

Analysis: Population segmentation in the KID

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INTRODUCTION

- Key message: geographic vs. person level analyses (utilising segmentation techniques)
- Example 1 – Inequalities in life expectancy, presented by CACI ACORN segment
- Example 2 – Profiling of repeat attenders into A&E, presented by hhold summaries
- Questions

Kent Public Health Observatory – Who are we? What do we do?

- Group of 9 analysts working within KCC Public Health.
- Produce a range of analysis, knowledge and evidence to improve health and wellbeing across Kent.
- Some routinely like Health and Social Care Maps (HSCMs), but bespoke advanced analytical services are carried out too.
- Our website contains recent work and reports on a range of topics.

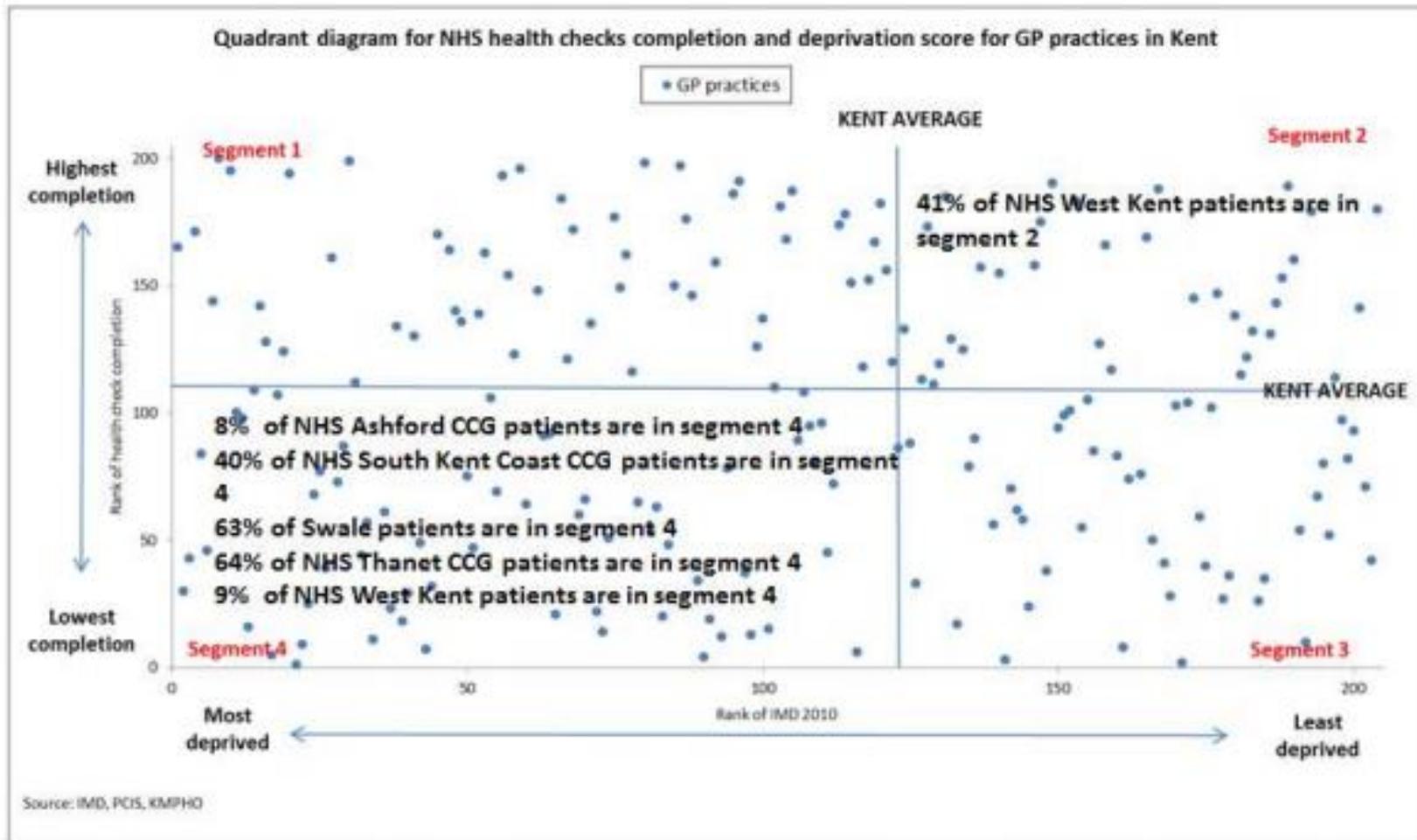
www.kpho.org.uk



KEY MESSAGE

- Previous geographic-based analysis of value but guilty of ecological fallacy
- Use of segmentation tools (commercial and non-commercial), within a linked data approach, have a use case in health intelligence
 - highlighted previously invisible insights
- All made possible through whole-population, linked dataset (the Kent Integrated Dataset)

Previous analysis ecological fallacy



Previous analysis ecological fallacy

- Could have substituted GP practice for Lower Super Output Area (LSOA) ...
- In Kent the avg. LSOA population size is around 1700 persons (or 745 households)

