Eligibility and Bus Patronage in the West Midlands Combined Authority

Supporting analyis

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Transport of West Midlands (TfWM)

1. Boarding trends and ENCTS eligbility in the West Midlands Combined Authority

TfWM has recorded a significant decline in the number of bus boardings by both non-concessionary and concessionary users, around 21% and 16% respectively (Figure 1). It has been hypothesised that the 5% greater decline in concessionary bus boardings may be due to a change in the age of eligibility for concessionary travellers, rather than a change in behaviour. This report will look at how the eligible population has changed throughout the West Midlands, at both bus stop catchment level and output area level, over the study period.

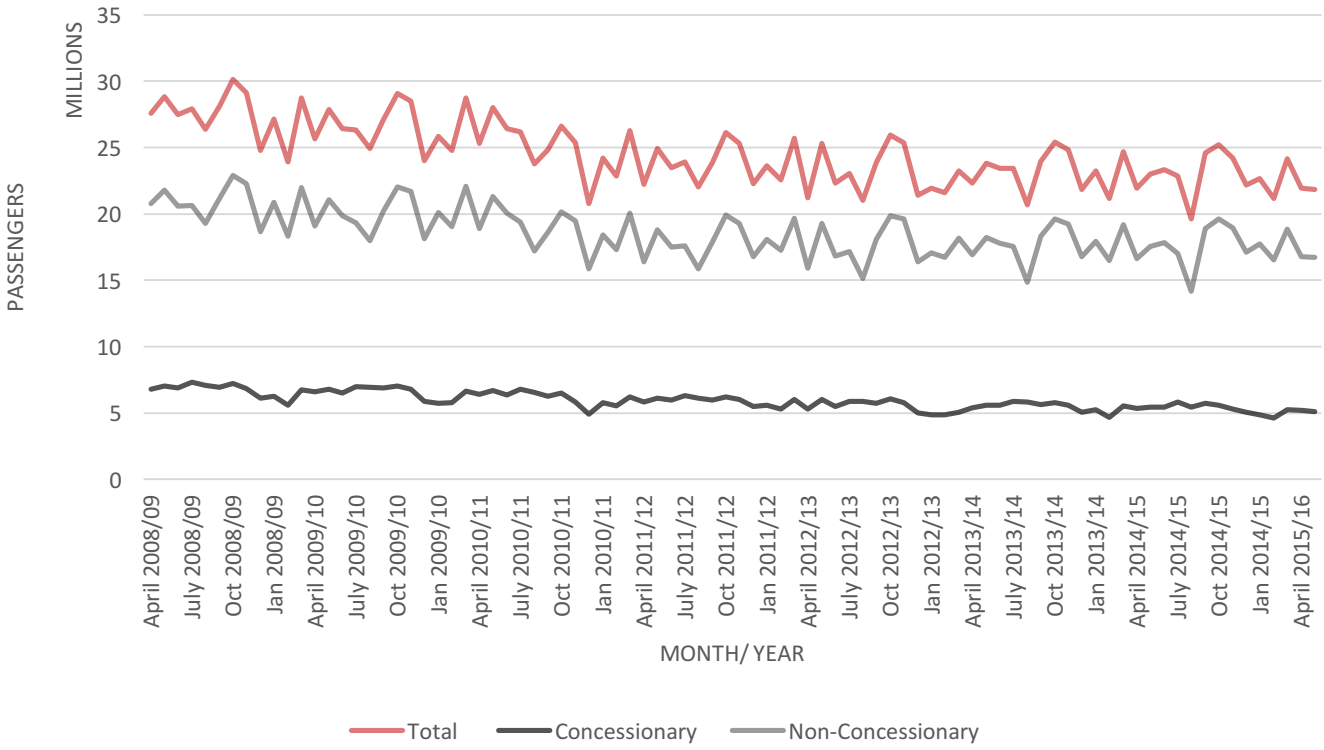

***Figure 1.** Monthly bus patronage in the West Midlands, April 2008 – April 2015 (data: TfWM)*

The age of eligibility for the ENCTS is tied to the retirement age for women which, between 2010 and 2020, will increase from 60 to 65. As this increase in the age of eligibility is likely to affect concessionary bus boardings and uptake of concessionary travel passes, it is important that we understand how the eligible population has changed over the study period.

While the actual age in eligibility for the ENCTS has increased at several points each year, the temporal resolution of the population estimates used for the analysis (mid-year population estimates) limits the specificity of the eligibility estimates in this analysis. For this analysis, we increased the age of eligibility instead by 0.5 years each year from 2010. Table 1 illustrates the staged increase in the age of eligibility used for this analysis.

Table 1. Staged increase in age of eligibility for ENCTS (2008 – 2016)

Year	*Eligibility Age*
2008	60
2009	60
2010	60
2011	60.5
2012	61
2013	61.5
2014	62
2015	62.5
2016	63

2.1. Catchment Area Populations – 400m Catchments

The first stage of this analysis will look at the eligible population living within a 400m catchment of each bus stop in the West Midlands. We chose 400m catchment areas as this is the distance that urban planners agree that people are willing to walk to public transport stops and stations (Kimpel 2007; Hess 2012).

'Staged Increase'

The change in the age of eligibility has had an effect on the number of eligible people living within each bus stop catchment area. The number of people living within the 400m bus stop catchment areas has decreased by around 10% since the eligibility age began increasing in 2010, with an average year-on-year decrease of around 2% (Table 2).

Previous to the staged increase in the age of eligibility introduced in 2010, the eligible population appeared to be increasing by around 1% each year.

