An Evidence-Based Model for Estimating Requirements for Specialist Alcohol Treatment Capacity in England

The Specialist Treatment for Alcohol Model (STreAM) Version 1.0

Final report to DH Policy Research Programme

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APMS	Adult Psychiatric Morbidity Survey
AUDIT	Alcohol Use Disorders Identification Test
AUDIT C	Alcohol Use Disorders Identification Test – short form
DH	Department of Health
GLF	General Lifestyle Survey
GOR	Government Office Region
HES	Hospital Episode Statistics
HONOS	Health of the Nation Outcomes Scale
HSE	Health Survey for England
ICD-10	International Classification of Diseases 10
IMD	Index of Multiple Deprivation
KCL	King's College London
KIT	Knowledge and Intelligence Team
LA	Local Authority
LAPE	Local Alcohol Profiles for England
LDQ	Leeds Dependency Questionnaire
LSOA	Lower layer Super Output Area
NATMS	National Alcohol Treatment Monitoring System
NDEC	National Drug Evidence Centre
NDTMS	National Drug Treatment Monitoring System
NICE	National Institute for Health and Care Excellence
NICE CG115	National Institute for Health and Care Excellence Clinical Guideline 115
PbR	Payment by Results
PHE	Public Health England
SADQ	Severity of Alcohol Dependence Questionnaire
SAPM	Sheffield Alcohol Policy Model
SARN	Summary of Assessment Risk and Need
UoM	University of Manchester
UoS	University of Sheffield
UTLA	Upper Tier Local Authority

1 Executive Summary

1.1 Study Aims

The overarching aim of the study is to develop an evidence- and consensus-based capacity model to estimate the number of individuals who would access specialist alcohol treatment services and require different types of treatment options in England each year at both national and local levels. The six project objectives were to:

1. Identify key specialist treatment options and combinations of treatments and care packages; then investigate the effectiveness and resource uses of these treatment modalities, taking into account the severity of patients' alcohol dependence and other patient characteristics.
2. Estimate the prevalence of harmful and dependent drinkers by the severity of alcohol dependence, gender, age and other relevant patient characteristics in England at both national and local levels over time.
3. Engage with stakeholders to reach consensus on England-specific "amenable" and "acceptable" levels of service provision and other key model assumptions.
4. Estimate the annual demand for specialist alcohol treatment services at national and local levels; both the overall individuals accessing the service and the specific demand for each treatment option.
5. Estimate the impact of specialist alcohol treatment in terms of resource usage and reduced alcohol-related health (mortality, hospital admissions) and crime harms.
6. Cooperate with the Department of Health (DH) and Public Health England (PHE) to develop clear advice and process for model implementation and maintenance.

1.2 Background

1.2.1 Alcohol Dependence and Access to Services

Levels of alcohol-related harms from harmful drinking and alcohol dependence are high, and the consequences of severe dependence, in particular, are costly to individuals and their families, Local Authorities, the National Health Service (NHS), and society.[1] In England, it has been estimated that there are 1.6 million individuals showing signs of alcohol dependence[2], while in 2010 an estimated that 111,000 adults accessed specialised treatment services

nationally[3], which was up to 114,920 adults in 2013/14. In 2004, the Alcohol Needs Assessment Project (ANARP) identified an undersupply of specialist alcohol treatment services in England relative to need and inequity in their distribution. The ANARP project defined alcohol dependence purely using AUDIT scores, which is a different methodology to that developed in our study. It did find a low proportion (approximately 1 in 18) of people with AUDIT score 16+ accessing specialist treatment and also found an approximately tenfold regional variation in the prevalence to service utilisation ratio. Access rates in many areas were low in comparison to the benchmark suggested by the 1990 Canadian work of Rush,[4] who estimated that each year a treatment system should aim to treat 10-20% of "problem drinkers and alcohol dependent drinkers"[5].

In England, the Adult Psychiatric Morbidity Survey (APMS) provides the largest and most detailed representative household survey giving detailed measures of alcohol dependence.[2] While the APMS can provide a national estimate of the prevalence of alcohol dependence, the sample size (approximately 7000) is not large enough to provide LA-specific estimates. Further, the APMS is conducted only every seven years and includes only people living in private homes. Therefore people who are homeless (and more likely to be alcohol dependent) are not included. The 2007 APMS survey report says "It is acknowledged that using a household survey of this kind to measure drug use may underestimate several key groups whose patterns and levels of drug use may be atypical. These include students in halls of residence, the homeless, and those in institutions, including hospitals and prisons". New methods are therefore required to estimate Local Authority level prevalence of alcohol dependence and need for specialist treatment.

1.2.2 Treatment guidelines

In England and Wales, the best available evidence for the effectiveness of treatment has been synthesised in order to produce National Clinical Practice Guideline 115 [1] (hereafter referred to as CG115), endorsed by the National Institute for Health and Care Excellence (NICE). These guidelines are intended to provide advice as to the diagnosis, assessment and management of alcohol dependence. An important feature of CG115 is that the recommended treatment intensity increases with severity of alcohol dependence and presence of concurrent medical and social problems (i.e. 'complex needs'). The CG115 guidance identifies the usefulness of two well-established tools for the diagnosis and assessment of alcohol dependence. The Alcohol Use Disorders Identification Test (AUDIT) [6] is suggested for the identification of likely alcohol dependence and the Severity of Alcohol

Dependence Questionnaire (SADQ) [7] for measurement of its severity. For people with symptoms of *mild dependence/harmful drinking* (i.e. those scoring 16-19 on the AUDIT and/or who consume on average <16 units of alcohol per day) community based psychosocial therapy should be considered. People with *moderate dependence* (i.e. an AUDIT score of 20+ and/or who consume 16-30 units per day, and SADQ score 16-30) should be considered for treatment which includes community based detoxification, followed by psychosocial intervention accompanied by pharmacological relapse prevention intervention. Finally, for those with *severe dependence* (indicated by drinking >30 units a day or an AUDIT score 20+ and SADQ score > 30) and those with moderate dependence with complex needs inpatient or residential detoxification with more intensive community psychosocial intervention and pharmacological relapse prevention are recommended. For homeless clients with moderate or severe dependency, residential rehabilitation is recommended. In addition to consideration of dependence, CG115 recommends that complex needs such as "psychiatric comorbidity, poor social support or homelessness" be factored in when planning treatment with a client.

The capacity of treatment services and the types of treatment that are available should be designed based on the numbers of people with alcohol dependence and the severity and complexity mix. The National Drug Treatment Monitoring System (NDTMS) collects data on individuals with alcohol dependence who access specialist treatment for alcohol dependence. In order to assess the extent to which need for treatment services is being met, an evidence based prevalence estimate of alcohol dependence in the community is required.

1.2.3 Treatment commissioning

In England, Local Authorities (LA) are responsible for commissioning drug and alcohol specialist treatment services and it is intended that *"Specialist treatment should be accessible, matched to local need and NICE-compliant"* [8] (i.e. in accordance with CG115). Further, a recent review of alcohol and drug commissioning noted that those with the responsibility for commissioning services wanted *"improved access to evidence-based information and **models** to improve procurement and enable needs based service design"* [9, p. 17] (emphasis added). There is therefore a need for a treatment capacity planning tool to assist in resource allocation decision-making regarding the level and mix of services in relation to the prevalence and severity of alcohol dependence in the population. Further, there is a need for LAs to be able to benchmark both local treatment need and access relative to other areas.

1.2.4 Relationship to LA Public Health resource allocation formula methods

Recent work undertaken for the DH Advisory Committee on Resource Allocation (ACRA) has aimed to estimate relative need for alcohol services in developing the formula for the public health grant to LAs. This work was published in October 2015, almost at the end of our project and after our two main stakeholder events. Its purpose is to adjust the overall funding for public health budgets to account for variations in 'need' for drug and alcohol services. The data used is based on the actual levels of current utilisation of drug and alcohol services. The ACRA work does not undertake any estimation of prevalence of alcohol dependence but rather takes a different paradigm - using regression methods to explain what factors affect variations in current service costs or use. Specifically for alcohol (as opposed to drugs) it found little correlation between current levels of utilisation and other variables.

1.3 Overview of Methods and Structure of Report

The research team has undertaken evidence and literature review, sought out available and relevant data sources, undertaken statistical analyses using the available data and developed a new model to support planning and commissioning of specialist treatment services for people with alcohol dependence.

The research is presented in this report in 6 core studies as follows;

1. Updated Evidence Review - A summary of selected new evidence relevant to NICE clinical guideline 115 "Alcohol use disorders: diagnosis, assessment and management of harmful drinking and alcohol dependence"
2. Estimating the Prevalence of People Potentially in Need of Assessment for and Treatment with Specialist Services for Alcohol Dependence in English Local Authorities by Combining Survey and Routine Data Sources.
3. Using routine administrative data from specialist alcohol treatment services in England to estimate client severity of dependence, complex needs and treatment pathways
4. Benchmarking Local Authority Access Rates to Pathways for Specialist Treatment for Alcohol Dependence in England
5. Estimating the proportion of people with alcohol dependence who would be amenable to specialist alcohol treatment in England using Alcohol Toolkit Survey data on past year motivation to cut down drinking

6. Modelling the Potential Impact of Changing Access Rates to Specialist Treatment for Alcohol Dependence for Local Authorities in England – the Specialist Treatment for Alcohol Model (STreAM)

A further chapter of the report gives the description of the key research project processes. This includes details of stakeholder engagement with service users, Local Authorities, service providers, clinicians, Public Health England, Department of Health, academics and other related agencies. Also described is how the input, advice and feedback of stakeholders have been helpful in influencing the development of the research. A summary of how the final achievements of the research programme relate to the original objectives is given, followed finally by a brief description of plans for dissemination.

1.4 Patient and Public Involvement

Key stakeholders were identified in consultation with the Department of Health (DH) and included service providers, service users, academics, commissioners and representatives from DH and Public Health England (PHE). Service users were an important component of this engagement and were involved in the two main stakeholder meetings as well as subsequent follow up.

Stakeholder meeting 1 - The first day-long stakeholder meeting was held during the scoping and feasibility stage (July 2014) to seek general suggestions for the overall project and specific advice on the development of the capacity model including model structure, data requirements and functionality of the model (see Appendix 9.1 for attendees).

Stakeholder meeting 2 - The second stakeholder meeting (March 2015) provided an opportunity for the research team to present progress on model development and seek feedback on the appropriateness of the datasets used, analyses conducted and assumptions to be made regarding model parameters (see Appendix 9.1 for attendees).

Further Service User Engagement – After the stakeholder meetings above, additional feedback was sought via email from three service user representatives regarding their views on the face validity of our estimates of prevalence of alcohol dependence, treatment access rates, proportion of people amenable to treatment amenability and treatment pathways. The service user representatives were provided with summary information, guidance on how to interpret any graphical information presented and then asked to respond to the material. For example, in relation to the information on treatment access rates, service user representatives were asked “Do you have any comments on the access rate information?”,

"Is there anything missing?", and "Thinking about the subgroups (age, gender, level of drinking), is there anything else we should take into account?"

1.5 Addressing Equality and Diversity Issues

The benchmarking and what if modelling tools developed as part of this research are fundamentally embedded in the concept of examining inequalities across both localities and populations subgroups. Examination across LAs has identified large variations in prevalence of people potentially in need of specialist services. It has also identified large unexplained variations in estimated access rates to specialist services, even after accounting for age and sex, deprivation as measured by the Index of Multiple Deprivation and measures of homelessness. Unexpectedly, ethnicity was not a statistically significant variable in our models estimating predicted AUDIT scores and SADQ after the other variables were taken into account.

1.6 Summary of Methods and Results for Each Component Study

1.6.1 Updated Evidence Review Summary

1.6.1.1 Purpose

This review identifies new evidence that is relevant to, and may have a potential impact on: - Alcohol use disorders: harmful drinking and alcohol dependence, NICE clinical guidelines 115 (2011), and on, Alcohol use disorders: harmful drinking and alcohol dependence. Evidence Update (January 2013)

1.6.1.2 Methods

A search was conducted to identify new evidence relevant to the scope: reviews of effectiveness and cost-effectiveness of specialist alcohol treatment published between 1st January 2012 and 29th August 2014. A total of 6,153 pieces of evidence were identified and assessed, of which 24 (plus three possible) were initially selected for this Evidence Update, and in the end, 19 were deemed to meet the required criteria.

1.6.1.3 Results

The final sifting process indicates that only new findings in relation to nalmefene for mild dependent drinkers might alter the recommendations in the 2013 Evidence Update or the

original 2011 guidelines. A subsequent NICE Single Technology Appraisal has recommended nalmefene for harmful drinking/mild dependent drinkers who do not require detoxification. However, this was based on sub-group analyses of trial data with high dropout rates, and had no comparison to current standard treatments including naltrexone and acamprosate. Its relevance to clinical practice has been questioned. It is unclear how this would impact on the delivery of care in specialist alcohol treatment services.

1.6.1.4 **Conclusions**

Beyond that already reviewed as part of the NICE guideline processes, there is little new evidence on the effectiveness and cost-effectiveness of specialist alcohol treatment that is relevant to this research project.

1.6.2 **Prevalence of People In Need Study Summary**

1.6.2.1 **Introduction**

In England, Local Authorities (LAs) are responsible for commissioning drug and alcohol specialist treatment services and require information on the local at-need population. This study describes a method to derive LA estimates of the prevalence of mild, moderate and severe alcohol dependence.

1.6.2.2 **Methods**

The approach follows principles set out in National Institute for Health and Care Excellence (NICE) guidelines utilising the Alcohol Use Disorders Identification Test (AUDIT) questionnaire to categorise levels of harmful drinking behaviour and the Severity of Alcohol Dependence Questionnaire (SADQ) to stratify according to severity. To estimate the AUDIT and SADQ population distributions for each LA in England, two nested statistical models (Ordered Probit regression) were developed using 1) individual level AUDIT and SADQ data from the 2007 Adult Psychiatric Morbidity Survey, a nationally representative household survey of around 7,000 persons carried out every 7-8 years, 2) 2012 data on LA population profile (age, gender and deprivation), 3) 2012 LA data on hospital admissions related to alcohol dependence and 4) LA estimates of the homeless population.

1.6.2.3 **Results**

The statistical model to predict LA-level prevalence of AUDIT score categories adjusted for age group, gender, Index of Multiple Deprivation of place of residence, and former

Government Office Region (GOR) level average hospital admissions rate for alcohol dependence. The model for SADQ contains the same predictor variables and in addition the AUDIT score category. The 2012 implied national estimate of prevalence of people with alcohol dependence likely to be in need of specialist treatment is around 735,000 (1.75% of the 18+ population). This includes 397,000 with scores indicating mild dependence (0.94%: AUDIT 20+ and SADQ 4-15), 268,000 with moderate dependence (0.64%: AUDIT 16+ and SADQ 16-30), 52,000 with severe dependence (0.12%: AUDIT 16+ and SADQ 31+). After an adjustment for the number of homeless people in each LA, the latter group is increased by just over 19,000 people to an estimated 70,500 (0.17%). Local authority prevalence rates are estimated to vary widely ranging from 0.92% to 6.91% of the population for any dependence, 0.29% to 3.19% for moderate dependence and 0.05% to 1.04% for severe dependence, representing a 7-fold, 11-fold and 21-fold variation.

1.6.2.4 **Conclusions**

Local variation of prevalence is estimated to be substantial and LA service commissioners should consider reasons for and implications of these results. The measures of AUDIT and SADQ are crucial to benchmarking LA prevalence and we strongly advise that they be routinely collected for clients with alcohol problems within the National Drug Treatment Monitoring System. Our approach could also be applied in other countries where geographically marked survey and routine hospitalisation data exist.

1.6.3 Analysis of Treatment Pathways and Severity Subgroups in NDTMS Study Summary

1.6.3.1 **Introduction**

Clinical guidelines in England and Wales for the specialist treatment of alcohol dependence specify treatment pathways which should be followed according to severity of dependence and concurrent complex needs. A current project to develop a service system planning model for England requires estimates of the need for specialist alcohol treatment in relation to existing service provision. In this paper, our aim is to quantify specialist alcohol treatment provision, and to determine the extent to which clients follow treatment pathways that reflect clinical guidelines and the outcomes of their treatment journeys.

1.6.3.2 **Methods**

National Drug Treatment Monitoring System (NDTMS) data were analysed to identify treatment pathways for 60,947 clients entering treatment for alcohol use. Information was extracted from each client's most recent treatment journey ending in 2013/2014, including levels of alcohol consumption, presence of complex needs, intervention type and setting, treatment start and end dates, and outcomes. Using national clinical guidelines as a framework for defining treatment pathways, we examined what proportion of clients followed a recommended pathway and how these related to levels of alcohol consumption and the presence of complex needs.

1.6.3.3 **Results**

Although the greatest proportion of clients consumed alcohol at a level consistent with 'moderate' alcohol dependence (16 or more units a day), over three quarters received 'community psychosocial treatment only'; the recommended pathway for 'mild' dependence. Even amongst the small group with the most severe alcohol use and additional complex needs, three quarters received community psychosocial treatment only.

1.6.3.4 **Conclusions**

These results suggest that service system planning should not only address overall service availability and capacity, but also the intensity of treatment provided within those services.

1.6.4 **Benchmarking Access Rates Study Summary**

1.6.4.1 **Introduction**

Variations in access to treatment across Local Authorities in England are examined using recently developed estimates of the prevalence of people potentially in need of assessment for and treatment with specialist alcohol services combined with data from the national Drug treatment Monitoring System (NDTMS).

1.6.4.2 **Methods**

The analysis examines both the total number of people in the treatment system and the numbers of new people entering the system in one year to calculate access rates as a proportion of the estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services. Treatment journeys are classified into 22

different pathways based on NICE guidance and these are summarised into four main categories – psychosocial only, psychosocial with pharmacological treatments, residential based care and inpatient care (see Appendix 5.1 for detailed definitions). Analysis is also undertaken using an indicative measure of severity subgroups, and examining variations in treatment outcomes by LA.

1.6.4.3 **Results**

The overall rate of numbers of people in treatment at any point during 2013/14 was 14.1% of our estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services in England (penetration rate of 1 in 7.1). The access rate for clients starting new treatment journeys within 2013/14 was 10.6% of the estimated population with alcohol dependence (penetration rate 1 in 9.4). Local Authority rates varied substantially; from 2.3% to 26.6% i.e. more than 11 fold variation. Indicative analysis of severity groupings showed even larger variations. Similar order of magnitude variation across LAs existed for the proportion of clients receiving different pathways of care, and for successful treatment completion rates.

1.6.4.4 **Conclusion**

We strongly advise that national and local decision makers consider these benchmarking analyses as an aid to local commissioning and planning. Further data collection on severity of dependence within the NDTMS would be useful.

1.6.5 **Amenability Estimation Using Alcohol Toolkit Study Summary**

1.6.5.1 **Introduction**

Among people who are alcohol dependent, at any point in time there is a proportion who are not currently accessing specialist treatment, but who would do so if it was available and accessible (i.e. amenable to treatment). The size of the amenable population is a relevant consideration for commissioners because it signifies the extent to which a service system could potentially be expanded while still remaining in demand. However, there is a lack of published evidence with which to inform an estimate of amenability.

1.6.5.2 **Method**

In this study we aim to use an existing dataset, the Alcohol Toolkit Study (ATS), a monthly cross sectional survey of approximately 1,700 adults, to produce an estimate of the

proportion of people with alcohol dependence who would be amenable to treatment. Method: We used data from 19 monthly waves of the ATS including data from 7,948 individuals aged 18+ years who completed the Alcohol Use Disorders Identification Test (AUDIT) (scoring >4 on AUDIT-C or >7 on AUDIT) and who also provided data on the ATS question on 'motivation to reduce' alcohol use. Weighted logistic regression analysis was undertaken to explore the relationship of age group, sex, and AUDIT category (8-16, 16-19 and 20+) as predictor variables two bivariate variables based on responses to the 'motivation to reduce' item; Desire AND intention to cut down (i.e. in the near future) and Desire to cut down (within any time frame). These outcome variables were considered as proxies for amenability. The results of the regression analysis were used to estimate the proportion of people with possible alcohol dependence (i.e. AUDIT score 20+) who may be amenable to treatment.

1.6.5.3 **Results**

Motivation to cut down drinking in the near future was significantly associated with age and AUDIT score category, with 35-54 year olds and the heaviest drinkers being likely to want to cut down. Among the heaviest drinking group (AUDIT score 20+), we estimate 33.2% would be willing to consider treatment in the near future and 51.0% within an unspecified time frame.

1.6.5.4 **Conclusions**

Using existing data, we have been able to provide an estimate of the proportion of people drinking at a level consistent with alcohol dependence who may be amenable to treatment. This information may be useful to those planning treatment service systems in determining the likely scale of unmet need.

1.6.6 **Modelling the Impact of Changing Access Rates Study Summary**

1.6.6.1 **Introduction**

Variations in estimated access rates to specialist treatment services for alcohol dependence between Local Authorities in England are substantial. In this study we develop a modelling framework - Specialist Treatment for Alcohol Model (STreAM) version 1.0 – to enable national and local decision makers to explore the impact of changing access rates to

different treatment pathways on future prevalence of alcohol dependence, service capacity, costs, treatment outcomes and mortality rates.

1.6.6.2 **Methods**

The model's baseline is estimated Local Authority prevalence of people potentially in need of assessment for and treatment in specialist services for alcohol dependence. This is separated into mild, moderate and severe dependence and includes complex need. Baseline access rates are estimated combining these potentially in need prevalence rates with data from the National Drug Treatment Monitoring System (NDTMS). The model examines 'what-if' consequences of a change to access rates by a LA. It can also model changes to the proportion of clients assigned to 22 different treatment pathways, which have been constructed to reflect NICE guidance. To examine impact, the model also utilises published information on natural remission without treatment, and relapse rates following treatment. Outputs include the change in future prevalence rates up to the next 10 years, comparing the proposed change in access to current baseline access. The results also estimate commissioning costs for NICE guidelines compliant treatment provision (assuming a national average cost for each pathway), impact on successful treatment completion rates, indicative impacts on costs of NHS care for the alcohol dependent population, and mortality rates. These costs are only a partial estimate of the impact of treatment on public spending costs because Social Care costs and impact on crime are currently not included in the analysis.

1.6.6.3 **Results**

We illustrate the functionality of the model with three hypothetical scenarios for an example local authority in England: 1) achieving access rates at the 70th percentile nationally for each age / gender group; 2) increasing access rates by 25% across all population subgroups, and 3) increasing access rates by a factor of three (approximately to estimated access rates calculated for Scotland using a slightly different methodology). Baseline prevalence of people potentially in need in the exemplar LA is estimated at 14,581. The impact of the scenarios examined is greater as access rates are increased. Compared incrementally against a strategy of keeping access rates at current baseline levels, achieving the 70th percentile access rates nationally is estimated to reduce prevalence of the population potentially in need by 191 (1.3%) after 5 years, a 25% increase in access rates is estimated to reduce prevalence by 477 (3.3%), whilst increasing access rates approximately to those currently achieved in Scotland results in an estimated reduction of almost 2800 (19.2%). This relative scale of impact is reflected in each of the other model outputs including

mortality averted, increase in community based, inpatient and residential places provision, additional costs of specialist treatment as well as the indicative estimated NHS costs averted.

1.6.6.4 **Conclusions**

The STreAM framework version 1.0 enables national and local authority decision makers to estimate the potential impact for alternative plans of changing access to specialist treatment services for alcohol. The model is to be made available through Public Health England. Further development as new evidence and data emerges on prevalence of alcohol dependence and on service use would be useful.

1.7 Further Research

The project as a whole and the study components highlight several areas for further research and development.

1.7.1 **Updating Prevalence Estimates using APMS 2014**

The research team identify this as a priority. The estimates of prevalence of people in need of assessment for and treatment with specialist services for alcohol dependence make use general population survey data on AUDIT and SADQ from the APMS 2007. It will be necessary to update these estimates when the APMS 2014 data becomes available in 2016. There is more detailed discussion of proposed methods for this in Chapter 10.

1.7.2 **Considering prevalence trends**

Since the APMS is only undertaken every 7 years or so and, the prevalence estimation is somewhat out of date, it is difficult to estimate trends in prevalence. At present the model simply starts with the latest year's estimated prevalence, rather than utilising trend evidence which, if it were available, would be a useful addition.

1.7.3 **Proposal that NDMTS routinely collect AUDIT and SADQ**

Since the measures of AUDIT and SADQ are crucial to benchmarking of LA prevalence and hence long term planning of services, the research team would strongly advise that they be collected at assessment and recorded routinely within the National Drug Treatment Monitoring System for clients with alcohol problems coming into treatment. This would enable benchmarking of access to treatment services separately for mild, moderate and severe subgroups so that an understanding of variations in the access or targeting of services across LAs can be developed.

1.7.4 Extending the Evidence to Incorporate Crime Outcomes

We have not at this stage included the impact on crime harms, because there was limited evidence on how reducing the prevalence of alcohol dependence would impact on crime rates. The Public Services (Social Value Act) 2012 recommends that all public bodies, including local authorities, consider how their commissioning decisions benefit society. The Health and Social Care Act 2012 changed how public health funding is allocated and how local commissioning priorities are determined. An important part of that process is demonstrating to decision-makers and local stakeholders that alcohol and drug interventions contribute to public health and social care outcomes and cut crime and improve community safety. Commissioners need to know about potential savings to LAs not NHS alone. We understand that PHE is aware of this urgent need and has begun to develop further work on producing research and tools in these areas. Studies which quantify the relationship between reducing alcohol dependence and crime would be particularly useful. These could include studies linking police and crime data with NDTMS.

1.7.5 Extending the Evidence to Incorporate Impact on Social Care Costs and Harm to Others

Our analysis has focused on impact on treatment outcomes, future prevalence and a broad assessment of potential mortality reductions. Studies to quantify the impact of reducing the prevalence of alcohol dependence on social care costs and more widely on harm to others would be useful.

1.7.6 More Detailed Analysis of Hospitalisations

We considered utilising previously published risk functions for hospitalisation of 43 different conditions from the existing Sheffield Alcohol Policy Model work. This was felt to be too detailed and complex an approach at this stage, but is still potentially possible as a future project. This could involve detailed analysis of individual level Hospital Episode Statistics data and linkage to the NDTMS data.

1.7.7 Linking to Wider Modelling of Alcohol Policy in the Population.

Members of the research team have developed and used the Sheffield Alcohol Policy Model to examine consumption and harm patterns in the whole population of England and evaluate the potential impact of policies including minimum unit pricing, tax and implementation of greater levels of identification and brief advice. It would be useful to

develop a link between that work and the present modelling to enable a more integrated analysis of policies including wider public health measures and specialist treatment.

1.7.8 Understanding pathways as evidenced by NDTMS and their alignment with NICE guidelines

It would be useful to better understand why, according to our analysis; a minority of treatments recorded in NDTMS are apparently inconsistent with NICE Guidelines CG115. That is, how much of the discrepancy between recommended and actual treatment can be attributed to data issues (especially in relation to allocation to severity groups using 'units drunk on a typical drinking day', or service system level factors, such as inadequate treatment availability and capacity relative to the needs of the catchment population or the configuration of services, or clinician or client level factors when treatment pathways are decided and agreed. In addition, the actual client pathways we identify are informed by the entire client journey (potentially several points in time) whilst the NICE CG115 pathways recommendations are based on the client's dependency and complexity (a cluster) evaluated at one specific point in time, which could contribute to the misalignment between the CG115 treatment recommended for a client's cluster and actual treatment pathway taken.

1.7.9 Understanding underlying causes of LA access rate variations

Our research finds substantial variations in access rates per population in need and this generates an interesting set of research questions regarding the causes of such estimated variations, future investigation of which would best involve a mixed methods qualitative and quantitative research design.

1.7.10 Amenability

Our empirical analysis of amenability used cross sectional data analysis from the general population survey Alcohol Toolkit Study (ATS). A more targeted prospective study could be useful to reflect subgroups by severity of with alcohol dependence. There is also scope in future to utilise the ATS longitudinal panel element, which focusses on a sample of hazardous drinkers (i.e. AUDIT score of 8+) being followed-up at six months, and includes data on whether participants have made a serious attempt to cut down their drinking in the previous year, and if so what strategies were tried..

1.7.11 Relapse and Natural Remission

Despite there being considerable evidence for the effectiveness of specialist treatments for alcohol dependence, there is less quantified evidence on the wider natural history of alcohol

dependence in England. For the modelling of relapse rates after specialist treatment, and the natural remission of people who are untreated, we have had to rely on published literature estimates from the long term U.S. studies. It would be useful if some research were undertaken in England to attempt to quantify both natural remission and relapse rates.

1.7.12 Further Analysis using the STreAM Model version 1.0

This project has integrated a wide variety detailed data and existing evidence to develop tools both to benchmark Local Authorities in England and explore 'what-if' questions on the potential impact of changing access rates to specialist services. This report presents the analyses undertaken so far. Many further what-if analyses using these tools are possible for users at both national and local level.

1.7.13 Feedback from STreAM Model Users

While we have sought input from Local Authority end users and the piloting stage to ensure the model functionality was relevant to their commissioning decision needs, it is likely that additional areas for refinement will emerge as the model is implemented. We are interested in continuing to gather information from local authority and national users, including Public Health England, regarding the preferred scenarios to include in the modelling, what other outcomes would be useful to include, and the presentation of results.

1.7.14 Consideration of non-specialist treatment interventions

Interventions beyond commissioned specialist treatment for alcohol dependence including mutual aid, IT interventions and impacts on primary care have not been considered in this project. This is partly because the use were outside the formal scope of this project brief as laid out by DH. A more systems wide modelling exercise could be considered, for example to investigate whether and how more widespread use of mutual aid could ease the burden on formal treatment services posed by some less severely affected individuals [10]. This would of course have challenges; it is difficult to obtain precise estimates of the uptake of mutual aid as this lies outside of commissioning, and if differences in Alcoholics Anonymous (AA) attendance for example were found across the country, it is not clear that there is a mechanism to mandate or encourage changes in availability of AA support as they lie outside of the reach of commissioning or DH policy. Similarly, IT interventions, while promising, were outside the scope of the project, although some specialist treatment services could or do use technologies as part of their treatment programmes, either as part of a primarily clinician delivered treatment programme, or as an alternative to conventional treatment. The

effectiveness of IT interventions for alcohol dependence is currently unclear and they are not currently recommended as part of the treatment provision by NICE. Although the number of IT intervention tools for alcohol are increasing, the research team is aware from the Alcohol Toolkit Study that they are currently seldom accessed by people attempting to reduce or stop drinking compared to conventional counselling or treatment services. It may be that as new research emerges this becomes an increasingly important means of reaching a larger proportion of the in need population. Finally, the impact on primary care has not been considered except where GPs with specialist alcohol treatment skills work in a specialist addiction provider capacity and the data are captured by NDTMS. We do know from other Alcohol Toolkit Study research that GP activity in relation to alcohol is extremely low especially in comparison to smoking interventions[11]. Further research to consider all of these issues in a more systems wide modelling exercise could be useful.

We would strongly advise developing mechanisms to link the individuals in the NDTMS dataset to their records in Hospital Episode Statistics and to wider data on Community Mental Health Services and Primary Care. Such a linkage mechanism is not yet developed routinely across the country and could not be utilised in our study. It would certainly provide future benefits both in terms of extending the scope of treatments able to be analysed in a systems model and by generating evidence to quantify the impact on health services utilisation before and after successful treatment for alcohol dependence.

1.8 Dissemination plans

Any dissemination plans are subject to agreement with DH and PHE.

1.8.1 STreAM Benchmark and What-If Models version 1.0

The final product of the project, the STreAM Benchmark and What-If Models version 1.0, will be handed over to DH at the conclusion of the project, including provision of the EXCEL software for the model and associated data scripts. The plan is for PHE to be custodian of the model. Governance arrangements for the model including any licensing arrangements need to be finalised.

A power point user guide has been prepared for Local Authorities and PHE including an introduction to what the model is and its benchmarking and scenario modelling functions, how to run different models, and how to interpret the output.

1.8.2 Updates

A document had been prepared outlining which model data will require updating by PHE (for example, treatment data from NDTMS) and how to do this.

The research team is available to be commissioned to update either model functions or underlying model inputs and assumptions. For example, when new key evidence such as APMS 2014 data are available (anticipated to be 2016), the prevalence of alcohol dependence estimator will require updating.

1.8.3 Publication

This will be undertaken in line with policies and procedures of the DH Policy research programme.

The report has been prepared so that each of the key chapters can be readily adapted for peer review publication. We anticipate submitting these for publication following the DH PRP peer review process. An earlier version of the treatment pathways analysis was presented at the KBS alcohol conference in June 2015. An overview of the project was provided at the Society for the Study of Addiction conference in York in November 2015. The key dissemination processes to users in Local Authorities will be agreed with DH and PHE.

2 Introduction

2.1 Background

Levels of alcohol-related harms from harmful drinking and alcohol dependence are high, and the consequences of severe dependence, in particular, are costly to individuals and their families, the National Health Service (NHS), and society.[1] It is estimated that harmful use of alcohol is responsible for 10% of Disability adjusted Life Years (DALYs) lost in the UK[12], whilst 5.4% of all hospital admissions have a primary diagnosis of an alcohol-attributable disease [13]. Alcohol is estimated to cost the NHS £3.5 billion per annum [14]. Alcohol is also a factor in approximately 50% of violent crime, which equates to approximately 986,000 violent incidents in 2009/10 [15].

