Children’s Hospitals

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Hong Kong June 2011

History of Children's Hospitals

- **1802 Hopital des Enfants Malades Paris**
- **1821 National Children's Hospital Dublin**
- **1852 Hospital for Sick Children (GOSH) London**
- **1855 Children's Hospital of Philadelphia**
- **1869 Evelina Children's Hospital London**
- **1869 Children's Hospital Boston**


TAXIS
TAXIS

Children are not just little people; humans require many years from birth to reach maturity

- **Physiology; immunity, energy metabolism, fluid and electrolyte balance etc**

- **Pathology; infectious disease, metabolic disease, congenital and development disorders**

- **Psychology; emotional dependency, attachment theory, separation anxiety**

What has changed in recent years?

- **Patterns of illness; inf. diseases, gastroenteritis, newborn screening, foetal screening, anaesthetics and surgery etc**

- **Change in care; day case and short admissions, intensive care, subspecialisation**

- **Outcome evidence; centralise where necessary localise where possible**

Bibliography

- **Specialist health services for children and young people 2003 www.rcpch.ac.uk**
- **National Service Framework for children, standards for hospital services 2003 www.dh.gov.uk**
- **Strategic organisation of tertiary paediatric services for Ireland, the Mckinsey Report www.lenus.ie/hse/handle/10147/42911**
- **Supporting paediatric reconfiguration. A framework for standards 2008 www.rcpch.ac.uk**
- **Commissioning safe and sustainable specialised paediatric services, a framework of critical inter-dependencies www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_088068**
- **Meeting the health needs of children and young people Nov 2009 *www.healthcareforlondon.nhs.uk/new-nhs-guidance-on-healthcare-for- children-and-young-people-in-london***

The number of children with specialised conditions is relatively small, and services are increasingly sub-specialising. These factors will inevitably mean fewer, bigger centres.

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Commissioning safe and sustainable specialised paediatric services, a framework of critical inter-dependencies
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Healthcare for London

