Appendix K: Accessibility Study

K1: Executive summary

Based on five sites identified as potential locations for co-located maternity services with a service fixed at the Mater, six scenarios were defined:

1. Mater, St. Vincent's & St. James's
2. Mater, St. Vincent's & Tallaght
3. Mater, St. Vincent's & Beaumont
4. Mater, Beaumont & St. James's
5. Mater, Tallaght & St. James's
6. Mater, Beaumont & Tallaght

Methods

Patient travel behaviour was modelled using historical hospital admission data. Travel times were estimated by private car, public transport and a mix of public and private transport. Numbers of births were projected for 2016 and 2026.

Findings

The likely demand at each site and percentage population with travel times for each scenario based on **2006** population figures are as follows:

2006 births at each site for each scenario

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	8,499	5,504	9,296
Mater	St Vincent's	Tallaght	9,304	5,500	8,495
Mater	St Vincent's	Beaumont	9,913	8,097	5,290
Mater	Beaumont	St James's	8,842	4,482	9,976
Mater	Tallaght	St James's	9,006	7,948	6,344
Mater	Beaumont	Tallaght	8,591	4,763	9,945
Rotunda	**Holles St**	**Coombe**	**7,325**	**8,078**	**8,088**

Percentage 2006 births by private travel time band for each scenario

Site 1	Site 2	Site 3	% population within travel time			
			<30mins	<60mins	<90mins	<120mins
Mater	Beaumont	Tallaght	43.3	85.9	96.5	99.4
Mater	St Vincent's	Tallaght	40.6	85.7	96.3	99.2
Mater	Tallaght	St James's	39.1	85.7	96.2	99.3
Mater	St Vincent's	St James's	30.9	83.3	95.4	98.9
Mater	St Vincent's	Beaumont	29.8	82.7	93.4	98.7
Mater	Beaumont	St James's	32.4	82.3	94.6	98.4
Rotunda	**Holles St**	**Coombe**	**26.3**	**82.6**	**94.0**	**98.4**

The likely demand at each site and percentage population with travel times for each scenario based on **2016** population figures are as follows:

2016 births at each site for each scenario

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	8,856	5,689	9,704
Mater	St Vincent's	Tallaght	9,670	5,663	8,916
Mater	St Vincent's	Beaumont	9,948	8,571	5,731
Mater	Beaumont	St James's	9,556	4,695	9,998
Mater	Tallaght	St James's	9,348	8,340	6,560
Mater	Beaumont	Tallaght	9,346	4,984	9,919

Percentage 2016 births by private travel time band for each scenario

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Beaumont	Tallaght	42.8	85.9	96.5	99.4
Mater	St Vincent's	Tallaght	40.0	85.6	96.4	99.2
Mater	Tallaght	St James's	38.5	85.6	96.3	99.3
Mater	St Vincent's	St James's	30.2	83.1	95.4	98.9

Mater	St Vincent's	Beaumont	29.1	82.5	93.5	98.7
Mater	Beaumont	St James's	31.6	82.1	94.7	98.4

The likely demand at each site and percentage population with travel times for each scenario based on **2026** population figures are as follows:

2026 births at each site for each scenario

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	8,128	5,169	9,032
Mater	St Vincent's	Tallaght	8,818	5,095	8,416
Mater	St Vincent's	Beaumont	9,933	7,508	4,888
Mater	Beaumont	St James's	8,286	4,110	9,934
Mater	Tallaght	St James's	8,909	8,342	5,079
Mater	Beaumont	Tallaght	8,068	4,389	9,872

Percentage 2026 births by private travel time band for each scenario

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Tallaght	St James's	37.1	84.9	96.2	99.3
Mater	St Vincent's	Tallaght	38.0	84.8	96.2	99.2
Mater	Beaumont	Tallaght	40.3	84.8	96.3	99.4
Mater	St Vincent's	St James's	28.0	82.0	95.3	98.9
Mater	St Vincent's	Beaumont	27.0	81.3	93.2	98.7
Mater	Beaumont	St James's	29.3	80.9	94.5	98.3

Key findings

- The spatial distribution of births will not change radically between 2006 and 2026.
- All of the scenarios result in improved access for patients over the existing service distribution.
- Nearly 60% of births in the Greater Dublin Area originate south of the Liffey - it is therefore preferable to place two of the hospitals south of the Liffey.
- The scenarios cannot be adequately distinguished based on accessibility.
- The relative merits of solutions are consistent to 2026 and based on extreme population projections.
- The combination of Mater, St. Vincent's and either St. James's or Tallaght maximises continuation of the existing catchment areas.
- The selection involving Mater, St. Vincent's and Tallaght minimises the number of patients travelling to the city centre.

K2: Scope of work

The scope of work was to provide advisory support on an access review into the Maternity review. This should take Mater as one given site and then considering accessibility to other potential sites – St Vincent's, St James', Beaumont, Tallaght, Connolly and Naas. This should be for relevant populations at both 10 year and 20 year intervals. It would also be important to consider access to current sites for reference. The assignment will span a period of approximately four weeks during November 2007.

On foot of further discussions, the potential sites for maternity hospitals was reduced to include the Mater site along with any two sites from St Vincent's, St James', Beaumont and Tallaght. As such, travel patterns would have to be analysed for each of six possible combinations of those sites.

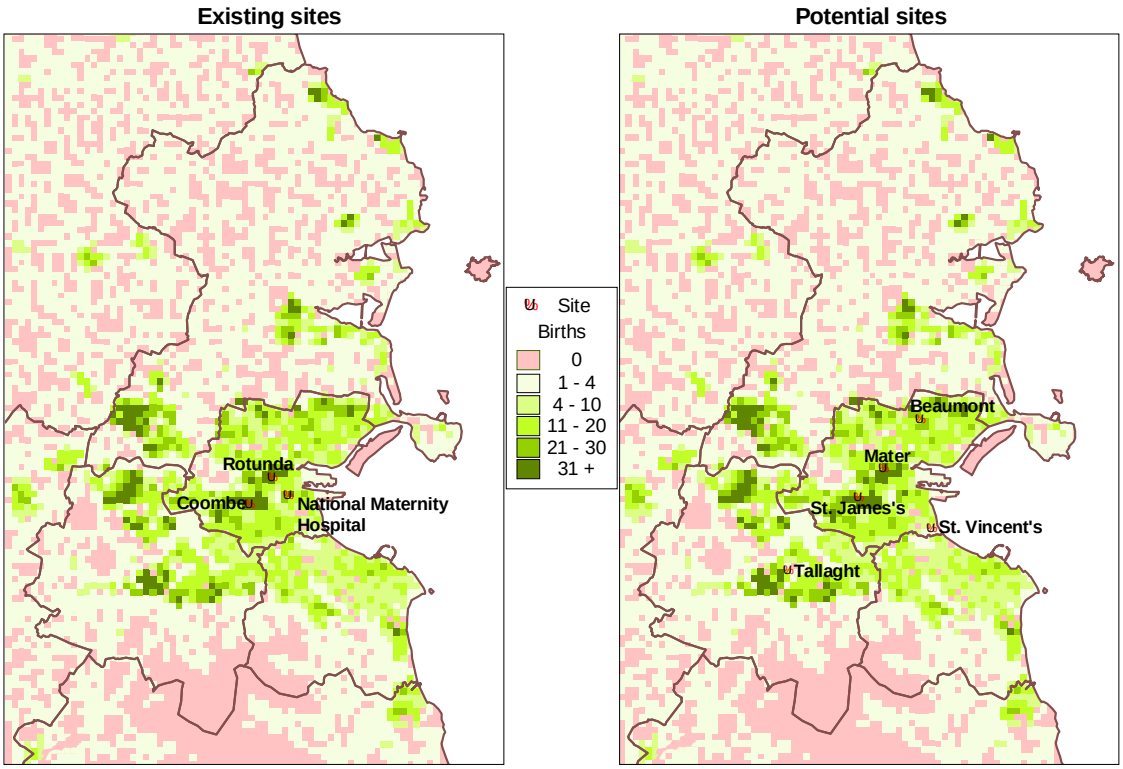
K3: Methodology & data

Scenarios

Based on the five sites identified as potential locations for maternity services with a service fixed at the Mater, six scenarios were defined as follows:

1. Mater, St. Vincent's & St. James's
2. Mater, St. Vincent's & Tallaght
3. Mater, St. Vincent's & Beaumont
4. Mater, Beaumont & St. James's
5. Mater, Tallaght & St. James's
6. Mater, Beaumont & Tallaght

The maps below indicate the locations of the current maternity hospitals and the five potential sites included in the analysis.



Birth projections

As part of this study it was necessary to estimate the numbers of births in 2006, 2016 and 2026. For a comprehensive analysis of travel times it was also necessary to have numbers of births in each small area as post code or county level would not provide sufficient detail for an effective model.