The Adult Psychiatric Morbidity Survey (APMS) for 2007 has estimated that there are 1.6 million individuals showing signs of alcohol dependence in England, which could range from mild to severe dependence [2]. For Canada, research suggests 10-20% of people with alcohol dependence would be amenable to effective treatment in any one year [4]; however, there appears to be no consensus on an equivalent estimate for England. In 2010, about 111,000 adults (or 7% of people with alcohol dependence) accessed specialised treatment services in England [3]. If it is assumed that 15% of "in need" people with alcohol dependence should be provided with specialist treatment annually (the median estimate based on the Rush study), this would imply an additional 129,000 people treated by specialist services in England. Potential reasons for the currently lower treatment levels may relate to the delay between developing alcohol dependence and seeking help, a 'postcode lottery' in provision of treatment across England, and alcohol misuse being under-identified by health and social care professionals, leading to missed opportunities to provide effective interventions [1]. There is awareness that prevalence and service provision are variable across England. However the scale of variation, and exactly where each local authority sits in comparison to others, has not been fully identified. There is a need to better understand the extent to which current levels specialist alcohol treatment provision in England are related to levels of alcohol dependence in the community. Given that services are provided locally, it is important that this be understood not only at a national level, but also at the Local Authority level.

2.2 Aims and objectives of commissioned research

The overarching aim of the study is to develop an evidence- and consensus-based capacity model to estimate the number of individuals who would access specialist alcohol treatment services and require different types of treatment options in England each year at both national and local levels.

The six project objectives were to:

1. Identify key specialist treatment options and combinations of treatments and care packages; then investigate the effectiveness and resource uses of these treatment modalities, taking into account the severity of patients' alcohol dependence and other patient characteristics.
2. Estimate the prevalence of harmful and dependent drinkers by the severity of alcohol dependence, gender, age and other relevant patient characteristics in England at both national and local levels over time.
3. Engage with stakeholders to reach consensus on England-specific "amenable" and "acceptable" levels of service provision and other key model assumptions.
4. Estimate the annual demand for specialist alcohol treatment services at national and local levels; both the overall individuals accessing the service and the specific demand for each treatment option.
5. Estimate the impact of specialist alcohol treatment in terms of resource usage and reduced alcohol-related health (mortality, hospital admissions) and crime harms.
6. Cooperate with the Department of Health (DH) and Public Health England (PHE) to develop clear advice and process for model implementation and maintenance.

This project focusses its scope on specialist alcohol treatment services that are commissioned by Local Authorities. It specifically excludes some other aspects of treatment such as use of mutual aid (Alcoholics Anonymous), and IT based interventions and interventions provided directly from primary care. The research team has worked to the commissioning brief and the proposal agreed with DH Policy Research Programme, and developed the research in conjunction with a large group of stakeholders who further discussed the scope in two major stakeholder meetings.

3 Updated Evidence Review

DH Modelling Specialist Alcohol Treatment Capacity
An Evidence Update February 2015 of:

Alcohol use disorders: harmful drinking and alcohol dependence – Evidence Update January 2013: A summary of selected new evidence relevant to NICE clinical guideline 115 "Alcohol use disorders: diagnosis, assessment and management of harmful drinking and alcohol dependence" (2011)

Kings College London Clinical and Evidence Review Team:
Colin Drummond, Amy Wolstenholme, Tom Phillips, Catherine Elzerbi

3.1 Introduction

3.1.1 **Outline**

This review identifies new evidence that is relevant to, and may have a potential impact on, the following:

- Alcohol use disorders: harmful drinking and alcohol dependence NICE clinical guidelines 115 (2011)
- Alcohol use disorders: harmful drinking and alcohol dependence. Evidence Update (January 2013)

A search was conducted to identify new evidence relevant to the scope: reviews of effectiveness and cost-effectiveness of specialist alcohol treatment published between 1 January 2012 and 29th August 2014. A total of 6,153 pieces of evidence were identified and assessed, of which 24 (plus three possible) were initially selected for this Evidence Update, and in the end, 19 were deemed to meet the required criteria.

The team at King's College London (comprising two researchers and led by Professor Colin Drummond) then reviewed the prioritised evidence and provided a commentary following the same treatment categories as the original NICE guideline and subsequent Evidence Update. This update will focus on any impact the new evidence may have on the existing NICE guideline recommendations. The final sifting process indicates that only new findings in relation to nalmefene for mild dependent drinkers might alter the recommendations in the 2013 Evidence Update or the original 2011 guidelines. A subsequent NICE Single Technology Appraisal has recommended nalmefene for harmful drinking/mild dependent drinkers who do not require detoxification. However, this was based on sub-group analyses of trial data with high dropout rates, and had no comparison to current standard treatments including naltrexone and acamprosate. Its relevance to clinical practice has been questioned [16]. It is unclear how this would impact on the delivery of care in specialist alcohol treatment services.

3.1.2 **Other relevant NICE guidance**

For other relevant NICE guidance, we have referred to the notes in the January 2013 Evidence Update:

- Depression: the treatment and management of depression in adults NICE clinical guidelines 90 (2009)
- Generalised anxiety disorder and panic disorder: with or without agoraphobia in adults. NICE guideline 113 (2011)

Quality standards

- Alcohol dependence and harmful alcohol use. NICE quality standard 11 (2011)

Other relevant NICE Evidence Updates

- Alcohol use disorders: physical complications. NICE Evidence Update 10 (2012)

3.2 Key points

The following table (Table 3.1) summarises what the reviewers decided were the key points for this Evidence Update. It also indicates the reviewers' opinion on whether the new evidence may have a potential impact on the current guidelines listed in the introduction. For further details of the evidence behind these key points, please see the full commentaries in the next section of this review.

Table 3.1 Key Points from Updated Evidence Review

	Potential impact on guidance	
Key point	**Yes**	**No**
Principles of care • No new evidence was found		
Identification and Assessment • No new evidence was found		
Interventions for alcohol misuse • Evidence suggests that internet delivered / computer assisted behavioural interventions may help to expand access and improve addiction treatment outcomes [17]		X
• Affect Regulation Treatment may be beneficial to alcohol dependent outpatients who report often drinking in negative affect [18]		X
• The inclusion of mindfulness teaching in relapse prevention approaches may be beneficial in preventing relapse, and promote longer term sustainability of treatment gains for substance misuse [19]		X
• Motivational Interviewing and cognitive behavioural therapy may be beneficial to patients with an alcohol use disorder and co-existing depression [20]		X
• Smart phone applications such as A-CHESS may support recovery and prevent relapse [21]		X
• Acamprosate for alcohol dependence in a family setting found no		

treatment effect but the study was underpowered [22]		
• Full dose ondansetron for heavy drinking males withdrawing from alcohol showed no significant treatment effect compared to placebo but the study was underpowered [23]		X
• Leveteracetum Placebo-Controlled Trial Assessing the Efficacy of Levetiracetam Extended-Release in Very Heavy Drinking Alcohol-Dependent Patients showed no significant treatment effects [24]		X
• Efficacy study of nalmefene, as-needed use, in patients with alcohol dependence showed significant treatment effects in harmful and mildly dependent drinkers. However the study had important methodological limitations. A subsequent NICE Technology Appraisal has recommended nalmefene for mild dependence, although the clinical pathways to implement this are currently unclear [25]	X	
• Effect of modafinil on impulsivity and relapse in alcohol dependent patients: a randomized, placebo-controlled trial showed no significant treatment effects in an intent to treat design, but some significant subgroup differences [26]		X
• Topiramate treatment for alcoholic outpatients recently receiving residential treatment programs showed no significant treatment effects [27]		X
• A double-blind, placebo-controlled trial assessing the efficacy of varenicline tartrate for alcohol dependence showed small treatment effects but was conducted in non-treatment seeking alcohol dependent participants recruited by advertisement in the US. The authors state that a more definitive trial is required [28]		
• Extending the treatment options in alcohol dependence: a randomized controlled study of as-needed nalmefene showed significant treatment effects but the study had significant methodological limitations. A subsequent NICE Technology Appraisal has recommended nalmefene for mild dependence, although the clinical pathways to implement this are currently unclear [29]	X	
• Results of a double-blind, placebo-controlled pharmacotherapy		

trial in alcoholism conducted in Germany and comparison with the US COMBINE study showed no overall treatment effects. However the NICE and Cochrane meta-analyses of acamprosate and naltrexone overall show moderate treatment effects and so this study is unlikely to alter the NICE recommendations [30]		X
• Gabapentin treatment for alcohol dependence: a randomized clinical trial showed significant treatment effects. However this was a small pilot study in non-treatment seeking participants, and a larger longer term clinical trial is needed to alter the NICE recommendation on gabapentin [31]		X
• Long-term efficacy, tolerability and safety of nalmefene as-needed in patients with alcohol dependence: A 1-year, randomised controlled study showed modest treatment effects, but had important limitations. A subsequent NICE Technology Appraisal has recommended nalmefene for mild dependence, although the clinical pathways to implement this are currently unclear [32]	X X	
• Efficacy of as-needed nalmefene in alcohol-dependent patients with at least a high drinking risk level: results from a subgroup analysis of two randomized controlled 6-month studies. The study had important methodological limitations. This is a post hoc analysis of previous trials of nalmefene. See above [33]		X
• Tailored postal feedback on general practitioners' prescribing of pharmacotherapies for alcohol dependence, showed a positive effect on prescribing behaviour. However the study is unlikely to alter the CG115 acamprosate prescribing recommendations [34]		X
• Internet based therapy offers better outcomes and better value for money than internet based self-help for harmful alcohol use but its relevance to the NHS is unclear [35]		

3.3 Commentary on new evidence

These commentaries analyse the key references identified specifically for this Evidence Update. The commentaries focus on the "key references" (those identified through the search process and prioritised by the reviewers for inclusion in the Evidence Update), which are identified in bold text. Section headings are taken from the original NICE Guidelines CG115.

3.3.1 **Principles of care**

No new key evidence was found

3.3.2 **Identification and assessment**

No new key evidence was found

3.3.3 **Interventions for alcohol misuse**

3.3.3.1 **Treatment system**

Internet interventions to expand access and improve patient outcomes:

Campbell, A.N.C., Nunes, E.V., Matthews, A. G., Stitzer, M., Miele, G. M., Polsky, D., Turrigiano, E., Walters, S., McClure, E. R., Kyle, T. L., Wahle, A., Van Veldhusien, P., Babcock, D., Stabile, P. Q., Winhusen, T., Ghitza, U. E. (2014) Internet-Delivered Treatment for Substance Abuse: A Multisite Randomized Controlled Trial. American Journal of Psychiatry, 171, 683-690.

A multisite randomised controlled trial by Campbell et al (2014) was carried out to evaluate the effectiveness of the Therapeutic Education System (TES), an internet delivered behavioural intervention that includes motivational incentives as a clinician-extender in the treatment of substance use disorders. TES is a web-based version of the community reinforcement approach plus contingency management; a packaged approach with substantial demonstrated efficacy. Adult men and women (n=507) entering ten outpatient addiction treatment programmes were randomly assigned to receive 12 weeks of either

treatment as usual (TAU) (n=252) or TAU plus TES, with the intervention substituting for about two hours of standard care per week (n=255). The programmes included had to offer at least two face-to-face therapeutic group or individual sessions per week lasting at least two hours, with most offering two to six sessions per week. The primary outcome measures were: abstinence from drugs and heavy drinking (measured by twice-weekly urine drug screens and self-report) in the last four weeks of treatment, and retention in treatment (time to drop out from treatment).

A total of 1,781 patients were screened and 507 were ultimately randomised. The sample was diverse (37.9% female, 44% ethnic/racial minorities [including 3% of patients who identify as both white and Hispanic/Latino] and presented for a range of typical substance use problems; 33.7% (N=171) were primary stimulant users (cocaine or other stimulants) and 54% (N=275) had negative urine drug and breath alcohol screens at baseline/study entry. Compared with patients receiving standard care, the internet-delivered intervention improved retention in treatment, produced equivalent high rates of abstinence among patients with a good prognosis (i.e. those who were abstinent at baseline/study entry) and most importantly, doubled the odds of abstinence among patients with an otherwise poor prognosis (i.e. those who were not abstinent at baseline. Those in the TES group had a lower dropout rate (hazard ratio=0.72, 95% CI=0.57, 0.92) and a greater abstinence rate (odds ratio=1.62, 95% CI 1.12, 2.35), when compared to TAU. This effect was more pronounced among patients who had a positive urine drug or breath alcohol screen at study entry (N=228) (odds ratio=2.18, 95% CI=1.30, 3.68). The main limitation of this study is that it tested TES as a combined package compared with treatment as usual, in a two arm design, so it is not possible to disentangle the unique effects of the computerised community reinforcement approach and of contingency management. Furthermore, previous research with clinician- and computer-delivered community reinforcement approach and contingency management techniques has suggested that both contribute to beneficial treatment effects. The authors suggest that future research focus on disentangling the effect of the two components in both community based addiction settings and non-specialty settings.

The trial took place in the USA. The study findings suggest that Internet-delivered interventions such as TES, as well as other efficacious computer-assisted interventions now emerging, have the potential expand access and improve addiction treatment outcomes, by helping to bridge the gap between the enormous need for high-quality evidence-based

treatment for addiction, and the capacity of the treatment system to deliver. These findings are not likely to impact on the NICE CG115 guidelines.

3.3.3.2 **Psychosocial**

Affect regulation training:

Stasiewicz, P.R., Bradizza, C.M., Schlauch, R.C., Coffey, S.F., Gulliver, S.B., Gudleski, G.D., Bole, C.W. (2013) Affect regulation training (ART) for alcohol use disorders: Development of a novel intervention for negative affect drinkers. Journal of Substance Abuse Treatment, 45(5), 433-43.

Staziewicz et al (2013) carried out a stage 1a/1b treatment development study combining several affect regulation strategies (e.g. mindfulness, prolonged exposure, distress tolerance) to create a new treatment called *affect regulation training (ART)* to add to, and enhance, cognitive behavioural therapy (CBT) for alcohol dependence. A draft therapy manual was developed with therapists and treatment experts and gained further input from patients before being tested. A pilot randomised clinical trial (n = 77) of alcohol dependent outpatients reporting drinking often in negative affect situations was conducted (stage 1b). The aim of the trial was to compare the clinical efficacy of 12 sessions of cognitive behavioural therapy plus affect regulation training (CBT + ART; n=39) with CBT plus a healthy lifestyles control condition (CBT + HLS; n=38), both of which were manual-guided and entailed weekly sessions of 90 minutes. Participants were recruited through radio and newspaper adverts and the Clinical Research Centre (CRC) – a publically funded outpatient substance abuse clinic at Research Institute on Addictions serving the Western New York community. Alcohol dependence was assessed by the Alcohol Abstinent Self-Efficacy scale (AASE) (DiClemente, Carbonari, Montgomery & Hughes, 1994), which evaluates self-reported self-efficacy to abstain from drinking in 20 situations. The mini International Neuropsychiatric Interview (MINI: Sheehan et al., 1998) was used to obtain a partial list of DSM-IV Axis 1 diagnoses. Following the baseline assessments, participants were interviewed at the end of treatment, and three and six months post-treatment. Primary drinking outcomes were measured and reported as percentage of days abstinent, but other drinking outcomes were explored due to the pilot nature of the study, including average drinks per day, and percentage heavy drinking days.

Thirty eight of the 77 participants were female, and all were seeking outpatient treatment for alcohol-related problems and reporting a negative affect drinking profile. Participants were predominantly Caucasian (14.3% African American and 1.3% other), married or living with a partner (42.9%; 24.7%, never married; 22.1% divorced; 3.9% single widowed; and 6.5% married but separated), with a mean age of 45.7 (SD 11.1). Those in the ART arm demonstrated significantly greater increases in percentage days abstinent from baseline to end of treatment, but this declined slightly in follow-up when compared to those in the HLS arm. Further analysis demonstrated no significant difference between those in ART and those in HLS at the time points in question, but a moderate effect size was detected for ART at three months (*b = 14.84, p – 0.106, Cohen's d = 0.43*). A simple slopes analysis revealed a significant increase (percentage days abstinent) from baseline to end of treatment for those who received ART (*b = 29.42, p < 0.001, Cohen's d = 1.90),* but not for those who received HLS. Limitations of this pilot study include that while individuals who received the ART treatment supplement did report significant within-group reduction in negative affect from baseline to end-of-treatment (effect size 0.40) it was not statistically significant, so there remains some uncertainty about how negative ART works. Secondly, the study cannot identify which components of ART's treatment sessions are the more active. The sample also had issues of homogeneity (due to only those patients reporting drinking in negative affect being recruited into the study) and heterogeneity as the group's selection criteria resulted in a high proportion of comorbidity (70.1%), and has possibly reduced the apparent effect of ART in increased affect regulation.

This study was carried out in the United States of America, and therefore has less applicability to a United Kingdom setting. The study results show promising support for ART, and specifically the study met all the aims of a stage 1b pilot trial: demonstrating excellent patient acceptance of the interventions (retention, satisfaction, and a strong therapeutic alliance), and an ability to recruit the target population. The authors commented that the results justify the need for a fully powered stage II clinical trial as the next step in evaluating ART's efficacy. Given that ART was designed as a treatment supplement for CBT for alcohol dependence, the control condition (CBT + HLS) presented a relatively strong test of ART's efficacy, opening up opportunities in the future to examine the efficacy of ART in a more diverse patient population, such as alcohol dependent adults who do not necessarily demonstrate affect disorder. The study suggests that treatment of negative affect alongside CBT may have a beneficial effect on patient outcomes, yet there is no compelling proof of

this, and further studies need to be carried out, so the present study is unlikely to affect the recommendations of the NICE CG115.

Mindfulness in relapse prevention:

Bowen, S., Witkiewitz, K., Clifasefi, S.L., Grow, J., Chawla, N., Hsu, S.H., Carroll, H.A., Harrop, E., Collins, S.E., Lustyk, M.K., Larimer, M.E. (2014) Relative Efficacy of Mindfulness-Based Relapse Prevention, Standard Relapse Prevention, and Treatment as Usual for Substance Use Disorders, A Randomized Clinical Trial. JAMA Psychiatry, 71(5):547-56.

A randomised clinical trial was carried out by Bowen et al (2014) comparing the long-term efficacy of mindfulness-based relapse prevention (MBRP) in reducing relapse with relapse prevention alone (RP) and with treatment as usual (TAU; [12-step programming and psychoeducation]) during the 12 month follow-up period. MBRP is a group-based psychological aftercare, integrating evidence-based practices from mindfulness-based interventions and cognitive-behavioural relapse prevention (RP) approaches. A total of n = 286 eligible individuals who successfully completed the initial treatment for substance use disorders (at a private nonprofit treatment facility) were recruited and randomised to MBRP, RP, or TAU aftercare and monitored for 12 months. Participants were recruited through posted advertisements at the treatment facilities and recruitment sessions conducted by research staff. Interested individuals were screened via telephone. Substance use was assessed with the calendar-formatted Timeline Follow-back. Urinalysis drug and alcohol screenings were obtained by the treatment agency from a subset of participants (n=199) court mandated or otherwise indicated for testing, showing a 72.4% agreement with self-report. Primary outcome measures included relapse to drug use and heavy drinking as well as frequency of substance use in the past 90 days. Variables were assessed to baseline and at 3-, 6- and 12-month follow-up points. Measures also included self-report of relapse and urinalysis drug and alcohol screening.

Participants medically cleared for continuing care were aged 19 – 70 years, 71.5% were male and 42.1% were of ethnic or racial minority. Compared with TAU, participants assigned to MBRP and RP reported significantly lower risk of relapse to substance use and heavy drinking and, among those who used substances, significantly fewer days of substance use and heavy drinking at the 6-month follow-up. Cognitive behavioural RP showed an advantage over MBRP in time to first drug use. However at the 12 month follow-up, MBRP

participants reported significantly fewer days of substance use and significantly decreased heavy drinking compared with RP and TAU. There were several differences between TAU and the active treatment groups, including therapist training and assignment of homework. However RP and MBRP interventions were matched on time, structure, and therapist training, differing only in the intervention delivered, thus offering a rigorous test of MBRP. Another limitation is the self-report measures of main treatment outcomes, and the limited urinalysis data, although research has shown that self-reported substance use and urinalysis documentation are often not significantly different.

This study was carried out in the United States of America in non-profit treatment organisations.
MBRP participants reported significantly fewer drug use days and higher probability of not engaging with heavy drinking compared with RP participants. These findings suggest that the MBRP and RP treatments may be equally effective at 3 months follow-up, compared with TAU, reduce the probability and severity of relapses at 6-month follow-up, and that MBRP may have a more enduring effect thereafter, showing a longer-term sustainability of treatment gains for individuals with substance-use disorders. A significant limitation was the inclusion of both substance misusers and alcohol misusers, so the relevance specifically to alcohol dependent only populations is unclear. These findings do not affect the recommendations of the NICE guidelines.

Motivational Interviewing and Cognitive Behavioural Therapy for co-existing alcohol misuse and depression:

Baker, A. L., Kavanagh, D. J., Kay-Lambkin, F. J., Hunt, S. A., Lewin, T. J., Carr, V. J., and McElduff, P. Baker et al (2014) Randomized controlled trial of MICBT for co-existing alcohol misuse ad depression: Outcomes to 36 months. Journal of Substance Abuse Treatment, 46(3), 281-90.

Baker et al (2014) conducted a multisite randomized controlled trial (RCT) of motivational interviewing and cognitive behavioural therapy (MICBT) for co-existing alcohol misuse and depression. The main aim was to compare outcomes over 36 months following the randomisation of 284 patients to one of four MICBT-based interventions: 1) brief integrated intervention (BI); or BI with nine further sessions with either 2) an integrated-, 3) alcohol-, or 4) depression-focus. Participants in each arm totalled 70, 75, 68, and 71 respectively. Most

participants self-referred in response to television advertisements or media stories (76%) plus a smaller proportion who heard about the study from others or were referred by health agencies. Alcohol consumption was assessed at baseline using the Alcohol Use Disorders Identification Test (AUDIT). A Severity of Alcohol Dependence Questionnaire (SADQ) also addressed the degree of dependence on alcohol over the preceding six months at baseline. Five primary outcome measures were used, including changes in alcohol consumption, depression (BDI-II: Beck Depression Inventory) and functioning (GAF: Global Assessment of Functioning). Three self-report alcohol-consumption indices were: 1) change in estimated standard drinks per day, based on Q scores for alcohol from the Opiate Treatment Index (OTI), 2) change in total standard drinks per week, based on a 2-week timeline follow-back (TLFB) procedure; and 3), and change in percent of days heavy drinking, derived from TLFB responses for which the daily threshold for heavy drinking was set at ≥6 standard drinks for men and ≥4 standard drinks for women.

On average participants (n=258) were aged 45.6 years (SD = 10.8), and 47% were female. The majority met SCID (DSM-IV) diagnostic criteria for alcohol dependence (89%) or depression (75%) during the last 12 months. Average improvements from baselines were a reduction of 3.4 standard drinks per day (OTI Q-score), 21.8 drinks per week (TLFB), 12.6 standard drinks per week (TLFB) and a 24.3 percent reduction in days heavy drinking (TLFB). The longer interventions tended to be more effective in reducing depression and improving functioning in the long-term and improving alcohol consumption in the short-term. Integrated treatment was at least as good as single-focused MICBT. Alcohol-focused treatment was as effective as depression-focused treatment at reducing depression and more effective in reducing alcohol misuse. However for the average follow-up time point, the longer interventions were not significantly better. Likewise with the longer interventions, the integrated-intervention did not differ from the single-focus conditions (collectively) at any follow-up time point. However for the average time point, there tended to be a relative advantage for the alcohol- versus the depression-focus intervention, which equated to a differential benefit for the alcohol-focus intervention 2.1 drinks per day (OTI Q-score, $p = 0.021$). The best approach seems to be an initial focus on both conditions followed by additional integrated- or alcohol-focused sessions. Participants in the trial were outpatients with co-existing alcohol misuse and depression, and the findings may not apply to other alcohol misusing populations. Potential recruitment and retention biases also need to be considered. By design, recruitment was based on concurrent hazardous alcohol use and depressive symptoms, rather than formal diagnostic criteria or other severity indices,

which may result in the inclusion of individuals below the typical threshold for treatment in some clinical settings; however at baseline, 96% (272/284) of the current sample met DSM-IV diagnostic criteria for either alcohol dependence or depression in the preceding twelve months. The average retention rate was 80% within the short-term 12 month period, which then dropped to 57% for the longer-term follow-up time points. Retention biases were likely to be minor with some possible links to socio-demographic (gender, location) clinical (baseline GAF scores) and intervention characteristics (depression-focus condition). The findings modestly support that 10 session interventions would produce greater improvement compared with the BI for alcohol outcomes. While more effective in the short-term, the longer interventions produced only marginal differential benefits overall – so the findings are deemed to neither support nor contradict other studies showing positive differential impacts on drinking from alcohol-focused BIs among inpatients with severe mental disorders. There was limited support for the second hypothesis that integrated treatment would have greater impacts than single-focused treatment, but equally there was no evidence that the single-focus interventions were collectively better than the integrated approach. An integrated BI should be considered a useful (but often not sufficient) first step, to help contextualize possible associations between alcohol misuse and depressive symptomatology. For those with continuing problems, the best approach seems to be further sessions of MICBT with either an integrated- or an alcohol-focus.

This study took place in Australia in an outpatient setting. Based on the current study's findings, manualised psychological interventions such as MICBT clearly contribute to sustained improvement by individuals with co-existing alcohol misuse and depression. Moreover, given the pattern of results, there is currently no reason to rule out an integrated intervention strategy addressing both conditions. However variations in the improvement trajectories for the different outcomes that were assessed reinforce the need for more creative, multifaceted and longer-term treatment plans. We also need more sophisticated strategies for monitoring outcomes, adjusting treatments and evaluating changes within routine treatment settings. The findings so far are unlikely to impact on the recommendations of NICE.

Smartphone applications to support recovery:

Gustafson, D.H., McTavish, F.M., Chih, M.Y., Atwood, A.K., Johnson, R.A., Boyle, M.G., Levy, M.S., Driscoll, H., Chisholm, S.M., Dillenburg, L., Isham, A., Shah, D. (2014) A

smartphone application to support recovery from alcoholism: A randomized controlled trial. JAMA Psychiatry, 71(5), 566-72.

In an unblinded randomised controlled trial Gustafson et al (2014) aimed to determine whether patients leaving residential treatment for AUDs with a smartphone application to support recovery have fewer risky drinking days than control group patients. 349 patients participated, all of whom met the DSM-IV criteria for alcohol dependence upon entering residential treatment. Three of the residential programmes were operated by non-profit in the mid-Western United States and two programmes were operated by another non-profit in the Northeastern US. An onsite project coordinator employed by each programme identified eligible patients from the programme's administrative database. 179 patients were randomized to the control group and 170 to the treatment group. The control group received treatment as usual for twelve months and the treatment group received treatment as usual plus a smartphone with A-CHESS (Alcohol – Comprehensive Health Enhancement Support System) for the eight month intervention period and treatment as usual only during the four month follow-up period. A-CHESS (Alcohol – Comprehensive Health Enhancement Support System) provides monitoring, information, communication and support services to patients including ways for patients and counsellors to stay in contact. Treatment as usual varied across programmes, but none offered patients coordinated continuing care after discharge. Counsellors were asked to treat study participants as they would normally treat a patient who had left residential treatment, i.e. respond to patient initiated requests for referrals or information, but not offer counselling per se. Patients in the A-CHESS group were asked each week to complete a reduced version of the Brief Alcohol Monitoring (BAM) Index, which included protective and risky items relating to drinking. Researchers called patients to administer the outcome survey at four, eight and 12 months after discharge from treatment. Primary outcome measures were risky drinking days – the number of days during which a patient's drinking in a two year period exceeded, for men, four standard drinks and for women, three standard drinks. Patients were asked to report their risky drinking days in the previous 30 days on surveys taken four, eight and 12 months after discharge from residential treatment.

Enrolled patients were white (80%), male (61%) and unemployed (79%). Most used or abused drugs in addition to alcohol (63%). Mean age was 38 years old (SD = 10, median = 39). Patients who received treatment as usual plus A-CHESS reported a lower average number of days of risky drinking (1.39 vs. 2.75; P = 0.003 and a higher likelihood of

consistent abstinence (52.9% vs. 39.6%; *P* = 0.032) than patients who received only treatment as usual, but no difference in negative consequences of drinking. For the eight months of the intervention and four months of follow-up, patients in the A-CHESS group reported significantly fewer risky drinking days than patients in the control group for the intervention and follow-up period (*P* = 0.003), and at months four (*P* = 0.020) and 12 (*P* = 0.032), but not month eight (*P* = 0.096). Limitations included that patients in the treatment group received a smartphone, while those in the control group did not, and the app included a weekly self-assessment, possibly producing an assessment effect, and more counsellor contact than for the TAU group. The study involved only patient self-report, without verification of urine testing and each survey asked about alcohol intake only in the past 30 days, which does not capture a complete picture of each patient's drinking, so could either under- or over-estimate drinking behaviour. The study involved only two treatment organisations and five programmes, and most patients were male, white and in their 30s and 40s, necessitating further testing with a more diverse population. Furthermore a longer intervention period may be sensible given that these patients have a chronic disease.

This treatment study took place in the US and may not be applicable to the NHS setting. The findings suggest that a multi-featured smartphone application may have significant benefit to patients in continuing care for AUDs, and perhaps other chronic illnesses. It may also prove to be economically viable under the Affordable Care Act, whereby emphasis is placed on a single payment for a defined population, with a reward for good outcomes. While promising, overall more research is needed in NHS treatment seeking alcohol dependent populations to consider addition of smartphone interventions as part of routine care. Unlikely to impact NICE CG115 guidelines

3.3.3.3 **Pharmacological**

Berger, L., Fisher, M., Brondino, M., Bohn, M., Gwyther, R., Longo, L., ... & Garbutt, J. C. (2013) Efficacy of acamprosate for alcohol dependence in a family medicine setting in the United States: a randomized, double-blind, placebo-controlled study. Alcoholism: Clinical and Experimental Research, 37(4), 668-674.

A 12-week randomised, double-blind placebo controlled trial conducted within family medicine settings by Berger et al., (2013) evaluated the efficacy of oral acamprosate

(1,998mg, 3 x 2 pills daily) (n=51) versus a matching placebo (n=49). Participants were recruited via advertisements and met DSM IV criteria for alcohol dependency. All participants were expected to be abstinent for three days prior to randomisation into the trial. Exclusion criteria included a history of alcohol withdrawal seizures or delirium tremens. All participants received five sessions of 20-30 minutes extended brief intervention from study physicians, where discussion was guided by an intervention workbook which participants were expected to complete between and during after each session. The primary outcome was percentage of days abstinent, and secondary outcomes included percentage of heavy drinking days.

A total of nineteen participants were lost to follow-up (19% attrition – acamprosate n=11, placebo n=8). No treatment effect of acamprosate was found for percentage of days abstinent and heavy drinking days. The authors noted that by the end of the study participants who had expressed an initial treatment goal of abstinence, rather than alcohol use reduction, had a higher percentage of days abstinent. Participants across both arms showed improvement from baseline to study end. Additionally, the effect sizes shown in this study were smaller than anticipated, and the authors suggested a larger sample was required in order for any differences to be statistically significant. Further, as a 'brief intervention only' group was not included, it is difficult to gauge the impact of brief intervention on the drinking-related outcomes reported in this trial.

This study was undertaken in the US, where intensive interventions for alcohol dependency might be significantly different to the UK treatment context. While there was no evidence of a treatment effect of acamprosate for participants with low to moderate alcohol dependency, a treatment goal of abstinence appeared to provide benefits in terms of percentage of days abstinent. For the purposes of this review, focus is on moderate to severe alcohol dependency, therefore a limitation of the current study was that it focused on a lower risk population of participants with alcohol dependency. Due to the limitations of the current study, the results are unlikely to have an impact on NICE CG115.

Correa Filho, J. M., & Baltieri, D. A. (2013) A pilot study of full-dose ondansetron to treat heavy-drinking men withdrawing from alcohol in Brazil. Addictive Behaviors, 38(4), 2044-2051.

A 12-week randomised double-blind placebo-controlled trial by Filho and Baltieri (2013) was conducted to determine the efficacy of ondansetron in alcohol-dependent outpatients. Participants were recruited from a drug and alcohol treatment service designed exclusively for men. All participants were male and met ICD-10 diagnostic criteria for alcohol dependency and underwent two weeks of detoxification prior to receiving trial medication. Participants were assigned to either 16mg per day of ondansetron (n=50) or placebo (n=52). All participants received brief cognitive behavioural interventions at each appointment. The primary outcome measures were percentage of abstinent days, and percentage of heavy drinking days.

57% of participants randomised to placebo and 42% of participants randomised to ondansetron dropped out of the study. Analysis did not indicate a significant difference between ondansetron and placebo for percentage of days abstinent. Additionally, a significant effect was not shown for ondansetron versus placebo for percentage of heavy drinking days. Multiple imputation analysis, however, did show a slight and statistically significant effect in favour of ondansetron over placebo for decreasing the percentage of heavy drinking days (χ^2 (12) = 23.35, p=.02). The authors suggest a limitation of the study was that it was under-powered, the sample size was too small, and there were high drop-out rates. The authors also mentioned that ondansetron has shown efficacy amongst light drinkers, rather than severely alcohol-dependent patients.

This trial was undertaken in Brazil where the treatment context might be different, in significant ways, to the UK. For the purposes of this review, focus is on moderate to severe alcohol dependency, therefore a limitation of the current study was that it focused on a lower risk population of participants with alcohol dependency. As this study did not show efficacy for ondansetron at 16mg per day dosage, it is unlikely the findings from this study will impact on NICE CG115.

