



A WORLD CLASS TERTIARY CHILDREN'S HOSPITAL FOR IRELAND

15th September 2006

Our Lady's Children's Hospital, Crumlin, Dublin 12

....where children's health comes first



Executive Summary

The Board of OLCHC welcomes and supports the centralisation of tertiary level paediatrics and secondary care for Dublin, in a single Children's Hospital. In view of the fragmentation of services, which currently exists, and the infrastructure of two of the paediatric hospitals in the Dublin region, the Board is concerned that the new Children's Hospital is provided at the earliest possible date.

Towards assisting in progressing the project, the Board has produced this report to enable it to better understand the site proposed and its capacity to deliver the model of care required.

The report sets out the views of the Board regarding:

- The overall paediatric service context in which the hospital would be developed.
- The Governance arrangements for the project and the new hospital.
- The essential model of care (co-location with a maternity hospital) core values, criteria and functional requirements for a new Children's Hospital, and
- The space and capacity requirements to enable the new hospital to function- now and over the long term – as a World Class Facility for children.

Critical to the Boards consideration is that the optimum model of care encompasses the integration of clinical, educational and research services, in the new hospital. In addition, easy access and adequate parking to the hospital for patients, families, visitors and staff is considered to be essential.

The Board reviewed the site proposed in the context of a framework for analysis, based on its optimum model of care, core values, criteria, functional and access requirements. On the basis of the outcome of this review, the Board does not consider that the site in the Mater submission selected by the Joint DOHC / HSE Task Group has the potential to deliver a facility, which can comply with the optimum model of care. In this regard, the Boards main concerns relate to size / space and accessibility to the Mater site. As a result the Board considers that there is a risk of this opportunity, to provide a World Class Children's Hospital, being lost and is suggesting that the decision to locate on this site at the Mater Hospital be reviewed. The Board recommend that the location of a new hospital on a Greenfield site be reconsidered as being the best option to deliver the optimal model of care and service delivery at competitive cost and in a reasonable timeframe.

Acknowledgements

The Board is grateful to the following who have contributed to both the document and the preceding workshop, including:

Tony Donoghue, Health Facility Planner, HOK International UK

Brian Cullen, Cullen Payne Architects, Dublin,

The key technical analysis contained in this report was provided by the above. Both experts have an in-depth knowledge of OLCB and the requirements for a new Children's Hospital following on from their work on the Development Control Plan (DCP) for the hospital. Both had been selected following open competition for the DCP in 2004 by a joint DoHC/ERHA/OLCB Project Team.

The Staff of the hospital and of the Children's Medical and Research Foundation also made a major contribution to this report.

We are also indebted to the contributions from the following during the course of our two-day workshop (July 20th/21st), and technical assessment:

Professor Roger Ulrich, Department of Architecture, Texas A&M University

Cathy Seguin, Vice President International Affairs, Hospital for Sick Children, Toronto

Dr Chris Fitzpatrick, Master of the Coombe Women's Hospital and colleagues.

In addition, in order to familiarize staff of the hospital with other paediatric hospitals of repute visits or contacts have been made to the following:

Children's Memorial Hospital, Chicago

St Jude's Memorial Hospital, Memphis

Hospital for Sick Children, Toronto

Great Ormond Street Hospital, London

Royal Children's Hospital, Melbourne, Australia

Manchester Children's Hospital

Starship Children's Health and National Women's Health, New Zealand

University of California, San Francisco, USA

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1. INTRODUCTION

Our Lady's Children's Hospital (OLCH) wishes to play a full and active part in partnership with the Health Services Executive (HSE), Department of Health and Children (DoHC) and the other paediatric hospitals in pursuing and achieving the goal of a World-Class Paediatric Hospital in Ireland. Towards this end, the Board of Directors of the hospital is putting this document forward, as a basis for consideration by the key decision makers, in the hope that they will review the requirements for a world-class tertiary and secondary paediatric hospital.

The Board considers that there is an opportunity now to achieve an optimum result for children in providing such a state-of-the-art facility. There is clear HSE & DoHC policy position, capital funding available for and keen philanthropic interest in being involved in the development.

From several points of view, such as quality of care, core values, and value for money it is imperative to ensure that the new hospital site will be able to provide for the scale of services, accessibility, parking, education and research facilities required for a world class facility, in a non fragmented environment which will have sufficient capacity for future expansion and the essential co-location with a maternity hospital.

CONTEXT

In October 2004, The Board of Our Lady's Children's Hospital submitted to the Tánaiste and Minister for Health and Children, a Development Control Plan for the redevelopment of the hospital on its current site. While the DCP for the Crumlin site was being considered, significant support from within the DoHC and the hospital emerged for the development of the hospital on a Greenfield site. The Board was considering proposals to this effect, when the Health Services Executive's Review of Paediatric Services commenced in late 2005. At the same time, the development of the Mater and Children's University Hospitals were put-on-hold, pending the outcome of this review.

The overall objective of the review was to provide an evidence base to facilitate the development of paediatric services in the best interests of children.

The consultancy firm of Mc Kinsey & Company Inc. were engaged by the HSE to provide advice on international best practice in tertiary paediatric services based on research, analysis and experience of their firm. Their report "Children's Health First" *International best practice in tertiary paediatric services, implications for the strategic organisation of tertiary paediatric services in Ireland*, was presented to the HSE on the 2nd February 2006. Subsequently, a Joint Task Group with membership from the HSE, DoHC, and the Office of Public Works (OPW), was formed to advice on the optimum location for the new National Children's Hospital. As regards the model of care and service organisation to be delivered on the site selected, the Board submitted its recommendations to the Joint Task Group on the 3rd of March 2006, stating that the new Children's Hospital should be co-located with a Maternity Hospital, in the best interest of

health outcomes for neonates as part of an integrated clinical/research/educational model of care.

The Joint Task Group concluded its report recommending that the new single; Tertiary Children's Hospital should be located on the site of the Mater Misericordiae University Hospital (MMUH).

Ireland now has a rare opportunity to create a very special health resource- a national paediatric centre that will stand comparison with any worldwide. This opportunity comes with the restructuring of Dublin based paediatric services and the redevelopment of the most important hospital facilities for children for the next fifty years.

THIS DOCUMENT

Our Lady's hospital brings with it fifty years of experience in planning, managing and delivering tertiary and secondary level acute hospital care for children – from Ireland and abroad-with highly complex and often life threatening conditions.

During this time, the hospital has been honoured to collaborate with the other two paediatric hospitals in Dublin as well as paediatric units outside Dublin, the primary and community services, hospitals and agencies abroad, the adult acute hospitals, the HSE and its predecessors and the DoHC.

In addition, OLCH has provide undergraduate and post-graduate training in medicine, nursing and to allied health professionals and has been the location for the Children's Medical Research Foundation, since 1966, and also the National Centre for Medical Genetics since 1996.

The document has been prepared following a two-day workshop for senior hospital staff, invited experts and technical contributors. This was followed by due diligence and review process on service and site requirements. It strives to demonstrate the evidence base towards ensuring that all elements, which are required to effectively implement the decision to centralise the National tertiary services and the local secondary services, in a single hospital, are taken into account.

The Board is of the view that it is critical that, **before** the actual site is ceded and a high level framework brief developed, that there is consensus on matters such as design values, functionality, core/non-core services, shared services, and capacity.

A critical consideration in this sequencing is that there is a clear agreement at the outset on the optimum model of care and the organisation of services to be provided, as part of the Tri-location of Paediatric, Maternity and Adult acute services before the actual site in the MMUH campus and its orientation is decided upon.

The Board feels that failure to do so will compromise the optimum development, provision and future expansion of an integrated treatment, education and research service for children.

CHAPTER 1 INTRODUCTION

KEY POINTS:

- An excellent opportunity now exists to support the development of world-class paediatric care in Ireland arising from the policy decision to develop a new Tertiary Children's Hospital.
- The Board is of the view that it is critical that, **before** the actual site is ceded and a high level framework brief developed, that there is consensus on matters such as design values, functionality, core/non-core services, shared services, and capacity.
- It is necessary to define the overall service context and the core values required to shape the Children's Hospital, to ensure it realises its potential as a national resource.
- This report evaluates the nominated site against the key requirements.

2. GOVERNANCE

The Board welcomes the decision taken by the Government that it is committed to ensuring that the new Children's Hospital would be multi-denominational and pluralist in character and that the development of the new hospital will be undertaken by an independent entity to be established by the Minister for Health and Children.

In this regard, the Board assumes that the Governance of the new hospital, in relation to its operation, when built and commissioned, will also be undertaken by an independent entity similarly established.

The Board is committed towards ensuring that O.L.C.H. will play its full part in the Governance of the new hospital, in both its development phase and ultimately in the operation of the new hospital.

The Board notes that the Joint Transition Group recently established to bring the project forward, will be mandated to address matters, which are critical to the achievement of a World Class Children's Hospital. Chief amongst those are:

- *Transfer of the site from the Mater Misericordiae University Hospital (MMUH)*
- *Definition of a high level framework brief*
- *Determination of the scope and location of the urgent care centres (which will have an impact on the functions, resources etc of the main hospital) and*
- *Advance considerations on the co-location of maternity services*

In the context of Governance of the Children's Hospital and the management of the campus hosting the three hospitals, in the future, the ownership of the sites above and below ground level needs to be agreed as part of the ceding of the various sites.

Joint Transition Group

Towards progressing and addressing these key issues, it is considered necessary by the Board to involve the key stakeholders in a more structured way than is apparently being done through the membership of the Joint Transition Group. In this regard the Board considers that membership should include experts/specialists whom, it is considered, would be beneficial to the process. These would include Paediatricians, other paediatric professionals, financial expertise for assessing the costs and benefits of different planning, design and build options. In addition, the Board considers that the Paediatric Hospitals should be represented directly on the Group, as well as the HSE's Dublin-Mid Leinster Acute Hospital Network Manager, who deals with two of the three hospitals to be amalgamated.

Statutory Development and Governance Boards

The memberships of the Statutory Development Board, and of the Statutory Board to be established to Govern/Manage the hospital when operational should reflect the principles of the Government decision that the new hospital will be an entity, which is independent in Governance, management, budgetary and other arrangements relevant to its independent status and its statutory remit. The appropriate Governance arrangement would provide that membership of the Board should be comprised of the three paediatric hospitals and from paediatric units nationally, as well as the HSE and the university partners.

Management of the Site

Following on from this, the Board considers that it would be possible to achieve a better outcome for the overall management of the site, through coordinating management arrangements, other than through “overarching Governance arrangement” as envisaged by the Joint Task Group. The operational coordinating mechanisms, such as shared or purchased services – could, for example, be addressed through a Joint Management approach, established by the three hospitals, which will be sharing the site. The details of this could be worked out as part of a Memorandum of Agreement between the Boards of the three hospitals in question.

Site Ownership

The Board wishes to draw attention to the critical issue of site ownership, in the context of the Governance of the New Children’s Hospital. The need for clarity and agreement on the adequacy and orientation and expansion needs of the site for the new hospital have been addressed previously. The question of ownership of the site below the ground of the new hospital has to be addressed and determined as part of the Governance arrangements, as an essential part of the work of the Joint Transition Group. If the hospital is to operate as an independent entity, on a site ceded by the Mater Hospital, it is critical that it has commensurate ownership of the site below ground, for, inter alia, dedicated car parking, income generation and operational functions such as the transportation of waste and laundry.

CHAPTER 2 GOVERNANCE

KEY POINTS:

- The new Tertiary Children’s Hospital must be independent in its governance.
- Membership of the Joint Task Group and the Governance Board of the new Children’s Hospital should be representative of the key stakeholders.

3. CORE VALUES

Ireland has an opportunity, unlikely to be repeated for a very long time, to create an exemplary paediatric health service, served by a world-class tertiary hospital. It arises from the coincidental re-structuring of Dublin-based paediatric services and the redevelopment of the most important hospital facilities for children. The effect of decisions taken now about the conception and siting of the hospital will be felt for at least 50 years. The Board considers all concerned with the project have an onerous responsibility to make the right decisions supported by the best evidence and opinion available.

In this regard it considers that the following issues will determine the outcome of the process and should be the starting point for deliberations:

- *The overall paediatric service context of which the Children's Hospital will be part.*
- *The Core Values required to shape the Children's Hospital to ensure it realises its full potential as a national resource.*

THE PAEDIATRIC SERVICE CONTEXT

Hospitals do not function in isolation from other parts of the health system. The new hospital therefore needs to be conceived in the context of a well thought out paediatric service plan, with national, regional and local dimensions.

The recent announcement from the HSE concerning the Joint Transition Group refers to “Co-ordinating policies between hospitals” and “Urgent care centres”. These are important aspects of children’s health services but in themselves isolated components. The Board feels that there is an urgent need to establish the principles, roles and relationships which will govern a comprehensive national and regional paediatric service before moving to designing the facility.

CORE VALUES FOR A WORLD-CLASS NATIONAL CHILDREN'S HOSPITAL

The New Children’s Hospital must be based on a clear vision and, if it is to be truly world-class, draw inspiration from the best of international examples. The Board’s vision for the New Children’s Hospital is defined by three Core Values:

- *The new Children's Hospital **must** be co-located with a full-service maternity hospital*
- *The new Children's Hospital **must** be an integrated academic health sciences centre, the model adopted by leading paediatric tertiary hospitals world-wide*
- *Resources for the development of the Children's Hospital – land, space and design values-- must be commensurate with a family-centered, world-class institution respecting the needs of its staff and sufficient to sustain it, as such, over the long term*

CO-LOCATION WITH A MATERNITY HOSPITAL

The New Children's Hospital must be co-located with a full service maternity and women's hospital including high risk/tertiary neonates. Co-location in this context means an intimate physical adjacency – no more than the width of a corridor --between maternity and paediatric services with neonatal intensive care forming the service bridge between the two. Such a co-location will eliminate the transfer of very sick neonates between hospital sites and speed intervention by the multi-disciplinary paediatric team. It will effect a lasting improvement in neonatal morbidity and mortality, benefits which have been demonstrated in well-researched submissions by many obstetric and neonatal consultants. They are of such a magnitude that the Board believe the maternity component of development should proceed simultaneously with the new Children's Hospital.

Tri-Location Model

Ideally the New Children's Hospital and the maternity hospital will be aligned with an adult teaching hospital in a "Tri-Location Model". Tri-Location is a desirable objective, which must be balanced against a variety of considerations such as "...the suitability and flexibility of available sites"¹. We, and our obstetric and neonatal colleagues, believe that co-location of paediatrics and maternity remains the first priority and an essential goal. This is considered to be compatible with the recommendations of McKinsey².

A CHILDREN'S ACADEMIC HEALTH SCIENCE CENTRE

The Board have been impressed by the quality of children's health care which is evident in certain overseas paediatric tertiary hospitals. It believes that this is the result of a far-sighted decision to integrate patient care with professional education and research creating a "paediatric academic health science centre". Excellence in patient care over the long term derives from best clinical practice disseminated through first class professional education informed by research. As the national focus of paediatric health care expertise in Ireland it considers that this integrated model should be the basis for the New Children's Hospital.

An effective academic health science model will be achieved through the physical co-location of all of its three elements on the same contiguous site. Physical fragmentation, no matter how slight, will detract from efficacy of the bench to bed-side to community health care continuum which lies at the heart of this value; and, it is inefficient. Inefficiency increases in proportion to the distance and travel time between elements. Education and research must be core elements of the New Children's Hospital. This was the consensus view of the recent workshop emphasised and supported by both the academic and research representatives.

The views expressed by leading paediatric centres world-wide are instructive:

¹ McKinsey & Company, *Children's Health First: International best practice in tertiary paediatric services: implications for the strategic organisation of paediatric services in Ireland*. February 2006, p. 59.

