult
- Young children can feel isolated if alone in the room.

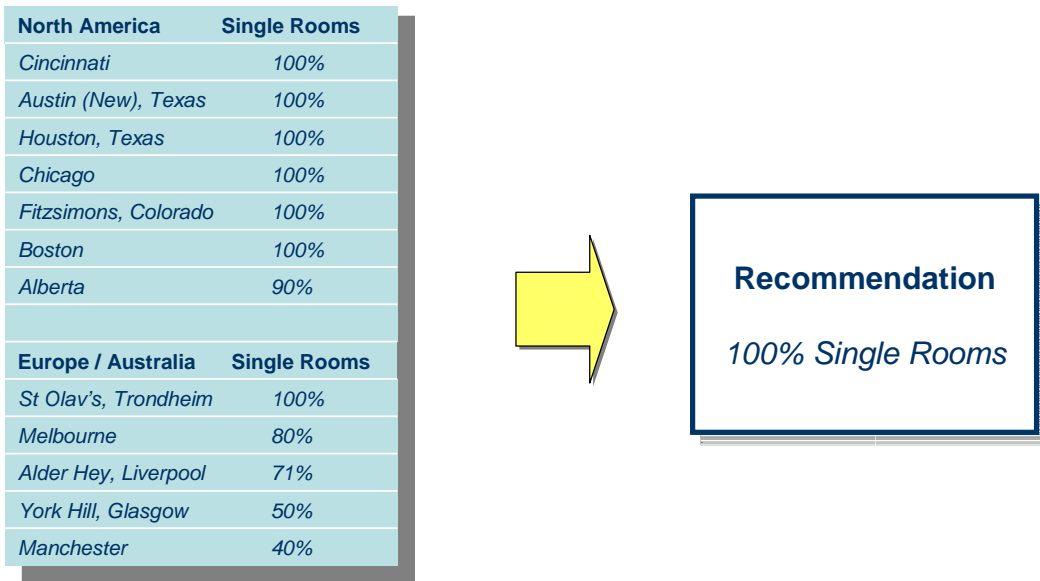
The evidence from our reference sites database indicated that –

- In the US all of the examples have 100% single rooms
- In Canada the figure is 80-90%
- In the UK provision varies from 12% at the Evelina Children’s Hospital to 71% planned for the new Alder Hey Children’s Hospital.

The recommendation in this Framework Brief is that 100% provision should be made – subject to further debate at the next stage. In particular, children and their parents should be asked their views.

Figure C3

International Reference Sites : Percentage Single Rooms



Children and their parents should be asked: “What would you prefer?”

Size of Single Rooms

There has been much local debate around the appropriate size of single rooms for a world-class hospital and figures up to 33m² per room have been cited. The CUH Brief for THE Mater sites in 2004 suggested 11m² and the OLCHC ODCP September 2004 suggested 16m². HBN 23 (Children and Young People) ^(Ref:61) published in 2004 in the UK to coincide with the introduction of the National Service Framework for Children suggests an area of 15m² ¹⁰.

The key principles in designing bedrooms for children are –

- Space for personal needs of the child – for sleep, recreation and education
- Space for nursing and other clinical staff to care for the child – including clinical hand wash facilities, data capturing and monitoring
- Space for parent(s)/guardian(s) to sleep overnight and store personal belongings without impeding on staff space
- En-suite facilities which may also be used by the parent
- As low-tech as possible, consistent with nursing requirements
- Access to daylight and views from the bed
- All bedrooms accessible to children and their parents with disabilities

Figure C4 sets out the size of single rooms for each of the reference sites. For UK, Australian and European examples the range is 14m² – 19m². The Trondheim example at 13.7m² is an outlier. The Evelina scheme was designed in 2000 and would now not meet current UK standards on critical dimensions and DDA compliance. Examples from the US – especially schemes currently at planning stage – are larger, which in part can be attributed to the commercial incentives to provide generous ‘hotel’ facilities. The size of single bedrooms across the US and Canadian examples in our reference sites ranges from 19m² – 31m².

Figures C5 – C8 illustrate exemplar layouts of five different configurations prepared by NBBJ –

¹⁰ The recommendations in HBN 23 relate to a very specific room layout with an overall width including ensuite of 5.7m. The layout is based on a pull-down arrangement for the parent’s bed within the 3.7m patient bed zone which conflicts with current standards for clear bed spacing in the UK.

- Example 1** 20m² + 4m² ensuite + 4m² lobby
- Example 2** 20m² + 4.3m² ensuite
- Example 3** 22m² + 4.3m² ensuite
- Example 4** 21.5m² + 4.3m² ensuite
- Example 5** 21.5m² + 4.3m² ensuite

The range is from 24.3 m² to 28m² with a mid point of 26.3 m². It is important to note that critical dimensions, the shape of the room, and location and type of ensuite facilities, are as important as the overall area in terms of functionality. Thus the lobby arrangement in Example 1 is in part necessitated by the ensuite location.

Future flexibility is also an important criterion. The evidence for the US reference sites suggests that the requirements for critical care beds will continue to increase as casemix becomes more complex. Therefore, it is important that acute beds can be easily converted to critical care standards in the future. For that reason, **we recommend that the combined area of the single bedroom and ensuite should not be less than 26.5m²**.^(Ref: 62) in line with the recommended size for a single critical care bedroom in UK design guidance, HBN 57 Facilities for Critical Care.

All of the examples demonstrate that key requirements can be met within an area of 26.5m² (room and ensuite combined excluding the lobby in Example 1). This would include an ensuite of 4.5 to 5.5m² and a bedroom of 21 to 22m². The min-max range for the bathroom would be 4.5-6.5m² depending on the level of assistance required and whether baths or showers were appropriate. It may be that the requirements for specific patient groups (eg neurodisabilities) will differ from the standard. The min-max range for the bedroom is 20 -22m² as demonstrated by the examples above.

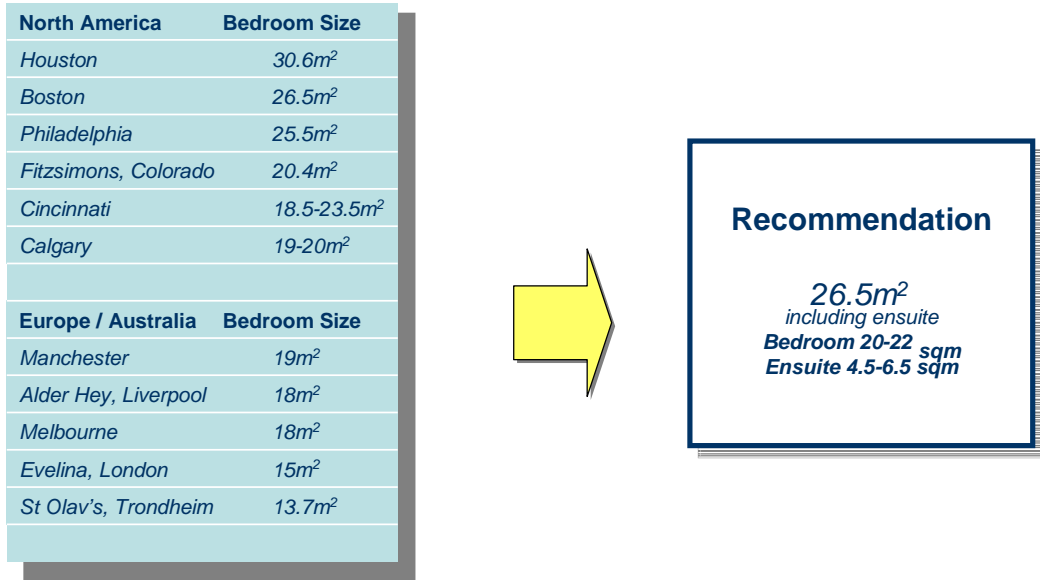
However, as can be seen from the examples in Figures C2 to C5 the location and shape of the en-suite bathroom will have an impact on the usable floor area and therefore we would suggest an upper limit of 30m² including the ensuite bathroom if ensuites are inboard¹¹. Based on an overall bed complement of 409 inpatient beds as outlined in section B2 the difference in area requirements between the recommended and higher space allowance is 1,550m² GDA¹².

¹¹ 30sqm calculated on the basis of 20sqm core bedroom area, lobby of 4 sqm and bathroom of 6 sqm.

¹² Calculated on the basis of 294 standard generic beds (excluding specialist beds). The impact on GIA is 2,180 sqm.

Figure C4

International Reference Sites : Size of single bed room



Bedroom plus ensuite capable of converting to critical care bed. Minimum based on UK design Guidance HBN 57.

Figure C5

Single Bedrooms

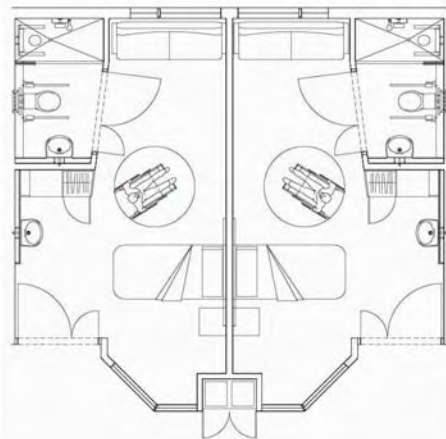


EXAMPLE 1
PLAN : INBOARD TOILET/SHOWER,
DAY-BED, SLIDING DOORS

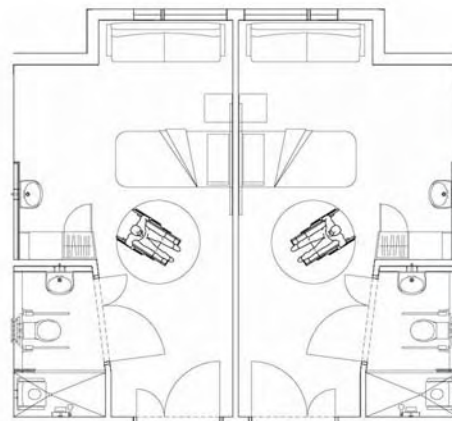
IMAGES : PATIENT ROOM WITH SLIDING
DOOR

Figure C6

Single Bedrooms



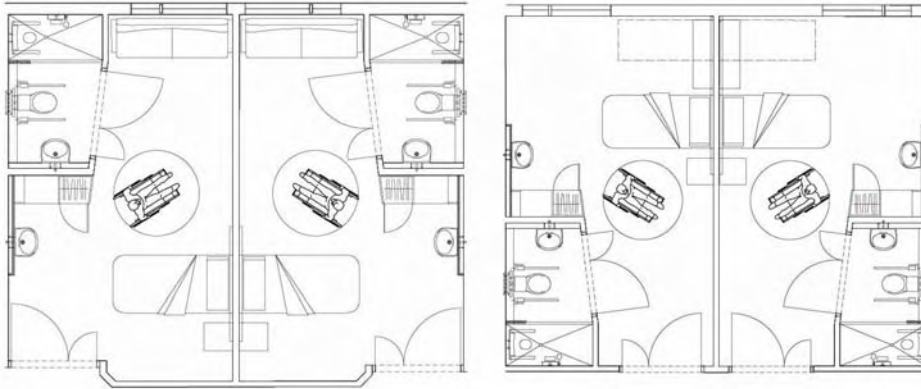
EXAMPLE 2
PLAN : OUTBOARD TOILET/SHOWER,
DAY-BED, OBSERVATION WINDOW



EXAMPLE 3
PLAN : INBOARD TOILET/SHOWER,
DAY-BED

Figure C7

Single Bedrooms

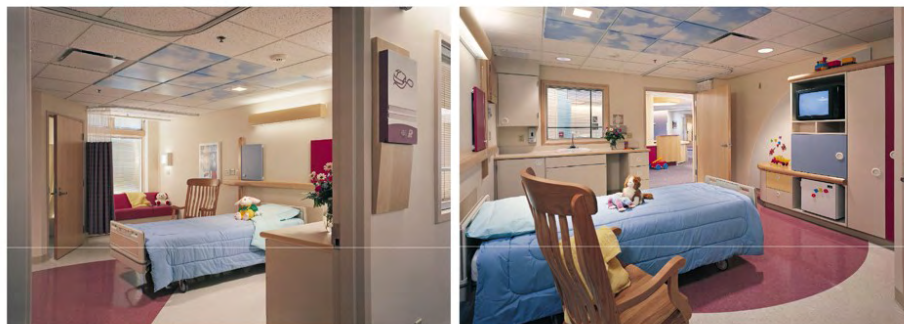


EXAMPLE 4
PLAN : OUTBOARD TOILET/SHOWER,
DAY-BED, OBSERVATION WINDOW

EXAMPLE 5
PLAN : INBOARD TOILET/SHOWER,
FOLD-DOWN BED

Figure C8

Single Pediatrics Bedrooms



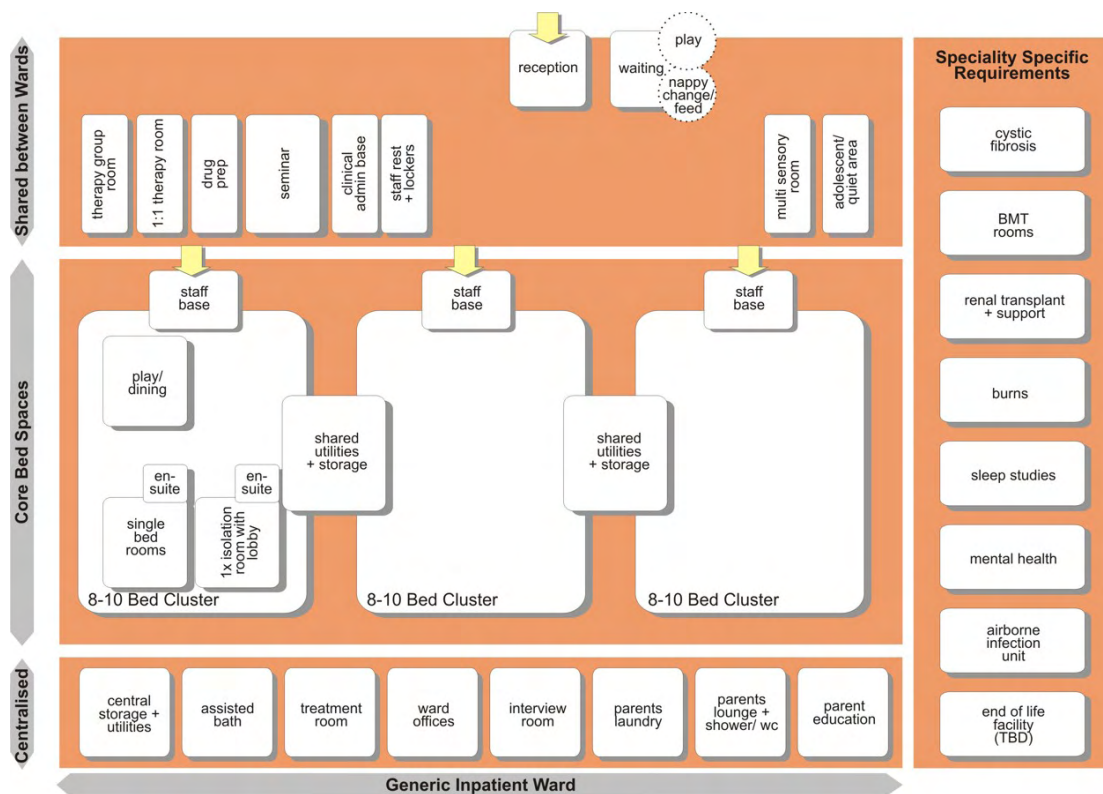
EXAMPLE 4
IMAGE : VIEW FROM ENTRANCE

EXAMPLE 4
IMAGE : VIEW FROM WINDOW

Range of activities at Ward Level

Figure C9 illustrates the range of activities and functions required at ward level for a 28-bed ward to best practice standards. This generic arrangement underpins the space standards adopted in the next section. In our space estimates we have made provision for drug specialty specific additional functions at ward level.

Figure C9



Adolescent Unit

A dedicated adolescent unit has been suggested. The reference sites vary in provision for adolescents. A few have dedicated inpatient units and some have dedicated centralised recreational facilities only. If wards are generic, how beds are allocated is immaterial from a design perspective. The advantages of such a unit are that it would signal that the special needs of this age group are recognised and that specialist adolescent services should be developed. A disadvantage is that cohorting this age group in one location will cut across specialty based nursing models and could potentially have an impact on staffing levels. Dedicated units can also have an impact on overall bed occupancy. On balance therefore we would not recommend inclusion of a dedicated cross-specialty ward for adolescents. However, within a specialty designated ward environment, for example haematology and oncology, there is no reason why a cluster of beds should not be allocated to young people.