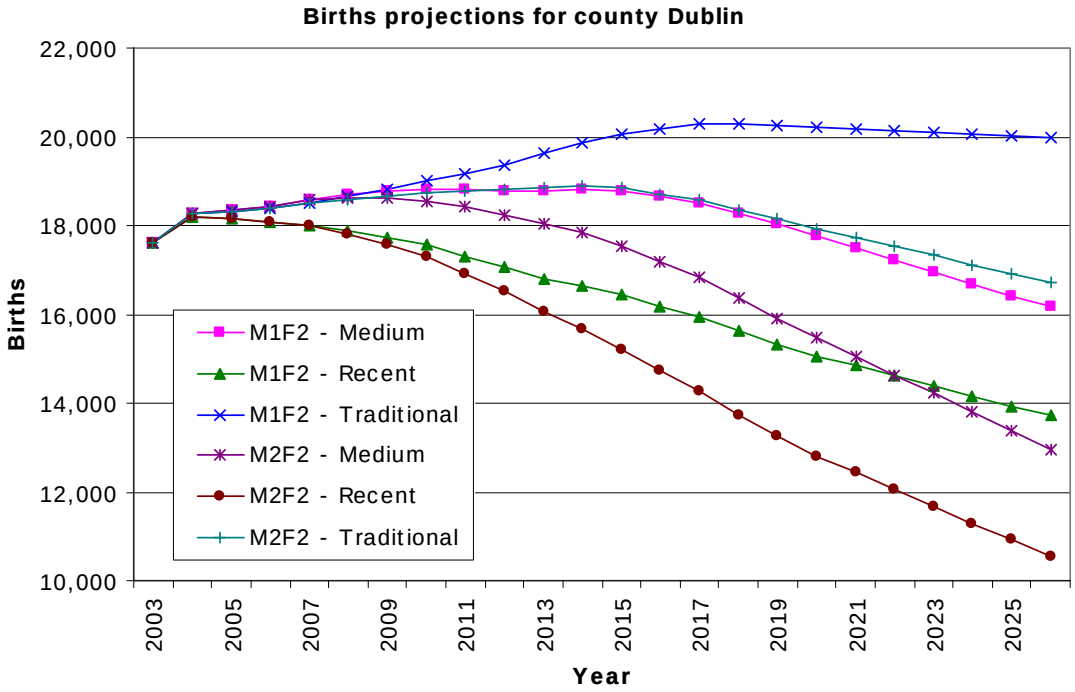
Rather than estimate female population in the 15 to 49 age range and then apply fertility rates it was decided to utilise all information on the likely current and future distribution of births.

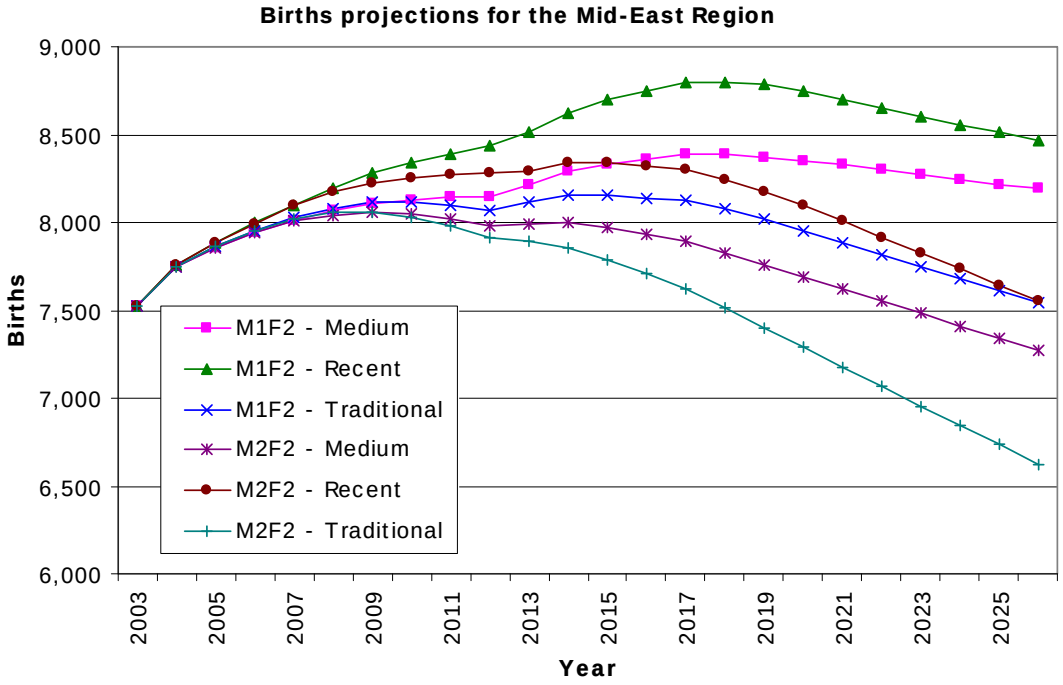
The Central Statistics Office (CSO) publish information on the annual number of registered births. The 2006 Vital Statistics report details 17,623 births in Dublin and a further 8,424 in the Mid-East region (counties Kildare, Meath and Wicklow). A source for small area data, the CSO's 2006 census, provides the number of under 1's by electoral division (ED). In theory this gives the number of children born in each ED the previous 12 months. The census data underestimates the number of births in the Greater Dublin Area by 7%. Without any basis to believe the undercount to be systematic it is presumed that the undercount is uniform across all EDs in a county. The undercounts are shown in the table below.

Local Authority	Census births	Registered births
Dublin City	5,723	6,446
South Dublin	3,951	4,305
Fingal	4,330	4,612
Dun Laoghaire - Rathdown	2,276	2,260
Kildare	3,129	3,405
Meath	2,843	2,907
Wicklow	1,973	2,112

A correction factor was applied to ED births in each local authority based on the percentage undercount.

With regard to births projections, CSO births projections were last published in 2005 and are available by region for each up to 2021. They are computed using 6 different scenarios based on assumptions with respect to how fertility and migration patterns will change over time. A simple linear extrapolation was used to extend the projections to 2026. The following two graphs show the range of projected births by year for the Dublin and Mid-East regions, respectively.


Births projections for county Dublin
22,000
20,000
18,000
16,000
14,000
12,000
10,000
Births
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Year
M1F2 - Medium
M1F2 - Recent
M1F2 - Traditional
M2F2 - Medium
M2F2 - Recent
M2F2 - Traditional


Births projections for the Mid-East Region
9,000
8,500
8,000
7,500
7,000
6,500
6,000
Births
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
Year
M1F2 - Medium
M1F2 - Recent
M1F2 - Traditional
M2F2 - Medium
M2F2 - Recent
M2F2 - Traditional

The current number of births is below what was predicted by the CSO in 2005 in the Dublin region but above what was predicted for the Mid-East region. The observed number of births by regions is shown in the table below for the years 2003 to 2006. There is no clear pattern although there has been an increase in the Mid-East region with a net gain of nearly 1,000 births in 4 years.

Year	Dublin	Mid-East	Total
2003	17,595	7,528	25,123
2004	17,708	7,953	25,661
2005	17,174	7,780	24,954
2006	17,623	8,424	26,047

A median projected number of births was used which suggested a slowly increasing number of births peaking in Dublin in 2014 and in the Mid-East in 2017. The predicted number of births by region was the following:

Region	Year		
	2006	2016	2026
Dublin	17,623	18,271	16,528
Mid-East	8,424	8,886	8,733

To allocate changes in births numbers to small areas EDs were assigned to one of three categories: increasing, static or decreasing. All EDs outside of Dublin city and towns of 1,500 or more persons were labelled ‘static’. This decision was supported by the small changes in births observed over the preceding 10 years. All of the towns and their environs were labelled ‘increasing’. Many of these towns have increased in size and attracted young families and couples no longer able to afford housing in Dublin city. Most Dublin city EDs were labelled ‘decreasing’ as evidence suggests an aging population. This is not uniformly the case and EDs in peripheral suburbs were labelled ‘increasing’ again based on evidence from census figures. Where there was a net decrease across a region that loss was primarily allocated to ‘decreasing’ EDs and then to a lesser extent to ‘static’ EDs with ‘increasing’ EDs staying unchanged or increasing only marginally, depending on the magnitude of the overall decrease.

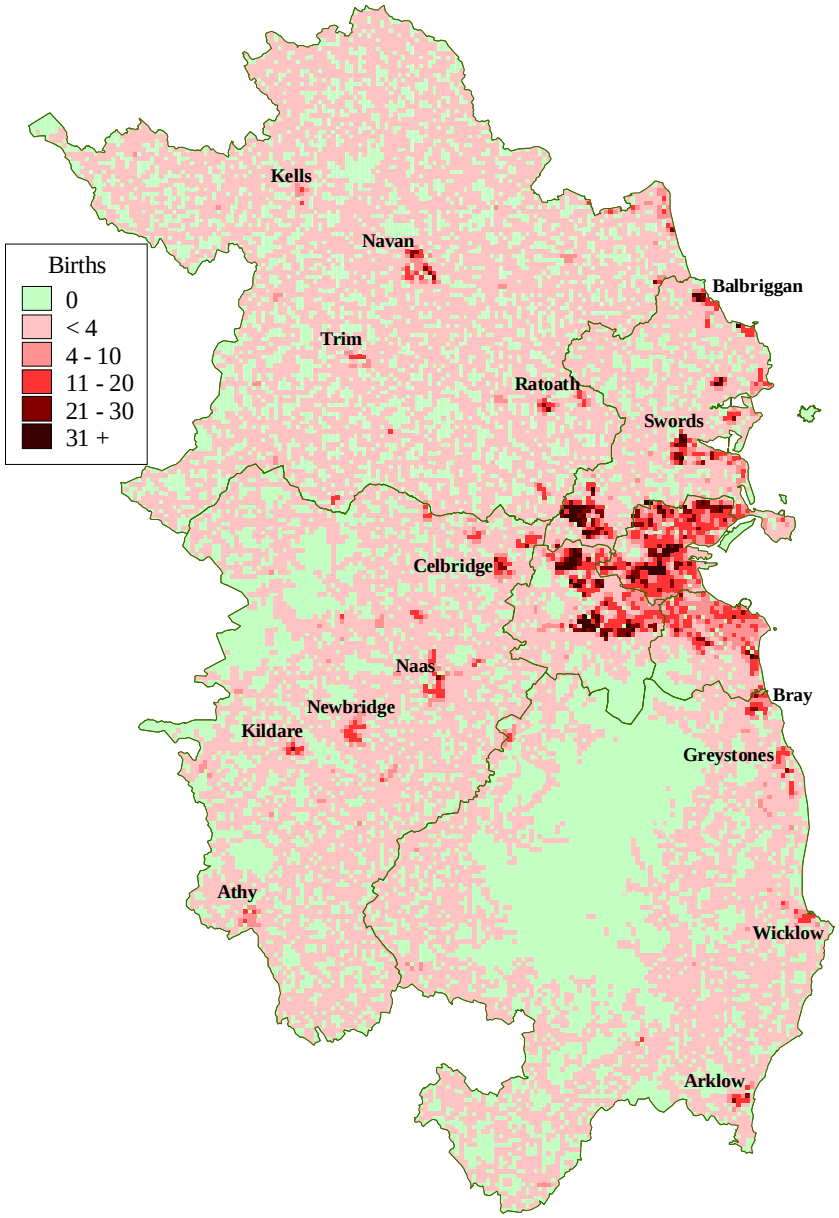
Births were then allocated to each house-point in an ED and then those house-points were aggregated to 500m grid squares. The benefit of grid squares is that they provide a finer level of detail than EDs which tend to be geographically quite large, particularly in rural areas.