Table 2. Eligible population living within 400m catchment areas – Staged Increase

Year		**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
	453,130	*457,201*	*461,615*	*453,935*	*446,122*	*437,969*	*430,619*	*422,296*	*414,267*	
2008	*453,130*									
2009	*457,201*	0.01								
2010	*461,615*	0.02	0.01							
2011	*453,935*	0.00	-0.01	-0.02						
2012	*446,122*	-0.02	-0.02	-0.03	-0.02					
2013	*437,969*	-0.03	-0.04	-0.05	-0.04	-0.02				
2014	*430,619*	-0.05	-0.06	-0.07	-0.05	-0.03	-0.02			
2015	*422,296*	-0.07	-0.08	-0.09	-0.07	-0.05	-0.04	-0.02		
2016	*414,267*	-0.09	-0.09	-0.10	-0.09	-0.07	-0.05	-0.04	-0.02	

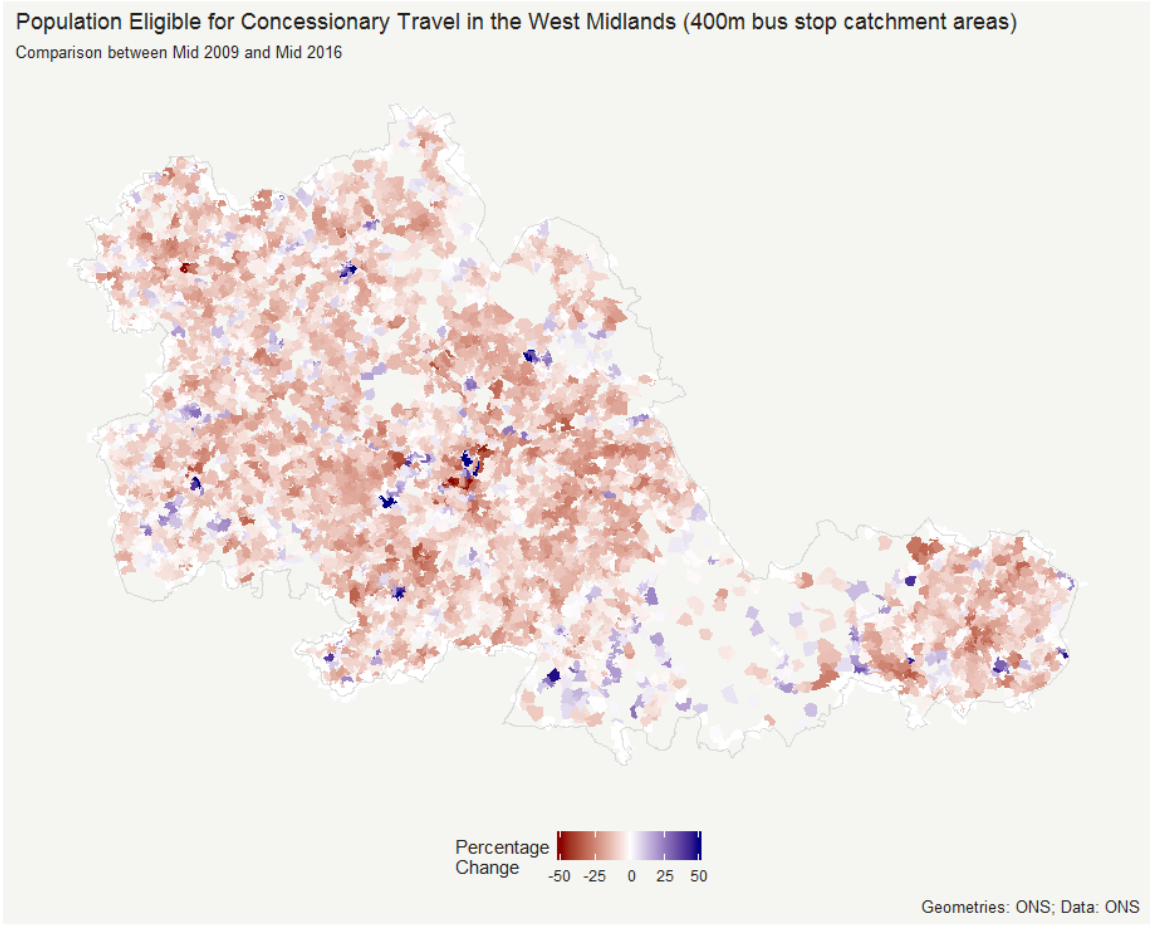

Figure 2. Percentage change in eligible population across the West Midlands between 2009 and 2016 (400m bus stop catchment areas)

Figure 2 shows the percentage change in the eligible population within each 400m bus stop catchment area between 2009 and 2016. The vast majority of catchment areas, around 85%, have experienced a decline in the number of eligible people, however there are still a significant number that have experienced an increase. Although there does not appear to be a clear spatial pattern, catchment areas in central Birmingham have experienced some of the most significant changes. This is unsurprising, as central urban areas tend to have high rates of population churn as well as generally lower numbers of older people (Baernholdt 2012). Only small changes in the population may result in a large percentage change in the eligible population in a catchment area.