Fertig, J. B., Ryan, M. L., Falk, D. E., Litten, R. Z., Mattson, M. E., Ransom, J., ... & Stout, R. (2012) A Double-Blind, Placebo-Controlled Trial Assessing the Efficacy of Levetiracetam Extended-Release in Very Heavy Drinking Alcohol-Dependent Patients. Alcoholism: Clinical and Experimental Research, 36(8), 1421-1430.

A 16-week randomised, double-blind, placebo-controlled trial by Fertig et al., (2012) was conducted to test the efficacy of a target dose of 2000 mg per day of levetiracetam

extended-release ('XR') (n=64) versus placebo (n=66) in reducing alcohol consumption amongst a group of heavy drinking alcohol dependent patients. The trial was conducted at five academic sites, participants were recruited via advertisements and met DSM IV diagnostic criteria for alcohol dependency. Exclusion criteria included undergoing medical detoxification during the screening phase, and pharmacotherapy for alcohol dependency within one month prior to randomisation. All participants received brief behavioural compliance enhancement treatment intervention (BBCET). All participants received up to 11 sessions of BBCET, which was a 15-30 min intervention to enhance compliance with medication, by addressing goals and barriers to medication adherence. Primary outcomes were weekly percent of heavy drinking days, and percentage of participants with no heavy drinking days.

Randomized patients were mostly male, white, employed, and middle aged. Research participation rate, defined as percent of patients with complete drinking data during the maintenance phase, was 81.5% overall and was slightly higher in the placebo group than the levetiracetam XR group (84.8% vs. 78.1%, respectively), though this difference was not statistically significant (p=0.323). The attrition rate across the trial was 28.5% (37 participants). There were no statistically differences between levetiracetam XR and placebo for percentage of heavy drinking days (p=0.58) and percentage of participants with no heavy drinking days (p=0.95). Levetiracetam XR group did show a statistically significant effect on lowering alcohol-related consequences (DrInC total score) (p=0.02), in particular the subscales of impulsivity, physical and intrapersonal. GGT decreased in both groups, though the decrease was larger in participants taking placebo (p<0.04). In terms of adverse events, the prevalence rate of fatigue in the levetiracetam XR group was more than 2 times that of the placebo group (53.1% versus 24.2%, p=0.001). The authors suggested it was possible the target dose of 2000mg per day might not have been the optimal therapeutic dosage to account for the lack of efficacy for levetiracetam XR and stated higher dosages (e.g. 3-4000) have been shown to increase the number of adverse events.

This was an early proof-of-concept trial conducted in the US and there was no evidence of a treatment effect for 2000mg/d of levetiracetam XR compared to placebo. The results of this study are unlikely to have an impact on the NICE CG115.

Gual, A., He, Y., Torup, L., van Den Brink, W., Mann, K., & ESENSE 2 Study Group. (2013) A randomised, double-blind, placebo-controlled, efficacy study of nalmefene, as-needed use,

in patients with alcohol dependence. European Neuropsychopharmacology, *23*(11), 1432-1442.

A 24-week randomised, double-blind trial conducted by Gual et al., (2013) assessed the efficacy and safety of as-needed use of nalmefene (n=358, 18mg) versus placebo (n=360) amongst a group of heavy drinking alcohol dependent patients. Participants were recruited from 57 sites across seven high-income European countries, from in and outpatient clinics, advertisements, and referrals to study sites. All participants received a motivational and adherence-enhancing intervention (BRENDA) at randomisation and each subsequent visit. Primary outcome measures were the number of heavy drinking days in the last month, and mean total alcohol consumption in grams per day over the last month.

Patients were predominantly men (70%) and mean age was 45 years. A large proportion, 38% (n=127) of the placebo-treated participants, and 41% (n=140) of the nalmefene-treated participants dropped out of the trial. Statistically significant greater effects of nalmefene compared to placebo were observed from baseline to month 6 for heavy drinking days (group difference: -1.7 days/month [95% CI -3.1; -0.4]; *p*= 0.012). In particular, the authors stated for participants who had reported more than 6 heavy drinking days per month in the period between screening and randomisation, a significant reduction in mean number of heavy drinking days was observed for nalmefene-treated participants compared to placebo-treated participants (-2.0 days/month [95% CI -3.6; -0.4]; *p*=0.012) and also for mean total alcohol consumption at month 6 (-7.0 g/day in the last month [95% CI -13.6; 0.4]; p=0.037). A limitation of the trial was that a high proportion of participants had already self-initiated a reduction in their drinking prior to the start of treatment/intervention, thus the authors acknowledged how there may have been little room for further improvement. Also, a potential limitation of this trial was that as patients with significant withdrawal symptoms were excluded from the trial, groups with the most severe alcohol dependency were excluded. The study had a high dropout rate. Further, the authors did not collect information on the treatment goal of participants i.e. abstinence, or reduction in alcohol consumption.

Both treatment conditions demonstrated reductions in number of heavy drinking days and total alcohol consumption. This was trial conducted in Europe and there appeared to be evidence of a statistically significant treatment effect in favour of nalmefene compared to placebo in reducing the number of heavy drinking days by month 6. Nalmefene might be likely to have an impact on NICE CG115 as a pharmacotherapy for mild alcohol dependency

and non-dependent high-risk drinking. However, significant limitations of the study were identified which might limit its relevance to clinical practice in the NHS.

Joos, L., Goudriaan, A. E., Schmaal, L., Fransen, E., van den Brink, W., Sabbe, B. G., & Dom, G. (2013) Effect of modafinil on impulsivity and relapse in alcohol dependent patients: a randomized, placebo-controlled trial. European Neuropsychopharmacology, *23*(8), 948-955.

A 10-week randomised double-blind controlled trial conducted by Joos et al., (2013) aimed to test the effect of modafinil on alcohol use and impulse control in alcohol dependent participants. Participants were recruited from 2 addiction treatment centres where most had been admitted as inpatients (87.9%) and met DSM IV diagnostic criteria for alcohol dependence. Participants were randomised to 300mg per day of modafinil (n=41) or placebo (n=42). Primary outcome measures were percentage of days abstinent from alcohol, and percentage of heavy drinking days.

Most of the participants were male (85.5%) and mean age of participants was 41.8 years (SD=9.4 years). There was no significant difference for drop-out rates between modafinil-treated group (n=17, 41.5%) and the placebo-treated group (n=15, 33.4%). The rate of change over time for percentage of days abstinent did not differ between the modafinil-treated participants and the placebo-treated participants (b= - 1.03, t (101.2) = -.312, *p*=1.756), or percentage of heavy drinking days (b= 4.46, t (101.0) = 1.597, *p*=1.13). There was, however, a significant time by treatment interaction for impulsivity scores in favour of modafinil compared to placebo (b= -6.2, t (124.1) = -3.413, p=.001). The authors stated that despite largely negative findings, overall abstinence rates in the modafinil-treated group were higher, but reduced statistical power might have prevented effects of modafinil from becoming statistically significant. In addition, the sample size might have been too small to detect any significant effects for modafinil.

This trial was undertaken in Belgium and found no statistically significant treatment effect for modafinil compared to placebo on percentage of days abstinent from alcohol and percentage of heavy drinking days. Modafinil did appear, however, to significantly reduce impulsivity scores. The results of this trial are unlikely to have an impact on NICE CG115.

Likhitsathian, S., Uttawichai, K., Booncharoen, H., Wittayanookulluk, A., Angkurawaranon, C., & Srisurapanont, M. (2013) Topiramate treatment for alcoholic outpatients recently receiving residential treatment programs: a 12-week, randomized, placebo-controlled trial. Drug and Alcohol Dependence, 133(2), 440-446.

A 12-week randomised double-blind trial conducted by Likhitsathian et al., (2013) evaluated the efficacy and safety of topiramate for alcohol dependency in patients after they received a residential treatment program for alcohol detoxification across three clinical sites. Participants met DSM IV diagnostic criteria for alcohol dependency, and were either assigned to 100-300mg per day of topiramate (n=53) or placebo (n=53). Primary outcome measures were percentage of heavy drinking days, and time to first day of heavy drinking. Topiramate was initiated when participants were approaching discharge, and continued throughout outpatient follow-up. All participants received 1-2 sessions of individual motivational enhancement therapy (MET), counselling for alcohol and drug use, group therapy, and family counselling as part of their post-acute treatment. After discharge, all participants had 2-3 sessions of MET delivered by trained psychologists or mental health nurses.

All participants were male and mean age was 41.5 years. Twenty-five participants dropped out of the topiramate group, and 28 participants dropped out of the placebo group. The majority of these participants were lost to follow-up. Averaged over the trial period, there were no significant differences between topiramate-treated participants compared to placebo-treated participants on primary outcome measures. The authors did not assess participant adherence to medication and this could constitute a possible limitation to the interpretation of the findings. Also, the sample size was small, which might have made it difficult to detect an effect size. High drop-out rates could have also affected the validity of the results.

The authors suggested that as the study was carried in Thailand, generalisation to any other population should be done with caution due to differing patterns of drinking behaviour between countries. The study did not demonstrate efficacy for topiramate in this particular population of Thai men, and is unlikely to have an impact on NICE CG115.

Litten, R. Z., Ryan, M. L., Fertig, J. B., Falk, D. E., Johnson, B., Dunn, K. E., ... & Stout, R. (2013) A double-blind, placebo-controlled trial assessing the efficacy of varenicline tartrate for alcohol dependence. Journal of Addiction Medicine, *7*(4), 277.

A 13-week randomised double-blind trial by Litten et al., (2013) evaluated the efficacy and safety varenicline tartrate for the treatment of alcohol dependence. Participants were recruited by advertisements at five academic sites and met DSM IV diagnostic criteria for alcohol dependence. Participants were assigned to either a target dose of 1 mg (0.5mg to be taken once per day on days 1 to 3, and taken twice on days 4 to 7) varenicline group (n=99) or placebo (n=101). All participants took part in 'Take Control' a novel computerised bibliotherapy platform based on NIAAA's self-help approach which comprised six modules, each module reviewed by the patient at each visit to the clinic. Primary outcome measure was percent of heavy drinking days measured weekly during weeks 2-13. Secondary outcome measures included drinks per drinking day, and percent of days abstinent.

Participants were mostly male, white, middle-aged, unmarried and employed. Drop-out rates for participants who left study or discontinued taking medication were 10 versus 18 for the varenicline and placebo groups, respectively. Across weeks 2-13, the varenicline group compared to placebo demonstrated significantly lower weekly percent of heavy drinking days (37.9 vs. 48.4; p=0.03; d=0.31). The varenicline group also had fewer drinks per day (4.4 vs. 5.3; p=0.03; d=0.29), fewer drinks per drinking day (5.8 vs. 6.8; p=0.03; d=0.26) and fewer percent of heavy drinking days (17.6 vs. 26.1; p=0.047; d=0.25). No significant differences were indicated between the two groups on percent of participants who were abstinent, percent of participants with no heavy drinking days, and percent of days abstinent.

This proof-of-concept trial was undertaken in the US and showed varenicline significantly reduced outcome measures of alcohol use. However, the authors suggested additional studies are needed to replicate these results and to examine whether the effects of varenicline are sustained post-treatment. In addition, the participants were recruited by advertisement rather than treatment seeking, so relevance to NHS unclear.

Mann, K., Bladström, A., Torup, L., Gual, A., & van den Brink, W. (2013) Extending the treatment options in alcohol dependence: a randomized controlled study of as-needed nalmefene. Biological Psychiatry, *73*(8), 706-713.

A 24-week randomised double-blind parallel-group study by Mann et al., (2013) assessed the efficacy and safety of as-needed use of nalmefene in reducing alcohol consumption in alcohol-dependent patients. Participants were recruited from 39 sites consisting of in- and out-patient clinics, including referrals from advertisements. All met DSM IV diagnostic criteria for alcohol dependence. Participants were assigned to either placebo (n= 298) or an as-needed dose of 18mg per day of nalmefene (n=306), and all participants took part in a motivational and medication adherence-enhancing intervention ('BRENDA'). Primary outcome measures were change from baseline in heavy drinking days and total alcohol consumption in grams per day at 6 months.

The participants were predominantly men, white and mean age was 52 years. Importantly, 18% of participants had already reduced their alcohol consumption in the period between screening and randomisation. There was a high dropout rate from the trial. 91 (31%) participants from the placebo-treated group and 160 (53%) participants from the nalmefene-treated group dropped-out of the study during the main treatment period. The difference between treatment group drop-out rates was significant (p<0.0001). The results indicated a statistically significant effect in favour of nalmefene compared to placebo at 6 months for heavy drinking days (difference: -2.3 days/month [95% CI: -3.8 to -.8]; p=.0021) and for total alcohol consumption (difference: -11.0 grams per day in the last month [95% CI: -16.8 to 5.1]; p=.0003). Limitations to the study included a non-specific treatment response between screening and randomisation in a proportion of participants, which meant that there would have been little room for improvement in this group. Also, the proportion of responders in the nalmefene-treated group was statistically significantly lower than the placebo-treated group.

This study was undertaken in Austria, Finland, Germany and Sweden and found that nalmefene had statistically significant benefits at 6 months follow-up in terms of reducing alcohol-related outcomes when compared to placebo. However, because of the limitations of the study, it is unclear what impact the results of this study have on the recommendations of NICE CG115.

Mann, K., Lemenager, T., Hoffmann, S., Reinhard, I., Hermann, D., Batra, A., ... & Anton, R. F. (2013) Results of a double-blind, placebo-controlled pharmacotherapy trial in alcoholism

conducted in Germany and comparison with the US COMBINE study. Addiction Biology, *18*(6), 937-946.

Following the protocol of COMBINE trial (Anton et al., 2006), 12-week double-blind randomised controlled trial by Mann et al., (2013) compared naltrexone and acamprosate to placebo in alcohol dependent patients. Participants were assigned to either up to 1998mg per day of acamprosate (n=172), 50mg per day of naltrexone (n=169), or placebo (n=86). Participants met DSM IV and ICD-10 criteria for alcohol dependency, and were recruited from in-patient facilities of five different university medical centres and two psychiatric centres. All participants received up to seven sessions of 20 minutes of medical management (MM) counselling. The primary outcome measure was time to relapse to heavy drinking.

The majority of participants were male and middle-aged. There were no significant differences between treatment groups in terms of completion rate. The results indicated no significant differences between treatment groups in terms of time to first heavy-drinking day. The authors suggested the potential reasons for failing to detect an effect between treatment groups might in part be due to a high placebo response rate (52%), as all patients underwent in-patient medical detoxification and had been abstinent for 20 days before entering the study. Additionally, the authors stated the effects of detoxification might have been augmented by MM counselling which might have also improved the placebo response.

This trial, undertaken in Germany, found no additional benefit of naltrexone or acamprosate when compared with placebo for time until first occurrence of heavy drinking. MM appeared to provide benefits in terms of maintaining participants in aftercare inpatient treatment programmes. The results of this study are Inconsistent with NICE CG115 guidelines on the effectiveness of acamprosate and naltrexone for alcohol dependency. However, overall the NICE meta-analysis and a Cochrane meta-analysis showed overall moderate treatment effects of acamprosate, so this study is unlikely to impact on the NICE guideline recommendations.

Mason, B. J., Quello, S., Goodell, V., Shadan, F., Kyle, M., & Begovic, A. (2014). Gabapentin treatment for alcohol dependence: a randomized clinical trial. JAMA Internal Medicine, *174*(1), 70-77.

A 12-week double-blind randomised three arm trial by Mason et al., (2014) sought to determine whether gabapentin increased rates of abstinence and no heavy drinking, and decreased rates of alcohol related insomnia, dysphoria and craving, versus placebo amongst alcohol dependent participants. Participants were diagnosed as alcohol dependent using DSM IV criteria and were recruited by advertisements from one clinical site. Participants were randomised to either 900mg (n=54) or 1800mg (n=47) per day of gabapentin or placebo (n=49). All participants received manual-guided counselling by study clinicians. None of the participants required detoxification prior to entering the study, and were able to remain abstinent for three days prior to randomisation. Primary outcome measures were rates of complete abstinence and no heavy drinking.

The majority of participants were white and middle-aged. The mean time in study and rate of study completion (85 of 150 participants) did not differ among treatment groups. The results indicated that gabapentin had a significant dose effect on rates of complete abstinence (*p*=.04) and no heavy drinking (*p*=.02). More specifically, rates of sustained abstinence were 17.0% (95% CI, 8.9% -30.1%) in the 1800mg group, 11.1% (95%CI, 5.2%-22.2%) in the 900mg group and 4.1% (95%CI, 1.1%-13.7%) in the placebo group. Rates of rate of no heavy drinking were 22.5% (95% CI, 13.6%-37.2%) in the placebo group, 29.6% (95%CI, 19.1%-42.8%) in the 900mg group, and 44.7% (95% CI, 31.4%-58.8%) in the 1800mg group. Limitations to the interpretation of these findings included significant drop-out rate (56% completion rate).

This study, undertaken in the US, found gabapentin had a beneficial dose effect in increasing rates of complete abstinence and no heavy drinking compared to placebo over the 12-week course of treatment. The greatest efficacy for gababentin was achieved at the 1800mg dose. The authors recommend larger studies with a diverse population of patients with alcohol dependence to replicate these findings. The results of this study are unlikely to alter the recommendations of the NICE guidelines.

Van den Brink, W., Sørensen, P., Torup, L., Mann, K., & Gual, A. (2014). Long-term efficacy, tolerability and safety of nalmefene as-needed in patients with alcohol dependence: A 1-year, randomised controlled study. Journal of Psychopharmacology, 28(8), 733-744.

A 52-week randomised, double-blind trial by van den Brink et al., (2014) evaluated the long-term efficacy of as-needed nalmefene in reducing alcohol consumption amongst patients

with alcohol dependence. Participants met DSM IV diagnostic criteria for alcohol dependence and were recruited from 60 sites across 11 countries by referrals to study sites, advertisements, from outpatient clinics and the study's own pool of patients. Participants were assigned to either as-needed use of 18mg per day of nalmefene (n=509) or placebo (n=166). All participants took part in a motivational and medication adherence-enhancing intervention ('BRENDA') at randomisation and all subsequent visits. Primary outcome measures were change from baseline in heavy drinking days and total alcohol consumption in grams per day at six months follow-up.

The majority of participants were white, male, and middle-aged (mean age 44 years). In post-hoc analyses, the authors target population were those participants with high/very high risk levels of drinking who continued drinking at this rate at the start of study treatment (n=183). 68% of the nalmefene-treated participants and 62% of the placebo-treated participants completed the trial. The results indicated no significant differences between treatment groups at six months. At month 13, however, nalmefene was shown to be more effective than placebo in reducing heavy drinking days (difference; -1.6 days per month; 95% CI -2.9 to -0.3); p=0.017) and the amount of total alcohol consumed (difference; -6.5 grams per day in last month; 95% CI -12.5 to -0.4); p=0.036). Post-hoc analyses with the target population of heavy drinkers did not show statistically significant effects for nalmefene compared to placebo at 6 months. At month 13, a statistically significant effect of nalmefene compared to placebo was observed on both primary outcome measures. For the purpose of the current review, a limitation to this study was that it included participants with less severe alcohol dependency. In addition, a large treatment response was observed prior to the start of treatment, with 40% of participants substantially reducing their drinking through self-initiation. The current study also included some participants with a stable co-morbid psychiatric disorder (5.4% in placebo group and 3.7% in nalmefene group).

This study was undertaken in the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Russia, Slovakia, Ukraine and the UK, and found long-term efficacy for nalmefene compared to placebo at 13 months follow-up in the reduction of heavy drinking days and reduction of total alcohol consumption. Nalmefene is likely to have an impact of the guidance as a pharmacotherapy for less severe dependence and non-dependent high-risk drinking, although there are important limitations to the study which may limit the relevance of the findings to specialist NHS alcohol treatment services.

Van den Brink, W., Aubin, H. J., Bladström, A., Torup, L., Gual, A., & Mann, K. (2013) Efficacy of as-needed nalmefene in alcohol-dependent patients with at least a high drinking risk level: results from a subgroup analysis of two randomized controlled 6-month studies. Alcohol and Alcoholism, 48 (5), 570-578.

A post-hoc analysis of two 6-month double-blind randomised placebo-controlled trials ESENSE 1 (Mann et al., 2013) and ESENSE 2 (Gual et al., 2013) was undertaken by van den Brink et al., (2013) to assess the efficacy, safety and tolerability of as-needed nalmefene versus placebo amongst a subgroup of the highest risk alcohol-dependent patients selected from these two trials. Participants were assigned to either 18mg per day of as-needed nalmefene (n=319) or placebo (n=322). At all scheduled visits, all patients received a motivational and adherence-enhancing intervention ('BRENDA'). The primary outcome measures were change from baseline in the monthly number of heavy drinking days and total alcohol consumption in grams of pure alcohol per day at month 6.

The majority of participants were male, white and middle-aged. Completion rates in ESENSE 1 were 63.3% for placebo and 43% for nalmefene, and for ESENSE 2, 63.9% for placebo and 63.8% for nalmefene. The analysis showed for ESENSE 1 at Month 6, the estimated mean change for number of heavy drinking days per month showed a treatment effect in favour of nalmefene (-3.7 HDDs/month [95% CI: -5.8 to 1.5]; $p = 0.0010$). For ESENSE 2 at 6 months, the mean change for number of heavy drinking days per month indicated a treatment effect in favour of nalmefene (-2.7 HDDs/month [95% CI: -5.0 to -0.3]; $p = 0.0253$). For pooled results from both trials at 6 months, the mean change from baseline for number of heavy drinking days per month also showed a treatment effect in favour of nalmefene (-3.2 HDDs/month [95% CI: -4.8 to -1.6]; $p < 0.0001$). For total alcohol consumption in ESENSE 1 at 6 months, a treatment effect in favour of nalmefene over placebo was observed (-18.3g/d [95% CI -26.9 to -9.7]; $p < 0.0001$). For ESENSE 2 at Month 6, estimated change in total alcohol consumption showed a treatment effect in favour of nalmefene (-10.3 g/d [95% CI: -20.2 to -0.5]; $p = 0.0404$). Pooled results of both ESENSE 1 and ESENSE 2 showed statistically significantly better effect for nalmefene over placebo in terms of reducing mean total alcohol consumed at Month 6 (-14.3g/d [95% CI: -20.8 to -7.8]; $p < 0.0001$). A limitation of this study was that analyses of this subgroup population was performed *post-hoc* and was not based on the total randomised population.

Both trials were undertaken across Austria, Belgium, Czech Republic, Finland, France, Germany, Italy, Poland, Portugal and Sweden. Results showed the magnitude of treatment effect for nalmefene was greater in high-risk alcohol-dependent participants across both trials separately, and for both trial results pooled. The authors claimed the treatment effect sizes observed for nalmefene were larger than those reported for heavy drinking outcomes in licensed medications for abstinence in alcohol dependence. Nalmefene seems likely to have an impact on NICE CG115 guidelines as a pharmacotherapy for less severe dependence and non-dependent high-risk drinking. However methodological limitations may limit the relevance of this study to the NHS specialist alcohol treatment setting.

3.3.3.4 **Cost-effectiveness**

Navarro, H. J., Shakeshaft, A. Doran, C. Petrie, D. J. 2012. The cost-effectiveness of tailored, postal feedback on general practitioners' prescribing of pharmacotherapies for alcohol dependence. Drug and Alcohol Dependence, 124(3), 207-15.

This was an randomised controlled trial to a) evaluate the cost-effectiveness of tailored, postal feedback on general practitioners' (GP) prescribing of Acamprosate and Naltrexone for alcohol dependence, relative to current practice, and b) evaluate its impact on alcohol dependence morbidity by looking at the impact of any change in prescribing behaviour of pharmacotherapies on hospitalization. Rural communities in NSW Australia were invited to participate in the Alcohol Action in Rural Communities (AARC) project if they met the inclusion criteria. They were then randomised into experimental (N=10) and control (N=10) communities. Tailored feedback on their prescribing of alcohol pharmacotherapies was mailed to GPs from the experimental communities (N=115). Estimates were made based on prevalence data on the number of dependent drinkers in communities. A community survey carried out by the same team in 2005 included the Alcohol Use Disorders Identification Test (AUDIT), with a score of ≥20 indicating alcohol dependence. To estimate the number of dependent drinkers in each of the 10 control and 10 experimental communities, the survey respondents classified as dependent were multiplied by population data. Segmented regression analysis was used to examine within- and between-group changes in prescribing, and in alcohol dependence hospitalisation rates, compared with the control communities. Incremental cost-effectiveness ratios (ICERs) were then estimated per additional prescription of pharmacotherapies and per alcohol dependence hospitalisation(s) averted.

The demographics of the two groups were comparable in proportion of males and females (50% - 50%) and with similar predicted numbers of dependent drinkers aged 18-62. There was approximately one GP for every 24 dependent drinkers in the experimental communities, compared to one for every 17 dependent drinkers in the control communities. GPs' prescribing rate trends in the experimental communities significantly increased for Acamprosate (ß = 0.24, 95% CI: 0.13 – 0.35, $p<0.001$) and significantly decreased for Naltrexone (ß = -0.12, 95% CI: -0.17 to -0.06) per quarter. Although there was a significant reduction in the prescribing of Naltrexone, prescriptions of Acamprosate increased significantly, as did prescriptions of these pharmacotherapies combined, with a median ICER of AUD $3,243 per additional quarterly prescriptions compared with the control communities. I.e. the statistically significant increase over time in Acamprosate prescriptions in the experimental communities outweighed the statistically significant decrease in Naltrexone prescriptions. Quarterly hospitalization trends in rates for alcohol dependence as a principal diagnosis significantly decreased (ß = -0.07, 95% CI: -0.13 to -0.01, $p<0.05$), compared to control communities. The intervention was found to be dominant in at least 60% of cases for reductions of hospitalisations of alcohol dependence, generating net savings in the experimental communities compared to the control. The quarterly trend in incidence of hospitalisations for alcohol dependence as principal diagnosis showed a non-significant decrease within the experimental communities over time, but the rate of these hospitalisations at post-test in the experimental communities was statistically significantly less than in the control communities. The median ICER per quarterly hospitalization(s) averted due to intervention was Dominant (Dominant - $12,750). The mean hospitalization rates for the experimental communities significantly increased from baseline to post-test immediately after implementation of the intervention, although the immediate change was not significant relative to the control communities. The pre- to post-test change in the mean quarterly hospitalization rate trends in the experimental communities was statistically significantly less than the control communities. Prescribing data for the three quarters before the intervention were not supplied, but this represents less than 8.2% of the longitudinal sample, well within the recommended limits of 10%-20% missing data to justify imputation. Prescribing data provided represent prescriptions dispensed in a pharmacy, rather than all prescriptions actually written by GPs – estimated to be 90% of all prescriptions written. Finally, the potential number of dependent drinkers was estimated using self-reported alcohol consumption on the AUDIT questionnaire in the AARC community survey (2005). Given a response rate of 40% to this survey respondents may not

be representative of their communities, since females and older people are over represented in the sample.

This study took place in Australia. Its findings suggest that postal, tailored feedback to GPs on their prescribing of Acamprosate and Naltrexone for alcohol dependence was a cost-effective intervention, in rural communities of New South Wales, resulting in increased overall prescribing of pharmacotherapies, and with a plausible effect on incidence reduction of hospitalization for alcohol dependence as principal diagnosis. Notwithstanding the limitations, this evaluation shows that overall, the main objective of significantly increasing the prescribing rate of pharmacotherapies for alcohol dependence by GPs in the experimental communities was achieved both for the immediate quarter after the tailored feedback to GPs, as well as for the overall study period. The findings are consistent with the recommendations on naltrexone and acamprosate in CG115 and are therefore unlikely to impact on the recommendations.

Blankers, M. Nabitz, U. Smit, F, Koeter, M.W.J. Schippers, G. M. (2012) Economic Evaluation of Internet-Based Interventions for Harmful Alcohol Use Alongside a Pragmatic Randomised Controlled Trial. Journal of Medical Internet Research, 14(5), e134.

An economic evaluation of internet-based interventions for harmful alcohol use was undertaken by Blankers et al. (2012) alongside a pragmatic randomized controlled trial. The aim was to evaluate the cost-effectiveness and cost-utility of Internet based therapy (IT) compared with internet based self-help programmes (IS) for harmful alcohol use. The study was performed in a substance abuse treatment centre in Amsterdam, The Netherlands. Applicants were recruited through the treatment centre's website. A total number of 136 participants were included. 68 individuals were allocated to each arm, but in the end 48 received the allocated IT intervention, and 57 received the IS intervention. Reported weekly alcohol consumption (>14 standard (10g ethanol) drinking units) and Alcohol Use Disorders Identification Test (AUDIT) scores (>8) indicated harmful drinking behaviour at baseline. Self-reported outcomes data from participants was collected prospectively at baseline, and six months after randomization. Cost data were extracted from the centre's cost records, and sex- and age-specific mean productivity cost data for The Netherlands. A societal perspective was used in the economic evaluation.

Of the sample, 70 (51%) were female, and the mean age was 41.5 (SD 9.83) years. The

median incremental cost-effectiveness ratio was estimated at €3,683 per additional treatment responder and €14,710 per quality adjusted life-year (QALY) gained. At a willingness to pay €20,000 for one additional QALY, IT had a 60% likelihood of being more cost-effective than IS. Sensitivity analysis attested to the robustness of the findings. Cost-effectiveness analysis was undertaken by dividing the incremental costs by the incremental effects, the mean Incremental cost effectiveness ratio (ICER) of IT compared with IS from the societal perspective is calculated as €845/0.24 = €3521 for one additional treatment responder, 6 months after inclusion. Using the bootstrapping procedure the mean ICER is estimated to be €3683. IT was found to have a 79% probability of leading to additional effects at additional costs relative to IS. A total of 20% fell into the dominant quadrant, indicating that there was a 20% likelihood that IT led to additional effects at lower societal costs. The WTP at 50% was €3683 per additional treatment responder. Above that WTP per additional treatment responder, IT must be considered cost effective in comparison with IS.

This study was performed in a substance abuse treatment centre in the Netherlands, so a different treatment system, with different associated costs to that of the UK. IT was found to offer better value for money than IS and might therefore be considered as a treatment option, either as first line treatment in a matched care approach or as a second line treatment in the context of a stepped care approach. The findings of this study are not likely to impact on the recommendations of the NICE guidelines.

3.4 New evidence uncertainties

The only findings identified which were likely to have an impact on the NICE guidelines were from the 4 studies of nalmefene for harmful drinking/mild dependence, in which significant treatment effects were found. These studies however had important methodological limitations in terms of high dropout rates, post hoc subgroup analyses, lack of active comparator medications [16]. It is also unclear whether the indicated group of harmful/mild dependent drinkers are sufficiently prevalent amongst NHS specialist help seeking alcohol treatment populations to warrant a change in clinical pathway recommendations. The subsequent NICE Single Technology Appraisal recommendation notwithstanding, a trial with naltrexone as the active comparator is needed to assess the relative effectiveness and cost effectiveness of nalmefene compared to current NICE recommended pharmacotherapies.

3.5 Appendices

Appendix 3.1 Methodology for Updated Evidence Review

METHODOLOGY

SEARCH CRITERIA & SIFTING

A search was conducted to identify new evidence relevant to the scope: reviews of effectiveness and cost-effectiveness of specialist alcohol treatment published between 1 January 2012 and 29th August 2014. The previous Evidence Update ran to 8th August 2012, but due to the limitations of some database search options, the start date 1st January 2012 was used, and duplicates from the 2013 update were then removed.

Following the NICE CG115 and NHS Evidence Update methodology the following databases were searched: CINAHL, DARE, EMBASE, HTA, MEDLINE, NHS EED, AMED and PsychINFO. Appendices 8, 9, 11 and 13 of the NICE CG115 were used to ensure continuity in judging trial eligibility and trial quality.

For evidence relating to specialist treatment options, only Randomised Controlled Trials were included, however for assessments of cost-effectiveness of treatment, this criterion could not be applied.

A total of 6,153 pieces of evidence were identified and assessed, of which 24 (plus three possible) were selected for this Evidence Update, of which 19 were deemed appropriate for this review upon closer analysis and write-up.

The team at King's College London (comprising two researchers and led by Professor Colin Drummond) then reviewed the prioritised evidence and provided a commentary following the same treatment categories as the original NICE guideline and subsequent Evidence Update. This update will focus on any impact the new evidence may have on the existing recommendations. The final sifting process indicates that there are no new findings that will alter the recommendations in the 2013 Evidence Update, however this will be written up in greater detail over the coming weeks.

4 Estimating the Prevalence of People Potentially in Need of Assessment for and Treatment with Specialist Services for Alcohol Dependence in English Local Authorities by Combining Survey and Routine Data Sources

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4.1 Abstract

Introduction

In England, Local Authorities (LAs) are responsible for commissioning drug and alcohol specialist treatment services and require information on the local at-need population. This study describes a method to derive LA estimates of the prevalence of mild, moderate and severe alcohol dependence.

Methods

The approach follows principles set out in National Institute for Health and Care Excellence (NICE) guidelines utilising the Alcohol Use Disorders Identification Test (AUDIT) questionnaire to categorise levels of harmful drinking behaviour and the Severity of Alcohol Dependence Questionnaire (SADQ) to stratify according to severity. To estimate the AUDIT and SADQ population distributions for each LA in England, two nested statistical models (Ordered Probit regression) were developed using 1) individual level AUDIT and SADQ data from the 2007 Adult Psychiatric Morbidity Survey, a nationally representative household survey of around 7,000 persons carried out every 7-8 years, 2) 2012 data on LA population profile (age, gender and deprivation), 3) 2012 LA data on hospital admissions related to alcohol dependence and 4) LA estimates of the homeless population.

