Alcohol-attributable hospital admissions: segmentation series report 3

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Executive summary

Approximately a fifth of the population in England are thought to drink at hazardous levels of consumption, and a further 5% at harmful levels. Such levels of consumption are associated with a wide range of health, crime and economic harms. However, neither consumption nor harms are universally experienced, and in order to effectively target interventions, it is vital to understand which populations are most at risk. Segmentation tools are one way of doing this, allowing the grouping of populations by age, gender, lifestyle, attitude and motivation. To further understand population segmentation in alcohol misuse, the North West Public Health Observatory has published a series of four reports utilising segmentation tools to discuss alcohol consumption, attitudes and related admission. This is the third report in the series and focuses on different types of alcohol-related hospital admissions. The first and second report discuss attitudes to consumption and consumption respectively whilst the fourth report in the series summarises the findings and presents them by classification in order to present an overview of the attitudes, consumption and harms experienced by each segmentation type.

It is important to bear in mind that the findings presented in this series represent only the starting point in understanding alcohol use and harm through segmentation techniques and that further research is required to fully comprehend the nuances that exist both between and within the segments.

Across the series, a number of datasets are used which represent the most robust intelligence available. However, this means that the reports use a range of national and regional data to present the findings. This report uses data for England. Data were extracted from Hospital Episode Statistics for admissions to hospitals in England for 2006/07. Individual alcohol attributable fractions were applied to estimate the prevalence of these conditions. Admissions in relation to relevant conditions were grouped under the following headings: admissions due to conditions with low alcohol-attributable fractions (e.g. malignant neoplasm of the colon); admissions due to alcohol-specific mental and behavioural disorders (e.g. dependence syndrome, acute intoxication); admissions due to alcohol-related acute conditions (e.g. ethanol poisoning, assaults and falls); and admissions due to alcohol-related chronic conditions (e.g. alcoholic liver disease). Admissions were then allocated to segmentation systems via their lower super output area. Segmentation systems investigated included: Index of Multiple Deprivation (IMD) 2007 quintile; IMD 2007 decile; People and Places (P[2]), Mosaic, Health ACORN and Office for National Statistics (ONS) Area. Data were analysed to reveal the relationship between admission, gender, age and deprivation.

Key findings from this report show:

- Conditions with low attributable fractions were the least prevalent admission category, while admission for alcohol-related chronic conditions was by far the most prevalent category of admissions. For example, the rate of alcohol-related chronic admission for males (739.8 per 100,000) was almost five times the rate of admission for alcohol-related acute conditions (153.2). Measures of admission showed strong relationships with deprivation overall, with increasing deprivation being linked to increasing hospital admission (with the exception, in females, of admissions due to conditions with low attributable fractions).
- Females had a significantly higher rate of admission for conditions with a low alcohol attributable fraction than males (13.6 per 100,000 compared with 10.5) but rates were similar between the segments.
- Males experienced almost twice the rate of hospital admission for alcohol-specific mental and behavioural disorders than females (262.6 per 100,000 compared with 101.7).
- Males experienced a significantly higher rate of admission for acute alcohol-related conditions than females (153.2 per 100,000 compared with 143.2). The Mosaic

tool showed high levels of acute admission in younger groups.

- Males experienced almost double the rate of admission for chronic alcohol-related conditions than females (739.8 per 100,000 compared with 397.7).

Findings such as these are vital in understanding consumption in different populations, and should be used (in conjunction with further research) to develop targeted interventions and campaigns. It is only through understanding the populations at risk that effective support, alternative activities and appropriate information can be supplied.

Contents

Acknowledgements

1. Introduction

1.1 Alcohol misuse

In England, it is estimated that a fifth of the population drink at hazardous levels and a further 5% drink at harmful levels.[1] Such levels of alcohol misuse have been associated with a wide range of health, crime and economic harms.[1-3] However, alcohol consumption and related harms are not universally experienced across the country, with areas having different experiences depending on factors such as deprivation. In order to target interventions, it is vital to understand which populations are most at risk, together with their experiences and use of alcohol.

1.2 Social marketing and segmentation

Social marketing was endorsed through the Government White Paper *Choosing Health* as a health promotion framework to tackle lifestyle harms.[4] It encourages the development of interventions that are built on deep consumer insight and strategies of effective and sustained engagement.[5] It can use a wide range of intervention formats such as education, new media and legislation, although the most appropriate mix will depend on the individual group targeted.[5]

Geodemographic segmentation can be used to maximise the evidence for social marketing interventions (Box 1).[5-7] This is because it can provide an understanding of people who may have common motivations and lifestyle patterns, and because the technique goes beyond traditional methods of grouping people by age and gender to grouping populations by lifestage, lifestyle, attitude and motivations.[6] This method is particularly useful when local data are limited or do not exist.[5]

There are a number of segmentation tools available, and the most appropriate tool to use depends on individual requirements. To date, the North West Public Health Observatory (NWPHO) has recommended the use of People and Places (P^2)[8] because it provides a greater level of discrimination by deprivation than the other systems available.[7] Others such as Mosaic are also widely used.[9] However, information is limited as to what extent analyses performed through the different segmentation tools reflect each other, and whether they show the same pattern. This report uses Health ACORN, Index of Multiple Deprivation (IMD) 2007 quintiles and deciles, Mosaic, Office for National Statistics (ONS) Area, and P^2 to investigate alcohol-attributable hospital admission.

> **Box 1: Segmentation techniques**
>
> Geodemographic segmentation aims to divide the population into groups, and make members of each group as similar as possible, while simultaneously differentiating between the groups as far as possible.[5] The systems are derived from large numbers of variables (up to 400) that have been collected from an array of different sources, such as the national census and Health Survey for England.[10] These provide information on factors such as demographics, socio-economic status, housing type and lifestyle. A cluster analysis is then performed to identify typologies. The systems may use different variables and/or algorithms in their development.[5]

1.3 This series of alcohol reports

This report, published by the NWPHO, is part of a series of four reports utilising segmentation tools to discuss:

- Alcohol-related attitudes and motivations;[11]

- Alcohol consumption;[12]

- Alcohol-attributable hospital admission (this report); and

- Pen portraits (see Box 2) – a summary document, which brings all of the information presented in the series together to provide a final and more in-depth understanding for some of the groupings.[13]

Together, the reports aim to synthesise the different data sources that identify at-risk groups as well as to provide an insight into related motivations and attitudes. Finally, they aim to identify where research is needed in order to develop further insight for facilitating behaviour change strategies.

This report concentrates on hospital admission relating to alcohol in order to highlight which groups and types of populations are most at risk. Admission is broken down by gender and into admission type: admissions due to conditions with low alcohol attributable fractions; admissions due to mental and behavioural conditions specific to alcohol; and acute and chronic alcohol-attributable admissions. Hospital admission is a particularly important dataset to include in such an analysis because rates of alcohol-attributable hospital admission have increased dramatically in recent years.[14] For example, between 2001/02 and 2005/06, rates of alcohol-attributable hospital admission increased by 28% for both males and females in England,[14] and have continued to increase since.[1] The reduction of these admissions is a Government priority.[15]

Box 2: Pen Portraits

The development of pen portraits is a technique used in social marketing to aide practitioners in defining their target audience. The pen portrait is a fictitious character to which a message or an intervention is targeted. Practitioners define who the pen portrait represents, their motivations, their likes and dislikes, their peer group, and even their name. The message or intervention developed must serve this character. The magazine 'Marie Claire' has created one such pen portrait as an example of their reader, who they see as having an average age of 33 years, and who enjoys spending money on clothes and toiletries.[16]

2.   Methodology

Data were extracted from Hospital Episodes Statistics (HES) in relation to hospital admission in England for 2006/07. Admissions relating to specific ICD-10 codes were included in the analysis and grouped under the headings outlined in Section 2.2. Details of the conditions included can be found in Appendices 1-4.

2.1   Geodemographic analysis

Once the data were extracted, geodemographic classifications were added.

These were based on lower super output area (LSOA) and included: IMD 2007 quintile, IMD 2007 decile, P^2, Health ACORN, ONS Area, and Mosaic (Table 1). (For details on the classifications, see Dedman et al. 2006.)[7] Data were analysed to reveal the relationship between alcohol-attributable hospital admission, gender, age and deprivation.

Table 1: Classification systems.

Classification system	Number of segments	Segmented according to...
Index of Multiple Deprivation (IMD) quintile	5	Multiple deprivation: income; employment; health and disability; education, skills and training; barriers to housing and services; crime and living environment.
Index of Multiple Deprivation (IMD) decile	10	Multiple deprivation: income; employment; health and disability; education, skills and training; barriers to housing and services; crime and living environment.
People and Places (P^2)	13*	Age, household composition, housing, employment, income, transport, leisure, spending patterns, general health, area stability.
Mosaic	11*	Demographics, socio-economics and consumption, financial measures, property characteristics, property value, location.
Health ACORN	25*	Indicators of existing health, lifestyle indicators, food consumption.
Office for National Statistics (ONS) Area	20	Demographics, household composition, housing, socio-economics.

*Three segments were not included in the analysis: Unclassified from each of P^2, Mosaic and Health ACORN classification systems.

2.2   Variables investigated

The report presents data for England in 2006/07 on the rate of:

- Hospital admission due to conditions with low alcohol-attributable fractions;

- Hospital admission due to alcohol-specific mental and behavioural disorders;

- Hospital admission due to alcohol-attributable acute conditions; and

- Hospital admission due to alcohol-attributable chronic conditions.

Details of the conditions included in the analysis and their alcohol attributable

fraction used to estimate prevalence can be found in Appendices 1-4.

2.3   Presenting the data

The geodemographic classifications are ranked according to average income levels or average income deprivation (that is, the proportion of the population living in households with an income of less than 60% of the median). Bivariate correlations were used to assess the relationship between rank of deprivation and the rate of alcohol-attributable hospital admission in each classification system.

For each variable discussed (see Section 2.2), charts have been provided for all six of

the geodemographic segmentation systems, allowing the reader to visualise the pattern of consumption. They are presented on the same scale to enable comparison across the charts.

Data were analysed using SPSS version 17. Percentages are discussed as being significantly different from the English average where the 95% confidence intervals (95% CIs) do not overlap. Although figures have been rounded to one decimal place, significance is taken from the unrounded figure. Tables detailing all the values and bivariate analysis are in the appendices (section 7.1 provides a guide to the appendices).

2.4 Data limitations

There are a number of limitations to the data presented in this report:

- The data analysed only include hospital admission and not presentation to accident and emergency departments (unless they resulted in an admission).

- The data presented on hospital episodes are for England overall, while the other reports in this series publish data on the North West region,[11, 12] or Great Britain.[11] This may affect comparability between the data.

- All area-based classifications are subject to ecological fallacy.[5] Thus, not every individual, nor any individual in particular, will necessarily demonstrate all of the characteristics of the area in which they live.

- Individuals may move between the segments over time and in different situations.[17]

The classifications can only provide a statistically-based stereotype and should always be used in conjunction with other local knowledge. In this way, the analysis provides a starting point with which to compare likely differences between geographical areas, so that further insight can be gathered.

3. Findings

3.1 Conditions with low alcohol-attributable fractions

The prevalence of conditions with low alcohol attributable fractions was an order of magnitude lower compared with the other condition groupings discussed in this report: 10.5 per 100,000 males and 13.6 per 100,000 females (2006/07 data for England). However, it was the only condition group for which females had a significantly higher rate of hospital admission than males. (See appendices for figures and details of analysis.)

3.1.1 Males

The rate of hospital admission due to conditions associated with low alcohol-attributable fractions according to classification for males in England ranged from 8.2 to 16.0 per 100,000 (Figure 1). Lower rates tended to be found in affluent groups such as Health ACORN Affluent Professionals (8.2 per 100,000), Mosaic Career Professionals (8.2) and P^2 Mature Oaks (8.4). For all of these groups, the rate of admission is significantly lower than the male national average (10.5 per 100,000).

Groups with higher rates of admission for conditions associated with low alcohol-attributable fractions typically represented deprived groups, including: Health ACORN Disadvantaged Elderly (16.0 per 100,000, although associated confidence intervals were very wide), Vulnerable Disadvantaged (14.7) and Urban Estates (14.6), Mosaic Social Housing (14.7), P^2 Disadvantaged Households (14.4) and the most deprived IMD decile (14.4). For all of these groups apart from Health ACORN Disadvantaged Elderly, the rate of admission was significantly higher than average.

The prevalence of admission for low alcohol-attributable conditions was significantly related to deprivation for five of the six classification systems with more deprived segments typically showing higher rates of admission. IMD quintile is the only classification system where there is no such relationship.

3.1.2 Females

The rate of hospital admission due to conditions associated with low alcohol-attributable fractions according to classification for females in England ranged from 10.9 to 15.7 per 100,000 (Figure 1). Those with lower rates tended to be multi-cultural areas such as ONS Area Multicultural Urban (10.9 per 100,000) and P^2 Multicultural Centres (11.8), but also other areas including Health ACORN Poor Single Parent Families (12.0) and Mosaic Older People in Social Housing (12.7). However, none of these rates were significantly lower than the female national average (13.6 per 100,000).