Teenage Cancer Unit

CanTeen Ireland has suggested the development of a specialist teenage cancer unit to treat teenagers and young adults up to early 20's. This is in line with models developed in the UK where it has been recognised that young people in the 16 – 25 age group with cancer have poorer outcomes than children and adults. In the UK, these tend to be located on joint adult and children's sites. A dedicated adolescent unit is currently being commissioned at OLCHC and the future model needs to be developed at the next stage.

Immunocompromised Patients

Hepafiltered inpatient facilities will be required for some groups of high risk patients, including bone marrow, stem cell and renal transplantation, cystic fibrosis, oncology and intensive care. The exact number and location of these facilities should be determined at the next stage.

Transplant Services

Views have been expressed about the potential development of a 'transplant floor' within the new hospital. Our understanding is that the only transplant activity currently undertaken is renal transplant and children requiring liver transplant and heart and lung transplants travel overseas. In line with the outcome of the Bristol Enquiry, it is also the consensus view that there will not be sufficient critical mass in these services to justify development of these transplant services in Ireland.

Airborne Infectious Diseases Unit

Plans for a 6-bed Airborne Infectious Diseases (AII) Unit were proposed for the OLCHC site in 2006. Two of the rooms were to be designed to critical care standards and be capable of becoming a secure unit in the event of a case(s) of Small Pox, Acute Viral Haemorrhagic Fever or SARS. For this Framework Brief we recommend a 2-bed full isolation unit attached to a generic ward. Direct patient access will be required, by-passing the primary hospital circulation routes.

Transitional Care Unit

Although grouped with critical care the functional and environmental requirements of the Transitional Care Unit differ from the standard critical care environment. The design and layout of the unit must support the progressive care by parent's model. Direct access to an outdoor play area is a key requirement as it is an integral part of the care model whereby children will undertake normal activities during the day.

Mental Health Unit

The mental health unit will not follow the standard generic ward design. The age group will be older (12-18 years) and parents are unlikely to sleep on the unit. There are specific design requirements relating to risk and security. The unit will require access to dedicated and secure outdoor space.

End of Life Facility

A number of stakeholders have suggested a need for a facility for a dying child and their families, which would be larger than the standard bedroom and more domestic in scale. Such a facility is provided in the new RCH at Melbourne. The preferred model of care is that children should die at home where possible, and it is acknowledged that the facility would be used intermittently. This has been identified as a potential service enhancement for future consideration.

Some paediatric AHSCs (e.g. Boston Children's Hospital) have recently built a palliative care facility for end-of-life care, where the dying patient is cared for by the family in a "home-like setting" but within the pAHSC. SickKids does not have the capacity at present for such a unit, but if building a new hospital, this facility would be incorporated.

Hugh O Brodovich
SickKids Toronto

PAHSC = Paediatric Academic Health Science Centre

Critical Care

The critical care service will comprise paediatric intensive care, neonatal care and cardiac intensive care. These services should be grouped together in a common environment. Given the size of the unit, a cluster arrangement of 6 – 7 clusters will best meet functional requirements (as illustrated in Figure C10).

There are differing views on the proportion of single rooms that should be provided. It has been suggested that a 60:40 split between open plan and single rooms would be appropriate. The evidence from our reference site database (shown in Figure C11) indicates –

- In US models all have 100% single rooms with the exception of Children's Hospital of Philadelphia
- In Canada the percentage is much lower at 27 – 36%

- In the UK and Europe - with the exception of Alder Hey where 100% single beds are planned – the proportion of single rooms in critical care is much lower.

The recommendation in this High Level Framework Brief is that 100% single rooms should be provided, but this should be debated and the views of clinicians and parents sought at the next stage.

Figure C10

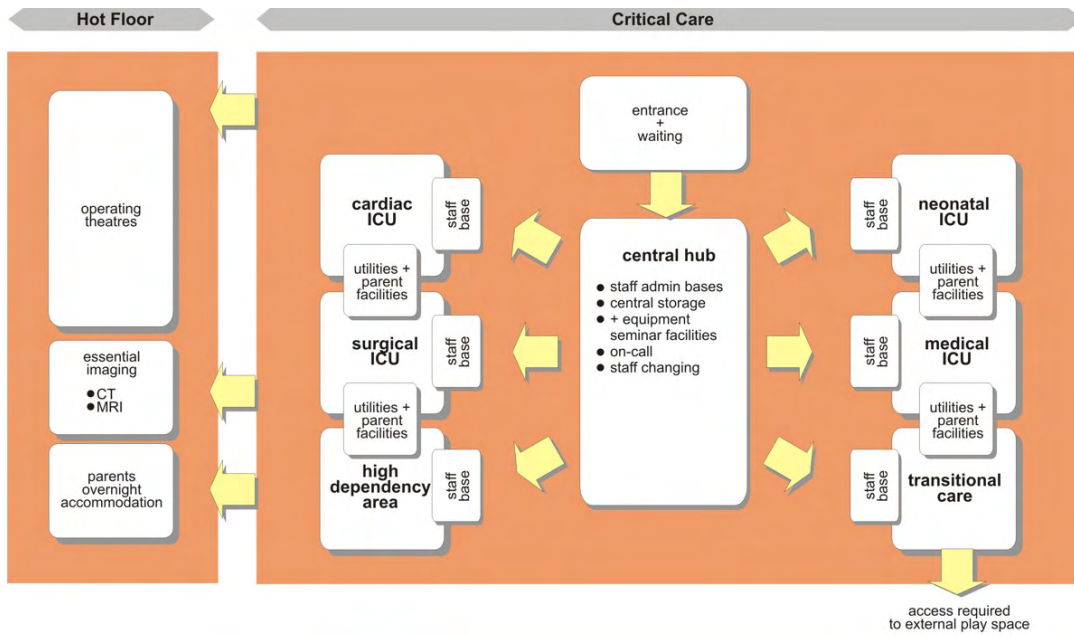
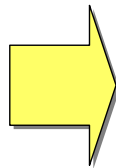


Figure C11

International Reference Sites: % Critical Care beds in Single Rooms

North America	% Critical Care Single Rooms
Houston	100%
Fitzsimons, Colorado	100%
Chicago	100%
Cincinnati	100%
Vancouver	36%
Toronto	27%
Boston	100%
Europe / Australia	
Melbourne	100%
Alder Hey, Liverpool	100%
Manchester	22%
Evelina, London	15%
St Olav's, Trondheim	9%



Recommendation
100%

Although PICU is a highly technological environment every effort must be made to reduce the impact made by the appearance of technology throughout the unit and thereby reduce the stress it evokes in patients and their families.

The flexibay patient care area is essentially a single room with large sliding/opening “break-away” doors on the front and large sliding glass doors between adjacent patient areas. This allows for circulation of staff between rooms when the sliding doors are open and also provides the option of creating an enclosed room if it is required.

Each patient care area should be designed to be as ‘homelike’ as possible and the interior design should be well thought out as it directly impacts staff, patients and visitors alike.

Importantly, a dedicated space within each flexibay should be designed for the exclusive use of family members and visitors to provide them with a space to settle into while visiting patients and loved ones. The space should be adjacent to the patient’s bed but in a location that will not interfere unduly with clinical activities.....

The design of each flexibay area will provide for the inclusion of a fold out bed for parents to use over night. The bed will fold up during the day into built in joinery and become a comfortable seating area.

**Royal Children’s Hospital Melbourne
Extract from Functional Brief 2006 ^(ref:63)**

In the continuing evolution of NICU design, there is a need to address infant and family privacy and flexibility to provide the entire spectrum of care without moving the baby. Individual private rooms provide the best setting for the NICU of the future, with substantial benefits according to many neonatologists, nurses, and support staff.

The intent of single-room NICU design is to maximize efficiency by enabling performance of all care and needed procedures in one room. A single room provides adequate space and flexibility for critical care as well as transitional care, which prepares parents for home care of neonates. The single-room approach reduces costs related to transporting the neonates and increases physician and staff efficiency.

Single-room NICUs provide the best setting for family-centered care by providing an area for each family adjacent to the neonate. The increased area for the single room is offset by the elimination of parent sleep rooms within or adjacent to the unit.

**A Single Room NICU-
The Next Generation: Evolution in Design of Neonatal Units
American Institute of Architects 2005 ^(ref:64)**

Examples by NBBJ of departmental plans with 100% single rooms and images of single bedrooms from some US sites are illustrated in Figures C12 - C13. There are examples of flexible partition systems whereby walls can be dismantled to combine single rooms to provide multi bed bays if required. This is the system proposed at Melbourne.

A second question relating to the design of the critical care facilities is whether ensuite facilities should be provided. The majority of patients in critical care will be very young children and babies who will be unable to use bathroom facilities. There is an argument that facilities should be available for parents and secondly, that some children in HDU would be able to use bathroom facilities. Our recommendation is that a proportion of critical care beds should have ensuite facilities and that shared facilities should be available for parents within or close to the unit.

Key functional relationships –

- Access to wards for patient transfer should be via dedicated inpatient lifts. Patients in beds should not be transported via public areas
- All inpatient wards need convenient access to outdoor play space which can be shared but should not be distant from ward areas
- Generic wards should be co-located to maximise use of shared resources
- Inpatients will require easy access to the play department and hospital school
- Critical care must connect directly to the helipad and Emergency Department
- Critical Care has an essential adjacency to theatres and (some) imaging
- The mental health unit and transitional care units, neurology and burns need immediate access to outdoor play space
- Haematology and oncology services will form an integrated unit with day patients and outpatients services. Close proximity is required to operating theatres and neurosurgery and neurology
- Urology and nephrology inpatients should be grouped together
- Respiratory and cystic fibrosis beds should be co-located in reasonable proximity to radiology and critical care (for post lung transplant patients).

Relationship to Adult Services –

- Access for staff working across both the Adult and Paediatric services.

Relationship to Maternity services –

- There is an advantage in PICU being adjacent to NICU but see Section C3

Figure C12

Critical Care Unit

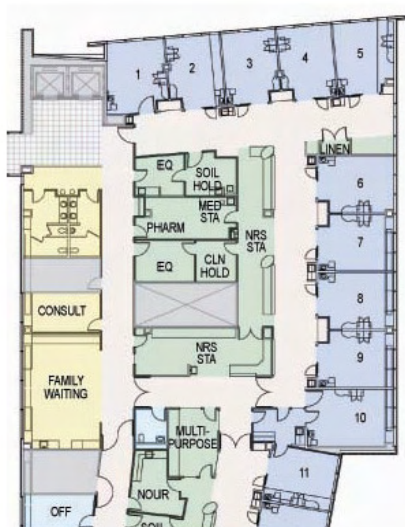


IMAGES : VIEW FROM NURSE STATION

IMAGES : VIEW OF PATIENT ROOM

Figure C13

Critical Care Unit



DEPARTMENTAL PLANS WITH SINGLE ROOMS

0 3m 6m 12m 24m

C1.4.3

Ambulatory Services

Outpatient Services

As outlined in Section B, the projected level of outpatient activity for the NPH Tertiary Centre including /UCCs in 2021 is 197,000 attendances, spread across more than 40 specialties and sub-specialties and AHPs. Key principles which should underpin the organisation and design of outpatient services are –

- Located for patient and family convenience and ease of way-finding
- Flexible to accommodate fluctuations in activity by specialties over time
- Efficient in use of staff (for example avoiding multiple reception points)
- Minimising the number of steps in the patient pathway (for example eliminating sub-waiting except where essential)
- Segregated inpatient routes where there is a need to access investigations in the outpatient setting
- Generic rooms that facilitate a wide range of activities including nurse led and therapy services
- Promote multi-disciplinary approach to care
- Minimise designation except where necessary

Based on the assumptions outlined in Section B the requirement at NPH Tertiary Centre is for 53 CE rooms. This is the figure that underpins the hospital sizing in Section C2.

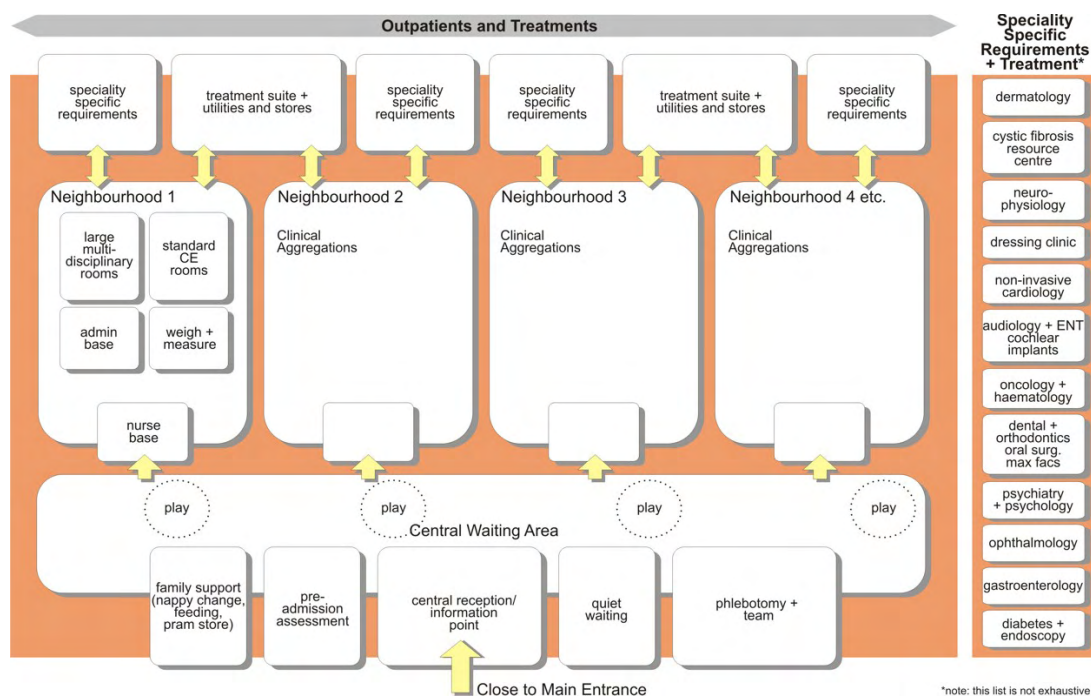
As outlined in Section A3 the recommendation is that a neighbourhood model be explored and developed at the next stages for clinical aggregations which would include consultant and nurse led clinics, therapy and other AHP services, some medical day cases and, for services which are predominantly ambulatory in focus, clinical offices and administrative support. This is in line with the approach currently being implemented for satellite units in CHOP. A proposed outline configuration is illustrated in Figure C14. Key characteristics are –

- Central arrival point, reception and waiting for ease of orientation and to contain high volume ambulatory activity in one zone of the hospital

- CE rooms arranged in clusters of 10-12 rooms which can be allocated to clinical aggregates (for example head and neck, to facilitate joint clinics)
- Specialty specific requirements (for example metabolic feed kitchen) plug into the generic accommodation
- Central treatment suites to promote maximum utilisation

The model proposes a central reception, information point and waiting area, family support facilities, pre-admission assessment and screening and phlebotomy and IV team services would be part of this central zone. Each clinical aggregation would have a range of consult-examination rooms, used flexibly across specialties, specialty specific investigation and treatment facilities and utilities. For maximum flexibility, the layout across neighbourhoods should be as generic as possible.

