

Technical report: Projection and trajectory for the number of Welsh speakers aged three and over, 2011 to 2050

Contents

Introduction.....	2
Projection.....	2
Methodology.....	2
Projection for two year olds	3
Projection for children aged three and over	3
Limitations	4
Results	5
Trajectory.....	7
Methodology.....	7
Transmission.....	8
Statutory education	8
Welsh for Adults	9
Progression	10
Results	10
Use	13
Workforce	14
Bibliography	15
Contact details	16

Introduction

The Welsh Government's strategy, [Cymraeg 2050: A million Welsh speakers](#), notes the Government's ambition of reaching a million Welsh speakers by 2050. A projection for the number of Welsh speakers aged three and over up to 2050 has been produced as part of the strategy. In addition to this, a trajectory has been developed to demonstrate one possible path of reaching a million Welsh speakers by 2050, based on the policy intentions included in the strategy. This technical report explains how the projection and trajectory are calculated.

Hywel Jones, [Statiath](#), advised the Government in updating the Welsh Language Board's demographic projection with 2011 Census data and quality assured the demographic projection up to 2050. Hywel Jones did not play a part in the development of the trajectory towards a million Welsh speakers. We would like to thank Hywel Jones for his advice and time.

Projection

What is meant by **projection** is the number of Welsh speakers that is predicted if the current patterns and trends regarding the Welsh language and the population continue until 2050.

The projection is an update of the projections developed originally by the Welsh Language Board in their publication [Statistical overview of the Welsh language](#), using 2011 Census data rather than 2001 Census data. There are many ways of developing projections but it was decided to use the same methodology as the Welsh Language Board's projections for consistency.

Methodology

The work of the academic Sankoff (2008) provides the conceptual basis for the projection of the number of Welsh speakers aged three and over. To calculate the projection, the following data are used:

1. the Office for National Statistics's (ONS) mid-year population estimates by age for the period 2011 to 2013
2. the ONS's national population projections by age for the period 2014 to 2050
3. data about the ability of the population to speak Welsh by age from the 2011 Census.

Broadly, the projection assumes that the percentage of Welsh speakers in one age group in one year will be equal to the percentage in the age group a year younger in the previous year (except for children). For example, it is assumed that the percentage of 41 year olds able to speak Welsh in one year is equal to the percentage of 40 year olds speaking Welsh in the previous year. The *numbers* will vary however as demographic factors (births, deaths and migration) affect the size of individual age groups.

The methodology for children is slightly different for two specific reasons.

Projection for two year olds

Data on the population's ability to speak Welsh from the Census is based on the population aged three and over. To project the percentage of three year olds able to speak Welsh, the percentage of two year olds able to speak Welsh in the previous year must be estimated.

To do this, the percentage of three year olds able to speak Welsh in couple households where two or more adults can speak Welsh, and the percentage in lone-parent households where one or more adult can speak Welsh are used for the previous year. The projection also depends on the percentage able to speak Welsh among the generation of child-bearing age and the transmission rate – it is assumed that the appropriate generation of child-bearing age is 20 to 49 year olds.

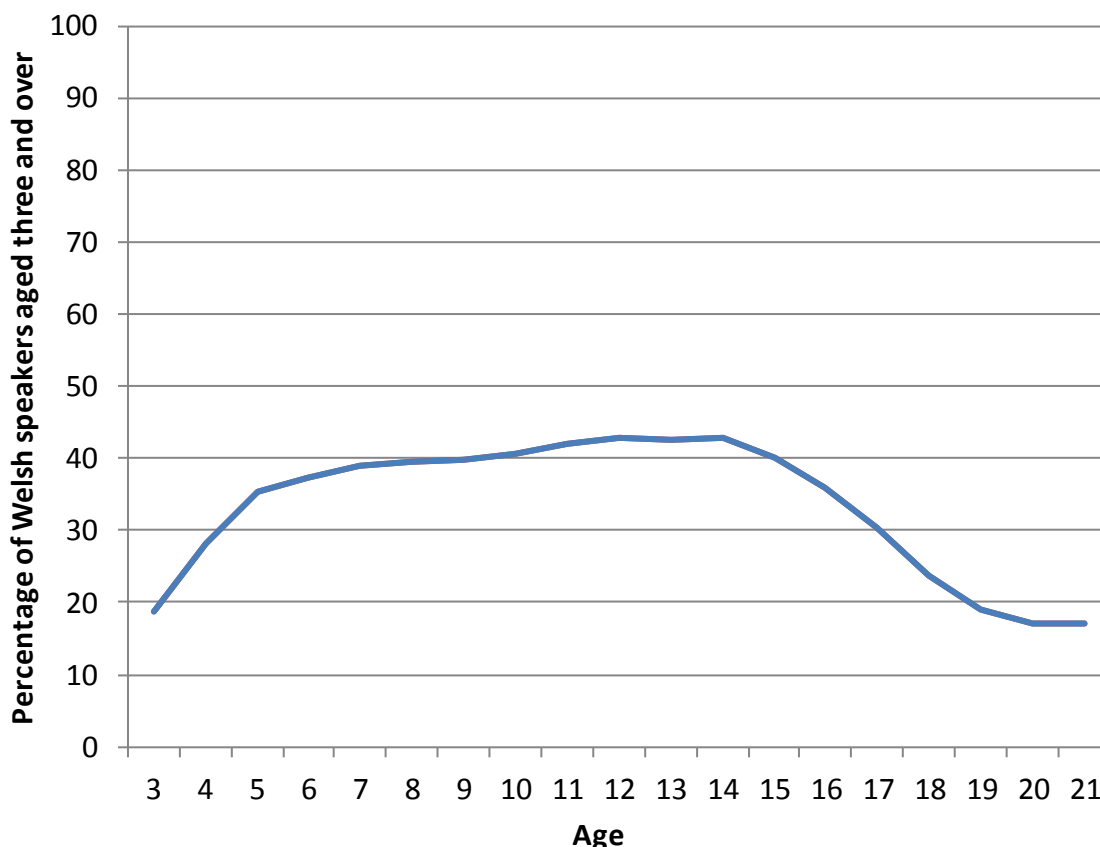
According to the 2011 Census 7.0 per cent of three year olds were able to speak Welsh and lived in either couple households where two or more adults could speak Welsh, or in a lone-parent household where one or more adult could speak Welsh. This is the estimate for the percentage of two year olds in the previous year able to speak Welsh. In the subsequent years, the estimate varies according to the percentage of 20 to 49 year olds able to speak Welsh.