Groups with higher rates of admission for conditions associated with low alcohol-attributable fractions tended to be Health ACORN older segments including Disadvantaged Elderly (15.1 per 100,000, although the associated confidence intervals were very wide), and Post Industrial Pensioners (14.9). ONS Area Countryside Communities also had higher rates of admission (15.7 per 100,000, although the associated confidence intervals were very wide). However, none of these rates were significantly higher than average.

None of the classifications displayed a significant association between hospital admission for conditions with a low alcohol-attributable fraction and deprivation.

Figure 1: Rate of hospital admission for low alcohol-attributable conditions per 100,000 by gender and geodemographic classification, in England in 2006/07.

Values for the figures and significant difference are shown in the appendices. Error bars show 95% confidence intervals. Classifications are arranged from least to most deprived group. *Confidence intervals are too wide to be displayed in full.

■ Males ☐ Females

a) Index of Multiple Deprivation (IMD) 2007 quintiles

b) Index of Multiple Deprivation (IMD) 2007 deciles

c) Mosaic classifications
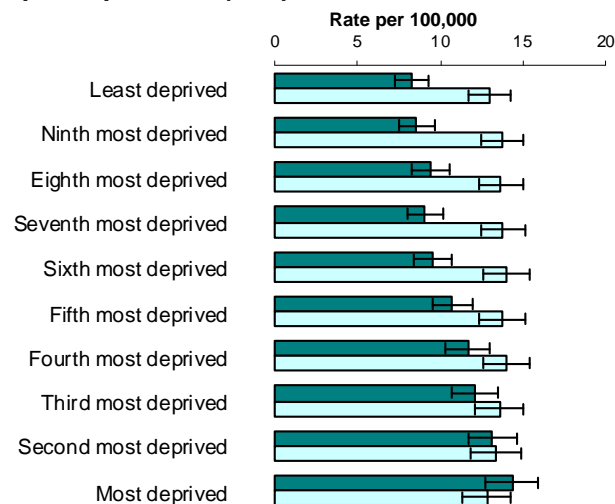
d) People and Places (P²) classifications
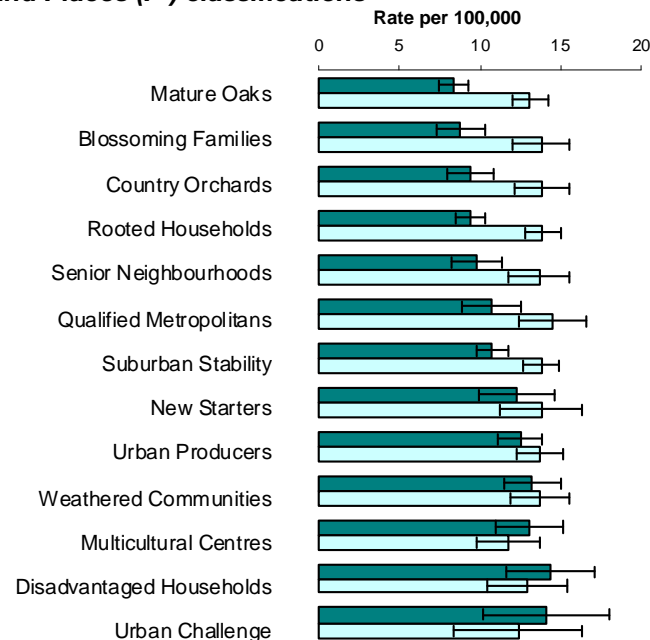
Figure 1 (continued): Rate of hospital admission for low alcohol-attributable conditions per 100,000 by gender and geodemographic classification, in England in 2006/07.

e) Health ACORN classifications
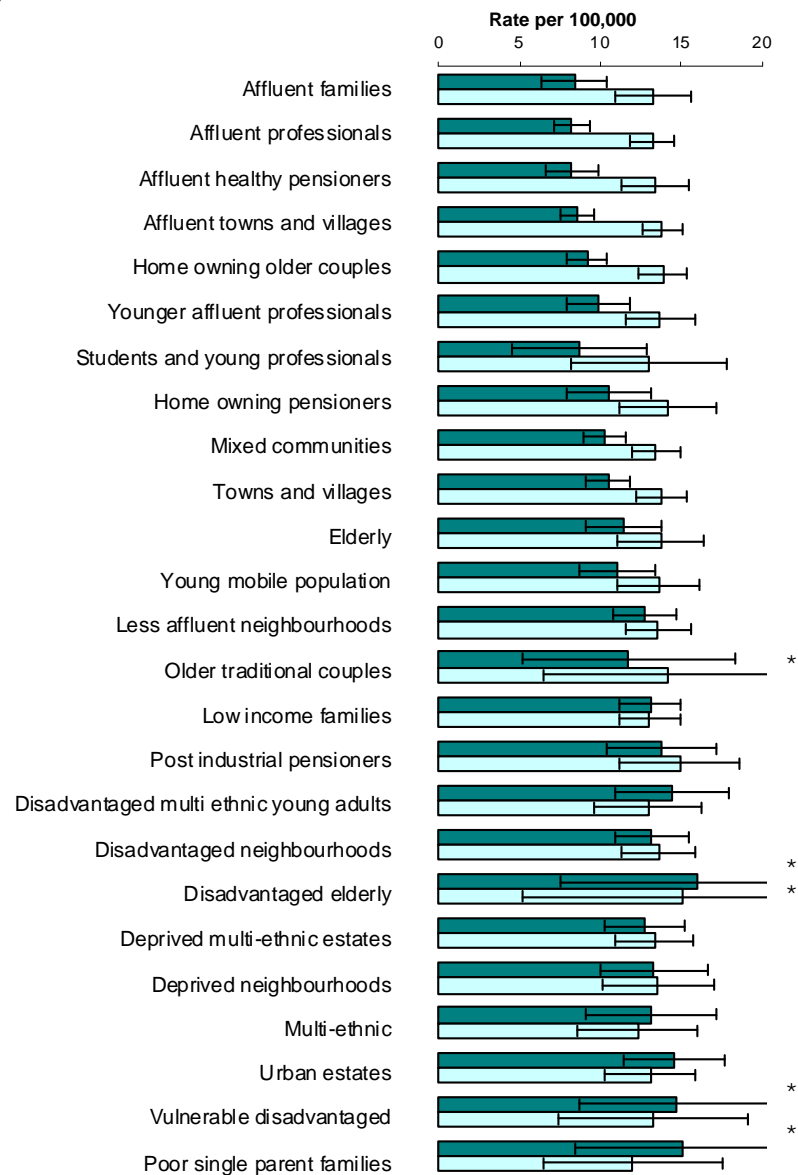
f) Office for National Statistics (ONS) Area classifications

3.2 Alcohol-specific mental and behavioural disorders

Alcohol-specific mental and behavioural disorders were the second most prevalent condition grouping for males in England in 2006/07, but the third most prevalent for females. Thus, males experienced admission at a rate of 262.2 per 100,000 compared with 153.2 for admission for acute-alcohol-attributable conditions. Rates of admission for alcohol-specific mental and behavioural disorders for males were more than twice the equivalent rates for females in England in 2006/07 (262.6 per 100,000 compared with 101.7). (See appendices for figures and details of analysis.)

3.2.1 Males

The rate of hospital admission due to alcohol-specific mental and behavioural disorders according to classification for males ranged from 94.4 to 1,221.7 per 100,000 in England (Figure 2). Those with lower rates of admission tended to be in affluent groups, such as Health ACORN Affluent Families (94.4) and Affluent Professionals (94.4), IMD decile Least Deprived (95.1), Mosaic Career Professionals (98.8) and ONS Area Urban Commuter (99.8). For all of these segments, the rate was significantly lower than the male national average (262.6 per 100,000).

Groups with higher rates of hospital admission due to alcohol-specific mental and behavioural quintiles often represented the most deprived quintiles including: Health ACORN Vulnerable Disadvantaged (1,221.7 per 100,000) and Disadvantaged Elderly (1,025.8), P[2] Urban Challenge (1,059.4) and Mosaic Social Housing (846.0). For all of these classifications, the rate was significantly higher than the overall average. Significantly higher levels of admission were also seen in some of the younger, student or professional groups, such as Mosaic Educated Young Single People (338.9 per 100,000) and P[2] New Starters (523.1).

The prevalence of admission for alcohol-specific mental and behavioural disorders was significantly related to deprivation for five of the six classification systems, with more deprived segments typically showing higher rates of admission. IMD quintile was the only classification system where there no such relationship was identified.

3.2.2 Females

The rate of hospital admission due to alcohol-specific mental and behavioural disorders according to classification for females ranged from 43.3 to 421.3 per 100,000 in England (Figure 2). The lowest rates were found in affluent, professional and/or rural segments including: Health ACORN Affluent Professionals (43.3); ONS Area Farming and Forestry (44.3 per 100,000), and Mosaic Career Professionals (46.0) and Rural Area Residents (53.2). For all of these groups, the rate was significantly lower than the female national average (101.7 per 100,000).

The higher rates of admission due to alcohol-specific mental and behavioural disorders were found in the most deprived segments including Health ACORN Disadvantaged Elderly (421.3 per 100,000) and Vulnerable Disadvantaged (391.0), and P[2] Urban Challenge (308.0). For all of these segments, the rate was significantly higher than average. Significantly higher levels of admission were also seen in some of the younger, student or professional groups, including Mosaic Educated Young Single People (117.4 per 100,000).

The prevalence of admission for alcohol-specific mental and behavioural disorders was significantly related to deprivation for five of the six classification systems with more deprived segments typically showing higher rates of admission. IMD quintile was the only classification system where there was no significant correlation with deprivation.

Figure 2: Rate of hospital admission for alcohol-specific mental and behavioural disorders per 100,000 by gender and geodemographic classification, in England in 2006/07.
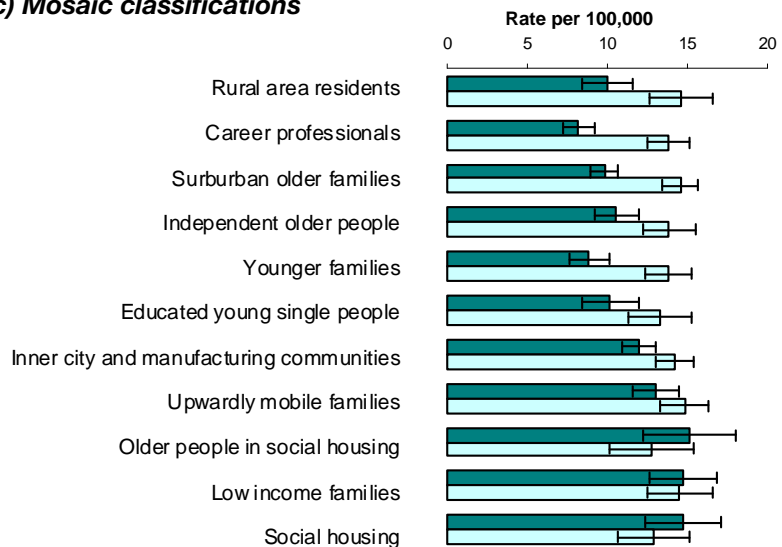
Values for the figures and significant difference are shown in the appendices. Error bars show 95% confidence intervals. Classifications are arranged from least to most deprived group.
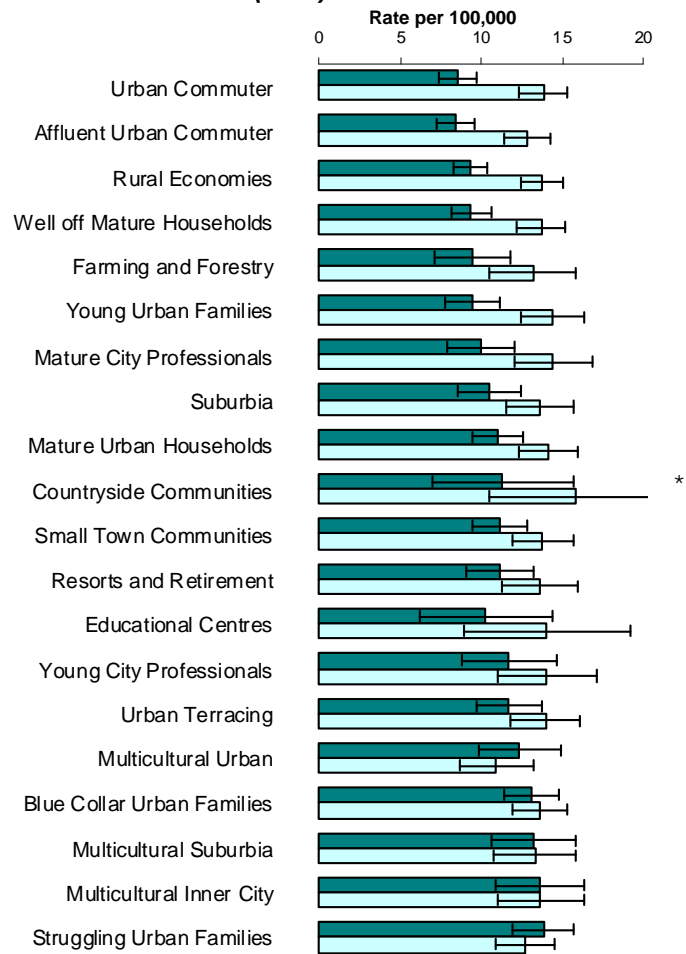
Males   Females

