Health and Wellbeing Board

Wednesday, 7 May 2014

Late Report – Item 5
Population Projections

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Population Projections

Health and Wellbeing Board **7 May 2014**

Author: Amanda Castellino

Wards: All

Locality Affected: All

Parishes Affected: All

1. **Purpose and Reasons**

1.1 To provide an overview of the population projections work undertaken by the Strategy & Research Team, including methodology and results, and gain approval from the Board to make the projections available to the Council and its Partners for use in forward planning;

1.2 To gain approval of the Board to make available the attached summary report on the projections to the Council and its Partners (see Appendix One).

2. Recommendations

The Board is recommended to:

2.1 Adopt the projections as the best fit for Swindon until such time as they are updated, subject to final testing of the results against ONS sub-national trend-based projections due to be published at the end of May 2014.

2.2 Promote the projections through publication on the JSNA section of the Council's website.

2.3 The estimates upon which the projections are based are regularly revised. Given that ONS produce a set of trend-based projections at sub-national level every two years the Board is recommended to agree a similar pattern for the production of more locally sensitive policy-based projections for Swindon.

3. Detail

3.1 Population projections form part of the evidence base for the Council's forward planning. They are used for a variety of purposes, most notably to establish future demand for public services, and there are a variety of users within the Council and beyond.

3.2 Population projections are constructed using the internationally recognized customer-cohort method. Estimated trends in births, deaths and migration are applied to a population base by age and gender and continued into the future:

Population + Births – Deaths +/- Migration = Future population

Such projections are known as 'trend-based' and are produced by ONS at national and subnational level every two years.

Further information on the subject of this report can be obtained from Amanda Castellino, 01793 464463, acastellino@swindon.gov.uk

3.3 Trend-based projections are not directly influenced by local policy, for example, they do not take into account a Local Authority's plans for housing or employment growth. Projections that take into account these plans are known as 'policy-led' projections and are undertaken by local authorities and other bodies to provide a more locally sensitive projection.

3.4 Policy-led projections are particularly pertinent in areas where significant housing change is planned. The supply of new housing, or the demolition of existing housing, can have a significant impact on the size and age structure of the population. In Swindon, where an additional 25,000 new homes are planned by 2026, it is relevant that the Authority considers the impact of additional homes on its population.

3.5 The projections presented here are policy-based taking into account the LA's plans in respect of housing growth. Annual housing targets from the Local Plan are input into the model alongside assumptions about future births and deaths having the effect of driving the migration element of the projection.

3.6 In the case of Swindon, the result of inputting housing targets into the projection model results in a higher estimate for 2031 than the 2008 and 2010 trend-based projections from ONS. Although ONS 2008 and 2010 trend-based projections for Swindon used data on migration that has since been revised upwards, it is anticipated that the ONS 2012 trend-based projection, which will use more up to date migration estimates, will be lower than our policy-led projection.

4. Alternative Options

4.1 An alternative to using and promoting this set of policy-led projections would be to use the ONS trend-based sub-national population projections due to be released at the end of April 2014. However, as set out above, these do not take into account Swindon's planned housing growth and could result in an under-estimate of the population by 2031.

4.2 Although ONS trend-based projections need to be considered by the Authority and its Partners, they should be done so alongside projections that take Swindon's housing plans into account.

5. Implications

5.1 Population projections are not predictions and will never be 100% accurate. Proper management and control of the projections can mitigate the risks associated with their use and it is recommended that requests are made to the lead officer who can also advise on their caveats.

Financial and Procurement Implications

5.2 None.

Further information on the subject of this report can be obtained from Amanda Castellino, 01793 464463, acastellino@swindon.gov.uk

Legal and Human Rights Implications

5.3 None.

All other Implications

5.4 None.

6. Consultees

6.1 The projections have been overseen and agreed by a Technical Advisors' Group made up of officers within the Council with specialist knowledge of demographic methods.

6.2 The projections have been presented to and discussed by the JSNA group at their meeting in March.

7. Background Papers

7.1 None

8. Appendices

8.1 Appendix 1: Swindon Borough Council Demographic Projections 2014 (Policy-led)

Further information on the subject of this report can be obtained from Amanda Castellino, 01793 464463, acastellino@swindon.gov.uk

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Appendix 1

Swindon Borough Council Demographic Projections 2014 (Policy-led)

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Swindon Borough Council Population Projections

These projections are at the development stage and remain confidential until such time as they have been through a process of validation within the Council. They should not be used for the purpose of planning or commissioning unless prior authorisation has been obtained from the Head of Strategy & Research at Swindon Borough Council. For information or advice about the projections or methodology used contact Amanda Castellino on 01793 464463 or acastellino@swindon.gov.uk

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Introduction

These projections cover the administrative area of Swindon Borough Council with additional projections for Shrivenham sourced from Oxfordshire County Council[1]. The projections follow the standard cohort-component method, which mirror the ageing of the population over time by applying assumptions about fertility, mortality, and migration (the components of change) to a known population. The components of change are applied as age-specific fertility, mortality and migration rates to a base population to produce our projected population.

The projections use official counts of births, deaths, and migration flows for Swindon Borough Council taken from ONS official statistics from 2001 to 2011, and apply these to the mid-year population of 2001. They are constrained by the revised mid-year population estimates calculated following the Census in 2011, and also Swindon District's housing targets to 2026 from the Local Plan.

Data for the projections is input to Popgroup software together with standard schedules of rates to produce a future population by age and sex[2].