Figure C14



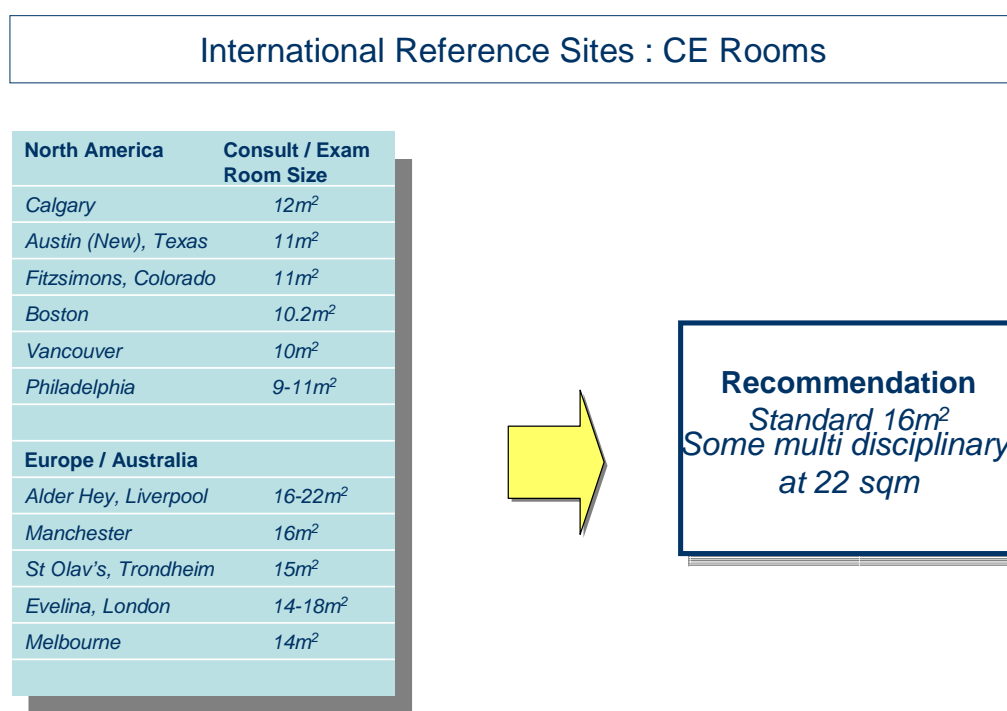
The model should be developed at the next stages but possible groupings include—

- General paediatrics and medical specialties
- ENT, audiology, cochlear implant programme and ophthalmology
- Dental, oral surgery, maxillofacial, orthodontic, plastic surgery
- Infectious diseases, immunology, allergy, dermatology
- Muscular skeletal services
- Neurosciences with developmental paediatrics, psychiatry and psychology

Size of Consulting and Examination Rooms

Design guidance in the UK in HBN 23 Children and Young People ^(Ref:61) recommends 16m² for a combined consultation and examination room (CE room) A room of 16m² is flexible in that it can be used for a variety of activities including treatments. In the US, the tendency is to differentiate between consultation and examination and across our reference sites the typical size of these rooms is 9m² – 12m² in all US and Canadian examples as shown in Figure C15.

Figure C15



In North America the preference is to split consulting and examination in separate rooms

At Alder Hey in Liverpool, 30% of the CE rooms are planned at 22m² to accommodate large multi-disciplinary clinics. Within the Tower Block at OLCCH we understand that the CE rooms have been planned at 18m². This size may be over generous for clinics where patients are not routinely examined on a couch, for example if used by dieticians or speech and language therapists. **We would therefore recommend that, in a multi-disciplinary model combined consultation and examination rooms ranging from 16m² – 22m² are appropriate** (giving an average area of 18m²).

Key functional relationships –

- Directly accessible from main entrance
- Close proximity to imaging (for some specialties). Depending on the location of the main imaging department a satellite plain x-ray room may be justified for orthopaedics, provided that the model for imaging is not too fragmented
- Close to outpatient therapy services for multidisciplinary inputs
- Direct vertical access to inpatients for gastroenterology, cardiology and cardiothoracic surgery
- Plastics dressings' clinic located with the burns and plastics inpatient service.

Relationship to adult services -

- Access for staff working across both the adult and paediatric service

Relationship to Maternity Services –

- Potential links with neonatal outpatient services and fetal medicine. In some US models these services co-locate within children's hospitals (for example Children's Hospital, Boston)

Therapy Services

The range of therapy services to be included in the NPH Tertiary Centre includes –

- Physiotherapy
- Hydrotherapy
- Occupational therapy
- Orthotics
- Dietetics and nutrition
- Music therapy
- Speech and language therapy
- Play therapy

Our understanding is that Gait Laboratory services will continue to be provided at the Central Remedial Clinic (although the rheumatology service has suggested a facility within the NPH Tertiary Centre) and that the Prosthetics service will continue from Cappagh Hospital. It is also envisaged that equipment services will continue to be provided off-site. Hydrotherapy is a new service development and it is not currently provided on any of the children's hospitals sites.

Key principles which should underpin the organisation of therapy services in the new hospital are -

- Inpatients should be treated as far as possible at ward level, either in their room or in therapy space at ward level
- Inpatients who are undressed and need to access the central department should not cross through public areas
- Outpatient services which are provided as part of a multidisciplinary clinic (especially dietetics, speech and language therapy and orthotics) should sit in an outpatient setting and facilities should not be duplicated
- Facilities including treatment rooms should be generic and shared across disciplines for maximum efficiency and flexibility.

In discussions with stakeholders the possibility of an acute rehabilitation inpatient unit was highlighted and the potential should be explored further at the next stage.

Play Centre

In addition to the play facilities on wards and departments, a central play centre will be provided for patients and their siblings in the NPH Tertiary Centre. Hospital play is an important part of the child's care and recovery as well as being something that is normal and familiar which helps children adjust to a potentially stressful experience. The play team provide input into normal play, diagnostic play, preparation, distraction and post procedure play, and bereavement play. While we have received comments that as the acuity of children in hospital increases and length of stay reduces central play space may be less relevant, the evidence from the majority of the reference sites is that central provision is still considered important.

Functional Relationships -

- Close to outpatient services with some integration
- Easy access for inpatients
- Therapy disciplines embedded in multi-disciplinary neighbourhood model
- Play department located convenient to inpatients with access to outdoor play

Relationship to Adult Hospital –

- No strong links as therapists will be dedicated to children's services

Relationship to Maternity Hospital -

- For discussion in relation to neonatology services

Day Case

The model of care envisages that day care – both surgical and medical – should be provided as close to home as possible, either in the A/UCCs or at home (for example oral chemotherapy). Therefore the volume of day activity at the NPH Tertiary Centre is significantly reduced, providing tertiary day care for all referred patients nationally and secondary care for the local population in that part of Greater Dublin. Renal haemodialysis will continue to be provided centrally.

Medical day cases should be located with ambulatory services. Consideration should be given to a central medical day unit which would cater for all medical day patients with the exception of oncology and haematology services and dialysis. There are some advantages in co-location with day surgery recovery as there are some similarities in processes and care pathways for some medical and surgical day cases.

Key principles which should underpin the organisation and design of the service at the NPH Tertiary Centre are –

- Operational policies should facilitate high throughput for maximum efficiency
- Children requiring anaesthesia and recovery for procedures (surgery, endoscopy and imaging) should be cohorted as far as possible to maximise efficiencies in anaesthetic and nursing staff and safe clinical practice.

It is now common in new models being developed elsewhere (for example in Melbourne) to include a day of surgery admission (DOSA) area adjacent to theatres where elective patients are admitted (most inpatients and all day cases) prior to surgery / procedures. Patients are not assigned to a bed until after their procedure. The advantages of this model are that the admissions/clerking process is centralised and bed throughput is increased.

Current clinical practice at all three children's hospitals is to mix inpatient and day cases on operating theatre lists, It is envisaged that the high volume throughput day case work would be undertaken in the A/UCCs and that the small volume sub-specialty work would remain at the NPH Tertiary Centre. For that reason, mixed lists makes sense. This establishes a requirement for all theatres to be co-located with day case reception and recovery area adjacent to theatres.

Key Functional Relationships -

- Adjacent to Operating Theatres
- Easy access to imaging
- Easy access from Main Entrance
- Co-located day theatres and inpatient theatres
- Potential co-location of medical day and surgical day patients

Relationship to Adult Hospital -

- Access for staff working across both the Adult and Paediatric service

Relationship to Maternity Hospital -

- No strong links identified

Ambulatory Care: Emergency Department

The model of care envisages that the majority of children who require urgent care will receive that care at the A/UCCs. The workload remaining at the NPH Tertiary Centre will be approximately 45,000 attendances, but with a higher complexity compared to the current mix at the three children's hospitals.

It is now common to plan for an emergency admissions unit / acute admissions unit, adjacent to the Emergency Department (for example Alder Hey, Melbourne) which may include observation and clinical decision unit type services. The assumption for this Framework Brief is an 8-bedded observation unit co-located with the Emergency Department – but this is an area for further exploration at the next stage.

Key Functional Relationships –

- A&E imaging integrated within the department
- Direct helicopter dedicated access to resuscitation area
- Dedicated access to critical care (PICU and NICU) and emergency theatres
- Close proximity to bereavement suite and services

Relationship to Adult Hospital -

- Beneficial back to back arrangement with Adult A&E to co-locate blue light access

Relationship to Maternity Hospital - none

C1.4.4

Diagnostics and Treatment

The range of **diagnostic services** at the NPH Tertiary Centre will include –

- Diagnostic Imaging
- Non-invasive Cardiology
- Neurophysiology
- Sleep Studies
- Lung Function Laboratories
- Audiology
- Orthoptics
- Urodynamics
- GI Investigations
- Endoscopy

Services will be provided to inpatients and outpatients and therefore these services should be located with easy access from both outpatients and the wards. With the exception of imaging most of the other investigations should be located within the ambulatory setting.

Treatment or procedures include –

- Operating Theatres
- Endoscopies
- Laser Treatment (Dermatology)
- Lithotripsy (mobile service)

Children will be sedated for some imaging procedures including (some) CT and MRI. There is an advantage therefore in some imaging services being located next to theatres and/or day case facilities with access to anaesthetics and recovery.

Imaging

In order to balance the requirements for adjacencies to the imaging department it may be appropriate to consider a vertical stacking model in which high throughput modalities are associated with outpatients and the Emergency Department with complex imaging on the Hot Floor. The physical model should not result in over fragmentation of the service and should meet requirements for safe clinical practice in recovery from anaesthesia.

It is envisaged that the NPH Tertiary Centre will include the full range of imaging modalities, although –

History suggests that new technologies are introduced first to adult services before children, so access from the NPH Tertiary Centre to adult imaging could offer some advantages

Richard Newton
Manchester

However, the benefits are not sufficiently strong to dictate a requirement for a back-to-back arrangement.

Key Functional Relationships –

- Immediate proximity of imaging modalities to outpatients, Emergency Department and operating theatres
- Non-invasive cardiology co-located with cardiology outpatient services
- Neurophysiology, including sleep studies co-located with neurology outpatients.
- Lung function laboratory service located close to the Cystic Fibrosis Centre
- Respiratory sleep studies co-located with respiratory inpatients
- Audiology co-located with the cochlear implant programme and ENT outpatients
- Orthoptics co-located with ophthalmology outpatients
- Urodynamics close to both the outpatient and inpatient urology services
- Endoscopy located in the operating department

Relationship to Adult Services –

- Future access to adult imaging may be advantageous

Relationship to Maternity Services –

Depending on the future organisational model for Neonatal Intensive Care, neonates will require immediate access to a range of imaging modalities including CT and MRI.

Operating Theatres

The central operating theatres in the NPH Tertiary Centre will include –

- Generic Operating Theatres
- Laminar Flow
- Major Procedure Suites for endoscopic procedures
- Cardiac Catheterisation
- Other Interventional Imaging
- ECHO Services
- Stage 1 Recovery
- Anaesthetic administrative bases
- Seminar and Education Facilities
- Decontamination

Dedicated cardiac MRI and an interoperative imaging suite have been suggested as service developments. The case for inclusion will need to be evaluated at the next stage.

Operating Theatre Size

We understand that the size of theatres in the recently opened theatre block at OLCHC varies from approximately 40m² to 55m². The CUH Design Brief 2004 assumed an operating theatre size of 40m². Design guidance in the UK in HBN 26 Operating Department suggests a minimum size of 55m² and that is the minimum requirement of the UK Health Commission. Across our reference sites as illustrated in Figure C16 sizes vary from 37m² to 74m² (Cincinnati) with image guided therapy rooms at up to 93m² as noted below. As with inpatient rooms critical dimensions, shape and arrangement are as important as size.

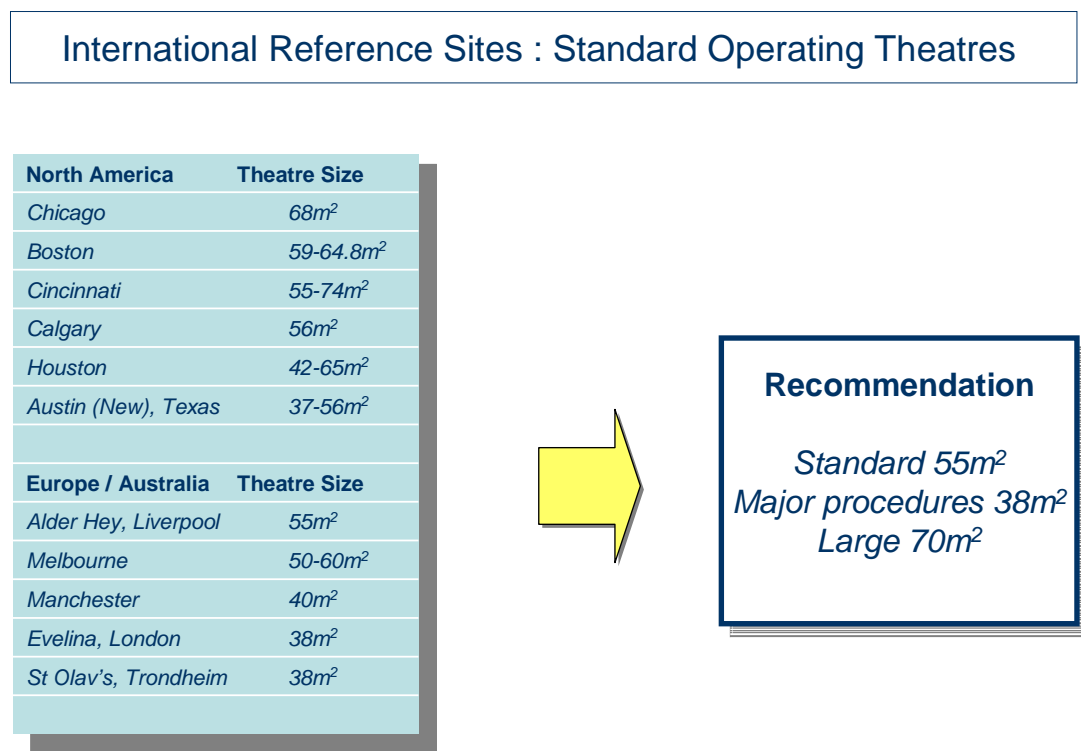
The operating room theatre should be a minimum of 800 sq feet (74 sqm). The IGT suites here are 1000 sq feet (93 sqm) each. With the increasing use of technology, the size of the operating room is critically important for a tertiary/quaternary centre. With transplant and CVS programs, there are multiple team members who need to have adequate space, and therefore ensure that space at the operating room table is not compromised. The use of videoconferencing and telemedicine to have interactive links to other centres exists now, and the capability for the surgeons to access this technology is critical.

Hugh O Brodovich
SickKids Toronto

Our recommendation is that the standard theatre size should be 55m². Two rooms could be allocated as major procedure rooms (including endoscopies) and sized at 38m². Three to four rooms should be designed as larger rooms for complex surgery, robotics and image guided therapy and should be at least 70m².

An example provided by NBBJ of a theatre department layout with universal procedure rooms of 2 sizes is illustrated in Figures C17 and C18. This illustrates how a mix of operating theatres, interventional suites and interoperative imaging can be provided within the 2 room size concept.

Figure C16



'The operating room theatre should be 800 sq feet (74 sqm). The IGT suites here are 1000 sq feet (93 sqm)' SickKids Toronto

Not all of the theatre capacity will be required when the hospital is commissioned. Therefore some capacity should be provided as shell space for future service developments. As noted in Section B4.4.1 we have include scope for future expansion of 2 image guided therapy suites in the schedule of accommodation. The space allowance assumes suites in line with the standards at SickKids quoted above.

Theatre Suite Arrangement

The previous plans for the CUH and the new theatre Block at OLCCH have been designed around the traditional European model with anaesthetic rooms, separate scrub rooms and prep rooms. In the US, anaesthetic rooms are routinely omitted, sterile preparation areas are located centrally, and scrubs are either integral to theatres or located off the corridor as illustrated in the layout in Figure C16.

There are operational advantages and disadvantages with both models. The US model is more space efficient and works best in a deeper plan arrangement. There are different views amongst stakeholders on whether anaesthetic rooms are desirable or not. These issues can be debated at the next stage.

Operating Theatres and Imaging

While there is broad consensus across the Reference Sites and local stakeholders that some imaging should be co-located with theatres for interoperative and interventional work, there are differing views on the quantity of imaging and range of modalities that should be located within or next to theatres and critical care. This is an issue to be resolved at the next stage.