Births projections assumptions

- Median births projections are a suitable indicator of future births numbers.
- Population increases will occur predominantly in towns and their environs with some increases in Dublin city suburbs.
- Numbers of births outside towns and Dublin city will remain relatively unchanged from 2006 until 2026.

The following map shows the 2006 births by 500m grid square.

2006 births by 500m grid square



Travel times

Travel times were computed from the centres of 500m grid squares to hospital sites using both public and private transport.

Private transport

The definition of private transport is travel by private car where the patient travels directly from home to the hospital site. Travel times and distances were computed along the road network. The attainable speed along each road segment was determined for road type (e.g. motorway, regional road) and location (i.e. city, town or rural). Speeds were lowest in city areas and highest in rural areas. The relative speeds were based on attained speeds as measured and published by the National Roads Authority (NRA, www.nra.ie). These speeds are those actually achieved by traffic over a 24 hour period. As these speeds are not necessarily indicative of speeds achieved during normal hours (i.e. 7am to 7pm) the values were further calibrated using Dublin Transport Office (DTO, www.dto.ie) and AA Ireland (AA, www.aaireland.ie) data.

Public transport

A number of public transport options are available in the Dublin region: Luas, DART, Dublin Bus, Bus Eireann and Iarnrod Eireann are the main services. It was presumed that individuals would not use more than one form of public transport to reach a destination.

Initially grid squares were allocated to public transport stations within walking distance. For this study it was assumed that a patient could walk 1,200m in under 15 minutes and that this was acceptable walking distance. For those outside walking distance it was presumed that a taxi or lift from a friend or relative would have to be used to get to the nearest stop.

Scheduled times were used for Bus Eireann, Luas, DART and Iarnrod Eireann services. It was assumed that a person would have to wait 10 minutes for the service to arrive. If possible the person would alight the service within walking distance of the destination hospital, otherwise a taxi would be used from the nearest convenient stop to the final destination.

For Dublin Bus services the average scheduled time equates to an average speed of 18kmph. This was moderated to an average speed of 15kmph as schedules do not tend to take heavier traffic volumes into account.

Public/private transport mix

It is unlikely that all patients will use private transport so it was required to determine a probable proportion of public transport users in each small area. Two sources of census data were used for this purpose: the percentage households with no car and the percentage population using public transport. For each ED the lesser of these two values was taken as the potential proportion of patients who would not travel by their own car. Of those not travelling in their own car it was presumed that half of these would use public transport and the other half would rely on lift from a friend or relative to reach the hospital. Travelling in another person's car was given an added time penalty of 15 minutes over and above travel by private car from home to hospital.

Travel time assumptions

- Public transport coverage and travel times in 2016 will be the same as observed in 2006
- The proportion of the population in each small area using public transport will remain unchanged between 2006 and 2016
- Private transport travel times will remain unchanged between 2006 and 2026
- Although travel times by public transport are provided it is expected that nearly all patients will travel by private car

Patient flows

To adequately predict the movement of patients from small areas to hospitals it was necessary to develop a spatial interaction model of patient flows. Data from the 2004 Hospital Inpatient Enquiry (HIPE) system was used to calibrate the model. Cases are coded to post code within Dublin and to county for the Mid-Eastern region (i.e. Kildare, Meath and Wicklow). There are 24 Dublin post code areas used in the HIPE coding. Repeat visits were excluded so that records would be a proxy for births.

The travel times and distances were computed from each grid square to each of the three maternity hospitals. A spatial interaction model (SIM) was developed that took into inter- and intra-county flows and the effect of the Liffey on travel behaviour within Dublin. This impact appears to extend to Kildare and Wicklow and, to a lesser extent, Meath. Hospital region was defined as Dublin North or Dublin South. Kildare and Wicklow were considered to be part of Dublin South and Meath as part of Dublin North.

The SIM is used to predict the flow of patients from post codes to hospitals taking into account travel distance and the impedance of the Liffey. By applying the SIM to proposed site combinations it is possible to predict the catchments for the new sites and the travel times of the patients. The model correctly predicts over 90% (R^2 = 0.913) of patient movement in the existing service configuration. It appears that there is a substantial undercount of Dun Laoghaire maternity cases in the HIPE database which may be due to some Dun Laoghaire patients being recorded as ‘Dublin South’ post code. As census births numbers were used as a basis for this study a significant undercount in Dun Laoghaire is avoided although the undercount will have impacted on the observed fit of the model.

Nearly 65% of patients travel to their nearest hospital in the present configuration. Clearly the inconvenience of travelling to a more distant hospital is sufficiently small that 35% opt for that choice. The distance between the hospitals is small – the furthest being 3.5km from the Coombe to the Rotunda. If the distances were increased to 10 or 15km then it is likely that people would be less inclined to utilise the more distant facilities. The distance decay function used in the SIM accounts for this relationship and thus is a suitable method of determining likely flows in a changed configuration of maternity services.

Patient flow assumptions

- 96.5% of births in the three hospitals originate from within the Greater Dublin Area – **the births figures quoted in subsequent tables include births from outside the Greater Dublin Area.**
- 5% of mothers in the Dublin North postal area will travel to the North East.
- 12% and 2% of Kildare mothers will travel to the Portlaoise and Mullingar hospitals, respectively.
- 50% of Meath mothers will travel to the North East and a further 4% will travel to Cavan and 5% to Mullingar.
- 10% of Wicklow patients will travel to Wexford Regional Hospital.
- Approximately 1,400 births will take place in Mount Carmel hospital.

K4: Current scenario (Rotunda, Holles St. & Coombe)

As an aide to assessing proposed new locations for the maternity services, it was decided to analyse the existing scenario. These are three city centre sites.

Births at each site

Site	Births
Rotunda	7,254
National Maternity Hospital	8,078
Coombe Women's Hospital	8,088

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Rotunda	National Maternity Hospital	Coombe Women's Hospital	Total
< 30	29.1	17.8	32.4	**26.3**
< 60	88.4	78.4	81.6	**82.6**
< 90	96.2	90.1	95.9	**94.0**
<120	99.5	96.6	99.1	**98.4**

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Rotunda	National Maternity Hospital	Coombe Women's Hospital	Total
< 30	6.3	2.0	4.7	**4.3**
< 60	31.9	15.3	25.1	**23.8**
< 90	82.5	76.3	69.3	**75.8**
<120	94.0	92.7	93.0	**93.2**

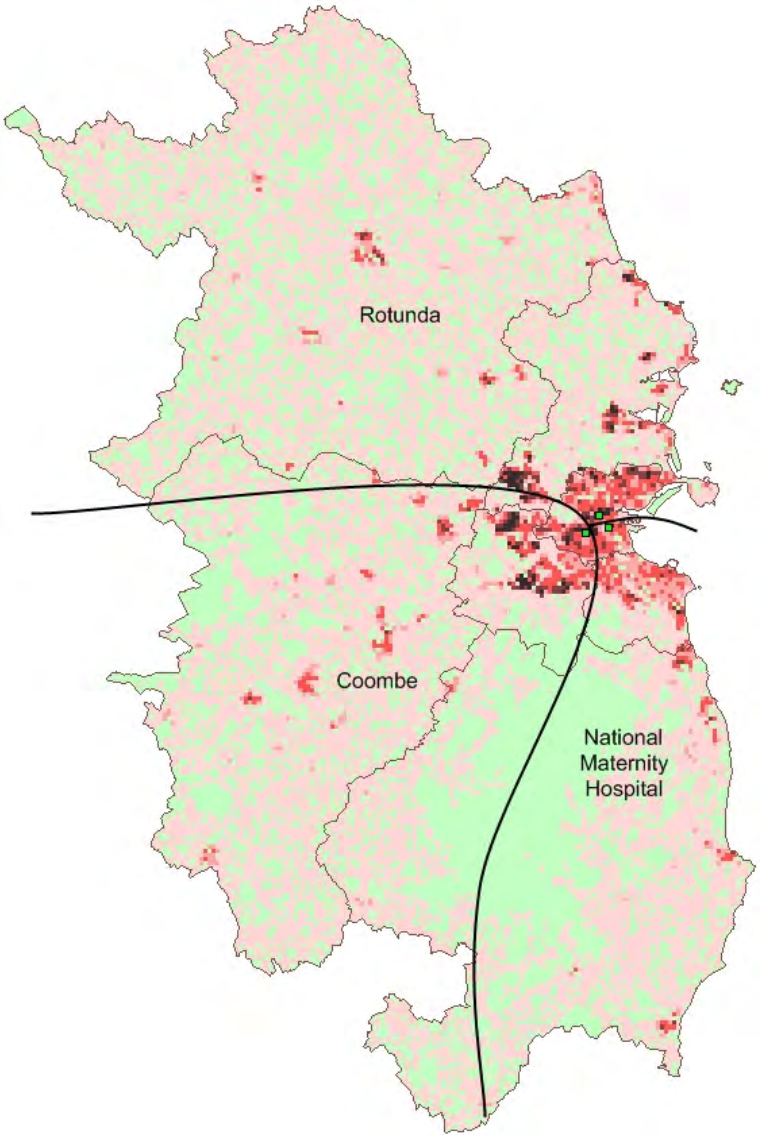
Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Rotunda	National Maternity Hospital	Coombe Women's Hospital	Total
< 30	15.2	8.8	18.9	**14.2**
< 60	86.5	76.9	81.0	**81.3**
< 90	95.4	89.7	95.4	**93.4**
<120	99.3	96.6	99.0	**98.3**