Projections by their very nature can never be 100% accurate as population change is the result of a variety of factors that influence births, deaths and migration not all of which can be accurately predicted. Users should refer to the caveats at the end of this report before using the projections and contact Amanda Castellino if further advice is required.

As it is not feasible to produce new projections each time ONS release new estimates on the components of change, it is intended that this set of projections is valid for a period of two years from 2014 to 2016.

[1] Shrivenham lies outside Swindon Borough Council but within the Swindon Clinical Commissioning Group (CCG) area and had an estimated population of 5,568 in 2011 . The CCG resident population will tend to follow the same ups and downs as SBC so users of the projections should add the Shrivenham totals to the totals for SBC if referring to the Swindon CCG area. The CCG registered population has approximately 5,000 more persons than the CCG resident population so users should refer to the appendix for information on including these additional numbers in projections.

[2] Popgroup was established by Bradford City Council and Andelin Associates with the support of its user group and was further developed by the Cathie Marsh Centre for Census and Survey Research (CCSR) at the University of Manchester. Popgroup is owned by the Local Government Association and supported by Edge Analytics Ltd., and is one of the main software packages used by local authorities to produce locally sensitive sub-national projections.

Methodology and assumptions

The projections were generated from the following data and sources:

Base population

- ONS 2001 mid-year estimate for Swindon.
- ONS Census 2011 revised mid-year estimate.
- ONS 2011 Census revised and back-dated mid-year estimates 2002-2010.

Births

- Annual births 2001-2010 from ONS.
- Total Fertility Rates (TFR)[3] from 2001-2010 calculated from Census 2011 revised mid-year estimates.
- The TFR applied in the projection from 2011 to 2031 is the average of the annual TFRs from 2001 to 2010, i.e.1.91.

Mortality

- Total deaths 2004 - 2010
- Age Specific Mortality Rates (ASMR)[4] from ONS 2010 national projections.
- Projected standardised mortality differential from ONS 2010 national projections.

Migration

- Swindon Age Specific Migration Rate (ASMigR)[5] calculated from revised ONS mid-year population & migration estimates.
- Housing targets from Swindon Local Plan from 2011 drive internal migration flows to 2026.
- Average counts of international migration from ONS 2013 revised estimates for 2001 to 2011 are applied to the projection from 2011 to 2031.
- Average counts of internal migration from ONS revised estimates 2013 are used to project internal migration from 2026.

[3] The Total Fertility Rate measures average family size or average number of children per woman. It is the sum of the single year age-specific fertility rates (per thousand), expressed as a rate per woman.

[4] The Age Specific Mortality Rate measures the incidence of death at each age and is the number of deaths in a calendar year at age * divided by the mid-year population aged *x 1000.

[5] The Age Specific Migration Rate measures the incidence of migration at each age or age group. It is calculated as the number of migrants at age * at the end of the period divided by the end of period population aged *.

Headline figures

1. The population of Swindon by mid-2011 was estimated to be 209,700, an increase of approximately 29,600 persons from 2001 representing a growth rate of 16%, the highest in the South West.

2. These projections estimate that Swindon's population could increase to 240,000 persons by 2021 and 265,400 by 2031, equivalent to growth of approximately 14% from 2011 to 2021, and a further 10% from 2021 to 2031.

3. From 2011 to 2031, births are projected to average 2,900 per year, deaths 1,700 per year, and net migration 1,575 per year.

4. The largest increase in persons is projected to be in the 65 to 74 year age group, a total of 12,900 additional persons by 2031. However, The 85 years and over age group will have the largest growth rate at approximately 136%.

5. By 2031 the population aged 65 and over is projected to grow by 25,900 persons by 2031 and account for 46% of total population growth.

6. The working age population (16-64) is projected to grow by approximately 21,600 persons and account for 39% of total population growth.

7. The population of school-age children aged 5-18 is projected to grow from 34,900 in 2011 to 43,000 in 2031, and overall, the population of children aged 0-18 will grow from 49,100 in 2011 to 58,300 in 2031.

8. Overall, the age structure of the population is projected to change with significantly higher growth in the older age groups than in the younger groups. This will result in an increase in the ratio of children and older people to working age people so that by 2031 for every one person under the age of 16 or aged 65+ there will be 1.5 persons of working age instead of 2 persons of working age in 2011.[6]

[6] Dependency ratio see page 12

Summary figures

	Males	Females	Total
2011	**104,865**	**104,844**	**209,709**
2012	105,625	105,552	211,177
2013	106,158	105,960	212,118
2014	107,254	106,933	214,187
2015	108,658	108,216	216,874
2016	110,401	109,844	220,245
2017	112,490	111,816	224,306
2018	114,476	113,676	228,152
2019	116,481	115,554	232,035
2020	118,554	117,501	236,055
2021	120,586	119,407	239,993
2022	122,314	121,016	243,330
2023	123,851	122,432	246,283
2024	125,193	123,653	248,846
2025	126,317	124,660	250,978
2026	127,633	125,857	253,490
2027	128,930	127,035	255,965
2028	130,203	128,198	258,401
2029	131,449	129,343	260,793
2030	132,676	130,461	263,136
2031	**133,876**	**131,554**	**265,430**

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Swindon age structure

The following tables and charts show how Swindon's population is projected to change by specific age groups. Table 1 and Chart 1 indicate change by 5 year age group, whereas Table 2 and Chart 2 show change by specific age group categories that may be of interest to providers of services. The numbers have not been rounded so may therefore vary slightly from other figures quoted in this document.

For a full breakdown of the projected population by single year and age and sex, or specific years, contact the Head of Strategy and Research at Swindon Borough Council.

