NPH Location relative to Paediatric Population

A study of the National Paediatric Hospital location at St James's relative to the Paediatric Population of Ireland

Connolly for Kids Hospital

November 2016

Executive Summary

- St James's Hospital is located in Dublin City Centre, deep inside the M50:
  - **6.6 Km** from the M50 motorway
  - **3.3Km** from Dublin City Centre

- The Tertiary and Secondary Catchment Areas of the NPH extend well beyond the M50:
  - **Tertiary** catchment area is the **whole the Republic of Ireland**
  - **Secondary** catchment area is the **Greater Dublin Area** (counties Dublin, Meath, Wicklow and Kildare)

- The Paediatric Population resides predominantly outside the M50:
  - **9/10** children in the Tertiary catchment area (Rep. of Ire) live **outside the M50**
  - **2/3** children in the Secondary catchment area (GDA) live **outside the M50**

- **7/10 Inpatients and Day Cases** arrive from **Outside the M50**
- **3/4 Outpatients** arrive from **Outside the M50**

- **40%** of inpatients are **Tertiary patients** from across Ireland, 9/10 live outside the M50

- **Tertiary** patients endure significantly longer '**Length of Stay'** in hospital. This means that **significantly more than 40%** of the total visits (patient, parent, visitor) to the hospital will arrive from across Ireland. 9/10 of these visits are from outside the M50.

- The Dolphin Report stated that the hospital location must be informed by the distribution of paediatric population:

  "the NPH site investigation should take into account the location of the children if the focus is to be upon the best service for the children"

  However, none of the 10 Dolphin criteria, upon which each hospital site was benchmarked, related to paediatric population distribution and as such this important consideration was effectively eliminated from the St James's site selection decision.

- The facts presented by the proponents of the St James's project to **justify the location of the NPH at St James's** are based on:
    - **Paediatric population** statistics of **Dublin only** (ignoring the other GDA counties, and all other counties of Ireland)
    - **Patient attendances** from **whole of the GDA** as a block (ignoring the distribution of paediatric population within the GDA)

- Connolly for Kids Hospital maintains that the NPH should be sited close to the M50 for <u>fair and equitable access</u> for all the children of Ireland.

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1. Definition of Tertiary and Secondary Care

McKinsey (p.33) identified three categories to be considered tertiary:

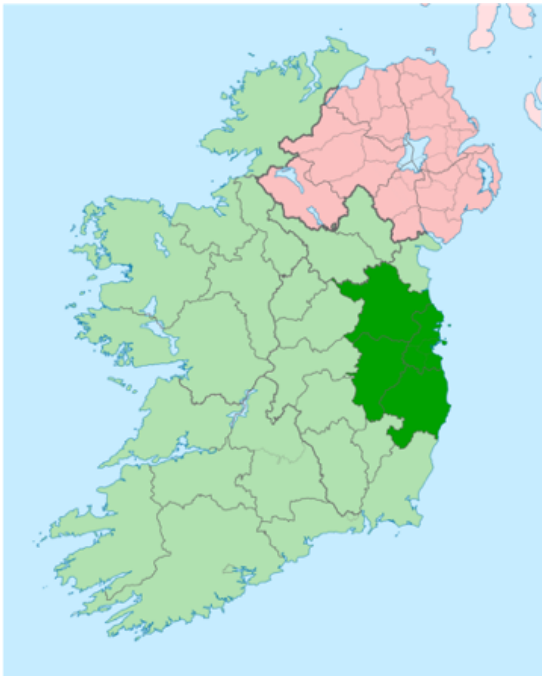
- ***"The critically ill patient"***: patient admitted to the ICU or PICU at any time during their encounter.
- ***"Complex disease"***: List of tertiary Diagnosis Related Group codes which were "classified as clearly tertiary by our reference sources" or "clinically indisputable that was tertiary in our experts' judgment".
- **"*Simple disease in a complex patient*":** "the presence of a comorbid condition" (eg: bronchiolitis in a child with congenital heart disease).

All other hospital encounters were considered Secondary Care.

2. NPH Catchment Areas

The NPH has two distinct remits:

- Tertiary care for the sickest Children in Ireland
- Secondary Care for children with minor illnesses in the Greater Dublin Area.



Secondary catchment - Greater Dublin Area (Dublin, Kildare, Meath and Wicklow)

Tertiary catchment area – Republic of Ireland

Tertiary catchment area may include Northern Ireland for a small number of conditions (eg: an additional 100 encounters per annum relating to Cardiothoracic Surgery and 7 relating to Complex Urology)

These catchment areas were first defined by McKinsey in their Report "Children's Health First" (2006). A summary of this report with regard to the definition of the catchment areas is outlined below.

McKinsey (2006)

In December 2005 the HSE commissioned McKinsey & Company to prepare a report advising on the 'strategic organisation of tertiary paediatric services for Ireland' that would be 'in the best interests of children'.

The resultant McKinsey Report (Feb 2006) recommended:

- Population and projected demands of Ireland can support only one world class tertiary centre. (p.58)
- This centre would be in Dublin. (p.58)
- The centre would be at the nexus of a integrated paediatric service, also comprising adequate geographic spread of A&E facilities (including 2-3 in Dublin). Treatment at 'urgent care' centres is another option. (p.59)
- Tertiary catchment is only one part of achieving scale for these centres. Pure tertiary cases typically constitute a minority component of total paediatric volume, and secondary cases are an essential part of maintaining scale. (p.26)
- That this centre would also provide care for all the secondary needs of Greater Dublin (p.59), defined by McKinsey as Dublin, Meath, Wicklow and Kildare. (p.39)

Dolphin (2012)

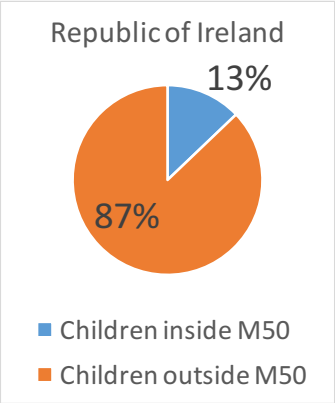
Dolphin report also references a third Catchment Area, that of emergency care for the Dublin Metropolitan Ares:

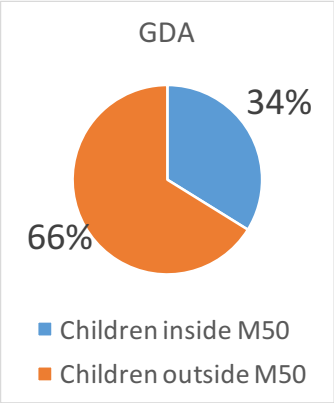
> "The National Paediatric Hospital will provide emergency care for part of the Dublin Metropolitan Area; secondary care for the GDA and tertiary care for a number of children requiring specialist care and referred from all parts of the country and Northern Ireland."
>
> "The Dublin Metropolitan Area expands beyond the boundaries of the 4 Dublin planning authorities, into Bray and Greystones in Co. Wicklow and into Leixlip, Celbridge, Maynooth and Kilkock in Kildare on the west side, into Ashbourne, Clonee and Dunboyne in Co. Meath. These areas combined make up what is described as the Dublin Metropolitan Area.
>
> [Source: Dolphin Report, Appendix 5.]