² McKinsey & Company, p. 59

The Royal Children's Hospital (RCH), Melbourne is in partnership with the Murdoch Children's Research Institute (MCRI). As it moves to a comprehensive redevelopment it has stated ³:

"Teaching, training and research are fundamental elements of RCH..."

"MCRI believes that research, whether laboratory, clinical or public health, ethics or education, works best if fully integrated in space and concept with clinical and public health care. This co-location on one site ensures access to the latest clinical developments, including clinical trials, and new diagnostic modalities."

The Hospital for Sick Children, Toronto, integrates clinical, education and research activities seamlessly essentially on a single site. Its corporate web-site notes that

"As innovators in child health, Sick Kids improves the health of children by integrating care, research and teaching."

"Its central mission is to deliver exemplary patient care, to train the next generation of health leaders, and to develop new interventions and treatments."

Great Ormond Street Hospital, occupies a notoriously constrained site in central London. Yet, in recent communication they refer to:

"... our portion of the "island" site, shared with UCL (University College London) ICH (Institute of Child Health) -- our academic partner from whom we could not be separated. When we have looked at moving away from GOSH we have (had) to include them (ICH) @ c. 15,000 sq m."

RESOURCES FOR A WORLD-CLASS FACILITY – LAND AND SPACE

Physical resources -- site area and building space -- must match the vision of a national tertiary centre. A world-class facility will look to the best examples of paediatric development world-wide. It must embody following the principles:

- *An integrated, academic health science centre model*
- *Clinical and diagnostic services delivered in dedicated children's facilities, in the Children's Hospital*
- *Space for a child and family centred approach*
- *Space and design that reflect the projected volume and sophistication of services*
- *Potential to accommodate change, growth and renewal*
- *A location to which families and staff can travel using the mode of transport which best suits their needs*
- *Potential to create an attractive, supportive therapeutic and working environment incorporating the best practices identified by a growing body of evidence-based research*

³ Royal Children's Hospital, Melbourne, *Service Plan Final Draft*, 2004

Dedicated Facilities for Children

“Care will be provided in an appropriate location and in an environment that is safe and well-suited to the age and stage of development of the child or young person.”⁴

The Board believes that the needs of children will be met best through clinical and diagnostic services delivered in a child-only as well as child-friendly setting, served by appropriately trained and experienced medical, nursing and paramedical staff. Anything less would represent a serious dilution of the concept of the new Children’s Hospital. Therefore the configuration must be distinct children’s services and amenities in the Children’s Hospital. There may be rare instances when this ideal cannot be met. Combined adult and child facilities should be entertained only where the alternative would compromise quality and safety of care; and would require an exceptional economic outlay.

The following categories of service and facility must, without compromise, form part of the Children’s Hospital physically and operationally. A comprehensive listing of essential child-only services and facilities is shown in Appendix A.

Accident & Emergency Department	All Standard Acute Care Inpatient Beds
General and Sub-Specialist Outpatient Clinics	Critical Care Medicine
Operating Theatres	Rehabilitation Therapies
All Surgical and Medical Day Care	Clinical Support
Diagnostic Imaging	
Sub-Specialty Diagnostic Services	Education and Research
Pathology and Laboratory Medicine	Corporate/Executive Functions
National Centre for Medical Genetics	Main Entrance & Public Services

Pathology and Laboratory Medicine

A world-class national reference centre for children must be served by a dedicated paediatric laboratory service, functioning integrally with other elements of the Children’s Hospital. The laboratory professionals of the Children’s University Hospital and OLCH are in complete agreement on the need to maintain a physically and operationally distinct paediatric laboratory service. (Appendix B).

The National Centre for Medical Genetics

A genetics service has been a part of OLCH for many years. Latterly this has been designated as the NCMG but it remains both a department of OLCH and a national resource on which children’s services depend heavily, particularly in the area of haematology and oncology. As the genetic basis of disease is explored and new therapies move from the research to clinical application it will be imperative for the Children’s Hospital to retain and develop its present close relationship with the NCMG. It must be an integral part of a New Children’s Hospital.

⁴ Department of Health, United Kingdom, *Getting the right start: National Service Framework for Children; Standards for Hospital Services*, Department of Health 2003

Other “Shared” Support

Joint services –shared or purchased by the Children’s Hospital from a host hospital or third party -- should be considered only when there is a demonstrable economic case and clear evidence that quality of service, from a paediatric perspective, can be maintained at the highest level.

However, any service that impacts directly on the quality of the patient stay should remain in the control of the Children’s Hospital. In this respect Pharmacy and Food Services are significant examples. The management of paediatric medications, especially at a tertiary level, requires special expertise. Food Service for children is different from adults. This is especially so when modern food service for children moves from trays and set meal times to Room Service and Food-on-Demand models.

Child and Family Centred Care

Child and family centred care means actively involving both child and family in the assessment, planning and delivery of care. The new facility must be sized and designed with children’s needs to the forefront; and, allow parents to be present and engaged throughout their child’s encounter with the hospital. The wider needs of families must also be accommodated. Child and family centred care requires space, specifically:

- *All inpatients accommodated in private, single-bed rooms with en-suite bathroom*
- *All patient bedrooms be capable of accommodating one and preferably two parents*
- *Separate rooms for parents close to their child where it is not practical or desirable for the parent to stay at the bedside continuously, for instance the Intensive Care Unit*
- *Additional amenities for parents – kitchens, lounges, private reflective spaces healing gardens – to enhance their stay*
- *Accommodation for families who attend the hospital for longer periods – for instance those with infants in the NICU – or who attend repeatedly over long periods*
- *For the unique needs of children in hospital -- School Programme, Play Therapy and Music Therapy*
- *Facilities for the support of siblings of children who require frequent admission or long stay care*
- *Additional amenities to support the connection of parents with their home and work environment- communications, internet access, etc.*

As ambulatory models of care become more widespread it will be important to recognise the needs of patients and families in these settings. An outpatient visit in the tertiary setting may involve multi-stage encounters and last all day. Space consuming facilities will include:

- *Comfortable, private non-clinical space for interaction between parent and the clinical team, when addressing difficult issues related to a child’s condition*
- *Play therapy resources*
- *Day lockers and storage for buggies*
- *Food and refreshment areas appropriate for children*

- Long stay play space for siblings
- Diversionary amenities for patients and families between multiple appointments or awaiting test results such as a children’s library
- A Child Health Information Centre to support families in self-directed research into their child’s condition

Space for the Projected Volume and Sophistication of Services

The New Children’s Hospital will have the critical mass of patients and concentration of expertise to offer the most sophisticated care possible. It will be one of the busiest hospitals in Ireland receiving more than 153,000 outpatient visits, discharging over 24,000 inpatients and around 20,000 day patients. In addition it is likely that some significant proportion of emergency activity of 150,000 will arrive at the site. Much of this care will be at the tertiary level. Tertiary care is by definition complex and this reflects in the space requirements of the hospital. A sense of this complexity is conveyed by the case descriptions included in Appendix C.

With this in mind the Board feels that size of the new hospital should be determined through a functional planning and briefing exercise initiated by the Development Board with a minimum of pre-emptive limitations, particularly a predetermined site. Hopefully, that process will take into account an appropriate vision for the hospital, such as we have set out in our Core Values, as well as the volume and sophistication of the care delivered.

International Comparisons

In thinking about the term “World Class” it is important to understand the spatial range of hospitals fulfilling similar roles internationally. To that end the Board have reviewed a number of children’s hospitals world-wide using gross area per inpatient bed as a comparator. This measure is susceptible to quite small variation in the definition of “a bed” but it remains a useful, if only rough, indicator of comparative size. The following table shows the results of that survey. The survey, while not exhaustive does give a useful insight into the question of how large the hospital will need to be. (Further detail regarding these international examples is given in Appendix D.

	Gross Area/ Inpatient Bed Sq M	Gross Area Sq M	Inpatient Beds	Total Beds/Day place	Status
Hospital for Sick Children, Toronto	644	173,271 ³	269	+/-330	Actual
Great Ormond Street Hospital	448	128,000	286	410	Projected
Royal Children’s Hospital Melbourne	353	95,753	271	336	Projected
Children’s Memorial, Chicago	293	80,865 ¹	275	315	Projected
Manchester Children’s Hospital	164	56,250 ⁴	343	393	In constr’n
Crumlin ODCP	288	80,800 ⁵	281	350	N/A
Task Group Terms of Reference	230	78,000 ⁶	339	380	N/A

Notes

- 1) North American gross area is approximately 5 per cent greater than GIA used in Ireland and the UK.
- 2) Inpatient beds rather than total beds used as comparator since day beds not recognised in North America.
- 3) Excludes approximately 20,000 sq m attributable to the Research Institute; total space 193,000 sq m.
- 4) Gross Area is calculated from a reported Departmental Gross Area of 50,000 x 1.25.
- 5) Based on Cyril Sweet Brief x 1.25 to GIA with 17 per cent expansion space.
- 6) Gross Area includes 20 per cent expansion as specified in the Terms of Reference.

- Hospital for Sick Children is a referral centre for the Province of Ontario, with a population of over 12 million. It was originally projected to operate over 500 inpatient beds but now uses less than 300. It reports that space remains a chronic problem and in addition to its core space leases a further 23,000 sq m.
- Children’s Memorial Hospital, Chicago is a stand-alone paediatric facility although affiliated with North Western General Hospital. It will feature all single room patient accommodation including variable acuity rooms capable of housing patients requiring transition to standard acute care to critical (intensive care).
- Manchester Children’s Hospital will have approximately 60 per cent of its bed capacity in single rooms. It includes an emergency department, imaging and laboratories: only nuclear medicine and the stem cell laboratory are shared with the adult hospital. Unfortunately no provision was made in the original plans for these rooms to accommodate parents.

The survey reveals a wide variation in size of hospitals which are of generally similar capacity measured in terms of inpatient and total bed capacity. The space projection used in the Task Group siting study lies at the lower end of the range possible. It is substantially less than the space projected by Cyril Sweet in the Design Brief for the Crumlin ODCP⁵. It is difficult to imagine the New Children’s Hospital will accommodate far higher levels of activity, in quality facilities and occupy substantially less space.

The Board believes that the Task Group space allowance for the new hospital is too conservative to ensure that all required functional content is housed satisfactorily and that overall the facility is truly world-class. An appropriate space allowance will be not less than 280 gross sq m per inpatient bed and could exceed 300 sq m. International comparisons support this position.

Impact of Shared or Purchased Services on Total Area

Another perceived benefit of co-location is the space saved through sharing of services. The Board have examined the potential impact of sharing non-clinical support services so that minimal space for these functions is embedded in the Children’s Hospital. If a mix of support service and administrative functions (as listed in Appendix E) could be secured from the host hospital, or elsewhere, the maximum reduction in total building area is likely to be less than 10 per cent. This reduction will be offset in part by increased space required in the host hospital.

Functional Adjacencies and the Floor Plate

Functional adjacencies are at the heart of successful hospital design. A small number of such adjacencies are critical and a factor in defining an ideal site area. For a children’s hospital the safe, efficient provision of anaesthesia and sedation is a key determinant. As a consequence it is important to create horizontal adjacencies which will avoid or minimise the need to transport an anaesthetised, or recovering, child by lift. In addition the advanced programmes of care in a tertiary hospital, such as paediatric cardiac surgery, often entail the movement of very sick patients needing ventilatory and attendant support

⁵ Cyril Sweett, *Design Brief Final Version*, February 2004.

systems such as ECMO pumps. This cluster of activities is the “Unconscious Floor” – a functional grouping which brings together at a single level:

- Operating Theatres, including first stage recovery
- Critical Care, including Paediatric and Neonatal Intensive Care Units
- Medical and Surgical Day Care facilities
- Diagnostic Imaging, especially the advanced scanning and interventional units but also including fluoroscopic screening, nuclear medicine and ultrasound

On the basis of the analysis in Appendix F the Board considers that the “Unconscious Floor” will require a footprint of 12,500 floor gross sq m, and preferably more.

Growth Change and Renewal

The New Children’s Hospital will serve Ireland for at least a generation and probably longer. The ability to change, grow and ultimately renew is as important as the realisation of the initial vision. Institutions which cannot change will atrophy. Growth and renewal are inevitable and unavoidable events in the life of institutions and dependent upon sufficient site area.

The Hospital for Sick Children in Toronto has completed a major development project in every decade from 1950 until the 1990’s, gradually filling its 3.3 ha site. The history of Our Lady’s Hospital from its opening in 1956 until the present day is a further example of this process of expansion and ultimate obsolescence.

Therefore, choosing a new site presents a fundamentally different problem from extending or replacing a facility where existing investment and established services dictates the site. In such instances bare feasibility is a reasonable criterion of suitability. A new site offers the priceless opportunity to position an institution to meet the evolving needs of health care in the future: the criteria in this case must be more demanding and address a yet to be defined future.

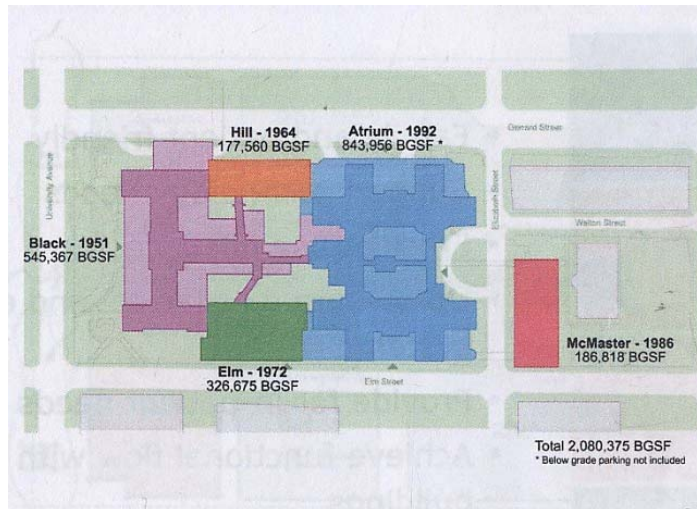


Diagram 1: Growth and Change, Hospital for Sick Children, Toronto



Diagram 2: *Growth and Change in 50 years OLCH, Crumlin*

Land will be the single most valuable resource for the New Children’s Hospital. It will determine the initial building footprint, building form and massing and of course the ability to grow and change. The site area will influence perceptions regarding the character of the setting and physical environment of a development.

How much land is enough? There is no absolute answer to this question but one can postulate an approximate, and rational, answer by saying that it would be a site which can accommodate:

- A gross building footprint consistent with functional needs
- Vehicular access to a main entrance and emergency entrance at a minimum
- Short term surface parking to serve these entrances
- Permanent open amenity space for patient, family and staff
- Specified expansion of the built area of the hospital
- A strategic reserve of land for long term renewal

Using these parameters a reasonable minimum site area for a new Children’s Hospital and a maternity hospital as envisaged would be in the range of 4-5 ha. This area does not include any explicit provision for longer-term car parking on surface or an above ground structure. The basis of this estimation is shown in Appendix G.

Travel and Parking

The workload of the New Children's Hospital, (excluding emergency patient numbers), extrapolated from the three existing children's hospitals is unlikely to be less than shown in the following table.

	<i>Inpatient Admissions</i>	<i>Day Cases</i>	<i>Outpatient Visits</i>
Paediatric Annual Total	24,000	20,000	153,000
Paediatric Daily Average	+/- 80	+/- 80	+/- 640
Maternity Annual Total ¹	17,000	9,900	64,000
Maternity Daily Average	+/- 75	+/-40	+/- 270
Total Annual	41,000	29,900	217,000
Total Average Daily	155	120	910

Notes

1) Based on Coombe Women's Hospital

The combined children's and maternity workload is likely to exceed that of the host hospital. There will be at a minimum double the number of staff and double the number of patient activity. Each of these encounters will generate a trip to the hospital; and, each inpatient admission will generate further trips by visiting friends and relatives. Travel and parking are of fundamental importance in selecting a site. A traffic impact study would have been valuable in assessing the access issue.