Key Functional Relationships –

- Co-location of inpatient and day patients theatres
- Essential adjacency with PICU
- Important adjacency with NICU
- Essential co-location with some imaging modalities
- Direct vertical access from Emergency Department

Relationship with Adult Services –

- Access for staff working across adult and paediatric services

Relationship with Maternity Services –

- None

Figure C17

Surgical Theatres

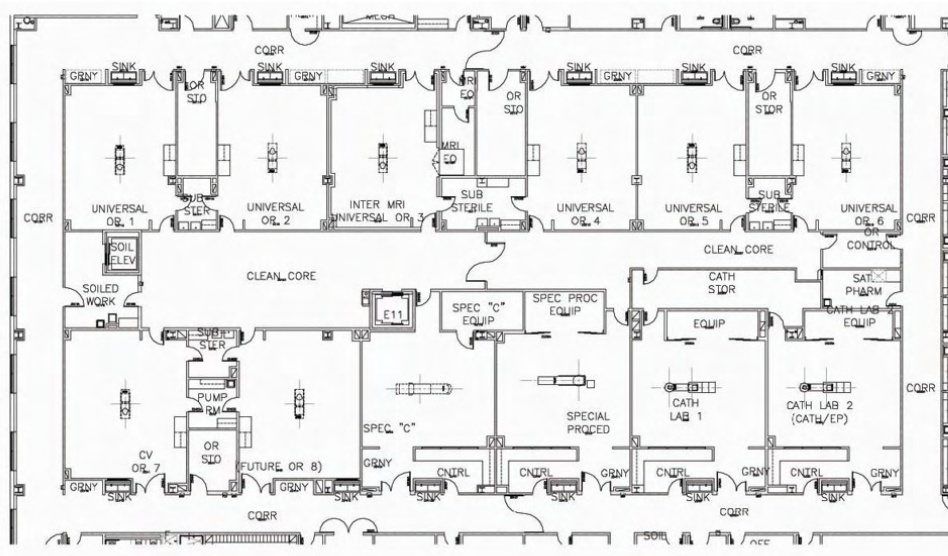


IMAGES : THEATRES AND EQUIPMENT

SOUTHWEST WASHINGTON : SURGERY NBBJ 03 EXAMPLE PROJECTS

Figure C18

Surgical Theatres



DETAIL PLAN : THEATRES SUITE WITH UNIVERSAL PROCEDURE ROOMS

SOUTHWEST WASHINGTON : SURGERY NBBJ 02 EXAMPLE PROJECTS

C1.4.5

Clinical Support Services

Clinical support services include –

- Pathology Laboratories
- Mortuary and PM services
- Palliative Care and Pain Management services
- Medical Illustration
- Clinical Engineering including equipment library and decontamination
- Sterile services
- Hospital School

Pathology Laboratory Services

Across OLCHC and CUH 175 people approximately are employed in the Pathology Laboratories. Each site provides a full range of disciplines including clinical biochemistry, haematology, blood transfusion, microbiology and histopathology. In addition, there are a number of specialist laboratory services including –

- Newborn Screening Service (CUH)
- Metabolic Laboratory (CUH)
- Meningococcal Reference Laboratory
- A laboratory service for blood and blood products

These services should be centralised in one location with a mechanical distribution system to all departments. Scope for sharing with adult and/or maternity services is discussed in Section C1.2 and location in relation to on and off site services is discussed in Section C1.3.

Plans for a new Haematopoietic Stem Cell Transplant laboratory complying with the EU Tissue Directives 2004 have been prepared at OLCHC. An alternative option under discussion is a combined and centralised facility with the adult service elsewhere. For this Framework Brief the working assumption is that it will be provided at the NPH Tertiary Centre co-located with other Laboratory services. The facility has a close functional relationship with cancer services and non-malignant haematology.

Sweat Testing for cystic fibrosis patients is currently undertaken by laboratory services. This service is best located within an outpatient setting.

A central **Phlebotomy service** will be provided. The current practice is for GP's to refer all children requiring blood tests to one of the Children's Hospital. Phlebotomy services should be included in the A/UCCs which would reduce the volume at the NPH Tertiary Centre site.

The **Mortuary and Viewing facility** should be located on the hospital site. Co-location with pathology laboratories is not essential but easy access is an advantage. Discreet access for hearses is essential and the facility should not be overlooked by children's wards. Careful consideration of access routes for parents is important, both from outside and from within the hospital.

Pharmacy Services

Pharmacy services will comprise –

- Purchasing, Storage and Distribution
- Dispensing
- Aseptic Preparation
- Radio-pharmacy (linked to nuclear medicine)
- Drugs Information

Total parenteral nutrition (TPN) services will continue to be provided externally. Scope for sharing with adult services and location are discussed in Section C1. A back-to-back arrangement with the adult service would facilitate shared entrances for deliveries. Consideration should be given to co-location of aseptic preparation with adult services.

The introduction of robotics to children's services falls behind adult services where robotic dispensing is commonplace in the US, Europe and the UK. Scope for robotics and automated dispensing units at ward level should be explored at the next stage.

Clinical Engineering

The future model for clinical engineering needs to be explored further, specifically around potential to share with the adult services. At OLCHC clinical engineering comes under the remit of anaesthetics. There are close linkages with medical physics services. The service at OLCHC has a close relationship with the clinical service and much of the training of nursing staff in use of equipment, maintenance and calibration takes place within clinical departments.

The new NPH Tertiary Centre should include a central equipment and bed library, with full electronic tagging of equipment and a central equipment decontamination facility. There are close operational links with sterile services and there are advantages in these facilities being in close proximity.

Medical Illustration

Medical illustration has two components – Clinical photography including medico-legal support and graphic design and audio visual presentation. Currently, medical illustration is provided by an external organisation at OLCHC. An in-house service with 1 member of staff is provided at CUH. This Framework Brief makes provision for an in-house service at the NPH Tertiary Centre.

Hospital School

The Department of Education provides a school service currently at OLCHC, CUH AMNCH and Beaumont Hospital, with a complement of 9 teachers, special needs teachers and classroom assistant.

The focus is currently on primary age children however, there is a need to develop services for pre-school children, many of whom attend pre-school services at home and for secondary school children – specific provision is required for children taking exams. There is also a need to develop services for children with special needs who attend special needs schools at home, many of whom require 1:1 teaching.

At any one time the number of children enrolled at the hospital school across all 3 hospitals is approximately 75 – 80 children. Of this, approximately 50% would attend the classroom on any day. A variety of teaching methods are employed. Video links are likely to be established in the near future.

Currently the MMUH site accommodates a special school for children with developmental needs who come from the community and are not inpatients in the hospital. This service does not need to be on the hospital site, but could be provided in the vicinity. It is not included in the area calculations for the NPH Tertiary Centre.

The needs of children admitted to the mental health inpatient unit also require consideration. Whilst some of these children will be unable to leave the unit, some will be well enough to attend the hospital school.

Teaching for haematology and oncology patients will take place within the haematology and oncology unit.

Key functional relationships –

- Pathology and Pharmacy services require pneumatic tube link or other mechanical distribution system to all departments. Access for couriers and deliveries needs to be considered
- Discreet access is required for hearses to the mortuary
- The location of histopathology in relation to operating theatres is important
- Phlebotomy services located centrally within outpatients
- Clinical engineering require facilities within theatres and critical care. The central equipment and bed library should be located for ease of delivery from service access points with direct FM vertical access to wards and the hot floor
- The hospital school should be located within easy reach of all inpatient wards. Access to outdoor play space is required. There are advantages in co-location with the central play therapy centre
- The medical illustration department is not location sensitive.

Relationship to Adult Services –

- Advantages in back-to-back arrangements with adult services for pathology, pharmacy and clinical engineering
- Mortuary services for children should be separate from adults
- Medical illustration services could be centralised for all three hospitals

Relationship to Maternity Services –

- As above. Pathology services for the neonatal component of the Maternity Hospital including mortuary, should be integrated

C1.4.6

Administrative and Staff Facilities

Corporate Services

Facilities will be required at the NPH Tertiary Centre site for a range of corporate services including –

- Management Board and Executive Team
- PR and Communications
- Nurse Management
- Finance
- HR
- Risk Management and Quality Improvement
- Information Technology (IT)
- Fundraising
- Patient Services
- Medical Records
- Procurement (part of Materials Management)

Related to patient services are Medical Records and Admissions and Discharge Lounge.

Fundraising and **Patient Services** should have a presence close to the main entrance. There are advantages in centralising the remaining administrative functions in a flexible modern office type environment.

The model for **Procurement** across the three organisations and across services needs to be explored at the next stage, especially in relation to any national initiatives for bulk purchasing.

Medical Records

It is anticipated that electronic patient records will have been introduced by 2021. In the interim there will be a requirement for some storage for current records. Archived records can remain off site. The impact of IT on future requirements for central reception and admissions and medical records requires consideration in moving forward. In line with developments in the UK, it is likely that appointments will be

booked remotely and that follow up appointments and admissions will be booked at the time of consultation.

Facilities for Staff

The provision of staff facilities is a key area where opportunity for sharing across the adults, children's and maternity hospitals should be exploited. Facilities and amenities for staff will be a major factor in recruitment and retention when the hospitals relocate. In a tri-located model, the Mater Hospital site and campus is likely to include more than 6000 staff and students. Joint HSE / commercial opportunities should be explored to provide a range of staff facilities including, for example, gym and swimming pool facilities, social club and Crèche close to the Mater Hospital site. (Note that provision is not included in the Schedule of Accommodation for recreational facilities).

Bicycle Storage

Adequate changing facilities including lockers and shower facilities and bicycle storage on site are essential to support green transport policies and mobility plans.

Staff Changing

From discussions with nursing staff at the three children's hospitals, the clear preference is for local staff changing at ward level, from a point of view of staff convenience. In the UK, the evidence from recent large PFI hospitals is a return to central staff changing models, principally because of benefits for control of infection in management of policies and quality assurance, especially with automated systems. Local changing will be required for staff working in environments including theatres, critical care, catering, sterile services, mortuary and aseptic units. The Schedule of Accommodation assumes central changing for other departments – this could be located in a number of central locations in the hospital, depending on whether the preference is for an automated or manual system.

Staff Crèche

The exact number of spaces required and the model of operation needs to be considered. The number of places will be influenced by other services available in the locality and the age profile of staff on the site. The working assumption in this Framework Brief is a unit of 60-70 places in relation to children's services. The crèche will need access to some external play space.

Staff Residential Accommodation

Staff residential accommodation will need to be considered from a staff retention and recruitment perspective. Cost in a central city location is an issue and we understand that there is no policy in place for low cost key worker accommodation. Commercial opportunities should be explored with adult and maternity services in the context of the regeneration plan for the Phibsboro area.

Key Functional Relationships –

- Administrative and staff facilities are not location sensitive

Relationship to Adult Services –

- Some corporate services may be considered in a shared services model as outline in Section C1, therefore, flexible planning for office accommodation is important
- Joint HSE / Commercial opportunities for providing a range of staff facilities close to the Mater site should be explored. An off site location could be appropriate

Relationship to Maternity Services –

- As above

C1.4.7

Education and Research

The model for the NPH Tertiary Centre envisages a central multi-professional education, training and research facility supported by seminar and resource rooms within clinical areas. The detailed configuration of the Centre will be for development at the next stage of the project but it should include teaching and learning spaces of different sizes allowing reconfiguration to accommodate different group size and teaching models. As well as providing undergraduate and postgraduate education for medical, nursing and AHP students and staff, the Centre will be the focus of education, training and research activity for the whole hospital and the national network and should allow ease of access for staff working in and visiting the hospital.

Key functional relationships –

- Ease of access for all staff from all areas of the hospital
- Location and zoning to allow for out of hours access to IT suites, library and resource rooms
- External access for conferences and events

Relationship to adult services –

- Potential for shared facilities and events

Relationship to Maternity Services –

- Consider development of joint facility

C1.4.8

Back of House

Back of House services include –

- Materials Management
- Waste Management
- Household Services
- Portering
- Technical Services (including estates and facilities)
- Switchboard
- Linen and Uniform Services
- Patient Transport
- Security
- Catering.

The scope for shared services is discussed in Section C1.2. From a site configuration perspective a shared approach makes sense in –

- Reducing the number of service access points to the site which has benefits for the environment including noise control and security
- Avoiding duplication of external waste management facilities

A site-wide horizontal and vertical distribution strategy is critical to effective operation and it is essential that any advanced design for the adult services takes site-wide distribution into account.

Key functional relationships –

- Access points for service vehicles away from visitor and ambulance access points
- Dedicated horizontal distribution system at lowest level, linking into dedicated FM (facilities management) lifts.

Relationship to adult services –

- Significant scope exists for these services to be shared with both the adult and maternity services.

Relationship to Maternity Services –

- As above

C1.5 Impact of ICT on Operations and Design

Information and Communications Technology will underpin operational processes and clinical practice in the future. The role of telemedicine and the requirement to build a national paediatric infrastructure have already been discussed in Section A.

Advanced implementation of the Electronic Patient Record and PACS is critical to the successful roll out of the National Network and the A/UCCs for the Greater Dublin area.

Early integration of systems across the 3 existing children's hospitals in advance of the NPH Tertiary Centre is essential.

The design must be driven by new technologies including –

- Integrated IT systems across services
- Wireless environment
- Electronic Patient Records (EPR)
- PACS Imaging
- Robotics and automated delivery systems for materials and supplies, pathology and pharmacy
- Therapeutic Robotics
- A range of methods for data capture including mobile devices
- Electronic tagging of supplies and equipment and patients
- Links to University systems for education and research
- Hospital intranet system to distract and entertain children in isolation
- Telemedicine links to other centres, A/UCCs, local schools etc
- Integrated communications.

DFI considers that it is vital that the new National Children's Hospital is equipped with state of the art communications technology aids and that the hospital should be future proofed for advances in this area.

Disability Federation of Ireland

C2 Hospital Sizing

This section sets out the methodology adopted in determining the appropriate size for the NPH Tertiary Centre at the Mater Hospital site and the projected high level space requirements for capacity projections to 2021. Table C4 summarises the key functional content output from the capacity modelling described in Section B, which underpins the hospital sizing described below and illustrated in Figure C19.

Table C4

	Total Requirement	Mater Hospital Site			A/UCC 1	A/UCC 2	A/UCC 3
		Non- A/UCC	A/UCC	NPH Total	Tallaght	Blanchardstown	Loughlinstown
Inpatient beds	409	409		409			
Day beds / places	65	22	15	37	19	9	
Consulting rooms	76	43	10	53	12	7	4
Theatres + Procedures : IP*	11	11		11			
Theatres + Procedures : DP	9	2	2	4	3	2	
A+E /Urgent Care attendances	110,300	14,700	30,000	44,700	34,000	20,600	11,000
A+E /Urgent Care assessment places	21	2	6	8	7	4	2

* Includes 2 shell suites for future expansion

C2.1 Principles and Methodology

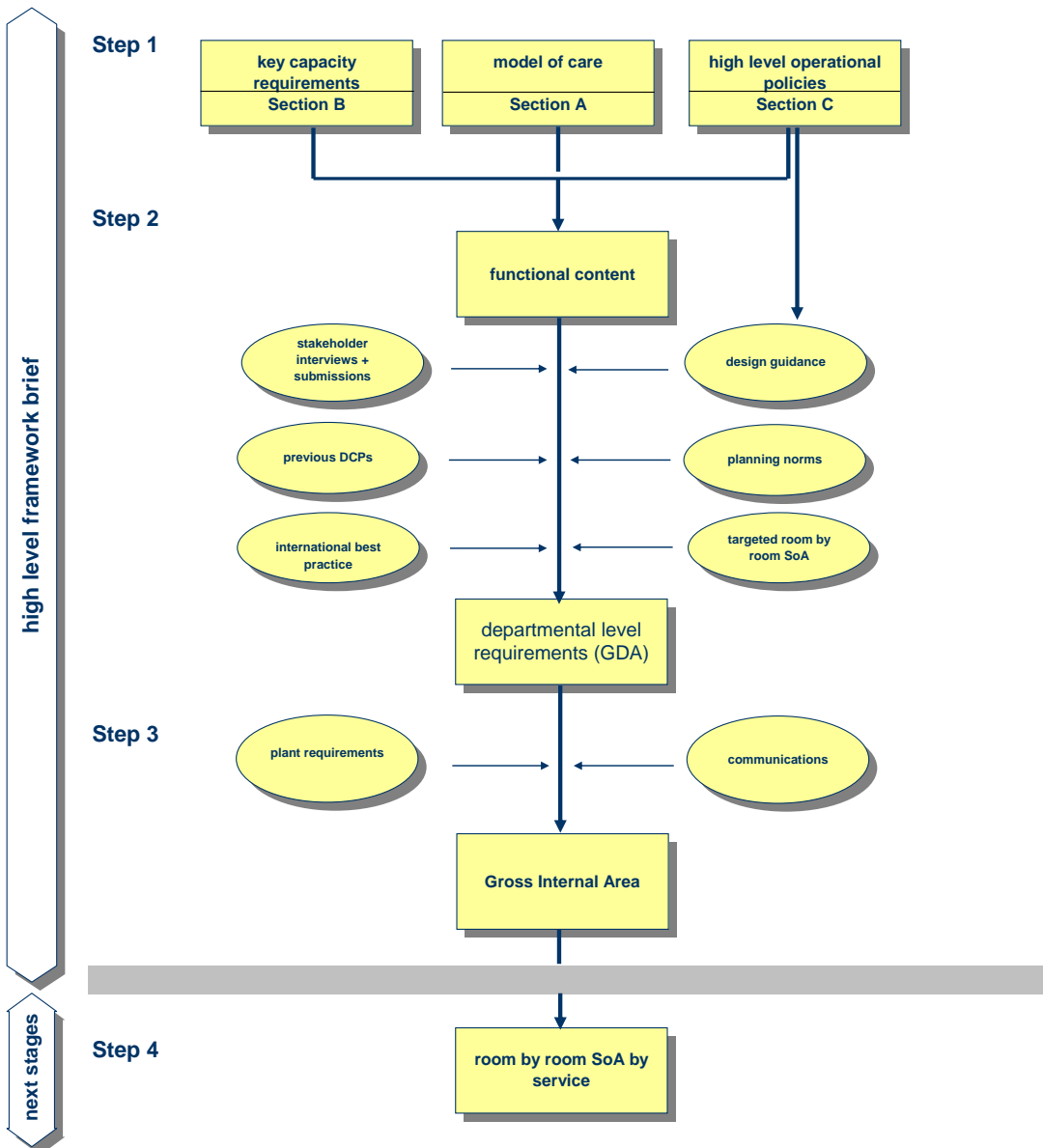
In defining the overall hospital size our approach has been guided by principles, that space allowances should –

- Be underpinned by Best Practice Standards (for example for Control of Infection, Patient Safety and improving working lives)
- Reflect new ways of working (for example impact of IT and modern office environments including open-plan arrangements)
- Reflect efficiency gains generated by more extensive use of IT and technology
- Be based on a generic approach to maximise capacity and flexibility over time and promote multidisciplinary, multi-function use

- Ensure consistency and parity across services
- Be directed to patient and family benefit
- Demonstrate value for money.