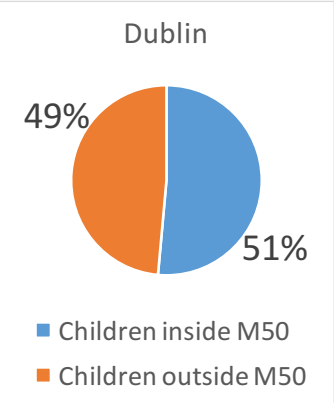
3. C4KH Analysis of Paediatric Population of Ireland

Connolly for Kids Hospital analysed the geographic distribution of the paediatric population in the 2011 Census data (see Appendix 1). The results show that:

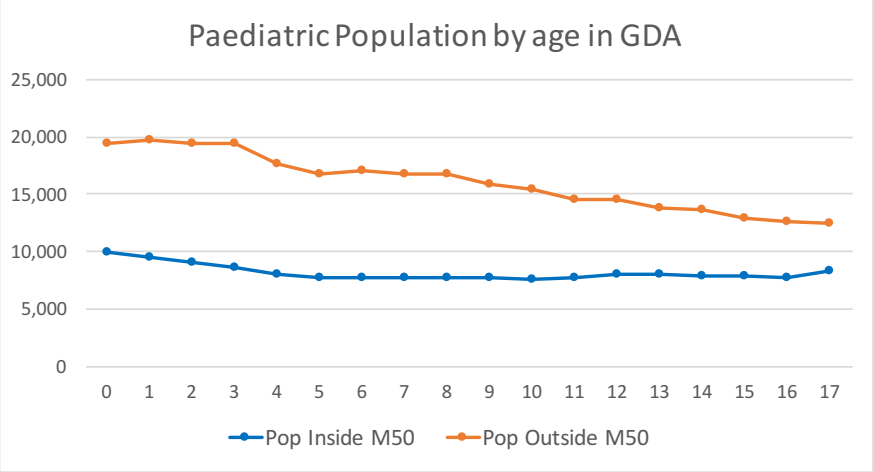
- 87% of the paediatric population of Ireland live outside the M50
- 66% of the paediatric population of the GDA live outside the M50
- 49% of the paediatric population of Dublin live outside the M50







The paediatric population for each age was analysed for the GDA. This showed significantly higher numbers of very young children in the area outside the M50 compared with inside the M50. Therefore, it should be noted that families with very young children are predominantly located outside the M50.



4. Analysis of Paediatric Population in Published NPH Reports

Location Task Group Report (2006), Appendix 7

Appendix 7 of the Location Task Group Report contains the "Distance and Travel Time Calculations for a proposed National Paediatric Hospital in Dublin: A report to the HSE" (SAHRU, TCD, March 2006).

[Source data used in this report: The CSO's report dated 25th May 2005 entitled "Regional Population Projections 2006-2021" and the associated detailed tables (available from the CSO's web site).]

This report examined current and predicted population statistics for each of the CSO Areas:

The total child (0-15 years) population projections for the same period are as follows:

Total Child (0-15 years) population			
Region	2002	2006	2016
Border	104,949	105,222	113,765
Dublin	230,364	242,918	290,955
Midland	55,739	58,509	65,586
Mid-East	103,093	113,113	138,737
Mid-West	77,342	79,640	89,023
South-East	100,911	104,170	113,543
South-West	129,505	132,288	144,672
West	86,407	88,293	107,069

From this data Connolly for Kids Hospital has extrapolated the 2002-2006 and 2002-2016 growth rates for each area:

Total Child (0-15 years) population				Growth Rate	
CSO Area	2002	2006	2016	2002 - 2006	2002 - 2016
Border	104,949	105,222	113,765	0.3%	8.4%
Dublin	230,364	242,918	290,955	5.4%	26.3%
Midland	55,739	58,509	65,586	5.0%	17.7%
Mid-East	103,093	113,113	138,737	9.7%	34.6%
Mid-West	77,342	79,640	89,023	3.0%	15.1%
South-East	100,911	104,170	113,543	3.2%	12.5%
South-West	129,505	132,288	144,672	2.1%	11.7%
West	86,407	88,293	107,069	2.2%	23.9%
Total	888,310	924,153	1,063,350		

Analysis of data from Location Task Group Report, Appendix 7

It is clear that the Mid-East area (Kildare, Meath and Wicklow) will experience by far the most aggressive paediatric population growth at almost 35%. The paediatric population of Dublin, half of which is located outside the M50 is predicted to grow at 26%. However, most of this growth is expected to occur largely outside the M50:

> *"In the Dublin region, we have used the detail provided by the constituent authorities in their development plans (and accompanying maps) to determine where growth will occur. This tends to be on the fringes of already developed land in Fingal, Dun Laoghaire-Rathdown and South Dublin."*
> *[Source:* Location Task Group Report (2006), Appendix 7.]

RKW Report (2007)

RKW reported the 2021 demographic projections using data collated by the Central Statistics Office (CSO). This report, like McKinsey, shows by far the most intense paediatric population growth occurring in the Mid-East area (Kildare, Meath, Wicklow) at 26%.

Table B10: Demographic Change Factors for 0-15 year

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

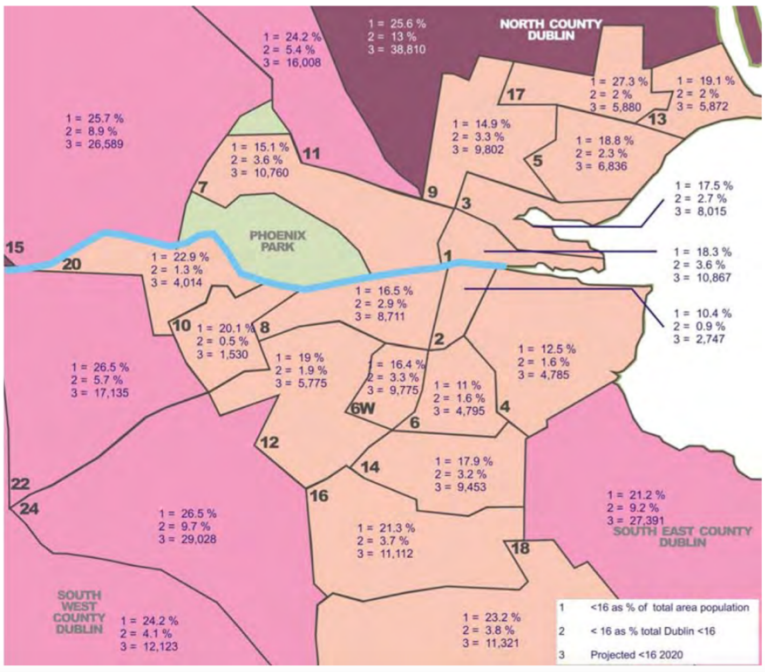
[Source: RKW Report (2007), Part 2, Table B10, p.112]

RKW A/UCC Report (2007)

Potential locations for A/UCC were considered, firstly, in relation to the distribution of the under 16-population as projected to 2021 for Greater Dublin including Wicklow, Kildare and Meath. This is based upon the Central Statistics Office (CSO) estimate using the MIF2 population growth scenario which assumes high external migration. This is illustrated in the Figure below which shows on a postcode basis for the Dublin area –

1. The population <16 as a percentage of the total population for that postcode
2. The percentage of <16 in that postcode as a percentage of total under 16s for Greater Dublin including Wicklow, Kildare and Meath
3. Total predicted <16 population in 2021.