a) Index of Multiple Deprivation (IMD) 2007 quintiles
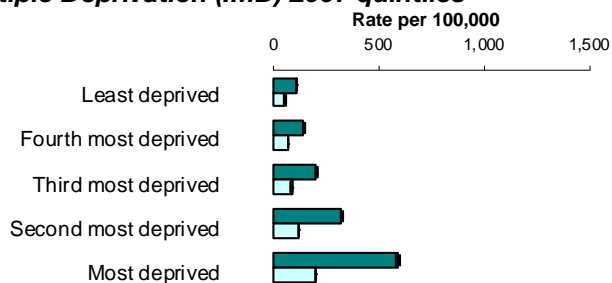
b) Index of Multiple Deprivation (IMD) 2007 deciles
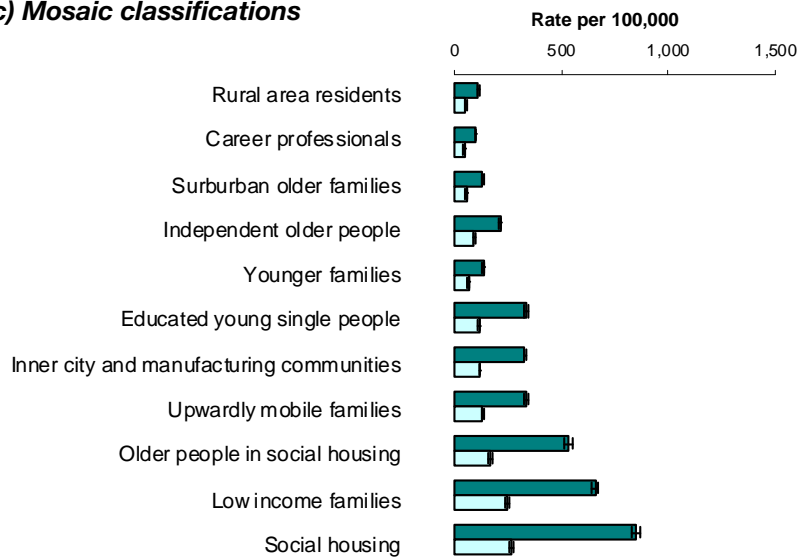
c) Mosaic classifications

d) People and Places (P²) classifications

Figure 2 (continued): Rate of hospital admission for alcohol-specific mental and behavioural disorders per 100,000 by gender and geodemographic classification, in England in 2006/07.

e) Health ACORN classifications
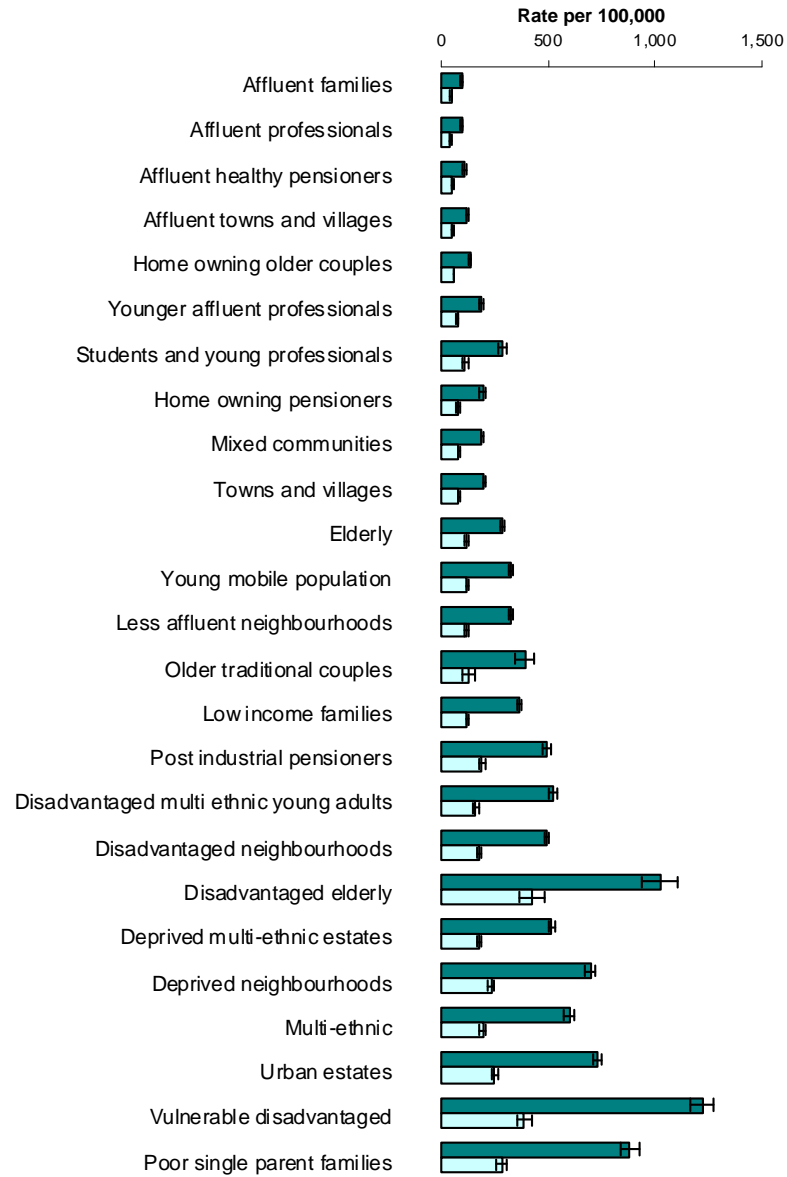
f) Office for National Statistics (ONS) Area classifications

3.3 Alcohol-attributable acute conditions

Alcohol-attributable acute conditions were the third most prevalent admission grouping of those discussed for males but the second most prevalent admission grouping for females. Thus, females experienced admission for acute conditions at a rate of 143.2 per 100,000 compared with 101.7 for admission for alcohol-specific mental and behavioural disorders. The rate of hospital admission due to alcohol-attributable acute conditions was significantly higher for males compared with females in England in 2006/07 (153.2 and 143.2 per 100,000 respectively). (See appendices for figures and details of analysis.)

3.3.1 Males

The rate of hospital admission due to alcohol-attributable acute conditions according to classification for males ranged from 86.1 to 428.8 per 100,000 in England (Figure 3). Lower rates tended to be found in affluent groups including Mosaic Rural Area Residents (86.1 per 100,000), and Health ACORN Affluent Families (88.2) and Affluent Professionals (89.0). For all of these groups, the rate was significantly lower than the male national average (153.2 per 100,000).

Higher rates of hospital admission due to alcohol-attributable acute conditions were found in deprived segments including Health ACORN Vulnerable Disadvantaged (428.8 per 100,000) and Disadvantaged Elderly (365.8), P^2 Urban Challenge (358.6), and ONS Area Struggling Urban Families (311.6). For all of these groups, the rate was significantly higher than average.

The prevalence of admission for alcohol-attributable acute conditions showed a significant relationship with deprivation for four of the six classification systems with deprived segments typically showing higher rates of admission than affluent ones. IMD quintile and Mosaic were the only classification systems identified no such relationship.

3.3.2 Females

The rate of hospital admission due to alcohol-attributable acute conditions according to classification for females ranged from 82.5 to 339.1 per 100,000 in England (Figure 3). Lower rates tended to be found in affluent groups including Mosaic Rural Area Residents (82.5 per 100,000), Health ACORN Affluent Professionals (84.3) and Affluent Health Pensioners (85.5) and the least deprived IMD decile (90.2). For all of these groups, the rate was significantly lower than the female national average (143.2 per 100,000).

Higher rates of admission for alcohol-attributable acute conditions were found in deprived segments including Health ACORN Poor Single Parent Families (339.1 per 100,000) and Vulnerable Disadvantaged (334.3.3), and P^2 Urban Challenge (308.0). For all of these groups, the rate was significantly higher than average.

The prevalence of admission for alcohol-attributable acute conditions showed a significant relationship with to deprivation for four of the six classification systems with deprived segments typically showing higher rates of admission than affluent ones. IMD quintile and Mosaic were the only classification systems where there was no such relationship.

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Figure 3: Rate of hospital admission for alcohol-attributable acute conditions per 100,000 by gender and geodemographic classification, in England in 2006/07.

Values for the figures and significant difference are shown in the appendices. Error bars show 95% confidence intervals. Classifications are arranged from least to most deprived group. *Confidence intervals are too wide to be displayed in full.
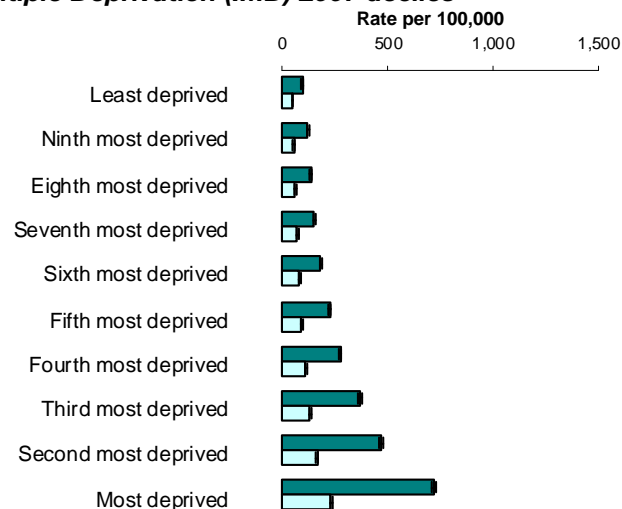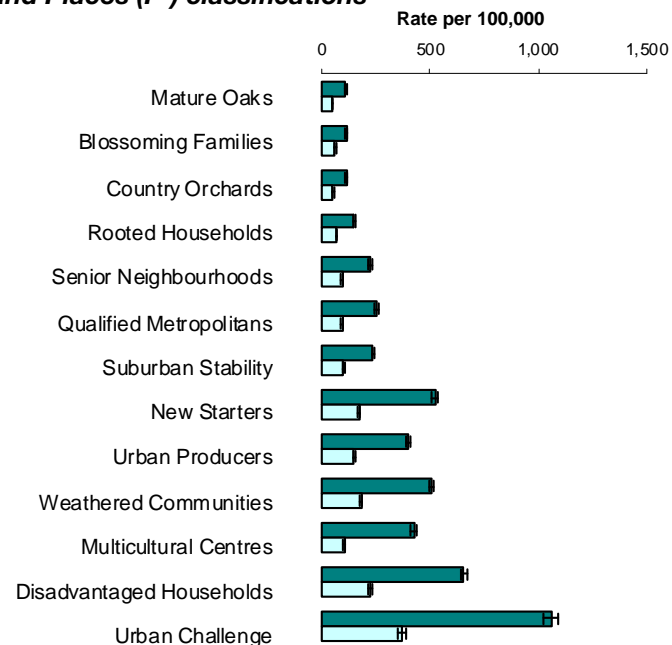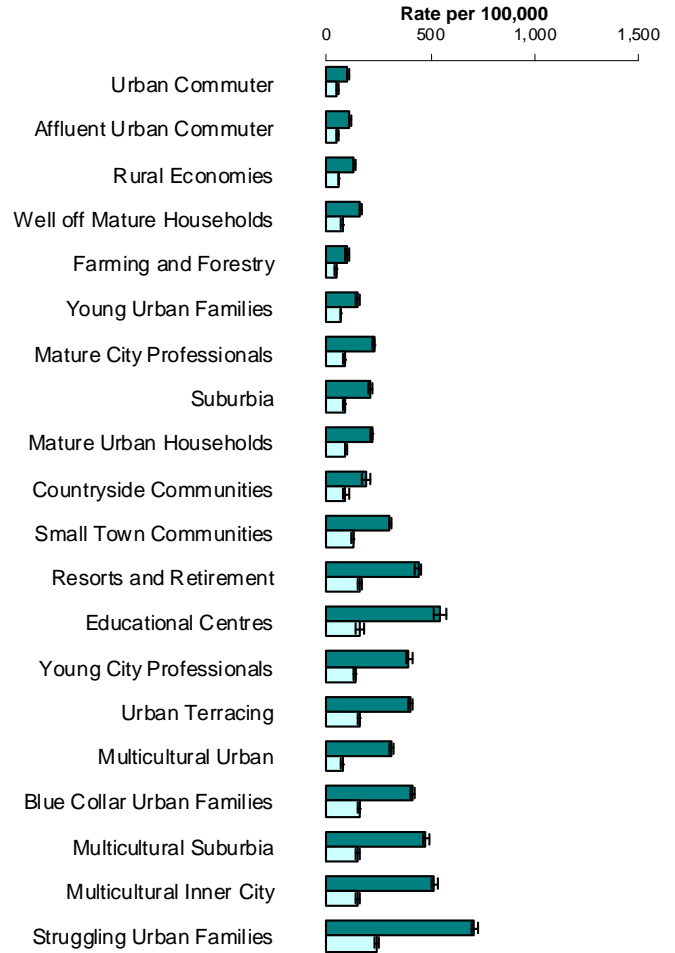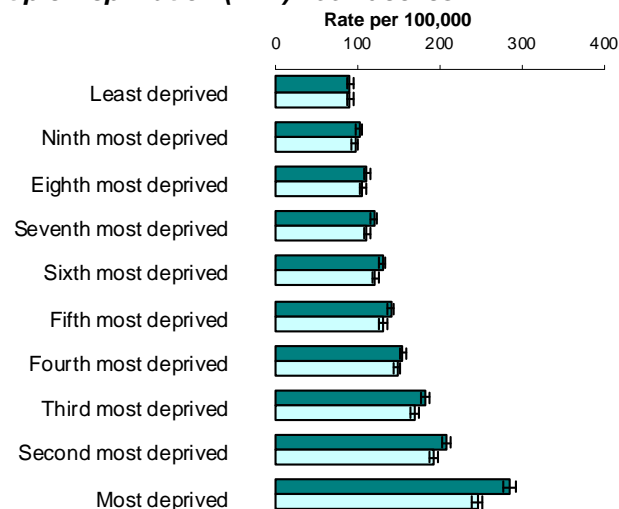
■ Males   □ Females
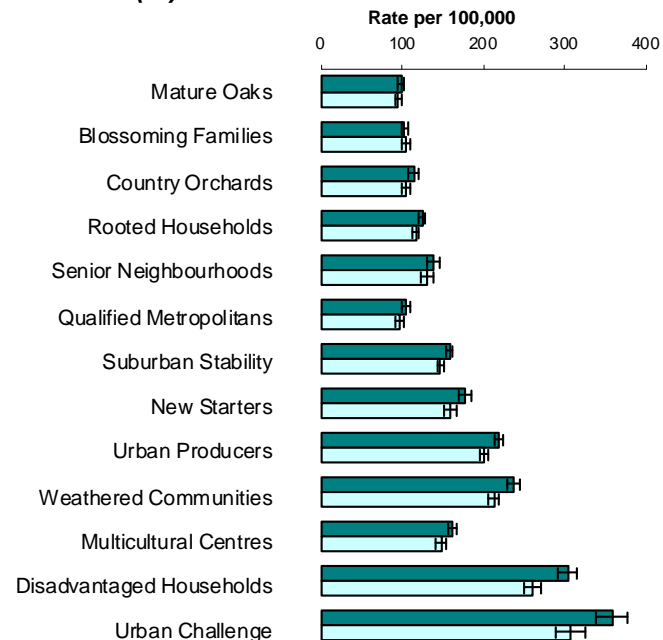
Figure 3 (continued): Rate of hospital admission for alcohol-attributable acute conditions per 100,000 by gender and geodemographic classification, in England in 2006/07.

