

Access to garden spaces: England

The statistical significance of differences in garden access when all factors are controlled simultaneously.

Contact:
Jaya Jassi and Adam Dutton
Natural.Capital.Team@ons.gov.
uk
+44 (0)1633 580051

Release date:
14 May 2020

Next release:
To be announced

Table of contents

1. [Introduction](#)
2. [Statistical analysis](#)
3. [Results](#)
4. [Discussion](#)

1 . Introduction

This analysis was done as part of a wider project to estimate access to gardens and green spaces at and around people's homes in Great Britain during the coronavirus (COVID-19) pandemic.

Some of the differences identified in today's article, "[One in eight British households has no garden](#)" regarding garden access are likely to be driven by multiple factors. For instance, if ethnic minorities are more likely to be younger, live in London or inner cities and be in lower socioeconomic groups then many or all of the trends identified regarding ethnic minorities might be explained by these characteristics.

The purpose of this analysis is to examine whether trends identified in the article remained [statistically significant](#) in predicting garden access when all factors are controlled simultaneously. Finding that all variables with identifiable trends have significant explanatory power simultaneously would indicate that they are of more independent interest.

We analysed the impact of several variables on garden access including: age, ethnicity, location, social grade and whether the household has children or not. We used a binary logistic regression model to estimate the impact different variables have on the probability of not having a garden - this is discussed in more detail under the Statistical analysis section.

The data used for this analysis was from the [Monitor of Engagement with the Natural Environment \(MENE\) survey](#), that covers England.

2 . Statistical analysis

We used a binary logistic regression to examine what factors are associated with access to a private garden.

All variables included in this regression analysis are categorical and so were included as sets of binary variables.

Separate models were estimated, controlling for different variables. In our first model, we adjust for age and ethnicity. In our second model we included age, ethnicity and location variables. Finally, in our third model we included all required variables: age, ethnicity, location, social grade and whether the household has children or not.

The classes within each variable are as shown in Table 1:

Table 1: A breakdown of each variable included in the regression

Variable	Class
Age	Age 16 to 24 years
	Age 25 to 34 years
	Age 35 to 44 years
	Age 45 to 54 years
	Age 55 to 64 years
	Age 65 years and over
Ethnicity	White
	Mixed
	Asian
	Black
	Other
Urban or Rural	Urban city and town
	Urban major conurbation
	Urban city and town in a sparse setting
	Urban minor conurbation
	Rural town and fringe
	Rural town and fringe in a sparse setting
	Rural village and dispersed
Rural village and dispersed in a sparse setting	
Region	Yorkshire and The Humber
	North West
	North East
	East Midlands
	East of England
	South East
	South West
	London
	West Midlands
Social Grade	AB
	C1
	C2
	DE
Children	Children
	No children

Source: Office for National Statistics

Odds ratios are reported in this analysis. Odds ratios aim to quantify the likelihood of one class within a given variable having an impact on the dependent variable, in comparison with another class within that same given variable. In other words, the odds ratio can be defined as the ratio of odds of X in the presence of Y, where X and Y are classes within the same variable.

3 . Results

Model 1

Our first model, including only the age and ethnicity variables as seen in Table 2, shows that people of Black ethnicity and those aged 25 to 34 years old are the least likely to have a garden.

The results in Table 2 compare the likelihood for people of White ethnicity to not have a garden with those of other ethnicities. It also compares the likelihood of people aged 65 years and over to not have a garden with those of other age groups. The odds ratio indicates that people of Black, Other, Asian and Mixed ethnicities are less likely to have access to a garden compared with people of White ethnicity. When looking at the age odds ratios, we can see that those aged 16 to 24 years and 25 to 34 years are less likely to have access to a garden than those aged 65 years and over.

Model 2

The second model includes age, ethnicity and location (an urban or rural breakdown and regions) variables. As in the previous model, the likelihood for people of White ethnicity and those aged 65 years and over to not have a garden is compared with people of other ethnicities and age groups, respectively. The likelihood for the urban or rural groupings to not have access to a garden is compared with the rural village and dispersed sparse setting class, whilst the likelihood for all regions to not have access to a garden is compared with London.