The methodology adopted in sizing the hospital is outlined in the diagram below.

Figure C19



Step 1 defines the overall functional content requirement for the NPH Tertiary Centre which is based on the capacity requirements identified in Section B, the Model of Care in Section A3 and the high level operational policies outlined in Section C1.

Step 2 defines the overall estimates of space requirements by services and/or department. In applying space standards we have taken account of, where appropriate –

- Existing Design Guidance from Professional Organisations, UK Health Building Notes, etc.
- Other planning norms from RKW's experience of working on large scale hospital developments elsewhere
- International Best Practice based on the outcome of our reference site survey.

This generates a Schedule of Departmental Accommodation and Gross Departmental Area (GDA).

Steps 1 and 2 have been informed by –

- The stakeholder consultation process undertaken as part of this project, to refine specific service requirements and requirements for facilities
- The Designs Briefs which underpinned the previous schemes for OLCCH and CUH developments –
 - Our Lady's Hospital for Sick Children, Outline Development Control Plan, Design Brief Final Version February 2004 and Appendix F January 2004 (Ref:65)
 - 'The Mater Misericordiae and Children's Hospital Final Consultation Brief and Update 2006' (Ref:66)
 - The various submissions prepared by the children's hospitals following the McKinsey Report (Refs:4,19,22)

It is important to note that these documents have been used only to supplement our understanding of current and likely future service provision as the information contained therein is now historical in the context of a single NPH Tertiary Centre where services and departments will merge.

Step 3 defines the overall Gross Internal Area (GIA) for the hospital by applying an allowance for communication space and engineering plant areas.

C2.1.1 Gross Internal Area

Communication (main circulation space including lifts and staircases) and engineering plant requirements will be an output from the design solution. We have factored in an allowance of 30% of GDA in the Framework Brief, which is based on our experience of outturn benchmarks from major acute health projects recently completed in the UK. This allowance will include atrium and performance spaces, dedicated and segregated vertical communications for visitors and patients and FM routes and connections to underground carparking.

We anticipate that efficient use of plant and communication space will be a core design objective, consistent with achieving appropriate segregation of patient and visitor flows. In this respect, we understand that recent schemes completed in Ireland, notably Cork Maternity and Tullamore hospitals have been constructed with lower percentages, at 21% and 23% respectively. (It is acknowledged that these are not of the same scale and complexity as the NPH).

C2.1.2 Room by Room Schedule of Accommodation

These overall space allowances will be further refined at Stage 2 of the briefing process when detailed room by room schedules will be developed on a service by service basis. In order to test space allowances for this Framework Brief we have developed indicative room by room schedules for key services including –

- Generic Inpatient Wards
- Critical Care
- Outpatients
- Operating Theatres
- Emergency Department

These are included in Appendix 6. Together, these departments represent 50% of the overall space requirement for the hospital.

C2.1.3 Additional Space Pressures

From our discussions with stakeholders and written submissions received, there are a number of bids for additional facilities and service developments and expansion compared to current provision. Some of these are plausible, likely future requirements which will need to be analysed further, others may be aspirational and subject to formal approval. For this Framework Brief we have taken a view on the more aspirational items and the area impact is not included in the Schedule of Accommodation. These equate to approximately 10,000m² (GIA) and pending

ratification of these items this may be regarded as a reasonable planning contingency. Whilst we endorse the vision of a world class service, we recognise that the affordability of the project has yet to be tested and would suggest that a formal process needs to be established at the next stage for decisions on new service developments and expansion. For comparison, at this stage of the project, the current UK guidance for 'optimism bias' is 30-40% based on the basis that historically schemes are consistently undersized and under priced in the early stages.

C2.1.4 Space Standards

It is important to note that the space standards underpinning the overall hospital sizing represent optimum facilities based on International Best Practice and emerging trends and, at this stage, have not been influenced by affordability constraints. However, at the next stage value for money considerations will be legitimate in deciding project priorities. In this context it is important to recognise the different financial drivers behind US and European space standards, US examples have been widely cited in support of increased space provision, however, comparison against US examples is not always helpful and can be misleading, for a number of reasons –

- Research facilities constitute a very significant percentage of overall hospital area as research in the US is the major revenue generator
- In a predominantly insurance and private health care driven market, commercial decisions around attracting greater market share will govern 'hotel standards' including size of patient bedrooms and bathrooms.

Recommended space standards for key activity spaces are summarised in Table C5 which includes recommendations made in Section C1.

Table C5

Recommended room sizes for key activities	Evidence from Reference Sites	Recommendation	Additional Comments
<i>Size of Nursing Unit</i>	24-30 beds per ward	24 to 30 beds arranged in clusters of 8-10 beds	flexible clusters for specialty, age and dependency designation
<i>Percentage of single rooms: Acute Inpatients</i>	100% norm in US 12%-70% in UK	100%	children and parents should be asked for their views
<i>Size of single room acute ward</i>	14-31 sqm	21 - 24sqm	minimum size 26.5 sqm with ensuite (max 30 sqm) for easy conversion to critical care bed
<i>Percentage of single rooms: Critical Care</i>	100% norm in US 9%-100% in UK	100%	children and parents should be asked for their views
<i>Size of single room PICU</i>		26.5 sqm	based on UK design guidance HBN 57
<i>Size of single room NICU</i>		26.5 sqm	based on UK design guidance HBN 57
<i>Size of Operating Theatres and Intervention Suites</i>	US examples 37 - 74sqm UK and European examples 38 sqm - 55sqm	standard theatre 55 sqm 3-4 larger theatres at 70 sqm endoscopy and major procedure 38 sqm	Consideration should be given to US models for operating theatres which achieve a more space efficient balance between core theatre size and theatre suite support
<i>Stage 1 Recovery space</i>		12 sqm	some single rooms should be provided
<i>Stage 2 Recovery space</i>		12 sqm	some single rooms should be provided
<i>Outpatient Consultation and Examination (CE) room</i>	preference in US for separate consultation and examination. Range from 9-11 sqm	16 - 22 sqm (average 18 sqm)	Consideration should be given to 2 sizes of room. A large room is required for multi disciplinary groups but is wasteful when used for 1:1 consultation only
<i>Diagnostic Imaging Rooms</i>		Plain xray 30- 33 sqm General Flouroscopy 38 sqm Ultrasound 18 sqm CT 38-45 sqm MRI 45-55 sqm Interventional 55 sqm Nuclear medicine 38 sqm Bone density 18 sqm	Recommendations based on UK design guidance in HBN 6 . Sensitive to manufacturers specifications'

C2.2 Service by Service Requirements

Table C6 sets out area requirements for key service groups in line with the structure for high level operational policies outlined in Section C1. For core clinical and support functions this indicates an overall Gross Internal Area (GIA) of 90,200m². Note that these are internal areas only and therefore the figures exclude essential external area for deliveries and waste movement etc, ambulance parking, staff and visitor parking and external play spaces. Further detail is provided in Table C7. Further breakdown of these areas and indicative room by room schedules are included in Appendix 6. Appendix 6 also includes details of assumptions underpinning space allocations on a service by service basis.

Table C6¹³

NPH Tertiary Centre : Summary of Areas	All NPH Tertiary Centre services
Ambulatory Care	10,940
Inpatients	27,740
Diagnostics and Treatment	10,360
Clinical Support	7,390
Non-Clinical Support	12,930
Total Hospital Departmental GDA sqm	69,360
<i>Engineering Plant</i>	8,670
<i>Communications</i>	12,140
TOTAL Hospital Gross Area GIA sq m	90,170
Education + Training	4,490
Research	3,500
Parents + Hostel Accommodation	2,690
National Centre Medical Genetics	2,740
Total Hospital and Non-Hospital GIA sqm	103,590

Note : These numbers have been rounded

¹³ Parents Accommodation: In addition to provision by the bed side 15 rooms totalling 408m² are included within the Inpatient area in Table C6.

Table C7

NPH Tertiary Centre : Area Breakdown By Grouping

Ambulatory Care

Emergency Department	1,560
Outpatients	8,040
Day Patients	1,340

Sub Total Departmental Area sqm	10,940
--	---------------

Inpatients

Generic inpatients	18,300
Specialty specific support	630
Specialist beds	2,810
Critical Care (PICU,NICU) TCU	5,590
Parent's overnight accommodation	410

Sub Total Departmental Area sqm	27,740
--	---------------

Diagnostics and Treatment

Imaging and Investigations	3,340
Theatres	5,080
Therapies	1,940

Sub Total Departmental Area sqm	10,360
--	---------------

Clinical Support

Pathology	4,500
Pharmacy	1,030
Other Clinical Support	1,860

Sub Total Departmental Area sqm	7,390
--	--------------

Non Clinical Support

Main Entrance and Family Support	1,430
Back of House services	2,420
Staff support	1,450
Administration and clinical offices	7,630

Sub Total Departmental Area sqm	12,930
--	---------------

TOTAL Departmental Areas (GDA) sqm	69,360
---	---------------

Allowance for Plant and communications	20,810
--	--------

Total Gross Internal Area sqm	90,170
--------------------------------------	---------------

- 1 Note that Transfer and Retrieval is included in clinical support
- 2 Note that investigations are included in Diagnostics and Treatment
- 3 Specialist beds include, BMT, renal transplant, CF, mental health

C2.2.1 Non Hospital Requirements

In addition to core hospital requirements we have identified separately the space requirements for those services which will either be provided by other providers or jointly with the NPH Tertiary Centre and others. Capital requirements are also likely to be funded by other / alternative sources. These include –

- Parent's overnight and patient hotel accommodation
- Education Centre – for undergraduate and post graduate training
- Research
- National Centre for Medical Genetics.

These services total an additional 13,420m² of accommodation, giving an overall total of 103,590m².

C2.2.2 Education, Training and Research

Further work is required to substantiate the requirement for Education, Training and Research and the proportion to allocate between the NPH Tertiary Centre the Universities and other partners. The figure included is based on RKW experience of similar sized hospital developments elsewhere.

Note that additional education and training space has been allocated to the A/UCCs. A more detailed assessment is also required of the capacity that might be available within existing facilities on the Mater Campus.

The area indicated for research reflects local stakeholder's estimates ^(Ref: 42).

C2.2.3 Patient Hostel and Parent Accommodation

In addition to provision for parents at the bedside and parent accommodation within the core hospital at 'dressing gown' distance, the schedule of accommodation includes 45 rooms in 'Ronald McDonald' style accommodation. These are high level assumptions at this stage which will require more detailed assessment of need at the next stage. One of the benefits of the City Centre location is the immediate availability locally of a mix of hotel and hostel type accommodation available on a rental basis, and we would recommend that the full range of options is explored at the next stage.

C2.2.4 Staff Residential Accommodation

The schedule of accommodation does not include staff residential accommodation. However, we recognise that living accommodation for staff is currently available on the OLCHC site. The availability of low-cost key-worker accommodation will be important for recruitment and retention and a proactive approach with the planning department is essential in this respect.

C2.2.5 National Centre for Medical Genetics

The figure of 2,740m² quoted for the National Centre for Medical Genetics has been taken from the OLCHC Outline Development Control Plan Design Brief which included for a 100% increase in existing space provision. Local estimates of future requirements are in the order of 5,000m² which needs to be confirmed at the next stage. This has been identified as a future potential additional space pressure.

C2.2.6 Area per bed and Comparisons with other hospitals

Taking the hospital requirements together with the A/UCCs (and excluding Research and NCMG) the area per bed is in the order of 270m² (based on 409 inpatient beds). In making comparisons with other hospitals it is important to recognise that calculations of space standards are highly sensitive to a number of factors, including–

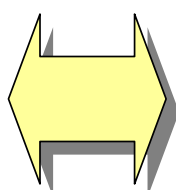
- The case mix across quaternary, tertiary and secondary services
- Satellite services and units
- The extent of research on site and embedded facilities
- Embedded education and training facilities
- Populations served relative to bed numbers
- Whether the hospital is standalone or co-located with another hospital

We would suggest that using bed numbers to make space comparisons is misleading as the number of beds for a given health economy will reflect different local circumstances including demographics, the extent of development of primary and community services and clinical practice and the availability of secondary beds in other locations. Space standards similarly will vary with local circumstances, for example the extent of primary, community and research provision within the hospital. This is graphically illustrated in Figure C20. The NPH Tertiary Centre at the Mater site has been sized on the assumption that the A/UCC model will be implemented in full by 2021 and therefore any comparisons with other hospitals must take this into

account. As outlined in Section A, this equates to a further 12,400m² of accommodation.

Figure C20¹⁴

Proposed NPH Tertiary Centre	Proposed RCH, Melbourne
Role :	Role :
National Tertiary , Secondary services for Greater Dublin	National Quaternary (some), Regional Victorian Tertiary , Secondary and Community services for Melbourne along with other providers
Demographics:	Demographics:
Tertiary remit : 5.2 million	Tertiary remit : 9 million
Secondary remit : 2 million approx.	Secondary remit : 3.5 million Melbourne but other providers in catchment
Paediatric population predicted to increase by 17.4% nationally, 21% in Dublin	Paediatric population of Melbourne predicted to decline by 4% , by 11% in 0-4 age group
Projected beds:	Projected beds:
409 acute inpatients	255 acute inpatients
65 day places <i>across the Tertiary Centre and A/UCCs</i>	30 rehabilitation
	70 day beds
	Note : secondary beds for Melbourne are available in other centres
Hospital size:	Hospital size:
103,600 sqm <i>of which</i>	102,000 sqm approx. <i>of which</i>
3,000 relates to research	25,000 relates to research
12,400 sqm in A/UCCs	



C2.2.7 Core and Shared Services

Allocation of services between core NPH Tertiary Centre and potential shared services has already been discussed in Section C1.2. Table C8 sets out how space is distributed across core and potentially shared services.

The potentially shared element represents approximately 26,000m² or 25%. A considerable proportion of this is education, training and research and the NCMG which already provides services to adults. Note that the area allocated to these services in Table C8 relates to the paediatric element only. Whether these areas can be reduced further by sharing will depend on a more detailed assessment of capacity available within services planned for adults on the Mater Hospital site. The

¹⁴ For secondary services the RCH role will continue to provide PICU for the whole of Melbourne population and secondary inpatient services for a local catchment within Melbourne in a network arrangement with other providers, including Monash Medical Centre, which will continue as the centre for orthopaedics.

requirements for a maternity service would also need to be addressed, subject to the outcome of the maternity services review. At this stage we would suggest that, with the exception of the central kitchen, that any further space savings are likely to be small.