Results

The statistical model to predict LA-level prevalence of AUDIT score categories adjusted for age group, gender, Index of Multiple Deprivation of place of residence, and Government Office Region (GOR) level average hospital admissions rate for alcohol dependence. The model for SADQ contains the same predictor variables and in addition the AUDIT score category. The 2012 implied national estimate of prevalence of people with alcohol dependence likely to be in need of specialist treatment is around 735,000 (1.75% of the 18+

population). This includes 397,000 with scores indicating mild dependence (0.94%: AUDIT 20+ and SADQ 4-15), 268,000 with moderate dependence (0.64%: AUDIT 16+ and SADQ 16-30), 52,000 with severe dependence (0.12%: AUDIT 16+ and SADQ 31+). After an adjustment for the number of homeless people in each LA, the latter group is increased by just over 19,000 people to an estimated 70,500 (0.17%). Local authority prevalence rates are estimated to vary widely ranging from 0.92% to 6.91% of the population for any dependence, 0.29% to 3.19% for moderate dependence and 0.05% to 1.04% for severe dependence, representing a 7-fold, 11-fold and 21-fold variation.

Conclusion

Local variation of prevalence is estimated to be substantial and LA service commissioners should consider reasons for and implications of these results. The measures of AUDIT and SADQ are crucial to benchmarking LA prevalence and we strongly advise that they be routinely collected for clients with alcohol problems within the National Drug Treatment Monitoring System. Our approach could also be applied in other countries where geographically marked survey and routine hospitalisation data exist.

Acknowledgements:

We are grateful for the valuable contribution of our project stakeholder group, including service providers, service users, academics, commissioners and representatives from DH and Public Health England (PHE). We would particularly like to acknowledge the contribution of those Local Authorities involved in pilot testing the model.

We also thank the Public Health England North West Knowledge Intelligence Team (PHE NW KIT) for their assistance in the provision of Hospital Episode Statistics data, especially Mr Sacha Wyke.

4.2 Introduction

Alcohol is responsible for a substantial burden of disease, and alcohol dependence is the upper end of a spectrum of alcohol use disorders including those people whose health is most likely to be adversely affected by alcohol.[36] As well as greatly elevated risks of a wide range of chronic and acute health conditions, alcohol dependence is characterised by symptoms of addiction such as tolerance, withdrawal, craving, relief drinking and neglect of alternative pleasures.[37] Effective treatments exist for alcohol dependence, with the aim of drinkers becoming abstinent or having moderated non-problematic drinking, including psychosocial interventions and pharmacology to assist during withdrawal and reduce the likelihood of relapse (e.g. Raistrick et al 2006 [38]).

In England, Local Authorities (LAs) are responsible for commissioning alcohol specialist treatment services, allowing them to tailor services to the needs of the local population.[9] The capacity of treatment services and the types of treatment that are available should be designed based on the numbers of people with alcohol dependence and the severity and complexity mix. The National Drug Treatment Monitoring System (NDTMS) collects data on individuals with alcohol dependence who access specialist treatment for alcohol dependence. In order to assess the extent to which need for treatment services is being met, an evidence based prevalence estimate of alcohol dependence in the community is required. NICE guidelines (PH24 and CG115) for England and Wales describe recommendations for identification, assessment and treatment for people with Alcohol Use Disorders.[1] As part of clinical decision-making, the guidelines recommend the Alcohol Use Disorders Identification Test (AUDIT)[6] as a useful indicator of treatment need. According to NICE guidelines (CG115), people with an AUDIT score 8-15 (sometimes termed 'hazardous drinkers') may benefit from a brief intervention which can be delivered by a generalist. Such people are therefore unlikely to attend specialist treatment services and so are not reported in NDTMS. In contrast, those scoring 16-19 on the AUDIT ('harmful drinkers') may require extended brief intervention or brief treatment/stepped care.. For those people who are unable to reduce their drinking after such extended brief intervention/treatment, CG115 recommends considering referral to specialist structured treatment. For people with an AUDIT score of 20+, NICE recommends referral for assessment of the severity of possible dependence and the need for structured treatment. This may include specialist assessment, detoxification, psychosocial treatment and the prescribing of relapse prevention medication. CG115 uses the Severity of Alcohol Dependence Questionnaire (SADQ)[7] to indicate suggested pathways

for people in treatment according to severity. More specifically, people displaying symptoms of mild dependence (i.e. SADQ <16) may require community based psychosocial therapy (but are unlikely to need assisted withdrawal treatment or relapse prevention medication).; People with moderate dependence (i.e. an AUDIT score of 20+and/or who consume 16-30 units per day, and SADQ score 16-30) should be considered for treatment which includes community based detoxification**,** followed by psychosocial intervention accompanied by pharmacological relapse prevention intervention. For those with severe dependence (indicated by drinking >30 units a day or an AUDIT score 20+ and SADQ [7] score >30) OR with moderate dependence but additional complex needs, then inpatient or residential detoxification with more intensive community psychosocial intervention and pharmacological relapse prevention are recommended. For homeless clients with moderate or severe dependency, residential rehabilitation is recommended.

Despite the importance of considering local need in service planning, we are not aware of published research which has developed methods to provide robust local level estimates of alcohol dependence. There is awareness that prevalence and service provision are variable across England. However the scale of variation, and exactly where each local authority sits in comparison to others, has not been fully identified. Household surveys are typically the primary source of national estimates of the prevalence of alcohol dependence. An international example is the US National Epidemiological Survey on Alcohol and Related Conditions (NESARC).[39] In England, the Adult Psychiatric Morbidity Survey (APMS) provides the largest and most detailed representative household survey giving detailed measures of alcohol dependence.[2] While the APMS can provide a national estimate of the prevalence of alcohol dependence, the sample size (approximately 7000) is not large enough to provide LA-specific estimates. Further, the APMS is conducted only every seven years and includes only people living in private homes. Therefore people who are homeless (and more likely to be alcohol dependent) are not included. The Projecting Adult Needs and Service Information (PANSI) project[40] has used APMS data to provide simple estimates of the numbers of people with alcohol dependence in each LA by applying the national prevalence rates from the APMS to local population data. However, the PANSI estimates do not take into account the underlying population structure within each LA and does not adjust for homelessness. Our aim therefore is to develop a new method for estimating alcohol dependence at different levels of severity which more fully captures local variation.

This paper has three aims. Firstly, we aim to describe a method to derive LA estimates of the prevalence of alcohol dependence in England. We have made use of the individual level

information on alcohol-related problems available in the Adult Psychiatric Morbidly Survey (APMS) 2007. Statistical analysis combines this data with LA level data on hospital admissions related to alcohol dependence, demographic characteristics and deprivation in order to produce new estimates of the numbers of people with alcohol dependence, with further adjustment for homelessness. Secondly, we describe the resulting estimates, including analysis of the extent of the variation in the estimated prevalence of mild, moderate and severe alcohol dependence between LAs. Finally, we discuss how these estimates can be combined with data on the numbers accessing treatment, in order to help LAs benchmark current access levels and plan commissioning of services.

4.3 Methods

To estimate the prevalence of alcohol dependence for each LA in England, a four step process has been undertaken. The first *preparatory* step was to gather and manipulate data from the 2007 Adult Psychiatric Morbidity Survey (APMS) and LA level data regarding population age and sex structure, deprivation, hospital admissions for alcohol dependence, and homelessness. The second step was to develop statistical *models* to estimate the distribution of the population across AUDIT and SADQ scoring groups. The third step was to apply these models to each LA's population structure and local characteristics to generate an *estimate* of prevalence of mild, moderate and severe alcohol dependence in each LA. Finally, because the APMS does not take account of people who are homeless, an additional *adjustment* to the prevalence estimates is made for the numbers of people accepted as homeless in each LA.

4.3.1 Step 1 Data Preparation and Framework for Defining the "Potentially In Need of Specialist Treatment" Population

National estimates of the prevalence of alcohol dependence in 2007 can be obtained from the Adult Psychiatric Morbidity Survey (APMS), the primary source of information on the prevalence of both treated and untreated psychiatric disorders. The APMS is a cross-sectional, nationally representative survey of private households in England and collects data on mental health from adults aged 16 and over. Persons in institutions or homeless are not included. The survey has been conducted every 7 years since 1994, the most recent data available is for 2007 (57% response rate; n=7,461; adjusted for weighting n=7,262). The survey includes the full Alcohol Use Disorders Identification Test (AUDIT) and the Severity of

Alcohol Dependence Questionnaire (SADQ). The AUDIT test is used to identify 'harmful' drinking behaviour (Appendix 4.1). The AUDIT score results summarise the extent of harmful drinking. The SADQ is used to classify severity of alcohol dependence (Appendix 4.2). It asks questions regarding the occurrence and frequency of symptoms related to alcohol dependence such as sweats, shaking, anxiety, despair, and cravings, as well as questions regarding frequency of very heavy consumption. The results for these tools are presented in Table 4.1.

We developed a framework, based upon NICE guidance,[1] to define the sub-population of people likely to be in need of specialist treatment. We started from the perspective of NICE guidance that people with 20+ on AUDIT should be referred for assessment. We then excluded those who scored AUDIT 20+ but only scored 0-3 on the SADQ measure, because clinically, those with high risk levels of drinking without concurrent symptoms of dependence would be more likely to be provided with a brief intervention rather than specialist addiction treatment. We then considered the AUDIT 16-19 group. According to NICE guidance a brief intervention should be provided, followed by a tier 2 extended brief intervention if no consumption reduction is achieved. Only if this also fails, tier 3 structured specialist treatment should be considered in a stepped care paradigm. To capture this population, we included those with AUDIT 16-19 and SADQ scores of 16+. Finally, we excluded the small number of people who score AUDIT < 16 but high on SADQ because non-problematic drinkers would not be referred directly to structured treatment under NICE guidelines but investigated for potential underlying problems not associated with alcohol use. We therefore defined 3 groups:

The two stage approach in which SADQ is modelled second, and conditional on AUDIT score, has been chosen as it reflects NICE guidance on treatment pathways. AUDIT is a screening tool regularly used to identify harmful alcohol use and then those with high scores may then receive the SADQ to further classify the severity of their harmful use.

Table 4.1 Cross tabulation of AUDIT score group by SADQ score group using 2007 Adult Psychiatric Morbidity Survey data (adjusted for sample weightings)

AUDIT score	SADQ score				Total
	0-3	4-15	16-30	31+	
0-7	5523	0	0	0	6,991
8-15	1233	231	4	0	1468
16-19	69	83	8	0	160

20+	15	61	28	6	111
Total	6,840	375	40	6	7,262

The NICE treatment guidelines suggest that people in the mild group presenting to specialist services should be offered comprehensive assessment, care coordination, 12 sessions of structured behaviour therapy or social network therapy. Those with moderate/severe dependence should be offered comprehensive assessment, case management, assisted withdrawal, relapse prevention medication, and structured psychosocial intervention, with those who with severe dependence or have additional complex needs being more likely to need residential or inpatient care (see section 4.2 for specifics).

Demographic data was obtained on the population structure for 2012 in each of 151 England upper tier LAs (UTLAs).[1] The demographic data includes the numbers of people living in each LA by gender, 4 age groups (18-24, 25-34, 35-54, 55+), and 5 deprivation based subgroups (defined by the number living in neighbourhoods in each 2010 Index of Multiple Deprivation (IMD) national quintile)[41] i.e. for each LA there are 40 subgroups. The index of multiple deprivation was already pre-calculated for each individual within the APMS based on the known postcode, but to avoid identifiability, this postcode was removed before the data were available to the research team, so that the only known geography is that the government office region level. Nevertheless, the IMD data for each individual is specific to their exact place of residence. Data on the proportion of the population in different ethnic subgroups was also incorporated. The subgroups defined and examined were “White British”, “White non-British”, “Black”, “South Asian”, and “Mixed or Other”. In our exploratory analyses and final models we did not find ethnicity to be a statistically significant variable.

Hospital admission data related to alcohol dependence were obtained. This quantified the numbers of individuals admitted to hospital (i.e. the same person admitted twice was only counted once) by LA of residence in the years 2006 through to 2012. A person was counted

[1] This includes 55 unitary authorities, the City of London, 27 non-metropolitan counties, 36 metropolitan boroughs and 32 London boroughs. The Council of the Isles of Scilly was excluded because there is a very small population.

if his or her admission contained an ICD-10 diagnosis code related to alcohol dependence or withdrawal (ICD-10 codes F10.2, F10.3, F10.4, F10.5, or F10.6[37]) either as a primary or secondary diagnosis. Together with the population data, this allows estimates of the rate of unique persons admitted per population for recorded alcohol dependence.

Alcohol dependence is more common among the homeless than the general population, so it was important to ensure this group were included in our estimates. However, no single definitive LA-level source of data homelessness prevalence data was been identified. Potentially sources of data considered were survey data on numbers sleeping rough in LAs; the availability of hostel bed spaces by GOR; and the numbers of households accepted under the homelessness provisions of the 1985 and 1996 Housing Acts. We identified the latter as providing the best estimate of the prevalence of homelessness and used the nearest data to our baseline year of 2012 i.e. September to December 2011, and January to March 2012 for statutory homelessness in England[42] (see Appendix 4.3 for further detail).

4.3.2 **Step 2 Statistical Models for AUDIT and SADQ scores**

Ordered Probit regression models were fitted to the APMS data to study how individuals' scores on the AUDIT and SADQ measures related to individual characteristics such as age, gender and local area characteristics such as the IMD deprivation quintile of the area in which the individual lives and the local rate of hospital admissions for diagnoses related to alcohol dependence. A two stage approach was adopted, first to model AUDIT scores, and second to model the probability of being in an SADQ score group conditional on AUDIT scores.

Examining the effects of variations in LA admission rates is challenging because the APMS data is not coded with LA of residence of the individual. We therefore examined this by the nine English former Government Office Regions (GORs) (i.e. using the GR of each APMS participant). The average hospital admissions rates for alcohol dependence, in each GOR in 2007, have been calculated by summing over the LAs in each GOR and dividing by the total population. The average per capita rate of admission for each GOR, along with the numbers across other variables in the APMS is presented in (Table 4.2). This shows that LAs in the North West region have the highest levels of admission rates, whilst those in the East of England Region have the lowest.

Table 4.2 Population characteristic data used in prevalence estimation regression models (from 2007 Adult Psychiatric Morbidity Survey, using sample weightings) and alcohol dependence hospital admission rates by GOR

APMS Variable	N
Gender	
Male	3,125
Female	4,137
Age Group	
18-24	439
25-34	1,032
35-54	2,542
55+	3,249
IMD quintile	
0.59->8.35 [least deprived]	1,396
8.35->13.72	1,614
13.72->21.16	1,437
21.16->34.21	1,355
34.21->86.36 [most deprived]	1,460

Government Office Region (GOR)	Unique Persons Admitted to Hospital per 18+ population with ICD-10 code F10.2, F10.3 or F10.4
North East	0.00120
North West	0.00163
Yorkshire & the Humber	0.00101
East Midlands	0.00080
West Midlands	0.00100
East of England	0.00063
London	0.00093
South West	0.00081
South East	0.00070

Note- the figure of 0.00120 as used in the regression model is equivalent to 120 per 100,000 population

To develop the statistical model for AUDIT scores, exploratory data analysis was undertaken. Although the AUDIT scores are discrete data (i.e. they are integer values ranging from 0 to 40), there is no reason to believe that the difference between AUDIT scores of 6 and 7 is the same as the difference between AUDIT scores of 16 and 17. The Ordered Probit model uses

information about the ordering of the groups.[43] This is useful in our context because we know that an AUDIT score of 16 implies heavier drinking than an AUDIT score of 4. Mathematically, the Ordered Probit assumes a latent variable y* determined by

$$y^* = \boldsymbol{x\beta} + \epsilon$$

Cut points are chosen such that

$$y = 0 \quad \text{if } y^* \leq \alpha_1$$
$$y = 1 \quad \text{if } \alpha_1 < y^* \leq \alpha_2$$
$$y = J \quad \text{if } y^* > \alpha_j$$

where y is the observed group. The Ordered Probit assumes that the error term ϵ is normally distributed, meaning the probabilities of belonging in each group (defined by the cut points) are given using the normal cumulative density function as

$$P(y = 0|x) = P(y^* < \alpha_1|x) = P(\boldsymbol{x\beta} + \epsilon \leq \alpha_1|x) = \Phi(\alpha_1 - \boldsymbol{x\beta})$$

For AUDIT scores, the Ordered Probit regression model used to estimate the probability of being in one of four AUDIT groups (0-7, 8-15, 16-19, 20+) is dependent on age group, gender, IMD quintiles, and the alcohol-related hospital admission rate for each of 9 government regions.

For SADQ scores, the Ordered Probit regression model used to estimate the probability of being in one of four SADQ groups (0-3, 4-15, 16-30, 31+) is dependent on age group, gender, IMD quintile, local hospital admission rate and one additional independent categorical variable i.e. AUDIT group (defined using three groups AUDIT <16, 16-19, and 20+). The rationale for the addition of the AUDIT group variable follows from the NICE recommendations and pathways in that we wish to identify the probability of different SADQ severity groups conditional on the AUDIT scores under 16, 16-19 and 20+. The two stage approach in which SADQ is modelled second, and conditional on AUDIT score, has been chosen as it reflects NICE guidance on treatment pathways. AUDIT is a screening tool regularly used to identify harmful alcohol use and then those with high scores may then receive the SADQ to further classify the severity of their harmful use.

The ordered probit models were undertaken in STATA which reported a pseudo R^2 and the resulting output provides p values and standard errors for the model coefficients.

4.3.3 **Step 3 Estimating LA Specific Alcohol Dependence based on the Statistical Models**

The two statistical models developed above are used to estimate the numbers of people by category of alcohol dependence in each LA. This process proceeds in two main steps. First, the process estimates the proportion of people in each AUDIT group. For each LA, we divide the population into 40 subgroups, defined by 4 age groups, two sex, and 5 IMD quintile categories. We further merged the LA's per capita rate of (person specific) hospital admission with alcohol dependence related ICD codes to this data. The parameters from the AUDIT Ordered Probit regression are then used to estimate a distribution of AUDIT scores for each of the 40 population subgroups, such that subgroup-specific proportions falling into each AUDIT group can be calculated. For example, we estimate that 6.2% of male, 25-34 residents in Sheffield are in the AUDIT 20+ group compared to 9.7% of male, 25-34 residents in Blackburn and Darwen. Second, the process takes the 3 AUDIT groups <16, 16-19 and 20+ and further breaks them down into the numbers of people partitioned by the 4 SADQ groups. Again, this is done for each LA separately for each of the 40 population subgroups. The ordinal regression coefficients (including those for LA per capita hospital admission rate for alcohol dependence related diagnoses, and proportion of the subgroup in each IMD quintile) are estimated and used to calculate the estimated proportions in SADQ 0-3, 4-15, 16-30 and 31+ groups. The central assumption required to make LA predictions using the results of these models is that the relationship estimated between AUDIT / SADQ and the regional average rates of hospital admission for alcohol dependence for GORs also holds when applied to the LA specific rates.

4.3.4 **Step 4 Adjusting Estimated Prevalence for LA Specific Data on Homelessness**

We estimate the numbers of homeless people in each LA the Statutory homelessness in England data for September to December 2011 and January to March 2012.[42] The "numbers accepted as homeless" in each quarter were combined to provide a 6-month figure and then doubled to obtain a 12-month estimate. This process yields a figure of 51,544 households accepted as homeless by LAs in 2012. We estimate the prevalence of alcohol dependence among the homeless population using the only source of data identified, which was the APMS 1994 sample of 1,100 homeless people aged 16 to 64 years living in hostels for the homeless or other such institutions [44]. Respondents were classified as alcohol dependent if they had three or more positive responses to 12 questions concerning binge drinking, loss of control, and symptomatic behaviour; 19.25% of those sampled were classified as having alcohol dependence using these questions. We applied this percentage to the estimated

2012 "accepted as homeless" figures for each LA to estimate a total adjustment, and we further assumed that homelessness was equally distributed across the eight age and gender groups. We further assumed that all were in the severe/complex needs category given their homeless situation.

4.3.5 **Difficulties in analysing complexity using APMS self-reported psychiatric morbidity**

The research team did investigate the issue of complex needs and the use of psychiatric comorbidity data from within Adult Psychiatric Morbidity Survey. Data on comorbidities between mental disorders and different AUDs are not presented in the APMS 2007 report in a way that could be used to inform our study. We examined the data further. For individuals in the APMS, we examined the correlation of Alcohol dependence with each of the following 14 reported psychiatric morbidities: Generalised Anxiety Disorder (GAD), Mixed Anxiety and Depression, Obsessive Compulsive Disorder (OCD), Depressive episode, Panic disorder/phobia, Drug dependence, Psychotic disorder, Borderline Personality Disorder, Antisocial Personality Disorder, Post Traumatic Stress Disorder, Attention Deficit Hyperactivity Disorder, Eating disorder, Problem gambling and Suicide attempt. All of these were positively correlated with Alcohol Dependence, with correlations ranging from 0.18 to 0.63. However, when discussing these clinically it became apparent that it was difficult, if not impossible, to define whether an individual with say moderate dependence also had complex needs on the basis of this list of conditions because mild levels of say depression or anxiety would not be enough to warrant a designation of complex needs. Because of small numbers and the many conditions listed above not being disentangled enough in terms of severity measures it proved too difficult to develop a single algorithm for defining complex needs within the APMS dataset on the basis of these conditions.

4.4 Results

4.4.1 **Estimated Prevalence of People with Alcohol Dependence Potentially In Need of Specialist Assessment and Treatment**

4.4.1.1 **Statistical Modelling Results**

Table 4.3 presents the results of the Ordered Probit regression model used to estimate the association between a range of individual and local area level attributes, and the individual's score on the AUDIT. Three components of the predictor variables specifying the final model, which included age group, gender, and regional average hospital admissions rate for alcohol

dependence, all displayed a statistically significant association with AUDIT scores. The trend is for older age groups to report lower AUDIT scores relative to younger age groups, and for females to report lower scores relative to males. In the model used, deprivation had small effects and was not statistically significant. The reference group for deprivation was the least deprived (i.e. most well-off) quintile and the other four deprivation groups are estimated to have lower AUDIT scores than the least deprived group, though the trend across deprivation quintiles is not linear. Several earlier versions of the model did show deprivation as statistically significant (including the ones described later using a negative binomial model). We decided to leave IMD deprivation scores in as part of our base model for estimating prevalence. After accounting for these individual level attributes, there remains an association between the hospital admissions rate for alcohol dependence of the Government Office Region and an individual's AUDIT score i.e. people in regions with a higher rate of alcohol dependence admissions tend to have higher AUDIT scores after accounting for age/gender/deprivation.

Table 4.3 Results of regression model to estimate the proportion of the population in each of 4 AUDIT categories using ordered probit model

Model Parameter	AUDIT Score		
	Beta	SE	P>z
Male 18-24	-	-	-
Male 25-34	-0.001	0.103	0.991
Male 35-54	-0.364	0.092	<0.001
Male 55+	-0.681	0.091	<0.001
Female 18-24	-0.390	0.122	0.001
Female 25-34	-0.880	0.103	<0.001
Female 35-54	-0.916	0.093	<0.001
Female 55+	-1.272	0.093	<0.001
IMD Q1 (least deprived)	-	-	-
IMD Q2	-0.074	0.057	0.190
IMD Q3	-0.009	0.059	0.876
IMD Q4	-0.026	0.059	0.664
IMD Q5 (most deprived)	-0.032	0.061	0.608
GOR HES Rate*	289.850	56.851	<0.001
cut point 1	0.333	0.106	-
cut point 2	1.500	0.109	-
cut point 3	1.911	0.110	

* GOR HES RATE = Government Office Region level Hospital Episode Statistics admission rates for alcohol dependence

The results of the second regression analysis, which used the individual's SADQ results to explore how SADQ results vary within AUDIT score groups, are presented in Table 4.4. As expected, individuals' scores on the AUDIT and SADQ are associated, with someone in a higher AUDIT score group much more likely to be in a high SADQ score group. After controlling for the association with AUDIT score group, there are additional associations between the probability of high scores on the SADQ and individual attributes such as age and gender, as well as the hospital admissions rate for alcohol dependence of the Government Office Region. These mirror the patterns seen for just the AUDIT, lower scores being associated with older age groups, females and lower admission rates.

Table 4.4 SADQ regression model - estimation of the proportion of the population in each of 4 SADQ categories using ordered probit model

Model Parameter	SADQ score		
	Beta	SE	P>z
AUDIT <16	-	-	-
AUDIT 16-19	1.805	0.120	< 0.001
AUDIT 20+	2.724	0.167	< 0.001
Male 18-24	-	-	-
Male 25-34	-0.072	0.142	0.612
Male 35-54	-0.282	0.132	0.032
Male 55+	-0.652	0.139	< 0.001
Female 18-24	-0.225	0.197	0.253
Female 25-34	-0.705	0.174	<0.001
Female 35-54	-0.640	0.134	<0.001
Female 55+	-1.275	0.163	<0.001
IMD Q1 (least deprived)	-	-	-
IMD Q2	-0.003	0.105	0.977
IMD Q3	-0.042	0.108	0.698
IMD Q4	-0.041	0.104	0.696
IMD Q5 (most deprived)	-0.012	0.107	0.909
GOR HES Rate*	262	102	0.01
cut 1 (SADQ 4)	1.591	0.166	-
cut 2 (SADQ 16)	3.243	0.221	-
cut 3 (SADQ 31)	4.371	0.267	-

* GOR HES RATE = Government Office Region level Hospital Episode Statistics admission rates for alcohol dependence

4.4.1.2 Implied National Estimates

In Table 4.5 Part A, the calculations for each LA have been undertaken and then summed to provide an estimate of the numbers of people aged 18 and over in each AUDIT/SADQ group for England. Almost 730,000 people are estimated with a score of AUDIT 20+ and over 1,000,000 with an AUDIT score of 16-19 i.e. a total of 1.74 million with AUDIT 16+. These estimates are slightly higher than raw estimates obtained by multiplying up raw percentages from APMS to the adult population of England (643,000 AUDIT 20+ and 925,000 AUDIT 16-19, which gives a combined 1.6m AUDIT 16+).

Table 4.5 Part B shows the defined groups of people with probable alcohol dependence likely to be in need of specialist treatment. This shows estimates of around 397,000 displaying symptoms of mild dependence (i.e. 0.94% of the adult population estimated to have AUDIT 20+ and SADQ 4-15 – shaded light blue). In addition, there are approximately 268,000 (0.64%) estimated with moderate dependence (AUDIT 16+ and SADQ 16-30 – shaded medium blue) and 52,000 (0.12%) with severe dependence (AUDIT 16+ and SADQ 31+ - shaded dark blue). This gives a total estimated as potentially in need of specialist treatment based on the statistical modelling of the APMS survey of around 716,000 (1.70% of the adult population).

Table 4.5 Part C shows the effect of adding in the adjustment for the number of people accepted as homeless in each LA annually. This adds just over 19,000 people in to the severe / complex needs category making this grow to an estimated 70,500 (0.17%), and the total population of people with alcohol dependence likely to be in need of specialist treatment up to just below 735,000 (1.75% of the population).

Table 4.5 National estimates of prevalence of alcohol dependence based on summation of statistical modelling of each LA in England (adjusting for age/gender/IMD quintile/LA of rate hospital admissions related to dependence)

Part A: Estimated prevalence matrix of AUDIT and SADQ Scores for the England Population 2012 based on APMS and regression model

	SADQ 0-3	SADQ 4-15	SADQ 16-30	SADQ 31+	Total
AUDIT_ < 16	38,855,546	1,454,293	15,909	16	40,325,764
AUDIT 16-19	434,170	496,976	75,651	6,303	1,013,100
AUDIT 20+	95,262	396,640	192,015	44,908	728,825
Total	39,384,978	2,347,909	283,575	51,227	**42,067,689**

Part B: Potentially In need of specialist treatment based on APMS and regression model

	Mild symptoms (AUDIT 20+ and SADQ 4-15)	**Moderate** (AUDIT 16+ and SADQ 16-30)	**Severe** (AUDIT 16+ SADQ 31+)	**Total**
Number	396,640	267,666	51,211	**715,517**
% prevalence	0.94%	0.64%	0.12%	**1.70%**

Part C: Adding in the estimated numbers of homeless people with alcohol dependence

	Mild symptoms	**Moderate**	**Severe + Homeless**	**Total**
Number	396,640	267,666	70,529	**734,845**
% prevalence	0.94%	0.64%	0.17%	**1.75%**

It is worth noting that, of the estimated 1,013,100 people in the AUDIT 16-19 group, there are just under 82,000 (8.1%) who have estimated SADQ scores high enough to be considered moderately or severely dependent. This chimes broadly with evidence from the recent AESOPS trial of UK stepped care. From a sample of n=246 people with AUDIT 8+, a total of 21 (8%) were referred through tier 2 to tier 3 specialist treatment [45]. Whilst not in any way statistically validating the prevalence estimates from the regression models, it is reassuring that the estimated proportion of people in AUDIT 16-19 group who we estimate to be in need of referral to specialist treatment is of the same order of magnitude as that seen in evidence from recent UK practice.

Appendix 4.4 presents a more detailed breakdown of the numbers of people estimated in each age/gender subgroup and compares these with raw APMS estimates. Also in Appendix 4.5 we present an alternative set of regression models were estimated using a different functional form (a negative binomial) for the AUDIT regression. This latter modelling gives estimates with a larger prevalence of alcohol dependence than the estimates presented in Table 4.5 and the negative binomial appears to substantially over-estimate numbers in some younger age/gender groups.

4.4.2 LA Variation in Estimated Alcohol Dependence Prevalence

The prevalence estimates for alcohol dependence based on the statistical modelling have been calculated for each LA in England. Table 4.6 summarises the range of estimated prevalence rates for dependence across the 151 LAs in England. Appendix 4.6 provides the estimates for each LA by region in terms of numbers of people and Appendix 4.7 in terms of % prevalence and rank of the 18+ population potentially in need of specialist treatment.

Table 4.6 Estimated Variation in LA population prevalence of people with alcohol dependence likely to be in need of specialist treatment by severity of alcohol dependence

Description	Displaying symptoms of:			Total
	Mild dependence	Moderate dependence	Severe dependence	
Defined as:	AUDIT 20+ and SADQ 4-15	AUDIT 16+ and SADQ 16 - 30	AUDIT 16+ and SADQ 31+ and Homeless Adjustment	Sum of 3 groups
Mean prevalence of 151 LAs	1.01%	0.71%	0.19%	1.91%
Min	0.57%	0.29%	0.05%	0.92%
5th percentile	0.64%	0.35%	0.08%	1.10%
95th percentile	1.60%	1.36%	0.36%	3.31%
Max	2.69%	3.19%	1.04%	6.92%

Figure 4.1 shows the range of percentage of the LA population aged 18+ potentially in need of specialist treatment for alcohol dependence ranked from lowest to highest LAs. This shows that from the lowest LA estimate (0.90% of the population) to the highest (6.91%) there is a 7-fold variation.

Figure 4.1 Estimated % overall prevalence of alcohol dependence in 151 English Local Authorities

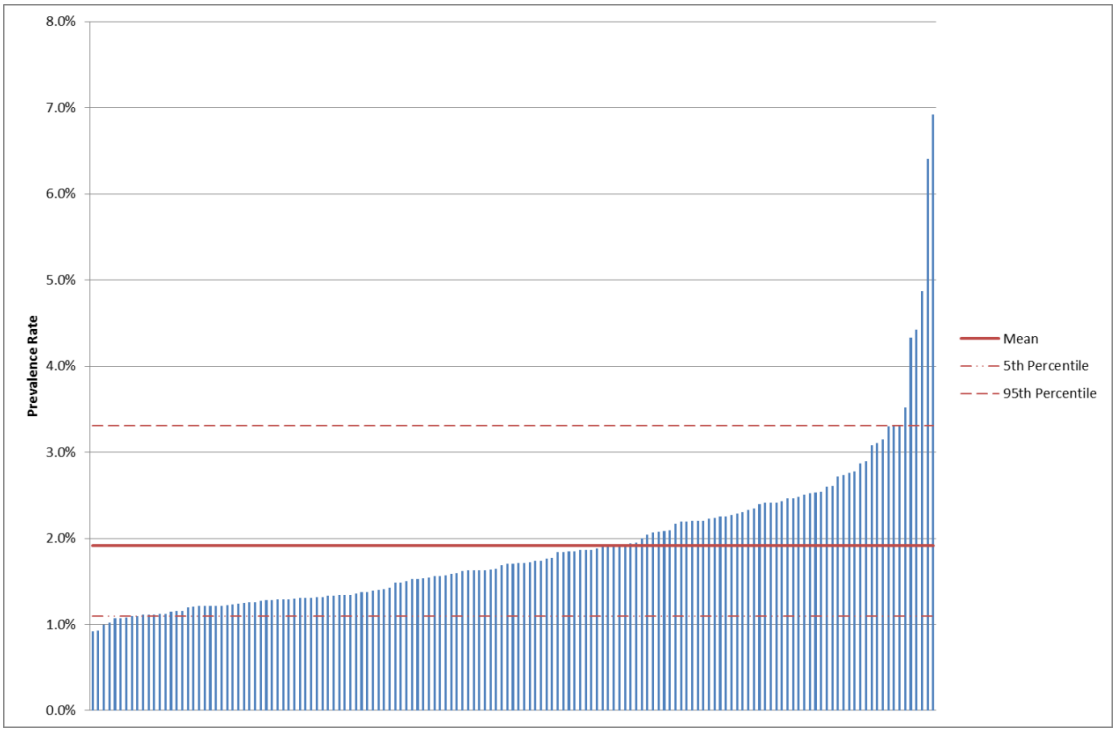


Figure 4.2-Figure 4.4 show the percentage of the population that are estimated to have mild, moderate and severe dependence respectively, using the same ranking as for overall prevalence. This shows that generally those with high prevalence overall also rank highly across each severity band, though some variations do occur. For mild dependence there is a 4.5 fold variation in the estimated prevalence, ranging from 0.57% to 2.69%. This rises to 11 fold for moderate alcohol dependence, which ranges from 0.29% to 3.19%. The range is greater still for the estimates of severe alcohol dependence with a 25 fold variation between highest and lowest, from 0.04% to 1.02% of a LA's population.