Table 3 shows that people of Black ethnicity are still the least likely to have access to a garden, followed by people of Other ethnicity. Within the age groups, the coefficient tells us that those aged 16 to 24 years are least likely to have access to a garden. Those living in urban major conurbation areas, and urban cities and towns are less likely to have access to a garden, whilst those living in rural town and fringe sparse setting areas are more likely to have access to a garden, although this figure is not statistically significant. As for the regional split, those living in London are least likely to have access to a garden followed by the North West, and those in the West Midlands are most likely to have some form of garden or outdoor space.

With the addition of the location variables, the odds ratio between people of Black ethnicity and White ethnicity likelihood to not have access to a garden has reduced but this figure is still statistically significant.

Those aged 16 to 24 years are less likely to have access to a garden than those aged 65 years or over, similar to Model 1. All areas within the urban or rural variable are less likely to have access to a garden when compared with a rural village and dispersed sparse setting, apart from a rural town and fringe sparse setting, which is more likely. The odds ratios for different regions shows that people living in London are less likely than any other region to have access to a garden.

Model 3

The final model includes all variables of interest: age, ethnicity, location, social grade and whether the household has children or not. As in the previous models, the likelihood for people of White ethnicity, those over the age of 65 years, rural village and dispersed sparse settings, and London to not have access to a garden is compared with other ethnicities, age, urban or rural groupings and regions, respectively. The likelihood for those with children to not have access to a garden is compared with those without children, whilst the likelihood for all social grades to not have access to a garden is compared with [social grade AB](#).

Table 4 shows that, even including all variables, all minority ethnic groups are less likely to have access to a garden, with people of Black ethnicity the least likely. The correlations with all ethnicities are statistically significant. Model 3 reverts to people aged 25 to 34 years as those least likely to have access to a garden. Again, the final model shows that those living in urban major conurbation areas or urban city and town areas are least likely to have access to a garden. However, no other urban or rural category is significantly different from the sparsest most rural areas.

Those living in London are least likely to have access to a garden. The additional variables of having a child and social grade show that those with a child are more likely to have access to a garden and those of social grade DE are the least likely to have access to a garden.

Table 4 displays the odds ratios. With the inclusion of all required variables, the odds ratio shows that people of Black ethnicity are significantly less likely to have access to a garden than those of White ethnicity. People of Black ethnicity are 2.4 times more likely to not have garden access. The odds ratio was converted into a relative probability using the following calculation:

$$Probability = \frac{Odds\ Ratio \times Baseline\ Probability}{(1 + Odds\ Ratio \times Baseline\ Probability - Baseline\ Probability)}$$

The baseline probability was the weighted percentage of White respondents without access to a garden and the odds ratio was taken from Model 3 for the Black ethnic group.

Those aged 25 to 34 years are less likely to have access to a garden, compared with those who are aged 65 years and over. Those living within an urban major conurbation are less likely to have access to a garden compared with those living in a rural village and dispersed sparse setting. Those in the London region are least likely to have access to a garden. The odds ratios also show that households with a child are more likely to have access to a garden than those without a child. Further, those of social grade DE are less likely than those of social grade AB to have access to a garden.

4 . Discussion

All models indicate that people of all ethnic minorities are less likely to have a garden than those of White ethnicity, with those of Black ethnicity being least likely to have access to a garden. Ethnicity results remain statistically significant even when other available potential covariates are controlled for. This modelling therefore indicates that correlation with ethnicity and garden access is unlikely to be purely a result of other socio-economic, demographic or geographical factors.

Younger groups are consistently least likely to have access to a garden. If you live in an urban major conurbation or urban city and town you are less likely to have access to a garden than those living in rural areas, although these results were not consistently statistically significant – suggesting other factors are better predictors. People living in London are least likely to have access to a garden area and these results are significant, across models. Finally, those of a lower social grade and those without children are less likely to have access to a garden and these results are statistically significant.