C2.2.8 On and Off Site Services

Potential to locate services off the main campus site has already been covered in Section C1.3. The space requirements relating to these services are provided in Appendix 6. Table C8 illustrates the breakdown of those services that should be located on the main hospital site and those services which could be located in the locality as part of a campus configuration and subject to site availability and compatibility of implementation timescales.

Table C8

NPH Tertiary Centre : Summary of Areas - Potential to Share	Potential to share		TOTAL All NPH Tertiary Centre services
	1 Stand alone core NPH Tertiary Centre Services	2 Potential to share with Maternity and /or Adults hospitals	
Ambulatory Care	10,940		10,940
Inpatients	27,740		27,740
Diagnostics and Treatment	10,360		10,360
Clinical Support	360	7,030	7,390
Non-Clinical Support	8,780	4,150	12,930
Total Hospital Departmental GDA sqm	58,180	11,180	69,360
<i>Engineering Plant</i>	7,270	1,400	8,670
<i>Communications</i>	10,190	1,950	12,140
TOTAL Hospital Gross Area GIA sq m	75,640	14,530	90,170
Education + Training		4,490	4,490
Research		3,500	3,500
Parents + Hostel Accommodation	1,950	740	2,690
National Genetics Centre		2,740	2,740
Total Hospital and Non-Hospital GIA sqm	77,590	26,000	103,590

Note : These numbers have been rounded

Potential for Off - Site Location	Core Services	Shared Services	Total
On Main Hospital Site	72,250	3,370	75,620
Off Main Hospital Site	5,340	22,630	27,970
TOTAL	77,590	26,000	103,590

The analysis indicates that the **minimum** space requirement on the main Mater Hospital site subject on the basis of a fairly aggressive approach to what could be located off site is in the order of 75,600m² of accommodation. In practice, if off site provision was achievable, there would be a requirement to provide some satellite services on the main site, for example pathology hot lab facilities and more local decontamination if sterile services is not provided on site which will result in some increase on this number.

C2.3 Summary of this Section

- Based on the capacity requirements calculated in Section B and the high level operations policies identified in C1, the overall space requirement for core hospital services at NPH Tertiary Centre is **90,200m²**
- When non-core services including education and training and research, the NCMG and Parents Accommodation (Ronald McDonald) are added the total requirement is **103,600m²**.
- The A/UCCs are **additional** to this and total **12,400m²**
- In addition, a total of **10,000m²** arising from stakeholders aspirations and proposed service enhancements has not been included
- Of that total of 103,600m² based on the analyses of potential shared services in Section C1, **77,600m²** is essential core to the Children's Hospital. **26,000m²** could be shared, much of this relates to education, training and research and NCMG
- Of the total 103,600m² a maximum of **28,000m²** could be located off site if appropriate sites can be identified consistent with the project timescale. Therefore the minimum requirement for the NPH Tertiary Centre on the Mater Hospital site is 75,620m²
- Recommended **room sizes** for key activity spaces are summarised in Table C5
- The above is based on the moderate scenario capacity projection. If the bed capacity requirements are reduced as illustrated in Section B2.9 the area impact could be a reduction of 4,000-8000m².

C3 Preferred Configuration - Mater Hospital Site

Sections C1 and C2 defined the High Level Framework Brief for the NPH Tertiary Centre. This section now considers how that brief might be implemented on the Mater Hospital site and identifies issues and opportunities for consideration in subsequent project stages.

C3.1 Background and Context

Following the McKinsey Report, and the recommendation that the NPH Tertiary Centre be co-located with an adult hospital site, a Joint Task Group was established to decide the most appropriate location and governance arrangements for the new hospital.

In inviting submissions from the six existing Dublin Area Teaching Hospitals (DATHs), the Task Group set out response requirements covering Planning and Development considerations, Co-location Values and Governance. From a development perspective responses were to take into consideration the McKinsey recommendation of a hospital of 380 beds with an indicative footprint of 65,000m² plus 13,000m² expansion and flexibility to accommodate a hospital of 585 beds (90,000m²). Subsequent to the initial approach, the Joint Task Group requested that the potential to include a Maternity building of an indicative area of 25,000m² be factored into responses.

Four of the DATH sites were excluded in the initial evaluation because they did not provide the appropriate range of adult sub-specialties to maximise benefits of the co-located model as outlined by McKinsey. A further evaluation of the two remaining sites, St James' Hospital and the Mater Hospital was undertaken which was focused on site capacity. The outcome of the evaluation exercise was that the Mater Hospital site was chosen as the preferred option on the basis of their submission. The recommendations of the Joint Task Group were endorsed by the HSE in May 2006 and accepted by Government in June 2006.

A Locality Plan and Existing Site Plan are illustrated in Figures C21 and C22.

C3.2 Space Requirements

The likely area requirement for the **NPH Tertiary Centre** outlined in Section C2 is 103,600m² of which up to 28,000m² could be provided off the main site if suitable sites were identified consistent with the implementation timescale for the main site. In addition we have identified a potential requirement for a further 10,000 m² associated with service development proposals. The sensitivity testing of capacity projections in Section B suggests a possible reduction in inpatient bed requirements through performance improvements beyond those assumed of approximately 50-100 beds. This would reduce space requirements by approximately 4000-8000m² GIA.

An estimate of 25,000m² for a maternity hospital on the site, 15,000m² of which is within the 'red line' site to be ceded, is the working assumption agreed by the Task Group which underpinned the DATHs submissions in March 2006. This assumption will be re-assessed in the context of the forthcoming recommendations of the Maternity Services Review. If gynaecology services are to be included in the service model for the site there are options on where these would be located – with maternity or with the adult services on the adult part of the site. There are also options on where shared services would be provided – on the adult, paediatric or maternity site – or a combination of all.

For the purposes of this Framework Brief we have been instructed by the HSE to work on the assumption that 15,000m² for a maternity hospital is accommodated within the site to be ceded (the 'red line').

C3.3 Site Capacity

The area of the Mater site to be ceded is illustrated in Figure C26. We have explored the capacity of the Mater Site to accommodate the space requirements of the NPH Tertiary Centre and a maternity hospital under three scenarios, illustrated in Figure C23. This is based upon advice from the HSE that *“following meetings with Dublin City Council over recent months ...the area to be ceded has a development capacity of at least 140,000 m²”*.

The analysis indicates that the space requirements for the NPH Tertiary Centre can be accommodated on the site. The amount of unallocated space available

for future developments in a tri-located model will be determined by decisions on the extent of on/off site provision.

“Our studies of the recommended site indicate that the NPH can be established there in a building that is clinically functional, patient and family friendly, flexible, a sound partner to other components of the Mater Hospital – an asset to the surrounding community”

Ken Schwarz, NBBJ

In its submission to the Joint Task Group in the Mater Hospital identified sites within the ‘Medical District’ which could augment the main site’s capacity including the Rotunda Hospital, Temple Street and Eccles Street.

C3.3.1 Temple Street Hospital

Temple Street Hospital is within a very short walking distance – 5 minutes (380m) to the Mater site. It sits within a conservation area on a site of just over 1 hectare. The development potential of the site has been assessed at 40,000m² in the Mater Hospital Report. This is a prime site in the centre of Dublin in an area that has been earmarked for regeneration. Redevelopment is not possible until CUH has been relocated but the site could contribute – potentially significantly - to the overall expansion strategy for the three hospitals in a number of ways –

- An Ambulatory Care Centre(s) could be developed in the longer term as a stand-alone building on the site. Such a model exists at CHOP. The site could serve the ambulatory needs of adult, paediatric and maternity services, including potentially community and primary care services in a vertically integrated approach. In this model the Mater Hospital site would become the ‘hot’ site over time focused on emergency inpatient and tertiary care
- The site could be developed for Research including the Children’s Research Centre and adult related activity
- Part of the site could be developed for carparking subject to Dublin City Council approval to supplement capacity at the Mater site
- Additional residential accommodation for parents and families and for administrative and non-clinical support functions

- One approach might be to consider a strategic land swap with public or private land owners of other sites in the vicinity to provide expansion capacity closer to the Mater site.

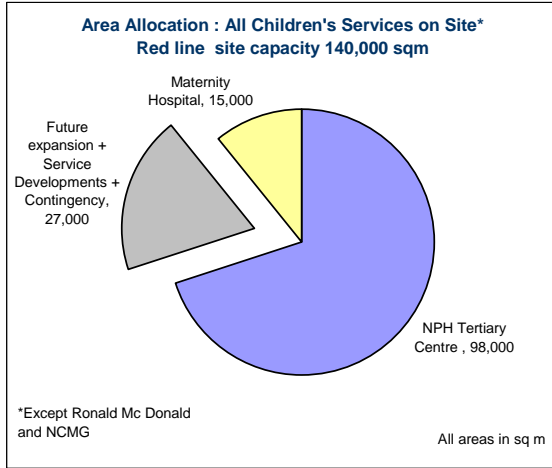
C3.3.2 Rotunda Hospital

The Rotunda Hospital has identified 10,000m² within their redevelopment plans for the Rotunda Hospital site in Parnell Square which could be made available for health and related services in the future. This capacity cannot be made available until the services on the site are wholly or partly relocated subsequent to the review of Maternity services Dublin-wide but could contribute to a future expansion strategy in the longer term. The site could facilitate expansion for Ambulatory functions, teaching and research, administration or support functions. Opportunities may also exist to negotiate additional carparking provision depending on how, and by whom, the site is redeveloped.

C3.3.3 Eccles Street

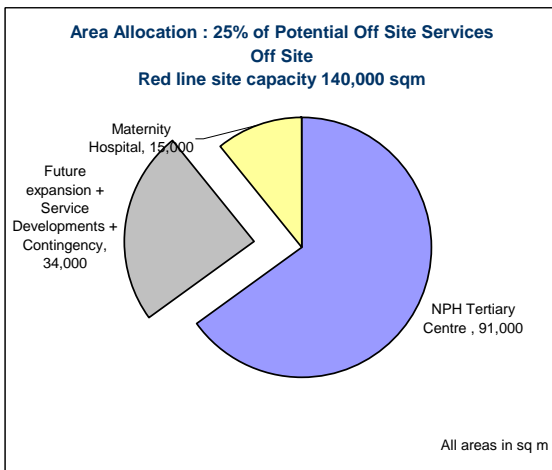
Eccles Street properties house a number of health and education facilities, including a range of outpatient clinics, Research, School of Nursing and Medical School. Partial pedestrianisation of Eccles Street has been suggested as a means of closer integration of these properties into the Mater site campus. Pedestrianisation would help to overcome issues relating to ambulance parking, short stay drop off and taxi waiting. We understand that The Children's Research Centre may consider Eccles Street to be an appropriate location for their functions if an appropriate site was available. Clinics located here could be relocated to an Ambulatory Care Centre in the longer term.

Figure C23 Capacity Analysis¹⁵



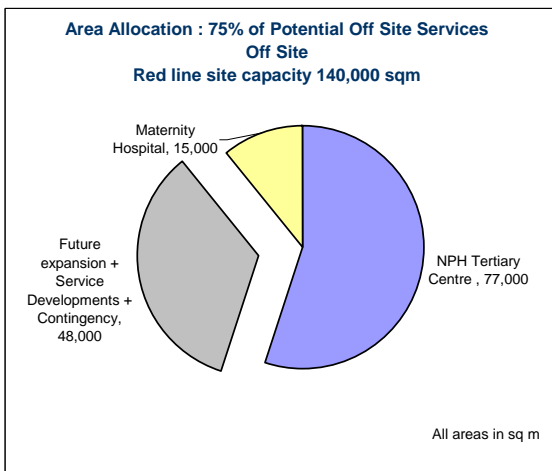
Scenario 1 :

On the basis of the space requirements and site capacity potential outlined the pie chart demonstrates capacity to accommodate a development of this size on site and indicates the residual unallocated space for future developments in a tri-located model **IF all services are located on the main site** with the exception of parents' accommodation and NCMG.



Scenario 2 :

On the basis of the space requirements and site capacity potential outlined the pie chart demonstrates capacity to accommodate a development of this size on site and indicates the residual unallocated space for future developments in a tri-located model **IF 25% of services identified as having potential to be located off the main site are excluded**



Scenario 3 :

On the basis of the space requirements and site capacity potential above the pie chart demonstrates capacity to accommodate a development of this size on site and indicates the residual unallocated space for future developments in a tri-located model **IF 75% of services identified as having potential to be located off the main site are excluded**

¹⁵ The area of 98,120m² has been derived from the overall requirement of 103,600m² excluding Ronald McDonald type facility and the NCMG which will be discrete elements.

Note that this analysis assumes 25,000m² of accommodation for the Maternity Hospital of which 15000m² is within the 'red line'. Subject to the outcome of the Maternity Services Review and specifically if gynaecology services are included some of this would be located on the adult portion of the site.

This analysis also allocates a proportion of shared services on the paediatric and maternity sites respectively, with a proportion remaining on the adult site (or off-site location depending on scenarios). This will need to be confirmed as part of the design process.

C3.4 Functional Relationships

Key functional relationships have been discussed in Sections A3 and C1. From a clinical risk perspective the critical relationships are between critical care (NICU and PICU), operating theatres and **some** imaging modalities. Collectively these functions are routinely referred to as 'the hot floor'.

In examining these relationships we have assumed, consistent with strong stakeholder representation, co-location of the National Paediatric Hospital with a maternity hospital.

C3.4.1 Children's perspective

From a children's perspective, there are different views amongst stakeholders across the three hospitals on the relationship between operating theatres, PICU and day cases. Many children undergoing complex tertiary surgery will be admitted to PICU post-operatively and some children will by-pass Stage 1 recovery to be admitted to PICU. For that reason co-location with operating theatres is considered essential.

Evidence from international reference sites as illustrated in Figure C24¹⁶ and responses from international advisers point to co-location of day case and inpatient theatres being very desirable in a tertiary centre, for two reasons – future flexibility in designation of theatres and efficient management of surgery and operating time. The high volume secondary fast throughput day cases will be largely undertaken in the ambulatory centres. For small volume surgical sub-specialties it is likely to be more efficient to mix inpatient and day cases in any one operating session in the same

¹⁶ 12 out of the 14 of the reference sites as illustrated in Figure 24 co-locate all theatres in inpatient and day case. See quote from John Wedge below.

theatre. In that context, separation of day theatres from inpatient and emergency theatres would be sub-optimal.

The relationship between NICU and PICU will depend on whether maternity services are located on site and whether an interim arrangement in advance of a maternity scheme is required. Although these will be separate units there are overlaps – for example in relation to cardiac ICU patients, many of whom will be neonates. Close proximity is also important but not essential for anaesthetic cover.

Currently, the day surgery is combined with inpatient surgery. This model makes sense in a tertiary centre. The secondary cases are appropriate to be done in an ambulatory centre in the community/network.

John Wedge

Therefore, from a paediatric perspective, the preferred model is co-location of NICU and PICU with inpatient theatres and essential imaging, day theatres and day surgery recovery.

Figure C24 Hot Floor Functional Relationships across Reference Sites

Hot Floor Functional Relationships	Inpatient theatres	Day theatres	Day Surgery recovery	PICU	NICU	Obstetric Delivery	Interventional Imaging	Other imaging	All imaging
	Vancouver, British Columbia Children's Hospital	●	✓	✓	✓	✓	✓	✓	✓
Glasgow, York Hill	●	✓	✓	✓	✓	✓	✗	✗	✗
Texas, Austin New Children's Hospital	●	✓	✓	✓	✗	■	✓	✓	✗
Toronto, Sick Kids	●	✓	✓	✓	✗	■	✓	✓	✗
Manchester, Manchester Children's Hospital	●	✓	✓	✓	✗	✗	?	✗	✗
Liverpool, Alder Hey	●	✓	✓	✓	■	■	✓	?	✗
Melbourne, Royal Children's Hospital	●	✓	✓	✓	✗	■	✗	✗	✗
London, Evelina Children's Hospital ¹	●	✓	✓ stage 1	✓	✗	✗	✗	✗	✗
Cincinnati, Cincinnati Children's Hospital	●	✓	✓	✗	✗	■	✓	✗	✗
Philadelphia, CHOP	●	✓	✓	✗	✗	■	✓	✓	✗
Massachusetts, Boston Children's Hospital	●	✓	✓	✗	✗	■	✗	✓	✗
Calgary, Alberta Children's Hospital	●	✓	✓	✗	■	■	✓	✗	✗
Texas, Houston Children's Hospital	●	✗	✗	✓	✗	■	✗	✗	✗
Trondheim Norway, St Olav's Children's Hospital ²	●	✗	✗	✓	✓	✓	✓	✓	✗

Note 1 : Stage 2 day recovery on wards

Note 2 : Separate day unit for Women and Children

✓
✗
■

Located with inpatient theatres

Not located with inpatient theatres

Service not provided

C3.4.2 Maternity Perspective

The review of maternity services has yet to be concluded, however, the future model is likely to include a high proportion of high risk births and therefore the physical proximity of delivery suites and obstetric theatres to neonatal intensive care will be very important. In the US, the recommended standards for newborn ICU design state that dedicated lift access is required between delivery and NICU if they are located on separate floors ^(Ref:67). Easy access for neonatal surgery to operating theatres is also desirable, although it is anticipated in the future that many procedures would be undertaken in NICU. The neonatal service will require immediate access to imaging, especially CT and MRI.