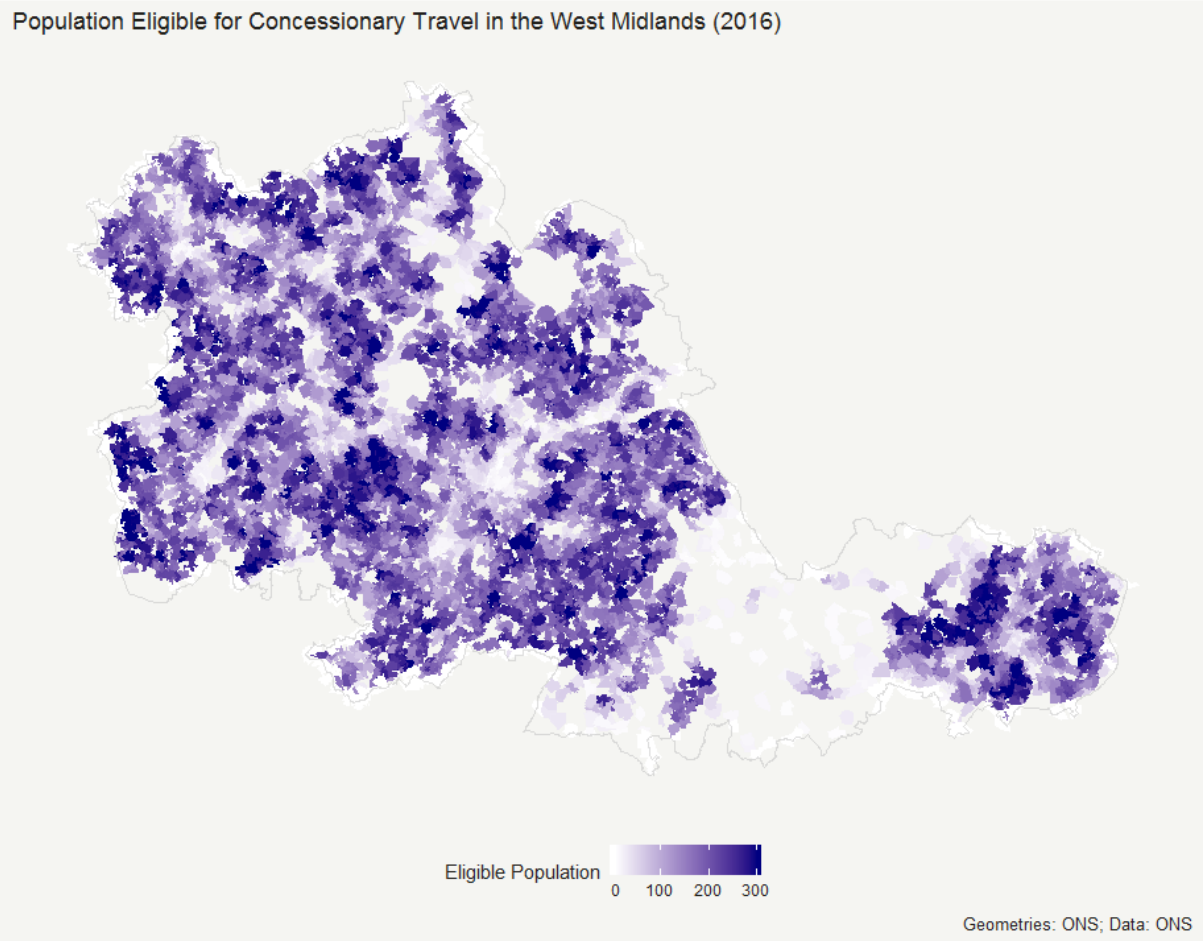

Figure 3. Eligible population living within 400m bus stop catchment areas (2016)

Figure 3 shows an estimate of the number of eligible people living within each 400m bus stop catchment area, giving an indication of the areas that have a particularly high number of people eligible for the ENCTS. Bus stop catchments in central urban areas tend to have particularly low numbers of eligible people, which again is likely due to the propensity of the older population to live in suburban and rural areas (OECD 2015). In addition, bus stop catchments in Solihull also contain low numbers of eligible people, which is likely due to the low population density in this area.

'Maintained at 60'

As suggested from the data in Table 2, had the age of eligibility been maintained at 60 it is likely that the eligible population living within the bus stop catchment areas would have increased year-on-year. Table 3 shows how the eligible population within each catchment would likely have changed from 2008 to 2016 had the age of eligibility remained at 60. From these results we can see that the 1% year-on-year increase seen from 2008 – 2010 in Table 2 is predicted to have continued until 2016. From 2008 to 2016 there would have been around a 6% rise in the number of eligible people living within these catchments, with around a 4% rise between 2010 and 2016.

Table 3. Eligible population living within 400m catchment areas – Maintained at 60

Year		2008	2009	2010	2011	2012	2013	2014	2015	2016
		453,130	*457,201*	*461,615*	*465,027*	*468,397*	*471,962*	*476,144*	*478,745*	*481,968*
2008	*453,130*									
2009	*457,201*	0.01								
2010	*461,615*	0.02	0.01							
2011	*465,027*	0.03	0.02	0.01						
2012	*468,397*	0.03	0.02	0.01	0.01					
2013	*471,962*	0.04	0.03	0.02	0.01	0.01				
2014	*476,144*	0.05	0.04	0.03	0.02	0.02	0.01			
2015	*478,745*	0.06	0.05	0.04	0.03	0.02	0.01	0.01		
2016	*481,968*	0.06	0.05	0.04	0.04	0.03	0.02	0.01	0.01	

As a result, the largest gap between eligible populations within the bus stop catchments can be seen for 2016, with a 14% difference (Table 4). Year-on-year we can see a gradual decrease in the eligible population within these catchment areas, of around a 2-3% each year, equating to a decrease of around 11,000 people.