Figure 15 Profile of Paediatric Population in Dublin 2021



[Source: RKW A/UCC Report (2007), p.37]

It is evident from the map, taking all 3 measures into account, that the areas of highest paediatric population in 2021 are grouped in 4 zones –

- North East including North County Dublin
- North West including Dublin 15, Dublin 11 and County Meath
- South West including Dublin 22, Dublin 24 and County Kildare
- South East including South East County Dublin and Wicklow.

Dolphin Report (2012)

With regard to Population Statistics, the Dolphin Report summarised data that was presented in the RKW Report, and in particular noted the low paediatric population in Dublin City Centre:

> "[The RKW Report] shows low paediatric population in central and eastern sectors compared to western and peripheral areas of the Dublin Metropolitan Area."

Dolphin also investigated the population statistics of the GDA relative to the M50 (for all ages) and discovered that:

> "The GDA population was 1,804,156 in the 2011 census, meaning that 1 million of the 'secondary care' catchment lives outside the M50"

Dolphin repeated the requirement for locating the hospital relative to the paediatric population:

> "consideration must be given to the location of the hospital in relation to the child population served, taking into account staff access which is daily and visitor access which is irregular and dispersed."

References - Paediatric Population

Quote	Source
"In attributing growth in the numbers of children by region in future years we have considered that such growth will inevitably be *predominantly* associated with new residential developments in the environs of existing towns and larger villages. It has been assumed in relation to the distribution of additional population numbers over the next decade that these will be added to existing population centres *in proportion to the present size of such centres*." "In the Dublin region, we have used the detail provided by the constituent authorities in their development plans (and accompanying maps) to determine where growth will occur. This tends to be on the fringes of already developed	Location Task Group Report (2006), Appendix 7.

land in Fingal, Dun Laoghaire-Rathdown and South Dublin."	
"Programmes for re-occupation of the [Dublin] city centre were focused on high density apartment developments, which were inimicable to family upbringing and resulted in a low child representation in the population. The NPHDB Paediatric Population in Greater Dublin 2021 report (page 37)* shows low paediatric population in central and eastern sectors compared to western and peripheral areas of the Dublin Metropolitan Area."	Dolphin Report (2012), Appendix 5. * Refers to section 4.3.3 of the RKW report "Ambulatory and Urgent Care Centres for Greater Dublin" (2007)
"While global figures for population within the M50 can be stated at approximately 800,000, the NPH site investigation should take into account the location of the children if the focus is to be upon the best service for the children…. The GDA population was 1,804,156 in the 2011 census, meaning that 1 million of the 'secondary care' catchment [all ages] lives outside the M50."	Dolphin Report (2012), Appendix 5.
"As one of the major public perception issues relates to convenience of access, consideration must be given to the location of the hospital in relation to the child population served, taking into account staff access which is daily and visitor access which is irregular and dispersed."	Dolphin Report (2012), Appendix 5.

4. Analysis of Patient Attendances in Published NPH Reports

Inpatient and Day Case Attendances

Appendix 7 of the Location Task Group Report (2006) contains the "Distance and Travel Time Calculations for a proposed National Paediatric Hospital in Dublin: A report to the HSE" (SAHRU, TCD, March 2006)

This study analysed the **Hospital In-patient Inquiry data (HIPE)** for children, where HIPE data for all national day case and inpatient admissions of children aged between 0 and 15 years for the year 2004 were made available by the HSE.

Excluding children who were not resident in Ireland, the inpatient and day case counts are as shown:

Type	Events	%
In-patient	86,846	68.5
Day case	39,786	31.5
Total	126,632	100.0

[Where: The term 'events' is used in lieu of cases or patients as some children have multiple episodes.]

The report provided a breakdown of the regional distribution of the day case and inpatient children by CSO Region. This data is summarised as follows:

HIPE 2004: Total events per CSO area (aged 0-15) for all Dublin hospitals

CSO Area	In-Patient	Day case	Events	%
Border	1,123	1,020	2,143	5.13%
Dublin	14,228	9,682	23,910	57.24%
Midland	743	822	1,565	3.75%
Mid-East	4,832	3,583	8,415	20.14%
Mid-West	474	362	836	2.00%
South-East	1,081	1,466	2,547	6.10%
South-West	519	439	958	2.29%
West	704	697	1,401	3.35%
Total	23,704	18,071	41,775	100%

Summary of data from Location Task Group Report, Appendix 7

This data has been further summarised into three distinct regions: Dublin, Mid-East (Kildare, Meath & Wicklow) and All Other Regions:

HIPE 2004: Total events per Region (aged 0-15) for all Dublin hospitals

Area	In-Patient	Day case	Events
Dublin	14,228	9,682	23,910
Mid-East	4,832	3,583	8,415
All Other Regions	4,644	4,806	9,450
Total	23,704	18,071	41,775

Summary of data from Location Task Group Report, Appendix 7

By applying the ratios of paediatric population living Inside and Outside the M50 outlined in Section 3 to the patient numbers for these three regions, the inpatient and day case numbers can now be analysed relevant to the M50:

HIPE 2004: Total events from in/out M50 (aged 0-15) for all Dublin hospitals

Patient Type	Inside M50 [1]	Outside M50 [1]	All Locations
Inpatients	7,114	16,590	23,704
Day Cases	4,841	13,230	18,071
Total	11,955	29,820	41,775

Summary of data from Location Task Group Report, Appendix 7

[1] Using C4KH population distribution as per Appendix 1

Converting this data into percentages, it is clear that the vast majority of inpatient and day cases attending Dublin hospitals, for both Tertiary and Secondary care, arrive from Outside the M50:

HIPE 2004: % events from in/out M50 (aged 0-15) for all Dublin hospitals

Patient Type	Inside M50 [1]	Outside M50 [1]
Inpatients	30%	70%
Day Cases	27%	73%
Total	29%	71%

Summary of data from Location Task Group Report, Appendix 7

[1] Using C4KH population distribution as per Appendix 1

Connolly for Kids Hospital concludes:

Based on HIPE 2004 data, 71% (over 7/10) of Inpatient and Day Case encounters at Dublin hospitals arrive from Outside the M50

Outpatients Attendances

The RKW Report (2007) presents the Outpatient Attendances for 2006 for each of the three Dublin Children's Hospitals. With regard to the origin of outpatients "NCH indicated that 8% of their outpatients in 2005 and 2006 were from outside the Dublin area [GDA]. At OLCHC the corresponding figure for 2005 was 31%, and at CUH 23%."