Previous analysis masked cheek by jowl difference

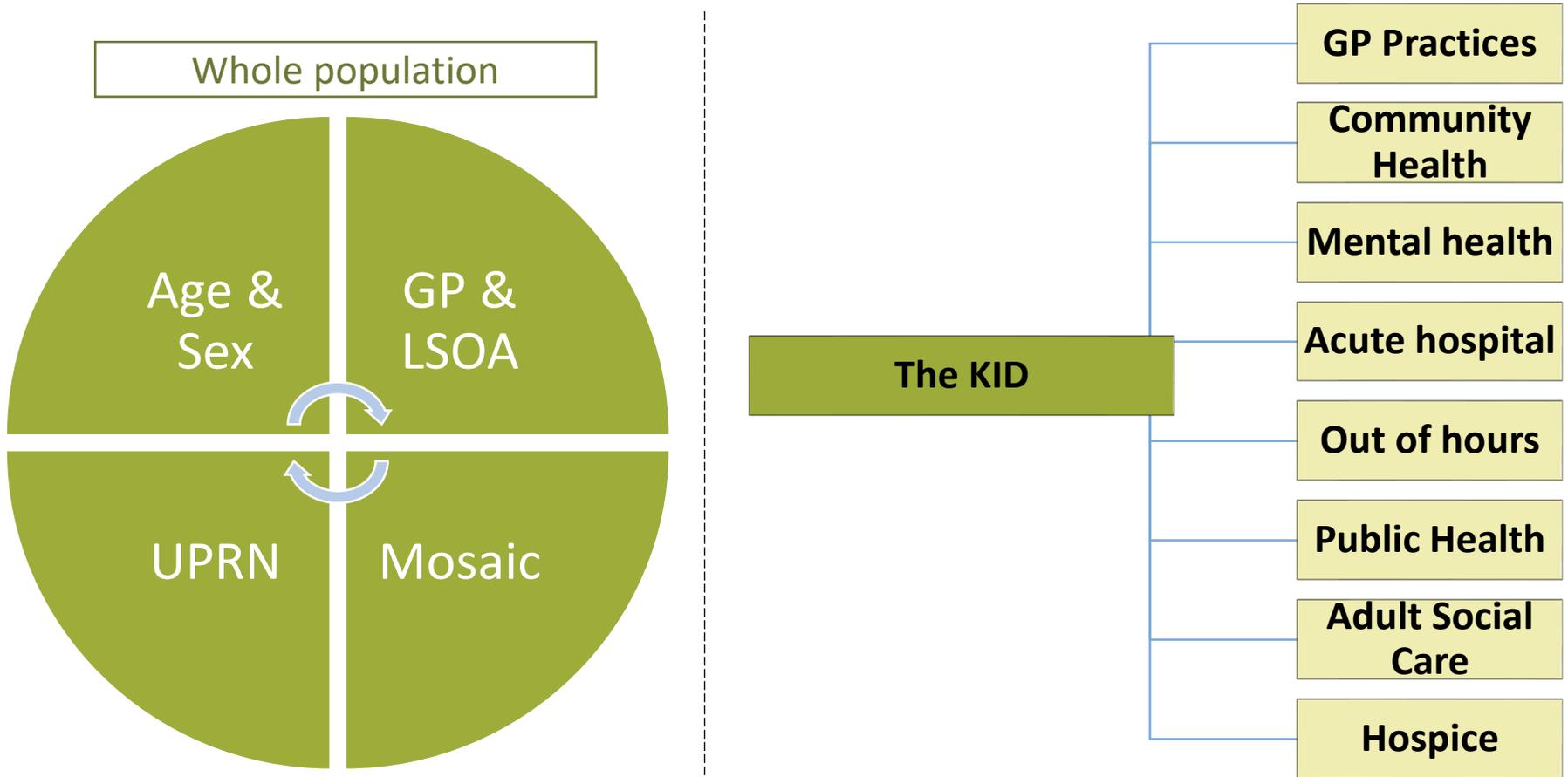


EXAMPLE 1

INEQUALITIES IN LIFE EXPECTANCY BY CACI ACORN SEGMENT

On behalf of Gerrard Abi-Aad, Head of Health
Intelligence, Kent County Council

DATA SOURCE THE KENT INTEGRATED DATASET



CONTEXT

- In the report 'Living Well for Longer' (2013), the Department of Health identifies that **1 in 3 deaths in England was before the age of 75**.
- Deaths in under 75's are generally considered to be **premature** because average life expectancy prospects often exceed 75 years.
- At a local level, in Kent and Medway during the period January 2016 to August 2018 (32 months) there were a total of 14,172 premature deaths - an average of **443 per month**. 31% of total deaths over the same period.
- From a public health perspective, it's important to monitor how the distribution of premature mortality varies across socio-economic groups. There is tendency toward **higher risk exposure among people who live in more challenging social and economic circumstances**.

METHOD

- Using death counts captured in the Kent Integrated Dataset (KID), it is possible to identify premature deaths for the Kent and Medway population.
- Previous approaches to life expectancy have considered variability in life expectancy at a geographic level, i.e. x % difference between ward x and ward y etc. etc.
- By identifying the ACORN Wellbeing group (a grouping of health and lifestyle propensity risks) at **household level** for people who have died prematurely, it is possible to calculate the cumulative hazard of premature death by Wellbeing segment.
 - Focus of analysis shifts to household and behaviours, rather than place of birth
- Cumulative hazard can be interpreted as the probability of premature death at time x given survival to point x.