Families

Families should be able to, and most certainly will, select the means of transport which best meets their needs. Ideally a new site will offer an effective choice of public transport with good connections to rail termini and the airport. Notwithstanding, a new site must have adequate parking for families. The private car is likely to remain the preferred choice for many parents, both those living locally and those who are travelling a greater distance. A private vehicle is often most convenient when siblings must also travel to the hospital; or, where the family must bring a large quantity of personal belongings to support an extended stay. A recent family survey of inpatients and outpatients was conclusive in its results. Of over 700 families questioned 81 per cent had travelled to the hospital by car and only 10.5 per cent by public transport. Approximately ten per cent of the full survey were questioned as to whether they would consider public transport if it were more convenient and accessible. Ninety-seven per cent would not consider it no matter the circumstances. There is also anecdotal evidence that many if not most visits to accident and emergency, sometimes involving serious conditions, begin with a trip in the family car.

Staff

OLCH will provide the largest pool of paediatric expertise for recruitment to the new hospital. Currently, staff reside in a geographical disposition which reflects the location of OLCH. That disposition is strongly biased to South Dublin and even into parts of Wicklow and Kildare. Over time this pattern will adapt to reflect the location of the new Children's Hospital but in the short and medium term it is likely that many staff will be faced with a long journey to a new location, a journey which is not convertible to walking or cycling. Pending major improvements to the public transport infrastructure of the city, most of which are many years in the future, there needs to be adequate provision for

parking for private cars which will remain a popular and often unavoidable choice for many.

EVIDENCE- BASED DESIGN

The foundations of good patient outcomes are well-structured services, well-planned and managed care, and of course, the skills of individuals supported by the best technologies available. In addition over the last decade or so a growing body of evidence has accumulated around the significant additional benefits on the course of recovery from illness derived from design values based around the patient experience. The patient experience is now the focus of design and operation for good healthcare and must be the central consideration in the process of defining the physical configuration and capacity requirements of the new Children's Hospital.

There is a great opportunity to create an environment suitable for healing and care and built to support achieving the maximum return for the investment made in terms of patient outcomes.

Some of the issues which have been highlighted by recent experience and research in planning and designing for patient outcomes and safety are:

- The patient outcomes, safety and cost evidence for single rooms
- The growing size of single rooms in new developments
- The value of designing for light enhancement and noise management
- Designing for good work planning
- A focus on safety will help create a healing environment
- The business case for evidence based design
- Facility flexibility is essential to long term value

The patient outcomes, safety and cost evidence for single rooms

One of the key features specified by the Board as a basic requirement for the support of family centred care in the new hospital development is the provision of single rooms for in-patient accommodation. The support of the presence and integration of care with parents and siblings is an integral part of our model of care. But there is also compelling and extensive evidence and research in support of exclusive single room accommodation with regard to patient outcomes and safety⁶.

- A strong case has been made in the NHS for the connection between a reduction in healthcare associated infection (HCAI) and improved hospital layout particularly the

⁶ Rubin H.R., A.J. Owens and G Golden 1998, *An Investigation to determine Whether the Built Environment Affects Patients Medical Outcomes*, Report Martinez, CA: Centre for Health Design.

provision of single rooms^{7 8}. The research undertaken by more than 150 scientific studies in this area⁹ indicates that the design of buildings can have a significant impact on the control of infection including MRSA and help reduce the more than £ 1bn annual cost burden of HCAI's in the UK. Design must be evidence-based to ensure that the potential for HCAI is reduced, not increased. Through advances in treatment patients in hospitals today are more compromised and debilitated than 10 or 20 years age and HCAI is therefore a greater risk. This trend will continue and the design of hospitals must be capable of meeting this challenge in the future and the provision of single room inpatient accommodation is seen as a key factor in this.

- France has used single bed patient accommodation in all new hospitals for 20 years. There are two strong assumptions behind this apparently expensive choice: firstly bed utilisation is superior and secondly patient recovery is faster. Based on international evidence, modern hospital design has moved to single room accommodation to reduce hospital acquired infections, such as M.R.S.A. At a less critical level, patients in single rooms have several of the most desired facilities, privacy, quietness and control of conditions.
- The utilization of single rooms is considered to facilitate management of bed availability leading to improved utilization and therefore more effective use of resources, particularly the universally scarce resource of paediatric nurses. This is because the challenges of placement of patients based on gender or speciality arising from the use of multi-bed rooms are negated.
- Research in the US has provided evidence of reduction in medical errors, including medication errors, by the reduction in patient transfers arising from the use of single rooms.
- The Joint Commission on Accreditation of Healthcare Organisations in the US has claimed that private (single) rooms with a window to the outside will shortly be mandatory for all paediatric patients (excluding newborn).
- For examples of practice in world-class institutions, in all current and new configurations of inpatient facilities in Sick Kids in Toronto only single room accommodation is considered. Likewise the development of a new facility for Children's Memorial Hospital in Chicago plans for 100% single rooms of significant size.

The growing size of single rooms in new developments

The configuration and sizing of single rooms has been developed to recognise evidence of changing needs of family's patient care and patient safety. Design values in some recent developments in the US are now being enhanced to accommodate oversized single rooms

⁷ NHS Estates, *Exploring the Patient Environment*, Report from workshop held in Leeds UK, June 24 2003.

⁸ Ulrich RS., 'Evidence based design to enhance patient safety', *The environment for care: An NHS symposium*. London: The Stationery office, 2004.

⁹ Anjali J., *The Impact of Design on Infections in Healthcare Facilities*, The centre for Health Design, July 2006

with dedicated space for patients, family activities, and sufficient capacity for in room procedures with decentralised nurse stations that place nurses in close proximity to their patients and supplies. The issue of adaptability of rooms to cater for all acuity levels in support of management of transfers is also being researched and may deserve consideration in the design and service flow brief for the new hospital. Family needs in terms of capacity for two parent stays, access to technology to reduce isolation from their work or family environments, sufficient space for sibling interaction, etc. are now considered to be superior for health outcomes and family support.

The Board consider that such values should be accommodated in the design and configuration of the new hospital in order to match the highest of standards available elsewhere, notwithstanding the space demands that this places on the optimum site and building size for the development. The sizing of rooms in the redevelopment of Chicago Memorial hospital is planned for 30-33 sq m.

The value of designing for light enhancement and noise management.

In a study undertaken comparing UK hospital design and building costs with France there are two particular design related issues where value appears higher in the French product: the use of single rooms for patients and the general provision of daylight and views to all areas. The value point of the French daylight regime is that it provides better staff wellbeing, aiding recruitment, retention and good patient care. Staff amenities in France also reflect this respect for staff in a way not found in the UK equivalent.

In studies in the US patient outcomes and lengths of stay have been shown to be superior where natural light and views of nature are integral to patient rooms¹⁰. There is strong evidence that exposure to bright light improves sleep and circadian rhythms. The evidence of results achieved through the use of gardens and green spaces both for patient outcomes, family support and staff stress management are also compelling for the integration of such features as core values in the brief for the design of the new hospital¹¹.

There is also growing evidence from research into design features for noise reduction that support improved patient outcome, patient and staff stress. The provision of single rooms is an integral part of noise reduction for patients, with evidence of better sleep, reduced pain medication, and shorter lengths of stay. Other design features targeting noise reduction particularly to accommodate patient communication and confidentially are now considered to be necessary in optimum design. It is also important to note that many of the design features that help relieve patients stress also relieve caregivers stress. Car parking facilities for staff, access to gardens and courtyards, are all examples of facilities which support the design of healthcare facilities which demonstrate respect for staff needs and value loyalty, recruitment and retention. A good example of such accommodation values is RCH in Melbourne which has views of parkland on three sides of the hospital.

¹⁰ Ulrich, R., *View through a Window may Influence Recovery from Surgery* Science 224 (647):420-421 1984

¹¹ Evaluating a Children's Hospital Garden Environment: Utilization and Consumer Satisfaction Journal of Environmental Psychology 21(8)

Designing for good work planning.

There have been valuable studies undertaken in the US, which support the integration of design values with good work flow and service management planning¹². De-centralised nursing stations with view of single rooms, technology access, and localised storage for example support the reduction in nursing time spent on ‘hunting and gathering’ and walking thereby giving increased time to patient care. The resultant value can be assumed in terms of outcomes, improved patient safety, improved work satisfaction and lower staff turnover.

A focus on safety will create a healing environment.

Just as a healthcare facility can be designed to moderate stress, so can it be designed to enhance patient safety. The combination of process design improvements and facilities design improvements can save lives, money and institutional reputations.

First and foremost we should be providing safe care to patients. The near misses, errors, and mistakes that create the potential for preventable harm and death should be minimised and managed and the adoption of values derived from evidence based design are a valuable support in achieving this goal.

This focus on patient safety is critical to staff safety and satisfaction¹³. In a stressful acute care environment the ability of the institution to be able to demonstrate support to staff by planning for optimum patient and caregiver safety could be a significant satisfier and enhance attractiveness of employment. Evidence shows that healthcare facility design offers strong reinforcement of a health organisations values and is effective in staff recruitment and retention

The business case for evidence based design

It would be easy to dismiss some of the precepts of evidence-based design as being too aspirational and in an environment of financial constraints to assume that they would be too costly. Research undertaken by the Centre for Health Design in the US has accumulated data from a range of actual build projects gathering outcome related data before and after construction of new healthcare facilities¹⁴. The evidence in the study indicates that the one-time incremental costs of designing and building optimal facilities (at 5%) can be quickly repaid through savings through operational efficiency, process performance, clinical outcomes, safety, family participation, patient and staff satisfaction, market share and philanthropy. While the evidence in the study of payback on incremental investment in one year may not have been tested in a non-US setting, the range of cost and outcome impacts examined is compelling:

- Reduce hospital – based infection through single patient rooms, high quality air filtering and convenient hand washing stations. The total US cost of HCAI is estimated at \$4.5billion pa.

¹² Ulrich, R., *Evidence Based Design for Better Healthcare Building*, IHM Annual Conference, Manchester, 2005.

¹³ Institute of Medicine, *Keeping patients safe: Transforming the environment for nurses*, Washington DC: National Academies Press, Quality Chasim Series, 2004.

¹⁴ Berry LL, Parker D, Coile RC, Hamilton DK, O’Neill DD, Sadlier BL. *The Business Case for Better Buildings*. Frontiers of Health Services Management 2004:

- Reduce patient transfers by use of single room and acuity adaptable rooms to minimise disruption and risk of error.
- Reduce employee turnover. Address issues in nursing shortages by improving work management, stress etc. Environments appeal not just to patients, they can improve staff morale, recruitment and retention and thereby an organisations ability to deliver care.
- Reduce costs by increasing efficiency in design and decreasing variable costs.
- Reduce medical errors by improving lighting, noise reduction, and workspace for staff.
- Reduce need for pain medication through improvement in environmental quality particularly provision of light, gardens, views.
- Reduce lengths of stay through stress free environments.
- Increase philanthropy through improved design and a well-articulated compelling vision. Good design encourages donors.

Facility flexibility is essential to long term value.

Flexibility for change in layout and equipment is a major contributor to long term value enhancing the economy and effectiveness of the hospital over its lifetime. Physical flexibility in the built facility is a good investment for long term cost effectiveness. Tightly fitted layouts with constrained structure and services soon become obsolete.

Healthcare in the next decade will move towards a managed clinical network of ICT linked services, technologies will continue to change, circumstances in the Irish environment with the developments under the HSE will change, and a facility such as the new hospital will be only economic if it has the capacity both within its structures and outside on its site to accommodate that change. The challenge in the site selection is to look beyond the present and the past and anticipate the requirements which will determine success in the near future.

This highlighting of the issues around evidence based design is not to suggest that these would not have been incorporated in the design brief yet to be compiled for the proposed children's hospital, but rather to give them an appropriate upfront focus even at this stage. This is so that in evaluating the MMUH site capacity, orientation, open spaces etc only the very best of international models will be considered for the patients and their families.

The Board feels that by not getting it right will unacceptably compromise the goal of providing a facility of the highest standard and will also have significant financial consequences. These design features will have a major impact on the patient, the caregiver, the institutions ability to accommodate care developments and technology, and even the safety of the care provided.

CHAPTER 3 CORE VALUES

KEY POINTS:

- The principles, roles and relationships which will govern a comprehensive national and regional paediatric service need to be established.
- The vision of a new Children's hospital is defined by three core values:
- The new Children's Hospital must be co-located with a full-service maternity hospital, including tertiary/high risk neonates
- The new Children's Hospital should be an integrated academic health sciences centre, the model adopted by leading paediatric tertiary hospitals world-wide
- Resources for the development of the Children's Hospital – land, space and design values -- must be commensurate with a world-class institution, and sufficient to sustain it as such over long term and which meets the needs of families
- A traffic impact study would have been valuable to examine the access issue
- A clear children's hospital 'brand' will underpin the key functions of clinical excellence, education, research and fund raising.

4. THE PROPOSED SITE

SITE AREA

The total contiguous area of the host hospital site is 6.2 hectares. However, the western portion of the site is occupied by the original Mater Misericordiae Hospital, a building of historical and architectural interest, and by a recently completed Sister's Residence. At least a part of the original hospital building is designated as a Protected Structure, while the west and south frontages to Berkeley Road and Eccles Street are designated as a Conservation Area. Numbers 30-38 Eccles Street are also Protected Structures. These designations do not prevent development but they complicate the process of securing the necessary permission. The net area of the whole site which is *readily* available for development for any purpose is approximately 4.5 ha.

We estimate that the maximum site exclusively for the New Children's Hospital will be about 1.45 ha. A further 0.5 ha has been offered for a future Maternity Hospital.

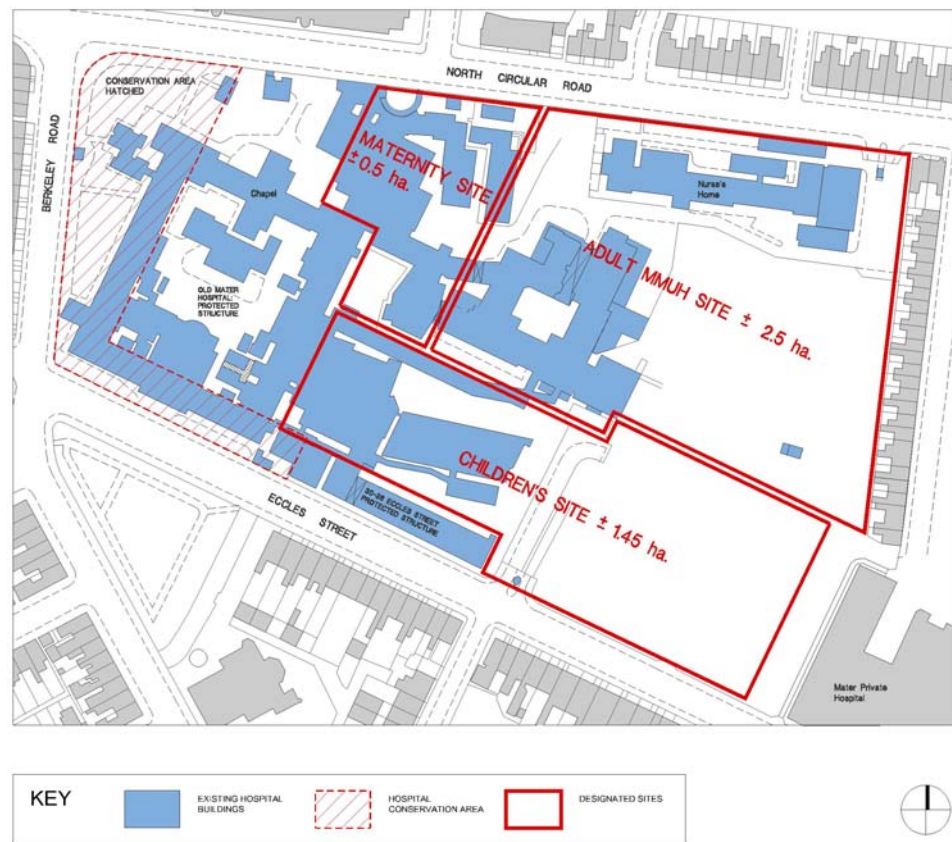


Diagram 3: *Inferred Site Allocation Proposed Children's and Maternity Hospitals*

The site area allocated for the New Children's Hospital is less than one quarter of the size of the present Crumlin site. It is about half a hectare larger than the Temple Street site to be vacated by the Children's University Hospital. See Diagrams 4-5.