Table 1: Projection by 5-year age group and selected years

Age group	2011	2016	2021	2026	2031
0-4	14,162	14,416	15,163	15,447	15,285
5-9	12,269	14,383	15,203	15,574	15,816
10-14	12,394	12,125	14,578	15,155	15,506
15-19	12,541	11,859	11,972	14,092	14,647
20-24	12,776	12,950	13,109	12,466	14,661
25-29	15,083	15,068	16,920	15,852	14,964
30-34	15,249	16,226	17,561	18,696	17,375
35-39	16,169	15,293	17,239	17,974	19,076
40-44	16,838	15,984	15,748	17,302	17,998
45-49	16,469	16,574	16,196	15,667	17,193
50-54	13,983	16,233	16,734	16,105	15,572
55-59	11,667	13,766	16,347	16,628	16,000
60-64	11,040	11,362	13,719	16,074	16,361
65-69	8,617	10,541	11,094	13,269	15,569
70-74	6,679	8,059	10,000	10,529	12,633
75-79	5,626	6,002	7,360	9,164	9,718
80-84	4,324	4,668	5,161	6,383	8,017
85-89	2,642	3,012	3,465	3,922	4,980
90+	1,181	1,727	2,424	3,191	4,059
Total	**209,709**	**220,245**	**239,993**	**253,490**	**265,430**

Chart 1: Projected change by 5 year age group from 2011 to 2031

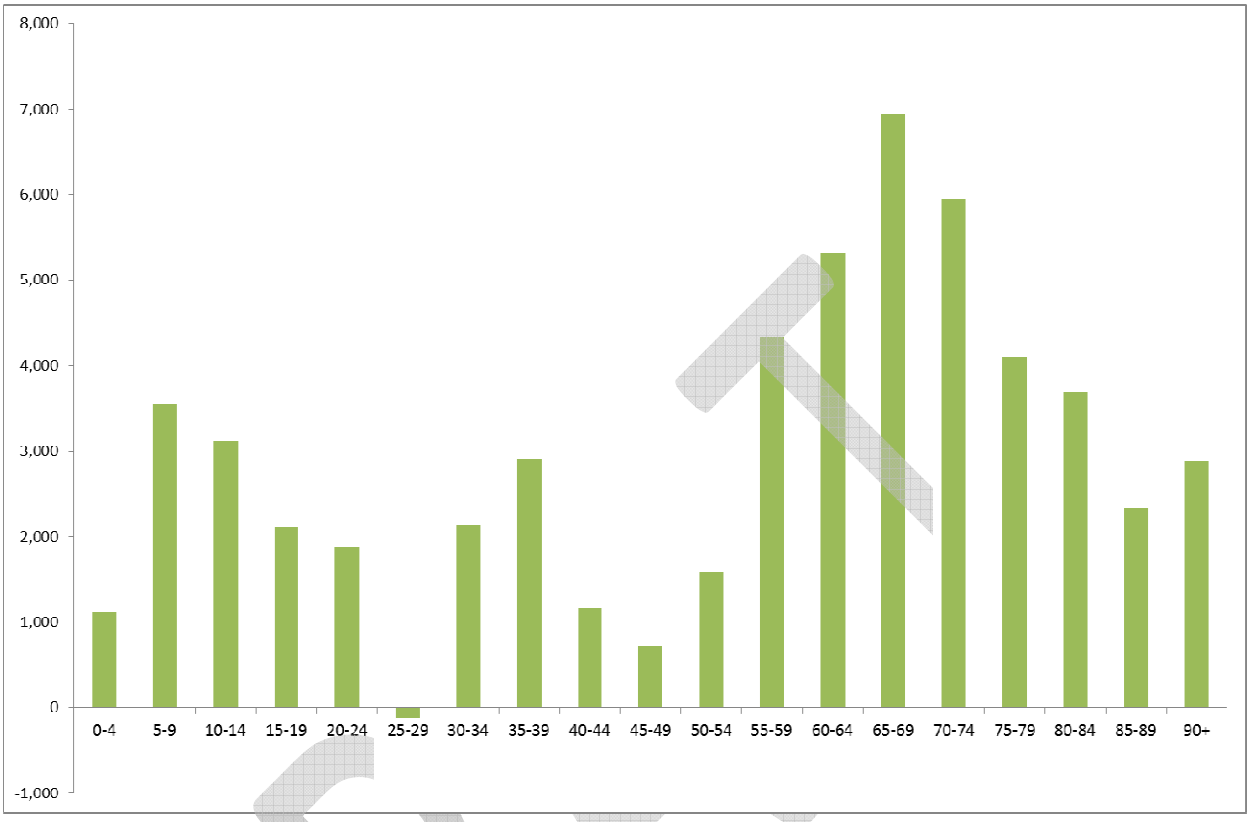

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Table 2: Projections by specific age groups and selected years