METHOD: ACORN WELLBEING GROUP

1	Group 1 Health Challenges	1 Limited living 2 Poorly pensioners 3 Hardship heartlands 4 Elderly ailments 5 Countryside complacency
2	Group 2 At Risk	6 Dangerous dependencies 7 Struggling smokers 8 Despondent diversity 9 Everyday excesses 10 Respiratory risks 11 Anxious adversity 12 Perilous futures 13 Regular revellers
3	Group 3 Caution	14 Rooted routines 15 Borderline behaviours 16 Countryside concerns 17 Everything in moderation 18 Cultural concerns
4	Group 4 Healthy	19 Relishing retirement 20 Perky pensioners 21 Sensible seniors 22 Cym & juices 23 Happy families 24 Five-a-day greys 25 Healthy, wealthy & wine

Group 2

At Risk

▶ These neighbourhoods do not generally have high incidences of illness. However, multiple unhealthy behaviours, as a result of their lifestyles, could put their health at risk in the future.

They have the highest rates of smoking in the country along with some alcohol concerns. Social issues such as unemployment, debt and dissatisfaction with life overall contribute to one of the lowest scores on the mental wellbeing scale.

Group 4

Healthy

▶ These neighbourhoods are more affluent, often with older residents. Their health, given their age, is especially good with very low levels of illness and good lifestyle behaviours.

Smoking is very low and consumption of fruit and vegetables are extremely high. There are, however, issues with alcohol intake, particularly for women.

Group 2 Types

- 6 Dangerous dependencies
- 7 Struggling smokers
- 8 Despondent diversity
- 9 Everyday excesses
- 10 Respiratory risks
- 11 Anxious adversity
- 12 Perilous futures
- 13 Regular revellers

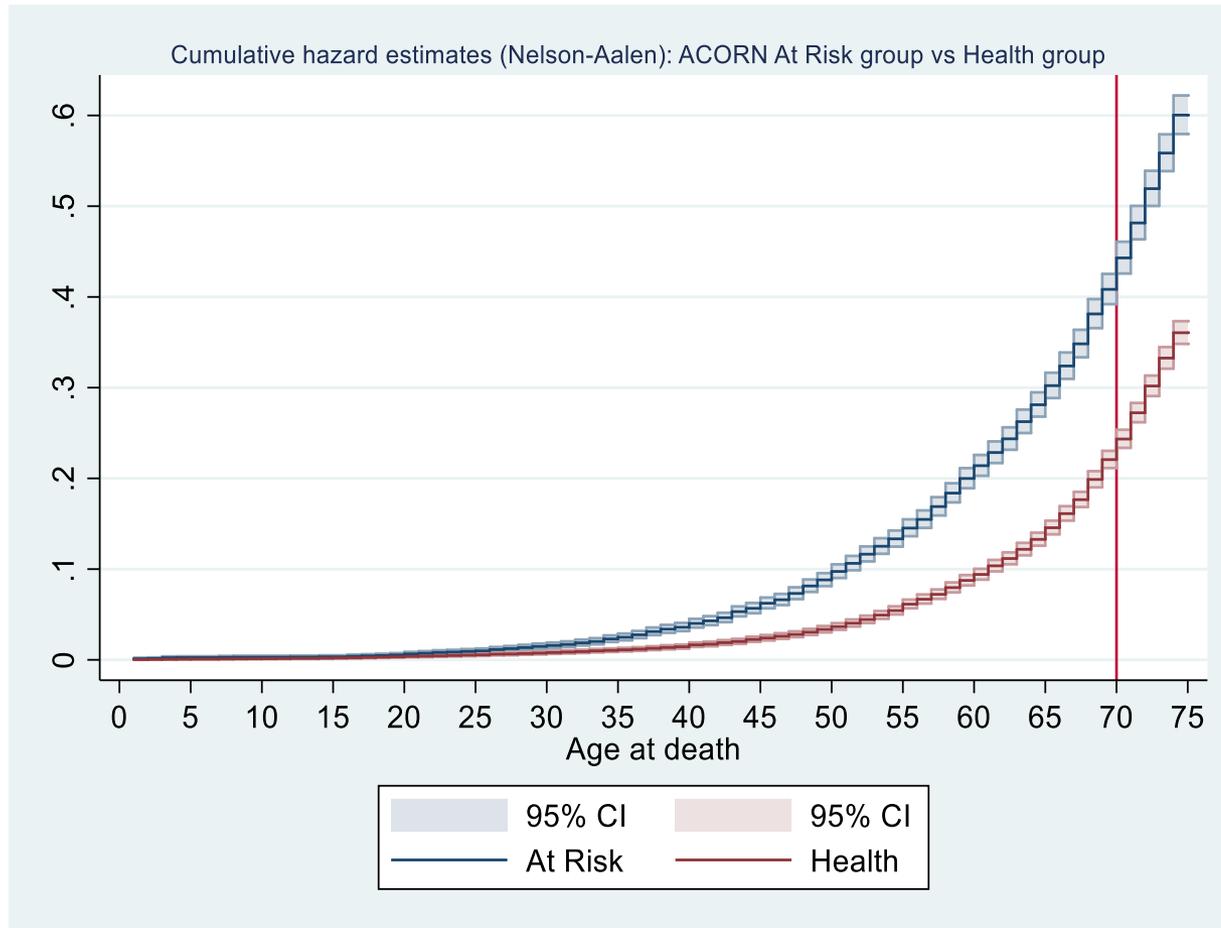


Group 4 Types

- 19 Relishing retirement
- 20 Perky pensioners
- 21 Sensible seniors
- 22 Cym & juices
- 23 Happy families
- 24 Five-a-day greys
- 25 Healthy, wealthy & wine



RESULTS PT1



This graphic presents the cumulative hazard of premature death for two ACORN Wellbeing groups – ‘At Risk’ and ‘Healthy’.