e) Health ACORN classifications
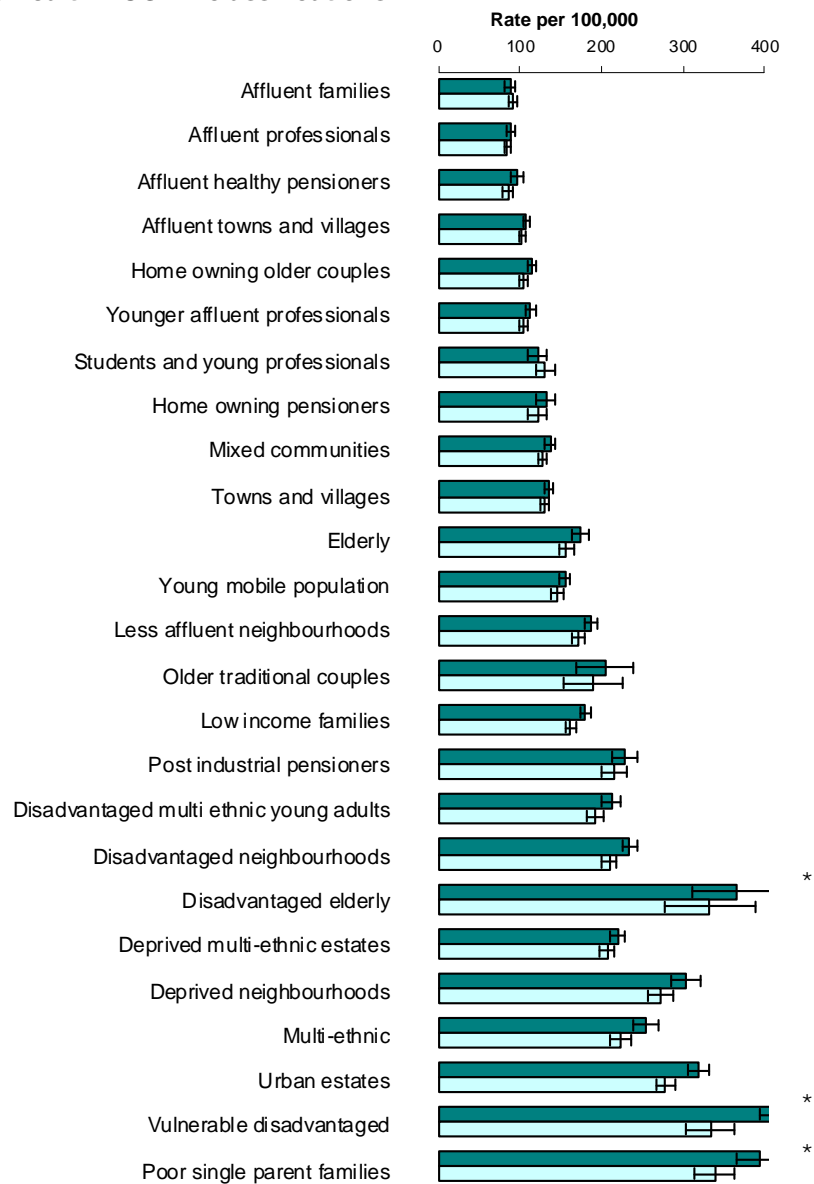
f) Office for National Statistics (ONS) Area classifications
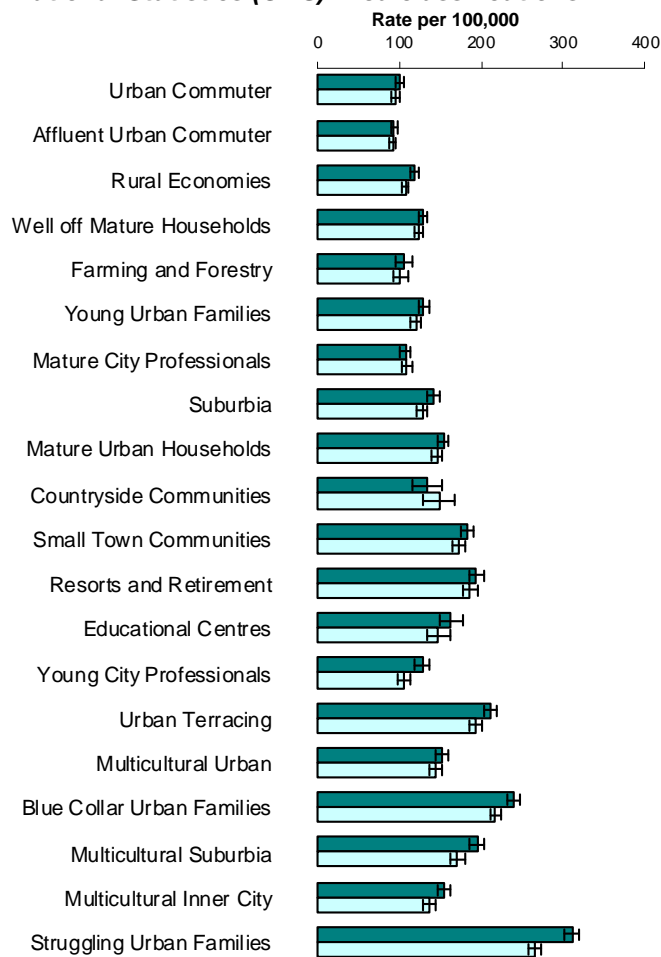
3.4   Alcohol-attributable chronic conditions

Admission for alcohol-attributable chronic conditions was the most prevalent admission grouping discussed in this report. The rate of alcohol-attributable chronic admission for males (739.8 per 100,000) was almost three times the rate of admission for alcohol-specific mental and behavioural disorders (262.6) and almost five times the rate of admission for acute conditions (153.2). For females, the rate of admission for alcohol-attributable chronic conditions (397.7 per 100,000) was almost three times the rate of acute admission (143.2) and almost four times the rate of admission for mental and behaviour disorders (101.7). Rates of hospital admission for alcohol-attributable chronic conditions for males were almost twice that for females in England in 2006/07 (739.8 per 100,000 compared with 397.7 respectively). (See appendices for figures and details of analysis.)

3.4.1   Males

The rate of hospital admission due to alcohol-attributable chronic conditions according to classification for males ranged from 515.5 to 1,448.0 per 100,000 in England (Figure 4). Rates were lowest in the most affluent groups including Health ACORN Affluent Professionals (515.5 per 100,000), Affluent Healthy Pensioners (537.2) and Affluent Families (562.1), and Mosaic Career Professionals (539.9). For all of these groups, the rate was significantly lower than the male national average (739.8 per 100,000).

Rates of admission for alcohol-attributable chronic conditions were typically highest in the most deprived segments such as Health ACORN Disadvantaged Elderly (1,448.0 per 100,000, although the associated 95% confidence intervals were wide) and Vulnerable Disadvantaged (1,412.5), P^2 Urban Challenge (1,258.2), the most deprived IMD decile (1,137.9) and Mosaic

Low Income Families (1,207.6). For all of these groups, the rate was significantly higher than average.

The prevalence of admission for alcohol-attributable chronic conditions disorders was significantly related to deprivation for five of the six classification systems, with more deprived segments typically showing higher rates of admission. IMD quintile was the only classification system where there was no such relationship.

3.4.2   Females

The rate of hospital admission due to alcohol-attributable chronic conditions according to classification for females ranged from 257.9 to 880.2 per 100,000 in England (Figure 4). The lowest rates were found in the least deprived segments, including Health ACORN Affluent Professionals (257.9 per 100,000) and Affluent Healthy Pensioners (265.9), Mosaic Career Professionals (261.5) the least deprived IMD decile (274.2), P^2 Mature Oaks (283.5), and ONS Area Affluent Urban Commuter (287.7). For all of these groups, the rate was significantly lower than the female national average (397.7 per 100,000).

Higher rates of admission for alcohol-attributable chronic conditions were found in the most deprived segments, including: Health ACORN Disadvantaged Elderly (880.2 per 100,000) and Vulnerable Disadvantaged (838.3) and P^2 Urban Challenge (723.7). For all of these groups, the rate was significantly higher than average.
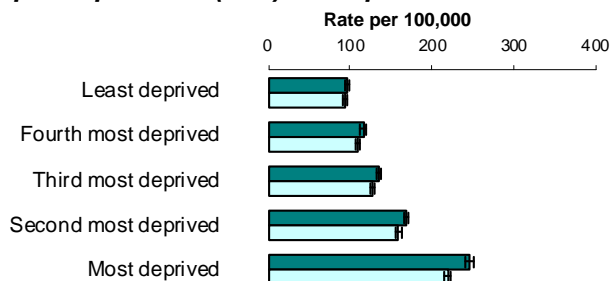
The prevalence of admission for alcohol-attributable chronic conditions was significantly related to deprivation for five of the six classification systems, with more deprived segments typically showing higher rates of admission. IMD quintile was the only classification system where there is no such relationship.

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Figure 4: Rate of hospital admission for alcohol-attributable chronic conditions per 100,000 by gender and geodemographic classification, in England in 2006/07.
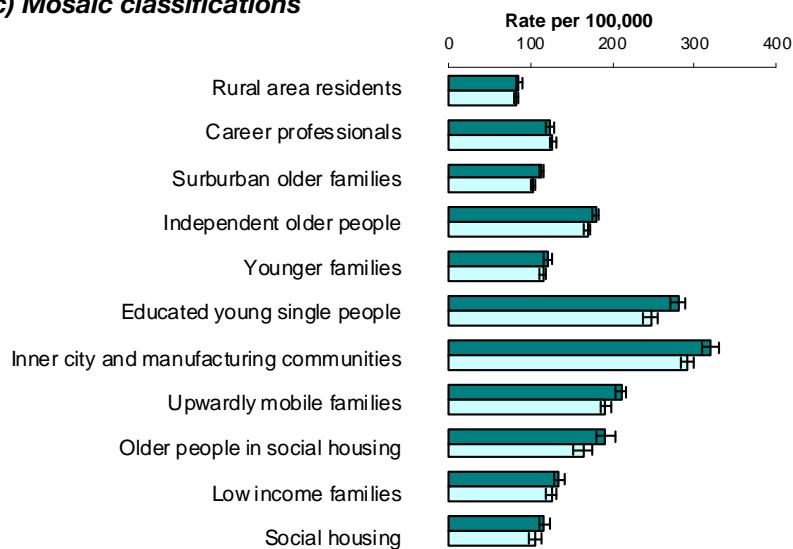
Values for the figures and significant difference are shown in the appendices. Error bars show 95% confidence intervals. Classifications are arranged from least to most deprived group. *Confidence intervals are too wide to be displayed in full.