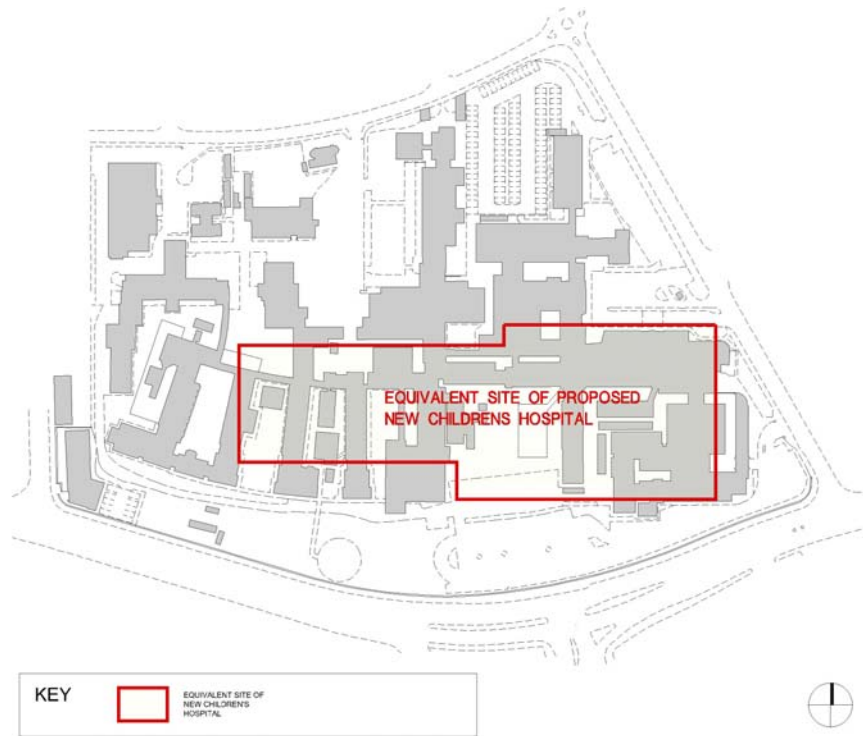


Diagram 4: Proposed Site Compared to Present Crumlin Site



Diagram 5: Proposed Site Area Compared to Current Site Children's University Hospital

The suggested footprint of the New Children's Hospital results in site coverage of between 66 and 82 per cent of the *children's* site, depending on the height and density of the block. A development of 65,000 sq m GIA (gross internal area), will create a Plot Ratio local to the Children's Hospital Site of 4.3, rising to 5.2 at 78,000 sq m and 6.2 for a building of 90,000 sq m. For comparison the plot ratio for the Crumlin DCP was less than 1.5. Consequently, what is proposed represents a very dense development.

Potential to Extend the Site

The core site of the host hospital has poor potential to be extended, through acquisitions to create a contiguous, enlarged plot. It is limited by Protected Structures and the Conservation Area on west and south sides; and on the north by the North Circular Road. The eastern boundary abuts the Mater Private Hospital and a residential area where a small number of properties fronting Leo Street are in the possession of the Sisters of Mercy. Acquisition of individual domestic properties is likely to be protracted and expensive.

The proposed children's site is especially restricted, by the retained original Mater Hospital buildings to the west, the Mater Private Hospital and the adult development to the north.

TENURE OF THE SITE

The Board understand from recent discussions with MMUH that they intend to cede a "Flying Freehold" over the proposed site for the Children's Hospital. That is, the freehold tenure will extend to the ground floor level of the new building but will not include the two-storey basement car-parking which lies under the eastern portion of the building. Presumably this "supporting ownership" together with operational responsibility for the car park will be retained by the host hospital. The "Flying Freehold" proposal will have significant operational implications, and potential complications, for both hospitals. One consideration is the possibility that operation of the car park may be delegated to a commercial provider.

It is not clear whether the "Flying Freehold" will extend under the western portion of the children's footprint. In the original development plans this part of the site was occupied by the Concourse Wing and included a large unfinished basement.

Maternity Development

The co-location of a maternity with the New Children's Hospital is a prime objective of OLCH, one which has been accepted by the HSE. The site for the maternity development is currently occupied by host hospital buildings, which appear to be retained at least until the conclusion of the currently projected developments. While it may not be possible to transfer the site for a maternity hospital in the immediate future there needs to be a binding commitment to reserve the land and transfer it when appropriate. It is feared that any uncertainty regarding the proposed site for the maternity hospital could delay - or at worst compromise the simultaneous co-location of the maternity and paediatric hospitals.

SUPPLEMENTARY SITES

One of the perceived benefits of the chosen site is the availability of potential land in the vicinity which could be used to supplement the core children's site. Three sites have been mentioned in this respect.

The University Children's Hospital Site: Temple Street Site, of slightly more than one hectare, is about 380 metres from the proposed Children's Hospital. The site, if available at no cost and unencumbered, will not be appropriate for any functions.

Grangegorman Site: Grangegorman is approximately 2.5 km distant, measured along the shortest road and pedestrian route. (Direct access is inhibited by the direction of the intervening streets and the Broadstone/Dublin bus depot.) This is approximately 20-25 minutes walk from the entrance of the projected Children's Hospital.

Mountjoy Prison Site: Recent policy announcements regarding the development of the Mountjoy Prison suggest that this land is no longer a serious consideration. In any case, its location makes it of little use in solving the fundamental problem of the Children's Hospital, a lack of contiguous development land.

The use of any of these sites would detract seriously from the vision of an integrated paediatric academic health science centre and the effectiveness of the new hospital.

DEVELOPMENT PLANNING

The 2002 DCP for the MMUH-CUH development offered a well-structured solution to the phased development of the MMUH site (although it provided no ground level expansion for the Children's University Hospital). The new proposal, incorporating an expanded children's development and a future maternity hospital is an adaptation of the original DCP.

Of particular concern to the Board is the potential disposition of the two or three site ownerships. The proposal will split the host hospital ownership into two largely unconnected zones – to the west, the Old Mater Hospital and in the north-east quadrant the expanded adult hospital – with the maternity development interposed between. This arrangement is likely to be a problem day-to-day and in the long term.

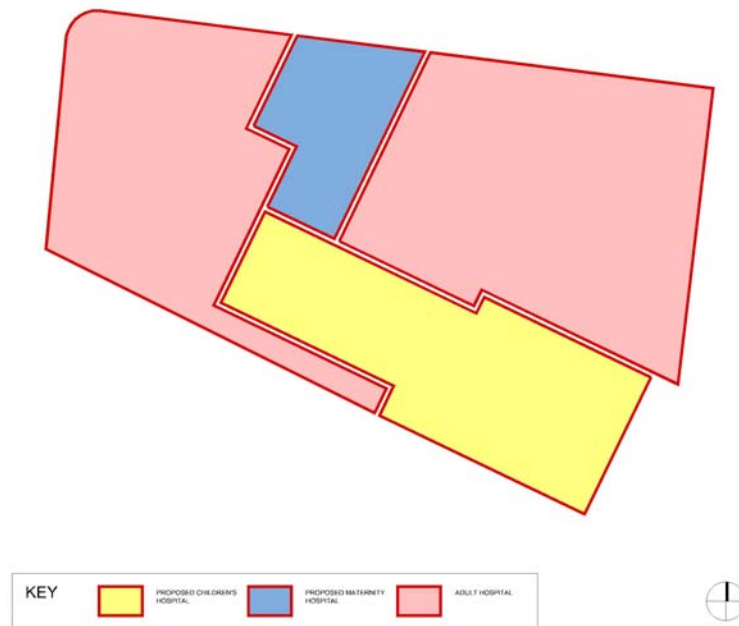


Diagram 6: Potential Site Ownership

Also, the MMUH proposal, when account is taken of the maternity hospital, has no horizontal expansion potential. The original DCP, while keeping the overall height of development at or less than the existing buildings, preserved a modest area for future, strategic expansion and/or renewal in the horizontal plane. The inclusion of the maternity hospital has eliminated this land. On-site expansion will be possible only by vertical addition to existing buildings which could be fraught with complications and disruption to ongoing patient care.

The original MMUH DCP has also been seriously compromised by other changes:

- The extended children's block displaces the Concourse Wing of the adult development which is to house a significant number of adult beds. Presumably the main core of the adult development will need to be altered to absorb the former Concourse Wing.
- The children's wing appears to require the early demolition of the building between Rosary House and the Old Mater Hospital which now accommodates some radiology functions as well as linkages between the Old Hospital and 1980's Wing. This demolition did not appear to be necessary in the original DCP.
- The children's development necessitates the re-location of the main entrance to the adult hospital, from Eccles Street to North Circular Road. The main hospital entrance is, therefore, divorced from the access to the underground car-parking. The shift of the main entrance to the North Circular Road will reverse the flow of inpatients and visitors, and combine inpatient and outpatient traffic at a single entrance. It also diminishes the purpose of the striking entry concourse since this feature will now be remote from the main adult entrance.
- The location and footprint of the proposed maternity hospital appears to pre-empt the shared Pathology and Technical Services Building which forms part of the

currently proposed development. A significant modification of the current plan appears to be necessary if the offer of the maternity hospital site is to be honoured.

- The more than doubled capacity and increased complexity of the Children's Hospital, and the proposal to incorporate a maternity hospital on the site, will place increased demands on the so-called shared services, such as central processing. These departments will require fundamental re-planning and possible revision of prepared construction documentation.

The Board would respectfully suggest that the original DCP of the MMUH, and the site strategy be considered afresh.

BUILDING MASSING

The Board examined the building forms that result from the built areas as instructed by the Task Group and the site area offered. The examination also included the implications of varying the footprint of the building to provide free land to be designated for long-term development; and, the ability of each form to accommodate key functional adjacencies at a single level.

Built Form Full Footprint

The Task Group Terms of Reference for hospital submissions indicated a base proposal of 65,000 sq m Gross Internal Area (GIA), plus 20 per cent in-built expansion for a GIA of 78,000 sq m. The Task Group also referred to the ability of the site to accommodate up to 585 beds, the maximum thought possible by McKinsey within the planning horizon. The host hospital has interpreted this requirement as needing a GIA of 90,000 sq m.

Starting from the courtyard forms indicated in the MMUH submission:

- The analysis has been unable to achieve 78,000 sq m GIA with the six-seven stories shown in the submission; we have been able to do this with an eight/nine storey building (Diagram 7). The analysis would show that 78,000 sq m GIA in a six storey building provided no courtyards are included (Diagram 8), and
- It could not find any indication of the built form resulting from a 90,000 sq m GIA development in the MMUH submission. The board believes that a building of this area utilising the site available will be ten or eleven storeys high if courtyards are included and seven storeys without courtyards. (Diagrams 7 and 8)

The difference in area between the host hospital submission and this analysis may be explained by the fact that in the host hospital submission at least some of the space has been allocated to a separate building. It appears that the pathology laboratory has been assumed to be in a building located beside the North Circular Road. This would not be compatible with the OLC vision for the new hospital.

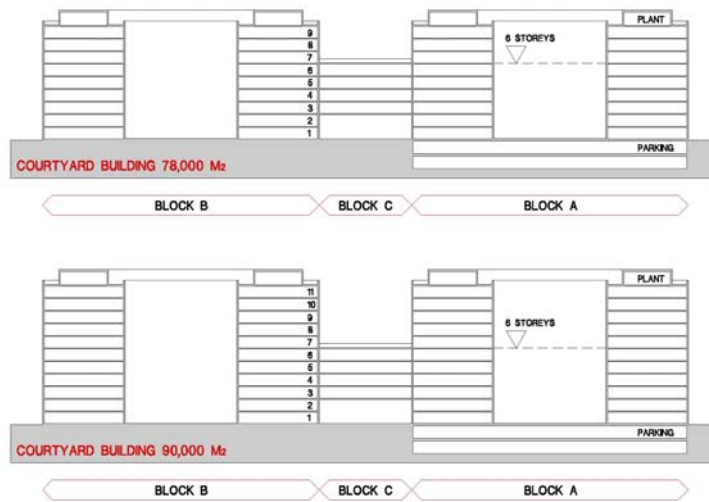


Diagram 7: Massing Studies, Full Footprint Courtyard Form

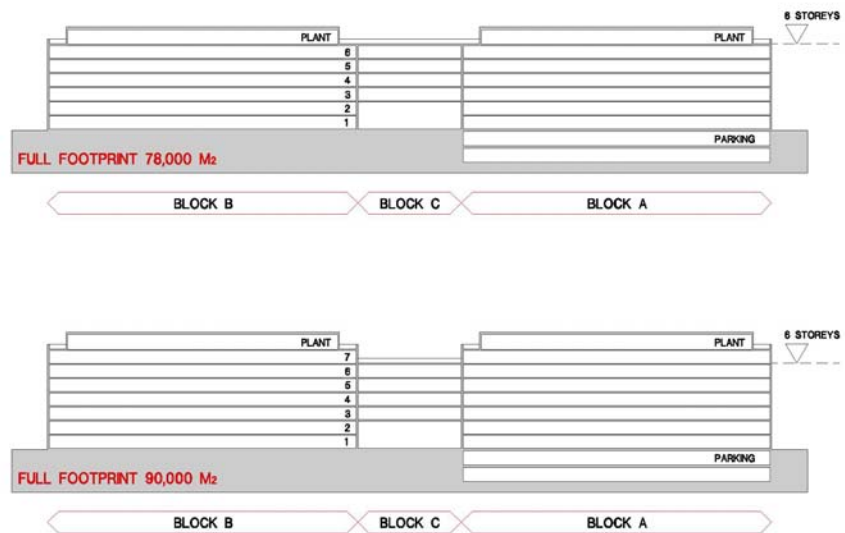


Diagram 8: Massing Studies, Full Footprint Dense Form

Built Form Reduced Footprint

The analysis next considered the impact of reducing the building footprint by approximately 25 per cent to create a minimal strategic land reserve for expansion or renewal. As demonstrated in Diagrams 9 this results in a nine-storey building, with a maximum floor plate of 8,000 sq m at 78,000 sq m GIA; and ten storeys at 90,000 sq m GIA. It should be noted that these studies assume a dense building block without daylight penetration and none of these options will be able to accommodate the key “Unconscious Floor”.



Diagram 9: Massing Studies Reduced Footprint

TRAVEL AND PARKING

Parking

Current parking capacity with planning permission and truly on-site appears to be 900 spaces comprising 800 underground places plus 100 surface slots. The host hospital submission to the Task Group variously states parking capacity to be either 1,600 spaces or 1,200 spaces. The proposed underground car park can be extended physically to 1,200 spaces. In addition, plans have been prepared for a 386 place structure at Nerney's Court, Temple Street Hospital, which is nearby but not "on-site" and is still subject to a third planning application.

The Parking Impact section of the Planning Report attaching to the original planning application indicates current peak demand (MMUH + CUH) to be 1,550-1,570 places rising to 1,670 places in 2009. Actual provision is shown as 1,020 places (1,150 including Dalymount) with a further 1,055 public and on-street spaces. However, taking into account the effects of the Mobility Management Plan and improved transport infrastructure this demand is projected to decline to 990 places (1,225 places taking into account the Mater Private Hospital).