The hazy area covering each hazard trajectory is the 95% confidence interval for the point hazard estimate.

The At Risk group has a significantly elevated cumulative hazard of premature death.

At age 70 the cumulative hazard of death for the At Risk group is twice that of the Healthy group.

RESULTS PT2

- When comparing both segments the mean life expectancy was 59.4 and 62.8 for the At Risk and Healthy groups respectively.
- This represents an average **life expectancy difference between both groups of 3.4 years** in favour of the Healthy ACORN segment.
 - This difference is statistically significant.
- Previously invisible household by household difference can now be identified

DISCUSSION CONCLUSION

- The Acorn 'At Risk' group have increased propensity to health contexts that increase their hazard of premature death.
 - These deficits include depression, adverse mental health and disability or infirmity.
 - This group also has the highest propensity toward social isolation - known to be strongly associated with life expectancy deficits.

- Conversely, the Healthy group have propensities that reduce their risk of ill health and isolation.

- Understanding the scale of inequality in risk exposure and tackling the maldistribution of underlying risk factors such as social isolation, smoking, obesity, alcohol misuse and physical inactivity will lead to:
 - reduced levels of premature mortality
 - a narrowing of the premature life expectancy gap

EXAMPLE 2

PROFILING OF REPEAT ATTENDERS INTO A&E

CONTEXT

- Frequent/repeat attenders of A&E Departments (defined here as those attending 6 or more times in a year) are thought to be one of a range of factors contributing to increased pressure on unplanned care in the NHS.
 - However, very little is known about the homogeneity of this cohort.
- KPHO were commissioned to profile 'repeat attenders' into the A&E Department at Medway NHS Foundation Trust. All 3 other trusts in Kent then asked for replication.
- Better understanding of this cohort, drawing on wider data than acute trust A&E SUS, will support the Trust and partners to develop interventions to reduce attendances.
- De-identified (pseudonymised) person-level data linking patients across the majority of NHS providers in Kent and Medway from the Kent Integrated Dataset was used for this analysis.
 - Patients were also linked to consumer classification types (Acorn), household types and long term conditions history.

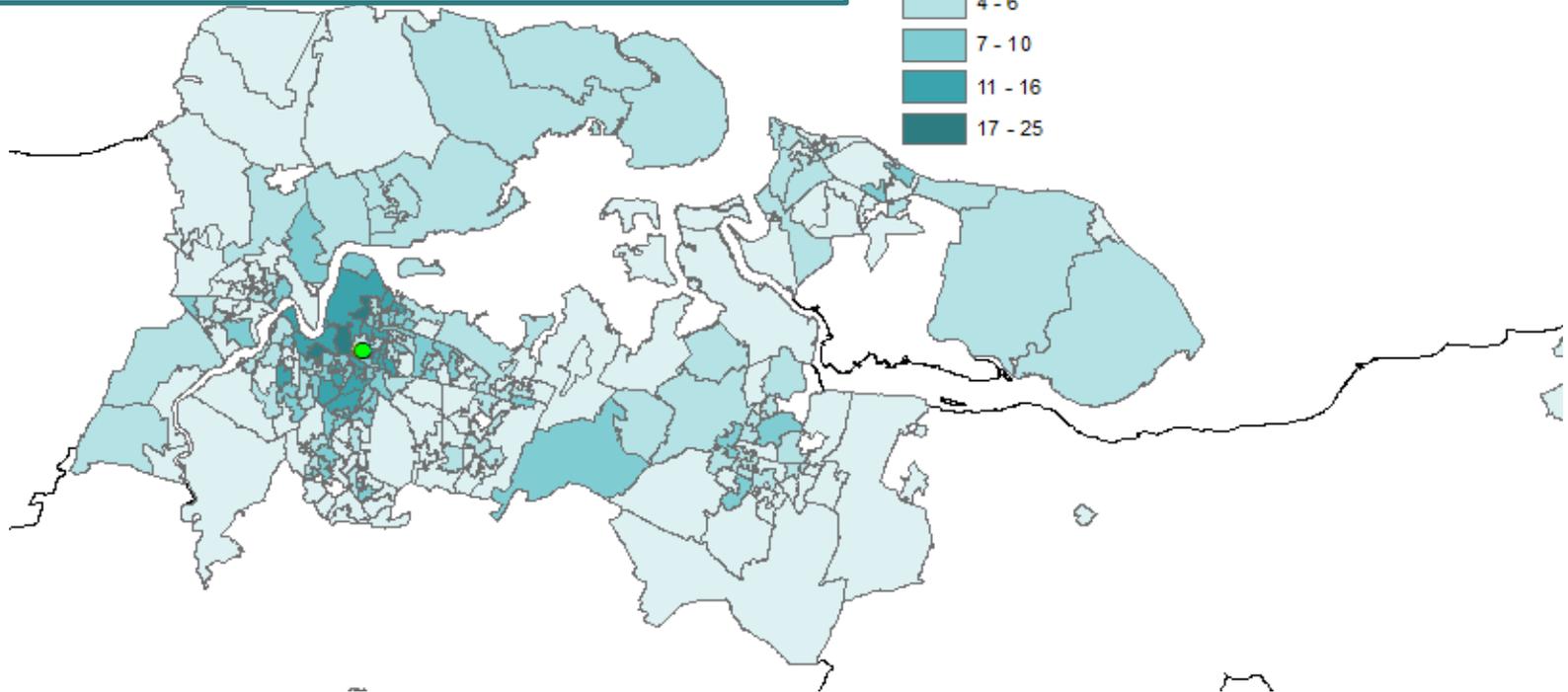
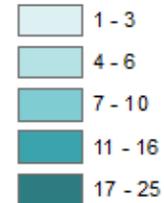
Patients attending A&E 6+ times a year by lower super output area, 2017-18