Projection for children aged three and over

Projections for children aged three and over in the model are based on the assumption that education will have the same effect from one age to the next. The assumption is that education will have the same effect from one age to the next as it did in the 2011 Census. For example, 39 per cent of seven year olds were able to speak Welsh compared to 37 per cent of six year olds according to the Census. This increase from one age to the next is reflected in the subsequent age groups in the model. This is done for each age from 3 to 21 year olds.

The chart below shows how the percentage of Welsh speakers varies by age for children and young people aged 3 to 21.

Chart 1: Percentage of Welsh speakers aged 3 to 21, 2011 Census



The percentage of Welsh speakers rises with age, reaching a peak of 43 per cent for 14 year olds, falling thereafter to 17 per cent for 21 year olds. The rise up to the age of 14, and the fall after the age of 14 are reflected in the model.

Limitations

The projections are an attempt to predict the number of Welsh speakers by 2050 to understand approximately how many additional Welsh speakers would be needed to reach the target of a million Welsh speakers.

As is the case for any type of projection, these projections should be treated with care as they are based on a set of assumptions which are based on previous trends – it's likely that these trends will change over time. For example, the birth rate may vary from year to year and this would have a large influence over the early years. The assumptions regarding migration are based on the migration patterns for the latest five years and are likely to change from year to year. The ONS publishes population projections variants to demonstrate the effect of these assumptions on the total population.

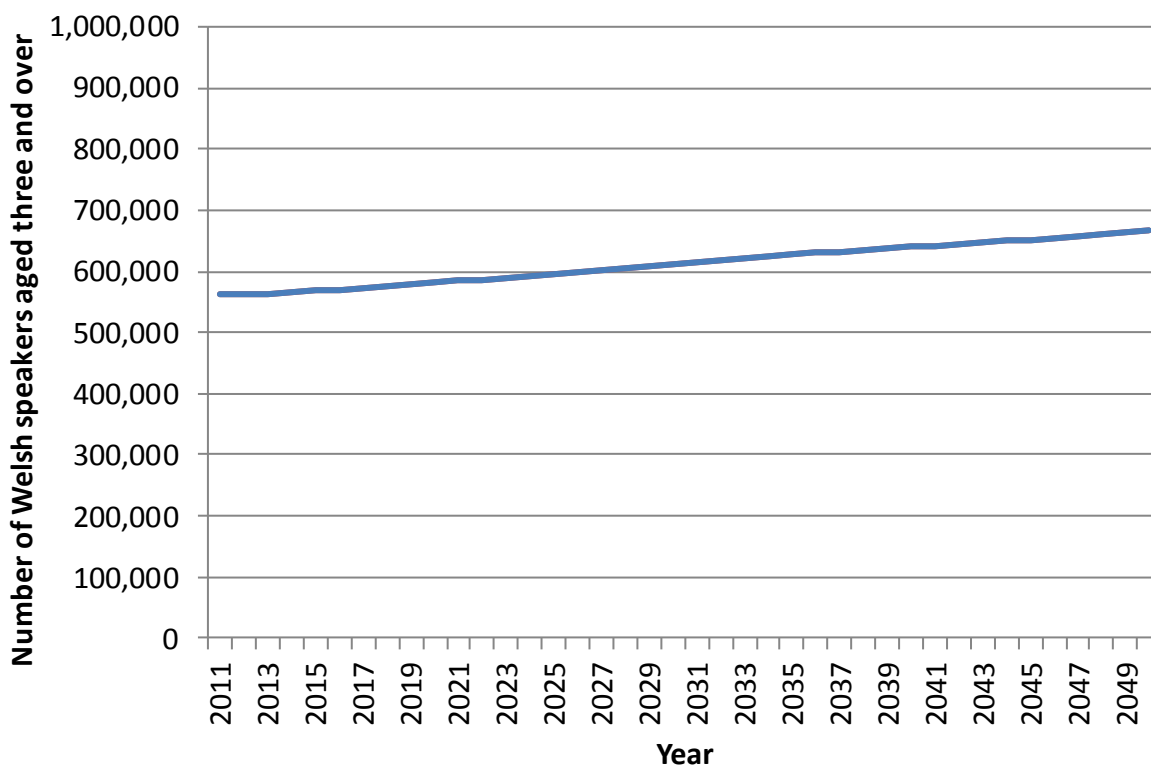
Looking at the previous projections published by the Welsh Language Board in 2012 (based on 2001 Census data), they predicted that there would be 583,000 Welsh speakers aged three and over in 2011. This was 21,000 more than the number seen in the 2011 Census. The projections therefore won't give the exact numbers expected up to 2050. We will be updating the projection with 2021 Census data as soon as it's available.