Comments

The National Maternity Hospital has a disproportionate attraction for residents of Dun Laoghaire. It is less attractive than anticipated for residents of Dublin 20 and Dublin 24. Overall, due to the close proximity of the three sites, each hospital attracts patients from every part of the Greater Dublin Area although 65% of patients attend their closest hospital. The main effect of the close proximity of the sites is that the population within 1 hour of each site is very similar. The location of the three sites effectively minimises the coverage of the services.

Approximate primary catchments for current service configuration



K5: Scenario 1 – Mater, St Vincent's & St. James's

In this scenario, as in all subsequent scenarios, the Rotunda hospital is relocated to the Mater site. The National Maternity Hospital is relocated to the St. Vincent's site and the Coombe is relocated to the St. James's site. The St. James's site is quite central so the effect of this scenario is to draw the NMH out from the city centre. The move results in a much reduced catchment for the NMH and increased births at St. James's.

2006

Births at each site in 2006

Site	Births
Mater	8,499
St. Vincent's Hospital	5,504
St. James's Hospital	9.296

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Mater	St. Vincent's	St. James's	Total
< 30	32.7	28.5	30.8	**30.9**
< 60	90.0	77.2	80.6	**83.3**
< 90	97.0	91.3	96.3	**95.4**
<120	99.7	97.1	99.3	**98.9**

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Mater	St. Vincent's	St. James's	Total
< 30	5.8	1.8	7.6	**5.6**
< 60	45.9	34.7	31.2	**37.4**
< 90	86.8	81.3	73.5	**80.2**
<120	94.2	93.2	94.0	**93.9**

Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Mater	St. Vincent's	St. James's	Total
< 30	19.8	19.8	17.5	**18.9**
< 60	88.4	75.7	80.1	**82.1**
< 90	96.2	90.4	95.7	**94.6**
<120	99.6	96.0	99.2	**98.6**

2016

Births at each site in 2016

Site	Births
Mater	8,856
St. Vincent's Hospital	5,689
St. James's Hospital	9,704

Cumulative percentage 2016 births within travel times by private car

Time band (minutes)	Mater	St. Vincent's	St. James's	Total
< 30	31.8	28.1	30.0	**30.2**
< 60	89.9	76.8	80.5	**83.1**
< 90	97.1	91.2	96.4	**95.4**
<120	99.7	97.1	99.4	**98.9**

Cumulative percentage 2016 births within travel times by mixed public/private transport

Time band (minutes)	Mater	St. Vincent's	St. James's	Total
< 30	19.4	19.5	17.1	**18.5**
< 60	88.3	75.4	79.9	**81.9**
< 90	96.2	90.4	95.8	**94.7**
<120	99.6	95.9	99.3	**98.6**

2026

Births at each site in 2026

Site	Births
Mater	8,128
St. Vincent's Hospital	5,169
St. James's Hospital	9,032

Cumulative percentage 2026 births within travel times by private car

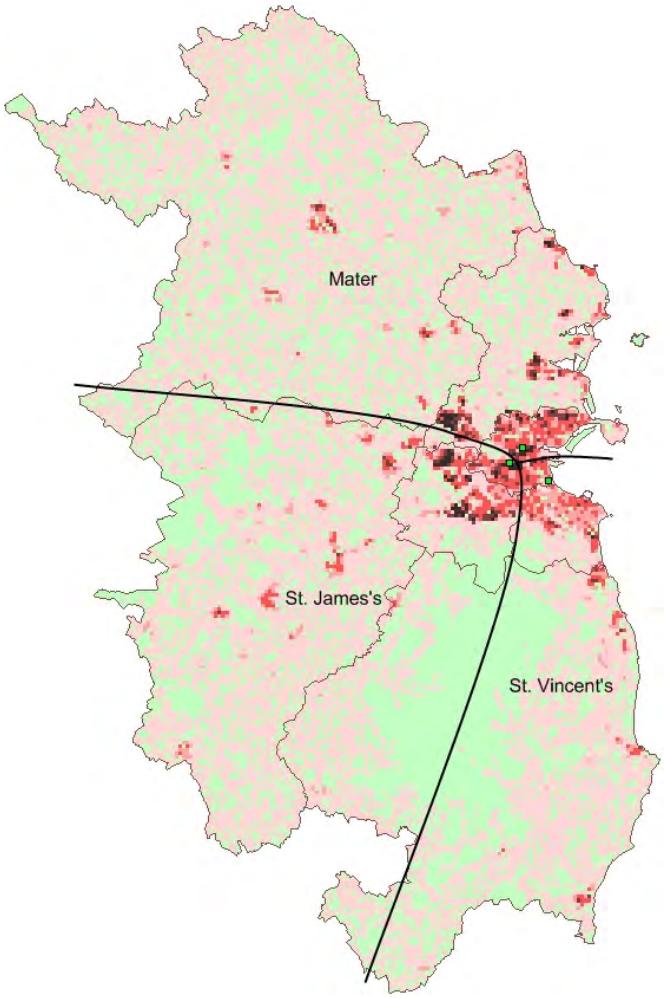
Time band (minutes)	Mater	St. Vincent's	St. James's	Total
< 30	28.9	26.7	27.8	**28.0**
< 60	89.3	75.1	79.4	**82.0**
< 90	96.9	90.7	96.4	**95.3**
<120	99.7	96.9	99.4	**98.9**

Comments

By bringing the two sites south of the Liffey further south, this scenario reduces the number of births from South Dublin, Dun Laoghaire–Rathdown, Kildare and Wicklow that use the north Dublin hospital. However, it also increases the number of north Dublin and Meath births no longer crossing the Liffey. The net change is to increase the number of births at the north-side site. The most substantial changes to the existing configurations are the reductions in Kildare, Meath and Dublin 15 patients travelling to the new St. Vincent's site.

The catchment at the St. Vincent's site is composed mostly of the south-east coast of Dublin and Wicklow. In losing its attraction to residents of north Dublin the site will have fewer births than at the current city centre location. The St. James's site is quite central and therefore will share a lot of the city centre catchment with the Mater site which to a certain extent replicates the overlapping catchments of the current configuration. As a consequence the improvement in access is moderate.

Approximate primary catchments for scenario 1 configuration



K6: Scenario 2 – Mater, St. Vincent's & Tallaght

For this scenario the National Maternity Hospital and the Coombe are relocated to the St. Vincent's and Tallaght sites, respectively. As two of the sites are drawn out of the city centre this further increases the catchment at the Mater as it now draws a patients from the south inner city.

2006

Births at each site in 2006

Site	Births
Mater	9,304
St. Vincent's Hospital	5,500
Tallaght Hospital	8,495

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Mater	St. Vincent's	Tallaght	Total
< 30	38.5	35.0	46.5	**40.6**
< 60	92.3	81.3	81.2	**85.7**
< 90	97.8	93.6	96.4	**96.3**
<120	99.8	98.1	99.3	**99.2**

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Mater	St. Vincent's	Tallaght	Total
< 30	6.7	2.0	3.1	**4.3**
< 60	51.5	38.9	16.9	**35.9**
< 90	88.9	88.3	38.7	**70.4**
<120	95.1	95.4	64.3	**83.9**

Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Mater	St. Vincent's	Tallaght	Total
< 30	23.3	21.6	30.4	**25.5**
< 60	90.9	79.8	77.3	**83.3**
< 90	97.1	92.9	95.7	**95.6**
<120	99.8	97.2	99.0	**98.9**

2016

Births at each site in 2016

Site	Births
Mater	9,670
St. Vincent's Hospital	5,663
Tallaght Hospital	8,916

Cumulative percentage 2016 births within travel times by private car

Time band (minutes)	Mater	St. Vincent's	Tallaght	Total
< 30	37.5	34.6	46.1	**40.0**
< 60	92.3	80.8	81.4	**85.6**
< 90	97.8	93.5	96.6	**96.4**
<120	99.8	98.1	99.4	**99.2**

Cumulative percentage 2016 births within travel times by mixed public/private transport

Time band (minutes)	Mater	St. Vincent's	Tallaght	Total
< 30	22.9	21.4	30.2	**25.3**
< 60	90.8	79.4	77.4	**83.2**
< 90	97.1	92.8	95.8	**95.6**
<120	99.8	97.1	99.0	**98.9**