■ Males   □ Females

a) Index of Multiple Deprivation (IMD) 2007 quintiles

b) Index of Multiple Deprivation (IMD) 2007 deciles

c) Mosaic classifications
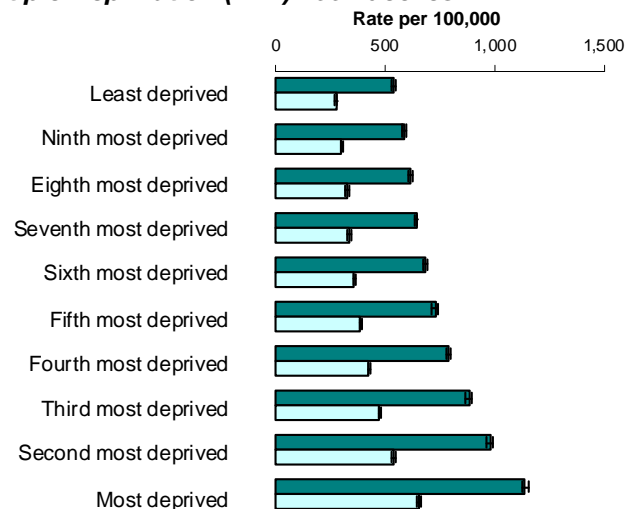
*d) People and Places (P²) classifications*
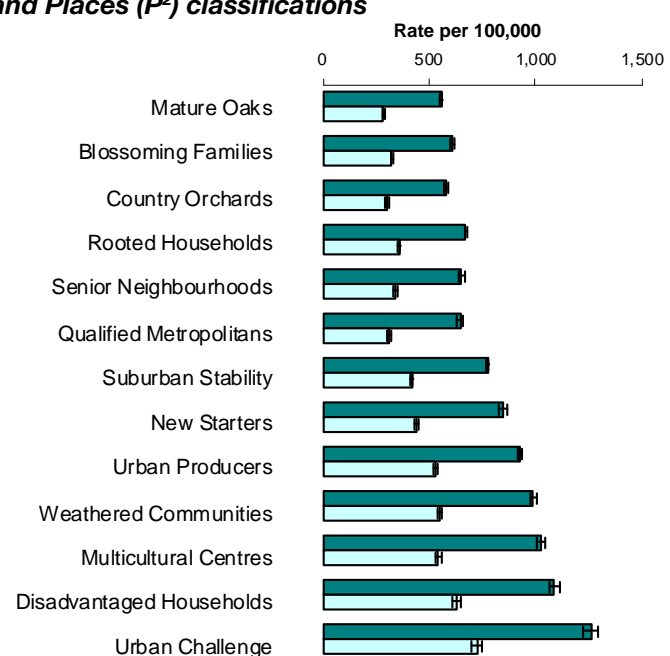
Figure 4 (continued): Rate of hospital admission for alcohol-attributable chronic conditions per 100,000 by gender and geodemographic classification, in England in 2006/07.

e) Health ACORN classifications
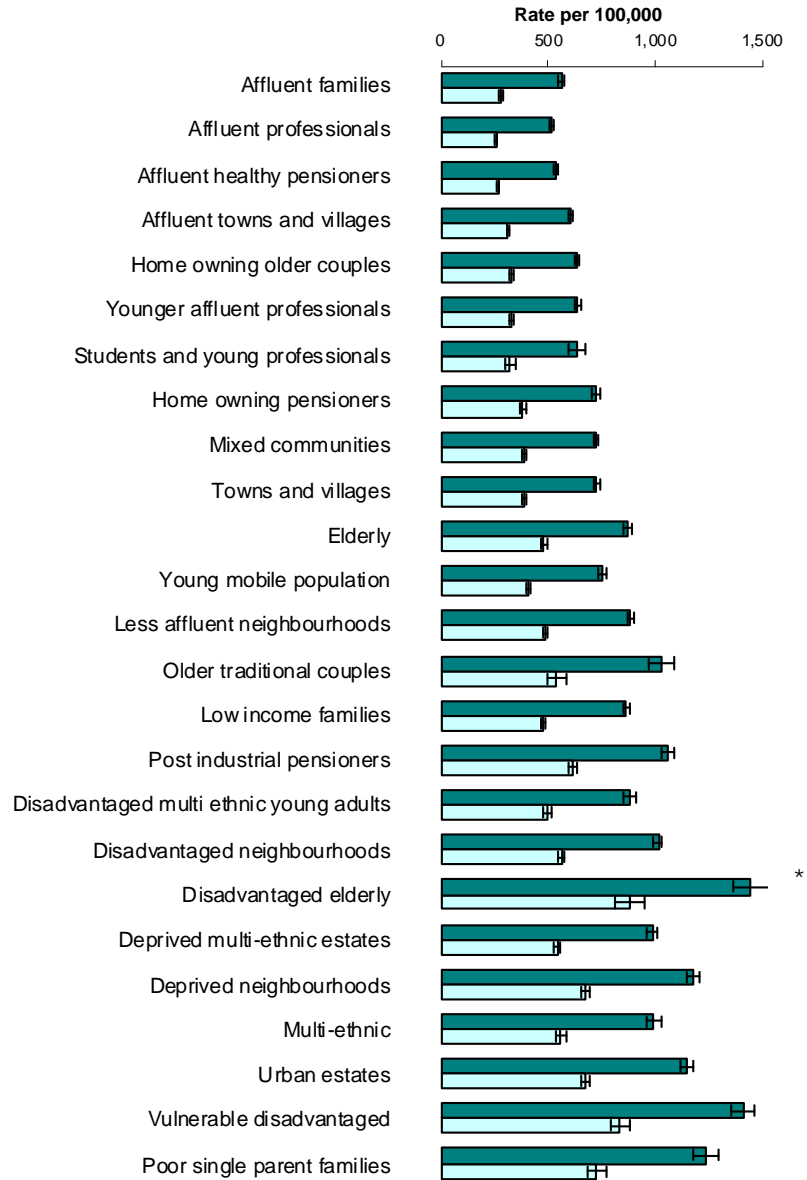
f) Office for National Statistics (ONS) Area classifications
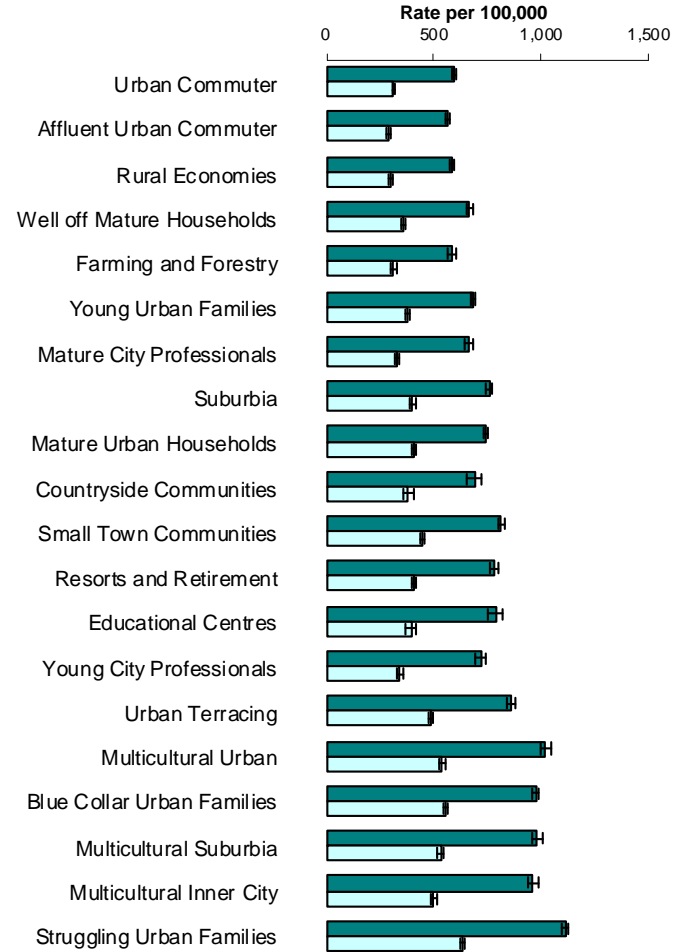
4. Discussion

Here, we provide a discussion of the key findings from the hospital admission analysis for England in 2006/07. For information on how attitudes towards alcohol and consumption itself relate to the geodemographic classifications and accompanying discussions, see segmentation reports 1 and 2 respectively.[11, 12] Segmentation report 4 brings together all of the information presented in this series to provide pen portraits of the segments for Mosaic and P^2 classification systems.[13]

While there are several data and analysis limitations that must be considered (see Section 2.4), this report highlights a number of valuable findings. In general, individual variations between the different classification systems were evident, but when used together they showed many commonalities. For those seeking information about which classification system to use, it is important to bear in mind the differences identified throughout this report, but also to remember that overall they provide a common pattern in terms of deprivation, gender and age.

The subsequent discussion focuses on where types of alcohol-attributable hospital admission were typically more or less prevalent. However, further work is needed in order to fully understand hospital treatment surrounding alcohol-attributable conditions and injuries, first, to gain a more qualitative insight but also to include data on presentations to accident and emergency departments. This is because (as noted in Section 2.4), the data examined do not include such presentations (unless they resulted in a subsequent admission) and it is not known to what extent their inclusion would affect the findings, particularly around acute conditions. This is important because of the high prevalence of such presentations among particular groups. For example, research with Liverpool nightlife users (n=380) shows that one in ten participants had been involved in a fight in the last year while on a night out.[18] Of these, 43% sustained an injury.

Very little intelligence has previously been published which examines in-depth groups in England who are most likely to be admitted to hospital for an alcohol-attributable condition. Thus, it is difficult to make direct comparisons between the findings highlighted here and published work. However, three reports have provided some evidence around groups at risk of alcohol-attributable hospital admission in England. The first of these is the Association of Public Health Observatories' (APHO) *Indications of Public Health* report on alcohol.[14] This examined alcohol-specific and alcohol-attributable hospital admission in relation to P^2 classifications and showed that the prevalence of these increased with higher levels of deprivation. (Alcohol-specific admissions are those that are wholly related to alcohol such as ethanol poisoning, whi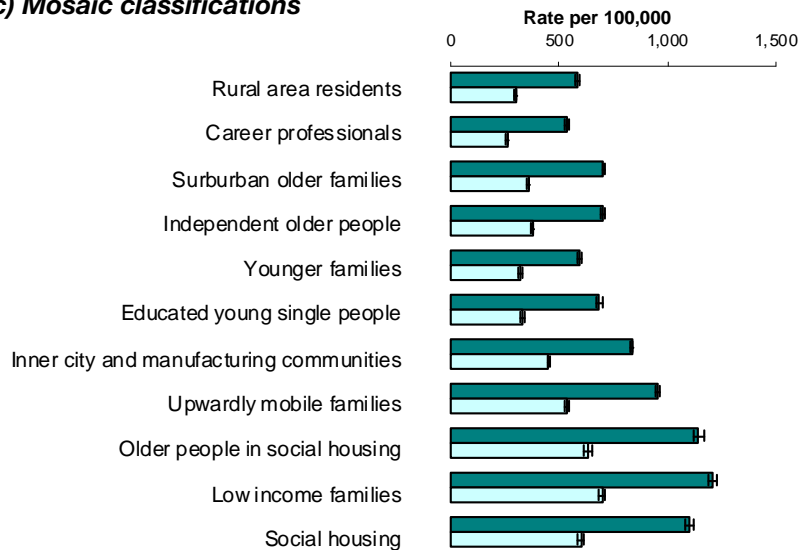le alcohol-attributable are those that are wholly related to alcohol, together with those that are partially related, such as assaults). Slight peaks were also seen in the younger segments, and males showed considerably higher rates than females.

Two reports by Dedman et al. (2006) examined alcohol-specific hospital admission by P^2.[7, 10] The first, looking at health inequalities, found that the prevalence of alcohol-specific hospital admission increased with deprivation.[10] Slight peaks were again seen in the younger segments, and males showed considerably higher rates than females. The other report on population targeting supported these findings but in addition also examined hospital admission due to mental health conditions in general (not just those that were alcohol-attributable).[7] Here, higher levels of admission were again found to be more common among males, in the more deprived groups, as well as some of the younger groups.

All three of the reports mentioned above provide valuable information on which population groups are more at risk of alcohol-attributable hospital admissions. However, they only used one geodemographic segmentation system (P^2) and did not provide an in-depth examination of alcohol-attributable admissions, instead dividing the analysis only into alcohol-specific and attributable admission. Our findings go further by

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grouping the admissions into low-alcohol attributable, mental and behavioural, acute and chronic and provide the data by six different geodemographic segmentation systems. These reports outlined above are used in the subsequent discussions around our report's main findings.