Results

It is projected that there will be 666,000 people aged three and over able to speak Welsh by 2050, equivalent to around 21 per cent of the population. This is just over 100,000 more Welsh speakers than there were in 2011 but around 334,000 short of the target of a million Welsh speakers by 2050.

The chart below shows how the number of Welsh speakers aged three and over is expected to vary during the period 2011 to 2050.

Chart 2: Projected number of Welsh speakers aged three and over, 2011 to 2050



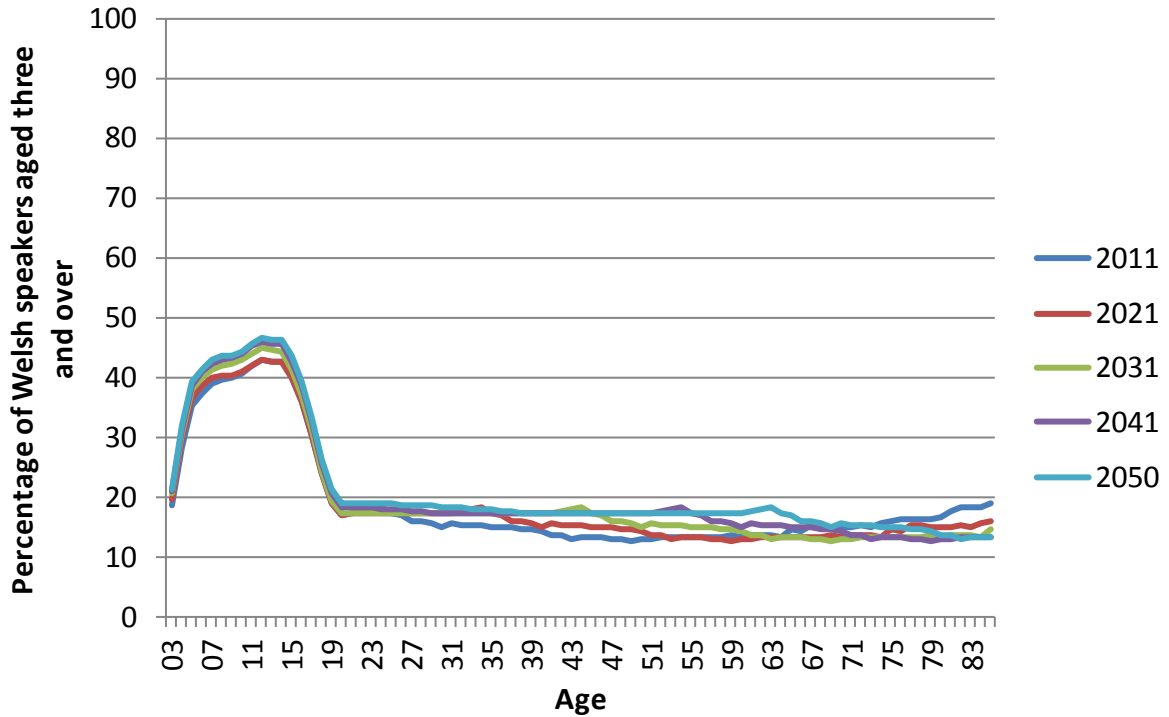
The table below summarises the numbers and percentages projected at specific periods up to 2050. The full data is available in open format on [StatsWales](#).

Table 1: Projected numbers and percentages of Welsh speakers aged three and over at specific periods up to 2050

Year	Number	Percentage
2011	562,000	19
2017	570,000	19
2021	580,000	19
2026	600,000	19
2031	610,000	20
2036	630,000	20
2041	640,000	20
2046	650,000	20
2050	670,000	21

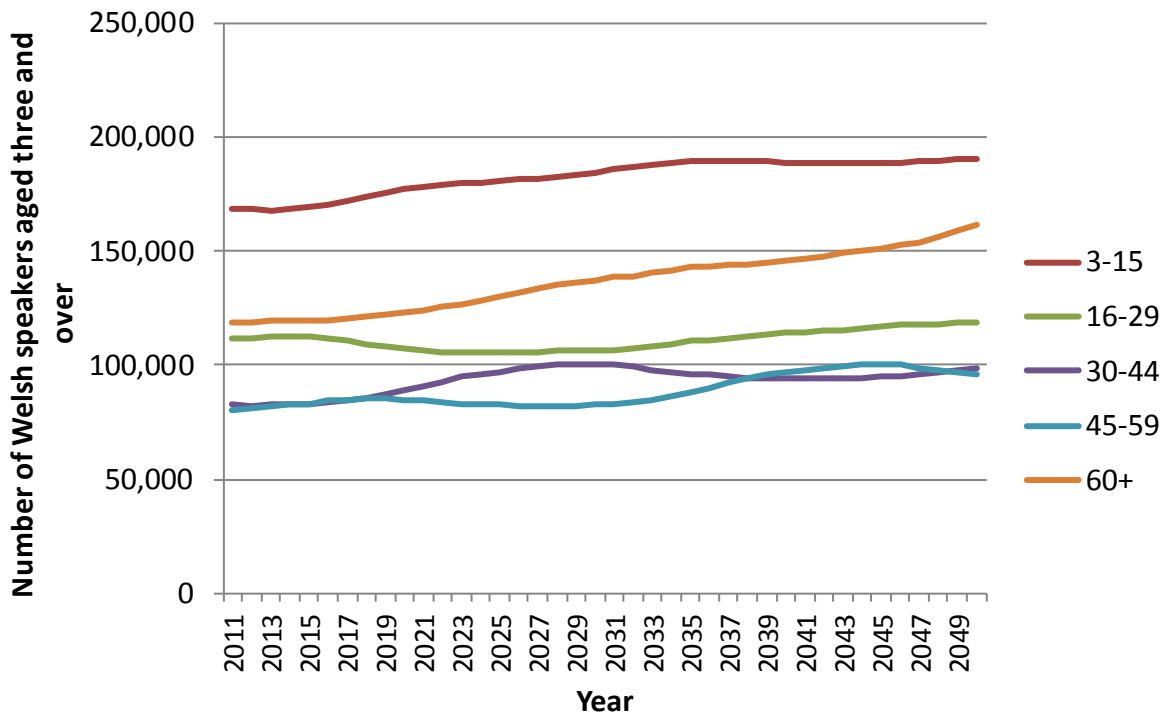
The chart below shows how the percentage of Welsh speakers aged three and over is expected to vary by age during the specific periods above.