Table 4. Comparison between 'Maintained at 60' and 'Staged Increase' populations

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Maintained at 60	453,130	457,201	461,615	465,027	468,397	471,962	476,144	478,745	481,968
Staged Increase	453,130	457,201	461,615	453,935	446,122	437,969	430,619	422,296	414,267
Difference	0	0	0	-11,093	-22,275	-33,392	-45,525	-56,449	-67,701
% Difference	0	0	0	-2	-5	-7	-10	-12	-14

Figure 4 shows the annual change in the number of people living within the bus stop catchment areas that are eligible for the ENCTS between 2008 and 2016. As previously discussed, until the increase in eligibility age from 2010, the eligible population living within the bus stop catchment areas was steadily increasing. After the staged increase from 2010, the eligible population living within the catchment areas decreased year-on-year, which will likely continue with the increase in retirement age until 2020.

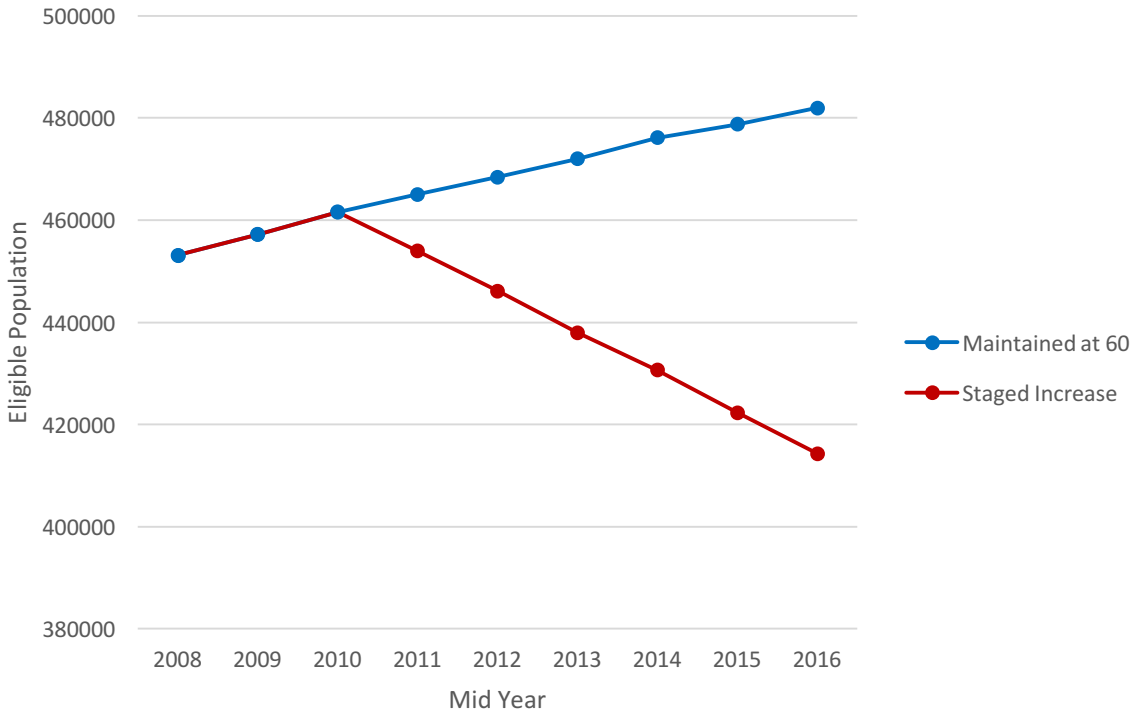

Figure 4. Population eligible for ENCTS living within 400m catchment areas

2.2. Total regional population

In addition to looking at the eligible population in bus stop catchment areas, analysing this at output area level can allow us to see how the eligible population has changed across the whole of the West Midlands, in addition to comparing output area level and catchment area level changes.

Table 5. Eligible population in the West Midlands Combined Authority

Year		**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
		539,903	*545,446*	*551,000*	*542,586*	*533,576*	*524,137*	*515,689*	*506,028*	*496,795*
2008	*539,903*									
2009	*545,446*	0.01								
2010	*551,000*	0.02	0.01							
2011	*542,586*	0.00	-0.01	-0.02						
2012	*533,576*	-0.01	-0.02	-0.03	-0.02					
2013	*524,137*	-0.03	-0.04	-0.05	-0.03	-0.02				
2014	*515,689*	-0.04	-0.05	-0.06	-0.05	-0.03	-0.02			
2015	*506,028*	-0.06	-0.07	-0.08	-0.07	-0.05	-0.03	-0.02		
2016	*496,795*	-0.08	-0.09	-0.10	-0.08	-0.07	-0.05	-0.04	-0.02	

Comparing the eligible population within the bus stop catchment areas, shown in Table 2, to the whole of the eligible population in the West Midlands, we can see that changes in the eligible population at output area level are similar to those at catchment area level. The same

10% decrease between 2010 and 2016 can be seen, in addition to the same 1-2% year-on-year decrease.

By comparing the eligible populations in both the catchment areas and the output areas, shown in Table 6, we can estimate that around 83% of the eligible population in the West Midlands live within 400m of a bus stop, indicating that there may be a relatively high level of accessibility throughout the study area. Although this 83% remains relatively constant between 2008 and 2016, Table 5 suggests a small year-on-year decrease, from 83.93% to 83.39%. Although not a significant decrease, if this trend continues in the future, fewer older people may be able to access transport services.