The host hospital is probably willing to provide as many parking spaces as possible within the physical limitations of the site. However, the increasingly onerous policies of the Dublin City Council (DCC) designed to limit the use of private vehicles in the city centre will inhibit the provision of sufficient parking capacity based on real demand.

The DCC divides its jurisdiction into three areas with parking standards varying according to zone (see below). MMUH lies in Area 2.

Area 1 1 parking space per 3 beds *or* 1 space/150 sq m of building

Area 2 1 parking space per 2 beds *or* 1 space/100 sq m of building

Area 3 1 parking space per bed or 1 space/60 sq m of building

No doubt the increased activity which will result from the children's and maternity developments will facilitate a revised approval by the DCC. Applying the formulae above against an additional 450 beds on the site (200 children's beds plus 250 women's beds) yields a maximum of 730 places based on an area-derived calculation. Total capacity would then be around 1,600 places for all three hospitals. By contrast the DCP for OLCHC recommended 915 spaces for a 350 bed paediatric hospital. If bed numbers are used as the basis of the calculation only 225 extra places are likely to be granted. (It is not clear whether the DCC would be prepared to take into account the maternity hospital prior to a firm decision to proceed.)

The Board finds it hard to escape the conclusion that the likely permitted parking capacity will fall far short of what is needed practically once a greatly enlarged Children's Hospital and a busy maternity hospital join the 700+ bed adult hospital. The city centre location of the MMUH site is not compatible with adequate provision for private cars on the scale required to meet the very high levels of activity and staff numbers. Over time and through the measures of the Mobility Management Plan staff may, to some extent, be persuaded to adopt other means of transport than private cars. In the short and medium term there are real impediments to this for many of the potential staff of the New Children's Hospital.

It is not certain that parents will abandon their cars, nor is it desirable to force them to do so. The increasing scope and sophistication of outpatient and day treatment may reinforce the clear preference of families to travel by car. It is legitimate to ask how many parents facing the journey home after day surgery, a debilitating chemotherapy treatment, an interventional procedure or an examination under anaesthetic would willingly opt for public transport? The Board considers that limitations on the means of transport should not discourage the development of clinically appropriate models of care.

The parking and the access is of specific importance because of the proportion of patients who travel to Our Lady's from outside the Dublin City area.

TIME FRAME

One of the perceived benefits of the proposed site is its ability to accommodate development in a shorter time than other sites considered. The host hospital suggested that the project could be brought to the start of construction by the beginning of 2007 with implied operation by the beginning of 2011.

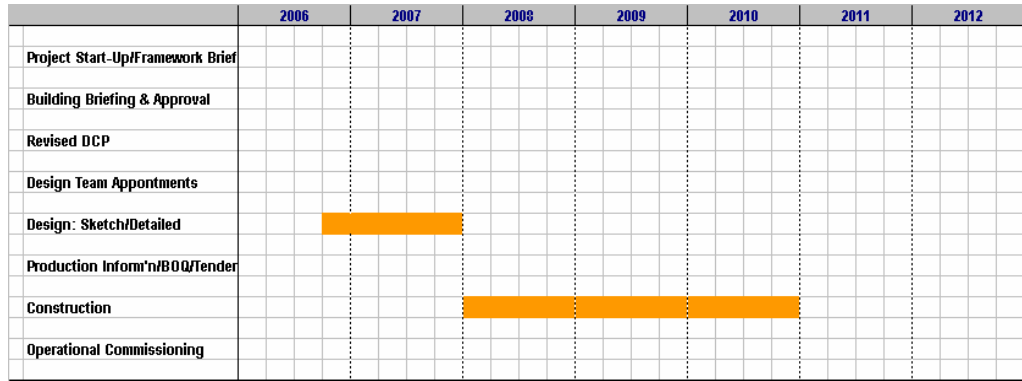


Diagram 10: Programme, MMUH

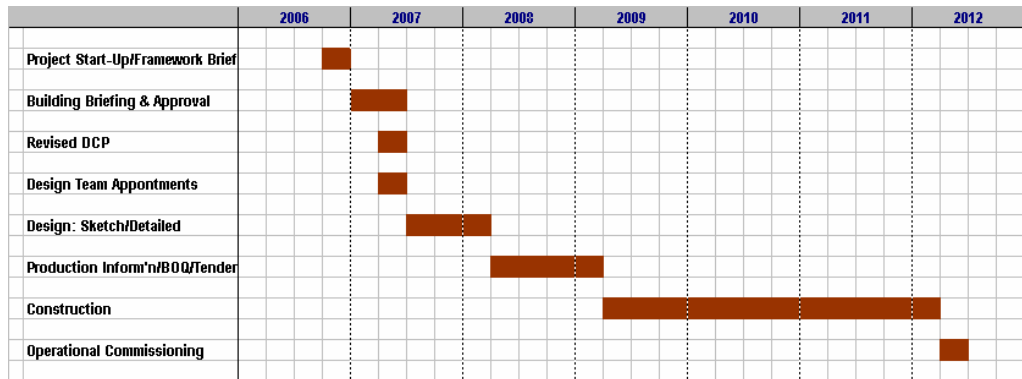


Diagram 11: Suggested Realistic Programme to "First Patient"

This is considered to be optimistic for the following reasons:

- 1) The Development Control Plan for the MMUH site requires serious revision.
- 2) Development of a Framework Brief and full, detailed Functional Briefing must precede the redesign of the New Children's Hospital.
- 3) Additional decanting and demolition must be completed before the enlarged Children's Hospital site is available.
- 4) A proper analysis needs to be undertaken to determine which support services will yield economic benefit if provided to all three hospitals from a single source. The enlarged Children's Hospital and the maternity hospital will bring over 400 extra beds, and corresponding day and outpatient activity, to the site so the impact on currently planned support facilities will be significant.

Completion of the hospital is therefore unlikely to occur before 2012. This date could be extended if it is decided to utilise one of the so-called supplementary sites such as the CUH Temple Street Site, thus adding a second phase to the development.

CHAPTER 4 THE SITE

KEY POINTS:

- The site size has been assessed in the context of the core values of a world class facility.
- From the site proposed we estimate that the area available for the paediatric hospital is 1.45 ha. with a further 0.5 ha. for the maternity hospital.
- The site area allocated for the children's hospital is less than one quarter of the size of the present Crumlin hospital site and is approximately 0.5 hectare larger than the current Temple Street site.
- The core site of the host hospital at the Mater Campus has limited potential for expansion and the proposed Children's hospital site is especially restricted.
- The host hospital intends to cede a 'Flying Freehold' over the proposed site for the children's hospital.
- There needs to be a binding commitment to reserve the land for transfer when appropriate for the maternity hospital development.
- The use of proposed adjacent sites would result in fragmentation of the integrated service proposed and detract from the overall effectiveness of the new hospital.
- Due to the significant changes to the original DCP for the MMUH, the site strategy needs to be considered afresh.
- The building forms and the site area offered have been examined. In addition the implications of varying the footprint of the building to provide free land for long-term development and the ability of each form to accommodate key functional adjacencies at a single level have been reviewed.
- The impact of the significant activity levels being brought to the site by the paediatric and maternity developments are reviewed in terms of travel, access and parking.
- One of the key benefits of the proposed site was the ability to accommodate development in a shorter time than other sites on offer. However, the requirements of these developments place serious doubts on the original timeframe.

5. CONCLUSIONS AND RECOMMENDATIONS

The Board of Management of Our Lady's Children's Hospital, and the hospital staff, have consistently supported proposals for restructuring the delivery of paediatric services. The Board welcomed the core recommendation of the McKinsey Report that tertiary and regional secondary paediatric services should be consolidated as being in the best interests of children. In the same spirit, the Hospital accepted the relocation of the redevelopment of Crumlin, in order to support the interests of our patients and their families. The Board and staff have offered this support without regard for the corporate future of the Hospital, the considerable uncertainty this has created for individuals, or any narrow interests, which the hospital may have had regarding building on its own site.

The Board prepared this study, as a means of examining what, in physical planning and design terms, are the required properties of a site and buildings which best further the interests of child health and in doing so, have considered the ability of the chosen site at the Mater Misericordiae Hospital, to accommodate these properties or core values.

THE CORE CRITERIA FOR A WORLD CLASS CHILDREN'S HOSPITAL

The Board believes that a World Class Children's Hospital will only be built if the following core criteria are met:

- A Tri-Location Model of the Children's hospital, a Maternity and Women's hospital and an Adult hospital is the **ideal** solution, subject to meeting other criteria as set out below
- A Co-location Model of the Children's Hospital and a Maternity hospital is an **essential** goal of redevelopment and must be **concurrent**.
- Clinical services, education and research **must** be physically integrated, dedicated to paediatrics, without fragmentation, in order to be considered a single academic health sciences centre
- The Children's Hospital **must** have sufficient capacity and flexibility to accommodate all the fundamentals of evidence-based design. It must incorporate the best international examples in terms of its care models, provision for families, recognition of the needs of staff, and its clinical and diagnostic facilities, all of which will be reflected, in its space requirements
- The hospital building must have **floors of sufficient size** to accommodate the key functional clusters which are essential for the efficient safe delivery of tertiary children's care
- The site should accommodate **expansion** at ground level for a measure of yet-to-be-defined expansion, and **must** incorporate a strategic reserve for long term self-renewal in order to be financially justified
- The site must accommodate **sufficient parking** for families and staff, having regard to the special circumstances of tertiary care, respect for the choices of

families in their mode of access, and of the staff who will need to be attracted to the hospital

- As regards Governance, Budget and Branding, it is critical that this includes its capacity to plan and manage its own future development in the interest of Children's Healthcare, autonomously from the other hospitals on the site.

CONCLUSIONS OF THE BOARD

The Site

On the basis of the outcome of this review, the Board does not, at this point, consider that the site proposed has the potential to deliver a World Class facility because:

- 1) The square meters specified by the Task Group are not adequate when benchmarked against international standards and as a consequence, the offered site of some 1.5 hectares out of the total available development space is insufficient.
- 2) The site footprint is inadequate to deal with floor plate size, necessary flexibility, design features, expansion and renewal.
- 3) The requirements of families and staff for car parking are extremely unlikely to be met in a site in Zone 2 in the Dublin City Development Plan.
- 4) The substantial additional activity on the site arising from the development of both paediatric and maternity hospitals does not appear to have been appropriately incorporated in assessing access to the site.
- 5) The assumption inherent in the site offered of the availability of supplementary sites in the vicinity is not compatible with the integrated clinical, educational and research, family-centered, model of care required.
- 6) The Task Group evaluated proposals based on size assessment, which they considered to be the size requirement of the new hospital. Having assessed these figures our finding is that this size requirement will not deliver on the key design components and will severely compromise service developments into the future.
- 7) The proposal to offer a "Flying Freehold" is fundamentally unacceptable to the long term interests of the Children's Hospital
- 8) In addition it will have serious potential impact on the other hospitals on the site in terms of short and long term development potential.

Space and Size

The Board considers that the chosen site will not realise the tremendous potential offered by the restructuring of services and development of a new National Tertiary Children's hospital.

The Board equally considers that there is a risk that key components of the hospital will have to be constructed on other sites unconnected to the main site. Indeed, one of the perceived benefits of the chosen site is the availability of other pieces of land, some of which are more than two kilometres distant. That this is even a consideration, points to the perceived uncertainty about the adequacy of the current site, and a tendency to

compromise the integral nature of the hospital at the outset. In this respect, the Board wishes to make it clear that it fundamentally disagrees with the notion of Core and Non-Core Functions, the latter to be developed away from the main site. Aside from a very few general support activities the Board regards the development of the Children's Hospital as a contiguous entity to be a pre-requisite.

THE RECOMMENDATIONS OF THE BOARD

Paediatric Network

As indicated in Chapter 2 of this report, the Board considers it essential that the development and provision of the new Children's Hospital is brought forward in the wider context of Paediatric Services generally.

The Board urges the HSE and the DOHC to develop the national framework for paediatric services, including that for the greater Dublin area, and in the context of that framework, agree on the functional model for the new hospital. This is consistent with the McKinsey report (Page 59), which sees the hospital "at the nexus of an integrated paediatric service" which would also comprise:

- important outreach capabilities at key non-Dublin hospitals
- adequate geographic spread of Emergency Facilities (including 2 – 3 in Dublin) or treatment at urgent care centres (which would not have overnight beds) and
- the secondary care needs of greater Dublin, subject to the development of a workable plan

The Board considers that in addition to tertiary / quaternary care the framework for the new Children's Hospital should include the following:

Primary and Community Care

The Primary Care Strategy cites that the appropriate setting to meet 90 – 95% of the health service needs of patients is the primary care environment, among others. McKinsey highlighted the requirement to further develop primary and community care services to facilitate the health needs of paediatric patients without having the cost of hospital admission. With over one hundred thousand attendances at the current A & E Departments of the three children's hospitals in Dublin, the inclusion of primary care facilities located at the urgent care centres backed up by the facilities such as radiology, phlebotomy at these urgent care centres has the potential to significantly reduce hospital admissions for some of these patients. In addition, non emergency paediatric care in the community requires a defined and structured relationship with the paediatric acute network.

Secondary Care

The new hospital will be the designated centre for the provision of secondary care facilities for the greater Dublin area, provided this was translated into a workable

plan. This was highlighted by McKinsey but is something that requires significant analysis prior to completing the outline plan for the new hospital.

In this regard the Board feel that the option of locating day surgery and some outpatient facilities at the urgent care centres needs to be fully clarified at the earliest possible juncture to maximise patient convenience associated with the opening of the new facilities.

The Board has highlighted previously that the model of urgent care centres as outlined by McKinsey, incorporating such facilities located at current paediatric sites, is an option which would provide the greatest reassurance for legitimate concerns expressed by families around the centralisation of facilities to one site.

The recommendation above is considered by the Board to be compatible with DOHC and HSE policy in relation to primary and acute services, as outlined in Policy and Strategy documents, such as “Quality and Fairness” (DOCH 2002), “Primary Care – A New Direction” (DOCH – 2002), “Children’s Health First” (McKinsey), (HSE 2006), and “Improving Safety and Achieving Better Standards: An Action Plan For Health Services In The North-East” (HSE, 2006).

The transitioning of the existing arrangements for the provision of paediatric care, at a regional (Dublin) and at a national level, to the new model of care requires discussion and agreement alongside the development of the functional (outline) model of the new hospital. There are opportunities for the development of a Paediatric Network in advance of the construction of the new hospital.

A Greenfield Site for the New Children’s Hospital

The Joint Task Group evaluated a number of sites on offer, co-located with existing Adult hospitals, and the Mater was deemed to be the best available.

The Board’s technical assessment contained in this report addresses significant questions regarding the adequacy of the site proposed to deliver a model of care envisaged, now and in the long term. As a result the Board is of the belief that the site proposed will not be able to deliver the mutually shared goal of a world class facility for children. The Board, respectfully, is requesting that these concerns are now considered by the DoHC, and the HSE **before** proceeding with the next stage of the process.

In addition, having regard to the recommendation of the Task Group that the site proposed is the only “co-located adult site” to meet its criteria, the Board would therefore strongly recommend that the DoHC and HSE would reconsider the location of the new children’s hospital on a Greenfield site

This would allow a site to be chosen:

- of sufficient size to accommodate the immediate development of the National Paediatric Hospital co-located with a Maternity Hospital. The site size could be of a size sufficient to ultimately accommodate in the future the additional co-location of an Adult Tertiary hospital with the Paediatric and Maternity hospitals.
- located to ensure that it is accessible to the largest population of Ireland as is possible, in keeping with its national role and the national spatial strategy. Currently, over two – thirds of patients with complex illness are referred to OLCH, from outside the Dublin area.