Chart 3: Projected percentage of Welsh speakers aged three and over at specific periods up to 2050



The chart below shows how the number of Welsh speakers aged three and over is expected to vary by age group in the period 2011 to 2050.

Chart 4: Projected number of Welsh speakers aged three and over by age groups, 2011 to 2050



The numbers of Welsh speakers aged 3 to 15 and aged 60 and over are expected to increase by 2050, increasing by over 22,000 for those aged 3 to 15 and by over 43,000 for those aged 60 and over. The numbers are expected to vary slightly in the other age groups with a general increase of between 7,000 and 16,000 by 2050.

Trajectory

What is meant by **trajectory** is the number of Welsh speakers estimated based on the projection as well as a number of assumptions in relation to the aims of the strategy to reach the target of a million Welsh speakers by 2050. The projection acts as a baseline for the trajectory and shows one possible path of reaching a million Welsh speakers. Modelling demographic change in the future is complex; modelling the impact of policy changes on specific characteristics of the population is even harder.

Methodology

The trajectory has been calculated based on four main assumptions based on the policy aims of the strategy.

1. Welsh language transmission at home
2. Learning Welsh in school
3. Learning Welsh through Welsh for Adults
4. Improved continuation of Welsh-speaking ability post-16

Transmission

Up until the next Census in 2021, the assumption is that the transmission rates for the trajectory are the same as for the projection, i.e. the transmission rates remain consistent with 2011.

By 2050, the assumption is that every three year old child living in a couple household where two or more adults can speak Welsh and every three year old child living in lone-parent households where one or more adult can speak Welsh, can also speak Welsh. Based on the numbers seen in the 2011 Census, this is equivalent to 10 per cent of three year olds able to speak Welsh and living in either couple households where two or more adults can speak Welsh or in lone-parent households where one or more adult can speak Welsh.

The increase from 7 per cent seen in the 2011 Census to 10 per cent by 2050 is based on a linear increase in the trajectory, with a gradual increase seen in the period 2021 to 2030 and a further increase in the period 2031 to 2050. By 2030 the assumption is that 8 per cent of three year olds will be able to speak Welsh and live in either couple households where two or more adults can speak Welsh or in lone-parent households where one or more adult can speak Welsh, reaching 10 per cent by 2050.

Statutory education

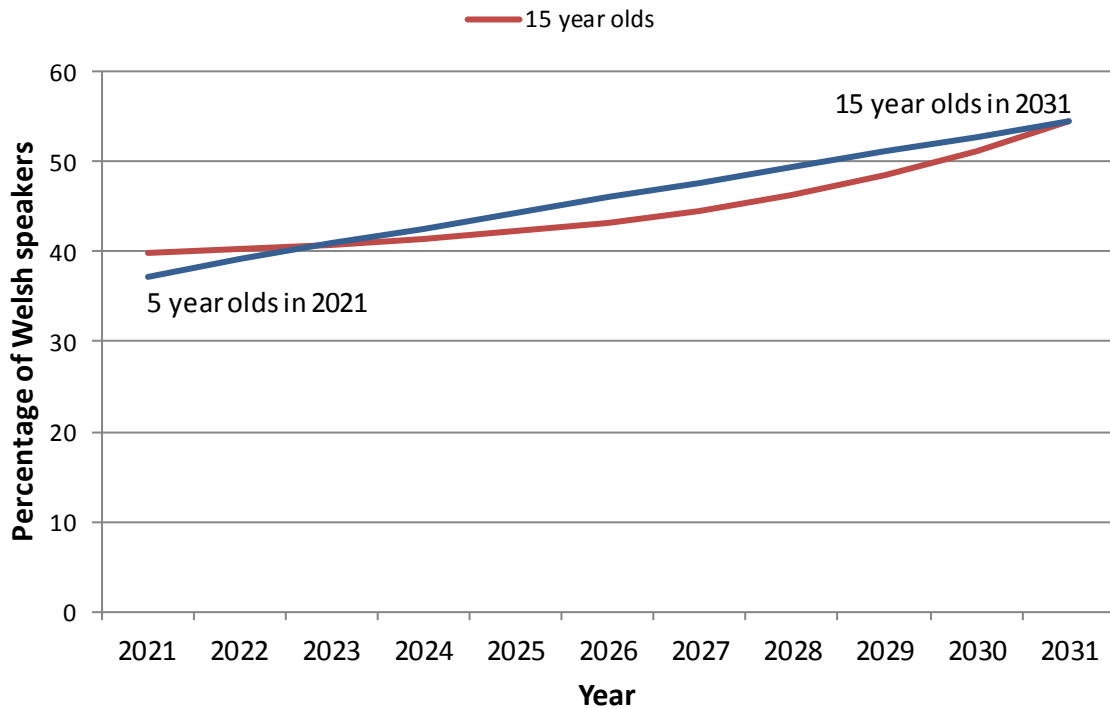
The new curriculum will be introduced in schools in 2021 so for the purposes of the trajectory there won't be any changes regarding education up to 2020. That is, the trajectory is equivalent to the projection during this period regarding the assumptions related to statutory education.