NHS

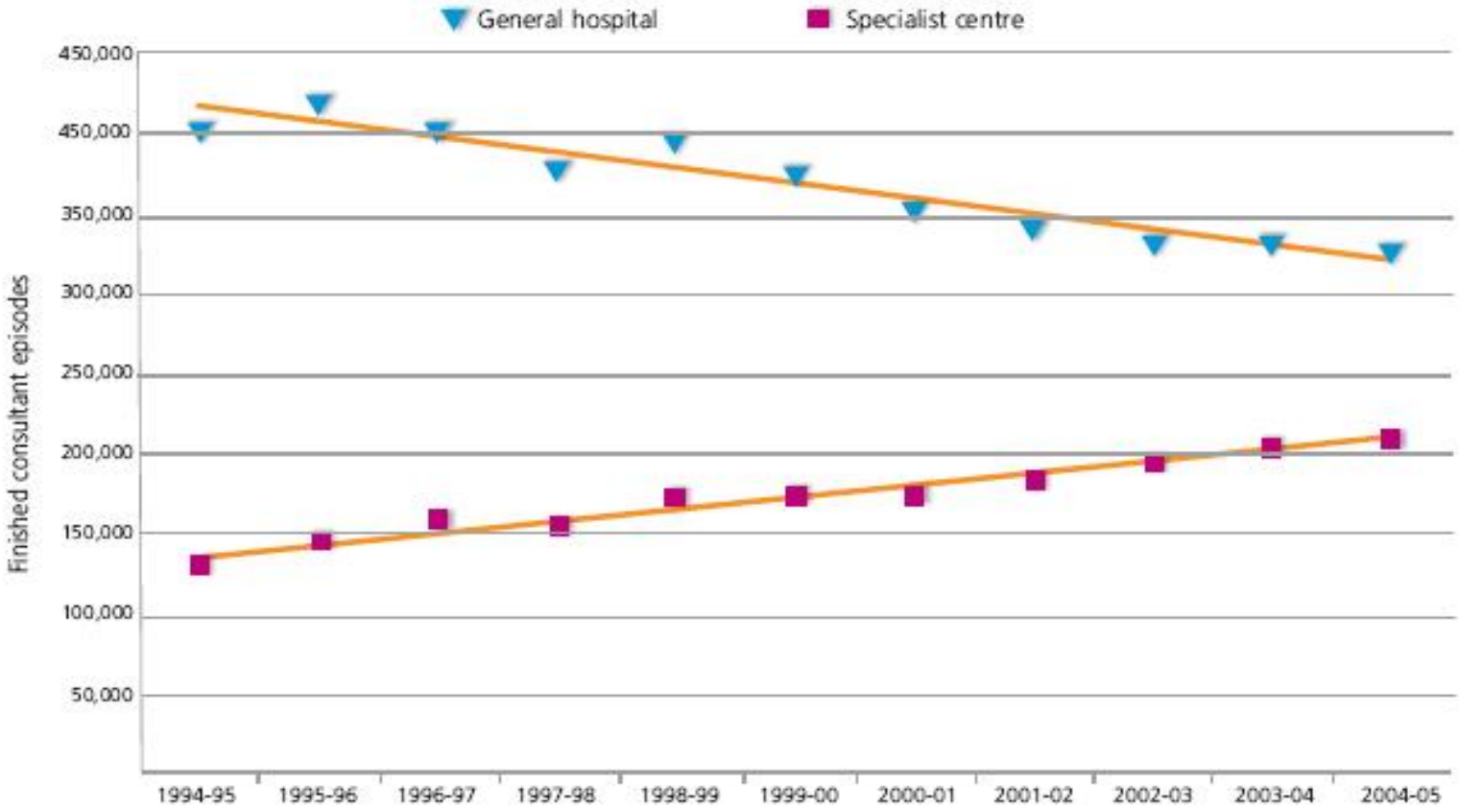
Commissioning Support for London

Meeting the health needs of children and young people

Guide for commissioners

*www.healthcarefor**london**.**nhs**.uk/new-**nhs**-guidance-on-healthcare-for-**children-and-young-people**-in-**london**/* **Nov 2009**