Figure 4.1 Estimated % overall prevalence of alcohol dependence in 151 English Local Authorities

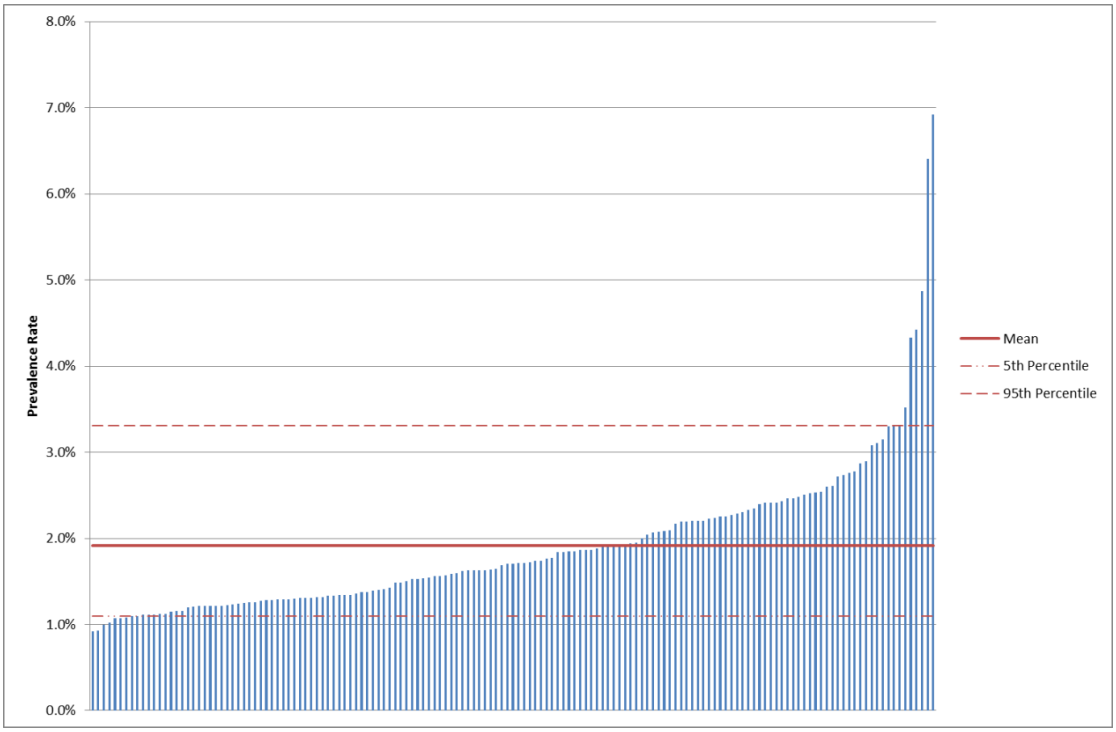


Figure 4.2 Displaying symptoms of mild dependence – Estimated % prevalence in 151 English Local Authorities

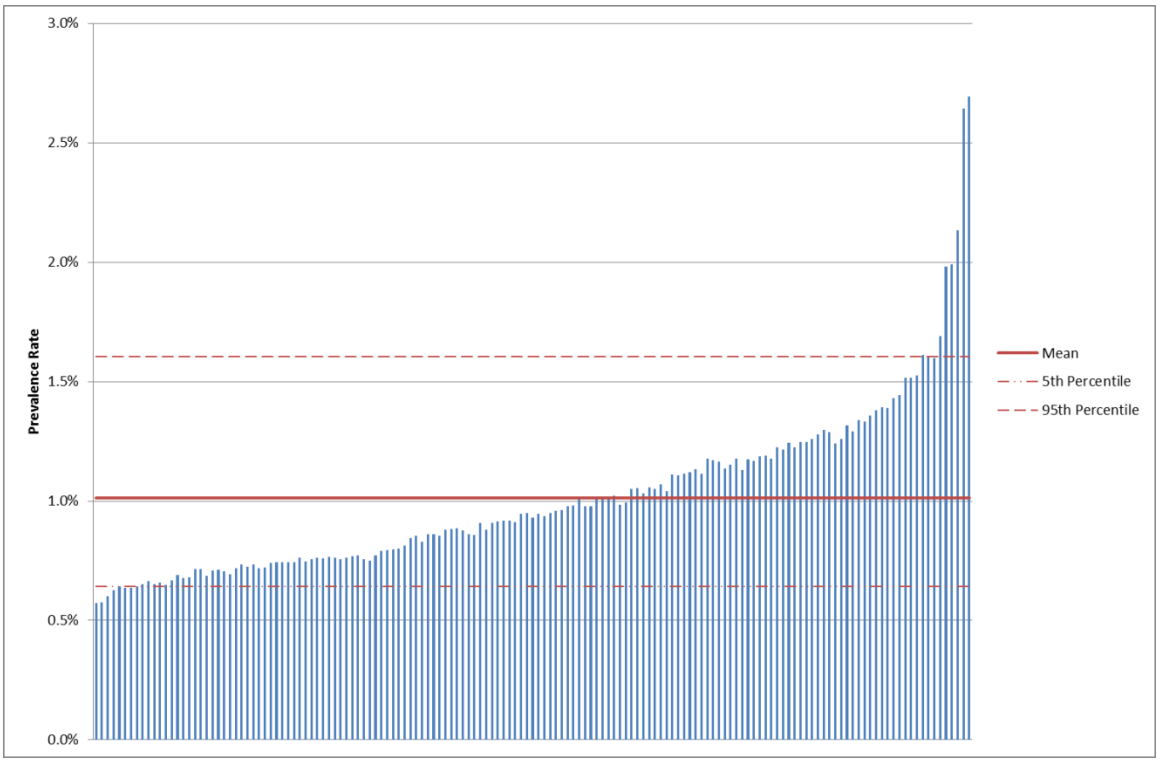


Figure 4.3 Displaying symptoms of moderate dependence – Estimated % prevalence in 151 English Local Authorities

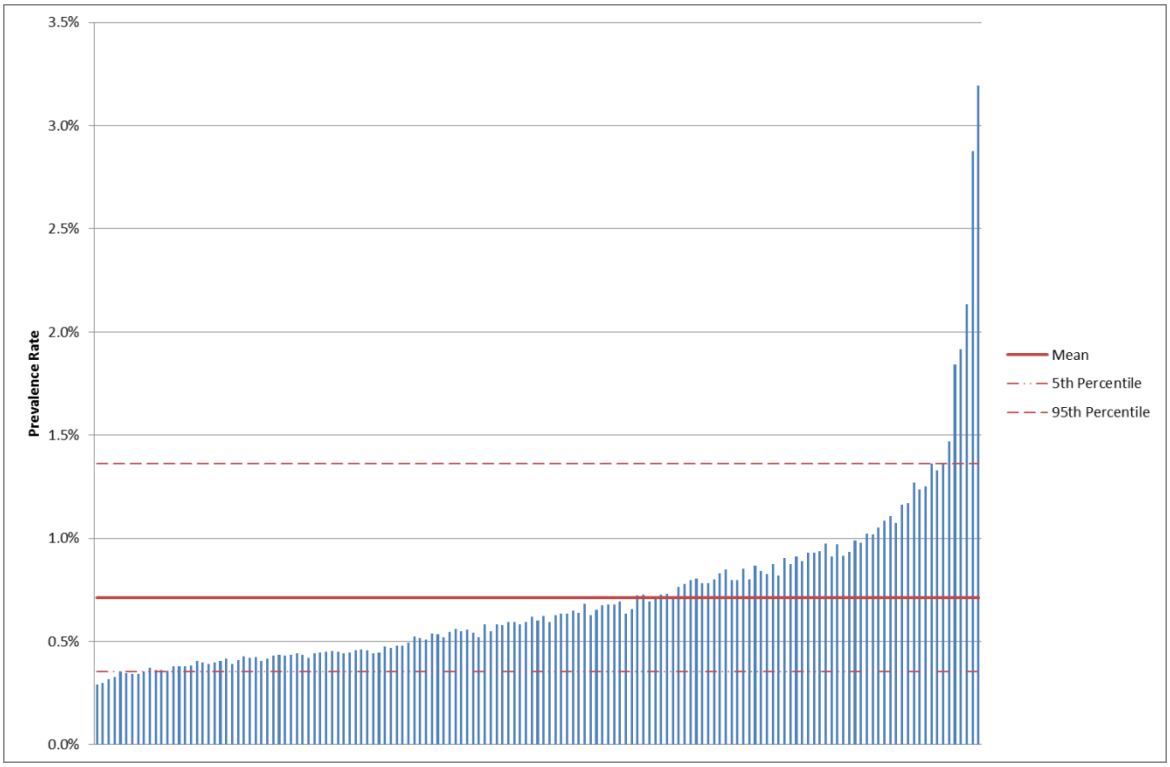
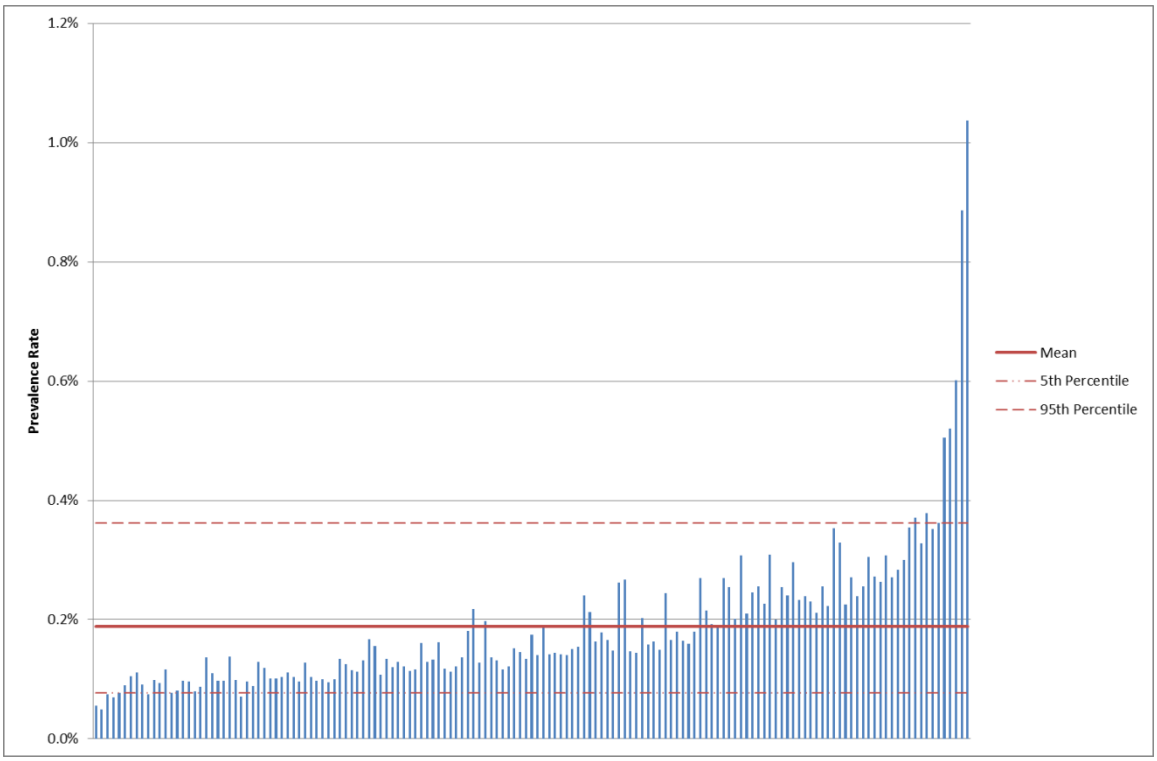


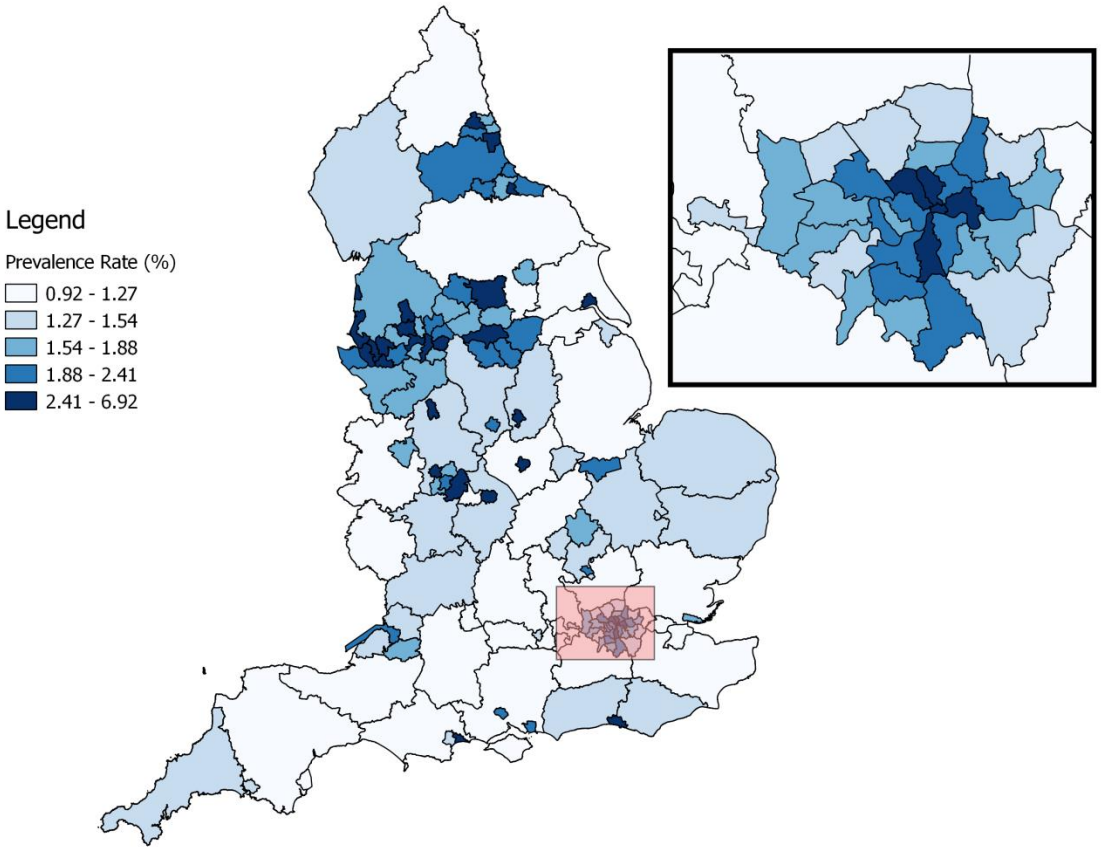
Figure 4.4 Displaying symptoms of severe dependence including estimated numbers of alcohol dependent homeless people – Estimated % prevalence in 151 English Local Authorities



Geographical Variation

Local Authorities that have high estimated prevalence of alcohol dependence do not appear randomly distributed across England, as can be seen in Figure 4.5. The North East (e.g. Middlesbrough, Sunderland and Newcastle) and the North West (e.g. Blackpool, Liverpool and Manchester) regions have a high concentration of LAs with a high estimated prevalence of alcohol dependence. The corresponding GORs contain 23% of all LAs in England, but 43% of 30 highest ranking LAs according to prevalence. In contrast, the South East and South West contain 23% of English LAs and 53% of the 30 lowest ranked LAs by prevalence. The high estimated prevalence LAs in central England generally correspond to major cities, such as Nottingham, Leicester and Birmingham. In London, the overall pattern is of higher estimated prevalence of alcohol dependence in more central LAs than in the south of the city, and generally lower estimates in LAs in the north and east of London.

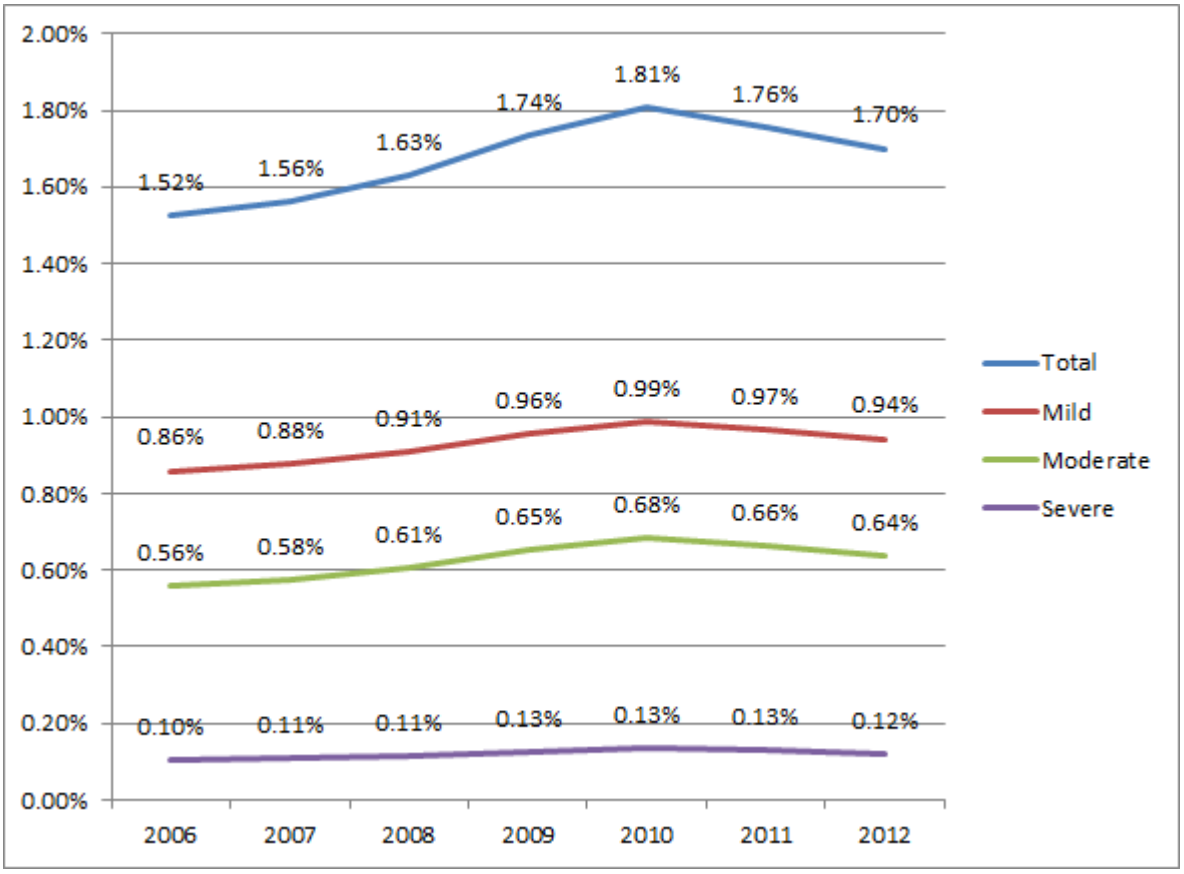
Figure 4.5 Map of alcohol dependence prevalence rates in England by Local Authority



4.4.3 Estimating Trends in Prevalence based on changing population structure and admission rates.

The same two stage regression model can be used to estimate prevalence of dependence (excluding homeless people) for earlier years. Figure 4 below shows the estimated trend in alcohol dependence using the regression method from 2006 to 2012. The main changes are due to increases in the alcohol dependence admission rates, which appear to peak in 2010 and then fall back slightly in 2011 and 2012. Examining across the LAs, 129 out of 151 (85%) upper tier LAs had an estimated prevalence that was higher in 2012 than it was in 2006 using this method, with the remaining 22 LAs having slightly falling trend estimates.

Figure 4.6 Trend in alcohol dependence prevalence for England using regression model (excluding adjustment for homeless people)



4.4.4 **Estimating Numbers of People with an AUDIT score of 16+.**

Objective 2 in our study is to estimate the prevalence of harmful and dependent drinkers. Our main focus has of course been to estimate need for specialist services i.e. objectives 4 and 5, and this is why our analyses focus upon the "prevalence of people with alcohol dependence likely to be in need of specialist treatment" and disentangling estimates by severity group.

We also present in Table 4.5 the national estimate of people in each AUDIT/SADQ category. We estimate the number of people aged 18+ who have an AUDIT score of 16 or above at approximately 1.74 million for England (see Part A of Table 4.5).

In this revised report we now also present the modelled estimates of the number (and percentage) of people aged 18+ with an AUDIT score of 16+ in each UTLA. Appendix 4.6 shows the estimated absolute numbers of people for each UTLA. Appendix 4.7 shows, in light grey, the estimated percentage of the over 18 population with an AUDIT score of 16+ in each UTLA using the two combined probit regression models. The average of these percentages across the 152 LAs is 4.44%, with the full range going from 2.6% to 12.3%. The two highest LAs were Blackpool and City of London (the only ones estimated at over 10%), with Liverpool, Manchester and Middlesbrough the next highest estimates. As with the estimated prevalence of people with alcohol dependence potentially in need of specialist treatment, these patterns reflect a combination of factors related to age, gender, deprivation and the local rate of admission for alcohol dependence related diagnoses.

4.5 Discussion

In this study, data from the national Adult Psychiatric Morbidity Survey, 2007 has been combined with other demographic and routinely available hospital episodes data to develop a new statistical model to estimate prevalence of alcohol dependence at LA level. An additional adjustment for homeless people, which are excluded from household surveys such as the APMS, has been made.

The key findings from the study are as follows:

F1. The method to estimate the prevalence of people with alcohol dependence potentially in need of specialist assessment and treatment is built upon NICE guidelines. These suggest that people who are screened as AUDIT 20+ can be classed as probably alcohol dependent, and that a proportion of those in AUDIT 16-19 will also have some level of severity of dependence that could require specialist treatment.

F2. The statistical analysis of APMS shows that higher AUDIT scores are more prevalent in the following groups: in younger age groups, in males, in areas of greater deprivation, and in areas with higher regional rates of hospital admissions related to alcohol dependence.

F3. For SADQ categories, the statistical analysis has also shown that the likelihood of suffering from higher severity alcohol dependence, as measured using a 4 band categorisation of the SADQ instrument, is higher for those in a higher AUDIT score band (i.e. AUDIT <16, AUDIT 16-19, and AUDIT 20+), those who are younger, those wo are male, and after accounting for these factors, also additionally higher in those people living in areas with higher regional rates of hospital admissions related to alcohol dependence and withdrawal.

F4. These statistical models, when combined with data on the local population structure and hospital admission rates, enable an estimation of the prevalence of alcohol dependence in each LA in England that adjusts for each of these important factors.

F5. The national estimate of prevalence of people with alcohol dependence potentially in need of specialist assessment and treatment is around 735,000 (1.75% of the 18+ population). . This includes 397,000 displaying mild dependence (0.94% with AUDIT 20+ and SADQ 4-15), 268,000 moderate dependence (0.64% AUDIT 16+ and SADQ 16-30), 52,000 with severe dependence (0.12% AUDIT 16+ and SADQ 31+), and an additional adjustment for the number of people accepted as homeless in each LA annually of just over 19,000 people in the severe / complex needs category making this grow to an

estimated 70,500 (0.17%). The 2012 national estimates of 268,000 with moderate dependence and 51,000 with severe dependence (excluding homeless adjustment) are somewhat higher than a simple crude model of taking the numbers in APMS and multiplying by the poulation (162,000 and 35,000 respectively). This is because the statistical model adjusts for identified factors in the population such as age, gender, deprivation and hospital admission rates. An adjusted model will of course always be different from a simple crude estimate with no adjustments and the model could have turned out lower or higher than the raw numbers. The model adjusts for the observed patterns which show the extent to which dependence relates to age, gender, deprivation, and the rate per population of people being admitted to hospital with ICD diagnosis of dependence / withdrawal synptoms in each LA area.

F6. The new methodology produces smaller numbers than the headline figures from the ANARP project[5]. ANARP used only an AUDIT 16+ definition when it was undertaken 10 years ago, which was before NDTMS existed and also before NICE published its guidelines recommending different treatment pathways for different severity groups. The ANARP estimates included both harmful and dependent drinkers in prevalence estimates. Our methodology estimates something different – the prevalence of people with alcohol dependence potentially in need of specialist assessment and treatment based upon NICE guidelines. Our method is informed by recent studies (e.g. AESOPS[45]) which help to quantify the proportion of people in need of specialist treatment in the AUDIT 16-19 group.

F7. At LA level, detailed calculations have estimated the numbers of people in three severity groups (potentially in need of specialist treatment whilst displaying mild symptoms, moderate dependence and severe dependence). This has been done separately for 8 age / gender subgroups (males and females aged 18-24, 25-34, 35-54, 55+). Local Authority estimates range from the lowest LA estimate (0.90% of the population) to the highest (6.91%) showing a 7-fold variation. The variation is 11 fold for moderate alcohol dependence and 25 fold for severe dependence.

F8. Areas of high and low estimated prevalence do not appear at random, the North West and North East and central London contain a large proportion of high prevalence LAs in contrast to the South East and South West where the estimated prevalence is typically lowest. Results for absolute numbers and percentage prevalence of alcohol dependence using these definitions for each upper tier LA are available in Appendix 4.6 & Appendix 4.7. These prevalence estimates for each LA have been embedded into the Excel

spreadsheet Sheffield Specialist Treatment for Alcohol Model (STreAM) Benchmarking Tool version 1.0 which will be available to LAs through Public Health England.

F9. The variations in prevalence estimates between the local authorities are due to the *combined* effects of the age, gender, deprivation and HES rate differences between UTLAs. It is important to note that whilst at the GOR level HES rates vary threefold, at the UTLA level these HES hospital admission rates per population for alcohol dependence related diagnosis actually vary 7 fold. This is one of the important assumptions of our model as a whole i.e. that the coefficients for the GOR HES rates from the statistical model will apply at the UTLA level also.

F10. These estimates make use general population survey data on AUDIT and SADQ from the APMS 2007. It will be necessary to update these estimates when the APMS 2014 data becomes available in 2016.

F11. Since these measures of AUDIT and SADQ are crucial to benchmarking of LA prevalence and hence long term planning of services, we would strongly advise that they be collected at assessment and recorded routinely within the National Drug Treatment Monitoring System for clients with alcohol problems coming into treatment. This would enable benchmarking of access to treatment services separately for mild, moderate and severe subgroups so that an understanding of variations in the access or targeting of services across LAs can be developed.

There are several limitations to the evidence and analysis. Given that the APMS is a household survey it is likely that there is under-sampling of people with alcohol dependence, due to populations being excluded (e.g. the homeless, military personnel, residents in psychiatric, hospitals, hostels or care homes) or under-sampled (e.g. students in halls, frequent travellers) [46]. Also, response rates among sampled populations to the request to complete a relatively long survey could be lower in alcohol dependent individuals than the general population. The APMS is focussed on understanding prevalence of a wide range of mental health / psychiatric problems in the population and as such efforts were made to ensure a good sampling frame [2]. The sample weighting process also attempts to ensure that the weighted sample reflects the full range of age, gender and deprivation in England [2]. As discussed in the findings above, the APMS data used is from 2007. The 2014 version has now been collected and when data become available to researchers, a further update of this statistical modelling would be necessary.

Within the full APMS sample of n=7,262 there are 111 people with AUDIT 20+, 160 with AUDIT 16-18 and 45 with SADQ 16+ (see Table 4.1). It is important to emphasise that the statistical models developed are not undertaken only on the high AUDIT/SADQ sample. This was a misunderstanding on behalf of one reviewer of the final draft report. The statistical modelling is built in fact on the full APMS sample (n=7,262) which is used to estimate the patterns for people in each category of the matrix of all AUDIT scores and all SADQ scores. This means that the estimated tails of the distribution for both variables are informed by the structures and patterns of the full data set. Clearly, one could wish for another dataset or a larger sample to exist but at this point the APMS provides the best evidence available.

One limitation of the regression models is that the APMS participants' geographical location is only known at government office region rather than LA level. This means that we have estimated a relationship between the predicted AUDIT / SADQ score and the rate of person specific hospital admissions related to dependence for the particular GOR of residence of the APMS participants. We assume that this quantified relationship holds at the LA level. It would have been valuable to have LA of residence of the APMS participants but this was unavailable. In future, the statistical modelling could be further developed. We investigated an alternative model structure using the negative binomial distribution and treating AUDIT score as a count variable, ranging from 0 to 40, but we found this did not provide predictions reflective of the age/gender raw APMS rates (see Appendix 4.5). Finally, it is possible in principle to get age / gender / IMD subgroup specific rates for the hospital admissions related to dependence and this could potentially provide additional explanatory power in future analyses.

There are issues raised by our choice to incorporate hospital admissions related to alcohol dependence and withdrawal into the statistical model. One might consider this a utilisation measure and hence susceptible to variation across LAs due to supply-side effects. Our thinking was that hospital admissions with these diagnoses are not restricted by a supply constraint to anywhere near the extent that access to specialist treatment for alcohol problems itself is. In other words, people with alcohol dependence in need of emergency care in hospital would not be turned away due to a lack of capacity, and indeed neither would that happen in terms of elective care. Also, variations in capacity per head of population for emergency and elective hospital care across the country are much smaller than the large variations seen in access to specialist care for alcohol dependence per head of population. This topic was discussed at the second stakeholder event and within the project

team. Some concerns were raised about what the hospital admissions data is telling us, especially whether it could be deprivation rather than prevalence of alcohol dependence driving hospital admission rate variations i.e. that in areas with higher versus lower deprivation the probability of a person with exactly the same severity of alcohol dependence being admitted to hospital might be higher because of reasons such as resilience or access to other support preventing admission for some population groups. Thus the higher HES rates could be markers of differences in deprivation rather than differences in prevalence of dependence. Of course the prevalence AUDIT and SADQ regression models have a separate covariate for deprivation and so direct effects of deprivation on prevalence are already accounted for in the model, and therefore the coefficient for HES rates essentially accounts for the effects of dependence related hospital admissions over and above any direct deprivation effect. It is still the case that the HES rate is a statistically significant predictor of higher AUDIUT and SADQ scores. Another concern raised in these discussions was possible differences by locality in diagnosis, identification and coding (alcohol is often a secondary diagnosis rather than primary reason for admission). There was no evidence available to us on differential coding of diagnoses and we accept that this is a limitation in relation to use of HES admission rates for alcohol dependence. Nevertheless, the overall numbers of people admitted to hospital with the F10 ICD diagnoses used are large (approximate sample size was n=36,900 in 2006/7), and the research team was convinced that these data should be incorporated as statistically significant covariates to adjust LA prevalence estimates.

We took a two stage approach to the statistical modelling of first AUDIT and then SADQ categories, and the theoretical justification for taking this two-stage approach has two components. The first is that this follows the clinical process wherebyAUDIT is used to screen people and refer to the service, and then SADQ along with clinical judgement is used to assess severity . The second justification is more is statistical. Severity is dependent on signals of alcohol use, so a model in which SADQ is independent of AUDIT would be missing information. One reviewer suggested modelling these simultaneously, and we have considered this. A bivariate ordered probit model in which the probability of both SADQ and AUDIT are modelled using covariates that are just age, gender, IMD and dependence related hospital admissions this, we believe technically possible in the STATA software but we do not anticipate that it would change the results substantially. This could potentially be tested as part of further work when APMS 2014 becomes available.

Ideally, confidence intervals for the prevalence estimates for each LA would have been provided but this has several challenges. It is possible to quantify some of the uncertainty in the parameter estimates for the two multinomial regression models (standard errors shown in Tables 3 and 4). However, there is no easy method to determine the extent of uncertainty that should be added on top of this in the next step of our method i.e. the uncertainty due to our making the assumption that the regional hospital admission rate coefficient can be applied at LA level. This would require making an informed judgement using Bayesian elicitation methods but there is little literature on how this could be achieved in such a case. Indeed, as we move down to the LA level for both regression models, there is a question as to whether the nationally derived statistical model is reasonable at local level and whether other unobserved local factors (for example ethnic mix) would add additional uncertainty. Again, there is no easy method to determine the extent of uncertainty that should be added do reflect this structural issue. We did consider using a very simplistic approximation formula for a binomial confidence interval to estimate uncertainty in the proportion of people estimated as alcohol dependent [95% CI = +/- 1.96 sqrt {(1/n) * p_hat*(1-p_hat) , where p_hat is the proportion of successes in a Bernoulli trial process estimated from n samples], but the problem at LA level is to have a reasonable way of deciding what the 'n' sample size to use in such a formula would be – since we have not directly used sample data from an particular LA to make the estimates. Our final judgement has been that presenting such a simplistic CI would both under-estimate and misrepresent the uncertainty in our LA level prevalence estimates. One reviewer suggested a bootstrapping approach using the AMPS data, but we do not consider there to be an additional benefit in doing this because it simply provides another way of estimating the uncertainty in the coefficients of the regression, which is already quantified using the variance standard errors (or covariance matrix) in the STATA output, and bootstrapping would not address the other key methodological difficulties in estimating confidence intervals.