According to the projection, 37 per cent of five year olds will be able to speak Welsh by 2021. These children will be the first cohort of children to study the new curriculum from beginning to end, reaching the end of statutory education in 2031, aged 15. One of the aims of the strategy is that 30 per cent of children (in each year group) will be in Welsh-medium education by 2031, with the remainder in English-medium education.

Regarding the children in Welsh-medium education, the assumption is that every child will leave school reporting that they are able to speak Welsh. The assumption for those studying the new curriculum in English-medium schools is that 35 per cent of them will leave school reporting that they are able to speak Welsh. All together, the assumption is that 55 per cent of 15 year olds will be able to speak Welsh by 2031, made up of 30 per cent in Welsh-medium schools and 25 per cent in English-medium schools (i.e. 35 per cent of the 70 per cent in English-medium schools).

Using the model, a path has been calculated to go from 37 per cent of five year olds able to speak Welsh in 2021 to 55 per cent of 15 year olds by 2031. Not only was it necessary to calculate a path for this cohort of children but also for the previous cohorts and years to avoid a large and unrealistic increase in 2031. A combination of linear and non-linear assumptions are used (using the beta distribution) as shown in the chart below.

Chart 5: Percentage of 15 year olds able to speak Welsh according to the trajectory, 2021 to 2031



By 2050, the aim in the strategy is for 40 per cent of children (in each year group) to be in Welsh-medium education (with each one reporting that they're able to speak Welsh), with the remainder in English-medium education. Of those in English-medium education, the assumption is that half of those leaving school will report that they are able to speak Welsh. All together, the assumption is that 70 per cent of 15 year olds will be able to speak Welsh by 2050, made up of 40 per cent in Welsh-medium schools and 30 per cent in English-medium schools (i.e. half of the 60 per cent in English-medium schools).

The increase in the period 2032 to 2050 is based on the same methodology as the increase in the period 2021 to 2031 (that is, a combination of a linear and non-linear increase – see Chart 5 above).

Welsh for Adults

The aim in the strategy for Welsh for Adults is to see 1,000 new Welsh speakers every year until the next Census in 2021. After that, the aim is to see 2,000 new Welsh speakers every year from 2021 to 2050.

The trajectory takes this into account by adding 1,000 Welsh speakers every year to the age group 30 to 59 year olds in the period 2012 to 2020, and then 2,000 Welsh speakers in the period 2021 to 2050. Welsh for Adults data shows that around 50 to 60 per cent of learners enrolled on a Welsh for Adults course are in the 30 to 59 year olds age group.

The increase in the number of adults able to speak Welsh through Welsh for Adults then has an influence on the number of Welsh speakers aged two and three in the model.

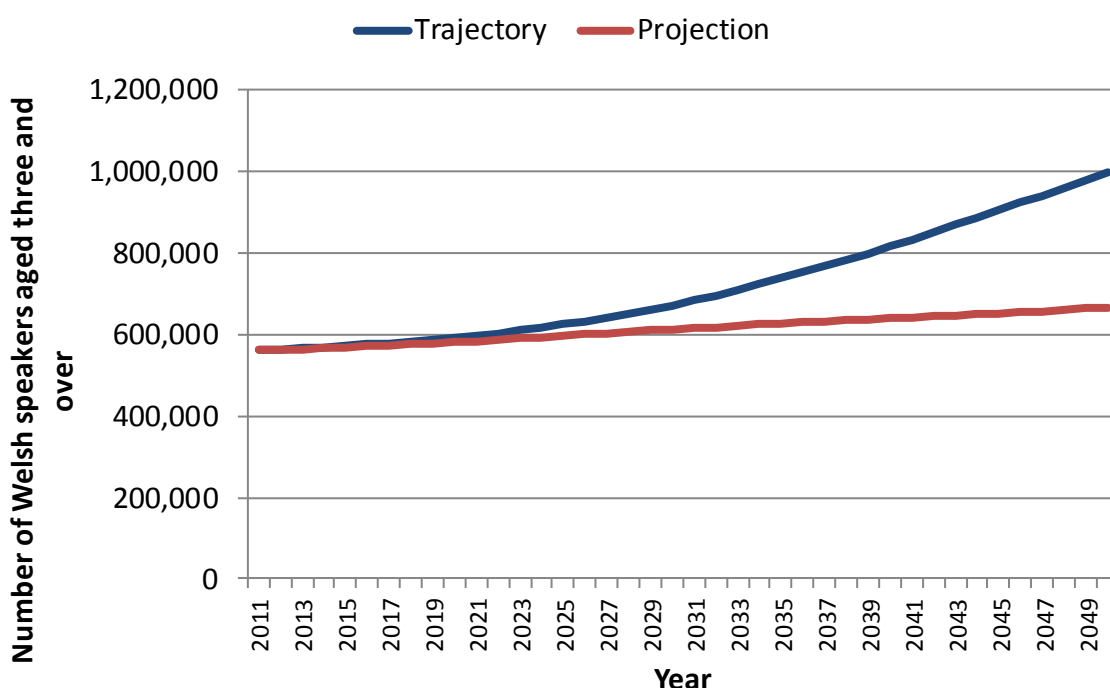
Progression

Chart 1 showed how the percentage of Welsh speakers falls by age after 15 years old. To reach the target of a million Welsh speakers by 2050, the trajectory assumes that the fall post-16 will be smaller from 2031 onwards, on the basis that 15 year olds will have studied and completed the new curriculum by 2031 and might be more robust in their Welsh language abilities.