Highest concentrations of repeat attenders are found living in LSOAs nearest the A&E department, although repeat attenders can be found across the whole of Medway

Legend

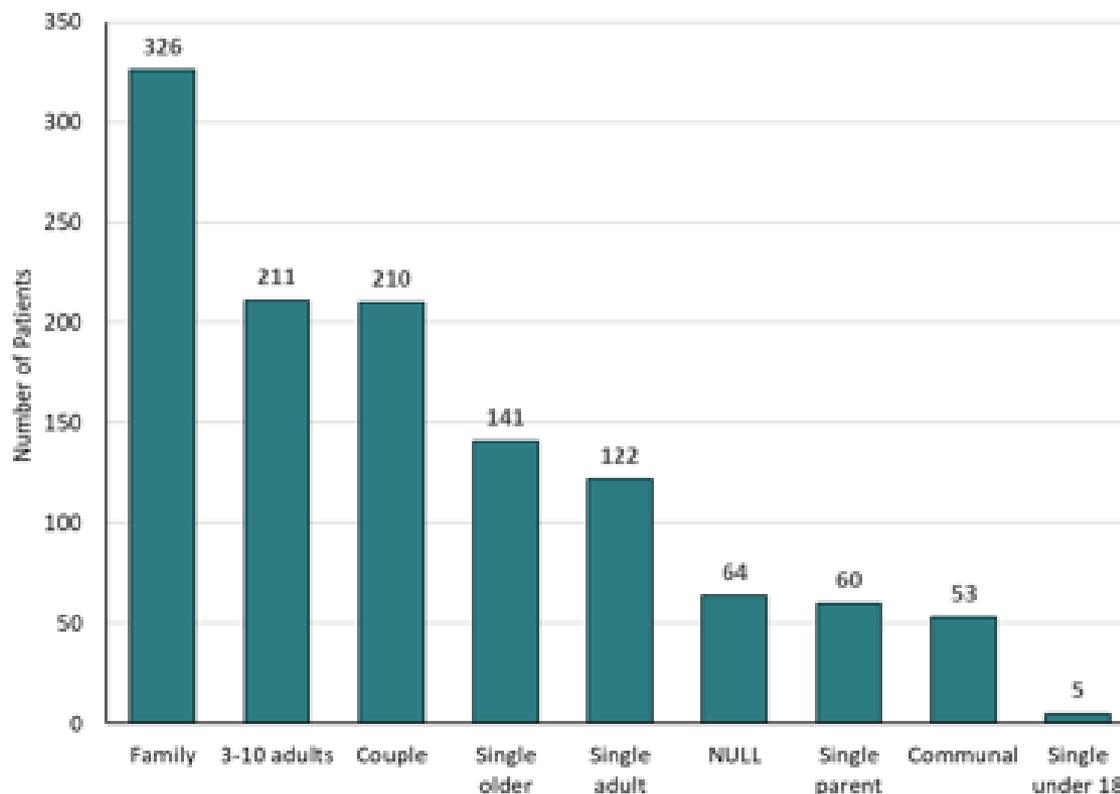
● A&E location

Number of patients with 6 or more A&E attendances

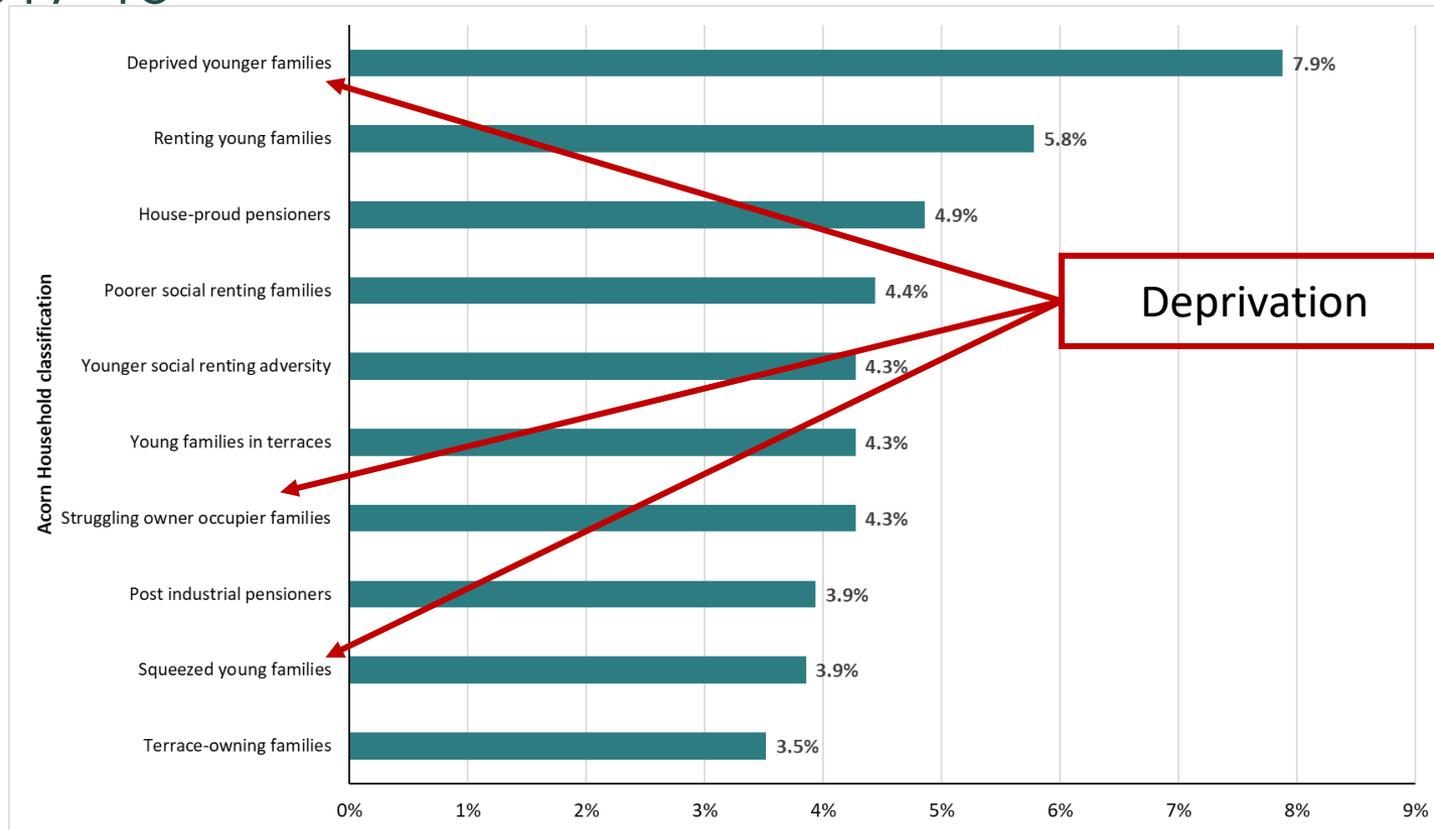


Patients attending A&E 6+ times a year by household type, 2017-18

- 'Family' group is the largest household type, of these nearly a quarter are 0-4 year olds (78 patients)
- Just over 2/3 of the 'family' group are 0-29 year olds (220 patients)
- '3-10 adults' in a house are the next household group, over 1/4 of these are 20-29 (57 patients). About 1/5 of this group are 50-59 (40 patients)
- 1/3 of the 'couples' group are aged 70-84 (71 patients)