HSE 2006: Outpatient Attendances for Consultant clinics only

Hospital	New Patient	Return Patient	Did Not Attend	Total	% from Non-GDA (2005) [1]
Crumlin	21,447	51,355	20,139	92,941	31%
Temple St	13,486	33,503	11,887	58,876	23%
Tallaght	9,637	20,460	5,700	35,797	8%
Total Dublin	44,570	105,318	37,726	187,614	

[Source: Adapted from RKW Report (2007), Part 2, Table B3, p.102]

[1] % arriving from outside GDA is from 2005, data is from 2006, results are indicative

By applying the ratios of paediatric population living Inside and Outside the M50 outlined in Section 3 to the patient numbers for these three hospitals, the outpatient numbers can now be analysed relevant to the M50:

HSE 2006: Outpatient Attendances for Consultant clinics only

Hospital	Inside M50 [1]	Outside M50 [1]	All Locations
Crumlin	21,376	71,565	92,941
Temple St	15,112	43,764	58,876
Tallaght	10,978	24,819	35,797
Total Dublin	47,466	140,148	187,614

[Source: Adapted from RKW Report (2007), Part 2, Table B3, p.102]
[1] Using C4KH population distribution as per Appendix 1

Converting this data into percentages, it is clear that the vast majority of outpatients attending Dublin hospitals arrive from Outside the M50:

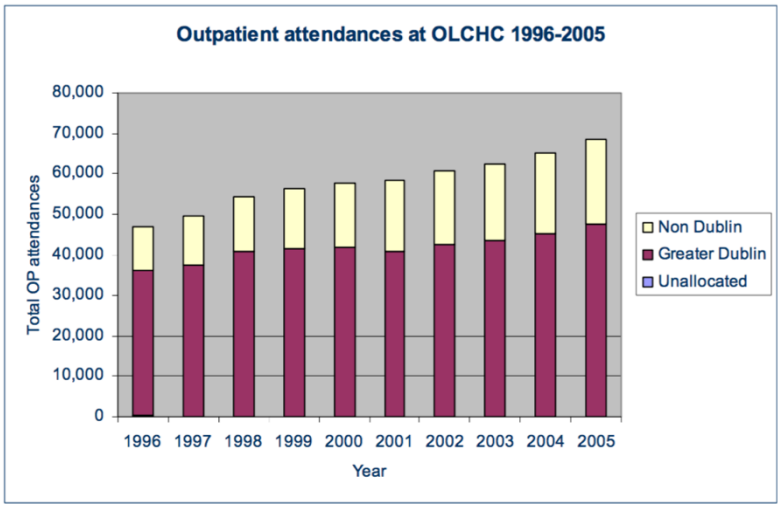
HSE 2006: Outpatient Attendances for Consultant clinics only

Hospital	Inside M50 [1]	Outside M50 [1]
Crumlin	23%	77%
Temple St	26%	74%
Tallaght	31%	69%
Total Dublin	25%	75%

[Source: Adapted from RKW Report (2007), Part 2, Table B3, p.102]
[1] Using C4KH population distribution as per Appendix 1

Crumlin Hospital provided OP attendance data from 1996-2005, showing a steady increase in the percentage of OP attendances arriving from outside the GDA, growing from 23% in 1996 to 31% in 2005:

Figure B1 OP Attendances OLCHC 1996-2005



Source: Data supplied by OLCHC

[Source: RKW Report (2007), Part 2, p.102]

Connolly for Kids Hospital concludes:
Based on HSE & Hospital 2005 & 2006 data, 75% (3/4) of Outpatient attendances at Dublin hospitals arrive from Outside the M50

Overall Attendances

Slightly different patient numbers were report in the Dolphin Report (2012), however the results are comparable. Dolphin reported (p.29) the following percentages for various paediatric patient types coming from the GDA, hence the rest of the patients come from outside the GDA:

NPHDB: Estimated % of NPH patients arriving from GDA & non-GDA

Patient Type	GDA	Non-GDA
Inpatients	75%	25%
Day Cases	65%	35%
Out-Patients	72%	28%
Emergency	80%	20%
Overall Attendences	70%	30%

[Source: Adapted from Dolphin Report (p.29), (referencing NPHDB data)]

By applying the ratios of paediatric population living Inside and Outside the M50 outlined in Section 3 to the patient numbers for these two regions, the patient numbers can now be analysed relevant to the M50:

NPHDB: Origin of patients as percent of total patients

Patient Type	Inside M50 [1]	Outside M50 [1]
Inpatients	25%	75%
Day Cases	22%	78%
Out-Patients	24%	76%
Emergency	27%	73%
Overall Attendences	23%	77%

[Source: Dolphin Report (p.29), (referencing NPHDB data)]

[1] Using C4KH population distribution as per Appendix 1

This tells a remarkably different story and exposes the flaws of reporting hospital attendances for the whole of the Greater Dublin Area, without analysing the paediatric population distribution within that very large and traffic congested conurbation.

Connolly for Kids Hospital concludes:
Based on Dolphin/NPHDB data, 77% (almost 8/10) of total paediatric attendances at Dublin hospitals arrive from Outside the M50

Secondary & Tertiary Inpatients for all regions

RKW examined the numbers of Secondary and Tertiary inpatients (<16) from HIPE 2003 data (presented in the McKinsey Report) and HIPE 2005 data for all hospitals nationally.

HIPE: National Secondary and Tertiary Workload: IP encounters <16

Inpatient Type	2003	2005	2003	2005
Secondary	67,000	67,285	85%	81%
Tertiary	12,000	15,315	15%	19%
Total	79,000	82,600	100%	100%

[Source: RKW Report (2007), Part 2, Table B5, p.108]
Note: Excludes neonatal activity in Maternity Hospitals and specialist hospitals

It can be see that in 2003 the ratio was 85% Secondary to 15% Tertiary inpatients, and in 2005 it was 81% Secondary to 19% Tertiary inpatients. RKW surmises that the shift towards more tertiary workload could be due to "a change in the DRG model used in Ireland from 2005 where procedures previously classified as secondary are now considered tertiary. It may also reflect an element of a more complex workload." (p.109).

As this data relates to all inpatient encounters across the entire country, irrespective of patient origin or treatment location, it is reasonable to conclude that these figures represent the "natural Secondary/Tertiary inpatient balance", which is assumed to be consistent across all regions of the country.

The HIPE 2005 Secondary/Tertiary ratio is determined to be the 'norm' for further calculations, as most of the data analysed in this report relates to 2005 or 2006 data (not 2003 data) and the 2005 ratio, being more recent, is assumed to be a more accurate representative of the future ratio for the NPH. For simplicity this ratio is rounded to 80:20.

Connolly for Kids Hospital concludes:
Based on HIPE 2005 data, the ratio of Secondary to Tertiary Inpatients for all regions is 80:20.

Secondary & Tertiary Inpatients for NPH

It is important to examine the Secondary/Tertiary ratio for the Dublin Hospitals alone, in order to gain insight into the workload of the NPH for these two levels of care. The Secondary/Tertiary ratio in the Dublin Hospitals will have a higher proportion of Tertiary encounters than all hospitals, as the catchment for Tertiary is the whole country yet the catchment for Secondary is just the GDA.

Once again, Dolphin stated the percentage of attendances from the GDA to be as follows:

NPHDB: Estimated % of NPH patients arriving from GDA & non-GDA

Patient Type	GDA	Non-GDA
Inpatients	75%	25%
Day Cases	65%	35%
Out-Patients	72%	28%
Emergency	80%	20%
Overall Attendences	70%	30%

[Source: Adapted from Dolphin Report (p.29), (referencing NPHDB data)]

The GDA figures in this table represent all encounters from the GDA, both Secondary and Tertiary. It is assumed that all of the encounters from outside the GDA will be predominantly Tertiary, as the catchment area of the NPH for Secondary care does not extend beyond the GDA.