Figure 16: The trend of increasing work in the specialist hospital is mirrored by a decreasing trend in general hospitals[58]



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'Localise where possible, centralise where necessary'
The impact on the District General Hospital

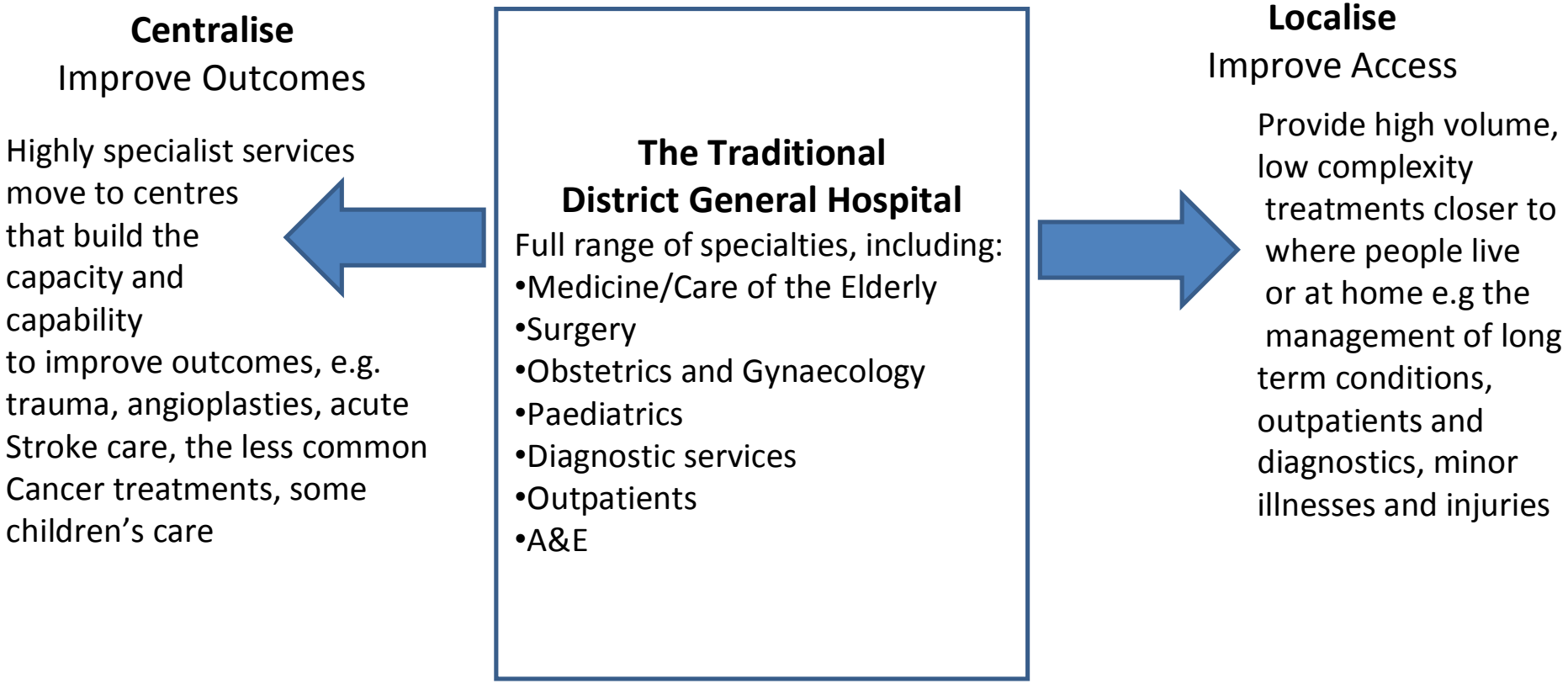
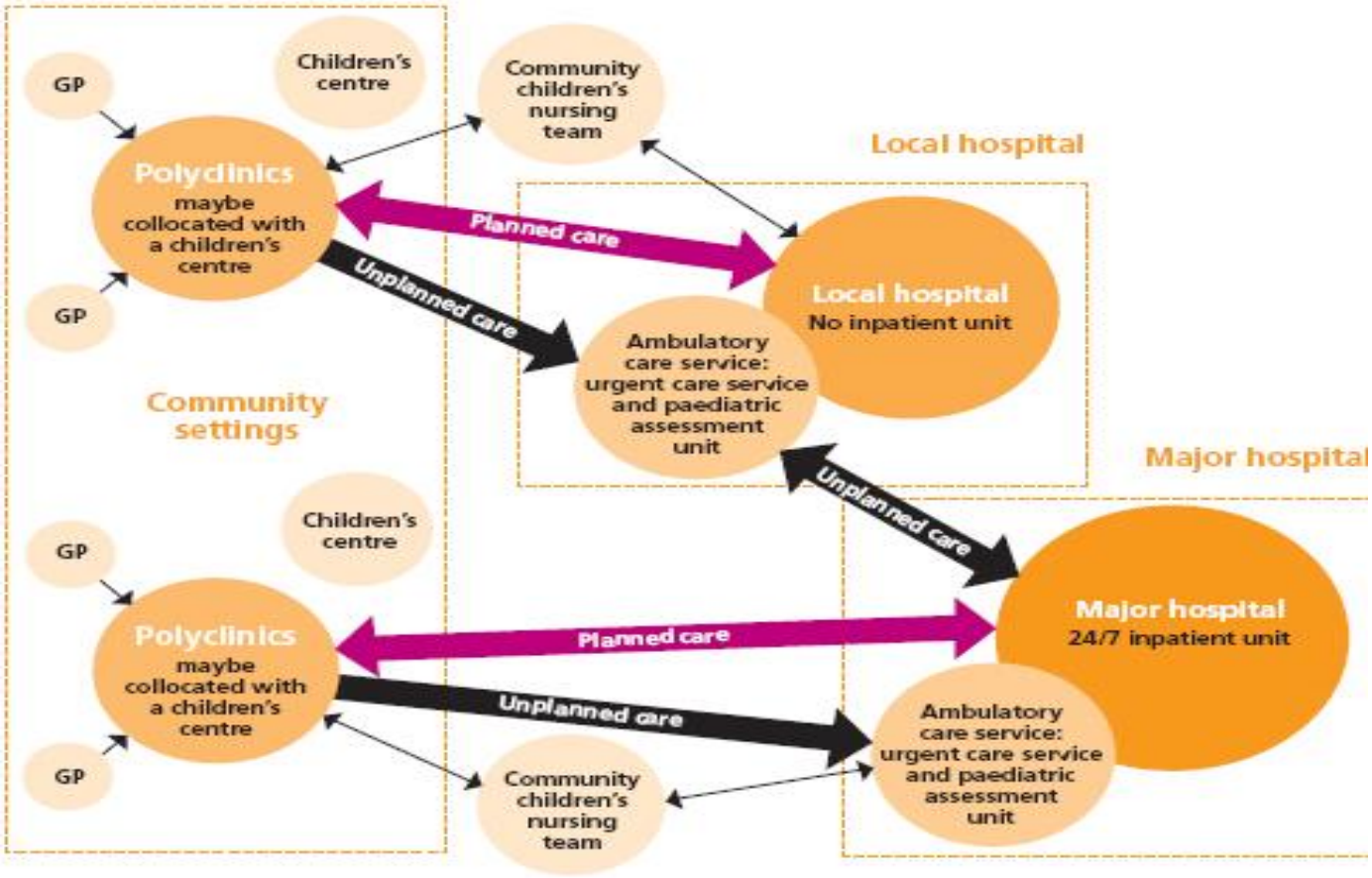