Easy access for women to adult intensive care is also desirable.

From a maternity perspective, therefore the preferred arrangement is co-location of delivery suites including obstetric theatres, NICU and essential imaging.

C3.4.3 Children and Maternity co-located

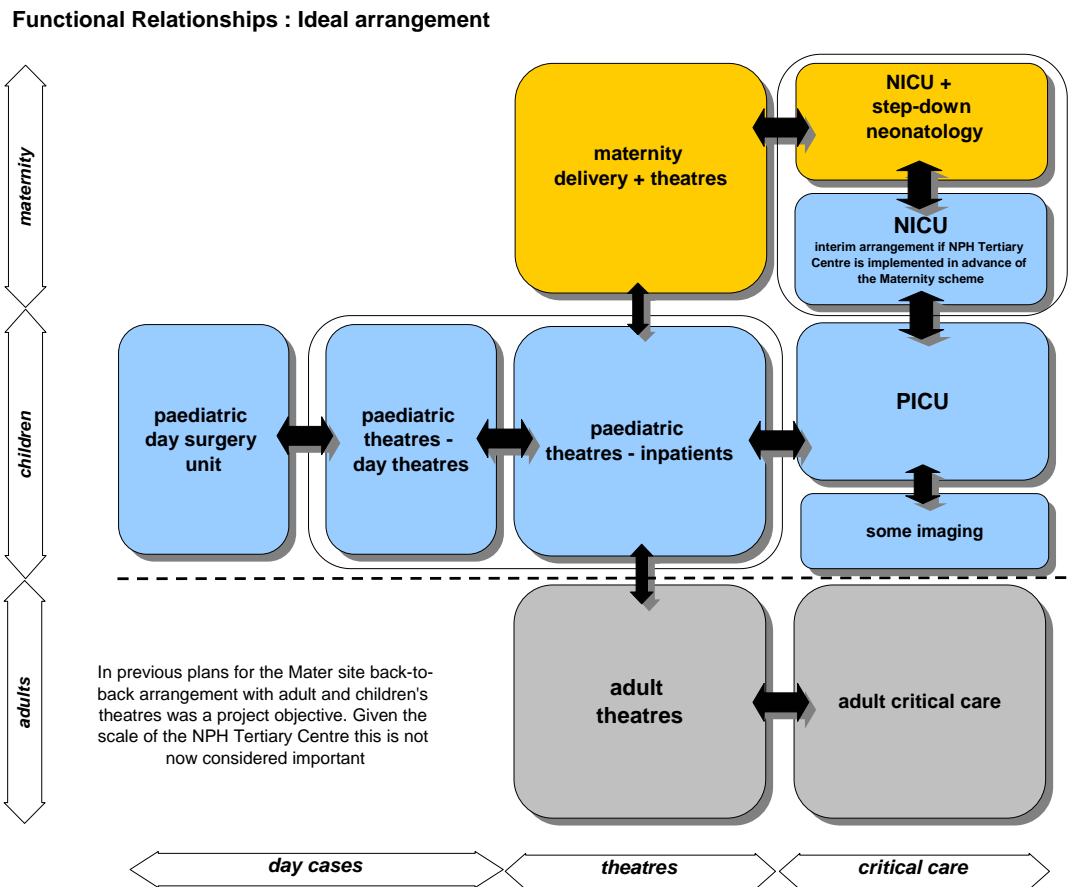
This leads us therefore to conclude that an **ideal** arrangement is for maternity delivery, NICU, PICU and children's operating theatres and day case to be co-located on a single level as illustrated in Figure C25. Back to back co-location with adult ITU and theatres would be advantageous, but not essential in a development of this scale.

It is interesting to note that this 'ideal' arrangement has been delivered in only two of our international reference sites (Glasgow and Vancouver children's hospitals) and **suitable solutions** have been identified elsewhere.

Additionally, across our reference sites just three of the units with a separate PICU and NICU have achieved the co-location of PICU and NICU on the same floor as illustrated in Figure C23. This leads us to conclude that, on balance, in a co-located model with maternity, **the preferred relationship** from a NICU perspective is with high risk delivery.

The next section identifies the area that might be available to meet this arrangement and outlines the options that are available in the context of the Mater Hospital site.

Figure C25 Ideal Functional Relationships for Hot Floor



C3.4.4 Building Levels

The size of the building footprint that might be available is most critical for the Hot Floor. In the adult scheme this is Level 3 but it is not essential that the Children's Hospital Hot Floor is at this level.

Not pre-empting the design solution, it is likely that inpatients will be located on the upper floors to benefit from the best outlook and high levels of natural light. It is likely that the floorplate will step back from the street frontage to provide external space for play on the upper levels. We recommend a minimum of 2 wards (50-60 beds) on a single level for efficient use of shared inpatient facilities.

The Emergency Department is likely to be fixed at Level 0, given the benefit of shared ambulance access and back to back arrangement with the adult Emergency Department – although again, while this is desirable it is not essential. Other ambulatory services including outpatients and therapies would be located on levels 0-2.

C3.4.5 Building Footprint and the Hot Floor

Within the site to be ceded for maternity and the children's hospital the gross internal area available on any one floor is in the order of 14,500m² as illustrated in Table C9. The total space estimated as required for the hot floor functions including a minimum allowance for communications is 12,510m² GIA. The residual space available for maternity on this floor is therefore in the order of 2,450m².

Table C9 Building Footprint and Hot Floor Requirements

Functional Relationships + Building Footprint	
Space Available	
Site area (hectares)	2.49
Site area (sq m)	24,900
Building Footprint (sq m)	14,500
Site coverage	58%
Space Required for Hot Floor	
Critical Care based (60 beds)	4,600
Operating theatres incl expansion	4,030
Allowance for some imaging	380
Surgical Day cases (excluding haem/oncology and other medical)	1,040
Total GDA required sq m	10,040
Allowance of minimum 15% for communications and plant	2,010
Total GIA required sq m	12,050
Residual area available for maternity on Hot Floor GIA sqm	2,450

Note : Site coverage is an outturn figure

Note that this analysis is based on the assumption of 60 Critical Care beds on the Hot Floor. The total for critical care beds plus TCU allowance is 73 beds. The working assumption is that a TCU in the order of 13 beds would be located elsewhere in the hospital. The 60 beds will include some NICU beds.

The Maternity Review has yet to report and therefore it is not possible to make assumptions on the likely capacity requirements for LDRP, delivery including theatres and additional NICU capacity. From our experience of other schemes, it is unlikely

that a footprint of 2,450m² would accommodate the full maternity Hot Floor¹⁷. However, as noted earlier, physical co-location of PICU and NICU is not essential and is achieved in very few of the reference sites which demonstrate alternative suitable solutions are possible¹⁸. Our recommendation is to locate delivery and NICU on an alternative floor where the footprint available to maternity could be larger. This is illustrated in Figure C27. This assumes an integrated concurrent build for Maternity and Children.

This analysis indicates that from a functional relationships perspective the preferred solution for the Paediatric Hot Floor including day cases and Maternity Hot Floor (on another level) can be achieved in an integrated approach with maternity as a single concurrent build as this provides more flexibility to accommodate the needs of both children and maternity.

The preferred configuration for paediatrics as described above would consume at the hot floor level, 83% of the available site footprint based on the site coverage in Table C10. As noted above the residual footprint available for maternity may be too constrained to accommodate the Maternity Hot Floor as a single stand alone build and therefore we would suggest the need to adopt a different strategy. Two approaches adopted in some of the reference sites as noted in Figure C24 are to—

- **Option A** : Locate day theatres and recovery on an alternative floor to inpatient theatres and PICU or
- **Option B**: Locate some Critical Care on a separate floor to inpatient and day theatres and day recovery

These options are illustrated in Figures C28 and C29. It is recognised that this would represent some compromise to the preferred option. With both options the site take is approximately 65%-70% or 1.6 -1.7 hectares.

¹⁷ For the proposed Leicester Women's Hospital serving a population of 1 million, the space requirement for high risk obstetric deliveries and neonatal critical care is 4,500m²

¹⁸ As noted in Figure C24 physical co-location of PICU and NICU is achieved in only 3 of the reference sites – Vancouver, Trondheim and Glasgow. Furthermore, both Trondheim and Glasgow schemes are not of a scale or complexity level comparable with the NPH.