Therefore, by applying the 80:20 ratio of Secondary to Tertiary inpatients to the GDA region, and assuming a 0:100 ratio in the non-GDA region, the expected Secondary/Tertiary inpatient ratios for the NPH from the GDA and Non-GDA can be calculated:

Estimated % of NPH Secondary and Tertiary inpatients arriving from GDA & non-GDA

	GDA		Non-GDA	
All Inpatient encounters by origin	75%		25%	
	GDA Secondary	GDA Tertiary	Non-GDA Secondary	Non-GDA Tertiary
Secondary/Tertiary Inpatient encounters	60%	15%	0%	25%

[Source: Based on Dolphin Report (p.29), (referencing NPHDB data)]

From this, the expected Secondary/Tertiary inpatient ratios for the NPH become evident:

Estimated % of NPH Secondary and Tertiary inpatients

	Secondary	Tertiary
Secondary/Tertiary Inpatient encounters	60%	40%

Connolly for Kids Hospital concludes:
Based on Dolphin/NPHDB and HIPE 2005 data, the ratio of Secondary to Tertiary Inpatients for the NPH is 60:40

Secondary & Tertiary Day Cases for NPH

RKW reported the Secondary/Tertiary encounters for Day Cases in Dublin Hospitals in 2005:

HIPE 2005: Day Case activity in Dublin Hospitals

Inpatient Type	Encounters	Percentage
GDA Secondary	12,375	58%
National Referred Tertiary	9,075	42%
Total	21,450	100%

[Source: Adapted from RKW Report (2007), Part 2, Table B9, p.111]
Note: National Referred excludes patients treated outside Dublin

It is clear from this that the ratio for Secondary to Tertiary Day Cases for the NPH is 58% to 42%. For simplicity this is rounded to 60:40.

Connolly for Kids Hospital concludes:
Based on HIPE 2005 data, the ratio of Secondary to Tertiary Day Cases for the NPH is 60:40

Length of Stay

The 'Length of Stay' measure determines how long patients stay after admission, naturally this is longer for Tertiary care than Secondary care due to the additional complexity and acuity of the illness.

> *"The length of stay for a Dublin-based, ICU 'tertiary' encounter is 19.0 days, while for a non-Dublin based encounter it is 4.5 days: there is a clear difference in the complexity and acuity of two sets of 'tertiary' cases."*
> McKinsey Report (2006), p.43.

> *"The average length of stay across all Dublin secondary and national tertiary in 2005 was 3.8 days. For the three Dublin children's hospitals combined the ALoS was 4.2 days."*
> RKW Report (2007), Part 2, Section B2.5.3, p.115

Although the data available is not extensive, it is none-the-less possible to observe the dramatically higher Average Length of Stay for Tertiary patients, at approx. 19 days for those patients attending Dublin hospitals. When comparable patient's numbers are combined with secondary patients, the Average Length of Stay in Dublin hospitals drops to just 4.2 days. [Note: these two sets of data are not directly comparable and therefore cannot be correlated further to get an exact figure for the average Secondary LoS].

A child's Length of Stay in hospital will impact very significantly on the family, with parents frequently traveling multiple times a day or week to swap shifts and siblings, relatives and friends also making the journey to visit the patient in hospital.

Therefore, while hospital attendances are a good measure for understanding the number of patients accessing a hospital from various locations, when combined with the Average Length of Stay it is possible to get insight into the amount of time spent in hospital by patients from various locations.

It has already been determined that approx. 40% of inpatients accessing the NPH will be Tertiary patients from all over Ireland, we can conclude that a significantly higher percentage of the total visits (patient, parent, visitor) to the hospital will arrive from all over Ireland.

References - Patient Numbers

Quote	Source
">120,000 patient encounters (approximately 79K inpatient and 41K day-case encounters) within the Hospital Inpatient Enquiry 2003 database"	McKinsey Report (2006), p.32.
"We know that national tertiary demand to be 12,000 encounters (15% of total inpatient encounters), constituting 68,000 bed days."	McKinsey Report (2006), p.38.

"The length of stay for a Dublin-based, ICU 'tertiary' encounter is 19.0 days, while for a non-Dublin based encounter it is 4.5 days: there is a clear difference in the complexity and acuity of two sets of 'tertiary' cases."	McKinsey Report (2006), p.43.
"Projected outpatient attendances, on the basis of demographic, other growth and enhanced performance to 2021, **before** outreach to local hospitals, outside Dublin and the Greater Dublin A/UCCs are 196,700."	RKW Report (2007), Executive Summary, p. 18
"The projected level of outpatient activity within the NPH Tertiary Centre in 2021 is 117,000 attendances"	RKW Report (2007), Executive Summary, p. 21
"Data provided by the HSE did not include an indication of [Outpatient] patient origin. However, data provided by NCH indicated that 8% of their outpatients in 2005 and 2006 were from outside the Dublin area. At OLCHC the corresponding figure for 2005 was 31%, and at CUH 23%."	RKW Report (2007), Part 2, Section B.1.4 Outpatients, p.102
"McKinsey identified that of the total national workload considered as tertiary, that 33% took place outside Dublin [HIPE 2003 data]. The corresponding figure in the 2005 HIPE data is 29%, which suggests an increase in referrals to Dublin over the two year period."	RKW Report (2007), Part 2, Section B2.3, p.109
"The average length of stay across all Dublin secondary and national tertiary in 2005 was 3.8 days. For the three Dublin children's hospitals combined the ALoS was 4.2 days."	RKW Report (2007), Part 2, Section B2.5.3, p.115
It is estimated that about 75% of inpatients will come from the Greater Dublin Area, as will 65% of day-care patients, 72% of out-patients, and 80% of Emergency Department (ED) patients.	Dolphin Report (2012) (p.29), (referencing NPHDB data)
"70% of the patients attending the hospital will come from the Greater Dublin Area."	Dolphin Report (2012) (p.78), Chapter 13 Conclusions and recommendations

5. NPHBD Presentation of Facts

NPHDB Population analysis for selection of A/UCCs

The extract below is taken from the NPHDB Planning Application, Chapter 4 "Examination of Alternatives" (p.16).

4.3.10.1 Southside Locations

The geographical analysis demonstrated that locating the satellite centre at Tallaght rather than St Vincent's would be significantly more successful in improving access for children, including children experiencing deprivation, in the south of the city and in reducing footfall on the main new children's hospital. For the Dublin South zone, the location of a satellite centre at either Tallaght Hospital or St. Vincent's University Hospital would alter the catchment zone for the main new children's hospital as follows:

- A southside satellite centre based at Tallaght Hospital would have a catchment zone of 99,481 children of whom 38.5% are classified as experiencing deprivation and 19.4% as moderate to high deprivation. The corresponding main hospital catchment zone would take in a paediatric population of 75,157.
- A southside satellite centre based at St. Vincent's University Hospital would have a catchment zone of 55,604 children of whom 22.6% are classified as experiencing deprivation and 9% moderate to high deprivation. The corresponding main hospital catchment zone would now include the greater Tallaght area, and would take in a paediatric population of 118,878. In other words, the population around Tallaght would tend to choose the main new children's hospital at St. James Hospital Campus over a satellite centre at St Vincent's, resulting in an increased risk of overloading the main centre Emergency Department.

In addition Tallaght Hospital had already been identified as a suitable location for the previously planned AUCC. Public and private transport access to Tallaght Hospital was also reviewed with no significant issues identified other than a risk of traffic congestion near Tallaght town centre at peak shopping times.