Figure 1 – The Impact of Changes on the District General Hospital

Figure 19: Future model of care for children and young people



* All major hospitals and most local hospitals will have a paediatric A&E as part of their paediatric assessment unit

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How we could provide care

Working together to provide more accessible, better, safer and more efficient services

How can we improve child health services?

The UK government's Health and Social Care Bill is unlikely to deliver the improvements in children's health services that are urgently needed. Useful lessons can be learnt from how other European countries deliver healthcare for children, say **Ingrid Wolfe and colleagues**

British Medical Journal 342 901-904 2011

In summary the report makes a series of interlocking recommendations: reduce the number of inpatient sites from 218 to approximately 170 with 32 new SSPAUs whilst increasing the number of consultants from 3,084 to 4,625 WTEs and changing working practices with increased use of resident consultants; expand significantly the number of advanced or enhanced neonatal nurse practitioners, the number of advanced children's nurse practitioners and the number of GPs trained in paediatrics whilst decreasing the number of ST trainees from 2,929 to 1720 WTEs (3,500 to 2,000 persons).

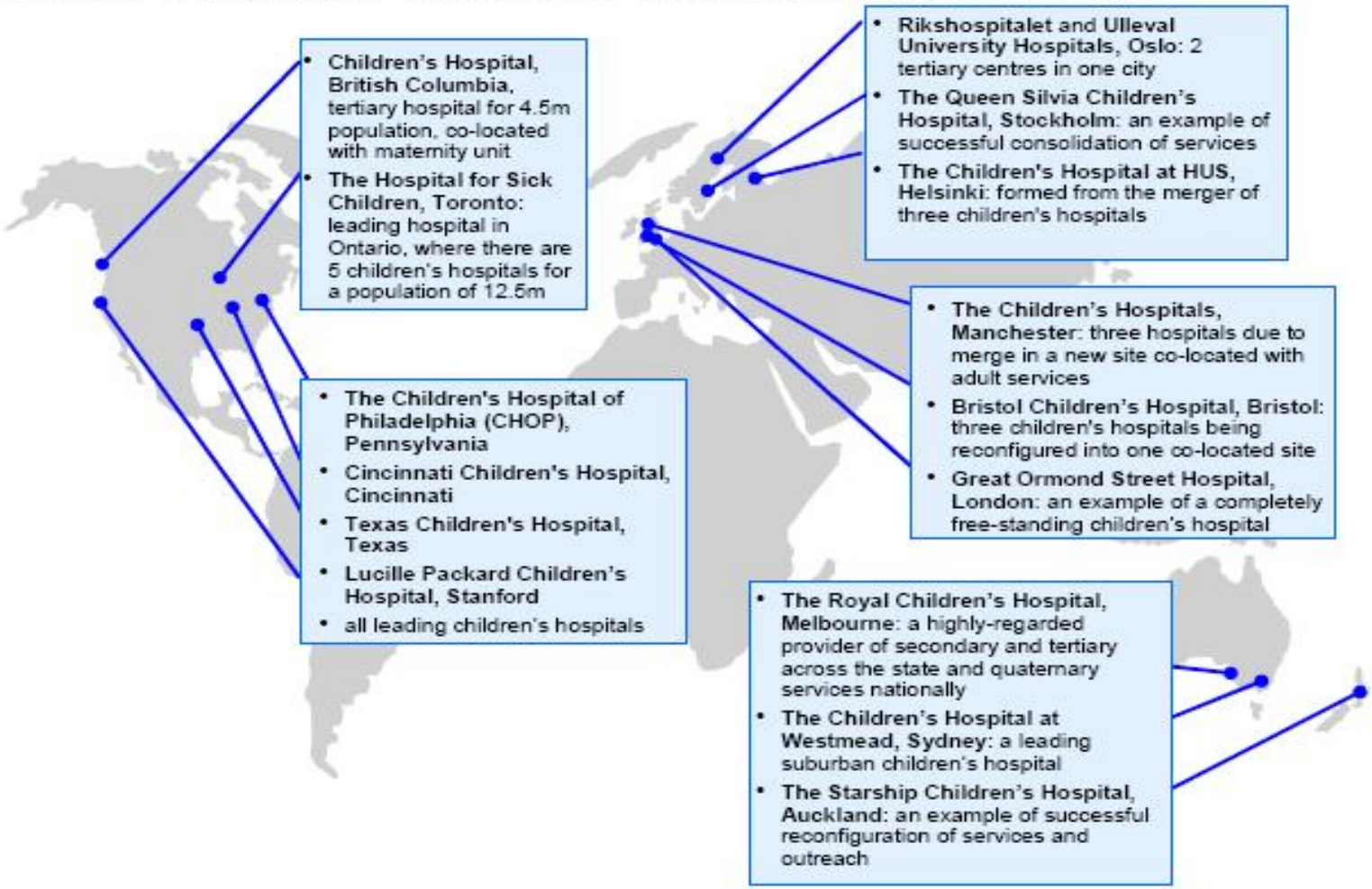
www.rcpch.ac.uk/facingthefuture

Strategic organisation of tertiary paediatric services for Ireland, the Mckinsey Report

www.lenus.ie/hse/handle/10147/42911

- Used contemporary data from hospital in-patient enquiry (HIPE) for Ireland
- Examined 15 centres worldwide and interviewed experts
- Problem of definition of tertiary cases
- Reviewed literature and professional reports
- Discussed outcomes, accomodation, co-location with adult facilities, university and maternity

HOSPITALS EXAMINED IN DEPTH PROVIDE A BROAD OVERVIEW OF BEST PRACTICES IN LEADING INTERNATIONAL SYSTEMS



McKinsey 2006

Tertiary Care Definition

Specialized consultative care, usually on referral from primary or secondary medical care personnel, by specialists working in a center that has personnel and facilities for special investigation and treatment. (Secondary medical care is the medical care provided by a physician who acts as a consultant at the request of the primary physician.)

Johns Hopkins Hospital

- **diagnosis** – some conditions are so serious or rare that all treatment relating to the condition will be considered specialised;
- **severity** – severe or intractable cases of otherwise general conditions will often require specialist expertise;
- **other underlying conditions** – a relatively straightforward procedure may become specialised when the patient has other serious underlying problems;
- **complications** – some procedures are not effective when first performed and may require a specialist to repeat the operation to correct the problems that have occurred; and
- **age** – simple procedures such as surgical interventions become specialised when the patient is very young, and specialised support services such as anaesthetics are required.