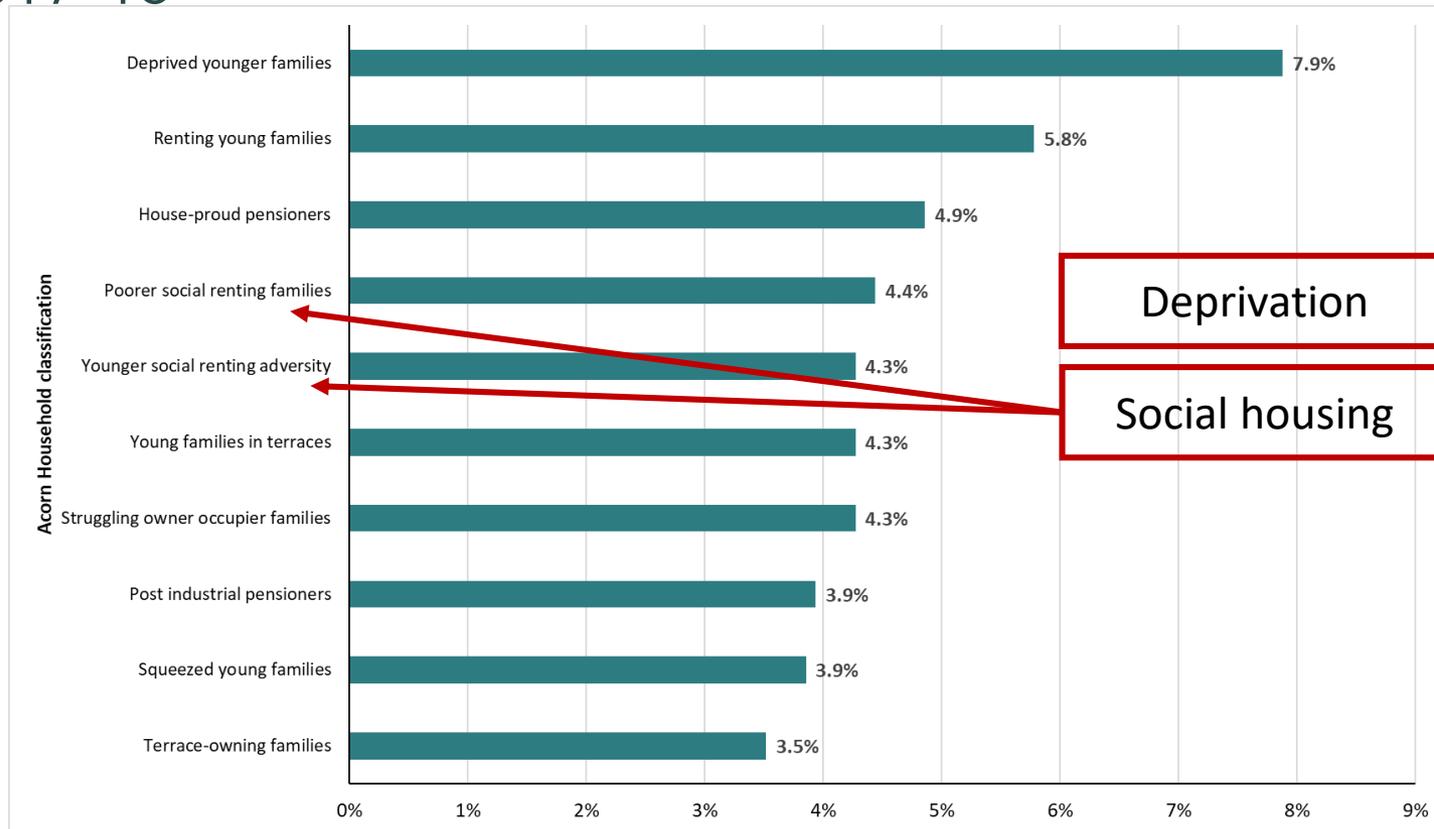


Patients attending A&E 6+ times a year by Acorn household consumer classification type (most common 10 types), 2017-18



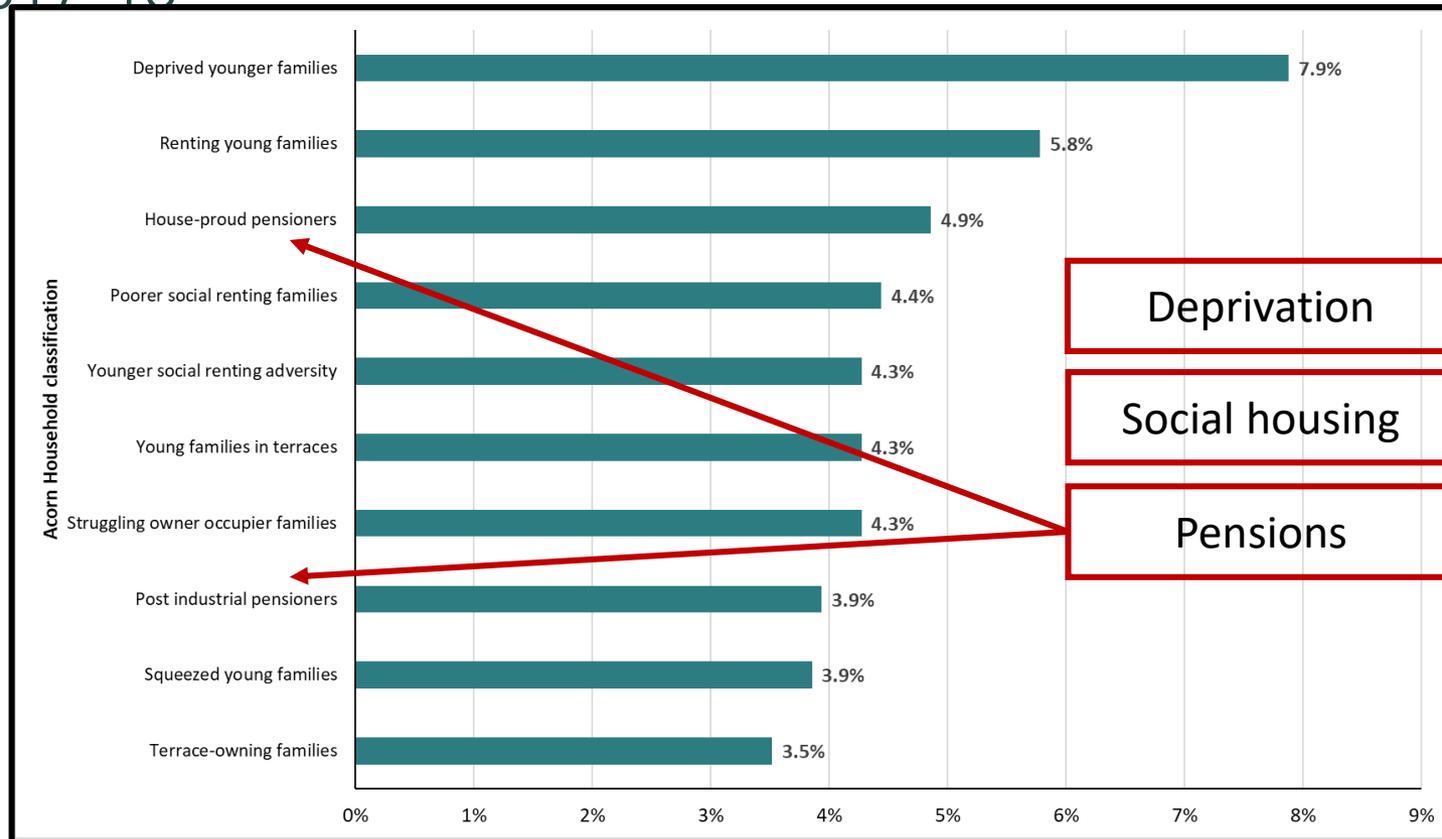
The socio-economic circumstances of those repeatedly attending A&E, according to Acorn consumer classification, are characterised by **deprivation, social housing and patients drawing pensions.**