Estimated and Forecast Population									
YEAR	0-4	5-10	11-15	16-17	18 – retired*	retired - 74	75-84	85+	Total
2011	14160	14660	12570	5170	128470	20890	9950	3820	209710
2012	14490	14960	12340	5010	128820	21560	10100	3900	211180
2013	14350	15530	11960	4960	128730	22280	10270	4030	212120
2014	14420	15880	11890	4870	129510	22910	10500	4200	214190
2015	14460	16410	11760	4810	130790	23550	10630	4470	216870
2016	14420	17050	11820	4760	132500	24290	10670	4740	220250
2017	14380	17580	12140	4680	134690	24950	10940	4950	224310
2018	14560	17850	12640	4550	136480	25670	11250	5170	228150
2019	14750	17930	13170	4600	138120	26380	11690	5380	232030
2020	14960	18160	13650	4720	139690	27100	12110	5650	236060
2021	15160	18310	14150	4760	141290	27910	12520	5890	239990
2022	15310	18300	14570	5060	142240	28310	13410	6130	243330
2023	15400	18220	15000	5320	142850	29010	14100	6370	246280
2024	15450	18360	15020	5560	143330	29890	14590	6650	248850
2025	15440	18480	15140	5630	143490	30830	15040	6920	250980
2026	15450	18610	15200	5620	144060	31890	15550	7110	253490
2027	15430	18730	15130	5880	144400	33060	15920	7410	255970
2028	15410	18830	15010	6110	144890	33980	16410	7760	258400
2029	15370	18900	15130	5980	145520	34790	16910	8200	260790
2030	15330	18950	15250	5790	146310	35570	17300	8640	263140
2031	15290	18960	15370	5820	146780	36430	17730	9040	265430

*Retired is 60 for women and 65 for men

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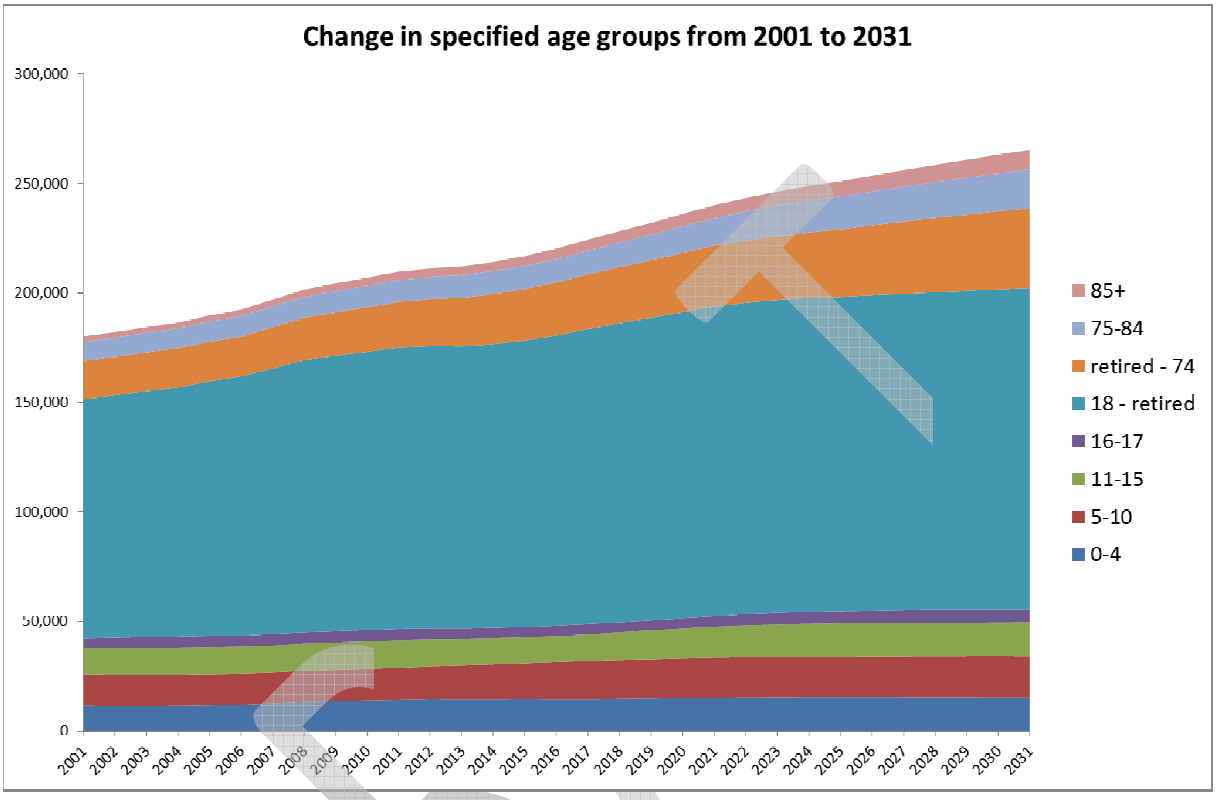
Chart 2: Estimated and projected change by specified age groups from 2001 to 2031



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Summary of components of change

Population change is determined by the balance of births and deaths combined with the effect of migration, and these effects are known as the components of change. The drivers of population change shown below indicate the respective contribution of natural change and net migration to Swindon's population growth from 2001 to 2031 and indicate that the past trend for net migration to make a greater contribution than natural change to Swindon's growth is projected to continue.

In comparison, ONS national 2012 projections indicate that of the 9.6 million projected increase in the UK population over the next 25 years, 57 per cent is natural increase and 43 per cent is net migration.

It should be recognised that migration also plays a part in natural change as migrants settle, have children, and go through the life process, contributing to the projected increase in the proportion of change that is natural change in the last decade of the projection period.

For more detail on the components of change see Appendix Two.

Table 3: Components of population change

10 year period	Natural change		Net migration	
2001-2011	+11,800	40%	+17,700	60%
2011-2021	+12,600	42%	+17,700	58%
2021-2031	+11,600	46%	+13,800	54%

Figures have been rounded to the nearest 100

Dependency ratio

The dependency ratio is a demographic method of explaining the relationship in numbers between those who are economically active and those who are not. It is a rather crude mechanism in that it is based on age and does not take into account the fact that some people between the ages of 16 and 65 may not be economically active, and many people over the age of 65 are not economically inactive. However, despite its limitations it can be an indication of future demand for services and impact on the economy with a high dependency ratio indicating that the economically active population face a greater burden to support and provide the social services needed by children and older persons.