2026

Births at each site in 2026

Site	Births
Mater	8,818
St. Vincent's Hospital	5,095
Tallaght Hospital	8,416

Cumulative percentage 2026 births within travel times by private car

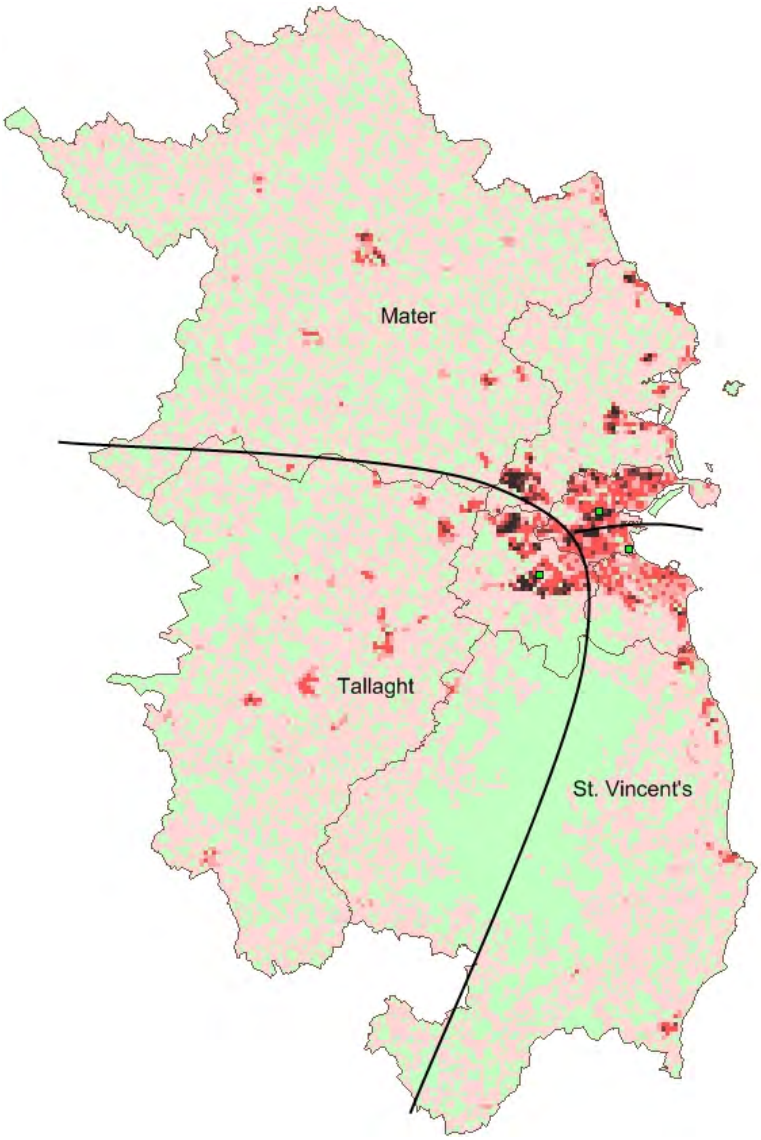
Time band (minutes)	Mater	St. Vincent's	Tallaght	Total
< 30	34.6	33.4	44.4	**38.0**
< 60	91.8	79.1	80.9	**84.8**
< 90	97.7	93.0	96.6	**96.2**
<120	99.8	97.9	99.4	**99.2**

Comments

This scenario effectively retains the layout of the present configuration while also improving access by maximising coverage. This is achieved by bringing the three sites into more central locations within their respective existing catchments. The number of births at the Mater site increases as fewer north Dublin patients will travel to south-side locations that are both quite far from the Mater. In this scenario nearly 90% of Kildare patients will travel to the Tallaght site.

The access within 30 and 60 minutes is good in this scenario due to the increased distance between sites. Nearly 76% of patients travel to their nearest site in this configuration of services.

Approximate primary catchments for scenario 2 configuration



K7: Scenario 3 – Mater, St. Vincent's & Beaumont

For this scenario the National Maternity Hospital and the Coombe are relocated to the St. Vincent's and Beaumont sites, respectively. As a result of this scenario the Mater catchment now draws in much of Kildare, Meath, west and central Dublin. This entails small catchments for the other two maternity sites and a large burden on the Mater service.

2006

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	10,608	9,913
St. Vincent's Hospital	7,761	8,097
Beaumont Hospital	4,931	5,290

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Mater	St. Vincent's	Beaumont	Total
< 30	24.3	27	44.4	29.8
< 60	77.8	80.6	95.0	82.7
< 90	92.3	91.3	98.9	93.5
<120	99.3	97.3	99.9	98.7

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Mater	St. Vincent's	Beaumont	Total
< 30	5.5	1.4	2.5	3.5
< 60	39.5	27.7	21.3	31.7
< 90	78.3	76.7	46.1	70.9
<120	93.8	93.0	86.0	91.9

Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Mater	St. Vincent's	Beaumont	Total
< 30	15.9	16.6	24.7	18.0
< 60	76.7	79.9	93.0	81.2
< 90	91.6	90.5	98.3	92.6
<120	99.2	96.3	99.9	98.4

2016

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	11,119	9,948
St. Vincent's Hospital	8,011	8,571
Beaumont Hospital	5,119	5,731

Cumulative percentage 2016 births within travel times by private car

Time band (minutes)	Mater	St. Vincent's	Beaumont	Total
< 30	23.4	26.3	42.8	29.0
< 60	77.3	80.4	94.7	82.5
< 90	92.3	91.3	98.9	93.5
<120	99.3	97.3	99.9	98.8

Cumulative percentage 2016 births within travel times by mixed public/private transport

Time band (minutes)	Mater	St. Vincent's	Beaumont	Total
< 30	15.5	16.4	24.0	17.6
< 60	76.5	79.6	92.9	81.0
< 90	91.6	90.4	98.3	92.6
<120	99.2	96.3	99.9	98.4

2026

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	10,435	9,933
St. Vincent's Hospital	7,269	7,508
Beaumont Hospital	4,625	4,888

Cumulative percentage 2026 births within travel times by private car

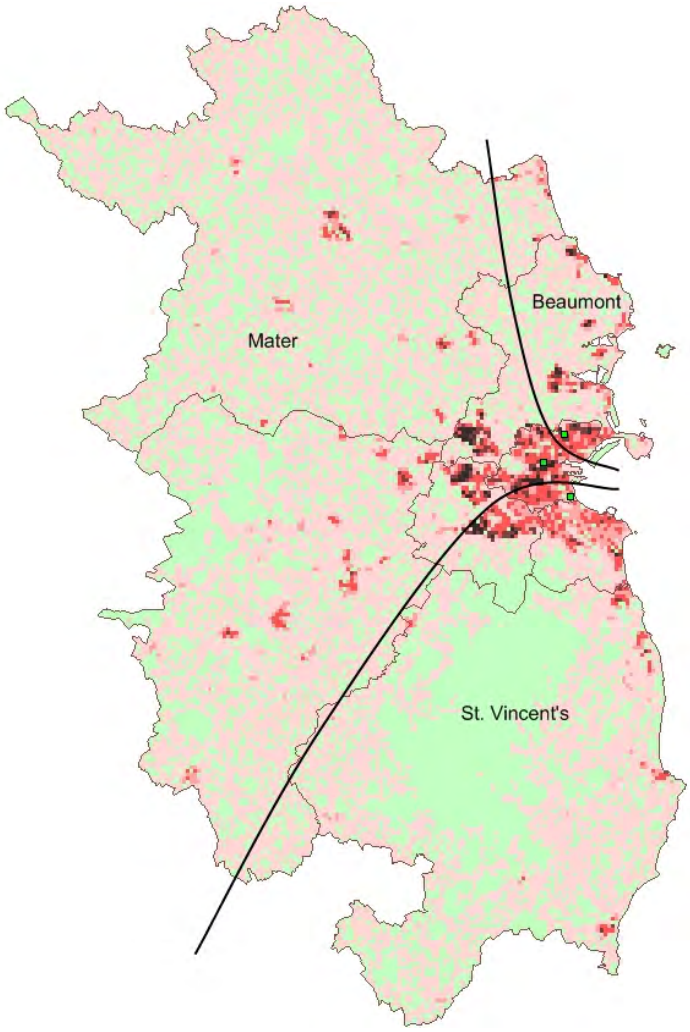
Time band (minutes)	Mater	St. Vincent's	Beaumont	Total
< 30	21.5	25.4	40.6	27.0
< 60	76.7	78.9	94.6	81.4
< 90	92.2	90.7	98.9	93.2
<120	99.3	97.1	99.9	98.7

Comments

In this scenario the north Dublin patients are split evenly between the two north-side sites. With the majority of Kildare and Meath patients travelling to the Mater location, that site will be heavily over-subscribed. Capping capacity at 10,000 will result in the extra patients being divided relatively evenly between the remaining two sites. The St. Vincent's site will draw almost all of its patients from Wicklow and south Dublin attracting virtually none from Kildare, Meath or north Dublin. The patients utilising the Beaumont site will come mainly from north Dublin although it will also attract some from the south inner city.

This scenario does not offer any clear advantage over the current configuration of services beyond relocating the maternity services to co-located sites. It will not improve access or demand at each site.

Approximate primary catchments for scenario 3 configuration



K8: Scenario 4 – Mater, Beaumont & St. James's

For this scenario the National Maternity Hospital and the Coombe are relocated to the Beaumont and St. James's sites, respectively. This scenario reduces the burden on the Mater site but entails a small catchment for the Beaumont site.