4.1 Conditions with low alcohol-attributable fractions

Admission for conditions with low alcohol-attributable fractions (such as malignant neoplasm of the colon) had by far the lowest prevalence of the admission groupings discussed. Nevertheless, for males, there was a strong association between deprivation and rates of admission for conditions with low alcohol-attributable fractions, with an increase in deprivation being associated with an increase in admission rates in England in 2006/07. Females overall, in comparison, had a significantly higher rate of admission for such conditions than males but rates were very similar between the individual segments. This provides a different insight than APHO's earlier analysis of alcohol-attributable hospital admission more generally in the *Indications* report, which showed a strong association between increasing rate of alcohol-attributable hospital admission and rising deprivation.[14] Some slight peaks were also seen in the younger segments among both males and females. This corresponds with general alcohol-specific admission in the *Indications* report.[14]

4.2 Alcohol-specific mental and behavioural disorders

Between 2001/02 and 2005/06, alcohol-attributable hospital admission increased by 28% among both males and females in England.[14] For males, almost half (43%) of this increase was in relation to a rise in admission for mental and behavioural disorders associated with alcohol use. In fact, the data presented in our report showed that males experienced more than twice the rate of admission for alcohol-specific mental and behavioural disorders compared with females in England in 2006/07. However, for both males and females, the rate of admission is strongly associated with deprivation, with deprived groups experiencing significantly higher

levels of admission than affluent groups. This is in line with alcohol-specific admission generally, which has strong associations with deprivation, as shown by both the *Indications* report and Dedman et al.'s report on health inequalities.[10, 14] Thus groups such as P^2 Urban Challenge experienced the highest levels of harm both in relation to alcohol-specific mental and behavioural disorders as well as alcohol-attributable admissions more generally. Similar patterns have also been identified in relation to admission for mental health conditions as a whole, whereby geodemographic classification systems have shown that those living in deprived segments suffer higher rates of admission than those in affluent areas, as shown by Dedman et al.'s report on population targeting.[7] In addition, and as with our findings presented here, higher levels of admission for both alcohol-specific conditions and mental health conditions more generally are found in some of the younger groups such as P^2 New Starters, which would not be expected considering their level of deprivation. This is also evidenced in both of the Dedman et al. reports.[7, 10]

4.3 Alcohol-attributable acute conditions

Males experienced significantly higher rates of admission for alcohol-attributable acute conditions compared with females in England in 2006/07. However, tackling admission for acute conditions is important for both females and males, as whilst males have a higher prevalence of admission, it is the second most common category of admission for females. For both males and females, there was some evidence that the rate of admission for alcohol-attributable acute conditions can be associated with deprivation, with more deprived groups experiencing higher levels of admission than affluent ones. This is in line with patterns observed for alcohol-attributable hospital admission more generally, as shown by the *Indications* report.[14] Thus groups such as P^2 Urban Challenge experienced the highest levels of harm both in relation to alcohol-attributable acute conditions as well as alcohol-attributable conditions more generally.[14]

4.4 Alcohol-attributable chronic conditions

Admission for alcohol-attributable chronic conditions was by far the most prevalent admission grouping discussed. Rates of admission for such conditions were almost five times higher than rates of admission for alcohol-attributable acute conditions and almost three times higher than admission for alcohol-specific mental and behavioural disorders. A similar pattern could be seen for females, although not quite to the same extent. As noted in Section 4.2, between 2001/02 and 2005/06, alcohol-attributable hospital admission increased by 28% among both males and females in England.[14] For males, a third of this increase was in relation to a rise in admissions for alcohol-attributable chronic conditions. Because of the high (and increasing) prevalence of such conditions, if local areas are to effectively meet established targets around reducing hospital admission, it is vital that these individuals at risk of alcohol-attributable chronic conditions are identified early and provided with effective services. Thus, identifying the characteristics of these individuals is crucial.

Here we show that males experienced almost double the rate of admission for alcohol-attributable chronic conditions compared with females in England in 2006/07. However, for both males and females, the rate of admission for alcohol-attributable chronic conditions was strongly associated with deprivation, with more deprived groups experiencing higher levels of admission than affluent ones. This is in line with patterns observed for alcohol-attributable hospital admission more generally, as shown by the *Indications* report,[14] and admission for alcoholic liver disease.[19] Thus groups such as P^2 Urban Challenge experienced the highest levels of harm both in relation to alcohol-attributable chronic conditions as well as alcohol-attributable conditions more generally.[14]

5. Conclusion

This report has outlined the levels of alcohol-related hospital admission that are present in different population groups in order to develop understanding in relation to alcohol misuse. The findings should be used (in conjunction with the other reports in this series and further research) to develop targeted interventions and campaigns. After all, it is only through understanding the populations at risk that effective support, alternative activities and appropriate information can be supplied.

6. References

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7. Appendices

7.1 Guide to appendices

Appendices 1-4 detail the conditions included in the analysis. Overall alcohol-attributable fractions have also been provided for information; however, for the analysis performed for this report, attributable fractions employed differed according to age and gender. See Jones et al. (2008)[2] for further details of these fractions and how they were calculated.

Appendices 5-10 show the directly standardised rates (DSR) of individuals that are estimated to be admitted to hospital according to type of admission, gender and geodemographic classification in England. The rates are displayed with their 95% confidence intervals (95% CIs). Where cells are highlighted, this indicates that the associated figure is significantly different from the mean for that gender. Cells shaded in dark green are significantly higher than the average, and cells shaded in light green are significantly lower than the average (see key below). Figures have been rounded to one decimal place but significance is taken from the unrounded figure. The tables are divided into gender and by classification system. In each of the tables, the categories are ordered from least to most deprived.

Key:

Dark green cell	Significantly *higher* than average
Light green cell	Significantly *lower* than average
DSR	Directly standardised rate
95% CI	95% confidence interval

Appendix 1: Conditions with low alcohol-attributable fractions included in the analysis.

Description of conditions with low alcohol attributable fractions	ICD-10 code	Overall attributable fraction	
		Males	**Females**
Malignant neoplasm of colon	C18	0.03	0.02
Malignant neoplasm of rectum	C20	0.07	0.03
Malignant neoplasm of liver and intrahepatic bile ducts	C22	0.13	0.06
Malignant neoplasm of breast	C50	-	0.06
Heart failure	I50-I51	0.004	0.002
Haemorrhagic stroke	I60-I62, I69.0-I69.2	0.23	0.09
Ischaemic stroke	I63-I66, I69.3-I69.4	-0.0002	-0.06

Source: Jones et al. (2008).[2]

Appendix 2:   included in the analysis.

Description of mental and behavioural disorders related to alcohol	ICD-10 code	Overall attributable fraction
Mental and behavioural disorders due to use of alcohol*	F10	1.00

* This may include, for example, conditions such as acute intoxication, dependence syndrome, withdrawal, psychotic disorder, and amnesic syndrome.
Source: Jones et al. (2008).[2]

Appendix 3: Acute conditions included in the analysis.

Description of acute conditions	ICD-10 code	Overall attributable fraction	
		Males	Females
Road traffic accidents (driver/rider)	V12-V14 (.3-.9), V19.4-V19.6, V19.9, V20-V28 (.3-.9), V29-V79 (.4-.9), V80.3-V80.5, V81.1, V82.1, V82.9, V83-V86 (.0-.3), V87.0-V87.9, V89.2, V89.3, V89.9	0.32	0.11
Pedestrian traffic accidents	V02-V04 (.1-.9), VO6.1, VO9.2, V09.3	0.36	0.18
Spontaneous abortion	O03	-	0.21
Ethanol poisoning	T51.0	1.00	1.00
Methanol poisoning	T51.1	1.00	1.00
Toxic effect of alcohol, unspecified	T51.9	1.00	1.00
Water transport accidents	V90-V94	0.20	0.00
Air/space transport accidents	V95-V97	0.16	0.16
Fall injuries	W00-W19	0.15	0.05
Work / machine injuries	W24-W31	0.07	0.07
Firearm injuries	W32-W34	0.25	0.00
Drowning	W65-W74	0.34	0.34
Inhalation of gastric contents / inhalation of food causing obstruction of the respiratory tract	W78-W79	0.25	0.25
Fire injuries	X00-X09	0.38	0.38
Accidental excessive cold	X31	0.25	0.25
Accidental poisoning by and exposure to alcohol	X45	1.00	1.00
Intentional self-harm / event of undetermined intent	X60-X84, Y10-Y34	0.34	0.31
Assault	X85-Y09	0.27	0.27

Source: Jones et al. (2008).[2]

Appendix 4: Chronic conditions included in the analysis.

Description of chronic conditions	ICD-10 code	Overall attributable fraction	
		Males	Females
Malignant neoplasm of lip, oral cavity and pharynx	C00-C14	0.45	0.26
Malignant neoplasm of oesophagus	C15	0.26	0.12
Malignant neoplasm of larynx	C32	0.28	0.14
Alcohol-induced pseudo-cushing's syndrome	E24.4	1.00	1.00
Degeneration of nervous system due to alcohol	G31.2	1.00	1.00
Epilepsy and status epilepticus	G40-G41	0.55	0.50
Alcohol polyneuropathy	G62.1	1.00	1.00
Alcoholic myopathy	G72.1	1.00	1.00
Hypertensive diseases	I10-I15	0.25	0.10
Alcoholic cardiomyopathy	I42.6	1.00	1.00
Cardiac arrhythmias	I47-I48	0.31	0.23
Oesophageal varices	I85	0.73	0.46
Gastro-oesophageal laceration-haemorrhage syndrome	K22.6	0.47	0.47
Alcoholic gastritis	K29.2	1.00	1.00
Alcoholic liver disease	K70	1.00	1.00
Liver cirrhosis	K73, K74	0.72	0.47
Acute and chronic pancreatitis	K85, K86.1	0.22	0.09
Chronic pancreatitis (alcohol induced)	K86.0	1.00	1.00
Psoriarsis	L40, excluding L405	0.34	0.24

Source: Jones et al. (2008).[2]

Appendix 5: Hospital admission (rate per 100,000) by gender and Index of Multiple Deprivation (IMD) 2007 quintile, in England in 2006/07.

Classification	Low alcohol-attributable conditions		Alcohol-specific mental and behavioural		Alcohol-attributable acute conditions		Alcohol-attributable chronic conditions	
	DSR	95% CI	DSR	95% CI	DSR	95% CI	DSR	95% CI
MALES								
Least deprived	8.4	7.7-9.1	106.6	103.7-109.4	96.3	93.5-99.1	561.6	555.7-567.4
Fourth most deprived	9.2	8.5-10.0	142.2	139.0-145.5	115.7	112.7-118.7	628.8	622.7-635.0
Third most deprived	10.1	9.3-11.0	201.2	197.3-205.0	134.9	131.7-138.1	702.9	696.2-709.7
Second most deprived	11.9	10.9-12.8	319.0	314.1-324.0	168.5	164.9-172.0	833.7	825.8-841.5
Most deprived	13.7	12.7-14.8	590.0	583.0-597.0	245.9	241.6-250.2	1056.6	1047.3-1066.0
Overall	10.5	10.1-10.9	262.6	260.6-264.6	153.2	151.7-154.7	739.8	736.6-743.0
Pearson's Rho (P)	0.722 (P=0.169)		0.735 (P=0.157)		0.754 (P=0.141)		0.740 (P=0.153)	
FEMALES								
Least deprived	13.3	12.4-14.3	51.9	49.9-53.8	93.8	91.0-96.6	287.2	283.2-291.3
Fourth most deprived	13.7	12.8-14.7	64.9	62.7-67.1	108.7	105.7-111.7	330.8	326.4-335.2
Third most deprived	13.8	12.9-14.8	84.9	82.4-87.4	126.4	123.3-129.5	372.7	368.0-377.5
Second most deprived	13.8	12.7-14.8	118.7	115.7-121.8	159.1	155.6-162.5	449.7	444.2-455.2
Most deprived	13.1	12.0-14.2	197.0	193.0-201.0	219.5	215.5-223.5	593.1	586.4-599.8
Overall	13.6	13.1-14.0	101.7	100.4-102.9	143.2	141.7-144.7	397.7	395.4-399.9
Pearson's Rho (P)	-0.165 (P=0.791)		0.845 (P=0.071)		0.852 (P=0.067)		0.860 (P=0.062)	

Appendix 6: Hospital admission (rate per 100,000) by gender and Index of Multiple Deprivation (IMD) 2007 decile, in England in 2006/07.