- enabling a facility design which offers strong reinforcement of its vision, purpose and values including the value placed on the needs of its core professional staff.
- supportive of the delivery of the New Children’s hospital within the shortest timeframe. The opportunity to construct without having the inherent delays of developing on the site of a busy, working acute hospital.

The Business Case for a Greenfield site

The Board has also considered the economic and financial implications of re-examining the option of a Greenfield site.

- The clear possibility of delivering an improved timeframe for the development of the new children’s and maternity hospitals on a Greenfield site would have a positive impact on the capital cost of the development. In addition there would be the added advantage of a reduction of the timescale for the development of the adult services at the Mater.
- While the absolute site cost of a Greenfield site will of course be a function of the size and location chosen it would not be appropriate to measure any site cost simply against the offer of transferring site ownership at the Mater at no cost. The fact that all available land currently held by the Mater would be fully utilised will create a need to purchase further land in the future both for the adult , paediatric, or maternity services in what is assumed to be a high land cost area of Dublin.
- The investment in a Greenfield site has the capacity to extend the lifetime of the new hospital thereby increasing the return on the construction and development costs. Tightly fitting layouts with constrained structures and services soon become obsolete
- The critical issue of capacity of future flexibility, development, and critical renewal can be most effectively dealt with on a Greenfield site of sufficient size. This would support the achievement of long-term value for money enhancing the economy and effectiveness of the new hospital over its lifetime.
- The capacity on a Greenfield site to promote and support the branding and vision of the new children’s hospital as a world class centre would support the recruitment and retention of professional staff. The significant financial costs currently being borne by the acute health services in dealing with this issue together with the negative effects on quality and safety of care delivery are important and critical issues.
- There exists in the delivery of a well articulated and compelling vision for excellence in a new children’s hospital development on a Greenfield site an opportunity to harness philanthropic interest to financially support the development. This would be a redefinition of a ‘Public/ Private’ partnership with an opportunity to add value to the capital development which would provide a positive return in the long-term.

- The assumed economic advantages of ‘shared service’ will still be available to the proposed development on a Greenfield site due to the scale of the amalgamation of services, patient volumes, facilities between the existing three paediatric hospitals.

Co-location Considerations

In making this recommendation, the Board is aware that, for the foreseeable future, this position would not be compatible with the McKinsey criteria of co-location with an adult hospital.

Equally, the Board notes that McKinsey stated that co-location of an adult and paediatric hospitals as being essential - rather it was the ‘*preferred option*’, (pg. 57)

The reality is, that it is not possible to deliver the full model of adult co-location envisaged because there is currently no adult tertiary level acute hospital, with the full range of services that meet these criteria.

A crucial element of the tertiary Children’s Hospital will be its Trauma Centre. The benefits of being co-located with any of the existing adult hospitals has been questioned by the report of the Joint Task Group who have stated that none of them “have the full range of services required to support a Level 1 Trauma Centre, within the paediatric hospital” (page 41)

Another point being emphasised vis-à-vis the benefits of collocation with an adult hospital is the transition from child to adolescent to adult services. However, for the vast number of patients from outside the Dublin area, the likelihood is that they will opt to receive their care at regional level. In any event, pending any future rationalisation of the adult acute services in Dublin, many adolescents will continue to transition from the paediatrics to adult acute services, across the five DATH’s hospitals.

The National Specialties are currently “distributed” between the five DATH’s hospitals and there is a very strong case to continue the relationship between the adult and children’s hospitals, on the basis of a collaborative model of care, rather than a co-located model, pending any future rationalisation of the Adult acute services. The deferring of the co-location with an adult hospital does not compromise the health and care of children in any way, provided appropriate collaboration is agreed and supported. In this regard, the Board notes the recommendations of the Joint Task Group that the HSE should undertake a review of the configuration of the adult acute services in Dublin.

In the light of the current configuration of adult acute services in the Dublin area, the Board is of the view that any benefits with the current co-location model might have, are far outweighed by the disadvantages and trade-offs which would lead to a sub-optimal service for children for the next 50 years.

This would represent a huge opportunity lost.

APPENDIX A

ESSENTIAL COMPONENTS OF THE NEW CHILDREN'S HOSPITAL

Ambulatory and Emergency Care

Accident and Emergency
General and Specialist Outpatient Clinics
Day Medicine and Day Surgery
Haematology & Oncology Day Care
Cardiac Day Care
Psychology
St Louise's Unit
Psychiatric Day Care

Inpatient Services

Specialist Medical & Surgical Acute Inpatient Services
Paediatric Intensive Care
Neonatal Intensive Care
Burns Care
Bone Marrow Treatment
Palliative Care
Infectious Diseases Unit
Child and Adolescent Psychiatry

Diagnostic and Therapeutic Services

Diagnostic Imaging
Radiography & Radiofluoroscopy
Ultrasound
Nuclear Medicine
CT and MR Scanning
Interventional radiology and cardiac catheterisation

Pathology and Laboratory Medicine
National Centre for Medical Genetics
Operating Department
Sterile Services Department
Haemodialysis
Rehabilitation Therapies
Physiotherapy
Occupational Therapy
Speech Language Pathology

Phlebotomy and IV Team
Specialist Diagnostic Services
Non-invasive cardiology
Neurological diagnostics
Urodynamic testing
Pulmonary Function Testing

Clinical Support

Pharmacy and ACU
Social Work
Nutrition and Dietetics
School
Play Therapy
Music Therapy
Medical Records/Information
Medical Offices
On-Call Rooms
Physiotherapy
Speech and Language
Occupational Therapy

General and Administrative Support

Patient Food Service and Formula Preparation

Executive
Public Relations/Communications
Patient Care (Nursing) Services
Finance
Quality Improvement

Academic and Training

In-service Training
Centre for Nurse Education
Student Facilities
Medical School: Teaching and Offices

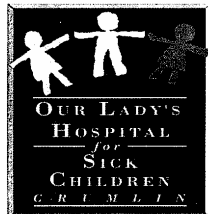
Children's Research Foundation

Other

Staff Living Accommodation
Crèche
Staff Changing Facilities
Patient/family Hotel
Assigned Parking
Outdoor and Indoor Play Areas

APPENDIX B

DELIVERING A QUALITY PAEDIATRIC LABORATORY SERVICES



Delivering a Quality Paediatric Laboratory Service

Introduction

The recent publication of the McKinsey Report into the configuration of acute paediatric services represents a watershed for children's healthcare in this country. The report envisages the creation of a single paediatric tertiary care facility for the country with the amalgamation of the three existing paediatric hospitals in Dublin on one site. This new tertiary facility will therefore also be charged with the bulk of secondary paediatric care for the Dublin region. The arguments in favour of a single tertiary facility have long been supported by the Faculty of Paediatrics including the paediatricians who deliver the service in Dublin hospitals as well as those paediatricians from other parts of the country who access the service for their most complex and critical ill patients. Creation of this single tertiary site should therefore be welcomed by all stakeholders in this service including, most critically, the patients and their parents who will be dependant upon it.

The principal benefit of the single tertiary centre is the concentration of expertise in rare conditions on a single site. This gathering of experienced healthcare professionals including medical, nursing and paramedical personnel produces a critical mass of both patient numbers and healthcare staff to facilitate the delivery of a high quality paediatric service. Quality is therefore the engine that has driven this proposed merger. Quality should therefore be the principal criterion by which any proposed site or any proposed hospital configuration should be judged.

In the context of paediatric laboratory medicine, the merger also represents a unique opportunity. Paediatric laboratory specialists are currently spread across a number of sites in Dublin including Our Lady's Hospital, Crumlin, the Children's University Hospital, Temple Street, and Maternity Hospitals. National services are similarly divided with Inborn Error of Metabolism Unit in CUH and National Haematology Service in OLCHC being just two examples. The merger of these laboratories into a single facility will reduce the duplication of services as well as increasing the critical mass of paediatric expertise which can be brought to bear on each clinical service or research question posed in the new hospital.

Configuration of Merged Laboratory

While the merger of the paediatric laboratory services is to be welcomed, their exact configuration remains a matter of some debate. Of note, the McKinsey report specifically recommends that the new children's hospital ideally be located on the campus of an adult facility. In the bidding process that has followed the publication, a number of adult hospitals have recommended a merger between the paediatric laboratory and adult laboratory services as one of the proposed advantages of this merger. Similar laboratory mergers have taken place in other jurisdictions and there is now considerable experience of the operational effects of such a merged adult and paediatric laboratory structure,

particularly from North America. In the opinion of the paediatric laboratory specialists at OLCHC and CUH, a merger of the paediatric laboratory service with the adult service on any adult hospital site would be a significant retrograde step and would not be capable of delivering the quality paediatric service which is the main driving force behind the merger of the paediatric hospitals themselves. It is our belief that this standard of care cannot be achieved in Ireland by the dilution of paediatric expertise in the midst of a larger multi-purpose laboratory.

Dedicated paediatric laboratory service

The consultant and senior scientific staff in the laboratories of both CUH and OLCHC therefore feel strongly that paediatric laboratory services are most appropriately provided from a dedicated paediatric laboratory in the setting of a dedicated paediatric hospital. As has been frequently pointed out, “children are not just small adults” and the need for a specialised on-site laboratory services tailored to meet the special requirements of paediatricians and their patients may be counted among the major reasons for the very existence of children’s hospitals as distinct institutions.

Children have

- Different patterns of disease
- Reference ranges which are not only different from adults but actually change with increasing age and weight
- Small sample sizes
- Specific quality requirements (e.g. rapid turnaround)

These special requirements are not always satisfactorily accommodated in adult or combined adult/paediatric institutions. Indeed, some of the laboratory services currently offered in the children’s hospitals were developed in response to what was perceived as an inadequate service from laboratories in adult hospitals.

The provision of this specialised service by a dedicated paediatric laboratory is central to the uniqueness of a children’s hospital and can play a pivotal role in the diagnostic, therapeutic and research life of the hospital. Furthermore, its influence can extend beyond the confines of the hospital’s patient population with the laboratory and its staff acting as a resource of information and expertise for other hospitals. Indeed, such a role was foreseen by Comhairle who highlighted the need for a reference facility in their 1991 report on paediatric pathology services. The proposed merger of paediatric laboratories offers an opportunity to develop not just such a reference centre for paediatricians and primary care centres around the state, but also affords an opportunity to develop a comprehensive and world class paediatric laboratory service for the whole island.

Arguments for merged laboratories

The arguments for merger and or separation can be divided into a number of discrete areas for ease of analysis

1. Financial

It has been argued by some commentators that a merged laboratory has inherent cost savings. Research from North America does not however support this contention. In a multiple hospital study Dooley (*Clin Leadership Management Review* 2000 vol. 14:

page 225-8) showed that laboratory costs of modelled paediatric health centres were in fact significantly lower than existing combined adult paediatric institutions. The actual cost of existing combined adult paediatric laboratories averaged 13.4% more than the modelled combination of existing stand alone paediatric and adult facilities.

Indeed, many of the reported opportunities for saving money in a merged laboratory are not at all dependent on a physically merged facility. Thus, for example joint ordering of reagents and other materials can deliver the opportunity for savings while still allowing physical separation and operational autonomy. Furthermore, many of the reported operational saving opportunities, e.g. use of robotic sample handling in large laboratories, simply do not work in a setting of paediatric samples where smaller sample containers do not allow robotic handling or barcode labelling to be undertaken at all let alone admixed with adult samples. The existence of different protocols for handling and reporting paediatric samples would make their admixture with an adult facility difficult to handle and likely to be disruptive to the smooth processing and reporting of both sets of samples.

2. Academic

One of the principal arguments in favour of moving the children's hospital onto the campus of an adult hospital is the academic opportunities that would be created. Access to a single university hospital campus with its research facilities, teaching and educational opportunities certainly represents an exciting opportunity for staff of both adult and paediatric institutions to cross-fertilise in the area of education and research. However, these opportunities are clearly not dependant on sharing the same physical laboratory facility. Indeed, mixing of the medical and scientific staff on a day to day operational basis is likely instead to lead to a loss of unique proficiency in one or other area producing a diluted professional expertise. The creation of the critical mass of specific paediatric expertise is one of the principal motivations behind the creation of a single merged institution so moves which would lead to the dilution and ultimate loss of that expertise should be strongly resisted.

3. Professional

Many paediatric laboratory specialists in North America have indicated a number of negative professional consequences of a merged laboratory structure. These include:

A. Loss of contact

Loss of day to day contact between laboratory medical and scientific staff and their client paediatricians hamper smooth operations of the hospital. Current configuration has readily identifiable individuals associated with each laboratory and allows ready access of laboratory staff to the clinicians and vice versa. Physical separation of the laboratory from the paediatric hospital would make such informal day to day contacts difficult to maintain and have very real practical impact in the delivery of care in circumstances where the laboratory practitioners attend clinical areas, e.g. frozen section analysis, fine needle aspiration cytology, microbiology consultations and infection control ward rounds etc.

B. Loss of training programme

Paediatric laboratory medicine expertise is not easily identified in the labour market. Recruitment to some of the paediatric laboratory medicine specialities has been a problem for the United Kingdom and North America and here in Ireland. The absence of dedicated training programmes for paediatric laboratory

specialities is one of the identified root causes of these recruitment difficulties. Efforts to improve such training programmes are critically dependent on having a specifically identifiable paediatric laboratory speciality and a clear career structure. The merging of paediatrics into a general adult laboratory will frustrate such efforts and could hamper recruitment of suitably qualified individuals for many generations to come.

C. Identity and Loyalty

Many North American colleagues have indicated to us that one of the intangibles lost in a merged laboratory is a loss of hospital identity and reduction in loyalty of staff towards the institutional laboratory. Many paediatric laboratory specialists and scientists deliver an exceptional service to their hospital, often well in excess of their contracted arrangement. This willingness to go the extra mile in no small way depends on their identification with the paediatric laboratory as delivering a service to the paediatric hospital. A merged laboratory in which they represent simply one of a large number of laboratory specialists without specific attachment to the paediatric hospital reduces this intangible but critically important identification and loyalty and has, in the experience of many North American colleagues, reduced the quality of service which can be delivered to the children's hospital.

D. Budget

Merging children and adult laboratories means loss of budgetary control for the children's hospital laboratory service. Paediatric laboratory priorities are then in competition with those of the usually larger adult laboratory. In the experience of many of our colleagues, this has led to a reduction in the ability of the paediatric laboratory service to develop new diagnostic testing areas and respond to evolving clinical challenges.

E. Paediatric Expertise

Finally, and most importantly, the creation of a merged children's hospital is designed to establish a critical mass of paediatric expertise. Paediatric laboratory services are an important part of that expertise and we would therefore argue that the role of the paediatric laboratory expert needs to be maintained and enhanced in this new hospital rather than diminished by integration with an adult laboratory. Paediatric laboratory medicine is a speciality in and of itself and it is not a specialty which should be allowed to wither at the expense of alternate models of laboratory practice. Thus, for example, in histopathology a liver biopsy may be interpreted by an adult liver pathologist in preference to a paediatric pathologist who would have a broader practical knowledge of the range of paediatric conditions and would interpret the findings in that context rather than in isolation. In North America, a system of pathology expertise that is based around individual body systems (e.g. liver pathologist, lung pathologist etc) has resulted in the loss of paediatric laboratory specialists in the wake of some mergers.

CONCLUSION

In the opinion of the consultant medical and scientific staff in the children's hospital laboratories, the optimum configuration for the delivery of a paediatric laboratory service to the new children's hospital and children elsewhere in the state is dedicated paediatric specialists in a dedicated paediatric laboratory in the heart of a paediatric hospital.

Paediatric specialists may be defined either by appropriate qualification or experience and practice which is substantially paediatric. Merger with an existing adult laboratory would dilute and ultimately dissipate paediatric expertise at a medical and scientific level, reducing the quality of service available to children at the only specialist children's hospital in the state. As the motivation for the construction of the merged facility is quality improvement, such a merger would represent an illogical and unjustifiable course of action.