Results

The chart below shows how the number of Welsh speakers aged three and over is expected to reach a million by 2050 based on the policy aims and assumptions above, as well as the original projection.

Chart 6: Projection and trajectory for the number of Welsh speakers aged three and over, 2011 to 2050



The trajectory shows that, of course, there will be a million Welsh speakers aged three and over by 2050, which is equivalent to around 31 per cent of the population.

The table below summarises the numbers and percentages of the trajectory at specific periods up to 2050. The full data is available in open format on [StatsWales](#).

Table 2: Numbers and percentages of Welsh speakers aged three and over at specific periods up to 2050 according to the trajectory

Year	Number	Percentage
2011	562,000	19
2017	580,000	19
2021	600,000	20
2026	630,000	20
2031	680,000	22
2036	750,000	24
2041	830,000	26
2046	920,000	29
2050	1,000,000	31

In the same way as for the projection, the charts below show the percentages and numbers that will be able to speak Welsh according to the trajectory by age and year.

Chart 7: Percentage of Welsh speakers aged three and over at specific periods up to 2050 according to the trajectory

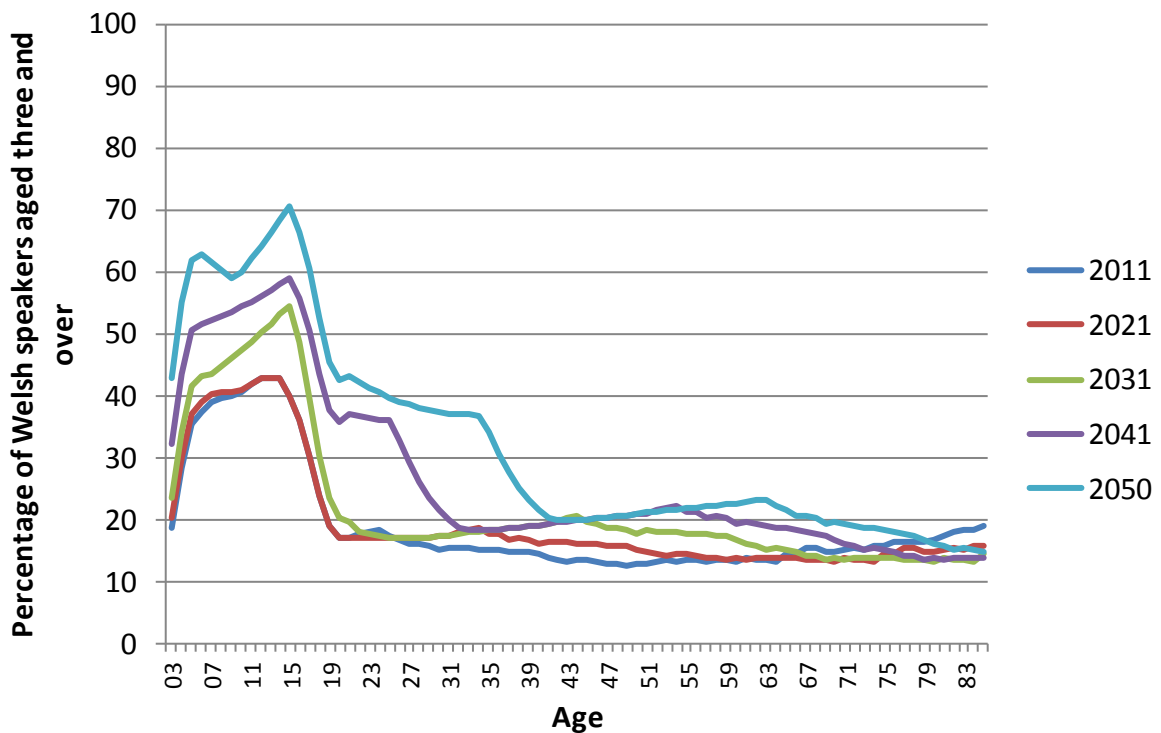


Chart 8: Number of Welsh speakers aged three and over by age groups according to the trajectory, 2011 to 2050