Further on confidence intervals, peer reviewers of the final draft report were very keen to see an attempt to address issues of uncertainty to the extent that this might be possible, and in Chapter 10, we set out a suggested approach for future work when APMS 2014 data become available in order to partially quantify the CIs. Briefly this approach would enable us to (a) allow for uncertainty in estimated regression parameters for the two ordered probit models (using the variance covariance matrix produced from the AUDIT and SADQ regressions in STATA to reflect uncertainty in the regression model parameters), and (b) allow for uncertainty in values of covariates at UTLA level, and particularly the person

specific hospitalisation rate at UTLA level for alcohol dependence related diagnoses (by sampling from an assumed Poisson distribution for the local authority HES person specific hospital admissions rate for diagnoses related to alcohol dependence). This could then be used to generate Monte Carlo samples of the prevalence estimates for each UTLA and England as a whole hence a partial confidence interval. It is important to emphasise that this proposed approach would still leave out the structural uncertainty regarding making the assumption that the regional hospital admission rate coefficient can be applied at LA level, and the extent to which other unobserved local factors would add additional uncertainty.

Our analyses uses AUDIT intervals (i.e., 0-7, 8-15, 16-19, 20+) to indicate need and as a proxy for the presence/absence of dependence. These intervals were originally proposed in a WHO guide to brief intervention.[6] While the identification of precise cut-points could be seen as arbitrary, the thresholds used have support within the peer-review literature.[6, 47, 48] Further, it is important to recognise that these AUDIT and SADQ categories are clinically accepted thresholds used in different countries. It is also important to emphasise that this new methodology for prevalence estimation follows current NICE guidelines and pathways, in which those scoring AUDIT 20+ and those scoring 16-19 and not responding to extended brief intervention, should be referred to services specifically trained to undertake specialist assessment and where appropriate, provide treatment. The proportion of those scoring AUDIT 16-19 who are estimated to potentially require specialist referral is based on a large NIHR funded trial of stepped care intervention whose results showed that 8% of participants did not respond to brief intervention followed by four sessions of motivational interviewing delivered by a trained specialist alcohol counsellor. This aligns with the proportion of AUDIT 16-19 scorers who we estimate to have moderate or severe dependence using SADQ definitions through our statistical modelling of APMS. AUDs are continuous rather than categorical phenomena, therefore cut-points for categories will always require some judgement, but nevertheless they provide a necessary heuristic for epidemiological research such as that used here. It is crucial to emphasise that a key purpose of needs assessment is benchmarking one locality against another. To deepen understanding of the relationship between prevalence measures based on AUDIT and SADQ scores and treatment need, future research exercises could consider collecting other data alongside these measures. For example, in conjunction with DSM and ICD diagnostic tools to measure harmful drinking and dependence or the Leeds Dependence Questionnaire[49], which is weighted more towards earlier subjective and behavioural signs of dependence and less towards the physiological signs of dependence used by SADQ.

There is always the limitation with AUDIT and SADQ that they are self reported. It is important to emphasise that we have not used information on self reported units of alcohol consumed in developing the prevalence model. One reviewer appeared to misunderstand this and was concerned about reliable information from self reports in terms of units of consumption. We have used only the AUDIT and the SADQ scores. Del Boca & Darkes[50] discuss issues of self report validity for units consumed but do not discuss either AUDIT or SADQ and do make reference to dependence when saying "Several studies suggest that respondent variables affect alcohol self-reports. Dependence severity (e.g. Babor et al . 2000), recovery stage and sobriety or withdrawal state (e.g. Sobell & Sobell 1990; Brown et al. 1992; Sobell et al. 1994) have all been shown to influence response validity". This does not explicitly discuss the two metrics we have used and, unfortunately, provides no mechanism for adjusting the APMS data or related statistical distributions to account for issues of self-report.

It is worth discussing the relationship between our project work and some recent work undertaken for the DH Advisory Committee on Resource Allocation (ACRA) which aimed to estimate relative need for alcohol services in developing the formula for the public health grant to LAs[51]. This work was published in October 2015, almost at the end of our project and well after our two main stakeholder events (where it did not feature in any of our stakeholders' comments). The ACRA work does not undertake any estimation of prevalence of alcohol dependence but rather takes a different paradigm following research by the University of Manchester[52]. Its purpose is to adjust the overall funding for public health budgets to account for variations in 'need' for drug and alcohol services. The data used is based on the actual levels of current utilisation of drug and alcohol services. Two statistical modelling approaches are used; the first using aggregated NDTMS data on each small area (MSOAs) as the unit of analysis, and the second using NDTMS data for each individual as the unit of analysis.

In the first model, the dependent variable is the ratio of actual to expected cost. The research calculated the expected cost for drug misuse, alcohol misuse, and drug and alcohol misuse combined for each postcode sector/ local authority combination area by calculating costs per capita by eight age bands (under 15, 15 to 19, 20 to 24, 25 to 29, 30 to 44, 60 to 64, 65 and above) and applying these age weights to each area, using 2011 population data (ONS). The shorthand tem used for the dependent variable in their report is "the indirectly-

standardised cost ratio". The Manchester team summarise the results of this as follows: "Tables 14 and 15 examine predictions of the cost of drug and alcohol service use at the MSOA (about 8000 people) level. They indicate that predictors common to both the drugs and the alcohol misuse models are SMR, IMD Crime, IMD Environment, population turnover, proportion male and proportion white British. A significant predictor in the drugs but not the alcohol model is IMD Income. The final alcohol model contained the IMD mood and anxiety indicator, which was not a significant predictor in the drugs model. The final model achieves an adjusted R-squared of 0.513 for the drugs cost ratio but performs less well for the alcohol cost ratio (adjusted R-squared of 0.334)." In summary, these results indicate that standardised mortality rates, deprivation and ethnicity affect utilisation at an area level.

In the second, person-based, model approach they incorporated measures of past-treatment utilisation (days of treatment received during the previous year, whether treatment was completed and whether the individual had received prescription-based therapy during the previous year) as predictors of 2013/14 expenditure at the level of the individual, alongside area-level needs variables. The dependent variable was the level of cost, not a cost ratio. Case-level data for those with treatment records were combined with data grouped by area and age group for those with no treatment records; the population of each provides the appropriate weighting. Indicator variables are applied at the level of area/age group. Past-year treatment utilisation is applied at case level. The Manchester report summarises the results of the individual level modelling approach as follows: "Tables 19, 20 and 21 present person-based models for drug and alcohol misuse combined, drug misuse and alcohol misuse, respectively. The best-performing predictors in all three models are received prescribing in the past year, days treated in the past year and whether treatment was completed in the previous year. These three variables together explain 46.9% of the variance in expenditure in the drug and alcohol misuse combined model, 48.8% in the drugs misuse model and a much lower figure, 2.1%, in the alcohol misuse model. The addition of other needs variables (SMR, population turnover and proportion male) does not add substantially to the adjusted R-squared statistic in any of the three models." This shows that, in the ACRA work, the expected use of alcohol services at a person level is almost completely unexplained by the variables available (see the final two sentences of the last quote above). That is, there is likely to be a substantial difference between the need variables identified in the ACRA work and the use of specialist treatment for alcohol.

Our interpretation of all of this is that those geographical areas with high use of specialist alcohol treatment services are likely to have this high use partly because of historical and organisational reasons rather than this fully reflecting underlying epidemiology and need. Interestingly, our project work also shows the same thing using different methods i.e. that the correlation between existing use of services and estimated need – in our case prevalence estimates (based on age, gender, deprivation and hospitalisations related to dependence) is very low. That is, both studies find little correlation between current levels of utilisation and variables which estimate need. This is why quantifying prevalence estimates as we have done is so important at the local level. It provides additional evidence for planners and commissioners to consider in developing services.

As discussed in 4.3.5, the research team did investigate the issue of complex needs and the use of psychiatric comorbidity data from within Adult Psychiatric Morbidity Survey. Because there are small numbers and because the self-reporting of the many conditions does not disentangle severity enough, it proved too difficult to develop an algorithm to define complex needs within the APMS dataset. Moreover, to incorporate this within the prevalence modelling, we would require a statistical model of the relationship between these conditions and the covariates in the prevalence model i.e. with the left hand side of the regression being the probability that an individual has AUDIT band 4 and SADQ band 3 and also a severe enough designated set of psychiatric comorbidities to define 'complex needs', and the right hand side being the age, gender, deprivation etc. of the individual and the UTLA level characteristics e.g. HES rate for alcohol dependence related diagnoses. We did not feel that such a regression was able to be constructed given the lack of clarity on exactly which configuration of existence and severity amongst the 14 conditions identified should constitute the designation 'complex needs'. In summary, the detailed psychiatric comorbidity data on the relatively small numbers of people with alcohol dependence from APMS 2007 did not lend itself to a simple analysis for the purpose of this needs assessment.

In spite of the limitations in the evidence available to estimate prevalence, the research team does not consider the local estimates we have generated to be subject to any systematic bias aside from the issue that homeless people are not sampled in the APMS. We did not conceive of any other substantive reasons for specific biases or a hypothesised direction of bias.

We were asked by one reviewer to explain why we did not use NDTMS access rates per head of population to estimate unmet need and prevalence. If we consdier the logic of including NDTMS access rates per head of population to estimate unmet need and prevalence, it is not really a coherent logic. Firstly, we know that the difference between treatment need and utilisation can be substantial even at a national level. There has been substantial treatment investment in Scotland and we do not believe that prevalence of dependence has suddenly jumped up to match the increased provision and utilisation levels. So why would we think that utilisation of specialist treatment is a useful or unbiased indicator of prevalence locally or by subgroup? Reasons not to use specialist alcohol treatment data to underpin estimates of prevalence of alcohol dependence are as follows. At face value, the extent to which alcohol treatment is utilised within a region may seem to be a useful indicator of alcohol dependence. However, actual uptake of treatment may not reflect actual treatment need for a number of reasons. System factors such as identification and referral processes may differ between areas in unknown ways. Differences in admissions procedures, and the level and mix of services available may reflect factors other than need e.g. local beliefs/judgements about level of appropriate level of service system response, competing funding priorities, service provision being based on historical funding decisions which have not been updated to reflect changing demographic and other factors. Individual factors may also differ by population subgroup. Decisions to seek treatment, even if available, may be influenced by a range of considerations which could vary by sociodemographic characteristics e.g. fear of stigma, self-recognition of a 'problem' requiring treatment, beliefs about effectiveness of treatment, awareness of where and how to access treatment, ability/capacity to access alternatives in the private sector, life circumstances affecting seeking treatment e.g. children and risk of being taken into care. Taking all of these issues together, the research team considers that NDTMS access rates per head of population are not a natural predictor of unmet need or prevalence. Having said all of this, in our suggestions for further work in Chapter 10, we do suggest at least examining whether the access rate to specialist treatment per head of population at GOR level is or is not a statistically significant predictor of levels of AUDIT / SADQ in the regression models for the APMS.

There are several implications of these analyses for national and local policy, planning and commissioning. The data and analyses developed here can be examined in conjunction with data on numbers of clients accessing treatment services using data from the National Drug Treatment Monitoring System, which is also available at a LA level. This will enable

benchmarking of access rates to services per estimated prevalent population in each upper tier LA. This in turn can be utilised to support planning decisions for service developments and commissioning. One can also undertake what-if modelling of changing access rates on future prevalence, costs of services, costs to the NHS and mortality. This capability has now been developed with the spreadsheet modelling tool known as the Sheffield STreAM Scenario Modeller version 1.0, which will be available to LAs through Public Health England. Alcohol dependence and the need for specialist treatment is a complex issue in which client needs and service providers' clinical expertise are crucial interacting components. The estimates produced here are necessarily using quantified tools which summarise and abstract information around harmful drinking behaviours (AUDIT) and levels of severity of dependence related symptoms (SADQ) in a population survey. Additional information may be available in some LAs and could be incorporated into these planning decisions where applicable.

Making use of these prevalence estimates in planning the potential need for specialist treatment still requires the judgement of national and local policy makers, commissioners and service providers. Given that there are limitations in the evidence available to quantify such prevalence estimates, the question arises as to whether the prevalence estimates should be used at national and local level. The only estimates currently available to local commissioners are from the Projecting Adult Needs and Service Information (PANSI) project and are based on a crude age/gender adjusted estimate of APMS 2007 data giving the prevalence of AUDIT score 16+. This used APMS data to provide simple estimates of the numbers of people with alcohol dependence in each LA by applying the national prevalence rates from the APMS to local population data. These estimates ignore the evidence from our study that dependence is statistically related to the rate per population of people being admitted to hospital with ICD diagnosis of dependence / withdrawal symptoms in each LA area. The research team would not recommend ignoring the evidence developed here on LA level factors in favour of simply adjusting for age and gender. The work we have undertaken is a step forward, and in Chapter 10, we set out suggestions for additional data analysis to further investigate different covariates and functional forms for regression models and update the prevalence analyses with 2014 APMS data.

The methods developed here are potentially generalisable to other localities and countries. From a technical perspective, similar statistical modelling could be used to generate prevalence estimates wherever equivalent data on the population age/gender/ deprivation

measure quintiles structure, and on hospital admission rates as measured using ICD10, are available. This is the case in a large number of countries worldwide. In England we used the Index of Multiple derivation (IMD), which is also used in Scotland, Wales and Northern Ireland, but, because it is essentially dividing the population into deprivation group quintiles, one could use other measures of deprivation, provided they are percentile ranked into 5 quintile groups. We would be cautious about direct use of the regression models developed here in other geographies because estimates made would of course only have validity if their local patterns align with the English relationships found between the AUDIT / SADQ and the predictor variables in our statistical modelling. Further work to replicate and test our approach and findings in countries which have surveys similar to APMS would be useful.

4.6 Summary

In summary, this study has developed a method to derive LA estimates of the prevalence of alcohol dependence in England, following principles set out in NICE guidelines and utilising the AUDIT and SADQ measures from the 2007 Adult Psychiatric Morbidly Survey combined with local level data on hospital admissions related to alcohol dependence, demographics and deprivation. The results estimate prevalence of people with alcohol dependence likely to be in need of specialist treatment at around 1.75% of the population for England aged 18+. Local Authority estimates range from the lowest LA estimate (0.90% of the population) to the highest (6.91%) showing a 7-fold variation. To further develop this approach, we strongly advise that AUDIT and SADQ be collected routinely for clients with alcohol problems within the National Drug Treatment Monitoring System. Updating these estimates, comparing different regression models and moving towards estimating confidence intervals when APMS 2014 becomes available is a high priority. We hope that these and further results together with those from the other components of the project will be able to be considered and used by LA service commissioners in England and that the methods can be adapted for other countries internationally.

4.7 Appendices

Appendix 4.1 Alcohol Use Disorders Test (AUDIT)

The Alcohol Use Disorders Identification Test: Interview Version. Read questions as written.

1. How often do you have a drink containing alcohol?
   - 0 points - Never
   - 1 point - Monthly or less
   - 2 points - 2 to 4 times a MONTH
   - 3 points - 2 to 3 times a WEEK
   - 4 points - 4 or more times a w eek

Questioner may skip to Questions 9 and 10 if reply to Question 1 is never, or if both answers to Q 2 and 3 are 0.

2. How many units of alcohol do you drink on a typical day when you are drinking?
   - 0 points - 1 or 2 drinks
   - 1 point - 3 or 4 drinks
   - 2 points - 5 or 6 drinks
   - 3 points - 7 or 8 or 9 drinks
   - 4 points - 10 or more drinks

3. How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year?
   - 0 points - Never
   - 1 point - Less than monthly
   - 2 points - Monthly
   - 3 points - Weekly
   - 4 points - Daily or almost daily

AUDIT-C Score ____/12 (complete full questionnaire if score is 3 or more)

4. How often during the last year have you found that you were not able to stop drinking once you had started?
   - 0 points - Never
   - 1 point - Less than monthly
   - 2 points - Monthly
   - 3 points - Weekly
   - 4 points - Daily or almost daily

5. How often during the last year have you failed to do what was normally expected from you because of drinking?
   - 0 points - Never
   - 1 point - Less than monthly
   - 2 points - Monthly
   - 3 points - Weekly
   - 4 points - Daily or almost daily

6. How often during the last year have you needed an alcoholic drink in the morning to get yourself going after a heavy drinking session?
   - 0 points - Never
   - 1 point - Less than monthly
   - 2 points - Monthly
   - 3 points - Weekly
   - 4 points - Daily or almost daily

7. How often during the last year have you had a feeling of guilt or remorse after drinking?
   - 0 points - Never
   - 1 point - Less than monthly
   - 2 points - Monthly
   - 3 points - Weekly
   - 4 points - Daily or almost daily

8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?
   - 0 points - Never
   - 1 point - Less than monthly
   - 2 points - Monthly
   - 3 points - Weekly
   - 4 points - Daily or almost daily

9. Have you or someone else been injured as a result of your drinking?
   - 0 points - No, never
   - 2 points - Yes, but not in the last year
   - 4 points - Yes, during the last year

10. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down?
    - 0 points - No, never
    - 2 points - Yes, but not in the last year
    - 4 points - Yes, during the last year

The Alcohol Use Disorders Identification Test (AUDIT) Score = ____/40

Appendix 4.2 Severity of Alcohol Dependence Questionnaire (SADQ)

NAME_____AGE_____No._____
DATE:
Please recall a typical period of heavy drinking in the last 6 months.

When was this? Month:……..Year……..

Please answer all the following questions about your drinking by circling your most appropriate response.
During that period of heavy drinking

1. The day after drinking alcohol, I woke up feeling sweaty.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

2. The day after drinking alcohol, my hands shook first thing in the morning.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

3. The day after drinking alcohol, my whole body shook violently first thing in the morning if I didn't have a drink.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

4. The day after drinking alcohol, I woke up absolutely drenched in sweat.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

5. The day after drinking alcohol, I dread waking up in the morning.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

6. The day after drinking alcohol, I was frightened of meeting people first thing in the morning.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

7. The day after drinking alcohol, I felt at the edge of despair when I awoke.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

8. The day after drinking alcohol, I felt very frightened when I awoke.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

9. The day after drinking alcohol, I liked to have an alcoholic drink in the morning.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

10. The day after drinking alcohol, I always gulped my first few alcoholic drinks down as quickly as possible.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

11. The day after drinking alcohol, I drank more alcohol to get rid of the shakes.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

12. The day after drinking alcohol, I had a very strong craving for a drink when I awoke.

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

13. I drank more than a quarter of a bottle of spirits in a day (OR 1 bottle of wine OR 8 units of beers).

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

14. I drank more than half a bottle of spirits per day (OR 1.5 bottles of wine OR 15 units of beer).

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

15. I drank more than one bottle of spirits per day (OR 3 bottles of wine OR 30 units of beer).

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

16. I drank more than two bottles of spirits per day (OR 6 bottles of wine OR 60 units of beer)

ALMOST NEVER *SOMETIMES* *OFTEN* *NEARLY ALWAYS*

Imagine the following situation:
1. You have been **completely off drink for a few weeks**
2. You then drink **very heavily** for **two days**

How would you feel the **morning after** those two days of drinking?

17. I would start to sweat.

NOT AT ALL *SLIGHTLY* *MODERATELY* *QUITE A LOT*

18. My hands would shake.

NOT AT ALL *SLIGHTLY* *MODERATELY* *QUITE A LOT*

19. My body would shake.

NOT AT ALL *SLIGHTLY* *MODERATELY* *QUITE A LOT*

20. I would be craving for a drink.

NOT AT ALL *SLIGHTLY* *MODERATELY* *QUITE A LOT*

SCORE _____

CHECKED BY:
ALCOHOL DETOX PRESCRIBED: YES/NO

NOTES ON THE USE OF THE SADQ

The Severity of Alcohol Dependence Questionnaire was developed by the Addiction Research Unit at the Maudsley Hospital. It is a measure of the severity of dependence. The AUDIT questionnaire, by contrast, is used to assess whether or not there is a problem with dependence.

The SADQ questions cover the following aspects of dependency syndrome:

- physical withdrawal symptoms
- affective withdrawal symptoms
- relief drinking
- frequency of alcohol consumption
- speed of onset of withdrawal symptoms.

Scoring

Answers to each question are rated on a four-point scale:

Almost never -0

Sometimes
1

Often
2

Nearly always -
3

A score of 31 or higher indicates "severe alcohol dependence".

A score of 16 -30 indicates "moderate dependence"

A score of below 16 usually indicates only a mild physical dependency.

A chlordiazepoxide detoxification regime is usually indicated for someone who scores 16 or over.

It is essential to take account of the amount of alcohol that the patient reports drinking prior to admission as well as the result of the SADQ.

There is no correlation between the SADQ and such parameters as the MCV or GGT.

Appendix 4.3 Method to add on Additional Numbers of People with Alcohol Dependence Related to Local data on Homelessness.

The APMS 2007 samples persons living in private households in England and therefore does not include the homeless. While the homeless may not constitute a significant proportion of the population in a given LA, the prevalence of AD in this group is known to be far higher than in the population as a whole. The homeless are also over-represented in those accessing specialist treatment services, since roughly 4% of those accessing were identified as having an urgent housing problem. It is, therefore, important to consider making a separate estimate of the prevalence of homeless and AD by LA.

We have considered a two-stage process of estimating the numbers of homeless with AD in LA. The first is to obtain an estimate of the numbers of homeless people in each LA and the second to apply an estimate of the prevalence of AD among the homeless to this population. For the second step, estimating the prevalence of AD among the homeless, only a single source of data has been identified. This is the APMS from 1994 which sampled 1,100 homeless people aged 16 to 64 years living in hostels for the homeless or other such institutions. Respondents were classified as alcohol dependent if they had three or more positive responses to 12 questions concerning loss of control, symptomatic behaviour and binge drinking. 19.25% of the sample was thus classified as having alcohol dependence. It is not known how this measure relates to other tools, such as the AUDIT or the SADQ.

For the prevalence of homelessness across LAs, no single definitive source of data has been identified. Potentially useful sources of data include; survey data on numbers sleeping rough in LAs; the availability of hostel bed spaces by GOR; and the numbers of households accepted under the homelessness provisions of the 1985 and 1996 Housing Acts, by LA. We have identified the latter as providing probably the best estimate of the prevalence of homelessness, although this is still likely to be an underestimate of the true figure. The nearest data to our baseline year of 2012 which we were able to obtain was for two quarters Statutory homelessness in England: September to December 2011, and January to March 2012.

Some assumptions were necessary in order to obtain an estimate of the prevalence of homelessness in 2012. The numbers accepted as homeless in each quarter were combined to provide a 6-month figure and then doubled to obtain a 12-month estimate looking forward 6-months. Although misaligned with the 2012 calendar year by a quarter, this figure was assumed to be sufficiently close as to provide an estimate of numbers accepted as

homeless in 2012. This process yields the figure of 51,544 households accepted as homeless by LAs in 2012.

We have limited each household to a single person who can potentially have AD and applied 1994 APMS figure of 19.25% of homeless having AD to the numbers for each LA. The resulting estimates typically have a small impact on our estimated prevalence for LAs. The increase in prevalence of AD for LAs after including homelessness was typically in the region of 0.16% in absolute terms (1-2% relative terms), but higher for some LAs especially in London where the prevalence of homelessness is highest. This is a simple approach to estimating the number of homeless people with alcohol dependence, but no more robust alternatives have been identified given the scarcity of relevant data sources.

Appendix 4.4 Detailed Comparison of Statistical Model Estimates with Raw APMS by Age and Gender

The estimates of AUDIT and SADQ distribution at each LA are intended to provide adjustments to a national based estimate. Without adjusting for any of the local factors i.e. age/gender/deprivation of the population structure or for local hospital admission rates, one can calculate simplistic national estimates of prevalence of alcohol dependence by age and gender. Table 4.7 below compares these raw estimates with the results obtained when we use the statistical modelling and adjustment for each LA to estimate prevalence and sum up again to the national total for England

Table 4.7 Raw APMS implied estimates of prevalence by age / gender compared with modelled estimates

	Raw APMS (weighted)	Ordered Probit Model Results
Male		
18-24	3.92%	5.88%
25-34	6.33%	5.64%
35-54	2.17%	2.37%
55+	0.64%	0.92%
Female		
18-24	2.13%	2.41%
25-34	0.81%	0.55%
35-54	0.70%	0.50%
55+	0.11%	0.11%
All Population	1.23%	1.70%

When compared, the statistical modelling estimates are somewhat higher than the raw APMS based estimates. For numbers of people in England with a score AUDIT 20+, the raw sample suggests a prevalence of 1.53% (97 people - 111 sample weighted from a sample of n=7,262 in the APMS), whilst the statistical adjusted model estimates 1.73% i.e. the model suggests an uplift factor of 1.13. For the numbers of people in England potentially in need of specialist treatment, the raw sample suggests a prevalence of 1.43%, (89 people - 104 sample weighted from a sample of n=7,262 in the APMS) whilst the statistical adjusted model estimates 1.70% i.e. the model suggests an uplift factor of 1.18.

When examined by age and gender, the modelled results provide slightly higher prevalence than the raw estimates for three of the male subgroups (males aged 18-24 has the biggest absolute difference, 35-54, and 55+) and slightly lower for the other one, males 25-34. Results for females are closer to the raw estimates – slightly higher for 18-24, and slightly lower for 25-34 and 35-54.

Appendix 4.5 Method and Results using Negative Binomial Count Distribution Approach for the Statistical Model of AUDIT Scores

As the AUDIT scores are integers, and the distribution resembles a count distribution, it is tempting for the analysts to use count data regression methods. Of course, count data regression models are only strictly valid if the numbers are true counts rather than scores – and in the case of AUDIT scores the research team were not fully convinced of the appropriateness of using count regression approaches. Nevertheless, a negative binomial regression was run as an extension to the analysis in order to check that the direction and rough magnitude of the parameters is not defined solely by favoured ordered probit model specification. The negative binomial is an extension of the Poisson regression, allowing for over-dispersion (where the variance is greater than the mean).

The parameter estimates from the negative binomial regression are presented in Table 4.8. As is seen in the ordered Probit regression, age is negatively related to AUDIT score and females are predicted to have lower AUDIT scores. The IMD quintile parameters are significant in the negative binomial (only some of them were in the ordered Probit models) but the pattern is largely the same. Furthermore, the parameter on the HES rate is positive and significant, as it is in the ordered Probit.

Table 4.8 Negative binomial regression results for AUDIT score

Model Parameter	AUDIT Score		
	Beta	SE	P>z
Age group 18-24	-	-	-
Age group 25-34	-0.158	0.050	0.001
Age group 35-54	-0.306	0.046	<0.001
Age group 55+	-0.643	0.045	<0.001
Male	-	-	-
Female	-0.489	0.023	<0.001
IMD Q1	-	-	-
IMD Q2	-0.075	0.034	-2.23
IMD Q3	-0.060	0.036	0.099
IMD Q4	-0.093	0.037	0.012
IMD Q5	-0.180	0.042	<0.001
GOR HES Rate	219	38	<0.001
Constant	2.038	0.059	<0.001
ln alpha	-0.354	0.029	-
alpha	0.702	0.021	-

The main difference between the negative binomial method and the ordered Probit arises when age-gender prevalence estimates are calculated, as shown in Table 4.9.

Table 4.9 Comparing model results for ordered probit versus negative binomial model by age and gender

	Ordered Probit	Negative Binomial	APMS (weighted)
Male			
18-24	5.88%	7.32%	3.92%
25-34	5.64%	7.43%	6.33%
35-54	2.37%	3.12%	2.17%
55+	0.92%	1.03%	0.64%
Female			
18-24	2.41%	3.10%	2.13%
25-34	0.55%	0.65%	0.81%
35-54	0.50%	0.53%	0.70%
55+	0.11%	0.03%	0.11%
All Population	1.70%	2.13%	1.43%

The negative binomial produces results for 18-24 males which are much, much higher than both the raw estimates and the ordered probit model. This may be because the negative binomial does not 'know' that AUDIT is truncated at 40 and instead continues the underlying trend further. At the opposite end of the spectrum, the negative binomial produces lower results for older women. Overall, the negative binomial would estimate 2.13% of people potentially in need of specialist assessment and treatment, considerably higher than the ordered probit estimate.

There are two possible interpretations of this. The first is that the negative binomial model is adjusting for important factors and using the pattern of the relationship between these factors and the AUDIT / SADQ scores across the full sample to better estimate the tails of those distributions. It is certainly plausible that the APMS is much more likely to be under-sampling people with alcohol dependence than it is to be oversampling them. The higher estimates by a factor of around 1.5 could be conceived of as implying an under-sampling rate of 1 in every 3 people in the AUDIT 20+ population (1 in 2.85 people in the potentially in need of specialist treatment population).

The second interpretation is that the statistical model, like any statistical model, uses certain assumptions and mathematical structures that may not reflect reality. The negative binomial distribution for the AUDIT scores, even adjusting for 4 categorical age groups, for gender, for IMD quintile and for average regional hospital admissions related to dependence, still imposes a particular mathematical shape on the distribution. If one believes that the tail of the distribution of AUDIT scores for example is not particularly well represented by those relationships between AUDIT scores across the whole APMS sample, then one might prefer to believe the ordered probit model (or even the raw sample) as the true underlying proportion. The judgement of the research team is that the ordered probit models provide a better statistical modelling approach to estimate prevalence than does the negative binomial model explored in this Appendix.