Signed:



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Consultant Histopathologist, OLH**



**Dr. Niamh O'Sullivan,
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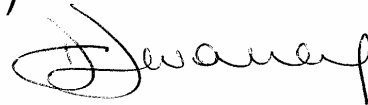
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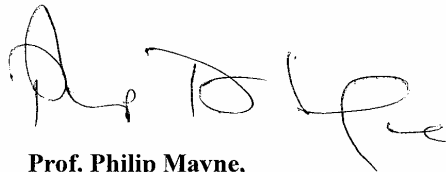
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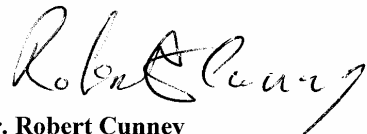
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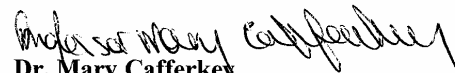
**Prof. Philip Mayne,
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**Dr. Robert Cunney
Consultant Microbiologist, CUH**



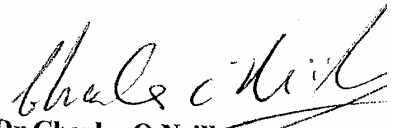
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Mr Terry Harvey
Laboratory Manager OLH



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Laboratory Manager CUH

APPENDIX C

TERTIARY CARE CASE DESCRIPTIONS

CASE STUDY 1- EXTREME PREMATURITY

Baby Boy 24/40 gestation premie

Hyaline Membrane Disease
Pulmonary Haemorrhage
Bilateral Intra-ventricular haemorrhage
Seizures
NEC
Sepsis
Long term Total Parenteral Nutrition
Retinopathy of Prematurity
Patent Ductus Arteriosus
Intravenous thrombosis
IV cannula infiltrate
Developmental delay

The baby was born at 24 weeks plus 3 days gestation. His mother a 40-year-old multiigravida had severe HELLP syndrome as a complication of her pregnancy and required emergent delivery. She was transferred from her local General Hospital with an attending Obstetric Registrar and 2 Midwives.

On arrival at the maternity centre she required emergent caesarean delivery under general anaesthesia. The neonatal intensive care team was led by the Consultant Neonatologist on call with the SpR, SHO and three neonatal nurses. The Consultant Neonatologist had a brief communication with both parents in theatre prior to anaesthetic induction. The neonatal pharmacy team was contacted to have prophylactic doses of surfactant and intravenous antibiotics available in Theatre. The radiographer on call was alerted and the chaplain called at the request of the parents.

The infant had a weak cry at birth and was suctioned. His heart rate was only 60 per minute and bag and mask ventilation was commenced and CPR instituted. Heart rate improved to 104/min, and he was intubated. Apgar scores were 3 at 1 minute and 7 at 5 minutes. He was then weighed on a pre-warmed scales, his weight being 620grams. He was treated with ETT surfactant and ventilated. Central umbilical lines were placed and initial blood sampling for metabolic testing, sepsis evaluation and ventilation gas monitoring was performed. When normothermia and normoglycemia were confirmed the resuscitaire was closed and he was transferred to the NICU, which was through the theatre doors down a short corridor.

The baby's father was informed of his son's condition and came with the neonatal team to take some Polaroid photos of his baby. The baby's mother who had been delivered under anaesthesia required high dependency post operative management and was unable to visit

the NICU but dad had brought the photos to her and the neonatal liaison nurse provided her with a video clip of her son.

If the delivery had been non-emergent advanced notice would have allowed prenatal consultation and afford the opportunity to inform them of the complex issues in relation to providing intensive care to a baby. This would have ensured their clear understanding of the morbidity and mortality risks associated with the treatment to which they are consenting. .

The baby had severe RDS secondary to Hyaline Membrane Disease of prematurity and required ongoing maximal ventilator support and repeated early surfactant therapy. He had hypotension and required inotropic infusion treatment. A pedipack was requested from blood transfusion. He was given total parenteral nutrition, and he had metabolic blood tests every 8hrs. He required an increase in intravenous fluid requirements because he developed hypernatremia secondary to high water loss due to immature skin and immature renal tubular function.

At 80 hours of age his Haemoglobin fell from 16 to 10 and this was associated with an episode of respiratory compromise secondary to a pulmonary haemorrhage. His ventilation status deteriorated, as did his blood pressure. He required radiological ultrasound of his cranium which confirmed a Grade III I.V.H. on left and grade II on right. The pulmonary haemorrhage did not recur but the baby required a change to high frequency oscillatory ventilation in order to achieve improved gas exchange..

The neonatal team met with the baby's parents later that day along with team psychologist, social worker and chaplain.

Neurology assessment

Following his clinical deterioration at 80 hours CFAM (cerebral function amplitude monitoring) had been placed overnight. A Paediatric Neurology consult confirmed left sided epileptiform activity on day 4 of life. Phenobarbitone was prescribed. An MRI was scheduled for term corrected gestational age.

Nutrition/ NEC Surgery/lactation consultation/expressed breast milk.

Naso-gastric trophic EBM expressed breast milk feeds were commenced day 5. Mother was supported by the lactation consultant. He was continued on total parenteral nutrition available from the on-site TPN manufacturing unit in the hospital pharmacy. On day 9 he developed abdominal distension with increasing bilious aspirate volume and abdominal x-ray confirmed suspicion for necrotising enterocolitis

His ventilator support increased and a septic work-up confirmed staph epidermis sepsis. Abdominal symptoms worsened and he developed a coagulopathy requiring transfusion products. His increase in abdominal distension and x-ray confirmed perforation, which required abdominal Penrose drain placed by the paediatric surgical team.

The baby had increasing oedema with declining urinary output, rising creatinine and urea and Gentamicin had to be withheld because of elevated levels. Two days later he had a Broviac catheter placed when blood cultures were sequentially negative after 48 hours on day 19. Over the following 7 days the oedema slowly resolved. Nutrition had been provided parenterally from the on-site TPN manufacturing unit in the hospital pharmacy. In association with his protracted total parenteral nutrition he had osteopenia of

prematurity Little success was encountered with enteral feeding as he had recurrent bilious aspirates and a contrast study on day 44 confirmed a stricture with incomplete obstruction. Further feeding attempts over the ensuing 10 days were unsuccessful and he required laparotomy for reparative surgery to the strictured small bowel. GI Hepatology team monitored liver dysfunction associated with protracted TPN.

Ophthalmology:

He commenced ophthalmological surveillance at 6 weeks. He required laser therapy on two occasions for a stage 3+ disease. This was performed in the neonatal unit laser treatment room under general anaesthesia.

Cardiology

His PDA which had been diagnosed on serial Echo's over the first two weeks, with refractory response to intravenous Brufen therapy and the PDA was ligated on the unit under general anaesthesia, by the cardiothoracic team.

Pain Management

Pain management was monitored by the pain nurse specialist team. As he required long term morphine therapy he had a protracted weaning programme to avert opiate withdrawal syndrome.

Plastic Surgery:

Due to protracted IV therapy (TPN, Antibiotics, Ibuprofen, Pressors, opiates) He unfortunately developed a calcium burn secondary to TPN infiltrate on the left leg. This was treated with Hyaluronidase. Extensive scarring evolved, and the plastics team reviewed him in the unit and arranged for his follow up in the Plastic Surgery Clinic.

Neurodevelopmental:

Because of the protracted naso-gastric feeding and mechanical ventilation the baby was assessed by the Speech & Language Therapist who undertook a programme of intervention to optimise his oromotor function. This was also taught to his primary care nurse and his parents for implementation. He also commenced on neuro-developmental physiotherapy at term gestation given his high risk for adverse neurological outcome in the context of his bilateral intraventricular haemorrhage on his sequential ultrasounds.

Respiratory:

He was then weaned to CPAP Assist mode and finally extubated to nasal CPAP on day 60. He extubated to nasal cannula oxygen on day 72

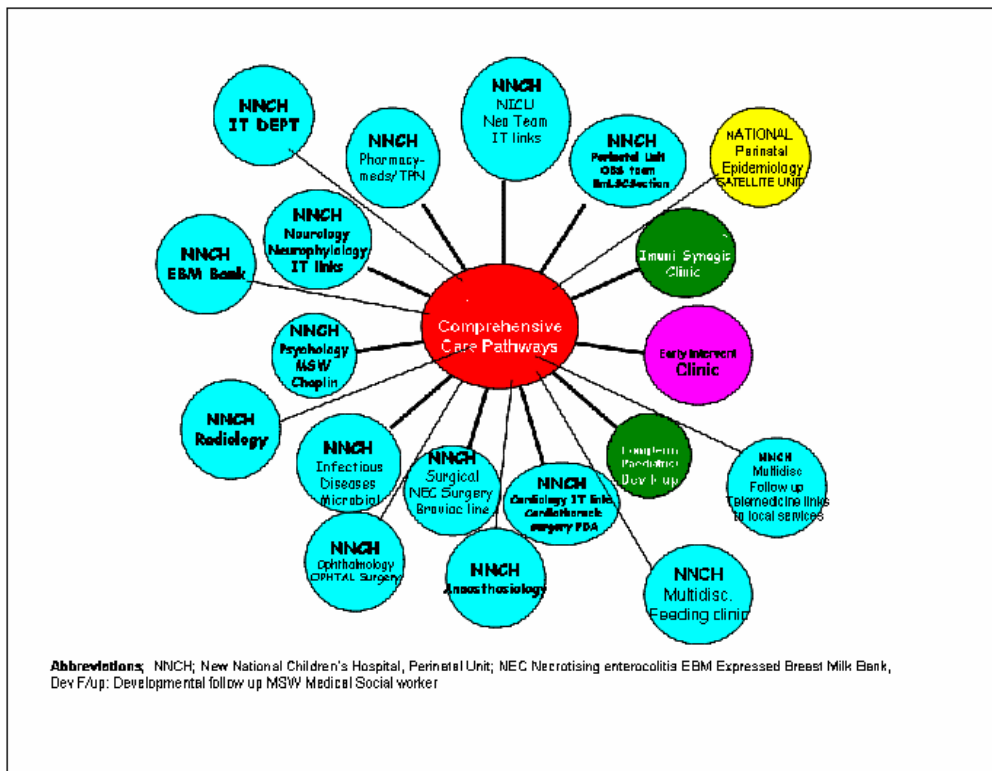
He developed bronchopulmonary dysplasia and continued on oxygen therapy to be discharged on half a litre of oxygen with the home oxygen therapy being organised by the nurse specialist in liaison with the community team. Because of persistent respiratory distress and feeding aversion, he was unable to manage full bottle-feeding at the time of discharge. Both parents and his eldest teenage sister were taught how to pass the nasogastric tube. They were also educated in relation to resuscitation in the event of any respiratory deterioration or acute event. This was facilitated by both parents remaining in his room, which had adjoining sleeping accommodation during the weeks leading up to his discharge. Home help was arranged for eight hours per week to facilitate some additional support for mother to allow her cater to school runs and sibling needs.

Immunisations:

The HSE was notified that the baby had already received the 5-in-1 Pentavac and also pneumococcal vaccine and was scheduled for monthly visits to the paediatric unit in local hospital. The baby’s siblings were able to visit on weekends and stay in the siblings facility and avail of the play facilities.

Follow-up discharge planning:

He will have follow-up with the paediatric team in regional hospital, where he will continue under regular surveillance in addition to having the monthly synagis over the winter months. He will be reviewed by the neurologist, developmental paediatrician, consultant paediatric surgical team, ophthalmologist, audiologist, plastic surgeon and at the feeding clinic with multi-disciplinary input as the feeding aversion will be an ongoing problem. Gastrostomy feeds may be required if he fails to progress in his oromotor skill.



CASE STUDY 2: ACUTE LYMPHOBLASTIC LEUKAEMIA

A teenage boy presented via his GP to his local General Hospital with a recurrence of a left cranial nerve palsy (face weakness) that was treated successfully with steroids two weeks prior to this presentation. Clinical examination showed him to have both cranial nerve palsies with associated lymphomatous features (enlarged liver and spleen together with diffuse enlargement of lymph glands). His initial blood tests showed a marked elevation in his white cell count ($150 \times 10^9/l$) and the presence of kidney failure. He was transferred to New National Children's Hospital (NNCH) where a diagnosis of acute T-cell acute lymphoblastic leukaemia with central nervous system (brain) involvement and acute renal failure was made.

The diagnosis of paediatric cancer is one of the most stressful situations a child and Family must face. It presents an overwhelming series of stresses, not the least of which is the possibility of the child's death. Although the survival rate of childhood cancer has improved significantly (from nearly always fatal in the 1950's to 60's to nearly 80% survival at present), the treatments remain lengthy (in his case 3.5 years) and intensive (In this boy's case 6 blocks of combination chemotherapy and 15 fractions of radiation therapy) involving fundamental changes in the child and family lives. The comprehensive health care programme that will be delivered to him and his family over many years will involve many health care professionals from a number of hospitals as is shown below

The patient's initial diagnosis and immediate treatment management at the NNCH would consist of a multidisciplinary team approach involving;

- **Paediatric Haematology/ Oncology** (Treatment Planning *via* Peer Review Protocol – in this case MRC ALL 2003 Protocol)
- **Paediatric Surgery / Anaesthesia** (Insertion of a central venous right atrial catheter, also known as Broviac or Hickman catheter to allow chemotherapy administration and blood products and antibiotic and antifungal support, insertion of a femoral vascatheter to allow renal dialysis to commence and to control tumour lysis syndrome and a lumbar puncture to administer intrathecal chemotherapy, procurement of bone marrow tissue for further defining the diagnosis of leukaemia)
- **Paediatric Haematology** (Cytomorphology, and Flowcytometry)
- **Paediatric Pathology** (Trepine Histology)
- **Paediatric Cytogenetics** (Analysis of bone marrow leukaemia genetic analysis will give vital information regarding overall prognosis and will dictate the intensity of chemotherapy)
- **Paediatric Nephrology** (Renal Dialysis to correct metabolic disturbance in real time to allow chemotherapy to commence)
- **Paediatric Cardiology** (Heart function is assessed prior to commencement of anthracycline chemotherapy)
- **Paediatric Pharmacy** (All initial chemotherapy and subsequent high dose chemotherapy is made up in Aseptic Compounding Unit of the NNCH)

Prior to the commencement of curative chemotherapy, the patient was offered to store his sperm and agreed, and it was done.

Subsequent Chemotherapy Scheduling and Complications

The patient achieves remission after his first 4 weeks of treatment and now has normal kidney function. His remission is consolidated with further intensive blocks of combination chemotherapy (consolidation, interim maintenance x 2, delayed intensification x 2) and maintenance chemotherapy – see chemotherapy flow sheets attached). It will take a further 3.5 years for him to complete this treatment schedule. Most of the blocks of combination chemotherapy and maintenance phases will be administered at the NNCH with the patient attending the NNCH no less than 84 days for such chemotherapy infusions to be administered. Some of his less intensive chemotherapy will be administered by his Shared Care Hospital, in his local general hospital (NNCH shares care with 16 hospitals around the country). The patient will be admitted to his shared care hospital when he develops fevers for intravenous antibiotic and antifungal treatment when his blood counts become low as a result of his chemotherapy. It would not be unusual for him to be admitted 10 times of one week duration for such life-saving supportive care treatment

Radiation Therapy

Because his leukaemia was present in his central nervous system (brain) at diagnosis, he received precise doses of radiation therapy to his brain during his second block of chemotherapy (one dose per day over a three week period at the nearest Radiation Oncology Centre (St James's / St Luke's or Beaumont Hospital). Each trip taking approximately 5 hours in duration to complete)

Psycho-Social / Education

Medical advances incorporating intensive and difficult multi-modal therapies have resulted in improved rates of survival in childhood cancer. Improvements in disease management and survival while enhancing and maintaining maximum quality of life in young people living with cancer is the accepted psycho-social goal of comprehensive care. With this in mind the boy, through out the period of his treatment great effort was made to maximise his school, academic and psycho-social outcomes by hospital and home tutors and the psycho-social service of NNCH

Relapse and Bone Marrow Transplantation

Five months after finishing treatment at the age of 17 years the patient suffered a bone marrow relapse. He achieved a second remission following combination chemotherapy and subsequently underwent successful unrelated bone marrow transplantation following conditioning with radiation (Radiation Oncology Centre - St James's / St Luke's or Beaumont Hospital) and chemotherapy.