The dependency ratio is worked out with this formula:

Dependency ratio = (% 0-15) + (% 65+) / (% 16 – 64) * 100

The results show that the ratio of the population aged 0 to 16 and over the age of 65, to those aged 16 to 65, will increase from 51.5 in 2011 to 65.5 by 2031.

Put another way, in 2011 for every one person under the age of 16 and over the age of 65 there will be approximately two people aged 16 to 65. However, by 2031 for every one person under the age of 16 and over the age of 65 there will be approximately 1.5 persons aged of 16 to 65.

Table 4: Calculation of dependency ratio

	2011	*%*	*2031*	*%*
0-15	41,400	20	49,600	19
16-65	139,200	66	160,800	61
65+	29,100	14	55,000	21
Total	209,700	100	265,400	100
Dependency ratio	***51.5***		***65.5***	

Figures have been rounded to nearest 100

Uncertainty in the projections

Population projections by their very nature are uncertain and it is important that planners take this into account when planning services, especially when looking at the longer term. Because of their inherent uncertainty it is not common practice to publish statistical measures of uncertainty around projections, although demographers sometimes vary the underlying assumptions upon which their projections are based and publish these.

It is worth noting that the projections are based upon ONS estimates of the components of change (births, deaths, and migration), and levels of uncertainty have been developed for these as part of their Uncertainty Project as part of their wider Migration Statistics Improvement Programme.

The following table by ONS indicates the range of uncertainty associated with the mid-year population estimates for Swindon and the contribution made by those components considered to have the most uncertainty associated with them.

In general births and deaths data are considered to have the most certainty associated with them and migration and the base population have the least.

Table 5: Range of uncertainty in the mid-year estimates

	Uncertainty measure (% population)	**% contribution**			**Uncertainty range**		**Mid-year estimate**
		2001 Census	International migration	Internal migration	Lower bound	Upper bound	
2002	0.67	77	20	3	178,800	183,600	181,447
2003	0.90	47	49	3	179,300	185,800	183,020
2004	1.11	32	65	3	179,800	187,800	184,419
2005	1.20	28	68	4	181,900	190,700	186,922
2006	1.28	24	72	4	183,700	193,200	188,998
2007	1.33	21	75	4	187,100	197,100	192,466
2008	1.36	19	76	5	190,500	201,000	196,046
2009	1.43	18	78	5	192,900	204,100	198,792
2010	1.49	16	79	5	195,500	207,200	201,757

Source: ONS Statistical measure of uncertainty for local authority mid-year population estimates from 2002 to 2010 for England and Wales

Comparison with ONS projections

This table shows the comparison between our policy-based projection and the trend-based projection for Swindon by ONS.

Our projection is most similar to the ONS 2011-based interim projection to 2021 but by 2031 varies significantly from the last sub-national projection in 2010 from ONS. This is likely to be the result of the lower population estimate in 2011 from the 2010 ONS projection.

The ONS 2011 interim projections were released to take into account the results from the Census 2011, however, as they apply rates calculated from population estimates rolled forward from the 2001 Census, which under estimated the population, the applied rates in the projection could be too high. For this reason ONS limited the projection to 10 years.

ONS sub-national projections do not take into account Swindon's planned housing growth. Swindon's housing growth has the effect of increasing net migration from the years from 2011 to 2026, after which it falls back to pre-2011 levels.

Table 6: Comparison of projections

	2011	*2016*	*2021*	*2026*	*2031*
SBC policy-based	209,700	220,200	240,000	253,500	265,400
ONS 2008 trend-based	204,200	218,000	231,400	243,700	254,800
ONS 2010 trend-based	203,000	217,000	229,000	240,000	249,000
ONS 2011 Interim	209,700	225,300	239,500	n/avail	n/avail
Shrivenham	5,600	5,500	5,400	5,300	n/avail

Figures have been rounded to nearest 100

Projections for Shrivenham

Shrivenham lies outside the boundaries of Swindon Unitary Authority but is within the Swindon Health Authority area, served by the Clinical Commissioning Group, or CCG.

The following data is taken from a projection produced for Oxfordshire County Council by John Hollis in 2012. It is based upon the cohort-component methodology and includes actual and planned housing development by ward.

The figures for Shrivenham project a total decline of -5.1% in the total population from 2011 to 2026 with negative growth in the 0 to 24, 35 to 54, and 65 to 69 age groups. Positive growth is projected in the age groups from 25 to 34, 55 to 64, and 70 to 85+.

Table 7: Count of Persons resident in Shrivenham ward from the Oxfordshire County Council Projections Model

	2011	2016	2021	2026	% Change 2011 to 2026
0-4	538	521	471	444	-17.5
5-9	462	460	440	404	-12.6
10-14	393	386	387	374	-4.8
15-19	406	401	387	391	-3.7
20-24	388	400	374	363	-6.4
25-29	175	196	203	179	2.3
30-34	279	278	295	299	7.2
35-39	444	384	401	419	-5.6
40-44	546	417	369	386	-29.3
45-49	457	449	349	304	-33.5
50-54	314	382	370	284	-9.6
55-59	214	257	312	298	39.3
60-64	268	209	251	304	13.4
65-69	253	255	201	244	-3.6
70-74	172	225	228	177	2.9
75-79	102	134	181	185	81.4
80-84	72	63	84	118	63.9
85+	84	87	90	109	29.8
Total	5,568	5,505	5,391	5,283	-5.1

Source: Oxfordshire County Council

The projections take into account the fact that no new housing is planned for Shrivenham over the projection period, which is likely to have an effect on net migration, especially among the age groups most likely to be in need of family sized housing. A lack of family housing will also impact on the birth rate as new households in need of family accommodation move out to areas where it is available and affordable.