Commissioning safe and sustainable specialised paediatric services, a framework of critical inter-dependencies
ww.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_088068

Current best practice

- **"The centres examined and the experts consulted all painted a picture of optimal tertiary service being delivered as part of an integrated service configuration"**

- **" It is now strongly established across a number of specialities that quality is driven by volumes"**

- **" These reports clearly imply a fundamental principle in configuring tertiary paediatric services; providing critical mass of sub-specialist care is the most important factor in delivering best outcomes for patients"**

- **"You cannot have two paediatric tertiary care centres focussing on different niches….I challenge you to find me an example of where that works"**

Mckinsey 2006

TERTIARY HOSPITALS TEND TO PROVIDE SUB SPECIALISTS IN AT LEAST 27 "CORE" SUB SPECIALTIES

Medical

Anaesthetics
Cardiology
Endocrinology
General Medicine
Genetics
Haematology
Immunology
Infectious Diseases
Intensive care
Neonatology
Nephrology
Neurology
Oncology
Opthamology
Pathology
Radiology
Respiratory
Rheumatology
Microbiology & Clinical Chemistry

Surgical

Cardiothoracic surgery
ENT surgery
Gastroenterology/GI/ hepatobiliary surgery
General surgery
Neurosurgery
Orthopaedic surgery
Transplant surgery
Urology

NOTE: Centres may have additional sub specialties, e.g., Dermatology, Burns, Plastics, Metabolic, Psychiatry, Clinical Pharmacology, Child development, Allergology etc.

McKinsey 2006

Specialities at Great Ormond Street

- Acute General Paediatrics
- Adolescent Medicine
- Anaesthesia
- Audiological Medicine
- Autism Services
- Biomedical Engineering
- Blood Transfusion
- Bone Marrow Transplant
- Cardiac Services
- Chemical Pathology
- Cleft Lip and Palate
- Clinical Ethics Centre
- Clinical Genetics
- Cochlear Implant
- Craniofacial
- Cytogenetics (Heamatology/Oncology)
- Cytogenetics (Regional Laboratory)
- Dental and Maxillofacial Surgery
- Department of Child and Adolescent Mental Health
- Dermatology
- Dietetics and Nutrition
- Ear, Nose and Throat
- Endocrinology
- End of Life Care Services
- Gastroenterology
- General and Neonatal Surgery
- Haematology Laboratory
- Haematology/Oncology
- Haemophilia
- Hand and Upper Limb Surgery
- Histopathology
- Immunology
- Immunology Laboratory
- Infectious Diseases
- Metabolic Medicine
- Microbiology
- Molecular Genetics
- Nephrology
- Neurodisability
- Neurology
- Neuromuscular Services
- Neurophysiology
- Neuropsychology
- Neurosurgery
- Occupational Therapy
- Ophthalmology
- Orthopaedic Surgery
- Paediatric and Neonatal Intensive Care Unit
- Paediatric Malignancy Unit
- Pain Control Service
- Palliative Care Service
- Patient and Staff Safety
- Perfusion Services
- Pharmacy
- Physiotherapy
- Plastic Surgery
- Play
- Psychology
- Psychosocial and Family Services
- Radiology
- Respiratory Medicine and Transitional Care
- Rheumatology
- Social Work
- Speech & Language Therapy
- Tracheal Team
- Traumatic Stress Clinic
- Urology

Service Inter-dependency Framework

	Specialised Paediatric Service	A BMT	B Clinical Haemo	C Immun	D Met Med	E Onc	F Burns	G Infect Dis	H Resp Med	I Cardio	J Card Surg	K Neuro	L Neuro Surg	M Major Trauma	N Spec Ortho & Spinal	O Neph	P Uro	Q Endo	R Gastro	S ENT Airway	T Neonatal	U Spec Plast Surg	V Paed Crit Care	W Spec Paed Anaesth
1	Blood and Marrow Transplant					3		2	3	1		1				3			2			3		1
2	Clinical Haematology (Non-malignant)			1						1													2	1
3	Immunological Disorder	2	1					3	2							1			3			1	1	1
4	Metabolic Medicine		2						1	2		2				1								1
5	Oncology (inc Haemato-oncology)	1						1	3	1	1	3	3*	1	1	3	2	1	2	1				
6	Burns											1		3		1								
7	Infectious Diseases			2					1	1		1							1				2	1
8	Respiratory Medicine			1				2		3		1						1	3	3		3*	3	1
9	Cardiology								1		3*	1										1		1
10	Cardiothoracic Surgery		1						2			2				1				2	1	3		
11	Neurology		1	1	2			1	2	1			3*		1	1		1	1	2		1		1
12	Neurosurgery					3								3*	2	1	1	2		2	1	2		
13	Major Trauma (inc Maxfax and Plastics)		1							2	2	1			1	1	2							
14	Spec Ortho and Spinal Surgery					1			2	1		2	1				1					1	3*	
15	Nephrology		2	2	1	1		1	2	3		2			2		3*	2	2	2	3			
16	Urology					2										3*		2				3		1
17	Endocrinology												1										1	1
18	Gastroenterology			2	1			2														3	1	1
19	ENT (Airway)								3	2	2	1		1								2		
20	Neonatology									2												3		1
21	Specialised Paediatric Surgery		3			1			3	1	1	2	3	1	3		3	3	3	1	3			
22	Paediatric Critical Care		3	1	2			1	3	3		2	3	2		2	1		1					
23	Specialised Paediatric Anaesthesia		1						1	1								1		1	1	1		

Commissioning safe and sustainable specialised paediatric services, a framework of critical inter-dependencies DH 2008

Beds, equipment, facilities and arrangements (1)

(McKinsey 2006)