Classification	Low alcohol-attributable conditions		Alcohol-specific mental and behavioural		Alcohol-attributable acute conditions		Alcohol-attributable chronic conditions	
	DSR	95% CI	DSR	95% CI	DSR	95% CI	DSR	95% CI
MALES								
Least deprived	8.2	7.2-9.3	95.1	91.2-98.9	90.5	86.6-94.4	535.7	527.6-543.8
Ninth most deprived	8.6	7.5-9.6	117.9	113.7-122.1	102.0	98.0-106.0	587.0	578.6-595.4
Eighth most deprived	9.4	8.3-10.5	133.8	129.3-138.3	111.7	107.4-115.9	617.8	609.2-626.5
Seventh most deprived	9.0	8.0-10.1	150.6	145.9-155.4	119.7	115.4-124.0	639.9	631.0-648.7
Sixth most deprived	9.5	8.4-10.7	178.1	173.0-183.3	129.6	125.2-134.1	679.7	670.4-689.0
Fifth most deprived	10.7	9.5-12.0	224.4	218.7-230.2	140.1	135.6-144.7	726.7	716.9-736.5
Fourth most deprived	11.7	10.3-13.0	272.7	266.3-279.2	155.1	150.3-159.9	788.3	777.7-798.9
Third most deprived	12.1	10.7-13.5	366.7	359.1-374.3	181.7	176.6-186.9	881.7	870.1-893.3
Second most deprived	13.2	11.7-14.7	466.9	458.2-475.6	208.2	202.6-213.7	978.3	965.7-990.9
Most deprived	14.4	12.8-16.0	717.5	706.5-728.4	284.7	278.1-291.3	1137.8	1124.0-1151.7
Overall	10.5	10.1-10.9	262.6	260.6-264.6	153.2	151.7-154.7	739.8	736.6-743.0
Pearson's Rho (P)	0.651 (P<0.05)		0.670 (P<0.05)		0.656 (P<0.05)		0.646 (P<0.05)	
FEMALES								
Least deprived	12.9	11.6-14.2	49.3	46.5-52.1	90.2	86.3-94.1	274.2	268.5-279.8
Ninth most deprived	13.7	12.4-15.1	54.4	51.5-57.2	97.5	93.5-101.5	300.1	294.2-305.9
Eighth most deprived	13.7	12.3-15.0	61.4	58.3-64.4	106.3	102.2-110.5	325.2	319.1-331.4
Seventh most deprived	13.8	12.4-15.1	68.4	65.2-71.6	111.1	106.9-115.3	336.4	330.2-342.6
Sixth most deprived	14.0	12.6-15.3	80.1	76.6-83.6	121.7	117.4-126.0	357.3	350.8-363.9
Fifth most deprived	13.7	12.3-15.1	89.7	86.0-93.3	131.0	126.5-135.4	388.4	381.5-395.3
Fourth most deprived	14.0	12.5-15.4	109.0	104.9-113.1	148.0	143.3-152.7	425.8	418.3-433.3
Third most deprived	13.6	12.1-15.0	128.6	124.1-133.1	169.9	164.9-174.9	474.8	466.7-482.9
Second most deprived	13.4	11.9-14.8	164.1	159.0-169.2	193.6	188.2-198.9	536.9	528.0-545.7
Most deprived	12.8	11.3-14.3	231.0	224.9-237.2	245.6	239.6-251.6	651.9	641.8-661.9
Overall	13.6	13.1-14.0	101.7	100.4-102.9	143.2	141.7-144.7	397.7	395.4-399.9
Pearson's Rho (P)	-0.185 (P=0.609)		0.846 (P<0.01)		0.862 (P<0.01)		0.868 (P<0.01)	

Appendix 7: Hospital admission (rate per 100,000) by gender and Mosaic classification, in England in 2006/07.

Classification	Low alcohol-attributable conditions		Alcohol-specific mental and behavioural		Alcohol-attributable acute conditions		Alcohol-attributable chronic conditions	
	DSR	95% CI	DSR	95% CI	DSR	95% CI	DSR	95% CI
MALES								
Rural Area Residents	9.9	8.3-11.5	112.9	106.3-119.4	86.1	82.3-89.8	584.9	573.2-596.6
Career Professionals	8.2	7.2-9.1	98.8	95.0-102.7	123.9	119.6-128.2	539.9	532.1-547.6
Suburban Older Families	9.8	8.9-10.7	132.8	129.2-136.3	113.5	110.1-116.9	705.0	697.8-712.1
Independent Older People	10.5	9.1-11.9	213.7	206.3-221.1	179.4	175.4-183.3	706.2	695.4-716.9
Younger Families	8.8	7.6-10.1	136.7	132.1-141.2	121.8	116.7-126.9	591.9	581.7-602.1
Educated Young Single People	10.1	8.4-11.9	338.9	329.4-348.5	279.8	270.5-289.2	683.5	669.2-697.8
Inner City and Manufacturing Communities	11.9	10.9-13.0	326.7	321.3-332.1	319.5	310.1-328.9	834.3	825.7-842.9
Upwardly Mobile Families	13.0	11.5-14.5	333.3	325.9-340.8	210.3	204.4-216.2	956.6	944.5-968.7
Older People in Social Housing	15.1	12.2-18.0	532.3	513.7-550.8	190.8	179.2-202.4	1141.3	1117.7-1165.0
Low Income Families	14.7	12.6-16.7	658.8	644.9-672.6	134.6	128.4-140.8	1207.6	1189.1-1226.0
Social Housing	14.7	12.3-17.0	846.0	828.7-863.3	116.9	109.9-124.0	1101.1	1081.0-1121.2
Overall	**10.5**	**10.1-10.9**	**262.6**	**260.6-264.6**	**153.2**	**151.7-154.7**	**739.8**	**736.6-743.0**
Pearson's Rho (P)	**0.893 (P<000.1)**		**0.924 (P<0.001)**		**0.279 (P=0.406)**		**0.913 (P<0.001)**	
FEMALES								
Rural Area Residents	14.6	12.6-16.5	53.2	48.7-57.7	82.5	78.8-86.1	298.8	290.5-307.0
Career Professionals	13.7	12.5-15.0	46.0	43.4-48.7	127.3	123.0-131.6	261.5	256.4-266.7
Suburban Older Families	14.5	13.4-15.6	55.8	53.5-58.1	103.6	100.3-106.9	358.1	353.3-362.9
Independent Older People	13.8	12.1-15.4	94.2	89.2-99.2	169.5	165.7-173.4	377.5	370.1-384.9
Younger Families	13.7	12.3-15.2	67.6	64.4-70.7	115.1	110.3-119.9	322.4	315.6-329.2
Educated Young Single People	13.2	11.3-15.2	117.4	111.8-122.9	246.6	237.7-255.4	336.1	326.8-345.4
Inner City and Manufacturing Communities	14.2	13.0-15.3	120.0	116.7-123.3	291.6	283.1-300.1	453.9	448.0-459.7
Upwardly Mobile Families	14.8	13.3-16.3	133.2	128.6-137.8	191.6	186.1-197.1	534.0	525.8-542.1
Older People in Social Housing	12.7	10.0-15.4	168.2	157.6-178.9	163.7	152.8-174.6	634.7	618.4-651.0
Low Income Families	14.5	12.5-16.5	244.1	236.1-252.1	125.3	119.2-131.3	699.7	687.4-712.0
Social Housing	12.8	10.6-15.0	266.4	256.6-276.3	105.7	98.8-112.5	600.9	586.7-615.2
Overall	**13.6**	**13.1-14.0**	**101.7**	**100.4-102.9**	**143.2**	**141.7-144.7**	**397.7**	**395.4-399.9**
Pearson's Rho (P)	**-0.359 (P=0.278)**		**0.932 (P<0.001)**		**0.236 (P=0.484)**		**0.908 (P<0.001)**	

Appendix 8: Hospital admission (rate per 100,000) by gender and People and Places (P²) classification, in England in 2006/07.

Classification	Low alcohol-attributable conditions		Alcohol-specific mental and behavioural		Alcohol-attributable acute conditions		Alcohol-attributable chronic conditions	
	DSR	95% CI	DSR	95% CI	DSR	95% CI	DSR	95% CI
MALES								
Mature Oaks	8.4	7.5-9.3	111.2	107.4-115.1	99.5	95.7-103.4	555.9	548.8-563.0
Blossoming Families	8.8	7.4-10.3	115.4	110.4-120.5	103.5	98.6-108.3	611.6	599.6-623.6
Country Orchards	9.4	8.0-10.8	114.8	109.0-120.6	115.0	108.9-121.2	579.3	568.9-589.7
Rooted Households	9.4	8.5-10.3	151.3	147.4-155.2	125.2	121.6-128.9	672.2	664.8-679.5
Senior Neighbourhoods	9.8	8.2-11.4	222.5	213.9-231.1	138.2	131.1-145.2	651.1	638.9-663.3
Qualified Metropolitans	10.7	8.8-12.6	254.8	246.0-263.7	104.2	98.9-109.4	644.0	629.7-658.3
Suburban Stability	10.8	9.8-11.8	239.1	234.2-243.9	158.4	154.4-162.4	771.5	763.3-779.7
New Starters	12.3	9.9-14.6	523.1	508.4-537.8	178.4	170.6-186.2	848.9	829.8-868.0
Urban Producers	12.5	11.2-13.9	398.2	390.4-406.0	218.7	213.0-224.4	927.9	916.3-939.4
Weathered Communities	13.2	11.5-15.0	503.7	492.5-514.8	237.4	229.7-245.0	985.5	970.8-1000.3
Multicultural Centres	13.1	11.0-15.2	425.4	414.0-436.8	162.2	155.9-168.5	1027.6	1009.3-1046.0
Disadvantaged Households	14.4	11.6-17.2	656.8	638.7-675.0	304.2	292.3-316.1	1087.8	1063.9-1111.6
Urban Challenge	14.1	10.1-18.1	1059.4	1025.0-1093.9	358.6	339.2-378.1	1258.2	1221.5-1294.7
Overall	**10.5**	**10.1-10.9**	**262.6**	**260.6-264.6**	**153.2**	**151.7-154.7**	**739.8**	**736.6-743.0**
Pearson's Rho (P)	0.985 (P<0.001)		0.884 (P<0.001)		0.870 (P<0.001)		0.964 (P<0.001)	
FEMALES								
Mature Oaks	13.1	12.0-14.2	50.5	47.9-53.0	95.2	91.4-99.1	283.5	278.4-288.6
Blossoming Families	13.8	12.1-15.5	60.3	56.6-64.0	104.6	99.7-109.4	325.1	316.8-333.4
Country Orchards	13.8	12.1-15.5	51.6	47.8-55.5	104.8	98.7-110.8	302.1	294.4-309.9
Rooted Households	13.9	12.8-15.0	67.7	65.1-70.3	116.8	113.3-120.4	358.9	353.7-364.1
Senior Neighbourhoods	13.7	11.7-15.6	94.1	88.4-99.7	131.2	124.2-138.1	338.6	329.9-347.2
Qualified Metropolitans	14.5	12.4-16.7	97.8	92.3-103.2	97.1	92.1-102.1	307.9	298.7-317.0
Suburban Stability	13.8	12.7-14.9	100.5	97.4-103.7	147.4	143.6-151.3	417.0	411.2-422.8
New Starters	13.8	11.3-16.4	171.9	163.4-180.5	159.9	152.4-167.3	439.5	426.1-452.8
Urban Producers	13.7	12.3-15.1	150.2	145.5-154.8	200.7	195.4-206.1	526.9	518.6-535.2
Weathered Communities	13.7	11.9-15.5	182.4	175.7-189.1	212.8	205.6-220.0	552.3	541.6-562.9
Multicultural Centres	11.8	9.8-13.7	106.7	101.3-112.2	148.0	142.2-153.8	542.8	530.1-555.5
Disadvantaged Households	12.9	10.4-15.4	222.8	212.8-232.9	261.9	251.5-272.3	628.4	611.4-645.3
Urban Challenge	12.4	8.4-16.3	369.2	347.6-390.8	308.0	289.0-326.9	723.7	695.4-752.1
Overall	**13.6**	**13.1-14.0**	**101.7**	**100.4-102.9**	**143.2**	**141.7-144.7**	**397.7**	**395.4-399.9**
Pearson's Rho (P)	-0.533 (P=0.061)		0.833 (P<0.001)		0.870 (P<0.001)		0.943 (P<0.001)	

Appendix 9: Hospital admission (rate per 100,000) by gender and Health ACORN classification, in England in 2006/07.