Table 6. Comparison between total and catchment area population

	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Totala Pop.	539,903	545,446	551,000	542,486	533,576	524,137	515,689	506,028	496,795
Catchment Area Pop.	453,130	457,201	461,615	453,935	446,122	437,969	430,619	422,296	414,267
% Population in CA	83.93	83.82	83.78	83.68	83.61	83.56	83.50	83.45	83.39

Figure 5 shows the percentage change in eligible population at output area level between 2009 and 2016. In comparison to the percentage change at catchment area level, shown in Figure 3, a larger number of output areas have experienced an increase in those eligible for the ENCTS (roughly 25% compared to just 15% of catchment areas). There does not appear to be a clear spatial pattern although, similarly to Figure 2, output areas in central Birmingham appears to have had some of the highest changes in the percentage of the population eligible for the ENCTS.

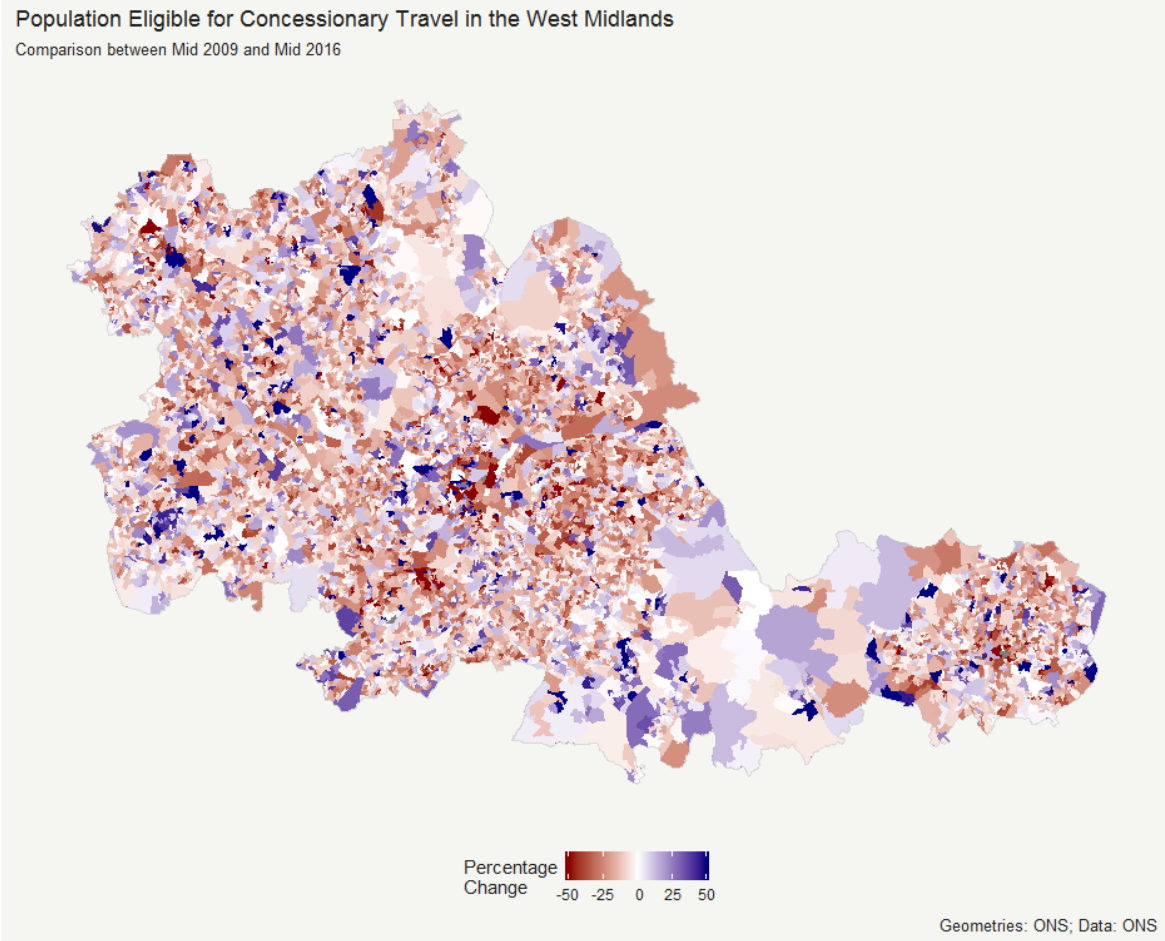

Figure 5. Percentage change in eligible population across the West Midlands between 2009 and 2016 (output areas)

2.3. Impact on Boarding trends

Although the increase in the age of eligibility is unlikely to fully account for the decline in concessionary boardings that has been observed by TfWM and in the AFC data, the decline in eligible population living within a vast majority of bus stop catchment areas may explain the larger decline in boardings that has been recorded for concessionary bus users in comparison to non-concessionary bus users, as seen in Figure 1.

A significant number of bus stop catchment areas have experienced a decrease in the number of eligible people living within them, which is likely to have an effect on the number of bus boardings made by concessionary travellers at these bus stops. The next step in this analysis will therefore be to compare changes in bus boardings throughout the study period to these changes in the eligible population. It is hypothesised that catchment areas that have experienced the largest decline in population eligible for the ENCTS will have also experienced declines in the numbers of concessionary bus boardings.