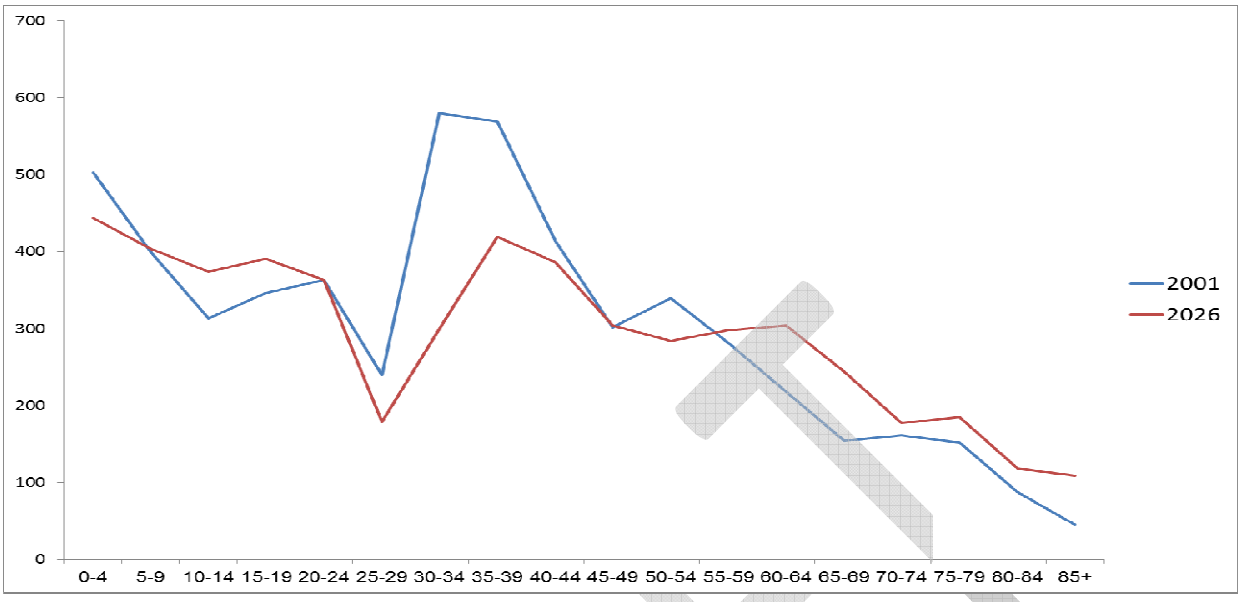
For further information about the CCG population see Appendix One.

Table 8: Combined SBC and Shrivenham projections for 2011, 2021, 2026, and 2031

	2011	2021	2026	2031
0-4	14,700	15,634	15,891	15,729
5-9	12,731	15,643	15,978	16,220
10-14	12,787	14,965	15,529	15,880
15-19	12,947	12,359	14,483	15,038
20-24	13,164	13,483	12,829	15,024
25-29	15,258	17,123	16,031	15,143
30-34	15,528	17,856	18,995	17,674
35-39	16,613	17,640	18,393	19,495
40-44	17,384	16,117	17,688	18,384
45-49	16,926	16,545	15,971	17,497
50-54	14,297	17,104	16,389	15,856
55-59	11,881	16,659	16,926	16,298
60-64	11,308	13,970	16,378	16,665
65-69	8,870	11,295	13,513	15,813
70-74	6,851	10,228	10,706	12,810
75-79	5,728	7,541	9,349	9,903
80-84	4,396	5,245	6,501	8,135
85+	3,907	5,979	7,222	9,148
Total	215,277	245,384	258,773	270,713

2031 = Shrivenham population 2026 + SBC population 2031

Chart 3: Shrivenham change 2001 - 2026



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Caveats for users

1. The annual population figures referred to in this report relate to the mid-year period as at 30th June each year. Users may notice a difference between the mid-year figure for 2011 quoted in this report, and the Census estimate for 2011, which refers to the population on Census day, 27th March 2011.

2. Projections are inherently uncertain and become more so the further they are carried forward in time. Confidence intervals around projections by ONS are not published although variant projections applying different assumptions are. To avoid confusion about which figures to use we have not published variant projections for Swindon and have limited the projection to 20 years from 2011. Although confidence intervals for projections are not published, ONS has published confidence intervals for their estimates of the components of change (see main body of report).

3. The projections use the average trends in births, deaths and migration from 2001 to 2011, which have the effect of reducing annual fluctuations and short-term trends for the period from 2011 to 2031 for births and deaths, and the period after 2026 for migration.

4. The Total Fertility Rate (the average number of children per woman) used in the projection is 1.91, which is an average of the rates for Swindon from 2001 to 2011. This rate is lower than the projected rates from ONS 2010 sub-national population projections, and slightly higher than the rates used by ONS in their national projection from 2012, 1.89. The change to the use of this average from 2012 could result in an underestimate of births in the first few years of the projection as it is somewhat lower than the estimated TFR for Swindon in 2010 and 2011, 2.07 and 2.05.