4.3.10.2 Northside Locations

The geographical analysis showed little difference between the two possible locations at Beaumont and Connolly Hospitals. In terms of access, Connolly was marginally preferable although in effect locating a satellite centre at either Beaumont Hospital or Connolly Hospital would provide good access for the paediatric population in the Dublin North zone, and be effective at reducing footfall on the main hospital site.

- The location of a satellite centre at either Beaumont Hospital for Connolly Hospital was not shown to affect the catchment zone of the main new children's hospital i.e. the paediatric population in the Dublin North catchment zone would tend to choose the northside satellite centre at either Beaumont or Connolly, in preference to the main new children's hospital.
- Locating at Beaumont would result in a paediatric population of 87,194 within a 30 minute travel zone, with 44% classified as experiencing deprivation and 22.8% experiencing moderate to high deprivation. Locating at Connolly would result in a paediatric population of 99,401 within a 30 minute travel time zone, with 43.6% classified as experiencing deprivation and 22.1% experiencing moderate to high deprivation. The closeness of Connolly to the motorway network indicated a slight advantage for Connolly in terms of travel time access.

C4KH Response: The NPHDB appear to have only analysed the <16 years olds in Dublin, and appear to have excluded the paediatric populations of Kildare, Meath and Wicklow which the NPH and the U/ACCs are expected to serve. Furthermore, the resultant paediatric numbers for each catchment zone (namely 99,481 for Tallaght, 99,401 for Connolly and 75,157 for St James's) would strongly support the case for locating the main NPH at one of the M50 sites which clearly have much higher local populations even when the populations of Kildare, Meath and Wicklow are excluded!

Joint Oireachtas Committee on Health – Public Hearing 27th October 2016

In opening statement, with regard to the NPH and the two Urgent Care Centres:

"It is important for us to be clear about the primary functions of these new facilities. First, the vast majority of work we undertake, which is 78% of the inpatients currently in the three children's hospitals, comes from the greater Dublin area, that is, Dublin, Kildare, Wicklow and part of Meath."

C4KH Response: Quoting statistics for the GDA is grossly misleading. By quoting the figures of the entire Secondary catchment area, and not the distribution within that area, we gain no further insight into where, within that catchment area, the hospital should be located. Furthermore, the actual figure according to the Dolphin report is 75%, slightly less than that quoted here.

"Our second objective has the national remit, which is the highly specialist tertiary-quaternary care, for children across all of the island. Currently, that comprises 22% of the workload undertaken by the three children's hospitals."

C4KH Response: We dispute this statement on number of fronts:
Firstly, the 78% (correct figure 75%) quoted in the preceding statement refers to all inpatients from the GDA. This includes both Secondary and Tertiary inpatients. Therefore, the figure for the "national remit, which is the highly specialist tertiary-quaternary care, for children across all of the island" needs to include the Tertiary part of the GDA inpatients. The 22% quoted only refers to the Tertiary patients from outside the GDA. We have estimated the actual proportion of National Tertiary inpatients to be 40%.
Secondly, using the term "workload" implies the "volume of time and effort" undertaken by staff in providing care for these patients. This is highly misleading. The figure being quoted refers to the percentage of encounters. While secondary and tertiary encounters may be directly comparable in terms of numbers, the "workload" generated by each of these types of encounters is vastly different, where Tertiary patients endure longer "length of stay" in hospital and typically require more intensive and acute care.
Thirdly, in terms of patient numbers, 40% are Tertiary patients arriving from all over Ireland. However, due to longer Length of Stay for Tertiary patients, this translates into a significantly higher percentage of the total visits (patient, parent, visitor) to the hospital which will arrive from all over Ireland.

In response to question on figures of population:

"Using CSO figures, with the health intelligence unit, it has been mapped that the children were from within a 10 km radius of St. James's Hospital. The mapping exercise was engaged in using postcodes. It has demonstrated to us that 48% of the children living in Dublin are within 10 km of St. James's Hospital. This was a key element in identifying where a hospital should be sited."

C4KH Response: It is unjustifiable to use population statistics for Dublin only when the Tertiary catchment area is the entire country and the Secondary catchment area is the Greater Dublin Area (Dublin, Kildare, Meath and Wicklow).

“Most of the rest, from a health care planning perspective, was focused on where we saw the population growing in the future - to the north west and south west of the city and in the greater Dublin area. Hence, both the analysis and the social deprivation index, an indicator of where families use health care facilities, were used in identifying where paediatric outpatient and urgent care satellite centres should be based - in Tallaght and Connolly hospitals.”

C4KH Response: It is clear from all published reports that the future growth of paediatric populations will predominantly occur outside the M50. This data was conveniently applied to the location of the A/UCCs but was, equally conveniently, not applied to the location of the NPH.

“One of the primary objectives, as a service provider, is to locate a hospital where most of the population live - the inner city - and then provide what is predominantly used on a daily basis, that is, outpatient and urgent care centres, at locations convenient to these families, that is, off the M50 to provide access to outpatient and emergency services. That would meet most of their needs.”

C4KH Response: This statement contradicts itself. The first part, that most of the population live in the inner city, is factually incorrect and grossly misleading and we reject it completely. Firstly, it is based on the Dublin population only, and secondly 48% is not “most”. The second part, that a location convenient to the families is a location off the M50, supports the requirement for the NPH to be located off the M50, not in Dublin City Centre.

6. Conclusion

Misrepresentation of Population statistics to justify the St James's Location
At the time of the Mater NPH design phase, the RKW Report discounted St James's as a potential site for the A/UCC due to the "comparatively low paediatric population" [Source: RKW A/UCC Report (2007), p.39]. This report consistently shows that the paediatric population of Ireland is concentrated outside the M50. Yet the message being portrayed by proponents of the St James's project is that "most of the paediatric population live in the inner city within 10 KM of St James's". This is categorically false.

Misrepresentation of Patient Attendance statistics to justify the St James's Location
Figures being presented by proponents of the St James's project consistently indicate the majority of patients attend from the Greater Dublin Area. However, quoting numbers arriving from the GDA does not fairly represent how many of those patients within the GDA are predominantly located outside the M50 and are actually travelling large distances to get into the St James's location. A finer level of granularity is required to represent the distribution of the paediatric population within the GDA.

Imminent Risks to the NPH
Locating a National Tertiary hospital in an inaccessible urban centre with low paediatric population and two A/UCCs in accessible locations, next to major national motorways, in areas of very high paediatric populations presents two significant risks:

1. The **risk of over burdening the small A/UCC centres**
   This is very likely to happen. This congestion can be alleviated in two ways:
   i. Divert the excess demand to the NPH. This effectively dismantles the entire 'hub and spoke' model, creating one large hub and forcing families and sick children to endure unnecessary journeys.
   ii. Expand the facilities at the A/UCC centres to cope with the excess demand. This also effectively dismantles the 'hub and spoke' model, creating several mid-sized hubs, leading to the second very significant risk.
2. The **risk of diluting the critical mass** of secondary care required to enhance the expertise of the National Tertiary centre:
   "Tertiary catchment is only one part of achieving scale for these centres. Pure tertiary cases typically constitute a minority component of total paediatric volume, and secondary cases are an essential part of maintaining scale."
   Source: McKinsey, 2006 *(p.26)*

Equity of Access is being denied to 9 out of 10 Children across Ireland
One of the 4 key goals set out by the Department of Health and Children in its 2001 Health Strategy Document was Fairness and Equity:

"Equity will be central to developing policies (i) to reduce the difference in health status currently running across the social spectrum in Ireland; and (ii) to ensure equitable access to services based on need."
[Source: "Quality and Fairness - A Health System for You"]

Yet 9 out of 10 of the sickest children across Ireland live outside the M50 and will face a considerable journey and considerable traffic to access the St James's location.