Table 7. Annual bus patronage in the West Midlands, April 2008 – April 2015 (data provided by TfWM)

Non-Concessionary (5 to threshold)					**Concessionary** (threshold -)				
	Board-ings (m)	Pop. (m)	Boarding Rate	% change since 2009		Board-ings	Pop. (m)	Boarding Rate	% change since 2009
2009	246	1.98	124		**2009**	80	0.55	147	
2010	240	2.00	120	-3	**2010**	78	0.55	142	-4
2011	219	2.02	109	-13	**2011**	72	0.54	133	-10
2012	214	2.03	105	-15	**2012**	70	0.53	131	-11
2013	211	2.05	103	-17	**2013**	66	0.52	126	-14
2014	212	2.06	103	-17	**2014**	66	0.52	128	-13
2015	210	2.09	101	-19	**2015**	63	0.51	125	-15
2016	206	2.11	98	**-21**	**2016**	61	0.50	123	**-16**

Adjusting boarding trends to the eligible population shows that the 25% decline reduces to a 16% decline in boardings when adjusted for the more restricted eligibility to ENCTS. Indeed, the decline among non-concessionary passholders now appears stronger. It is this 16% that demand explanation in the context of the 'Inclusive and Healthy Moblity' research project.

2. Projected population change and future ENCTS eligibility

In addition to the age of eligibility increasing from 60-65 between 2010 and 2020, it is also expected to increase again between 2026 and 2028, from 65-68. Population projections can enable us to determine how future changes in the age of eligibility will affect the number of people eligible for the ENCTS in the West Midlands over the coming years. Table 7 shows the age of eligibility for each year that was used in this analysis.

Table 7: Staged increase in age of eligibility for ENCTS (2018 – 2028)

Year	*Eligibility Age*
2018	64
2019	64.5
2020	65
…	…
2026	66
2027	67
2028	68

Figure 7 shows the eligible population in the West Midlands between 2008 and 2028, using population estimates and projections from the ONS.

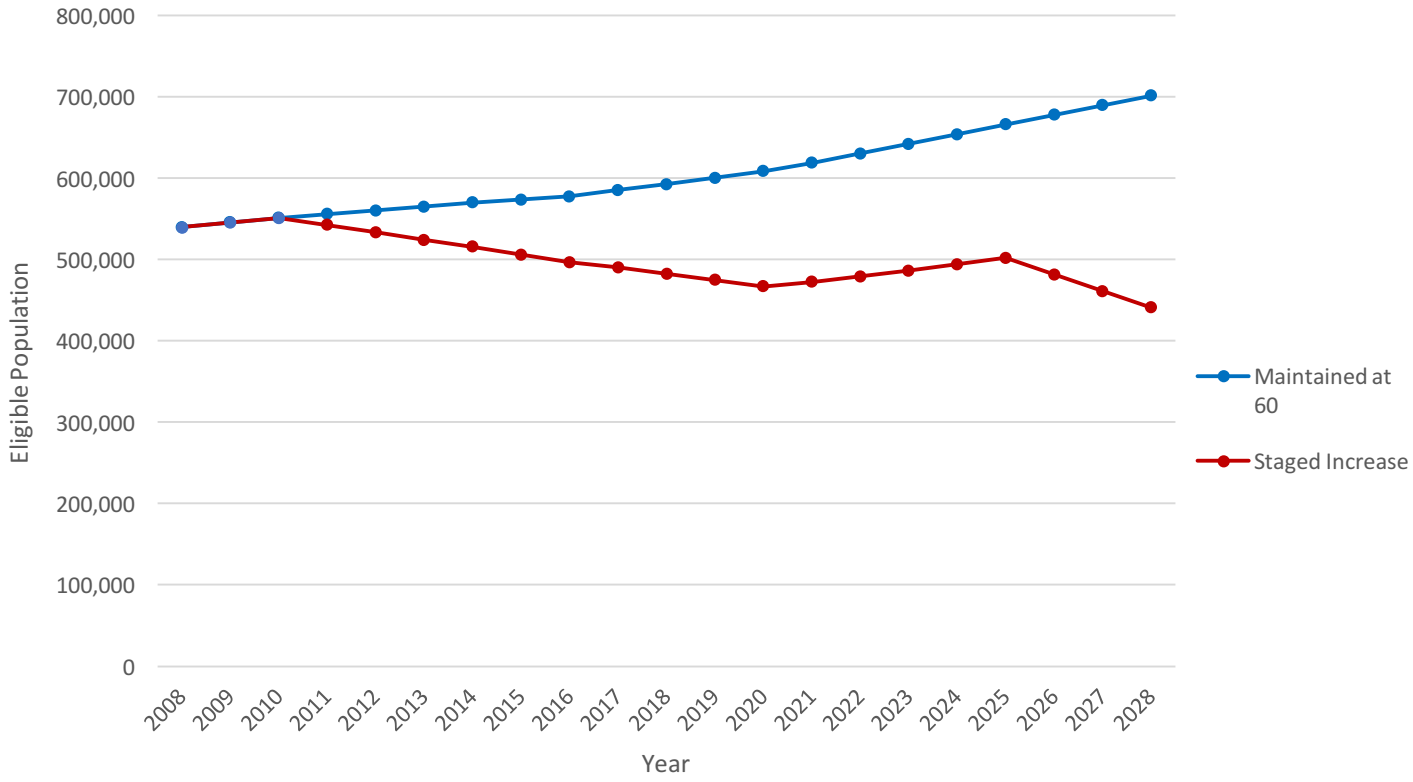

Figure 6. Eligible population in the West Midlands (2008 – 2028)

Similarly to Figure 4, Figure 6 shows the annual change in the number of people that are eligible for the ENCTS in the West Midlands between 2008 and 2028. Had the age of eligibility been maintained at 60 throughout this period, the number of eligible people living within the West Midlands would have increased by 30%, from around 540,000 to just over 700,000. With the increase in the age of eligibility increasing from 60 to 65, between 2010 and 2020, the number of eligible people living in the West Midlands is predicted to decrease by around 15%. Once the age of eligibility stabilises at 65 between 2020 and 2025, the eligible population is predicted to increase by around 6%. Once the age of eligibility begins to increase again from 65 to 68 between 2026 and 2028, the eligible population is predicted to fall once again by roughly 11%, meaning that between 2010 and 2028 there is predicted to be a 20% decrease in the number of eligible people living within the West Midlands.