5. The Age Specific Migration Rates (ASMigR) for Swindon have been calculated from the Census 2011 revised mid-year estimates and migration counts by age and sex estimated by ONS prior to their Census revised sub-national migration figures published in 2013. As the counts used to calculate the ASMigR for Swindon are lower than the latest ONS migration estimates the applied rates are likely to be lower than the latest estimates suggest. However, this should not affect the projection totals as housing targets are driving net UK migration into Swindon, and an average of net international migration from the latest ONS migration estimates is driving international migration.

6. Figures produced by the projection should be rounded to the nearest 100 as unrounded figures suggest a high degree of accuracy that is not present in projections.

7. Those requiring a full set of projections by single year of age and sex, or of specific age groups or years not provided here, or commissioners of services requiring short-term projections of less than 5 years, should contact Amanda Castellino to discuss their requirements.

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Appendix One

Projected annual births and deaths

Births

	Male	Female	Total
2011	1,510	1,480	2,990
2012	1,431	1,350	2,781
2013	1,421	1,340	2,761
2014	1,424	1,344	2,768
2015	1,435	1,354	2,789
2016	1,453	1,371	2,825
2017	1,479	1,395	2,874
2018	1,500	1,415	2,914
2019	1,518	1,432	2,950
2020	1,536	1,449	2,985
2021	1,552	1,464	3,016
2022	1,559	1,471	3,030
2023	1,562	1,473	3,035
2024	1,559	1,471	3,030
2025	1,551	1,463	3,015
2026	1,548	1,461	3,009
2027	1,545	1,457	3,002
2028	1,540	1,453	2,994
2029	1,536	1,449	2,984
2031	1,531	1,444	2,975

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Deaths

	Male	Female	Total
2011	775	830	1,605
2012	777	763	1,540
2013	784	766	1,550
2014	794	771	1,565
2015	804	775	1,579
2016	815	780	1,595
2017	829	787	1,616
2018	842	795	1,637
2019	858	804	1,662
2020	874	814	1,688
2021	890	825	1,715
2022	905	836	1,741
2023	922	846	1,768
2024	939	857	1,796
2025	955	870	1,825
2026	974	882	1,856
2027	993	897	1,890
2028	1,012	912	1,924
2029	1,033	931	1,964
2030	1,054	950	2,004

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Appendix Two

Projected annual components of change

	Natural change	Net migration	Net change
2011	+1,385	+83	+1,468
2012	+1,241	-299	+942
2013	+1,211	+858	+2,069
2014	+1,204	+1,483	+2,687
2015	+1,211	+2,161	+3,371
2016	+1,230	+2,831	+4,061
2017	+1,258	+2,588	+3,847
2018	+1,277	+2,606	+3,883
2019	+1,288	+2,732	+4,020
2020	+1,297	+2,641	+3,938
2021	+1,300	+2,036	+3,337
2022	+1,289	+1,665	+2,954
2023	+1,267	+1,295	+2,562
2024	+1,234	+898	+2,132
2025	+1,189	+1,323	+2,512
2026	+1,153	+1,323	+2,476
2027	+1,112	+1,323	+2,435
2028	+1,069	+1,323	+2,392
2029	+1,020	+1,323	+2,343
2030	+971	+1,323	+2,294

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Appendix Three

Projected annual households and dwellings

	Number of Households	Change over previous year	Number of dwellings	Change over previous year
2011	88,600	+1,290	91,340	+1,330
2012	89,411	+811	92,176	+836
2013	90,122	+711	92,909	+733
2014	91,187	+1,065	94,007	+1,098
2015	92,459	+1,272	95,318	+1,311
2016	93,923	+1,465	96,828	+1,510
2017	95,688	+1,764	98,647	+1,819
2018	97,451	+1,763	100,465	+1,818
2019	99,278	+1,827	102,348	+1,883
2020	101,125	+1,847	104,252	+1,904
2021	102,908	+1,783	106,090	+1,838
2022	104,618	+1,710	107,853	+1,763
2023	106,164	+1,546	109,447	+1,594
2024	107,499	+1,335	110,823	+1,376
2025	108,625	+1,126	111,984	+1,161
2026	109,883	+1,258	113,282	+1,297
2027	111,084	+1,201	114,520	+1,238
2028	112,360	+1,275	115,835	+1,315
2029	113,622	+1,263	117,136	+1,302
2030	114,870	+1,248	118,423	+1,287
2031	116,177	+1,307	119,771	+1,348

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Appendix Four

Methods of calculating the projected Swindon CCG Registered Population
(Chris Bartlett)

1. Context

The population of Swindon can be counted in three different ways. These are as follows:

- Swindon Unitary Authority (UA, Swindon Borough Council) resident population
- Swindon Clinical Commissioning Group (CCG) *resident* population (people living within the SBC boundaries or within the electoral ward of Shrivenham, Oxfordshire)
- Swindon CCG *registered* population (people registered with a Swindon CCG GP, some of whom may live outside the CCG boundaries)

The population figures, according to the three different methods, are as follows for mid-2011:

- Swindon UA resident population totalled 209,709 people at mid-2011 (ONS)
- Swindon CCG *resident* population totalled 214,903 in mid-2011 (ONS)
- Swindon CCG *registered* population totalled 220,082 in mid-2011 (reaching 223,863 in March 2013) (Open Exeter)

The CCG *registered* population may therefore be about 10,000 greater than the population of SBC. About 5,000 of these 10,000 people are resident in the ward of Shrivenham and most of the remainder live in the counties of Wiltshire and Gloucestershire.