EQUIPMENT AND BEDS

	Avg. beds	Ratio beds to			ICU beds as % of total beds, percent			
	Count (range)	MRI	CT	Operating theatres	PICU	NICU	HDU	Total
Australasia, Canada, Scandinavia, U.K.	241 (195–263)	163* (118–254)	231* (120–314)	38* (24–49)	7 (5–10)	13 (11–16)	5 (3–7)	18 (15–22)
U.S.	344 (180–514)	87 (82–90)	95 (60–136)	23 (15–33)	13 (6–18)	22 (11–33)	8 (4–11)	40 (21–58)

* Many of these hospitals share facilities with adult services – these figures represent the child-dedicated service only

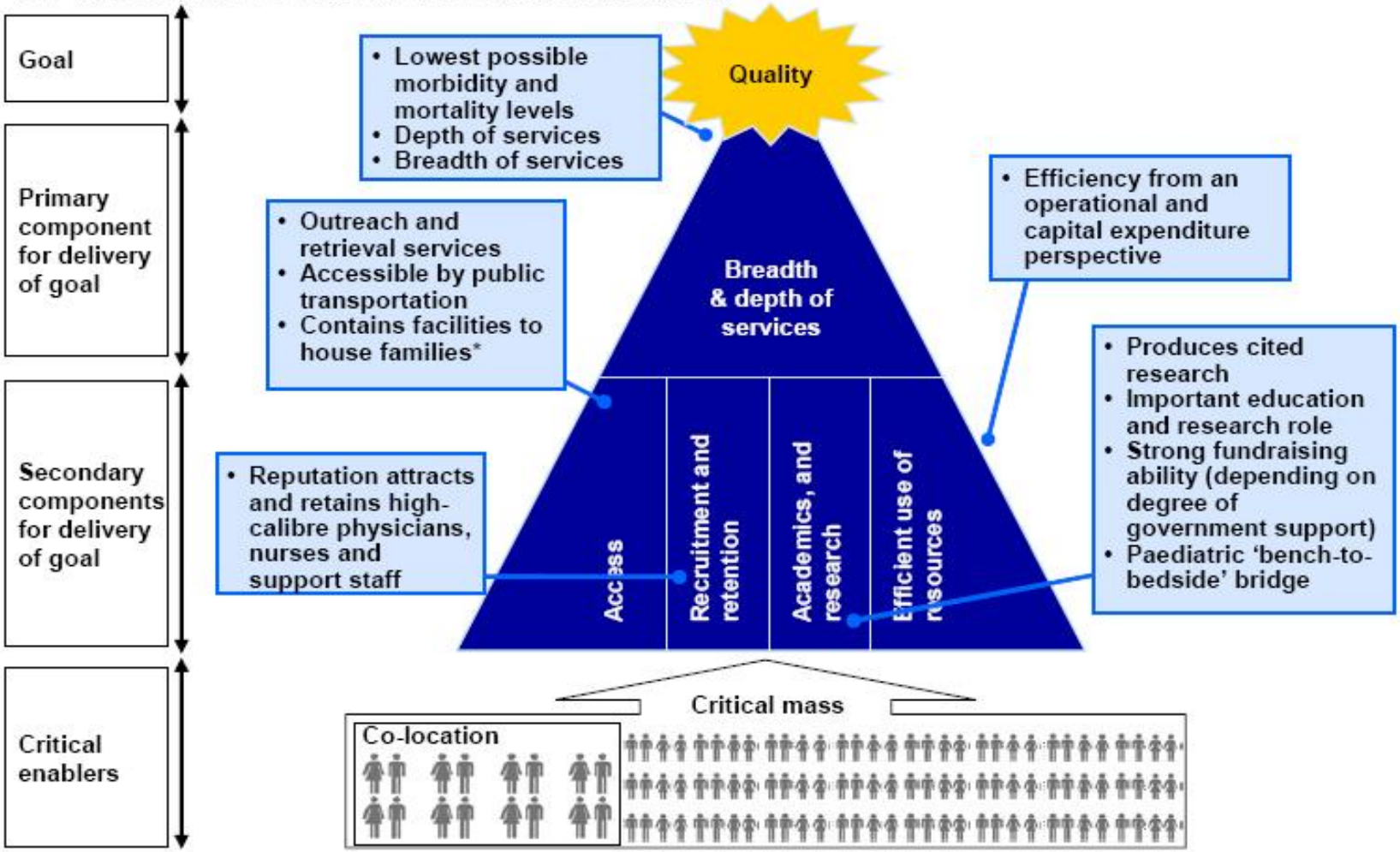
Note: PET scanner present in Texas, Cincinnati centres, HSC (Toronto) as reported by hospitals themselves

Beds, equipment, facilities and arrangements (2)

(McKinsey 2006)

- **Education**
- **Play therapy**
- **Accommodation**
- **Family and Carer support**
- **Single rooms with facilities**
- **Access**
- **Outreach**
- **Retrieval**

REQUIREMENTS TO DELIVER INTERNATIONAL BEST PRACTICE IN TERTIARY PAEDIATRIC SERVICES



* Does not include custodial or long-term facilities (e.g., for children with severe or profound disabilities)