Appendix 4.6 Prevalence Estimates by Local Authority - Estimated Numbers Prevalent with Alcohol Dependence Potentially in Need of Specialist Treatment in Defined Severity Groups by LA

Local Authority	Mild	Moderate	Severe	Total	Rank	AUDIT 16+
Barking and Dagenham	1160	730	245	2135	87	5103
Barnet	2085	1177	358	3620	115	9207
Barnsley	2357	1802	391	4550	27	10258
Bath and North East Somerset	1367	890	193	2450	77	5979
Bedford	1145	741	215	2101	76	5015
Bexley	1488	917	288	2693	95	6567
Birmingham	10039	7392	2852	20283	24	43379
Blackburn with Darwen	1757	1487	358	3602	9	7598
Blackpool	3040	3606	1170	7816	1	13901
Bolton	2662	1990	512	5164	29	11554
Bournemouth	2461	2105	542	5108	7	10682
Bracknell Forest	574	311	80	965	143	2572
Bradford	4093	2792	612	7497	56	17784
Brent	2530	1728	594	4852	53	11000
Brighton and Hove	3445	2829	836	7110	10	14892
Bristol, City of	4020	2855	659	7534	45	17349
Bromley	1836	1079	409	3324	104	8159
Buckinghamshire	2370	1256	296	3922	149	10733
Bury	1448	977	256	2681	64	6332
Calderdale	1467	947	187	2601	81	6444
Cambridgeshire	4002	2395	648	7045	99	17670
Camden	2425	1822	416	4663	22	10442
Central Bedfordshire	1537	899	210	2646	114	6830
Cheshire East	2724	1769	362	4855	80	11990
Cheshire West and Chester	2336	1482	297	4115	90	10292
City of London	180	196	60	436	2	791
Cornwall	3288	1982	573	5843	105	14666
County Durham	4865	3587	869	9321	39	21217
Coventry	3411	2644	767	6822	18	14732
Croydon	3143	2230	855	6228	40	13653
Cumbria	3286	2005	489	5780	98	14568
Darlington	919	658	136	1713	50	4014
Derby	2142	1506	348	3996	51	9303
Derbyshire	4716	2789	615	8120	110	20970
Devon	3928	2167	476	6571	147	17715
Doncaster	2501	1720	350	4571	59	10893
Dorset	2451	1421	323	4195	125	10956
Dudley	2341	1546	350	4237	73	10273
Ealing	2458	1560	489	4507	74	10715
East Riding of Yorkshire	1764	972	316	3052	139	7953

Local Authority	Mild	Moderate	Severe	Total	Rank	AUDIT 16+
East Sussex	3173	1890	441	5504	117	14179
Enfield	1895	1134	284	3313	100	8360
Essex	7239	4004	1093	12336	141	32556
Gateshead	1789	1289	254	3332	49	7808
Gloucestershire	3658	2145	469	6272	113	16233
Greenwich	1941	1265	299	3505	69	8440
Hackney	2290	1591	599	4480	35	9832
Halton	1410	1142	277	2829	13	6123
Hammersmith and Fulham	1827	1342	354	3523	32	7879
Hampshire	6979	3892	780	11651	142	31367
Haringey	1977	1278	525	3780	61	8579
Harrow	1430	814	180	2424	116	6301
Hartlepool	769	526	108	1403	54	3343
Havering	1196	647	198	2041	145	5373
Herefordshire, County of	1072	605	193	1870	123	4767
Hertfordshire	6178	3491	960	10629	131	27541
Hillingdon	1911	1191	261	3363	89	8369
Hounslow	1716	1040	434	3190	86	7518
Isle of Wight	754	428	87	1269	138	3391
Islington	2411	1868	535	4814	15	10367
Kensington and Chelsea	1260	808	311	2379	67	5461
Kent	8293	4755	1141	14189	127	36995
Kingston upon Hull, City of	3064	2500	717	6281	11	13229
Kingston upon Thames	1221	765	188	2174	78	5302
Kirklees	2983	1909	448	5340	83	13084
Knowsley	1916	1668	410	3994	6	8310
Lambeth	3137	2326	820	6283	23	13531
Lancashire	9120	6063	1305	16488	70	39920
Leeds	7572	5626	1383	14581	28	32723
Leicester	3265	2460	563	6288	25	14109
Leicestershire	3722	2128	511	6361	130	16619
Lewisham	1906	1196	429	3531	84	8362
Lincolnshire	3922	2211	565	6698	136	17601
Liverpool	8117	8118	2289	18524	3	35652
Luton	1737	1219	411	3367	43	7518
Manchester	7931	7364	2021	17316	5	34288
Medway	1534	892	209	2635	121	6811
Merton	1754	1205	262	3221	52	7571
Middlesbrough	2133	2051	557	4741	4	9333
Milton Keynes	1503	886	255	2644	101	6626
Newcastle upon Tyne	3053	2332	547	5932	20	13169
Newham	2760	1880	503	5143	46	11814
Norfolk	5397	3216	783	9396	106	23958
North East Lincolnshire	1080	673	166	1919	93	4748

Local Authority	Mild	Moderate	Severe	Total	Rank	AUDIT 16+
North Lincolnshire	975	562	118	1655	124	4344
North Somerset	1244	736	154	2134	111	5529
North Tyneside	1523	1008	227	2758	75	6684
North Yorkshire	3290	1851	467	5608	135	14751
Northamptonshire	3753	2118	746	6617	128	16796
Northumberland	1871	1094	180	3145	126	8348
Nottingham	3943	3264	931	8138	8	16949
Nottinghamshire	5307	3290	715	9312	97	23419
Oldham	2073	1528	338	3939	34	8990
Oxfordshire	3589	1991	423	6003	137	16002
Peterborough	1458	980	286	2724	57	6331
Plymouth	1785	1116	266	3167	94	7849
Poole	905	535	119	1559	112	4017
Portsmouth	2012	1463	486	3961	31	8682
Reading	1049	635	142	1826	96	4588
Redbridge	1640	948	332	2920	103	7236
Redcar and Cleveland	1132	783	156	2071	58	4938
Richmond upon Thames	1257	764	239	2260	92	5519
Rochdale	1918	1409	366	3693	36	8335
Rotherham	2128	1470	331	3929	55	9296
Rutland	223	131	37	391	108	987
Salford	2471	1888	474	4833	19	10661
Sandwell	2751	1987	579	5317	38	11936
Sefton	3334	2789	659	6782	12	14519
Sheffield	4946	3470	1197	9613	47	21470
Shropshire	1577	860	224	2661	146	7111
Slough	910	566	122	1598	91	3984
Solihull	1112	634	222	1968	132	4983
Somerset	3073	1774	509	5356	122	13723
South Gloucestershire	1558	907	213	2678	120	6923
South Tyneside	1163	779	253	2195	66	5095
Southampton	2178	1503	345	4026	48	9385
Southend-on-Sea	1248	799	175	2222	85	5467
Southwark	2832	2041	593	5466	33	12221
St. Helens	1740	1302	326	3368	30	7554
Staffordshire	5401	3241	730	9372	102	23928
Stockport	2281	1553	330	4164	62	9977
Stockton-on-Tees	1448	956	213	2617	71	6332
Stoke-on-Trent	2693	2115	532	5340	17	11658
Suffolk	4324	2512	605	7441	119	19223
Sunderland	3161	2574	600	6335	14	13751
Surrey	6381	3645	709	10735	134	28483
Sutton	1527	1015	249	2791	63	6642
Swindon	1179	659	144	1982	133	5241

Local Authority	Mild	Moderate	Severe	Total	Rank	AUDIT 16+
Tameside	2390	1903	452	4745	16	10388
Telford and Wrekin	1171	753	195	2119	79	5149
Thurrock	773	413	134	1320	144	3466
Torbay	753	443	104	1300	129	3375
Tower Hamlets	2667	1874	526	5067	26	11344
Trafford	1547	980	240	2767	88	6812
Wakefield	2606	1767	401	4774	68	11410
Walsall	1992	1318	299	3609	72	8722
Waltham Forest	1984	1313	534	3831	60	8621
Wandsworth	2899	2005	640	5544	42	12464
Warrington	1876	1361	321	3558	41	8151
Warwickshire	3359	1989	504	5852	107	14916
West Berkshire	681	347	67	1095	151	3092
West Sussex	4827	2822	726	8375	118	21492
Westminster	2211	1542	476	4229	37	9508
Wigan	2527	1698	408	4633	65	11043
Wiltshire	2458	1346	350	4154	140	11021
Windsor and Maidenhead	708	371	78	1157	148	3174
Wirral	2938	2145	472	5555	44	12808
Wokingham	696	360	59	1115	150	3162
Wolverhampton	2514	1907	527	4948	21	10878
Worcestershire	3443	2017	608	6068	109	15299
York	1501	953	215	2669	82	6562

Appendix 4.7 Prevalence Estimates by Local Authority- Estimated % of the Population Prevalent with Alcohol Dependence Potentially in Need of Specialist Treatment in Defined Severity Groups by LA

Local Authority	% Mild	% Moderate	% Severe	Total % Prevalence	Rank	% AUDIT 16+
Barking and Dagenham	0.86	0.54	0.18	1.58	87	3.78
Barnet	0.75	0.42	0.13	1.30	115	3.30
Barnsley	1.28	0.98	0.21	2.47	27	5.56
Bath and North East Somerset	0.95	0.62	0.13	1.70	77	4.16
Bedford	0.93	0.60	0.17	1.71	76	4.07
Bexley	0.83	0.51	0.16	1.50	95	3.65
Birmingham	1.24	0.91	0.35	2.51	24	5.37
Blackburn with Darwen	1.61	1.36	0.33	3.30	9	6.97
Blackpool	2.69	3.19	1.04	6.92	1	12.31
Bolton	1.25	0.93	0.24	2.42	29	5.41
Bournemouth	1.60	1.37	0.35	3.32	7	6.94
Bracknell Forest	0.65	0.35	0.09	1.10	143	2.92
Bradford	1.06	0.72	0.16	1.94	56	4.59
Brent	1.04	0.71	0.24	2.00	53	4.53
Brighton and Hove	1.53	1.25	0.37	3.15	10	6.60
Bristol, City of	1.17	0.83	0.19	2.20	45	5.06
Bromley	0.75	0.44	0.17	1.36	104	3.34
Buckinghamshire	0.60	0.32	0.08	0.99	149	2.72
Bury	1.01	0.68	0.18	1.86	64	4.40
Calderdale	0.92	0.59	0.12	1.63	81	4.03
Cambridgeshire	0.80	0.48	0.13	1.41	99	3.54
Camden	1.32	0.99	0.23	2.53	22	5.67
Central Bedfordshire	0.76	0.44	0.10	1.30	114	3.37
Cheshire East	0.92	0.60	0.12	1.63	80	4.04
Cheshire West and Chester	0.88	0.56	0.11	1.56	90	3.90
City of London	2.64	2.88	0.89	6.41	2	11.62
Cornwall	0.76	0.46	0.13	1.35	105	3.38
County Durham	1.17	0.87	0.21	2.25	39	5.12
Coventry	1.36	1.05	0.31	2.71	18	5.86
Croydon	1.13	0.80	0.31	2.24	40	4.91
Cumbria	0.81	0.50	0.12	1.43	98	3.60
Darlington	1.11	0.80	0.16	2.08	50	4.87
Derby	1.11	0.78	0.18	2.07	51	4.82
Derbyshire	0.76	0.45	0.10	1.31	110	3.39
Devon	0.64	0.35	0.08	1.07	147	2.89
Doncaster	1.05	0.72	0.15	1.92	59	4.58
Dorset	0.73	0.42	0.10	1.24	125	3.24
Dudley	0.95	0.63	0.14	1.72	73	4.17
Ealing	0.94	0.59	0.19	1.72	74	4.08

Local Authority	% Mild	% Moderate	% Severe	Total % Prevalence	Rank	% AUDIT 16+
East Riding of Yorkshire	0.65	0.36	0.12	1.12	139	2.92
East Sussex	0.74	0.44	0.10	1.29	117	3.32
Enfield	0.80	0.48	0.12	1.40	100	3.53
Essex	0.65	0.36	0.10	1.11	141	2.93
Gateshead	1.12	0.81	0.16	2.09	49	4.89
Gloucestershire	0.76	0.45	0.10	1.31	113	3.38
Greenwich	0.98	0.64	0.15	1.77	69	4.27
Hackney	1.18	0.82	0.31	2.31	35	5.06
Halton	1.44	1.17	0.28	2.90	13	6.27
Hammersmith and Fulham	1.24	0.91	0.24	2.40	32	5.36
Hampshire	0.67	0.37	0.07	1.11	142	2.99
Haringey	0.99	0.64	0.26	1.88	61	4.27
Harrow	0.76	0.43	0.10	1.30	116	3.37
Hartlepool	1.07	0.73	0.15	1.95	54	4.65
Havering	0.64	0.34	0.11	1.08	145	2.85
Herefordshire, County of	0.72	0.41	0.13	1.26	123	3.20
Hertfordshire	0.71	0.40	0.11	1.22	131	3.15
Hillingdon	0.89	0.55	0.12	1.56	89	3.88
Hounslow	0.86	0.52	0.22	1.60	86	3.76
Isle of Wight	0.67	0.38	0.08	1.13	138	3.01
Islington	1.39	1.08	0.31	2.77	15	5.97
Kensington and Chelsea	0.98	0.63	0.24	1.84	67	4.23
Kent	0.72	0.41	0.10	1.23	127	3.20
Kingston upon Hull, City of	1.51	1.24	0.35	3.10	11	6.54
Kingston upon Thames	0.95	0.59	0.15	1.69	78	4.11
Kirklees	0.91	0.58	0.14	1.63	83	3.99
Knowsley	1.69	1.47	0.36	3.52	6	7.32
Lambeth	1.26	0.93	0.33	2.52	23	5.44
Lancashire	0.98	0.65	0.14	1.77	70	4.28
Leeds	1.26	0.94	0.23	2.43	28	5.45
Leicester	1.29	0.97	0.22	2.48	25	5.57
Leicestershire	0.71	0.41	0.10	1.22	130	3.18
Lewisham	0.88	0.55	0.20	1.63	84	3.85
Lincolnshire	0.68	0.38	0.10	1.16	136	3.04
Liverpool	2.13	2.13	0.60	4.87	3	9.37
Luton	1.14	0.80	0.27	2.20	43	4.91
Manchester	1.98	1.84	0.51	4.33	5	8.57
Medway	0.74	0.43	0.10	1.27	121	3.29
Merton	1.11	0.76	0.17	2.04	52	4.80
Middlesbrough	1.99	1.91	0.52	4.43	4	8.71
Milton Keynes	0.79	0.47	0.13	1.40	101	3.50
Newcastle upon Tyne	1.34	1.02	0.24	2.60	20	5.78
Newham	1.18	0.80	0.21	2.19	46	5.04
Norfolk	0.77	0.46	0.11	1.34	106	3.43

Local Authority	% Mild	% Moderate	% Severe	Total % Prevalence	Rank	% AUDIT 16+
North East Lincolnshire	0.86	0.54	0.13	1.53	93	3.79
North Lincolnshire	0.73	0.42	0.09	1.25	124	3.27
North Somerset	0.77	0.45	0.09	1.31	111	3.40
North Tyneside	0.95	0.63	0.14	1.71	75	4.15
North Yorkshire	0.68	0.38	0.10	1.16	135	3.05
Northamptonshire	0.69	0.39	0.14	1.22	128	3.09
Northumberland	0.73	0.43	0.07	1.23	126	3.27
Nottingham	1.60	1.33	0.38	3.31	8	6.90
Nottinghamshire	0.85	0.52	0.11	1.48	97	3.73
Oldham	1.23	0.90	0.20	2.33	34	5.31
Oxfordshire	0.69	0.38	0.08	1.15	137	3.07
Peterborough	1.03	0.69	0.20	1.93	57	4.48
Plymouth	0.86	0.54	0.13	1.53	94	3.79
Poole	0.76	0.45	0.10	1.31	112	3.37
Portsmouth	1.22	0.89	0.30	2.41	31	5.28
Reading	0.85	0.52	0.12	1.49	96	3.73
Redbridge	0.77	0.45	0.16	1.37	103	3.40
Redcar and Cleveland	1.05	0.73	0.14	1.93	58	4.59
Richmond upon Thames	0.85	0.52	0.16	1.53	92	3.75
Rochdale	1.19	0.87	0.23	2.29	36	5.17
Rotherham	1.05	0.73	0.16	1.94	55	4.60
Rutland	0.76	0.45	0.13	1.34	108	3.38
Salford	1.33	1.02	0.26	2.61	19	5.75
Sandwell	1.17	0.84	0.25	2.26	38	5.07
Sefton	1.52	1.27	0.30	3.08	12	6.60
Sheffield	1.12	0.78	0.27	2.17	47	4.84
Shropshire	0.64	0.35	0.09	1.07	146	2.87
Slough	0.88	0.55	0.12	1.54	91	3.85
Solihull	0.69	0.39	0.14	1.21	132	3.07
Somerset	0.72	0.42	0.12	1.26	122	3.22
South Gloucestershire	0.75	0.43	0.10	1.28	120	3.31
South Tyneside	0.98	0.66	0.21	1.85	66	4.28
Southampton	1.13	0.78	0.18	2.09	48	4.88
Southend-on-Sea	0.91	0.58	0.13	1.62	85	3.98
Southwark	1.21	0.87	0.25	2.34	33	5.24
St. Helens	1.25	0.93	0.23	2.41	30	5.41
Staffordshire	0.79	0.48	0.11	1.37	102	3.51
Stockport	1.02	0.70	0.15	1.87	62	4.47
Stockton-on-Tees	0.96	0.64	0.14	1.74	71	4.21
Stoke-on-Trent	1.38	1.08	0.27	2.74	17	5.97
Suffolk	0.74	0.43	0.10	1.28	119	3.31
Sunderland	1.43	1.16	0.27	2.87	14	6.22
Surrey	0.71	0.41	0.08	1.20	134	3.19
Sutton	1.02	0.68	0.17	1.86	63	4.44

Local Authority	% Mild	% Moderate	% Severe	Total % Prevalence	Rank	% AUDIT 16+
Swindon	0.72	0.40	0.09	1.20	133	3.19
Tameside	1.39	1.11	0.26	2.76	16	6.05
Telford and Wrekin	0.91	0.59	0.15	1.65	79	4.00
Thurrock	0.64	0.34	0.11	1.10	144	2.88
Torbay	0.71	0.42	0.10	1.22	129	3.17
Tower Hamlets	1.30	0.91	0.26	2.47	26	5.52
Trafford	0.88	0.56	0.14	1.57	88	3.87
Wakefield	1.01	0.68	0.15	1.84	68	4.40
Walsall	0.96	0.64	0.14	1.74	72	4.20
Waltham Forest	0.99	0.66	0.27	1.92	60	4.32
Wandsworth	1.15	0.80	0.25	2.21	42	4.96
Warrington	1.18	0.85	0.20	2.23	41	5.11
Warwickshire	0.77	0.46	0.12	1.34	107	3.42
West Berkshire	0.57	0.29	0.06	0.92	151	2.60
West Sussex	0.74	0.43	0.11	1.29	118	3.31
Westminster	1.19	0.83	0.26	2.27	37	5.10
Wigan	1.01	0.68	0.16	1.85	65	4.40
Wiltshire	0.66	0.36	0.09	1.11	140	2.95
Windsor and Maidenhead	0.63	0.33	0.07	1.03	148	2.81
Wirral	1.16	0.85	0.19	2.20	44	5.07
Wokingham	0.58	0.30	0.05	0.92	150	2.62
Wolverhampton	1.29	0.98	0.27	2.54	21	5.59
Worcestershire	0.76	0.44	0.13	1.34	109	3.37
York	0.92	0.58	0.13	1.63	82	4.00

5 Using routine administrative data from specialist alcohol treatment services in England to estimate client severity of dependence, complex needs and treatment pathways

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5.1 Abstract

Introduction: Clinical guidelines in England and Wales for the specialist treatment of alcohol dependence specify treatment pathways which should be followed according to severity of dependence and concurrent complex needs. A current project to develop a service system planning model for England requires estimates of the need for specialist alcohol treatment in relation to existing service provision. In this paper, our aim is to quantify specialist alcohol treatment provision, and to determine the extent to which clients follow treatment pathways that reflect clinical guidelines and the outcomes of their treatment journeys.

Methods: National Drug Treatment Monitoring System (NDTMS) data were analysed to identify treatment pathways for 60,947 clients entering treatment for alcohol use. Information was extracted from each client's most recent treatment journey ending in 2013/2014, including levels of alcohol consumption, presence of complex needs, intervention type and setting, treatment start and end dates, and outcomes. Using national clinical guidelines as a framework for defining treatment pathways, we examined what proportion of clients followed a recommended pathway and how these related to levels of alcohol consumption and the presence of complex needs.

Results and conclusion: Although the greatest proportion of clients consumed alcohol at a level consistent with 'moderate' alcohol dependence (16 or more units a day), over three quarters received 'community psychosocial treatment only'; the recommended pathway for 'mild' dependence. Even amongst the small group with the most severe alcohol use and

additional complex needs, three quarters received community psychosocial treatment only. These results suggest that service system planning should not only address overall service availability and capacity, but also the intensity of treatment provided within those services.

5.2 Introduction

It is well-established that excessive alcohol consumption is associated with a wide range of health and social harms [53]. For some people, continued regular use at high levels is associated with the development of alcohol dependence. The syndrome of dependence has been defined in International Classification of Diseases, 10th Revision (ICD-10) [37] as "a cluster of behavioural, cognitive, and physiological phenomena that develop after repeated substance use and that typically include a strong desire to take the drug, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to drug use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state".

In some individuals, alcohol dependence may resolve over time without any specific intervention: this is referred to as 'natural remission' or 'maturation' [54]. However, many others seek or may be referred for formal treatment to help change their alcohol use, or in an effort to address the negative consequences that may have accrued in terms of their physical and mental health, social relationships, capacity to work and financial and housing situation. There is a large body of evidence to suggest that 'best practice' treatment delivered by a competent practitioner is both effective and cost-effective[38].

5.2.1 **Treatment guidelines**

In England and Wales, the best available evidence for the effectiveness of treatment has been synthesised in order to produce National Clinical Practice Guideline 115 [1] (hereafter referred to as CG115), endorsed by the National Institute for Health and Care Excellence (NICE). These guidelines are intended to provide advice as to the diagnosis, assessment and management of alcohol dependence. An important feature of CG115 is that the recommended treatment intensity increases with severity of alcohol dependence and presence of concurrent medical and social problems (i.e. 'complex needs').

For the purposes of diagnosis and assessment of alcohol dependence, CG115 outlines the potential usefulness of several well-established psychometric tools. The Alcohol Use Disorders Identification Test (AUDIT) [6] is suggested for the identification of likely alcohol dependence and the Severity of Alcohol Dependence Questionnaire (SADQ) [7] for

measurement of its severity. The CG115 guidelines, read in conjunction with the companion 'quick reference guide'[55], suggest the following treatment criteria. Treatment for *mild dependence/harmful drinking* should be considered for those scoring 16-19 on the AUDIT and/or who consume on average <16 units of alcohol per day. People with moderate dependence (i.e. an AUIDIT score of 20+and/or who consume 16-30 units per day, and SADQ score 16-30) should be considered for treatment which includes community based detoxification, followed by psychosocial intervention accompanied by pharmacological relapse prevention intervention. For those with severe dependence (indicated by drinking >30 units a day or an AUDIT score 20+ and SDAQ score >30) and those with moderate dependence with complex needs inpatient or residential detoxification with more intensive community psychosocial intervention and pharmacological relapse prevention are recommended. For homeless clients with moderate or severe dependency, residential rehabilitation is recommended. In addition to consideration of severity of dependence, CG115 also recommends that additional complex needs be factored in when planning treatment with a client. Although CG115 does not identify a standardised tool with which to identify complexity, examples of the type of issues likely to necessitate a more intensive treatment response are listed, including "psychiatric comorbidity, poor social support or homelessness." [1, p. 206]

CG115 outlines several potential treatment pathways on the basis of severity of alcohol dependence and the presence or absence of complex needs. A diagram representing the recommended pathways is shown in Figure 5.1, although it should be noted that this is a simplified representation of all possible pathways as the subcomponents of treatment are not fully outlined, nor does it show client history information which may affect clinical decision making, such as previous treatment attempts. Clients fitting the criteria for mild dependence, irrespective of whether they have complex needs, are recommended to receive specialist community-based psychosocial treatment only. The suggested AUDIT threshold for this group is below 20 (i.e. below the threshold indicative of probable dependence which may require specialist treatment)[1] However, a clinical advisor to our project noted many people in this group may have already tried to reduce their alcohol use with the aid of an intervention delivered in a non-specialist setting and have therefore entered the specialist treatment service system because less intensive interventions have not been effective. For those with moderate dependence, but without complex needs, the suggested treatment is pharmacologically-assisted withdrawal in a community setting. Treatment may also include psychosocial intervention and relapse prevention medication. For those with severe dependence, or moderate or severe dependence with complex needs,

it is recommended that pharmacologically-assisted withdrawal be undertaken in an inpatient or residential setting with ongoing psychosocial support and relapse prevention medication. Given that clinical guidelines such as CG115 are usually based on evidence for the effectiveness and cost-effectiveness of treatment, it would seem ideal that all people seeking treatment for alcohol dependence receive all recommended components of that treatment and in the suggested setting. However, the actual treatment undertaken, including whether or not it is consistent with clinical guidelines may depend on a number of factors other than severity of dependence and concurrent complex needs upon presentation. These might involve systemic or service issues (such as the availability of that treatment type and the opportunity for the individual to access it either in terms of geography or timeliness), clinician factors (such as experience with previous similar presentations), and client level factors (for example, preference for community-based or residential treatment setting, ability to navigate system) [56-59].

5.2.2 **Treatment access**

While there are multiple factors influencing the choice of treatment, the quantum of treatment resources available is undoubtedly a crucial system-level constraint on the treatment received. Evidence suggests an undersupply of specialist alcohol treatment services in England relative to need and inequity in their distribution: the 2004 Alcohol Needs Assessment Research Project (ANARP) estimated the prevalence of alcohol dependence among people aged 16-64 years to be 3.6%, or 1.1 million people[5]. At that time, however, only 1 in 18 (5.6%) people with alcohol dependence received specialist alcohol treatment per annum, with tenfold regional variation in the prevalence to service utilisation ratio (hereafter referred to as 'access rate') from as low as 1 in every 102 alcohol dependent persons accessing specialist treatment (North East England) up to 1 in 12 (North West England). The 2009 Scottish Alcohol Needs Assessment (SANA) found an even greater prevalence of alcohol dependence (4.9%), although with higher national treatment access rates compared to England of 1 in 12.1 (8.2%), with regional variation from a low of 1:18.3 (Highlands and Islands) up to 1:7.6 (Greater Glasgow)[60]. Reported access rates in both England and Scotland were poor in comparison to the benchmark suggested by the 1990 Canadian work of Rush[4] regarding the proportion of the in-need proportion of the population for whom specialist alcohol services should be planned (note: subsequent investment in the Scottish alcohol treatment system has seen substantial increases in the availability and uptake of treatment in that country[61]). In the Rush study, 1 in 10 people (i.e.

"problem drinkers and alcohol dependent drinkers") accessing treatment was considered a low access rate and 1 in 5 a high access rate[4].

To estimate the overall required capacity of the alcohol treatment service system, Rush argued that in addition to calculating treatment access rates, it is also necessary to understand the likely demand for each *component* of treatment (e.g. detoxification, outpatient treatment), which in turn requires an understanding of how people progress through treatment, including the proportion who drop-out[4]. Neither the ANARP nor SANA project disaggregated demand for specialist alcohol treatment according to its component parts or examined client pathways through care. However, the authors identified this as a necessary next step to assist with service system planning.

5.2.3 **Treatment commissioning**

In England, responsibility for the commissioning of alcohol interventions and services currently lies with Local Authorities, and it is intended that *"Specialist treatment should be accessible, matched to local need and NICE-compliant"* [8] (i.e. in accordance with CG115). To support Local Authorities in achieving this intention, Public Health England (PHE) have produced planning resources[8, 62, 63], for example, a good practice guide which outlines the principles for commissioning[62] and a support pack including locally relevant data on alcohol related harms (e.g. hospitalisations, deaths) and treatment statistics (e.g. interventions provided, client characteristics such as drinking patterns and homelessness)[63]. While these resources are comprehensive in their coverage of the types of information that should be considered in commissioning decisions, they are static. Local Authorities can see how they compare with other like areas in terms of alcohol-related harms, treatment interventions provided and treatment outcomes, but they cannot estimate the likely effects of altering the overall level, or importantly, the mix of treatment interventions delivered. A recent review of alcohol and drug commissioning noted that those with the responsibility for commissioning services wanted *"improved access to evidence-based information and **models** to improve procurement and enable needs based service design"* [9, p. 17] (emphasis added). There is therefore a need for a treatment capacity planning tool to assist in resource allocation decision-making regarding the level and mix of services in relation to the prevalence and severity of alcohol dependence in the population.

5.2.4 **The Specialist Alcohol Treatment Capacity Project**

To support future specialist alcohol treatment commissioning planning and resource allocation decisions, we were commissioned by the Department of Health to develop a

service system planning tool for England (both nationally and for 151 local areas). The tool requires estimates of the potential need for specialist alcohol treatment (that is, population level prevalence of alcohol dependence) in relation to current service provision. This paper reports on the second aspect: quantification of current treatment provision, including, as recommended by the ANARP report[5], examination of pathways through treatment. Specifically, our aim is to quantify the current level and mix of specialist alcohol treatment provision nationally and further, to relate this to treatment outcomes. Actual 'treatment pathways' taken by clients are identified and these are examined in relation to CG115 recommended specialist alcohol treatment pathways for different levels of severity of dependence and in the presence or absence of additional complex needs.

5.3 Methods

5.3.1 **Data source**

National Drug Treatment Monitoring System (NDTMS) data were analysed to identify treatment pathways for alcohol dependent clients. The NDTMS is the centralised reporting system for all publicly funded structured treatment (i.e. specialist community-based and/or specialist residential) alcohol and drug treatment providers in England [64]. Relevant data fields examined to determine inclusion in the analysis were age, primary problem substance (recorded at first triage), adjunctive problem substance(s) and interventions delivered (i.e. treatment type). Throughout this section a treatment 'journey' refers to a series of one or more adjoining structured treatment episodes, either overlapping in time or separated by fewer than 22 days between discharge and treatment start dates, while a treatment 'pathway' refers to the nature and sequencing of interventions received within a journey.

5.3.2 **Case selection**

Records were extracted for clients aged 18-99 years at journey start and who reported alcohol as their primary problem substance and did not report adjunctive opiate use. Exclusion of cases reporting adjunctive opiate use is consistent with the alcohol and drug treatment reporting conventions of Public Health England [65]. As there were modifications to the NDTMS coding system in November 2012, including a differentiation of whether pharmacotherapy provided is for withdrawal or relapse prevention, we used only those cases for which the treatment intervention was recorded as per the latest coding system.

We initially extracted data for all such clients who were in treatment in 2013/2014 (n = 78,055). However, as we were particularly interested in the complete treatment pathway, we looked at only the subset whose most recent treatment journey **ended** in 2013/2014. This resulted in 60,947 individual treatment journeys for analysis.

5.3.3 **Classification of clients to severity of dependence and complexity group**

As noted earlier, the treatment guidelines (CG115) differentiate between four groups or 'clusters' of clients according to the severity of dependence and complexity of their presentation as shown in Table 5.1. To consider each treatment pathway taken in relation to CG115, it was necessary for us to assign each client journey in the analysis to one of the four severity groups. As the NDTMS does not include AUDIT or SADQ scores, we were not able to directly ascertain 'severity of dependence'. Instead we constructed an indicator of 'alcohol consumption level' using self-reported alcohol consumption in the last 28 days. Specifically, we categorised the average number of units of alcohol drunk per drinking day in the last 28 days into three groups (0-15 units, 16-30 units, 31 units plus). To allow for clustering of cases as per CG115, these groups were then considered as proxies for mild, moderate and severe dependence respectively as there is evidence to indicate that higher levels of consumption are positively correlated with dependence [66] and these were consistent with daily consumption cut-offs identified in NICE CG115 as being clinically associated with different levels of severity of dependence. Consideration was given to also using the number of days on which alcohol was consumed in the last 28 (range 0 to 28) as a variable by which to categorise clients. However, detailed examination of the distribution of these data in conjunction with the number of alcohol units consumed did not reveal clear cut points for defining categories. We did not apply age and gender specific thresholds for alcohol consumption level: as although CG115 suggests that consideration should be given to these factors, it does not give specific advice as to how to adjust for them.

The NDTMS also lacks a single field indicating complex needs, although the PHE Alcohol Client Profiling Tool identifies ten potential 'compounding factors' (opiates or crack recorded as adjunctive drug problem, another drug recorded as adjunctive drug problem, three or more alcohol treatment journeys, housing issue, dual diagnosis, unemployed, referral from criminal justice system, live with children, pregnant, or also have a primary drug treatment journey). As these factors differ widely in their likely prevalence among those entering treatment (e.g. unemployment is common and pregnancy is comparatively rare) and also in the extent to which their presence is likely to influence clinical decision making, clinical

advice was sought regarding which NDTMS variables were the most relevant to include as a complex needs indicator. With clinical advice, we defined 'complex needs' as the presence of one of the following at first triage for the treatment journey: dual diagnosis of mental health problems (yes/no); urgent housing problem (no fixed abode); adjunctive use of benzodiazepines (yes/no). Clearly, while this is likely to be an underestimate of the true prevalence of the full range of potential complex needs, it is the only available data on complexity provided by NDTMS. It also does not take account of potential under-identification of complex needs by services reporting to NDTMS.

Having defined our 'alcohol consumption level' and 'complex needs' indicators, these were then used to construct four Severity Groups aligned with the above CG115-derived definitions. Clinical advisors to the project reviewed the final categorisation into Severity Groups and determined that while the data available to us did not map directly onto CG115-recommended tools for assessing severity of dependence, we had developed reasonable proxies for this and complex needs within the limitations of the available data, as shown in Table 5.1.

5.3.4 **Estimation of treatment pathways**

The 'treatment pathway' of each treatment journey was also constructed using NDTMS data regarding treatment interventions and settings. As this involved complicated combination of relevant data fields, detail of how this was achieved is included in Appendix 5.1. We defined 22 treatment pathways which can be categorised into four broad groups: community-based psychosocial treatment only, community-based psychosocial treatment with pharmacotherapy (withdrawal support and/or relapse prevention), inpatient treatment (with or without community treatment), and residential treatment (with or without community treatment). We also considered treatment outcomes (treatment complete alcohol free, treatment complete with moderated non-problematic drinking, transferred, dropped out/left, and died) by severity grouping and treatment pathway.

5.4 Results

Client characteristics

Most (58%) of the 78,055 clients who entered treatment during the year 2013/14 clients were aged between 35 and 54 years (Table 5.2). Almost two thirds (64.2%) were male, with a similar age distribution for males and females.

Treatment pathways

Treatment pathway data was available for 60,947 clients who ended treatment in 2013/14. Of these, 36% of clients were in Severity Group 1, 33% in group 2, 15% in group 3 and 14% in group 4. The remaining clients could not be assigned to a Severity Group due to missing data regarding alcohol consumption. The majority (77%) of treatment pathways were for community psychosocial treatment only (Table 5.3). Other forms of community psychosocial treatment accounted for 13.6% of clients and mostly included an element of pharmacotherapy. Only 7.5% of clients undertook some form of inpatient treatment and 1.8% some form of residential treatment. Although most clients (61%) had an average alcohol consumption level of 16 or more units a day, on days on which alcohol consumed in the last 28 (our proxy threshold for 'moderate' alcohol dependence), two thirds (77.4%) received 'community psychosocial treatment only'; the recommended pathway for 'mild' dependence.

As expected, the proportion of clients taking each broad treatment pathway (combining inpatient and residential pathways) varied according to client Severity Group (combining groups 3 and 4), with the proportion of people in more intensive treatments increasing with severity (Figure 5.2). According to guidelines, only Severity Group 1 should receive community based psychosocial intervention alone and this occurred for 84.7% of Severity Group 1 cases. However, more than two thirds of the clients in all other groups also received this low-intensity intervention (73.7%, 67.9% and 76.2% for Groups 2, 3 and 4 respectively). Similarly, while inpatient or residential treatment is not generally recommended for Severity Group 1, 5% of this cluster had such treatment recorded, compared to 16.1% and 11.5% for Severity Groups 3 and 4 respectively, for whom residential treatment is recommended by CG115. These broad results, shown in Figure 5.2 (with Severity Groups 3 and 4 combined and inpatient and residential treatment combined) suggest an apparent misalignment between the classification of clients based on triage data and the treatment pathways they subsequently took.