APPENDIX 1: C4KH Paediatric Population Calculation Methodology

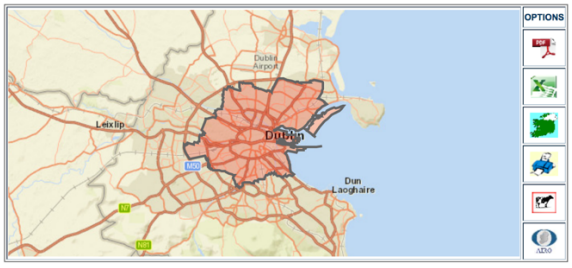
Source Data: Census 2011 population tables, at both CTY and LEA level, in CSV format.

Using the CSO SAPMAP http://census.cso.ie/sapmap/ each County was categorised as follows:

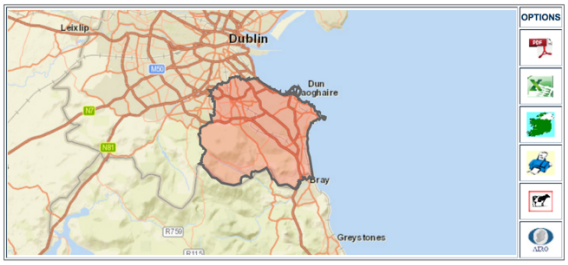
- "Inside M50" if the vast majority of the County was physically located inside the M50
- "Outside M50" if the vast majority of the County was physically located outside the M50
- "Defined at LEA Level" if the County was physically spread across both sides of the M50

County	Categorisation
Dublin City	Inside M50
Dún Laoghaire-Rathdown	Defined at LEA Level
Fingal	Outside M50
South Dublin	Defined at LEA Level
Kildare	Outside M50
Meath	Outside M50
Wicklow	Outside M50

Below are screenshots of from SAPMAP, showing the boundary of each County:

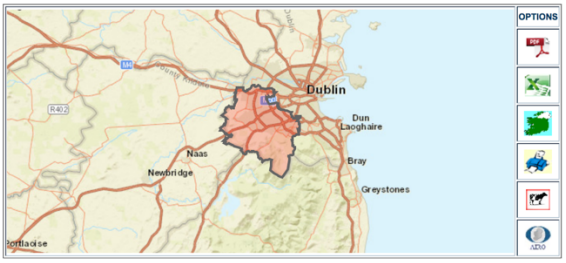


County Dublin City (CSO Area Code CTY 02)



County Dún Laoghaire-Rathdown (CSO Area Code CTY 05)

County Fingal (CSO Area Code CTY 04)



County South Dublin (CSO Area Code CTY 03)

For Counties which has to be defined at Local Electoral Area (LEA) level, each LEA within the County was analysed on SAPMAP and categorised as follows:

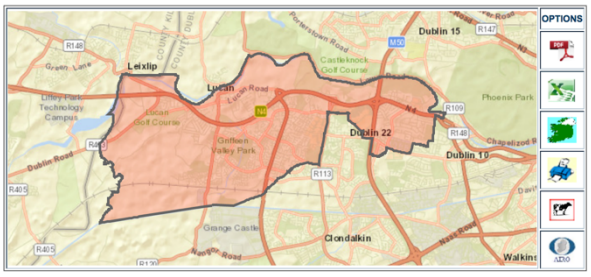
- "Inside M50" if the vast majority of the LEA was physically located inside the M50
- "Outside M50" if the vast majority of the LEA was physically located outside the M50
- "50-50" if the County was physically spread across both sides of the M50

For a higher degree of accuracy the process could have been taken to Electoral Division level, however, it was felt for the purposes of the Report estimating a population

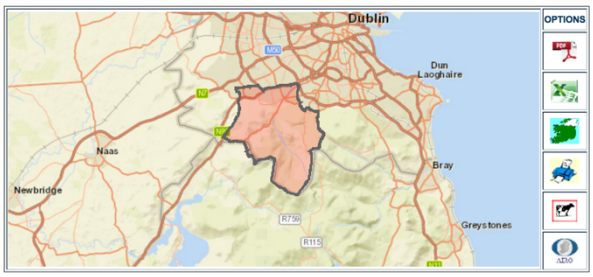
distribution of 50:50 for the 3 LEAs which were considerably spread across the M50 would suffice.

County	LEA	Categorisation
South Dublin	Lucan	Outside M50
South Dublin	Tallaght South	Outside M50
South Dublin	Tallaght Central	50-50
South Dublin	Clondalkin	Outside M50
South Dublin	Rathfarnham	Inside M50
Dún Laoghaire Rathdown	Ballybrack	50-50
Dún Laoghaire Rathdown	Blackrock	Inside M50
Dún Laoghaire Rathdown	Dundrum	Inside M50
Dún Laoghaire Rathdown	Dún Laoghaire	Inside M50
Dún Laoghaire Rathdown	Glencullen–Sandyford	50-50
Dún Laoghaire Rathdown	Stillorgan	Inside M50

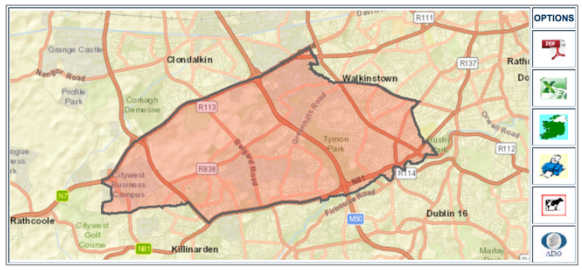
Below are screenshots of from SAPMAP, showing the boundary of each LEA in South Dublin:



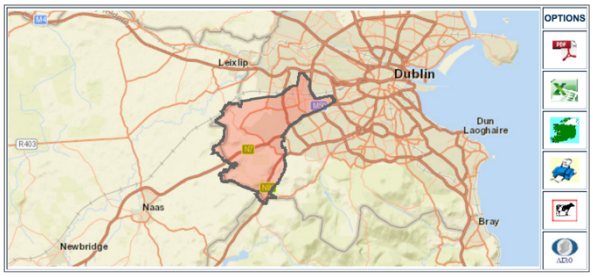
Local Electoral Area Lucan (CSO Area Code LEA 115)



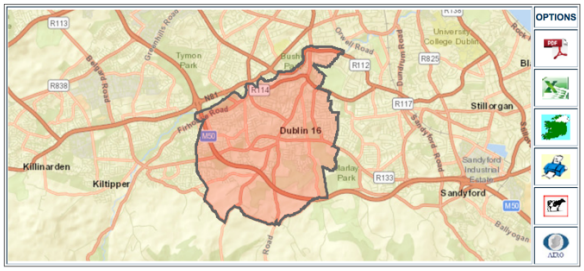
Local Electoral Area Tallaght South (CSO Area Code LEA 154)