Table 2: Binary logistic regression Model 1 results

Model 1			
Coefficients	Estimate	P value	Odds ratio
Intercept	-2.426461	***	0.088349
Mixed	0.617801	***	1.854844
Asian	0.757288	***	2.132485
Black	1.409617	***	4.094388
Other	1.019697	***	2.772356
White	NA	NA	NA
Age 16 to 24 years	0.666094	***	1.946619
Age 25 to 34 years	0.669686	***	1.953623
Age 35 to 44 years	0.299613	***	1.349336
Age 45 to 54 years	0.134936		1.144464
Age 55 to 64 years	0.004661		1.004671
Age 65 years and over	NA	NA	NA

Source: Natural England - Monitor of Engagement with Natural Environment survey and Office for National Statistics

Table 3: Binary logistic regression Model 2 results

Model 2			
Coefficients	Estimate	P Value	Odds ratio
Intercept	-3.75251	***	2.35E-02
Mixed	0.4449	*	1.56E+00
Asian	0.48485	***	1.62E+00
Black	1.04866	***	2.85E+00
Other	0.79187	**	2.21E+00
White	NA	NA	NA
Age 16 to 24 years	0.56369	***	1.7571
Age 25 to 34 years	0.54669	***	1.7275
Age 35 to 44 years	0.18883	*	1.2078
Age 45 to 54 years	0.04642		1.0475
Age 55 to 64 years	-0.03012		0.97033
Age 65 years and over	NA	NA	NA
Urban major conurbation	2.07025	*	7.93E+00
Urban city and town	2.02128	*	7.55E+00
Urban city and town sparse setting	1.30189		3.68E+00
Urban minor conurbation	1.28741		3.62E+00
Rural town and fringe	1.09471		2.99E+00
Rural town and fringe sparse setting	-10.32213		3.29E-05
Rural village and dispersed	0.51656		1.68E+00
Rural village and dispersed sparse setting	NA	NA	NA
Yorkshire and The Humber	-0.45743	***	6.33E-01
North West	-0.27786	**	7.57E-01
East Midlands	-1.11367	***	3.28E-01
East of England	-0.40917	***	6.64E-01
South East	-0.6613	***	5.16E-01
North East	-0.42717	**	6.52E-01
South West	-0.76071	***	4.67E-01
West Midlands	-1.18979	***	3.04E-01
London	NA		NA

Source: Natural England - Monitor of Engagement with Natural Environment survey and Office for National Statistics

Table 4: Binary logistic regression Model 3 results

Model 3			
Coefficients	Estimate	P Value	Odds Ratio
Intercept	-4.56051	***	1.05E-02
Mixed	0.47315	**	1.61E+00
Asian	0.51703	***	1.68E+00
Black	1.04675	***	2.85E+00
Other	0.8264	**	2.29E+00
White	NA	NA	NA
Age 16 to 24 years	0.79692	***	2.22E+00
Age 25 to 34 years	0.90806	***	2.48E+00
Age 35 to 44 years	0.63766	***	1.89E+00
Age 45 to 54 years	0.31784	***	1.37E+00
Age 55 to 64 years	0.08161		1.09E+00
Age 65 years and over	NA	NA	NA
Urban major conurbation	2.03893	*	7.68E+00
Urban city and town	1.98688	*	7.29E+00
Urban city and town sparse setting	1.28243		3.61E+00
Urban minor conurbation	1.1975		3.31E+00
Rural town and fringe	1.11019		3.03E+00
Rural town and fringe sparse setting	-10.3842		3.09E-05
Rural village and dispersed	0.63225		1.88E+00
Rural village and dispersed sparse setting	NA	NA	NA
Yorkshire and The Humber	-0.45678	***	6.33E-01
North West	-0.31203	***	7.32E-01
East Midlands	-1.15972	***	3.14E-01
East of England	-0.38978	***	6.77E-01
South East	-0.59185	***	5.53E-01
North East	-0.42149	**	6.56E-01
South West	-0.73906	***	4.78E-01
West Midlands	-1.20698	***	2.99E-01
London	NA	NA	NA
Child	-0.52811	***	5.90E-01
C1	0.43553	***	1.55E+00
C2	0.66839	***	1.95E+00
DE	1.21559	***	3.37E+00
AB	NA	NA	NA