Long Term Follow-Up

Because the bone marrow transplant conditioning treatment and the post transplant complications have adverse effects on many body organ function, he like all patients undergoing bone marrow transplantation, will be followed up in a dedicated long-term follow-up clinic for children and adolescents at the NNCH with subsequent transfer to a similar clinic in St James's Hospital, where the National Adult Bone Marrow Transplant Programme is housed when he turns 18 years of age.



Abbreviations: NNCH, New National Children's Hospital, CDXT, Cranial Radiotherapy, TBI, Total Body Irradiation, SJH, St. James's Hospital

APPENDIX D

INTERNATIONAL HOSPITAL COMPARISONS

HOSPITAL FOR SICK CHILDREN TORONTO

Standard Inpatient Beds	201	Staffed and set-up
Intensive Care	36	
NICU	32	
Day Beds	--	Not recorded; >24,000 visits annually, probably equivalent to 60+ places
Outpatient Visits	165,000	Excludes
Emergency Visits	47,585	
Parking Spaces	1,445	
Site Area	3.29 ha	
Gross Building Area	155,815 sq m	Excludes Research Institute & Residential
Gross Area/Inpatient Bed	579 sq m/bed	

Comments

The hospital has occupied the same downtown site since the early 1950's and has undertaken a major expansion project in each decade up to the 1990's. During the last expansion, in the early 1990's all inpatient accommodation, operating theatres, emergency department, laboratories and some imaging facilities were constructed. The balance of accommodation remained in buildings of the 1950 to 1970's. Only about 300 beds of the over 500 originally constructed have been used as the model of care has shifted to outpatient and day care. Much of the unused capacity has been converted to clinics and day care.

Inpatient units were built with 24 beds of which 20 in single rooms with provision for one parent to stay. The four-bed room is unpopular with parents and has sometimes been converted to other uses.

A number of major conversion, refurbishment and expansion projects have been completed since completion such as the Image Guided Therapy Suite, Renal Dialysis and outpatient expansion. A major expansion of interventional cardiac facilities, including cardiac MR is under way. Space has remained a constant problem on what is now a fully developed urban site.

The hospital has developed sophisticated shared care/outreach links to community paediatric programs in the Metropolitan Toronto area through the Child Health Network. The Network is supported by well-developed electronic links allowing sharing of information. Telehealth/telemedicine links are also well-developed linking other tertiary centres in Ontario and facilitating consultations at a distance to remote communities in Ontario.

The hospital supports a largely integral Research Institute employing approximately 400 research scientists, 950 trainees and 950 operations and support staff and is considered an essential component in the hospital's child health strategy.

The hospital is physically linked to the adult University Hospitals Network facility including the Princess Margaret Cancer Hospital; and, to the Mount Sinai Hospital. Clinical and diagnostic interaction is restricted to the use of radiotherapy facilities. In all other aspects the hospital functions independently.

CHICAGO CHILDREN'S MEMORIAL HOSPITAL

Standard Inpatient Beds	155	Includes 12 Psychiatry Beds
Intensive Care/HDU	60	
NICU	60	
Day Beds	60	
Outpatient Visits	250,000	
Emergency Visits	53,000	
Parking Spaces	2,500	
Site Area	0.7 ha	
Gross Building Area	80,685 sq m	Mid-range projected area
Gross Area/Inpatient Bed	293 sq m/bed	

Comments

A new facility is at the planning/briefing stage. All data refers to the projected new facility. The hospital has decided its key co-location is with a medical school and it is therefore to be developed on a downtown site of only

All standard inpatient accommodation is in single rooms. Single rooms are approximately 32.5 sq m in area and are capable of accommodating an Acuity Adaptable Nursing model in which the level of care can be varied from standard to intensive care without moving the patient.

The hospital has a growing number of Transitional Care patients, transferring from acute levels of Intensive Care, neurosciences and stem cell transplant.

In addition to the core hospital two types of satellite operation are supported: ambulatory sites operated by the Hospital; and, supported community hospital sites. The former include clinics, day surgery, imaging and rehabilitation and are staffed on rotation from the main site. The latter are staffed by community paediatricians (Hospitalists) emphasising outpatient care and have access to telemedicine links to the main site.

The new hospital will offer a Room Service model of catering with food on demand between certain hours.

MANCHESTER CHILDREN'S HOSPITAL

Standard Inpatient Beds	343	Includes 22 Short Stay Beds; includes A&E observation beds
Intensive Care/HDU	21+15 HDU	18 staffed initially; other ICU/HDU beds on specialist units such as Burn Care
Day Beds	50	Diagnostic & Treatment Centre model
Outpatient Visits	Not available	
Emergency Visits	27,000	
Parking Spaces	Not available	
Site Area	Not available	Physically integrated with adult hospital
Gross Building Area	+/-56,250	Based on 45,000 departmental sq m x 1.25
Gross Area/Inpatient Bed	164 sq m	

Comments

The hospital is under construction as part of a multi-hospital Private Finance Initiative redevelopment which also includes a Women's Hospital, Adult Acute Hospital expansion and Eye Hospital.

Standard inpatient accommodation is 45-50 per cent in single rooms with the balance in four-bed rooms. The area for single rooms, 14 sq m excluding bathroom/toilet, did not allow for parent sleeping accommodation a defect which they are trying to remedy. Some specialist units such the cystic fibrosis and rehabilitation units have larger rooms. Bone Marrow Unit and rehabilitation unit are all single rooms. The PICU is a mixture of open plan cubicles and single rooms.

A 60-bed Ronald McDonald House has been included on the campus.

Although co-located, indeed physically integral with the overall adult development day to day interaction will be limited. The Children's Hospital will share a Nuclear Medicine Department, Stem Cell Laboratory, Genetics Service, Cochlear Implant Service, Bone Densitometry, Pharmacy, Education Facilities, On-Call Rooms and Main Entrance with the Women's Hospital. Transitional Care has been identified as an important new service, for patients discharged from intensive care but requiring maintenance as well as respite care.

GREAT ORMOND STREET HOSPITAL (GOSH)

Standard Inpatient Beds	240	
Intensive Care	46	
Day Beds	124	
Outpatient Visits	95,000+	Current activity; projected activity likely to exceed 100,000
Emergency Visits	N/A	No emergency service provided at this site
Parking Spaces	0	
Site Area	2.15 ha	"Island" Site only; additional detached buildings
Gross Building Area	128,000 sq m GIA	Includes 17,000 sq m in detached buildings
Gross Area/Inpatient Bed	448 sq m	Area/total beds 312 m/bed

Comments

All data refers to the projected end-state of a multi-phase development scheduled for completion in 2014.

GOSH is a referral-only tertiary centre. It occupies a highly restricted site in the centre of London. It shares the site with its academic partners University College London and the Institute of Child Health and this physical relationship is considered indispensable. The hospital operates satellite outpatient and secondary inpatient services at the North Middlesex Hospital some miles away. GOSH is functionally self-sufficient in almost all respects.

The site is restricted by virtue of its central London location, including onerous height limitations designed to preserve the "viewing plane" to St Paul's Cathedral. Prior to implementation of the Variety Club Wing in the 1980's the question of remaining on this difficult site was reviewed. It was eventually decided to remain and redevelop, in spite of the restrictions. The principal reasons cited for staying on this very difficult site were a wish on the part of medical practitioners to maintain certain established relationships; and, the difficulty of raising sufficient capital to effect a transfer of the whole hospital in one

The core site, the so-called Island Site, will house patient care with some 17,000 sq m of patient hotel, education/training, corporate and medical offices located, literally, across the street.

APPENDIX E

SHARED OR PURCHASED SERVICES

EBME

Staff Food Services

Household Service

Linen Service

Waste Handling

Receiving, Storage and Distribution

Plant Operations, Maintenance, Grounds-keeping

Security

Project Office/Development

Human Resources

Payroll Services

Information Technology and Telecommunications

Health and Safety

Occupational Health

APPENDIX F

ESTIMATION OF A MINIMUM BUILDING FOOTPRINT

Minimum Building Footprint is defined as the area required to accommodate anaesthesia dependent services at a single horizontal level, the so-called “Unconscious Floor”. It comprises:

Operating Theatres

Medical and Surgical Day Care

Critical Care

Diagnostic Imaging

Operating Theatres

- a) Assume 20,000 + surgical procedures of all types and 1,700 cases per theatre per year
- b) $20,000/17,000 = 11.76 = 12$ theatres
- c) Assume 200 sq m per theatre = 2,400 departmental gross sq m

Medical and Surgical Day Care

- d) McKinsey projection 41 day beds
- e) Assume 45 sq m per bed, $41 \times 45 = 1,845$ departmental gross sq m
- f) Critical Care
- g) Mc Kinsey projection 54 beds
- h) Assume 80 sq m per bed, $54 \times 80 = 4,320$ departmental gross sq m

Diagnostic Imaging

- a) Assume Plain film, fluoroscopy, ultrasound, nuclear medicine, MR/CT
- b) Allow 2,300 departmental gross sq m as per ODCP

Summary

Operating Theatres	2,400
Medical and Surgical Day Care	1,845
Critical Care	4,320
Diagnostic Imaging	2,300
<i>Sub-total departmental gross area sq m</i>	10,865
Allowance for interdepartmental circulation and floor mechanical & electrical, 15 % of departmental area	1,630
<i>Floor gross area sq m</i>	12,495

APPENDIX G

ESTIMATION OF A DESIRABLE SITE AREA

Footprint

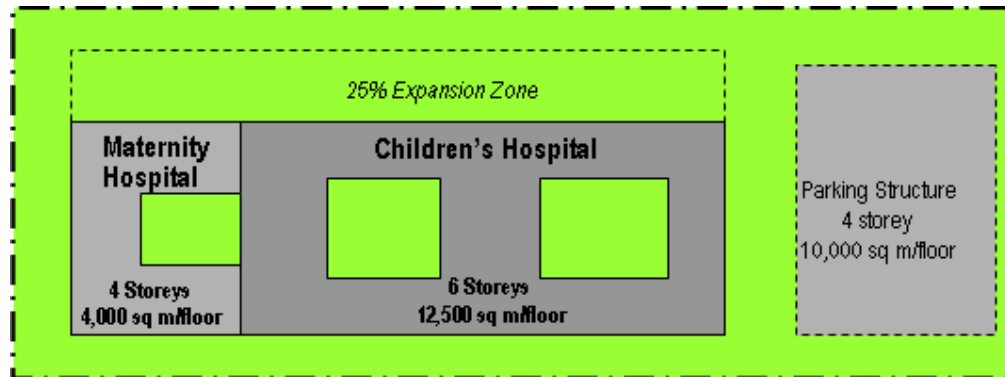
Assume minimum net footprint of building is 12,500 sq m as per calculation in Appendix F plus 4,000 sq m for maternity and women's hospital. This will result in building of at least six storeys, possibly higher, for a Children's Hospital of 78,000 sq m GIA and maternity hospital of 25,000 GIA.

Allow for daylight penetration in courtyards or atria of 30 per cent of occupied floor space, i.e. 25 per cent of gross footprint. This gives a total footprint of 21,450 sq m.

Expansion/Renewal Area

Allow 25% of gross footprint as strategic reserve

Total Hospital Area



Site Area with Parking Structure 5.5-6.0 ha

Site Area without Parking Structure 4.0 ha

- Allow further 20m zone for vehicle movements and landscaping around gross footprint
- Gross site area without parking = 170m x 270 m = 4.5 ha
- Site Area = 4.6 ha, say 5 ha

Allowance for Multi-Storey Parking

- Assume 1,500 parking spaces for combined children and maternity hospital.
- Assume 28 sq m gross/place, and four storeys
- $1,500 \times 28 = 42,000$ sq m, or 10,500 sq m per floor = 1.0 ha approximately

APPENDIX H

SITING CRITERIA MCKINSEY

The McKinsey report alluded to siting issues on two occasions. On the first occasion it said of the site¹⁵:

- That it would be in Dublin
- It would preferably be co-located with a leading adult hospital (to capture the sub-specialist and academic linkages discussed earlier)
- ***It would have space for future expansion*** (including research and education facilities)
- It would be easily accessible through public transport and the road network
- (***...with all these considerations subject to the suitability and flexibility of the sites available***)

The emphasis above is ours. On the second occasion the report set out criteria for the further implementation of the core recommendation¹⁶ (see over page). These are the criteria which apply to the site and facilities:

¹⁵ Ibid. Page 58.

¹⁶ Ibid. Page 62.

PROPOSED ASSESSMENT CRITERIA

1. Space	<ul style="list-style-type: none"> • Ability to meet projected tertiary and secondary needs (including potential to accommodate research and education facilities)
2. Breadth and depth of services	<ul style="list-style-type: none"> • Centre should offer the following services: <ul style="list-style-type: none"> – Sub-specialist capability across the 25+ core sub-specialties: Medical - Anaesthetics, Cardiology, Endocrinology, General Medicine, Genetics, Haematology, Immunology, Infectious Diseases, Intensive care, Neonatology, Nephrology, Neurology, Oncology, Ophthalmology, Pathology, Radiology, Respiratory +/- allergy, Rheumatology, Microbiology and clinical chemistry; Surgical - Cardiothoracic surgery, ENT surgery, Gastroenterology/GI/ hepatobiliary surgery, General surgery, Neurosurgery, Orthopaedic surgery, Transplant surgery, Urology – A patient and family focused environment and services; including accommodation and schooling learning from recent best practice trends (e.g. .parent and child rooms % single rooms)
3. Co-location	<ul style="list-style-type: none"> • The preferred option would be co-location. If so, needs to be specific about level of integration and sharing of services. If not co-located, need to be specific about how to address the challenges of isolation from adult services
4. Access	<ul style="list-style-type: none"> • Comprehensive outreach programme with other hospitals providing in-patient paediatric services in critical sub-specialties • National retrieval plan and ambulance diversion protocol for Dublin • Clear referral protocol and supporting liaison with Dublin A&E centres • Provision for “hospital hotel” facilities and family accommodation on site • Good public transport and road links • Parking for families and staff
5. Efficient use of resources	<ul style="list-style-type: none"> • Sufficient activity levels to support 24/7 cover in key sub-specialities and other multi-disciplinary support services • Appropriate sharing of diagnostic equipment and other operational services
6. People - attract and retain	<ul style="list-style-type: none"> • Attractive work environment and interesting career opportunities • Clear Children’s Hospital ‘brand’
7. Teaching and research	<ul style="list-style-type: none"> • Strong integration with under graduate and post graduate training programme, especially in medicine and nursing • Mandate to pursue clearly defined research agenda as part of child care mission, building upon the best of what is already ongoing and ensuring alignment with Ireland’s long term research and innovation goals
8. Financial stability	<ul style="list-style-type: none"> • Brand and associated governance status to enable fundraising for research • Sufficient budget to manage complete services and range of sub-specialties within hospitals including necessary outreach and retrieval programme and additional sub-specialists as appropriate • Budget to reflect likely trend to higher case mix index
9. Full project plan and role assessments	<ul style="list-style-type: none"> • Credibility of proposal including ability to execute capital project and willingness to address roles, in particular with respect to cooperation with other providers (e.g. A&E) and to support integration with adult services where there are clear