2. Forecasting Issues

The populations of Swindon UA and of Shrivenham ward are both *resident* populations and so population forecasts have been made for them by Swindon BC and Oxfordshire

County Council using the cohort-component method of population projections. However, it is not clear how the remaining 5,000 people in the Swindon CCG registered population can be subjected to forecasting techniques, as the size of this "Extra" population is more dependent on a lifestyle choice, rather than on rates of births and deaths. This "Extra" population is spread over a number of wards and we have no exact knowledge of who outside the Swindon CCG boundaries is likely to register with a Swindon CCG GP at any point in time and who is likely to de-register at any point in time. This "Extra" constitutes only 2.3% of the *registered* population, but commissioning plans will be more accurate if this group is taken into account in calculations that support CCG plans.

3. Possible Solutions

Here are some possible solutions with their strengths and weaknesses:

(i) Pro Rata the Case-Numbers. If we are planning needs for services to be commissioned by the CCG, we could assume the need in terms of "case-numbers" will change in proportion to the Swindon UA age-sex group changes (as calculated in the SBC demographic projections). This simple solution assumes that the CCG *registered* population will change approximately in proportion to changes in the Swindon UA population. This might be a reasonable approximation for about five years anyway. *This method is not flexible, however, if any complications arise and it has the weakness that it does not produce a projected CCG "Extra" population to refer to.*

(ii) Create CCG Reg Projections using Population Ratios. We could generate projections for the CCG *registered* population by using a set of "Population Ratios" to increase or decrease the projected Swindon UA population each year to make it into a CCG *registered* population. The CCG *registered* population is about 4 to 5% greater than Swindon UA population each year. At a more specific level, we have calculated ratios for five year age-groups over the three years 2008 to 2011, and they appear to be relatively stable over the short term.

To refine the method, we have also calculated age-sex specific ratios (CCG *registered* population/Swindon UA population) for 2011 which are shown in the Tables below. This should produce similar results to Solution (i), but has the benefit of generating a projected CCG population to refer to; this would be useful when new services have to be commissioned for which no precedents exist. *This method might only be accurate for about five years, as we do not know what drives changes in the "Extra" part of the CCG registered population.*

(iii) Count the "Extra" and add it to create CCG Reg Projections. This solution is based on the notion that people in the "Extra" group are there, purely due to a lifestyle choice. This involves calculating the "Extras" of the CCG *registered* population in 2011 (CCG *Registered* minus CCG *Resident*) for age-sex groups. We could then generate the CCG *Registered* population each year by using the Swindon UA forecasts by year and then adding in the Shrivenham ward projections by year and then the "Extra" as (a stable set of figures calculated in 2011) each year. *This assumes the "Extra" does not change greatly or age at all. This is not reasonable as the "excess" contains people of all ages, so there is bound to be some ageing..*

(iv) Regression Models. We could do regression models to see how the CCG *registered* population has varied, as the Swindon UA population has changed in the past. This will enable projections to be made for the CCG *registered* population, and for them to be subtle about age variations, e.g. the CCG *registered* population may increase in older age-groups, but not in younger age-groups. The model would also allow for changes in the variation over time. *Regression models would be the most robust option, but would take time to construct. As the "Extra" is not large, a simpler solution may be acceptable.*

4. Conclusion

This leaves Solution (ii) as the most practical option. The tables below show the ratios (according to age and sex) by which the Swindon UA projections should be multiplied

each year to make a projected CCG *registered* population. The ratio approach is not useful for babies in the first year of life, as there appears to be a delay for some in their appearance as registered patients. A full set of calculations relating to the various proposed solutions is available on request.

Table 1

	SUA 2011 Mid-Year	CCG REG 2011 Mid-Year	Ratio CCG REG/SUA
MALES			
All Ages	104,865	110,952	1.06
0	1,495	1,428	0.96
1-4	5,749	6,089	1.06
5-9	6,332	6,702	1.06
10-14	6,255	6,452	1.03
15-19	6,418	6,724	1.05
20-24	6,271	6,641	1.06
25-29	7,451	7,491	1.01
30-34	7,731	8,003	1.04
35-39	8,434	8,766	1.04
40-44	8,699	9,218	1.06
45-49	8,423	9,408	1.12
50-54	7,150	7,899	1.10
55-59	5,863	6,294	1.07
60-64	5,444	5,901	1.08
65-69	4,218	4,508	1.07
70-74	3,182	3,398	1.07
75-79	2,556	2,690	1.05
80-84	1,870	1,965	1.05
85-89	992	1,027	1.04
90+	332	348	1.05

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Table 2

	SUA 2011 Mid-Year	CCG REG 2011 Mid-Year	Ratio CCG REG/SUA
FEMALES			
All Ages	104,844	109,130	1.04
0	1,454	1,368	0.94
1-4	5,464	5,830	1.07
5-9	5,937	6,268	1.06
10-14	6,139	6,361	1.04
15-19	6,123	6,360	1.04
20-24	6,505	6,636	1.02
25-29	7,632	7,894	1.03
30-34	7,518	8,063	1.07
35-39	7,735	8,116	1.05
40-44	8,139	8,595	1.06
45-49	8,046	8,353	1.04
50-54	6,833	7,017	1.03
55-59	5,804	5,932	1.02
60-64	5,596	5,689	1.02
65-69	4,399	4,525	1.03
70-74	3,497	3,663	1.05
75-79	3,070	3,221	1.05
80-84	2,454	2,566	1.05
85-89	1,650	1,775	1.08
90+	849	898	1.06

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