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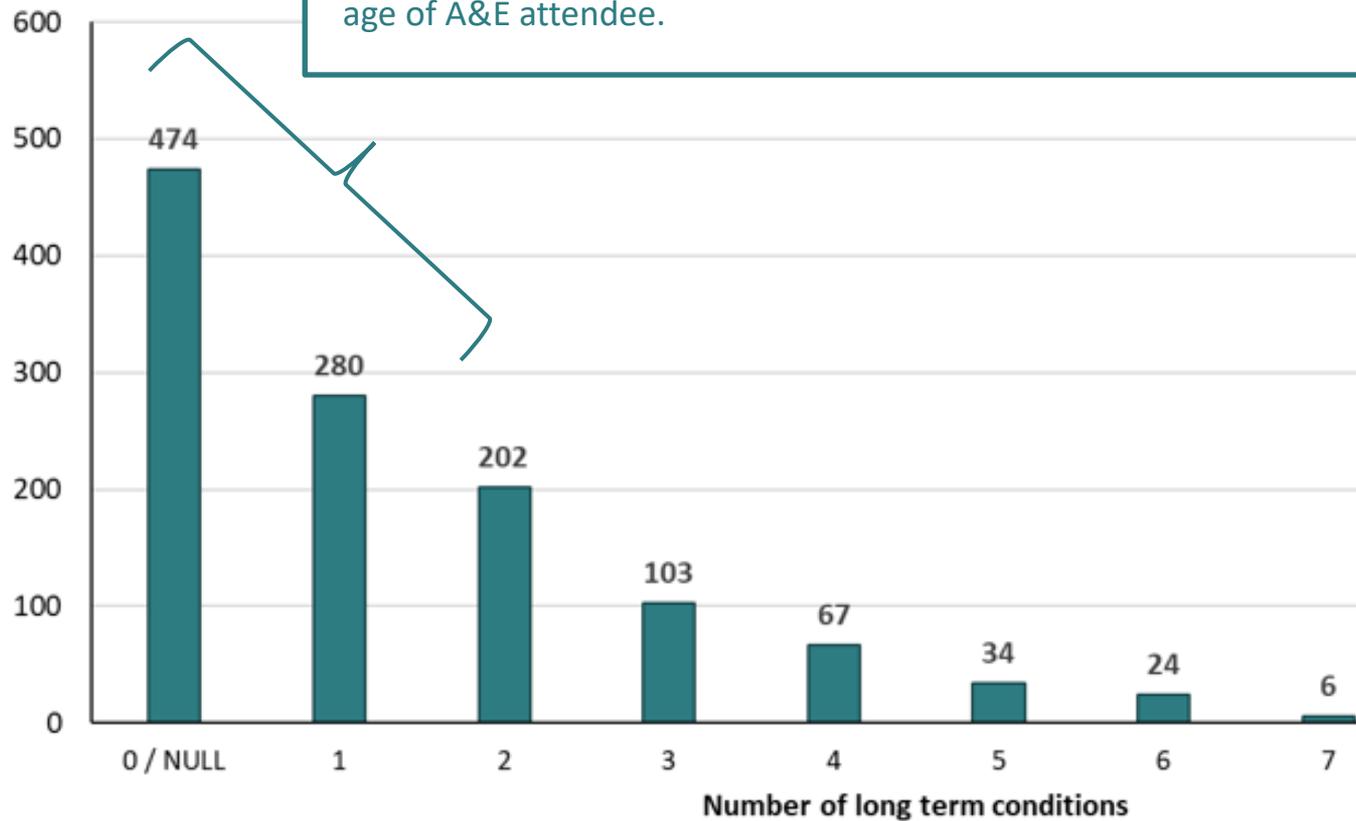
Selected Acorn household consumer classification types

Type	Summarised description
Deprived younger families (7.9%)	Pre-school children...private landlord...low skill jobs...unemployment...some noise, vandalism or crime...some debt...getting by financially...regular users of social media...
Renting Young families (5.8%)	Young parents...rent small houses...skilled or unskilled work...low incomes... not earning enough to pay tax... high unemployment...loans... 'just getting by'...health issues...unhealthy lifestyles...
House-proud pensioners (4.9%)	Retired couples...private pension...traditional attitudes to finances...spend moderately...investments...savings accounts...poorer health...prescription medicines...religious groups...frequent social interaction...
Poorer social renting families (4.4%)	Smaller homes...unskilled jobs...unemployment...loans...difficulty getting by financially...games consoles...smartphones...social media...follow celebrities...crime and vandalism concerns...smokers...health issues...
Younger social renting adversity (4.3%)	Young singles...single parents...social rented flats...low incomes...state benefits...very high unemployment...debt repayments...social media...interact with brands...follow celebrities...poor health...poor diet...some isolation...

Long term condition distribution of 6+ A&E attender patients, 2017-18

Just under two-thirds of the 6+ attenders have no or one long term condition.

Further work could be completed to explore distribution of long term conditions by age of A&E attendee.



ANY QUESTIONS?

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