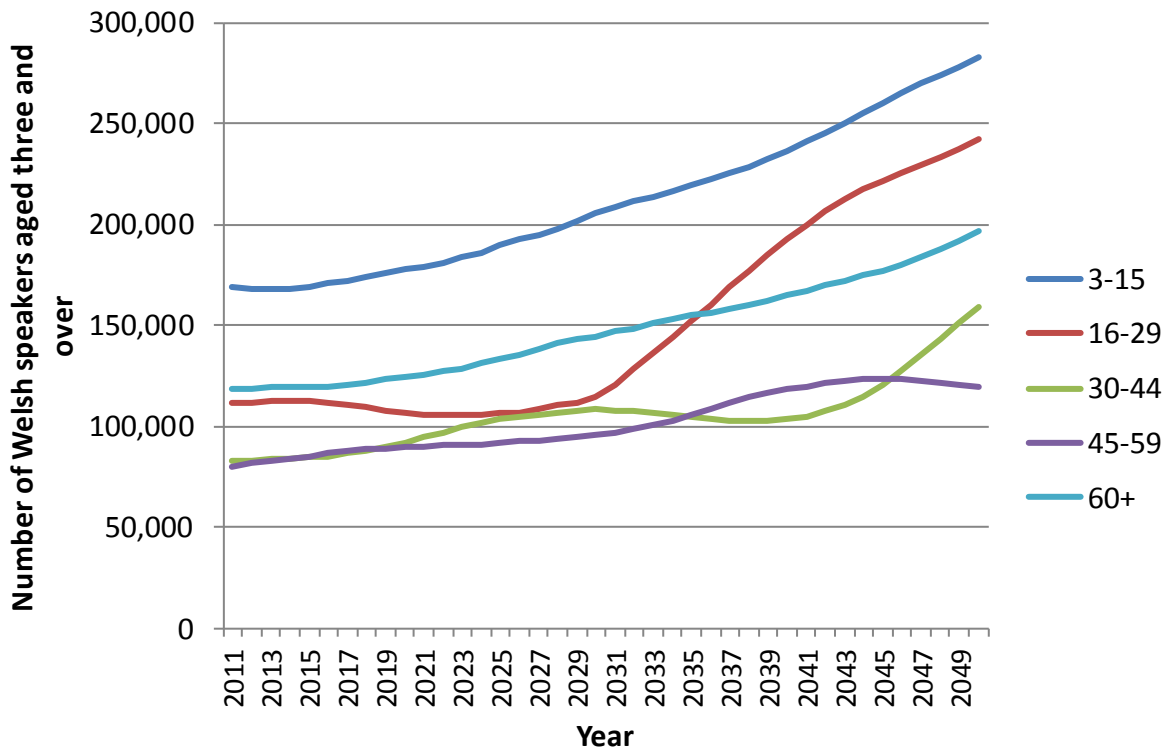
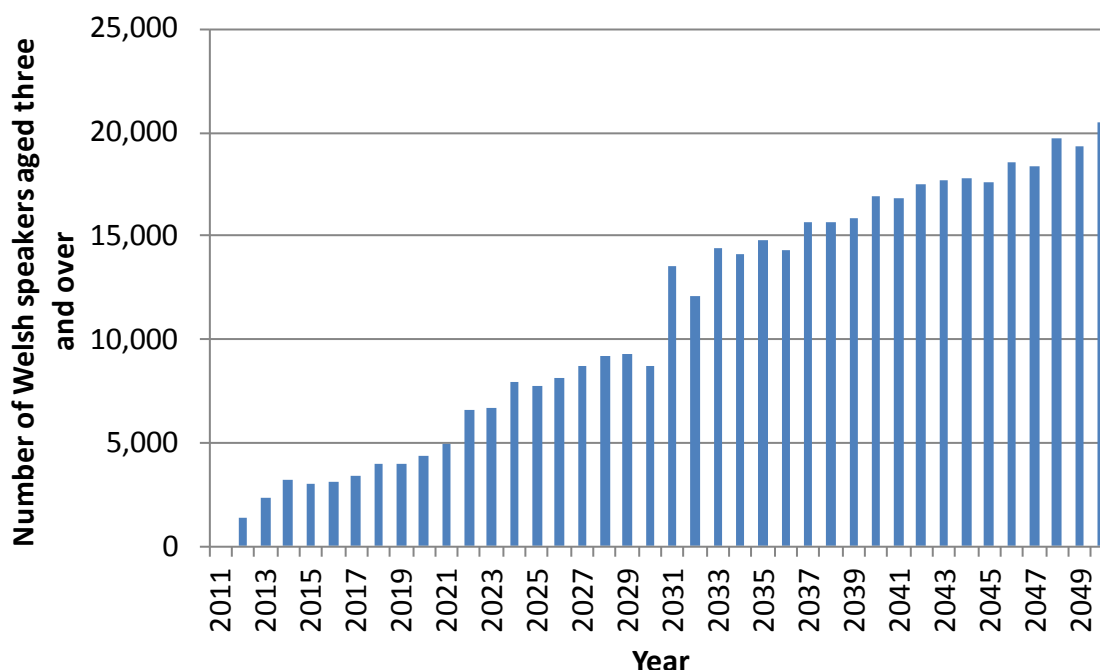


Chart 7 shows how the percentages of Welsh speakers is expected to increase for each age group up to 2050, increasing gradually in the earlier years and accelerating by 2050.

Chart 8 shows how the numbers of children aged 3 to 15 and 16 to 29 year olds are expected to increase substantially by 2050, increasing from 170,000 in 2011 to 280,000 in 2050 for those aged 3 to 15, and from 110,000 to 240,000 for those aged 16 to 29 during the same period.

The chart below shows how the number of Welsh speakers aged three and over is expected to increase annually in the period 2011 to 2050. The numbers are expected to increase more in the run-up to 2050 compared to the earlier years.

Chart 9: Annual increase in the number of Welsh speakers aged three and over, 2011 to 2050



It's important to remember however that this is just one way of reaching a million Welsh speakers by 2050, based on the aims of the strategy. The trajectory will be revised as necessary throughout the life of the strategy to reflect any new data or trends, or any changes in the Government's priorities.

Use

As well as reaching a million Welsh speakers by 2050, one of the main targets of the strategy is to increase the use of Welsh among the population. The target is based on one of the national indicators for the Well-being of Future Generations (Wales) Act 2015, which is the percentage of people who speak Welsh daily and can speak more than just a few words of Welsh. The Government's aim is to see the percentage increase from 10 per cent in 2013-15 to 20 per cent by 2050.