Source: Literature, expert interviews, hospital profiles

Mckinsey 2006

RANGE OF BED SIZES AND POPULATION CATCHMENTS FOR LEADING CENTRES

	Hospital	Effective catchment, m	Reported beds	Notes
Austra-lasia	• Westmead	4.2	339	• Additional specialist services provided at Sydney Children's Hospital, Randwick
	• Starship	5.0	200	• Also provides services to children of the Pacific area (population 1m)
	• RCH, Melbourne	9.0	250	• Monash Medical centre in Melbourne also provides some lower end tertiary care
Canada	• HSC, Toronto	12.5***	300	• Four other children's and acute hospital also serve this catchment • Ontario has 156 beds, London 58 beds, Kingston and Hamilton <80 beds • Only centre for neonatal cardiac surgery, and one of two offering paediatric cardiac surgery
	• BCCH	4.5	142	• Only tertiary children's hospital in British Columbia
Scandi-navia	• HUS	5.2	293	• Formed from consolidation of 3 hospitals. A degree of tertiary care is provided in the community
	• Queen Silvia's	4.7**	215	• Care in Sweden is still provided by 4 centres, however key tertiary care (e.g., cardiac surgery) has been consolidated to two sites
	• Ulleval	<2	120	• Example of two sub-scale hospitals. Both Rikshospitalet and Ulleval take tertiary referrals for Norway, however there is a network of "National Competency Centres" whereby a network of 3 other regional paediatric hospitals have developed areas of expertise.
	• Rikshospitalet	<2	150*	
U.K.	• Bristol	3.5–4.0	176	• In the process of consolidating the services provided across 3 hospitals onto one site, some secondary services in the community
	• Manchester	4.0-5.0	393	• Due to consolidate children's services from 3 hospitals onto one site in 2009, some secondary services to be provided across Manchester, but much to be centralised
	• Great Ormond Street Hospital	>7.4	314	• London (7.4m) provides 47% of inpatients, so catchment is larger • Recently agreed a partnership with North Middlesex and Whittington hospitals for secondary care provision
	• Evelina	<7.4***	140	• London has other tertiary paediatric services. Evelina catchment SE England plus part of London
U.S.	• Lucile Packard	10	180	• Secondary and tertiary services available at 160-bed UCSF in the same city. High surgical to medical ratio will impact on bed utilisation
	• Texas CH	4.6	464	• 90% of the local Houston catchment, plus patients from all Texas
	• CHOP	10	514	• Pennsylvania market. Other children from U.S. and world
	• Cincinnati	3.5	408	• Local Cincinati and Dayton catchment, 20% patients from outside this catchment

* Includes 50 beds in 'paediatric hospital' and the 100 beds in bays of adult wards in Rikshopsitalet
** 50% of Swedish population. There are 4 children hospitals in Sweden, but only 2 provide cardiac surgery, and only 3 provide dedicated facilities
*** Extended 'quaternary' catchment

Source: CEO interviews; hospital annual reports and homepages; team analysis

McKinsey 2006

Issues (1)

Co-location (not integration) with:

- **Adult hospital**
- **Maternity**
- **University: Clinical & Translational Research**

VIRTUALLY ALL CHILDREN'S HOSPITALS EXAMINED ARE CO-LOCATED. DEGREE OF INTEGRATION WITH ADULT SERVICES VARIES

	Hospital	Co-located	Adult Hospital	Med school affiliation	Notes on co-location
Austra-lasia	• Westmead CH	✓	• Westmead Hospital	• Sydney University and West Sydney University	• Physically linked by overhead walkways. Actively mention as one of their goals is to work more closely with Westmead Hospital
	• Starship	✓	• Auckland District Hospital	• Auckland University	• Physically linked by tunnels, shared facilities with adult centre. University adjacent
	• RCH, Melbourne	✓	• Royal Melbourne Hospital	• Melbourne University	• Royal Melbourne Hospital is 300m across the road, and Melbourne University is a further 300m away
Canada	• HSC, Toronto	✓	• Toronto General Hospital • Mount Sinai Women's Hospital	• Toronto University	• Separate buildings within same half-block
	• British Columbia CH	✓ Maternity only	• BC Women's hospital and healthcare	• British Columbia University	• No general adult facilities onsite, only women's/maternity
Scandi-navia	• HUS	✓	• Helsinki University Central Hospital	• Helsinki University	• Some sharing of laboratories etc. with adult hospital
	• Queen Silvia's	✓	• Ostra Sjukhuset Hospital	• Salgrenska University onsite	• Shared laboratory facilities. Separated radiology easy walk between the two buildings
	• Rikshos-pitalet	✓	• Rikshospitalet Adult	• Oslo University	• Children also share dedicated bays on adult wards as well as all the labs and radiology resources
	• Ulleval	✓	• Ulleval Adult Hospital	• Ulleval University	• Shared operating theatres, A&E, laboratories, etc.
U.K.	• Bristol	✓	• Bristol Royal Infirmary	• Bristol University	• Located on same city centre campus. A combination of walkways and dedicated ambulance services for neonates cover the distance of up to 100m between buildings
	• Manchester	✓	• Manchester Royal Infirmary	• Manchester University	• Currently 3 separate sites, due to consolidate to one site co-located with Manchester Royal Infirmary and Manchester University Medical School
	• Evelina	✓	• Guys & St.Thomas (GST)	• Guys & St. Thomas's Medical School	• On the same site as St. Thomas', integrated budget, governance, lab, and back office functions
	• Gt Ormond St. Hospital (GOSH)	X	• Nil	• University College, London	• No physical co-location. 40 of their consultants have shared positions in adult hospitals as well as GOSH
U.S.	• Lucile Packard	✓	• Stanford Hospital	• Stanford Medical School	• Situated on the same campus as adult and medical school facilities. Separate budget. Self-contained radiology etc. OB services located in adult hospital but run by children's
	• Texas CH	✓	• St. Luke's Episcopal Hospital	• Texas medical school	• Free standing governance, budget, and equipment, but connected with tunnels to the OB services at St. Lukes Episcopal. On campus with Texas University
	• CHOP	✓	• Pennsylvania University Hospital	• Pennsylvania University	• "Stand alone" governance, budget and most equipment etc., On the same campus as university and adult hospital. New initiative to share proton beam with adult centre
	• Cincinnati	✓	• University Cincinnati Hospital/ Medical Centre	• Cincinnati University	• Situated on the same campus as adult centre and medical school. High risk maternity at the adult centre, cared for by children's hospital staff. No sharing of equipment/laboratories