2006

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	7,808	8,842
Beaumont Hospital	4,301	4,482
St. James's Hospital	11,190	9,976

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Mater	Beaumont	St. James's	Total
< 30	24.8	50.0	30.2	32.0
< 60	78.0	95.6	79.5	82.0
< 90	92.6	99.3	94.0	94.5
<120	97.9	99.9	98.0	98.3

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Mater	Beaumont	St. James's	Total
< 30	6.8	2.9	6.6	6.0
< 60	37.8	24.2	27.8	30.5
< 90	82.4	51.3	71.9	71.6
<120	93.6	86.9	93.2	92.2

Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Mater	Beaumont	St. James's	Total
< 30	17.9	28.2	15.8	18.8
< 60	76.5	93.5	79.0	80.8
< 90	92.3	98.7	93.5	94.1
<120	98.0	99.9	97.9	98.3

2016

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	8,145	9,556
Beaumont Hospital	4,451	4,695
St. James's Hospital	11,653	9,998

Cumulative percentage 2016 births within travel times by private car

Time band (minutes)	Mater	Beaumont	St. James's	Total
< 30	23.9	48.6	29.7	31.1
< 60	77.7	95.5	79.2	81.8
< 90	92.6	99.3	94.1	94.5
<120	97.9	99.9	98.0	98.3

Cumulative percentage 2016 births within travel times by mixed public/private transport

Time band (minutes)	Mater	Beaumont	St. James's	Total
< 30	17.5	27.6	15.4	18.3
< 60	76.2	93.5	78.8	80.6
< 90	92.3	98.7	93.6	94.1
<120	98.0	99.9	97.9	98.3

2026

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	7,552	8,286
Beaumont Hospital	3,981	4,110
St. James's Hospital	10,795	9,934

Cumulative percentage 2026 births within travel times by private car

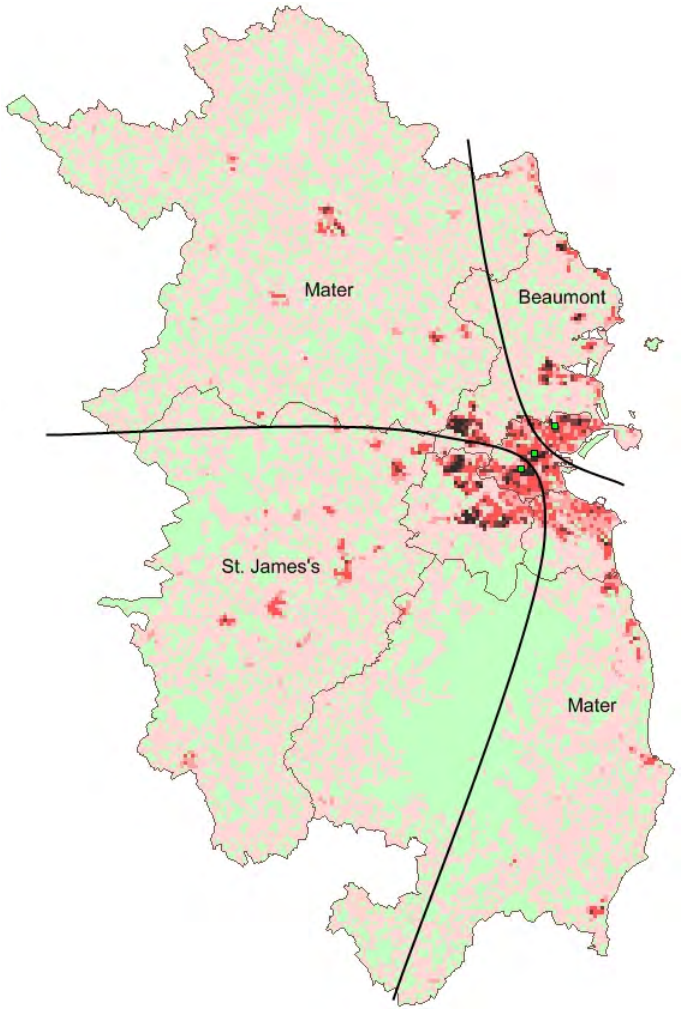
Time band (minutes)	Mater	Beaumont	St. James's	Total
< 30	22.4	46.6	27.4	29.1
< 60	76.6	95.4	78.1	80.7
< 90	92.5	99.2	94.0	94.4
<120	97.8	99.9	97.9	98.2

Comments

Services at the St. James's site will be oversubscribed in this scenario. By capping capacity at 10,000 most of the surplus will transfer to the Mater site. Nearly 48% of births at the Mater site will originate south of the Liffey in Wicklow and south Dublin. As can be seen from the map, the Mater catchment runs diagonally from the north-west to the south-east of the Greater Dublin Area. From an access point of view this is quite inefficient, particularly given the notional barrier that the Liffey presents. As such, capping capacity at St. James's may be difficult to enforce in practice. The Beaumont site serves an almost exclusively north Dublin catchment while the St. James's site draws mainly from south-west Dublin and Kildare.

Other than at the 30 minute catchment, this scenario does not offer any advantages over the existing locations.

Approximate primary catchments for scenario 4 configuration



K9: Scenario 5 – Mater, Tallaght & St. James's

In this scenario the National Maternity Hospital and the Coombe are relocated to the Tallaght and St. James's sites, respectively. As the St. James's site is between the other two sites its catchment is greatly reduced.

2006

Births at each site in 2006

Site	Births
Mater	9,006
Tallaght Hospital	7,948
St. James's Hospital	6,344

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Mater	Tallaght	St. James's	Total
< 30	33.8	42.4	42.5	39.1
< 60	90.3	77.2	89.9	85.7
< 90	97.3	93.9	97.6	96.2
<120	99.6	99.0	99.4	99.3

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Mater	Tallaght	St. James's	Total
< 30	6.3	2.2	10.9	6.2
< 60	46.9	14.8	36.1	33.0
< 90	88.4	32.9	78.0	66.6
<120	94.9	59.2	97.0	83.3

Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Mater	Tallaght	St. James's	Total
< 30	20.2	29.3	24.2	24.4
< 60	88.5	72.9	89.1	83.4
< 90	96.6	92.6	97.3	95.4
<120	99.6	97.6	99.4	98.8

2016

Births at each site in 2016

Site	Births
Mater	9,348
Tallaght Hospital	8,340
St. James's Hospital	6,560

Cumulative percentage 2016 births within travel times by private car

Time band (minutes)	Mater	Tallaght	St. James's	Total
< 30	33.0	42.2	41.8	38.5
< 60	90.1	77.3	89.7	85.6
< 90	97.3	94.0	97.7	96.3
<120	99.6	99.0	99.4	99.3

Cumulative percentage 2016 births within travel times by mixed public/private transport

Time band (minutes)	Mater	Tallaght	St. James's	Total
< 30	19.9	29.2	23.8	24.1
< 60	88.3	72.9	89.0	83.2
< 90	96.6	92.8	97.3	95.5
<120	99.5	97.6	99.4	98.8

2026

Births at each site in 2026

Site	Births
Mater	8,909
Tallaght Hospital	8,324
St. James's Hospital	5,079

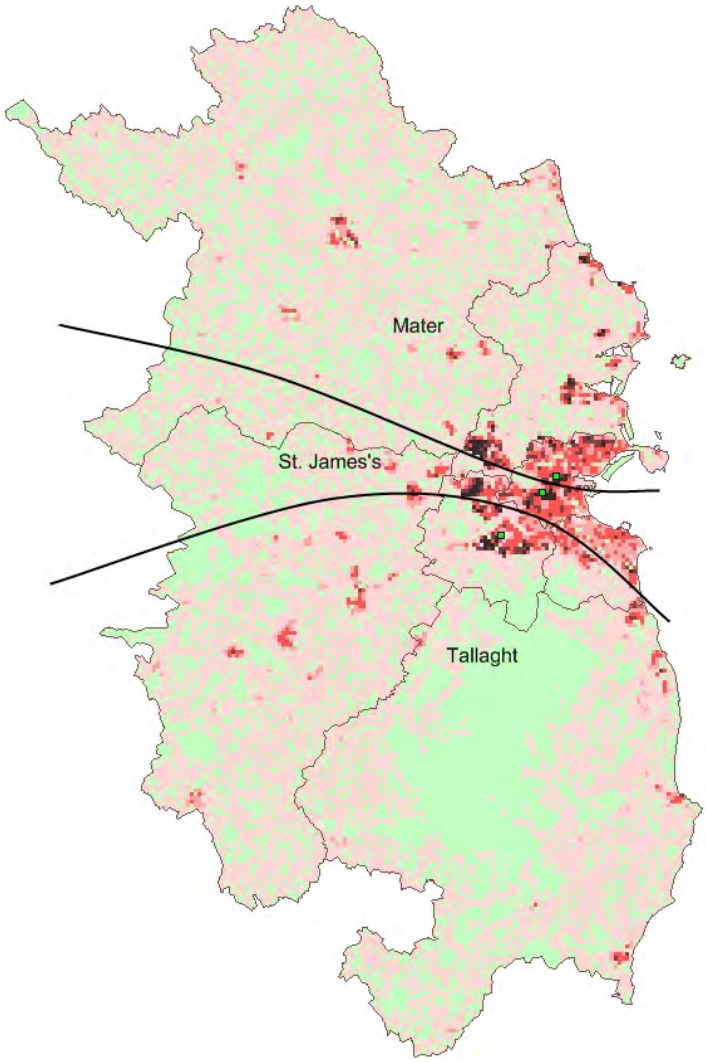
Cumulative percentage 2026 births within travel times by private car

Time band (minutes)	Mater	Tallaght	St. James's	Total
< 30	30.6	40.8	42.4	37.1
< 60	89.5	77.0	89.6	84.9
< 90	97.2	94.1	97.7	96.2
<120	99.6	99.0	99.4	99.3

Comments

Geographically this configuration places all three maternity hospitals along the main corridor from south-west Kildare to Dublin city centre. By placing services between Tallaght and the Mater at the St. James's site, there is poor demand at the St. James's location. The majority of Kildare and Wicklow patients will travel to Tallaght along with 45% of south Dublin patients. The Mater site will draw most of its patients from north Dublin. Most of the St. James's patients will come from south Dublin but the general overlap with the Tallaght catchment make this scenario an inefficient configuration of services. However, in terms of access this scenario offers a good improvement on the existing distribution of services.