The baseline of 10 per cent is based on Welsh Language Use Survey 2013-15 data. According to the Welsh Language Use Survey 2013-15, 52 per cent of Welsh speakers spoke Welsh daily and were able to speak more than just a few words of Welsh – a decrease from 62 per cent seen in the Welsh Language Use Surveys of 2004-06.

The goal by 2050 is therefore to reverse this decline and return to 62 per cent of Welsh speakers speaking Welsh daily and able to speak more than just a few words of Welsh. Based on the target of a million Welsh speakers and the population projections for those aged three and over in 2050, this is equivalent to 20 per cent of the population speaking Welsh daily and able to speak more than just a few words of Welsh.

To monitor progress towards this target by 2050, targets have been calculated for specific time periods – this was done based on a linear increase in the percentage speaking Welsh

daily and able to speak more than just a few words of Welsh. The National Survey for Wales will be used to monitor progress against this target in the absence of any Welsh language use survey, despite the National Survey for Wales being based on people aged 16 and over only (i.e. excluding 3 to 15 year olds).

Workforce

There are also targets relating to the numbers of teachers required to teach Welsh and through the medium of Welsh in primary schools and in secondary schools included in the strategy.

These targets were calculated based on data about pupils and teachers from the Pupil-Level Annual School Census (PLASC) 2015/16. Firstly, pupil:teacher ratios were calculated for primary and secondary schools by counting the numbers of teachers qualified to teach Welsh as a first language by sector (by allocating those teaching in middle schools to the primary and secondary sector) and the numbers qualified to teach other subjects through the medium of Welsh in secondary schools only.

To estimate the number of children studying Welsh first language, the number of children up to 10 years old in the primary sector was counted, and the number of children aged 11 and over in the secondary sector. The number of children studying Welsh first language in the primary sector is then estimated using the latest data about seven year olds assessed in Welsh (first language) from the National Data Collection of teacher assessments, which is 22 per cent of children. This is also done for the secondary sector using the percentage of 14 year olds assessed in Welsh (first language), which is 18 per cent. This was compared to data from PLASC that indicates whether a child studies Welsh first language for every pupil. Using this data, it's possible to calculate the number of children who study Welsh first language for each teacher teaching Welsh first language and through the medium of Welsh.

To project the number of teachers needed to teach Welsh or through the medium of Welsh by 2021, 2030 and 2050, pupil projections, the Government's targets regarding Welsh-medium education and the pupil:teacher ratios are used for these years for the primary and secondary sector.

Bibliography

Sankoff, D. 2008. 'How to predict the evolution of a bilingual community' in Meyerhoff, M. a Nagy, N. (eds.) *Social Lives in Language – Sociolinguistics and Multilingual Speech Communities Celebrating the Work of Gillian Sankoff*. Edinburgh University/ Toronto University.

Welsh Government. 2013. *Welsh speakers by local authority, gender and detailed age groups, 2011 Census* [Online]. Available at: <https://statswales.gov.wales/Catalogue/Welsh-Language/WelshSpeakers-by-LocalAuthority-Gender-DetailedAgeGroups-2011Census>

Welsh Government. 2015. *Population projections by year and gender* [Online]. Available at: <https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/National/2014-Based/populationprojections-by-year-gender>

Welsh Government. 2016a. *How to measure a nation's progress? National indicators for Wales* [Online]. Available at: <http://gov.wales/topics/people-and-communities/people/future-generations-act/national-indicators/?lang=en>

Welsh Government. 2016b. *National level population estimates by year, age and UK country* [Online]. Available at: <https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Estimates/nationallevelpopulationestimates-by-year-age-ukcountry>

Welsh Government. 2016c. *Pupil-Level Annual School Census (PLASC)* [Online]. Available at: <https://statswales.gov.wales/Catalogue/Education-and-Skills/Schools-and-Teachers/Schools-Census/Pupil-Level-Annual-School-Census>

Welsh Government. 2016d. *Pupil Projections* [Online]. Available at: <https://statswales.gov.wales/Catalogue/Education-and-Skills/Schools-and-Teachers/Schools-Census/Pupil-Projections>

Welsh Government. 2017a. *Cymraeg 2050: A million Welsh speakers* [Online]. Available at: <http://gov.wales/topics/welshlanguage/welsh-language-strategy-and-policies/cymraeg-2050-welsh-language-strategy/?lang=en>

Welsh Government. 2017b. *Welsh for Adults learners and enrolments* [Online]. Available at: <https://statswales.gov.wales/Catalogue/Education-and-Skills/Post-16-Education-and-Training/Further-Education-and-Work-Based-Learning/Learners/Further-Education/welshforadults-learners-enrolments>

Welsh Government and Welsh Language Commissioner. 2015. *Welsh language use in Wales, 2013-15* [Online]. Available at: <http://gov.wales/statistics-and-research/Welsh-language-use-survey/?lang=en>

Welsh Language Board. 2012. *Statistical overview of the Welsh language* [Online]. Available at: <http://www.comisiynyddygyymraeg.cymru/English/Publications%20List/A%20statistical%20overview%20of%20the%20Welsh%20language.pdf>

Contact details

For further information please contact:

Martin Parry
Knowledge and Analytical Services
Welsh Government
Cathays Park
Cardiff
CF10 3NQ
Phone: 03000 250373
E-mail: WelshLanguageData@gov.wales

Welsh Government, 25 July 2017