Figure C26

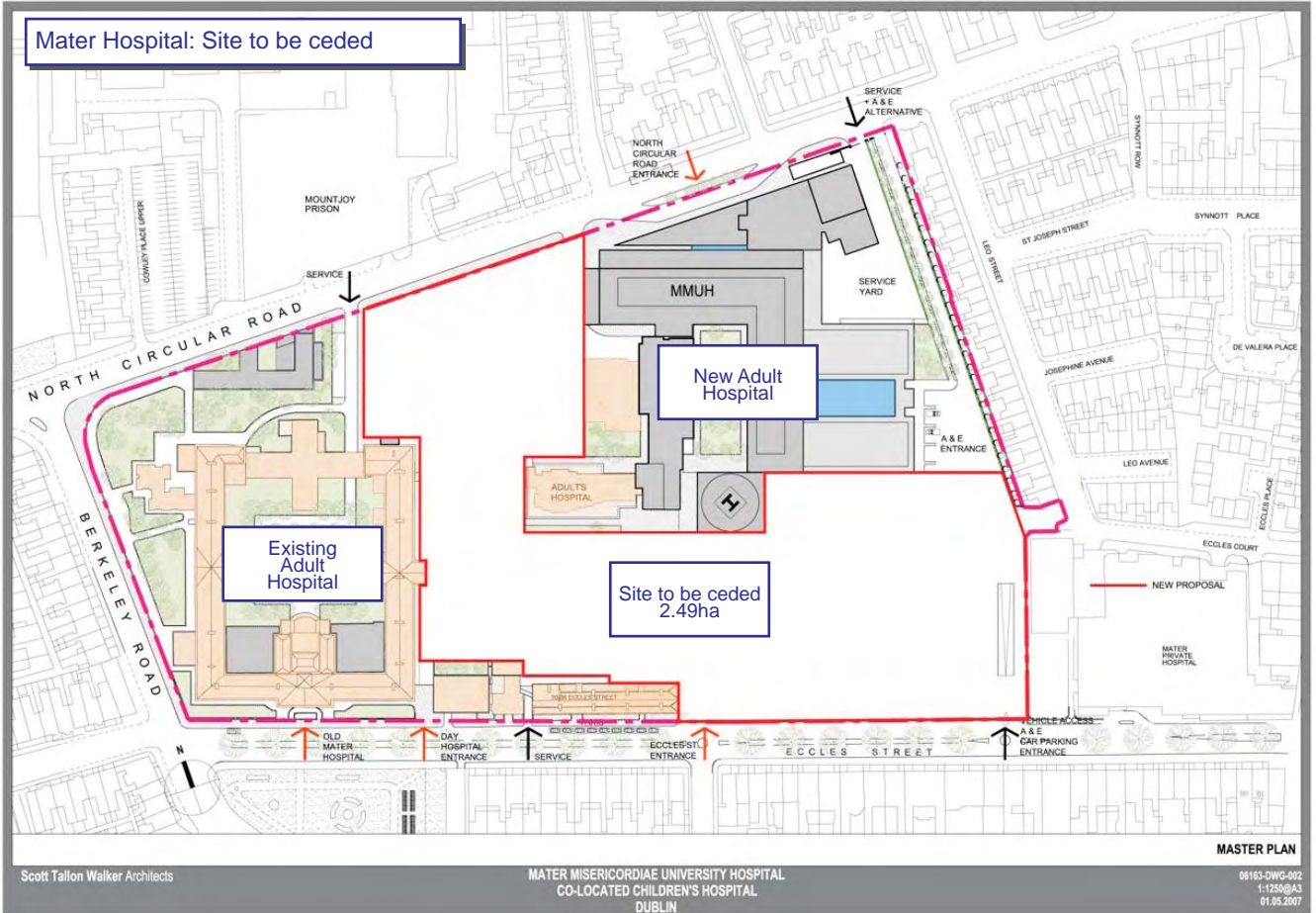


Figure C27

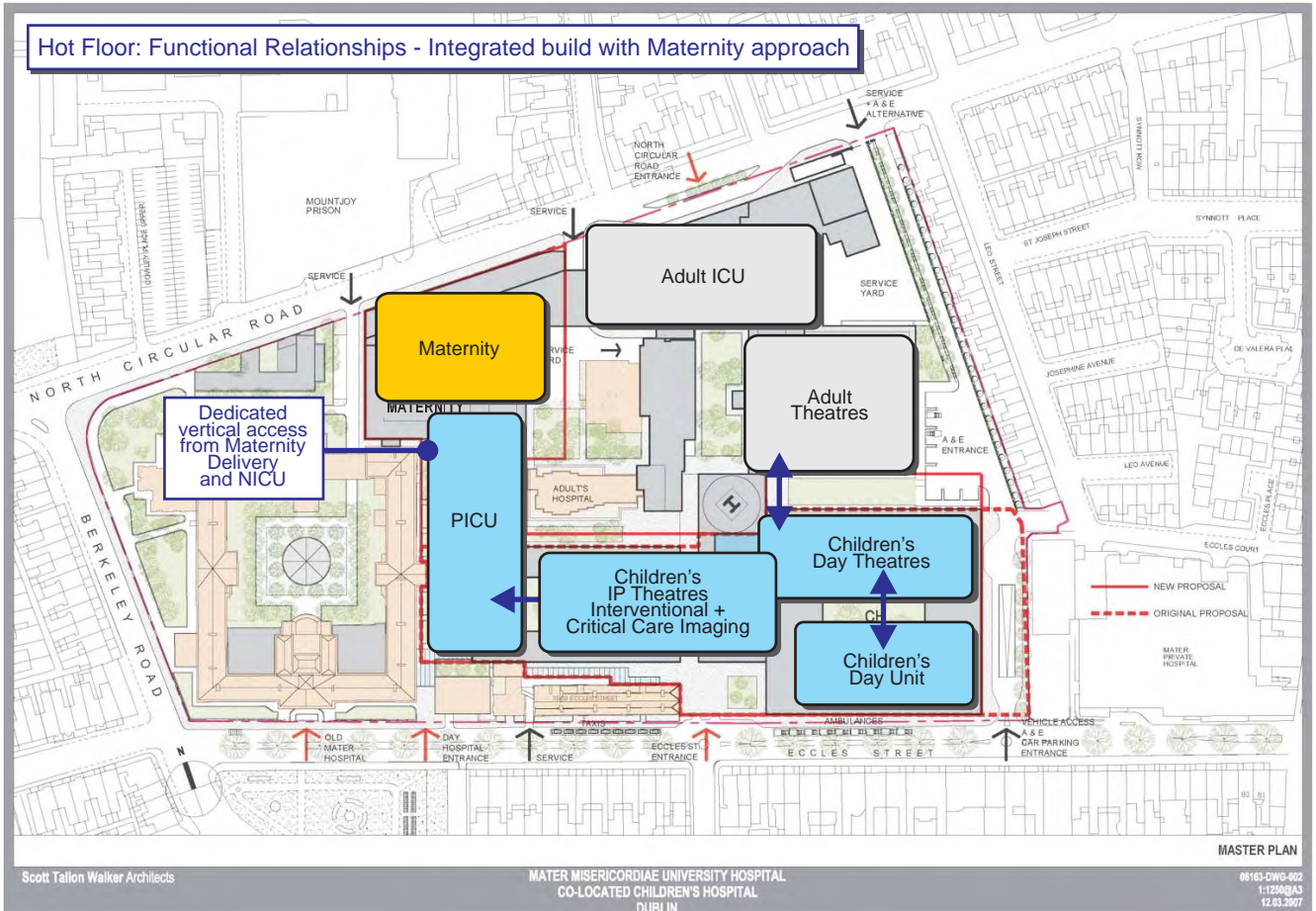


Figure C28

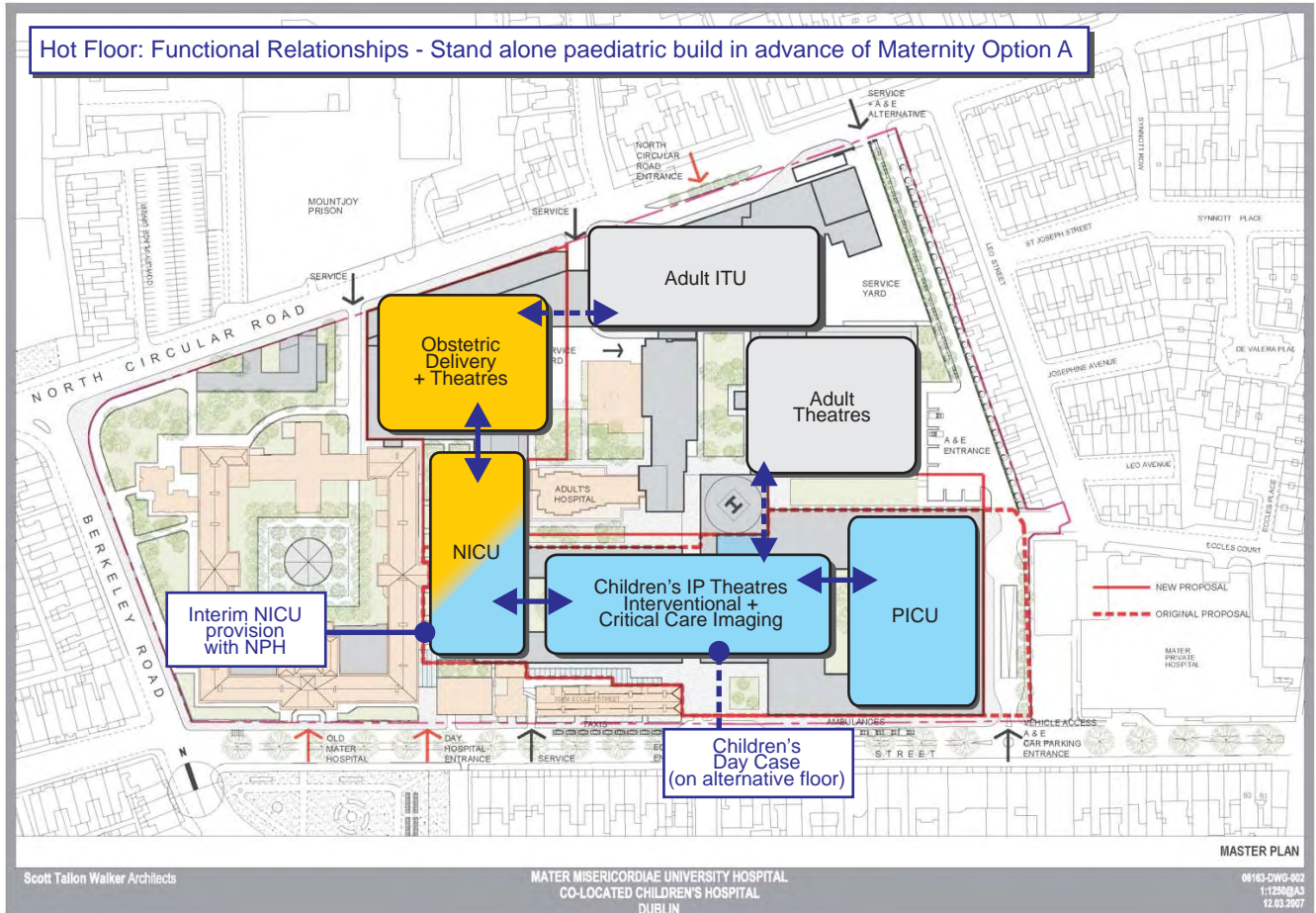
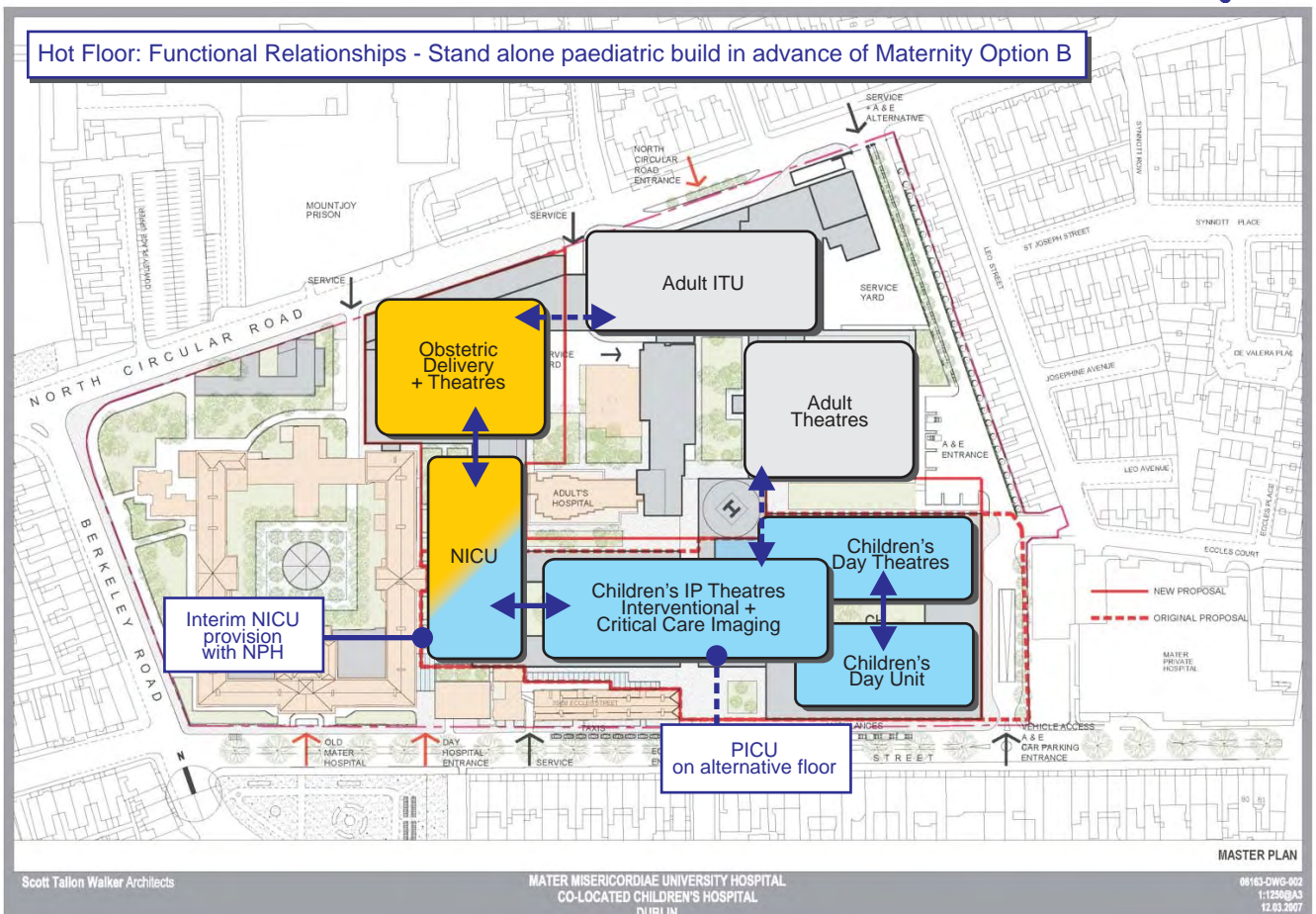


Figure C29



C3.5 Next Steps and Recommendations

The analyses above demonstrate that a building of the requisite scale can be accommodated on the site in line with urban developments elsewhere on the assumption that a cleared site will be available. There are many examples of children's hospitals in buildings of comparable density and height to that which is likely to result in a development on the Mater site. As this High Level Framework Brief is developed there are a number of areas where early action can help to ensure fulfilment of the vision of a world class children's hospital.

In drawing together the themes, there is an imperative to replace existing dysfunctional accommodation without delay, particularly at CUH, and that must be a key objective for the Development Board.

Assurances have been received from the HSE that a cleared site will be available for the single combined Maternity and HSE development consistent with the project timescale.

C3.5.1 Integrated Building with Maternity versus Stand-alone build

In considering the overall building mass and height and the available building footprint a key question is whether the children's and maternity hospitals will be delivered as a single building project. In an integrated building approach, there are issues around governance, ownership and timescales. However, a single project approach provides many advantages –

- It offers maximum flexibility on how the site is configured to meet the needs of each service
- It allows the building floorplate available to any one service to flex on a level by level basis to accommodate key functional relationships
- It facilitates efficient physical implementation of service delivery access points and goods distribution
- It maximises underground car parking capacity and flexibility
- It achieves optimum location of shared services
- It will be easier to minimise disruption to existing clinical operations with a single point for co-ordination of planning and building work

C3.5.2 Workforce

A key issue to the success of the NPH will be the availability of appropriately trained clinical, nursing and AHP professionals. In this context the impact of the new hospital on recruitment and retention should be considered as part of a comprehensive workforce strategy which addresses –

- Travel distances and availability of car parking on site
- Availability of appropriate housing in the locality
- Clarification of proposals for shared services – not just with merging of children’s hospitals – but potentially with adult and maternity services also
- Any proposals for services to be located off the main site

C3.5.3 Environment

Comments regarding the suitability of tall buildings for a children’s hospital have been made by a number of stakeholders. Tall buildings are a feature in any urban development and many of the hospitals in our reference sites database range from 2 – 21 storeys for city locations. There are also many examples of low rise buildings on large suburban sites – and the new Denver Children’s Hospital has been widely quoted as an example.

We would suggest that the issues around environmental quality relate more to the density of the buildings on the site than height. Development of strategies for securing demonstrable environmental quality in the context of an urban site should be an early priority for the Development Board addressing, for example –

- Outdoor play space or semi-covered space is important for children with long lengths of stay in hospital. The design should demonstrate the ability to achieve a variety of safe external areas close to inpatient wards. The location of the helipad in this respect requires consideration
- Permeability of the site is an important consideration in the context of operational requirements of the co-located hospitals, and external play space on upper floors will be easier to secure
- Strategies for minimising deep plan space and achieving high levels of natural daylight and outlook

- It will be important from a child protection perspective that the children's hospital is not unduly overlooked by the adult scheme. Therefore an adequate buffer zone is required between the 2 developments.

C3.5.4 Future Flexibility

The discussion in this section so far has focused on the ability of the site to accommodate anticipated capacity requirements to 2021, based on a service model which includes a number of off site A/UCCs to be implemented over that timescale.

The proposed Functional Content will accommodate significant growth beyond current provision and the future potential for further expansion, outlined in Section C2, is also significant.

From local and international experience it is widely acknowledged that change is a constant in health organisation and delivery. Therefore any development must anticipate expansion and a strategy for responding to future unknown needs. There are a number of generic approaches available, including –

- Flexible and generic planning within the physical envelope to allow space to be re-designated across services over time
- Inclusion of 'soft space' close to core clinical facilities can be re-located over time to facilitate in-situ expansion of core clinical functions
- Inclusion of 'shell' expansion space that can be fitted-out for use at a later stage. This is a high cost approach and carries the risk that expansion capability is locked in the wrong location

Figure C24 illustrates the capacity contingency available depending on the approach adopted for off-site provision. It is important that any opportunities are investigated to acquire sites that may become available within the private or public domain local to the Mater site that would contribute to building long term flexibility for all three hospitals.

C3.5.5 Overall Site Configuration and Tri-located Service Model

It is recognised that the site plan submitted by the Mater Hospital and the subsequent further development of these plans in the CUH submission, is indicative only at this stage and is not intended as a design solution. The proposal, incorporating an

expanded children's development and a future maternity hospital is an adaptation of the original Development Control Plan for the Mater site with the new Adult Hospital as a fixed point.

In terms of access and overall logistics there are a number of considerations which can be addressed by a coherent whole site plan for logistics and site pedestrian and vehicular traffic -

- Access to the Adult and Maternity Hospitals to and from Eccles Street
- Drop off points for vehicles at entrances to all three hospitals
- Site access points for deliveries and distribution to the Children's Hospital off North Circular Road or Eccles Street
- Communications routes from the Maternity Hospital to both the Children's and Adult Hospitals
- Blue light ambulance access to the Maternity block and generally containing ambulance routes on site from a safety and noise control perspective
- Access to car parking (presumed underground) to the maternity hospital site
- Requirement to accommodate expansion in non-clinical shared support services (for example materials management, equipment servicing, biomedical engineering) for children and potentially maternity services on Level -1
- Effective linkages between the adult new build scheme and services remaining in the old hospital.

We recommend that a co-ordinated comprehensive whole site development plan be developed.

If the Adult Hospital is commenced in advance of the Children's scheme it will be essential that clear parameters and an agreed development and design framework are in place to ensure the schemes remain mutually beneficial.

C3.5.6 Access and Carparking

With public policy focused increasingly on green transport solutions there are, within any major hospital development, conflicting – and potentially irreconcilable – perspectives on carpark provision. This is reflected in planning regulations which limit the car parking places within new hospital developments and promote the use of public transport. In this context the confirmation by the RPA that a metro station is to be located at the Mater site and Iarnrod Eireann's indication of support and intention to develop rail service links to the area are positive steps.

At the next stage of the project it will be appropriate to develop access and car parking strategies identifying -

- Prioritised provision for patients and for staff who frequently travel between sites, especially for emergencies
- Convenient parking for disabled visitors , staff and patients
- Adequate drop off and short term set down space at entrances to all 3 hospitals
- Short stay parking for families accessing Emergency Department in an emergency
- Workable solutions for staff together with a comprehensive mobility plan
- Pro-active management of car parking on and off site and across all 3 hospitals

Health boards should avoid selecting new hospital sites on the basis that plenty of car parking could be provided. In doing that they are just creating more illness in society

Hugh Barton, Adviser WHO Healthy Cities Programme

C3.5.7 Town planning considerations

Consultation with Town Planners is outside the remit of this Framework Brief. Issues to be explored at the next stage will include building heights, plot ratios, and design parameters. It will be appropriate to consult a number of external stakeholders including heritage groups, An Taisce, the RPA (Railway Procurement Agency), the Sisters of Mercy and others.

Any development on the site is likely to be considered in the context of a major urban regeneration of the area. A comprehensive planning framework for the locality including Phibsboro, the Mater Site, Mountjoy and Broadstone is in preparation, but has not concluded so there are no specific planning guidelines yet in place. In previous discussions between MCHD (Mater and Children's Hospital Development Ltd) and Dublin City Council the council considered that the site had capacity to absorb the scale of the proposed development suggested in the Mater Hospital Response and has indicated that it could be receptive to a higher and denser development beyond the plot ratios indicated in the Dublin Development Plan.

However, our International Adviser Ken Schwarz acting in his capacity as consultant to RKW has had informal discussions with the Planners together with the HSE to

discuss site development potential and it was confirmed that the authority was receptive to a denser and higher development on the site compared to earlier applications,

C3.5.8 Site Stakeholders

In moving forward we recommend that a forum is established to ensure dialogue across all future users of the site, including the universities, and to ensure that proposals are developed in the best interests of all parties.

"Entering a hospital can be an intimidating experience for anyone, but for children and their families it can be especially difficult. That's why we have worked so hard at the new Evelina to create an environment as far removed from the traditional institutional atmosphere as possible.....We have been working with children, parents and their carers ... to encourage them to 'tell their stories' about their time in hospital. This helped us to plan a ground-breaking training and induction programme to support the 900 staff who will be working in the new Evelina, ensuring we offer the best experience for current and future patients. The training, which uses 'scenes' from children's real life experiences played by actors, allows staff to reflect on what makes the experiences of children and their families the best they can be.

Dr Frances Flinter, Clinical Director,
Children's Services, Guy's and St Thomas's NHS Foundation Trust

*'The big conservatory feels like a breath of fresh air
.....that's what I miss when I'm in hospital'*

'There are no long scary corridors'

'This is a hospital that doesn't feel like a hospital'

Quotes from Children at the recently
commissioned Evelina Children's Hospital