Although these population projections are not yet available at a small area level, we can compare changes in eligible population between each of the seven authorities in the West Midlands, as shown in Figure 7.

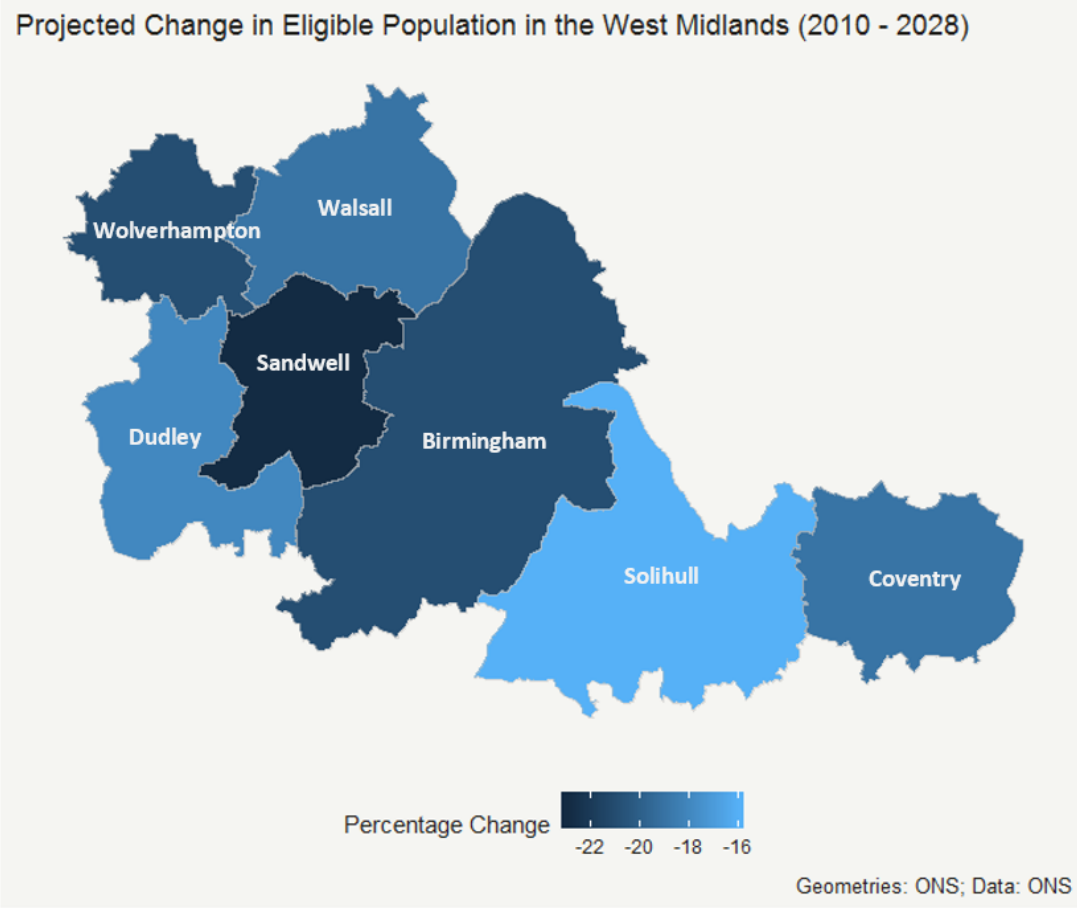

Figure 7. Projected change in eligible population in the West Midlands (2010 – 2028)

Figure 7 shows the projected change in the eligible population in each of the seven authorities in the West Midlands, between 2010 and 2028. Eligible population change ranges from a 16% decrease in Solihull to a 23% decrease in Sandwell, with an average decrease of around 19.5%.

Expanding this analysis to 2039 (the year to which population projections have so far been published), we can determine how the size of the eligible population in the West Midlands will be impacted with the age of eligibility remaining at 68.