Approximate primary catchments for scenario 5 configuration



K10: Scenario 6 – Mater, Beaumont & Tallaght

The National Maternity Hospital is relocated to the Beaumont site and the Coombe is relocated to the Tallaght site. As before, the catchment of the Beaumont site is restricted due to it's proximity to the Mater site so it primarily draws patients from north County Dublin.

2006

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	7,921	8,591
Beaumont Hospital	4,663	4,763
Tallaght Hospital	10,715	9,945

Cumulative percentage 2006 births within travel times by private car

Time band (minutes)	Mater	Beaumont	Tallaght	Total
< 30	37.3	48.0	45.1	42.8
< 60	87.6	95.7	79.1	85.6
< 90	96.7	99.3	94.7	96.4
<120	99.4	99.9	99.1	99.4

Cumulative percentage 2006 births within travel times by public transport

Time band (minutes)	Mater	Beaumont	Tallaght	Total
< 30	9.9	2.7	2.8	5.2
< 60	52.2	22.8	14.5	29.0
< 90	88.5	51.5	34.1	56.1
<120	95.8	87.9	62.1	78.7

Cumulative percentage 2006 births within travel times by mixed public/private transport

Time band (minutes)	Mater	Beaumont	Tallaght	Total
< 30	25.4	26.6	26.5	26.1
< 60	87.1	93.4	75.9	83.2
< 90	96.3	98.8	93.7	95.6
<120	99.5	99.9	98.0	98.9

2016

Births at each site in 2006

Site	Births	
	Uncapped	Capped
Mater	8,224	9,346
Beaumont Hospital	4,821	4,984
Tallaght Hospital	11,204	9,919

Cumulative percentage 2016 births within travel times by private car

Time band (minutes)	Mater	Beaumont	Tallaght	Total
< 30	35.4	46.7	45.4	41.8
< 60	86.9	95.6	78.8	85.4
< 90	96.5	99.3	94.6	96.3
<120	99.4	99.9	99.1	99.4

Cumulative percentage 2016 births within travel times by mixed public/private transport

Time band (minutes)	Mater	Beaumont	Tallaght	Total
< 30	24.0	24.2	25.8	24.9
< 60	86.2	93.1	74.9	82.2
< 90	96.1	98.7	93.8	95.5
<120	99.5	99.9	97.9	98.8

2026

Births at each site in 2026

Site	Births
Mater	8,068
Beaumont Hospital	4,389
Tallaght Hospital	9,872

Cumulative percentage 2026 births within travel times by private car

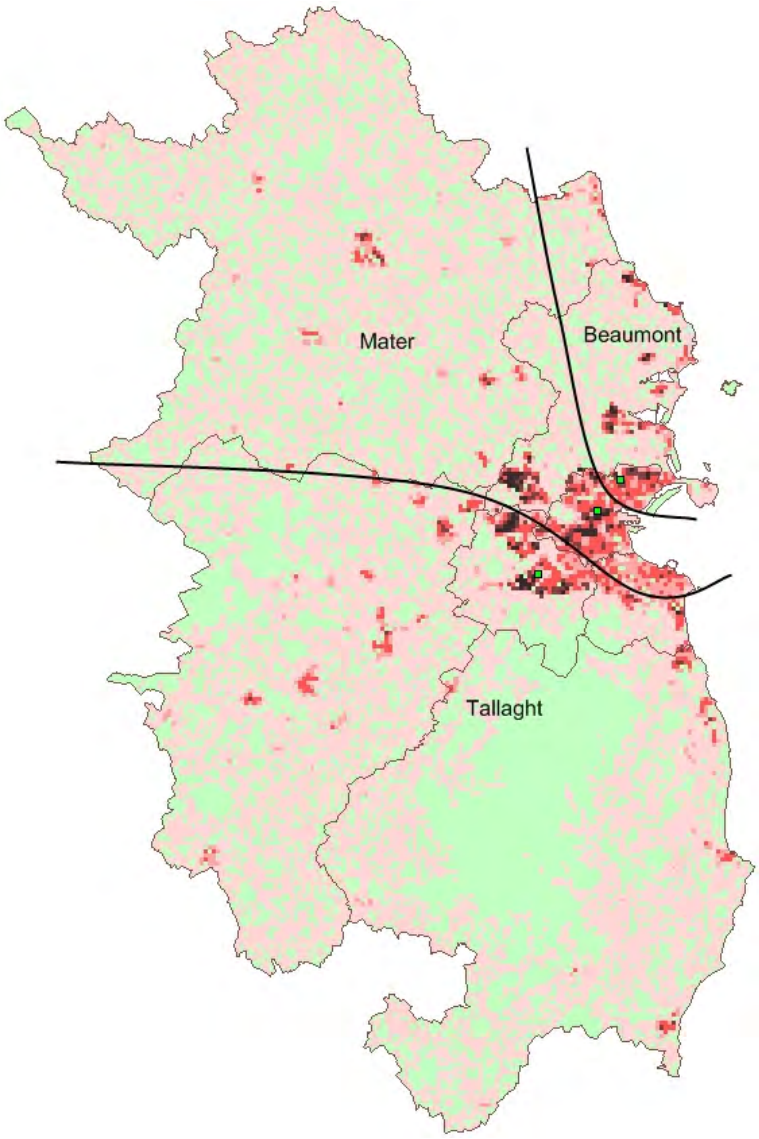
Time band (minutes)	Mater	Beaumont	Tallaght	Total
< 30	34.6	44.6	43.1	40.3
< 60	86.8	95.4	78.5	84.8
< 90	96.6	99.3	94.7	96.3
<120	99.4	99.9	99.1	99.4

Comments

Due to two services being based north of the Liffey, the Mater draws over a third of its patients from south of the Liffey. Most Kildare and Wicklow patients travel to Tallaght. As in previous scenarios, the Beaumont site draws almost exclusively from north Dublin. Based on 2006 and 2016 populations the Tallaght site will be oversubscribed. As there is no alternative on the south-side it will mean many of the diverted patients will have to cross to the Mater site.

This scenario results in the best access although it is only marginally better than scenarios 2 and 5 in that respect.

Approximate primary catchments for scenario 6 configuration



K11: Extreme population projections

The population projections used in the previous analyses are based on the median projection at each point in time. It is also pertinent to examine the impact of the extreme high and low projections on the numbers likely to attend each location. The following tables are based on capacity being capped at a maximum 10,000 births and minimum 4,000 births per annum.

High projection

The highest forecast projection for the three time points of interest occurs in 2016. As was stated previously, the peaks in Dublin and the Mid-East are projected to occur in 2014 and 2017, respectively. The highest value predicted for 2016 is 29,974 births. A marginally higher births projection occurs in 2017 but the difference is of the order of 0.5% so the 2016 projection is used for consistency with the previous analyses. The following two tables give the anticipated number of births per site and percentage births within travel times for each scenario (ranked by percentage births within 60 minutes) based on the high projection.

Births at each site for each scenario (high projection)

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	9,978	6,879	9,947
Mater	St Vincent's	Tallaght	9,964	6,854	9,986
Mater	St Vincent's	Beaumont	9,995	9,913	6,897
Mater	Beaumont	St James's	9,964	6,841	9,999
Mater	Tallaght	St James's	9,990	9,287	7,528
Mater	Beaumont	Tallaght	9,928	6,884	9,993

Percentage births within each travel time band for each scenario (high projection)

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Tallaght	St James's	39.1	85.8	96.3	99.3
Mater	St Vincent's	Tallaght	40.3	85.5	96.3	99.2
Mater	Beaumont	Tallaght	41.3	85.0	96.2	99.3
Mater	St Vincent's	St James's	30.8	83.1	95.3	98.9
Mater	St Vincent's	Beaumont	29.6	82.7	93.5	98.7
Mater	Beaumont	St James's	31.4	81.7	94.4	98.3

All of the scenarios result in one site experiencing demand for more than 10,000 births with the surplus having to be redirected to the two other hospitals. Scenarios involving Beaumont hospital result in the single south-side hospital having demand for more than 12,000 births.

Note: as a percentage of GDA births are attributed to hospitals outside the GDA and Mount Carmel, only 26,804 of the 29,974 GDA births will occur in the proposed three Dublin maternity hospitals. In a worst case scenario with all 29,974 births going to the three maternity hospitals and a cap of 10,000 births per site it is clear that each site would have to accommodate close to the maximum 10,000 births in a year.

Low projection

The lowest population projection occurs in 2026 when only 21,588 births are expected. The 2026 projections are based on a linear extrapolation from 2021. The following two tables give the anticipated number of births per site and percentage population within travel times for each scenario based on the low projection.