Classification	Low alcohol-attributable conditions		Alcohol-specific mental and behavioural		Alcohol-attributable acute conditions		Alcohol-attributable chronic conditions	
	DSR	95% CI	DSR	95% CI	DSR	95% CI	DSR	95% CI
MALES								
Affluent Families	8.4	6.4-10.4	94.4	88.2-100.6	88.2	82.2-94.2	562.1	545.1-579.2
Affluent Professionals	8.2	7.1-9.3	94.4	90.1-98.6	89.0	84.7-93.3	515.5	507.3-523.8
Affluent Healthy Pensioners	8.3	6.7-9.8	110.1	102.5-117.8	96.6	89.2-104.1	537.2	525.0-549.4
Affluent Towns and Villages	8.6	7.6-9.5	121.5	117.5-125.5	107.9	104.0-111.8	607.0	598.9-615.1
Home Owning Older Couples	9.2	8.0-10.4	135.1	129.7-140.5	113.9	108.6-119.1	637.5	627.9-647.1
Younger Affluent Professionals	9.9	8.0-11.8	190.2	182.1-198.2	113.0	107.1-118.9	637.8	622.3-653.4
Students and Young Professionals	8.7	4.5-12.9	287.6	266.9-308.2	121.4	109.7-133.1	636.9	600.8-673.0
Home Owning Pensioners	10.5	8.0-13.1	194.2	180.9-207.6	132.3	120.8-143.8	723.5	704.1-743.0
Mixed Communities	10.2	9.0-11.5	190.6	184.4-196.7	136.7	131.4-142.1	726.8	716.3-737.3
Towns and Villages	10.5	9.1-11.9	202.3	196.2-208.3	135.5	130.5-140.5	727.7	716.3-739.1
Elderly	11.4	9.0-13.8	285.7	272.6-298.8	173.5	162.8-184.1	868.6	848.7-888.6
Young Mobile Population	11.0	8.7-13.3	326.3	314.6-338.1	154.8	147.4-162.2	753.7	734.2-773.2
Less Affluent Neighbourhoods	12.8	10.8-14.7	325.3	315.1-335.4	188.3	180.5-196.1	885.5	869.7-901.2
Older Traditional Couples	11.7	5.2-18.3	394.2	349.1-439.2	204.5	169.2-239.8	1026.2	966.9-1085.4
Low Income Families	13.1	11.2-15.0	367.1	357.4-376.7	180.0	173.5-186.4	867.1	851.8-882.3
Post Industrial Pensioners	13.8	10.4-17.2	494.1	471.8-516.3	229.3	213.7-245.0	1063.2	1034.2-1092.2
Disadvantaged Multi-Ethnic Young Adults	14.4	10.9-18.0	526.0	506.7-545.2	211.9	200.8-223.0	884.3	856.9-911.7
Disadvantaged Neighbourhoods	13.2	10.9-15.4	494.6	480.6-508.6	234.5	225.0-244.0	1015.6	996.0-1035.2
Disadvantaged Elderly	16.0	7.6-24.4	1025.8	941.0-1110.5	365.8	310.8-420.8	1448.0	1365.9-1530.2
Deprived Multi-Ethnic Estates	12.7	10.3-15.2	515.6	500.7-530.5	220.0	210.9-229.1	987.2	965.7-1008.8
Deprived Neighbourhoods	13.3	10.0-16.7	699.5	674.0-725.0	303.7	286.7-320.7	1178.2	1147.5-1209.0
Multi-Ethnic	13.2	9.1-17.3	599.0	574.7-623.3	254.2	239.7-268.7	992.1	957.0-1027.2
Urban Estates	14.6	11.5-17.6	733.9	712.5-755.3	318.7	305.1-332.3	1149.8	1122.8-1176.8
Vulnerable Disadvantaged	14.7	8.8-20.7	1221.7	1165.4-1278.0	428.8	394.8-462.8	1412.5	1355.5-1469.5
Poor Single Parent Families	15.1	8.4-21.7	884.4	838.7-930.1	393.2	364.7-421.7	1239.6	1180.6-1298.7
Overall	10.5	10.1-10.9	262.6	260.6-264.6	153.2	151.7-154.7	739.8	736.6-743.0
Pearson's Rho (P)	0.934 (P<0.001)		0.889 (P<0.001)		0.918 (P<0.001)		0.910 (P<0.001)	
FEMALES								
Affluent Families	13.3	11.0-15.6	49.6	45.1-54.0	91.2	85.5-97.0	280.8	269.6-292.1
Affluent Professionals	13.2	11.9-14.6	43.3	40.5-46.1	84.3	80.1-88.6	257.9	252.1-263.7
Affluent Healthy Pensioners	13.4	11.3-15.5	52.2	47.1-57.2	85.5	78.3-92.7	265.9	257.1-274.7
Affluent Towns and Villages	13.8	12.6-15.1	54.0	51.4-56.7	101.8	98.0-105.7	310.9	305.2-337.6
Home Owning Older Couples	13.9	12.4-15.4	59.8	56.2-63.4	105.5	100.3-110.6	330.7	323.8-337.9
Younger Affluent Professionals	13.7	11.5-15.9	75.8	70.7-80.8	104.8	99.3-110.4	327.5	317.2-346.8
Students and Young Professionals	13.0	8.2-17.9	111.3	98.2-124.5	131.1	119.6-142.7	322.3	297.7-346.8
Home Owning Pensioners	14.2	11.2-17.2	84.1	75.2-93.0	121.7	110.4-133.0	382.0	367.9-396.3
Mixed Communities	13.5	12.0-14.9	81.3	77.3-85.3	127.3	122.0-132.5	388.8	381.2-394.7
Towns and Villages	13.9	12.3-15.4	82.9	79.0-86.8	129.9	125.1-134.8	386.8	378.8-492.0
Elderly	13.8	11.1-16.5	121.9	113.2-130.6	157.2	147.0-167.5	477.5	463.0-492.0
Young Mobile Population	13.6	11.1-16.1	122.6	115.5-129.8	145.4	138.3-152.5	407.3	393.7-420.9
Less Affluent Neighbourhoods	13.6	11.6-15.6	118.1	112.0-124.1	172.4	165.0-179.8	490.5	479.2-501.8
Older Traditional Couples	14.2	6.5-21.9	132.3	104.4-160.3	189.8	154.5-225.2	540.6	497.6-583.5
Low Income Families	13.1	11.2-14.9	123.4	117.8-128.9	162.4	156.3-168.5	474.2	463.5-484.9
Post Industrial Pensioners	14.9	11.2-18.6	191.6	177.7-205.5	215.4	200.3-230.5	614.3	592.7-635.9
Disadvantaged Multi-Ethnic Young Adults	13.0	9.7-16.3	163.7	153.2-174.2	191.4	181.1-201.7	494.0	474.2-513.7
Disadvantaged Neighbourhoods	13.6	11.3-15.9	179.6	171.3-187.9	210.2	201.4-219.0	565.1	551.1-579.0
Disadvantaged Elderly	15.1	5.2-24.9	421.3	361.5-481.1	332.7	276.9-388.4	880.2	809.2-951.2
Deprived Multi-Ethnic Estates	13.4	11.0-15.8	175.9	167.6-184.3	207.2	198.6-215.8	546.0	530.9-561.2
Deprived Neighbourhoods	13.6	10.2-17.0	238.0	223.3-252.8	272.6	256.8-288.5	674.9	652.3-697.5
Multi-Ethnic	12.4	8.6-16.1	196.6	183.3-209.9	222.7	209.9-235.5	558.6	533.8-583.4
Urban Estates	13.1	10.3-15.9	253.2	241.1-265.3	278.4	266.2-290.6	672.0	652.5-691.6
Vulnerable Disadvantaged	13.2	7.4-19.1	391.0	358.3-423.7	334.3	304.2-364.4	838.3	794.3-882.4
Poor Single Parent Families	12.0	6.5-17.5	283.8	259.4-308.1	339.1	314.3-364.0	728.8	686.1-771.5
Overall	13.6	13.1-14.0	101.7	100.4-102.9	143.2	141.7-144.7	397.7	395.4-399.9
Pearson's Rho (P)	-0.221 (P=0.288)		0.842 (P<0.001)		0.946 (P<0.001)		0.904 (P<0.001)	

Appendix 10: Hospital admission (rate per 100,000) by gender and Office for National Statistics (ONS) Area classification, in England in 2006/07.

Classification	Low alcohol-attributable conditions		Alcohol-specific mental and behavioural		Alcohol-attributable acute conditions		Alcohol-attributable chronic conditions	
	DSR	95% CI	DSR	95% CI	DSR	95% CI	DSR	95% CI
MALES								
Urban Commuters	8.5	7.4-9.7	99.8	95.4-104.3	101.1	96.4-105.8	593.1	583.7-602.4
Affluent Urban Commuter	8.4	7.2-9.5	110.7	106.1-115.3	94.2	89.8-98.6	567.9	558.8-577.1
Rural Economies	9.3	8.3-10.4	131.5	126.8-136.2	118.1	113.4-122.8	583.1	575.1-591.1
Well off Mature Households	9.3	8.1-10.6	161.2	155.6-166.8	129.0	123.8-134.2	666.8	656.9-676.7
Farming and Forestry	9.4	7.1-11.7	99.9	91.0-108.8	105.8	96.2-115.4	584.1	566.8-601.5
Young Urban Families	9.5	7.8-11.2	149.9	143.3-156.5	129.9	123.6-136.1	681.7	667.6-695.8
Mature City Professionals	10.0	7.9-12.0	225.3	215.8-234.7	108.0	101.7-114.2	660.9	644.7-677.0
Suburbia	10.5	8.6-12.4	210.8	202.4-219.2	141.9	135.1-148.7	757.8	742.1-773.6
Mature Urban Households	11.0	9.4-12.6	216.1	208.4-223.8	154.0	147.3-160.8	740.8	728.3-753.3
Countryside Communities	11.3	6.9-15.6	187.7	167.7-207.7	134.2	116.8-151.7	687.4	654.5-720.3
Small Town Communities	11.1	9.4-12.8	305.9	296.7-315.0	183.8	176.6-191.0	813.1	799.3-826.9
Resorts and Retirement	11.1	9.0-13.2	441.0	427.7-454.4	194.1	185.3-202.9	780.2	763.5-797.0
Educational Centres	10.3	6.2-14.3	545.6	516.8-574.5	163.5	149.4-177.7	788.2	753.0-823.4
Young City Professionals	11.7	8.8-14.6	397.2	380.9-413.5	128.2	119.5-136.9	717.0	694.6-739.3
Urban Terracing	11.7	9.7-13.7	403.6	392.1-415.1	212.1	203.9-220.2	859.9	843.0-876.9
Multicultural Urban	12.3	9.8-14.8	310.5	298.6-322.3	152.6	145.1-160.2	1020.7	998.3-1043.1
Blue Collar Urban Families	13.1	11.4-14.8	413.0	403.3-422.8	238.8	231.3-246.2	976.5	962.2-990.8
Multicultural Suburbia	13.2	10.6-14.8	476.7	461.7-491.7	195.5	186.5-204.5	980.8	958.9-1002.7
Multicultural Inner City	13.6	10.9-16.4	516.6	500.3-532.8	154.5	146.6-162.3	959.7	937.0-982.4
Struggling Urban Families	13.8	11.9-15.7	711.3	697.4-725.3	311.6	302.4-320.7	1110.9	1094.0-1127.8
Overall	**10.5**	**10.1-10.9**	**262.6**	**260.6-264.6**	**153.2**	**151.7-154.7**	**739.8**	**736.6-743.0**
Pearson's Rho (P)	0.968 (P<0.001)		0.898 (P<0.001)		0.775 (P<0.001)		0.929 (P<0.001)	
FEMALES								
Urban Commuter	13.8	12.3-15.3	52.0	48.8-55.2	95.2	90.6-99.9	313.0	306.3-319.8
Affluent Urban Commuter	12.8	11.4-14.3	50.3	47.2-53.4	91.5	87.2-95.9	287.7	281.4-294.0
Rural Economies	13.7	12.4-15.0	57.7	54.6-60.7	107.2	102.6-111.8	299.0	293.2-304.8
Well off Mature Households	13.7	12.2-15.2	75.0	71.2-78.7	123.5	118.3-128.6	356.8	349.7-363.8
Farming and Forestry	13.2	10.5-15.9	44.3	38.5-50.2	101.9	92.0-111.8	311.8	298.6-324.9
Young Urban Families	14.4	12.4-16.4	67.5	63.0-71.9	120.0	114.0-126.0	373.1	363.1-383.1
Suburbia	14.4	12.0-16.8	86.9	80.9-92.8	109.0	102.6-115.3	326.0	315.4-336.7
Mature City Professionals	13.6	11.5-15.7	84.1	78.9-89.4	128.8	122.4-135.2	401.3	390.4-412.1
Mature Urban Households	14.1	12.3-15.9	92.4	87.4-97.4	146.6	140.1-153.2	408.8	399.7-418.0
Countryside Communities	15.7	10.5-21.0	90.4	76.2-104.6	148.9	129.9-167.8	378.2	353.5-403.0
Small Town Communities	13.8	11.9-15.6	124.7	118.8-130.5	172.8	165.8-179.8	449.1	439.2-458.9
Resorts and Retirement	13.6	11.3-15.9	160.3	152.1-168.6	186.8	177.9-195.6	405.2	393.5-416.9
Educational Centres	14.0	8.9-19.1	158.7	142.4-175.1	147.7	133.7-161.7	392.5	367.8-417.1
Young City Professionals	14.0	11.0-17.1	134.8	125.3-144.3	106.5	98.7-114.2	340.5	326.1-354.9
Urban Terracing	13.9	11.8-16.1	156.3	149.1-163.4	193.4	185.7-201.2	484.4	472.3-496.5
Multicultural Urban	10.9	8.6-13.2	73.6	67.9-79.2	144.1	136.8-151.3	535.4	519.8-551.0
Blue Collar Urban Families	13.6	11.9-15.3	158.1	152.3-163.9	217.7	210.9-224.6	558.2	548.0-568.5
Multicultural Suburbia	13.3	10.8-15.8	148.6	140.4-156.8	171.3	163.1-179.6	530.4	515.1-545.8
Multicultural Inner City	13.7	11.0-16.3	146.6	138.4-154.7	136.7	129.7-143.7	498.8	483.4-514.1
Struggling Urban Families	12.7	10.9-14.5	243.0	235.1-251.0	264.9	256.7-273.0	634.9	622.7-647.1
Overall	**13.6**	**13.1-14.0**	**101.7**	**100.4-102.9**	**143.2**	**141.7-144.7**	**397.7**	**395.4-399.9**
Pearson's Rho (P)	-0.228 (P=0.334)		0.835 (P<0.001)		0.736 (P<0.001)		0.878 (P<0.001)	