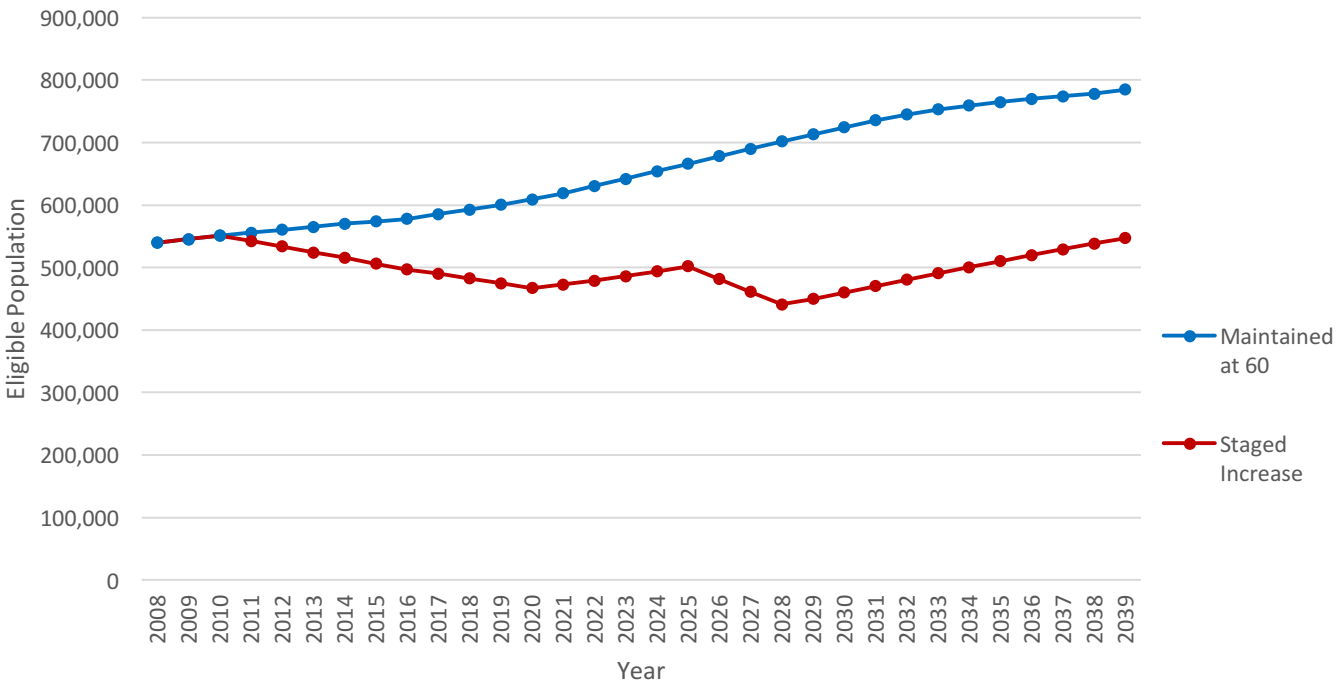

Figure 8. Eligible population in the West Midlands (2008 – 2039)

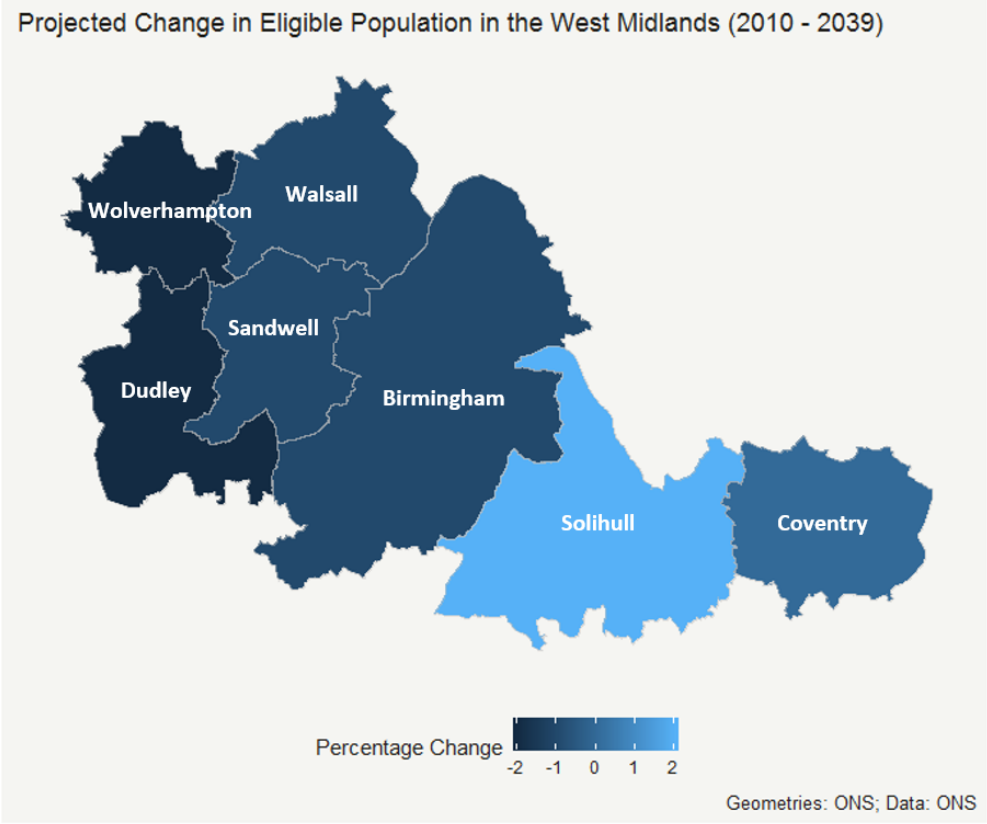

Figure 9. Projected change in eligible population in the West Midlands (2010 – 2039)

In comparison to the eligible population in 2010, the staged increases taking place between 2010 and 2028, along with natural changes in population, will result in just a 1% decrease in the size of the eligible population by 2039. Compared to this, had the age of eligibility remained at 60, there would be an increase of around 42% from the 2010 level.

Although changes in the eligible population in the West Midlands may result in some significant short-term changes in eligible population, Figure 9 shows that over a longer time period, the increase in age of eligibility from 60 to 68 combined with natural population changes will result in only a small decrease in the number of eligible people in the West Midlands.

References

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