Source: Interviews; hospital annual reports and homepages; team analysis

McKinsey 2006

Issues (2)

Efficient use of resources:

- **Staff, (volumes and secondary care)**
- **Facilities (bed flexibility, single rooms)**
- **Diagnostic and therapeutic equipment**
- **Services and back office functions**
- **Recruitment and retention**
- **Teaching and research**
- **Cost**

Higher costs of children's hospitals

- Nursing costs
- Complex rare diagnoses
- Tertiary services leading to more complex patients - low volumes, high cost and high variability in treatment
  Associated research costs
- Higher fixed costs

Specialised service top-up payments

76. The specialised services that will attract a top-up in 2010-11 for admitted patient care are children (defined as a patient aged under 19 in HRG4) and orthopaedics. This adjustment is illustrated in Annex C Figure 1c.

77. The specialised services for orthopaedics top-up is only applicable to adults but all organisations are eligible. The specialised services for children top-up is available only to those organisations deemed eligible in 2009-10. The list of eligible organisations is included in the *2010-11 tariff information spreadsheet*, and was determined by Specialist Commissioning Groups (SCGs) and SHAs.

78. Some HRGs already discretely identify specialised activity. Reference costs should already reflect the specialised nature of the activity and these HRGs do not qualify for specialised top-ups. Non-applicable HRGs are listed with the *2010-11 tariff information spreadsheet*.

79. Top-ups are a percentage of the relevant HRG tariff and are shown in Table 6. The orthopaedic top-up moves from 14% in 2009-10 to 30% in 2010-11 while the children's top-up remains the same.

Table 6: Specialised service top-up percentages

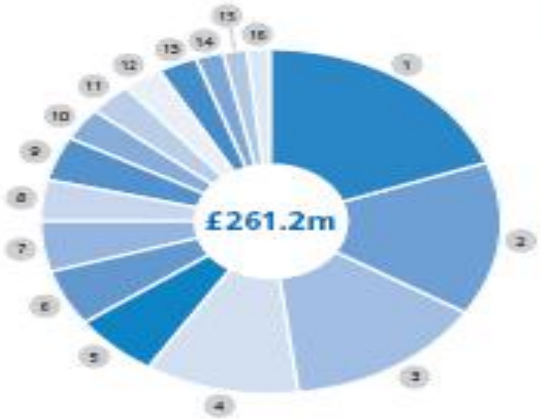
	Top-up
Children	78%
Orthopaedic	30%

Financial summary

The spend on NCG services in 2007/08 was £261.2m.

The enzyme replacement therapy (ERTs) drug costs for lysosomal storage disorder services are managed separately to the main NCG budget and are therefore not included in the above figures. Total expenditure on ERTs was £84.5m.

Expenditure on education for patients in the secure forensic mental health service for young people units, for which funding is provided by the Learning and Skills Council, is also managed separately and excluded from the above figures.



Total expenditure on NCG services in 2007/08

Service	Expenditure in 2007/8 (£m)
1. Liver transplantation service	50.8
2. Other services* (see listed below)	37.9
3. Heart and lung transplantation service	36.9
4. Secure forensic mental health service for young people	28.4
5. Primary malignant bone tumours service	15.9
6. Severe intestinal failure service	14.0
7. Specialist paediatric liver disease service	12.4
8. Pancreas transplantation service	10.4
9. Severe combined immunodeficiency and related disorders service	10.4
10. Extra corporeal membrane oxygenation service for neonates, infants and children	8.1
11. Craniofacial surgery service	7.8
12. Pseudomyxoma peritonei service	7.5
13. Lysosomal storage disorders service (excluding drug costs)	7.4
14. Extra corporeal membrane oxygenation service for adults	5.2
15. Ocular oncology service	4.4
16. Ventricular assist devices (bridge to heart transplant) for adults	3.7
Total	**261.2**

www.ncg.nhs.uk

Conclusion

- Changes determined by issues of quality and efficiency
- Increased specialisation leads to need to concentrate in-patients
- Catchment area
- Teaching and research facilities
- Staff training, recruitment and distribution
- Support for children and families
- Higher cost of children’s hospitals
- Issues: co-location, single rooms, back-office functions
- Need to integrate with other hospitals and community