Births at each site for each scenario (low projection)

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	6,916	4,309	7,734
Mater	St Vincent's	Tallaght	7,454	4,207	7,298
Mater	St Vincent's	Beaumont	8,901	6,023	4,035
Mater	Beaumont	St James's	5,935	4,040	8,985
Mater	Tallaght	St James's	7,145	6,843	4,971
Mater	Beaumont	Tallaght	5,944	4,075	8,940

Percentage births within each travel time band for each scenario (low projection)

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Beaumont	Tallaght	39.0	84.8	96.4	99.4
Mater	St Vincent's	Tallaght	36.4	84.5	96.3	99.2
Mater	Tallaght	St James's	35.1	84.4	96.2	99.3
Mater	St Vincent's	St James's	26.0	81.4	95.4	98.9
Mater	St Vincent's	Beaumont	25.2	80.7	93.2	98.7
Mater	Beaumont	St James's	27.4	80.3	94.6	98.3

The demand for maternity services at the Beaumont site is below 4,000 births under the low births projection. Capping maximum capacity is more readily achievable than minimum capacity as it requires redirecting patients from hospitals that are not over-burdened.

K12: Potential outreach clinics

This is a brief assessment of potential outreach clinics based at each of the five co-located sites assessed previously along with a number of additional sites. The nine sites under consideration are:

- Beaumont
- James Connolly Memorial Hospital
- Mater
- Naas
- St. Columcille's (Loughlinstown)
- St. James's
- St. Michael's (Dun Laoghaire)
- St. Vincent's
- Tallaght

The analysis is based on all sites having an outreach clinic. Patient travel is based on private car travel only. It is assumed that each site is equally attractive although in reality it is probable that the three maternity hospital sites will attract more patients than the stand-alone outreach clinics.

Patients at each potential outreach clinic

Site	Births		
	2006	2016	2026
Beaumont	3,476	3,586	3,158
James Connolly	3,980	4,247	4,169
Mater	2,653	2,720	2,384
Naas	2,104	2,208	2,160
St. Columcille's	2,265	2,364	2,235
St. James's	2,524	2,568	2,238
St. Michael's	766	778	660
St. Vincent's	1,272	1,302	1,149
Tallaght	3,445	3,625	3,394

It is evident from the above table that the St. Michael's site in Dun Laoghaire has a small catchment due to its position between Loughlinstown (which will draw many of the Wicklow patients) and St. Vincent's (which will take a portion of the south inner city patients). Again it must be stressed that numbers of births in Dun Laoghaire – Rathdown are relatively low.

A proper analysis of potential outreach clinic sites would require a decision on the locations of the three maternity hospitals. On foot of such a decision it would be possible to use a sensitivity analysis to test the impact of varying preference for maternity hospital sites over stand-alone clinics. Furthermore, an assessment of public transport access would be pertinent given the non-

emergency nature of visits to an outreach clinic. In a situation where not all nine sites are used, it is not advisable to select locations by merely ranking based on catchment size and excluding the smallest sites. A proper analysis of different site selections is required to give a clearer indication of the impact of excluding one or more sites.

K13: Discussion & comments

Comparing scenarios: 2006

The following table summarises the number of births at each site for each scenario.

Births at each site for each scenario (2006)

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	8,499	5,504	9,296
Mater	St Vincent's	Tallaght	9,304	5,500	8,495
Mater	St Vincent's	Beaumont	9,913	8,097	5,290
Mater	Beaumont	St James's	8,842	4,482	9,976
Mater	Tallaght	St James's	9,006	7,948	6,344
Mater	Beaumont	Tallaght	8,591	4,763	9,945
Rotunda	*Holles St*	*Coombe*	*7,325*	*8,078*	*8,088*

In the following table, each scenario has been ranked by the percentage population within 1 hour.

Percentage births by private travel time band for each scenario (2006)

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Beaumont	Tallaght	43.3	85.9	96.5	99.4
Mater	St Vincent's	Tallaght	40.6	85.7	96.3	99.2
Mater	Tallaght	St James's	39.1	85.7	96.2	99.3
Mater	St Vincent's	St James's	30.9	83.3	95.4	98.9
Mater	St Vincent's	Beaumont	29.8	82.7	93.4	98.7
Mater	Beaumont	St James's	32.4	82.3	94.6	98.4
Rotunda	*Holles St*	*Coombe*	*26.3*	*82.6*	*94.0*	*98.4*

Comparing scenarios: 2016

The following table summarises the number of births at each site for each scenario.

Births at each site for each scenario (2016)

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	8,856	5,689	9,704
Mater	St Vincent's	Tallaght	9,670	5,663	8,916
Mater	St Vincent's	Beaumont	9,948	8,571	5,731
Mater	Beaumont	St James's	9,556	4,695	9,998
Mater	Tallaght	St James's	9,348	8,340	6,560
Mater	Beaumont	Tallaght	9,346	4,984	9,919

In the following table, each scenario has been ranked by the percentage population within 1 hour.

Percentage births by private travel time band for each scenario (2016)

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Beaumont	Tallaght	42.8	85.9	96.5	99.4
Mater	St Vincent's	Tallaght	40.0	85.6	96.4	99.2
Mater	Tallaght	St James's	38.5	85.6	96.3	99.3
Mater	St Vincent's	St James's	30.2	83.1	95.4	98.9
Mater	St Vincent's	Beaumont	29.1	82.5	93.5	98.7
Mater	Beaumont	St James's	31.6	82.1	94.7	98.4

Comparing scenarios: 2026

The following table summarises the number of births at each site for each scenario.

Births at each site for each scenario (2026)

Site 1	Site 2	Site 3	Births		
			Site 1	Site 2	Site 3
Mater	St Vincent's	St James's	8,128	5,169	9,032
Mater	St Vincent's	Tallaght	8,818	5,095	8,416
Mater	St Vincent's	Beaumont	9,933	7,508	4,888
Mater	Beaumont	St James's	8,286	4,110	9,934
Mater	Tallaght	St James's	8,909	8,342	5,079
Mater	Beaumont	Tallaght	8,068	4,389	9,872

In the following table, each scenario has been ranked by the percentage population within 1 hour.

Percentage births by private travel time band for each scenario (2026)

Site 1	Site 2	Site 3	% population within travel time			
			<30	<60	<90	<120
Mater	Tallaght	St James's	37.1	84.9	96.2	99.3
Mater	St Vincent's	Tallaght	38.0	84.8	96.2	99.2
Mater	Beaumont	Tallaght	40.3	84.8	96.3	99.4
Mater	St Vincent's	St James's	28.0	82.0	95.3	98.9
Mater	St Vincent's	Beaumont	27.0	81.3	93.2	98.7
Mater	Beaumont	St James's	29.3	80.9	94.5	98.3

K14: General comments

Almost 60% of births originate in Kildare, Wicklow and south Dublin. This represents approximately 13,440 births in 2006. Clearly this is too large a number to be accommodated at a single site. The remaining 9,220 births originating in Meath and north Dublin, however, can be accommodated at a single site. As a simple matter of balancing supply and demand it would seem appropriate to place two services in south Dublin and one in north Dublin. As the ratio of north-side to south-side births is unlikely to change significantly in the next 20 years, such a balance of services will still be appropriate in 2026. The balance of demand is evident in that the three scenarios involving two north-side sites lead to one of the sites being oversubscribed. Such a situation is problematic as it requires patients to travel to a second choice site that is also probably further away than the first choice site.

The main areas of population growth in the Greater Dublin area are along the main N7/M7 corridor through Kildare, in various towns in Meath, the north-east coast of Dublin and to a lesser extent along the east coast of Wicklow. The development of a major new hospital in the North-East has to potential to draw more patients from Meath and north Dublin than is currently the case. In that event the catchment for a north-side site will be further reduced.

If is accepted that it is more practical to place two services south of the Liffey then it remains to compare three scenarios:

- Mater/St. Vincent's/St. James's
- Mater/St. Vincent's/Tallaght
- Mater/Tallaght/St. James's

The combination of Mater/St. Vincent's/Tallaght maximises access within 30 minutes and it is identical at 60 minutes to the Mater/Tallaght/St. James's solution. However, while those two solutions are superior at 30 minutes the advantage at 60 minutes is minor. As such these two scenarios cannot be adequately distinguished on grounds of accessibility.

The combination of the Mater with St. Vincent's and either St. James's or Tallaght will result in catchments that most closely mimic the catchments of the existing hospitals. Retention of these catchments would be desirable, particularly if the three new hospitals are not constructed simultaneously. Maintaining a similar service distribution will minimise disruption to patient

travel patterns and will maximise the ability to predict demand at the various stages of transition to the new hospital sites. Thus the combination of Mater with St. James's and Tallaght is not preferable as it will lead to substantially altered catchments.

Finally, comparing scenarios 1 and 2, due to the reliance on private transport it is preferable to minimise the number of patients making trips to the city centre. The combination of the Mater and St. James's sites will bring over 17,500 births to the city centre. While that is an improvement on the existing situation where all births take place in the city centre, the use of the Tallaght site in preference to St. James's would further reduce the number of city centre trips.

The optimal locations for the three co-located maternity hospitals, given that the Mater site is pre-selected, are as follows:

- Mater
- St. Vincent's
- Tallaght

The projected changes in births are relatively small with a gain of just over 1,100 births between 2006 and 2016 and then a drop of just under 2,000 births between 2016 and 2026. It is apparent that even with the shifts in births the relative benefits of the scenarios remain the largely unchanged. Assuming that changes to the road network will not advantage city centre sites, the locations of Mater/St. Vincent's/Tallaght will still be optimal in 2026. Similarly, based on the extreme high and low population projections, the Mater/St. Vincent's/Tallaght scenario offers the best solution for retaining the existing catchments, maximising access and minimising travel to the city centre.