Local Electoral Area Tallaght Central (CSO Area Code LEA 153)

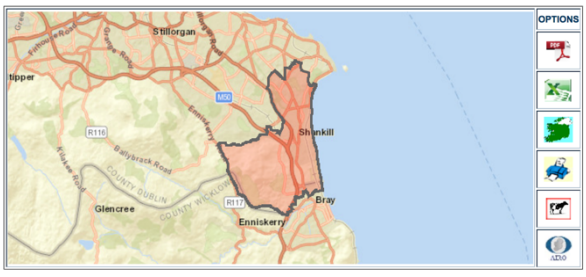


Local Electoral Area Clondalkin (CSO Area Code LEA 050)



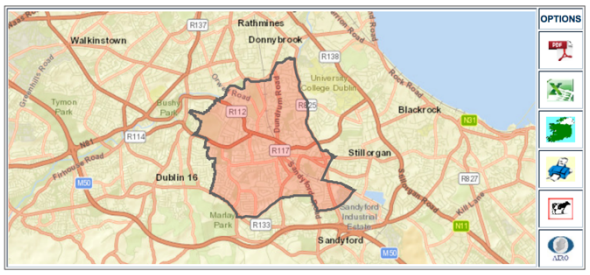
Local Electoral Area Rathfarnham (CSO Area Code LEA 138)

Below are screenshots of from SAPMAP, showing the boundary of each LEA in DLR:

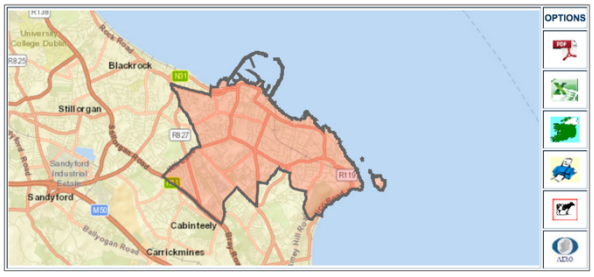


Local Electoral Area Ballybrack (CSO Area Code LEA 013)

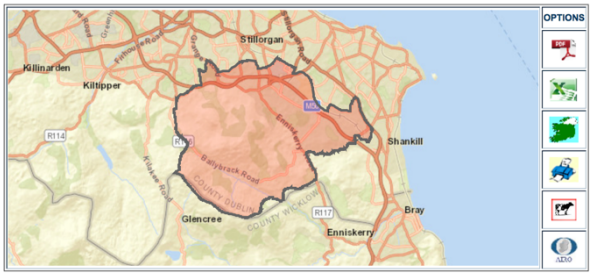
Local Electoral Area Blackrock (CSO Area Code LEA 026)



Local Electoral Area Dundrum (CSO Area Code LEA 074)



Local Electoral Area Dún Laoghaire (CSO Area Code LEA 077)



Local Electoral Area Glencullen-Sandyford (CSO Area Code LEA 090)

Local Electoral Area Stillorgan (CSO Area Code LEA 148)

Results

Secondary Care Catchment Area:

The paediatric population distribution in the Greater Dublin Area, relative to the M50, was found to be:

< 18 years old			
County	Pop Inside M50	Pop Outside M50	Total Pop
Dublin City	95,295	0	95,295
Dún Laoghaire-Rathdown	36,297	8,664	44,960
Fingal	0	75,795	75,795
South Dublin	16,135	55,074	71,208
Kildare	0	59,449	59,449
Meath	0	53,400	53,400
Wicklow	0	36,444	36,444
Total	147,726	288,825	436,551
Total %	33.8%	66.2%	

< 16 years old			
County	Pop Inside M50	Pop Outside M50	Total Pop
Dublin City	85,075	0	85,075
Dún Laoghaire-Rathdown	32,241	7,771	40,012
Fingal	0	69,557	69,557
South Dublin	14,302	50,281	64,583
Kildare	0	54,252	54,252
Meath	0	48,880	48,880
Wicklow	0	32,972	32,972
Total	131,618	263,713	395,331
Total %	33.3%	66.7%	

Connolly for Kids Hospital concludes:
67% (or 2/3) of the GDA Paediatric Population lives Outside the M50

Tertiary Care Catchment Area:

The paediatric population distribution in the Republic of Ireland, relative to the M50, was found to be:

< 18 years old			
Region	Pop Inside M50	Pop Outside M50	Total Pop
Country Total	147,726	1,000,961	1,148,687
	12.9%	87.1%	

< 16 years old			
Region	Pop Inside M50	Pop Outside M50	Total Pop
Country Total	131,618	905,199	1,036,817
	12.7%	87.3%	

Connolly for Kids Hospital concludes:
87% (or 9/10) of the National Paediatric Population lives Outside the M50

Dublin City and County:

Although the Dublin City and County region is irrelevant with regard to the catchment areas of the NPH, it has been used in analysis by the NPHBD and therefore it may be useful to present the population distribution relative to the M50 for just this area:

< 18 years old	Dublin City & County		
County	Pop Inside M50	Pop Outside M50	Total Pop
Dublin City & County	147,726	139,532	287,258
	51.4%	48.6%	

< 16 years old	Dublin City & County		
County	Pop Inside M50	Pop Outside M50	Total Pop
Dublin City & County	131,618	127,609	259,227
	50.8%	49.2%	

Connolly for Kids Hospital concludes:
50% (or half) of the Dublin City & County Paediatric Population lives Outside the M50

Paediatric Age Limit

The appropriate cut-off age for paediatric admissions at the new NPH is a subject of much debate and analysis in the related documentation. This population analysis examines the paediatric population relative to the M50 for both <16 and <18 years, showing relatively insignificant differences in terms of the overall numbers. The figures show a slightly higher ratio of children living outside the M50 when only <16 year olds are considered, suggesting a younger population resides outside the M50.
Most population and patient numbers reported in other NPH reports and documents relates to a cut-off age of 16 years. Therefore, to accurately cross reference with this data, an age limit of 16 years has been considered in the data of this report. That is not to imply that Connolly for Kids Hospital advocates a paediatric admissions cut-off age of 16 years.

Source Data

Data from the 2011 Census was used throughout this population analysis. Despite having more up-to-date data available from the recent 2016 Census, the data from the 2011 Census was used for a number of reasons:

- Census 2011 data was the most recent Census data available at the time of the Dolphin Report and the Subsequent Cabinet site decision, therefore it seems appropriate to analyse the data that was available at that time.
- In order to be able to directly correlate the data used in this population analysis with data presented at the time of the Dolphin Report and subsequent reports.
- The intention of this report is to analyse the most suitable location for the NPH relative to paediatric population distribution and not to analyse the capacity requirements of the NPH facilities. Therefore, this report is predominantly concerned with paediatric population distribution and less concerned with absolute population numbers. The variation in paediatric population distribution between 2011 and 2016 is assumed to be relatively insignificant and therefore similar results would be expected from the 2016 Census data.

Additionally, it should be noted that while the authors of the referenced reports had access to raw data from the HSE and the Hospitals, the analysis in this report has been compiled purely off the data presented in those referenced reports. Therefore, there has been some limitation in terms of precision and ability to cross-reference data accurately. Any assumptions or generalisations made have been noted.