The specific treatment pathways taken by clients in relation to their assigned Severity Group are shown in Table 5.4. We have shaded each cell according to whether the intersection between Severity group and treatment pathway is consistent with that suggested by CG115. Those cells which are unshaded represent seemingly 'appropriate' pathways and those shaded dark grey represent pathways which are not indicated for clients in that particular Severity Group. The cells shaded light grey indicate pathways that may or may not be appropriate. The uncertainty is because the person may have discontinued the intended treatment journey early, the first part of which would be appropriate if it then led on to a second or third part, which in the end was not received. When these three categories are summed and considered as a proportion of the total, 35.4% journeys are 'appropriate', 11.5% are 'not appropriate' and the appropriateness of the remaining 53.1% is unable to be definitively determined. It should be noted that while CG115 recommends Severity Group 1 clients receive community psychosocial intervention only, we have here considered such treatment in conjunction with community based pharmacotherapy for withdrawal or relapse prevention as 'appropriate' as clinical advice to this project indicates that such support may be offered where considered potentially useful, for example, if the client has in the past attempted to reduce their use without success.

We have also considered the relationship between the treatment pathway, Severity Group and treatment outcome. This is summarised in Table 5.5 and Figure 5.3 for each Severity Group by broad pathway (or treatment setting) and by the proportion completing treatment either alcohol free or with moderated non-problematic drinking. The proportion of people in each Severity Group assigned to that type of treatment is also shown as a black dot for comparative purposes. These data indicate, perhaps unsurprisingly, that a greater proportion of clients receiving treatment in inpatient and residential settings leave abstinent from alcohol compared to other settings, irrespective of Severity Group. The same data in greater detail (i.e. shown by all 22 pathways and including the proportion that represented for treatment within 6 months) is shown in Figure 5.4. From this it may be seen that a greater proportion of people who leave community psychosocial treatment (with or without pharmacotherapy) report at least occasional alcohol use compared with treatment in inpatient and residential settings. Data by all 22 pathways including outcomes for those who did not complete treatment [transferred or dropped out/left/died]) is shown in Appendix 5.2. The proportion of clients leaving treatment having successfully completed according to whether or not they completed an 'appropriate' treatment pathway is shown in Appendix 5.3. According to these data, across all Severity Groups and all pathways, approximately two thirds of people left treatment having successfully completed. 67% of clients following

'appropriate' pathways achieved successful outcome, compared with 56% for clients on pathways whose 'appropriateness is unknown', whilst the relatively small proportion of cases following 'not appropriate' pathways still achieved 66% success.

5.5 Discussion and Conclusion

Our study shows that routinely collected alcohol treatment data has the potential to inform capacity planning for the specialist service system, although further consideration may need to be given to which fields are included in the NDTMS database to fully realise this potential. At a national level, it was possible to construct indicators of both the estimated level of alcohol consumption (as a proxy for dependence) and complexity of client presentation to allow assignment to estimated Severity Groups, and also to identify treatment pathways taken. Although not presented here, these data are also available at a local area level which is crucial for local planning and commissioning purposes. Understanding the current mix of both presenting clients and their ensuing treatment is critical to modelling the likely impact of future changes to service capacity. We found a lack of alignment in some cases between recommended treatment pathways for people with different clinical characteristics and the actual treatment received. This requires further consideration. Three potential areas for discussion emerge: the degree to which our grouping of clients and/or definition of pathways was accurate; other factors contributing to the selection of treatment pathways which are obscured in our analyses; and potential lack of existing treatment capacity availability appropriate to the severity of presentations seen in alcohol services, which has implications for the translation of clinical guidelines into practice.

Firstly, while NDTMS has wide coverage of the service system, including all publicly funded specialist alcohol treatment services in England and the clients who attend them, data from standardised tools for the identification and measurement of severity of dependence such as AUDIT and SADQ are not available. We therefore used a proxy measure to categorise clients according to their alcohol consumption. Although quantity of alcohol use (akin to our measure 'the average number of alcohol units consumed on days on which alcohol consumed in the last 28 days'), is known to correlate with dependence[66], it may offer less precision in classifying clients according to their alcohol consumption and dependence than standardised validated tools would. Further, it is known that drinking in the days and weeks immediately prior to treatment entry may not represent the typical drinking pattern of the individual[67]. It would therefore be useful to have not only information on recent drinking, but also 'usual' patterns of consumption. Similarly, our measure of complex needs, while

including three components noted as relevant in CG115, may only partially reflect the complexity of clients' lives. Our measure is therefore likely to underestimate complex needs. It is not clear to what extent improved measures of dependence and inclusion of additional complex needs data would alter the severity grouping of clients within NDTMS data, but it may be assumed that our findings are conservative (i.e. it is possible that an even greater proportion of clients on pathways of lesser intensity have complex needs).

Secondly, there may be additional factors besides those above which are taken into account in selecting a treatment pathway which our analysis did not capture, but which could render pathways we identified as 'appropriate' as 'inappropriate' and vice versa. For example, previous unsuccessful treatment attempts, previous withdrawal in a service that does not report to NDTMS (such as hospital) or client preferences for a particular treatment setting may be taken into account when planning treatment. At a broad planning level, it is unlikely that all possible scenarios for allocation to pathway could be modelled, although it may be useful in a reporting sense to understand why a person, for whom one pathway would apparently be appropriate on the basis of their Severity Group upon presentation, ultimately took a different pathway. If client Severity Group were recorded at intake, it may also be useful to record the primary reason for selecting a non-recommended treatment pathway. There would also be advantages to linking NDTMS data with other health datasets, in particular, hospital data, to allow identification of previous withdrawal, for example.

Thirdly, even with greater precision in allocating clients to Severity Group and a better understanding of why some clients may take a seemingly non-recommended treatment pathway, it is likely that at least some of the apparently 'inappropriate' treatment journeys identified in our analysis were in fact just that; inappropriate given the nature of the alcohol dependence problem and other life circumstances of the individual. The distribution of cases in the dataset implies that this more often involved provision of treatment of insufficient intensity given the client characteristics at presentation, for example, the appearance of many Severity Group 3 and 4 clients on community based pathways, rather than more intense pathways than recommended in CG115. It is not clear to what extent this is due to the unavailability of suitable treatment options (e.g. clinicians able to prescribe, access to inpatient beds, or funding for residential rehabilitation), or other factors relating to clinical competence (such as lack of awareness of or willingness to implement guidelines, insufficient assessment processes), or client preferences. Similarly, our results show limited community prescribing of relapse prevention medication for Severity Group 2 clients. This is consistent with what is already known about the uptake of this treatment option: in relation to the evidence for the effectiveness and cost-effectiveness of such pharmacotherapy,

prescribing rates are low [1]. Nevertheless, acamprosate prescribing has doubled in the last 10 years in England (around 130,000 prescription items in 2013) and is now the most commonly prescribed relapse medication[68]. If this trend continues, future analyses of client pathways may show an increase in use of this intervention.

The CG115 guidelines are the product of a thorough review of evidence for the effectiveness and cost-effectiveness of different treatment interventions, followed by a clinical consensus process to synthesise the evidence into recommended pathways for different severities of alcohol problem; pathways which were then subject to national consultation with key stakeholders[1]. They should therefore be regarded as 'best practice' rather than 'minimum standards for practice'. In a related component of the our project, an updated review of the evidence for specialist alcohol treatment has been undertaken (see section 3.3 of this report), and it should be expected that clinical guidance will continue to evolve as further evidence becomes available or new treatments are developed and evaluated (particularly pharmacotherapies).

Guidelines provide a broad framework of evidence based approaches and clinical pathways rather than mandatory 'rules' for practice. In addition to severity of dependence and complex needs, CG115 recommends that the ultimate selection of treatment for individual clients should also be informed by clinical judgement and tailored to individual client needs, preferences and circumstances, so some discrepancy between recommended practice and actual practice as reflected in NDTMS data is to be expected, although we had no a-priori estimate of what the magnitude of this might be. A question for future research then is how to better understand *why*, according to our analysis, approximately 11% of treatment recorded in NDTMS is apparently inconsistent with CG115 and a further 53% uncertain. That is, how much of the discrepancy between recommended and actual treatment can be attributed to service system level factors, such as inadequate treatment availability and capacity relative to the needs of the catchment population or the configuration of services, versus clinician or client level factors. While the treatment outcomes (alcohol free or occasional use) reported here are promising, it is important to realise these are short term outcomes only, and further, that comparisons between outcomes for different settings need to be interpreted with caution given that abstinence after 6 months in community based treatment (i.e. while the person is still living in the community) is qualitatively different to abstinence following a comparatively brief stay in a residential facility, in relative isolation from daily life.

This work represents an important first step in informing the specialist alcohol treatment capacity planning for England. Improving the information tools available to those with

responsibility for commissioning treatment has potential for not only identifying and addressing inequities between areas in overall treatment access rates, but also in determining how to refine the treatment mix offered. Increased treatment rates should in turn affect the underlying prevalence of alcohol dependence in the population and thereby related harms[69, 70].

5.6 Appendices

Table 5.1 Features of 4 client alcohol dependence and complex needs Severity Groups according to CG115 and their operational definitions utilising NDTMS data

Severity Group	Features of client Severity Groups according to National Clinical Practice Guidelines (CG115)	Operational definitions of Severity Groups utilising NDTMS triage data
1	• Mild dependence • With OR without complex needs	• 0-15 units/day • 0-3 indicators of complex needs
2	• Moderate dependence • WITHOUT complex needs	• 16-30 units/day • 0 indicators of complex needs
3	• Severe dependence • WITHOUT complex needs	• 31+ units/day • 0 indicators of complex needs
4	• Moderate OR severe dependence • WITH complex needs	• 16-30 units/day OR 31+ units/day • 1-3 indicators of complex needs

Table 5.2 Treatment journeys included in analysis by age and sex

Age group in years	Male		Female		Total	
	n	%	n	%	n	%
18-24	2749	5.48	1680	6.02	4429	5.67
25-34	10171	20.28	5182	18.56	15353	19.67
35-54	28994	57.82	16239	58.18	45233	57.95
55+	8228	16.41	4812	17.24	13040	16.71
Total	50142		27913		78055	

Table 5.3 Most recent treatment journey ending in 2013-2014 by NDTMS-estimated treatment pathway

Broad treatment pathway	Specific treatment pathway	n	% specific pathway	% broad pathway
Community psychosocial ONLY	1. Community psychosocial only	46945	77.0	77.0
Community psychosocial AND other community treatment	2. Pharmacotherapy: relapse prevention	1552	2.5	13.6
	3. Pharmacotherapy: withdrawal	1653	2.7	
	4. Pharmacotherapy: withdrawal & relapse prevention	945	1.6	
	5. Pharmacotherapy: other (non-standard)	2952	4.8	
	6. Other community psychosocial	1214	2.0	
Inpatient	7. Inpatient psychosocial treatment only	93	0.2	7.5
	8. Inpatient psychosocial treatment followed by community psychosocial treatment	36	0.1	
	9. Pharmacotherapy: Assisted withdrawal	1262	2.1	
	10. Pharmacotherapy: Assisted withdrawal then community psychosocial treatment	841	1.4	
	11. Pharmacotherapy : Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment	869	1.4	
	12. Pharmacotherapy: other (non-standard)	261	0.4	
	13. Composite inpatient treatment[1]	159	0.3	
	14. Other inpatient	997	1.6	
Residential	15. Residential psychosocial treatment only	548	0.9	1.8
	16. Residential psychosocial treatment followed by community psychosocial treatment	80	0.1	
	17. Pharmacotherapy: Assisted withdrawal	157	0.3	
	18. Pharmacotherapy: Assisted withdrawal then community psychosocial treatment	91	0.1	
	19. Pharmacotherapy : Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment	44	0.1	

20. Pharmacotherapy: other (non-standard)	27	0.0	
21. Composite residential treatment[1]	16	0.0	
22. Other residential	205	0.3	
Total	60947	100.0	100.0

[1] *i.e. more than one non-overlapping period of residential treatment*

Table 5.4 Most recent treatment journey ended in 2013-2014 by NDTMS-estimated Severity Group and treatment pathway

		Severity Group 1		Severity Group 2		Severity Group 3		Severity Group 4		Unknown		Total	
Broad pathway	Specific treatment pathway	n	%	n	%	n	%	n	%	n	%	n	%
Community psychosocial ONLY	**1. Community psychosocial only**	**18762**	**84.7**	**14670**	**73.7**	**6171**	**67.9**	**6392**	**76.2**	**950**	**66.8**	**46945**	**77.0**
Community psychosocial AND other community treatment	2. Pharmacotherapy: relapse prevention	548	2.5	554	2.8	239	2.6	190	2.3	21	1.5	1552	2.5
	3. Pharmacotherapy: withdrawal	415	1.9	728	3.7	298	3.3	202	2.4	10	0.7	1653	2.7
	4. Pharmacotherapy: withdrawal & relapse prevention	203	0.9	428	2.1	164	1.8	133	1.6	17	1.2	945	1.6
	5. Pharmacotherapy: other (non-standard)	833	3.8	1011	5.1	472	5.2	381	4.5	255	17.9	2952	4.8
	6. Other community psychosocial	268	1.2	484	2.4	280	3.1	129	1.5	53	3.7	1214	2.0
	Total community psychosocial AND other community treatment	**2267**	**10.3**	**3205**	**16.1**	**1453**	**16.0**	**1035**	**12.3**	**356**	**25.0**	**8316**	**13.6**
Inpatient	7. Inpatient psychosocial treatment only	37	0.2	25	0.1	17	0.2	13	0.2	1	0.1	93	0.2
	8. Inpatient psychosocial treatment followed by community psychosocial treatment	5	0.0	14	0.1	10	0.1	7	0.1	0	0.0	36	0.1
	9. Inpatient pharma: Assisted withdrawal	226	1.0	426	2.1	376	4.1	194	2.3	40	2.8	1262	2.1
	10. Inpatient pharma: Assisted withdrawal then community psychosocial treatment	143	0.6	326	1.6	223	2.5	139	1.7	10	0.7	841	1.4
	11. Inpatient pharma : Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment	167	0.8	341	1.7	186	2.0	170	2.0	5	0.4	869	1.4
	12. Inpatient pharma: other (non-standard)	65	0.3	102	0.5	48	0.5	46	0.5	0	0.0	261	0.4

	13. Composite inpatient treatment[1]	28	0.1	60	0.3	44	0.5	25	0.3	2	0.1	159	0.3
	14. Other inpatient	143	0.6	365	1.8	319	3.5	148	1.8	22	1.5	997	1.6
	Total inpatient treatment	**814**	**3.6**	**1659**	**8.2**	**1223**	**13.4**	**742**	**8.9**	**80**	**5.6**	**4518**	**7.5**
Residential	15. Residential psychosocial treatment only	201	0.9	135	0.7	84	0.9	113	1.3	15	1.1	548	0.9
	16. Residential psychosocial treatment followed by community psychosocial treatment	20	0.1	26	0.1	19	0.2	14	0.2	1	0.1	80	0.1
	17. Residential pharma: Assisted withdrawal	24	0.1	62	0.3	52	0.6	15	0.2	4	0.3	157	0.3
	18. Residential pharma: Assisted withdrawal then community psychosocial treatment	10	0.0	42	0.2	18	0.2	18	0.2	3	0.2	91	0.1
	19. Residential pharma: Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment	5	0.0	7	0.0	15	0.2	15	0.2	2	0.1	44	0.1
	20. Residential pharma: other (non-standard)	3	0.0	9	0.0	5	0.1	7	0.1	3	0.2	27	0.0
	21. Composite residential treatment[1]	2	0.0	6	0.0	2	0.0	3	0.0	3	0.2	16	0.0
	22. Other residential	39	0.2	86	0.4	41	0.5	34	0.4	5	0.4	205	0.3
	Total residential treatment	**304**	**1.3**	**373**	**1.7**	**236**	**2.7**	**219**	**2.6**	**36**	**2.6**	**1168**	**1.8**
Total		22147	100	19907	100	9083	100	8388	100	1422	100	60947	100.0

[1] *i.e. more than one non-overlapping period of residential treatment*

'appropriate' pathway for Severity Group 'appropriateness' uncertain 'not appropriate' pathway for Severity Group

Table 5.5 Proportion with each treatment outcomes (completed alcohol free or occasional alcohol use) by Severity Group and broad pathway

Broad treatment pathway	Outcome	Severity Group (%)			
		1	2	3	4
Community psychosocial only	Alcohol free	34	28	28	24
	Occasional use	33	30	24	27
Community psychosocial with pharmacological treatment	Alcohol free	50	50	44	43
	Occasional use	19	17	18	12
Inpatient	Alcohol free	65	61	59	50
	Occasional use	7	8	6	7
Residential	Alcohol free	67	64	63	55
	Occasional use	2	4	7	7

FIGURES

Figure 5.1 Recommended treatment pathways (CG115) according to severity of dependence and complex needs

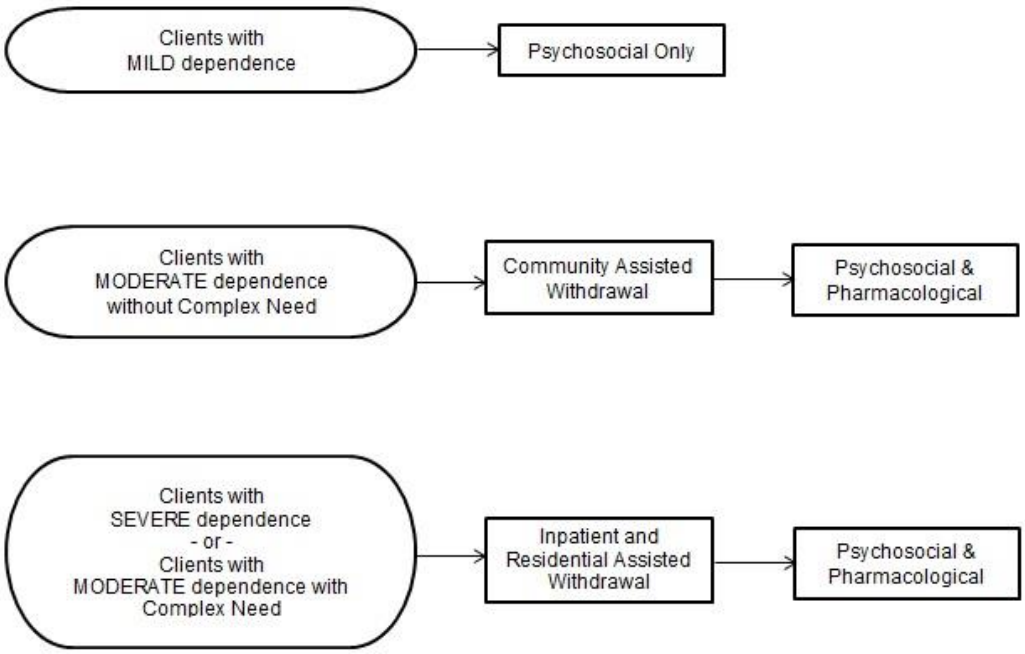


Figure 5.2 Proportion of clients taking each broad treatment pathway by Severity Group

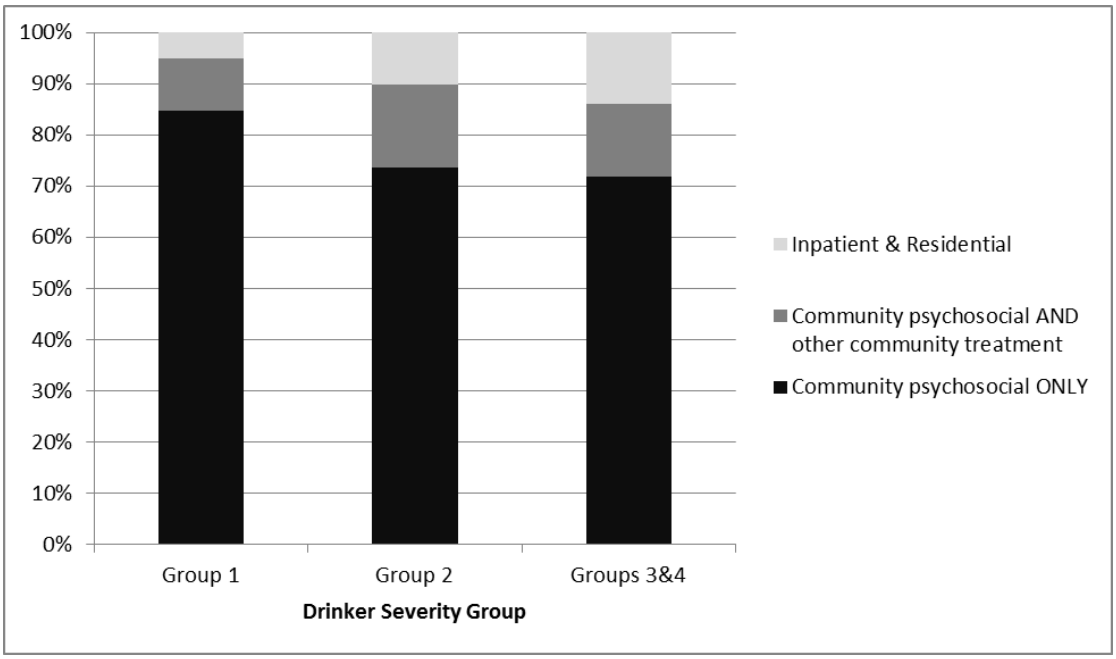


Figure 5.3 Proportion of clients in each Severity Group who completed either 'alcohol free' or with 'occasional use' by broad treatment pathway

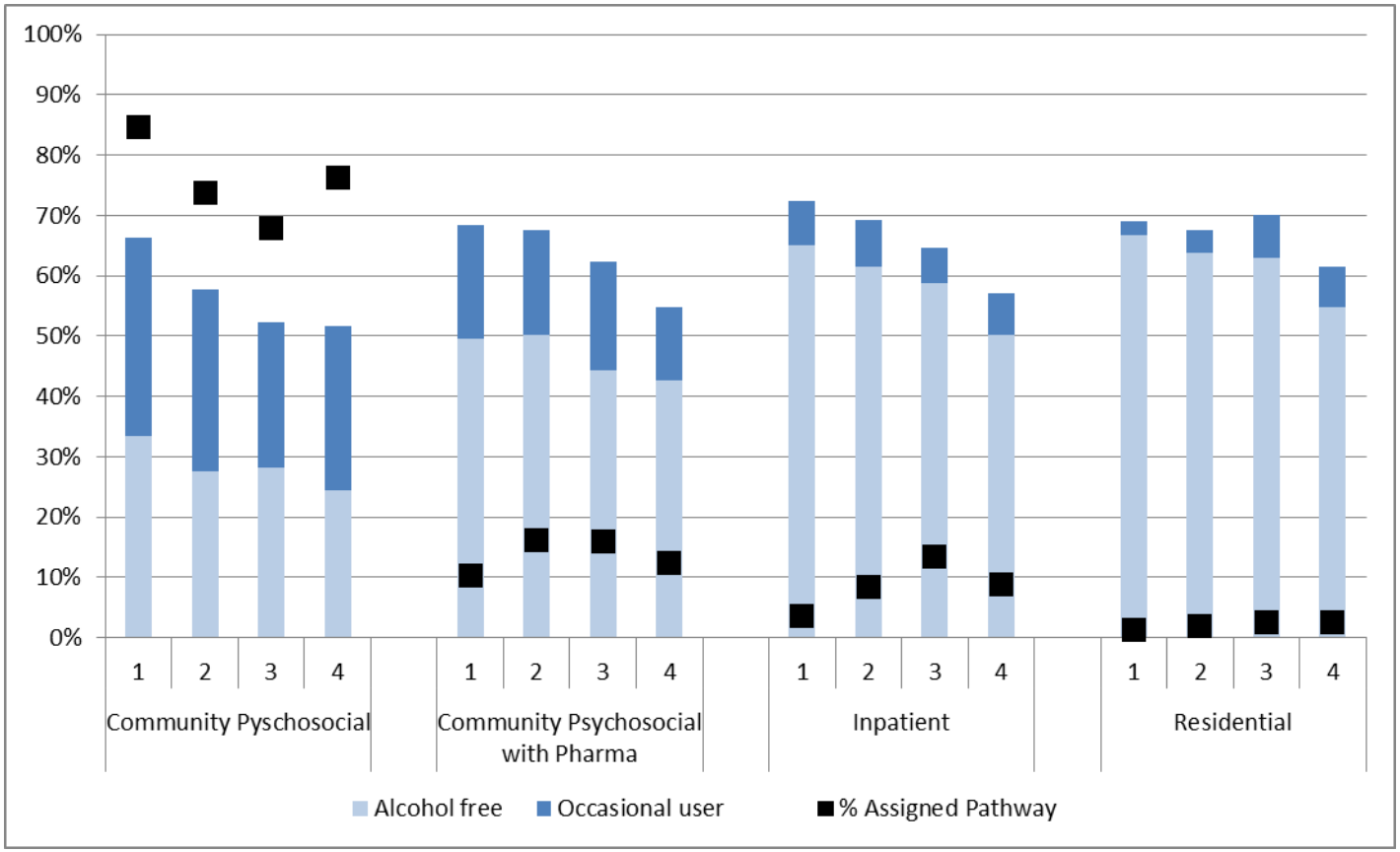
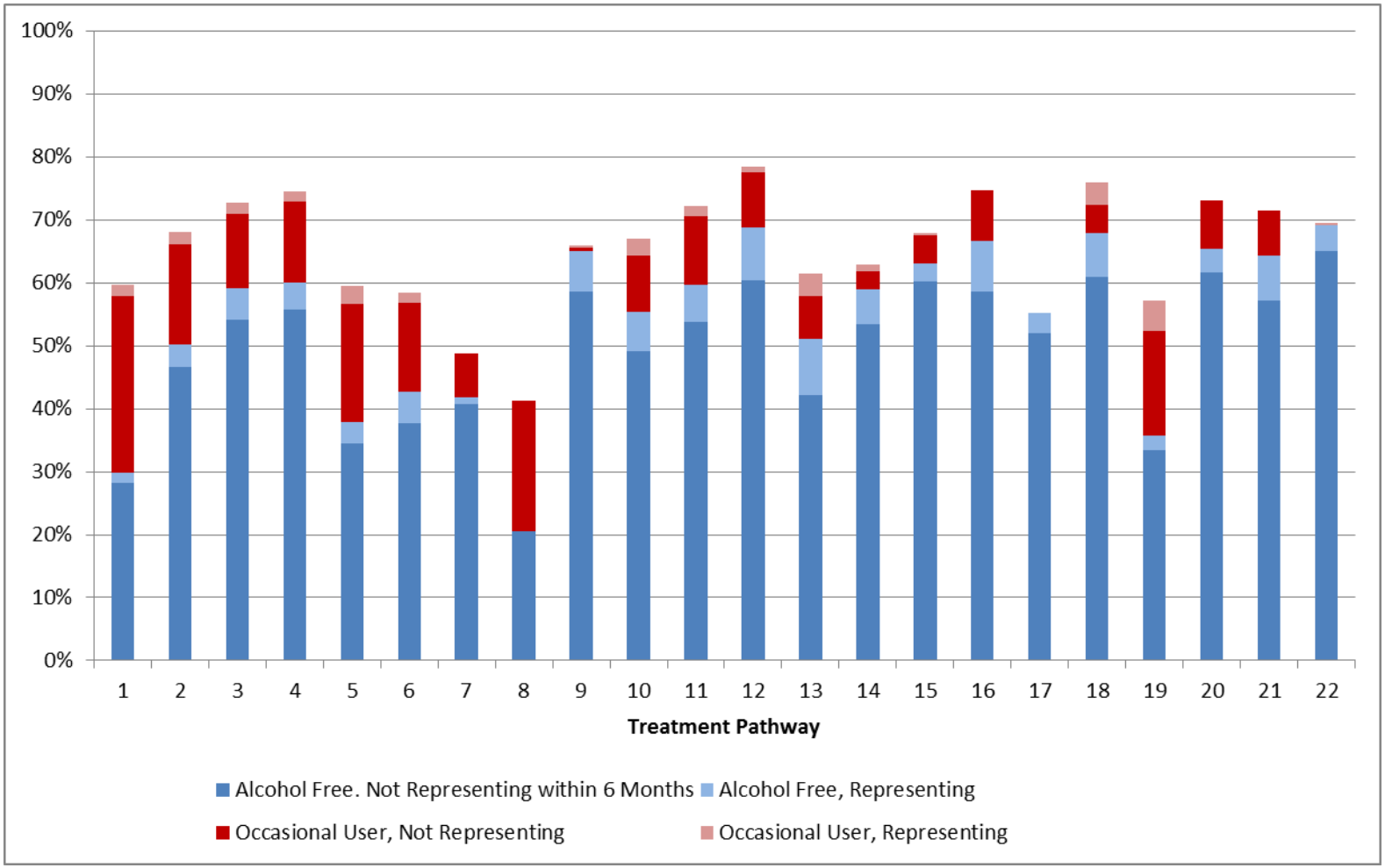


Figure 5.4 Proportion of clients in each of the 22 specific treatment pathways who completed alcohol treatment either 'alcohol free' or 'occasional use', including whether or not represented for treatment within 6 months



Appendix 5.1 Estimation of Treatment Pathways

A 'treatment pathway' is not recorded explicitly as a field within NDTMS; rather information is recorded about the elements of treatment (episodes of care), which can be linked to form 'treatment journeys'. The information captured about a client's treatment episode includes its interventions (and in some cases its sub-interventions), the setting in which this occurred and the related start and end dates. We used NDTMS episode data to construct a treatment pathway for each case included in our analyses, by the following method:

1. **Identifying episodes of care within the same treatment journey**

Treatment services report the episodes of care they provide to their clients and these are recorded in the NDTMS. Journeys are constructed by a method of linking episodes, described elsewhere[71]

2. **Forming building the building blocks for treatment pathways**

Within each identified treatment journey we established the nature of the treatments received by using information about the intervention type and the setting to make 'building blocks' (which were then used to construct treatment pathways as described in Section 3 below). There were two main overarching structured intervention types: psychosocial and pharmacological (for which the 'sub-interventions' of withdrawal support and relapse prevention medication could also be recorded). There were four possible settings: community, primary care, residential and inpatient. CG115 recommends particular interventions for different levels of alcohol dependence severity and complexity, but does not distinguish in terms of appropriateness between their delivery in community settings and primary care settings nor inpatient or residential settings. Therefore we were able to combine the same interventions delivered in different settings into four broad categories, or 'super-interventions' (Figure 5.5). Where interventions of the same community 'super-intervention' group overlapped in time, or where the start date of the later finishing intervention was 21 days or less after the end date of the earlier finishing intervention, these were merged together. This is consistent with the NDTMS 21 day threshold used for forming treatment journeys from episodes of care (see Section 1 above). Residential 'super-interventions' were combined if the later starting intervention started no more than one day after the end of the earlier-starting intervention.

Intervention ***(sub intervention where applicable)***	**Setting**	**Super-intervention**
Psychosocial	Community	Community psychosocial
Psychosocial	Primary care	
Pharmacological • *Withdrawal support* • *Relapse prevention* • *Other*	Community	Community pharmacological
Pharmacological • *Withdrawal support* • *Relapse prevention* • *Other*	Primary care	
Psychosocial	Inpatient	Residential or inpatient psychosocial
Psychosocial	Residential	
Pharmacological • *Withdrawal support* • *Relapse prevention* • *Other*	Inpatient	Residential or inpatient pharmacological
Pharmacological • *Withdrawal support* • *Relapse prevention* • *Other*	Residential	

Figure 5.5 Relationship between NDTMS-recorded treatment interventions and settings and 'super-interventions'

3. **Assigning relationships between building blocks: temporal relationships between super-interventions**

To estimate or define treatment pathways, it was also necessary to consider how the super-interventions identified above related to one another in time. For example, it was possible to have more than one super-intervention at a time, although not of the same type and setting. Super-interventions could relate to one another in the following ways (more than one relationship may hold):

a. **Concurrent**: If two super-interventions (A & B) shared a start date, or if the later-starting (B) started before the end date of the other (A), they were considered concurrent (Figure 5.6).

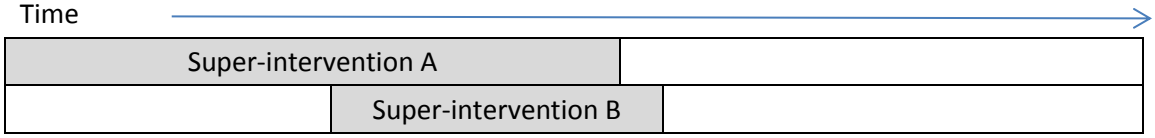
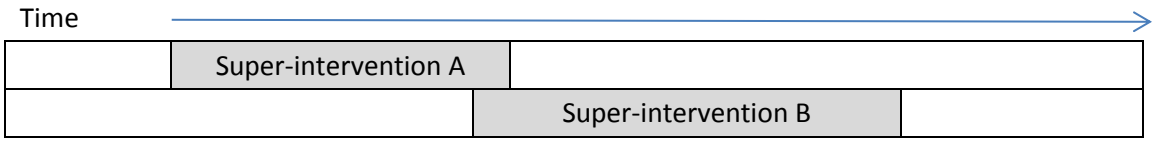


Figure 5.6 Example of 'concurrent' super-interventions

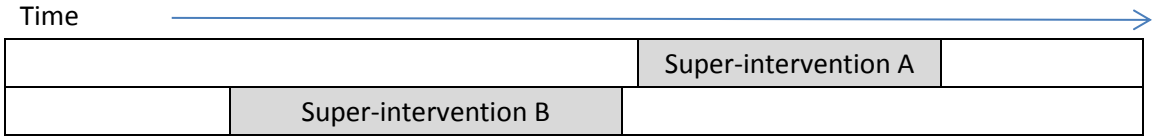
b. **Preceding**: A super-intervention (A) is considered as *preceding* another super-intervention (B) if it starts between 1 and 21 days before the other and ends before or at the same time as the other ends (**Figure 5.7**).

Figure 5.7 Example of a 'preceding' super-intervention



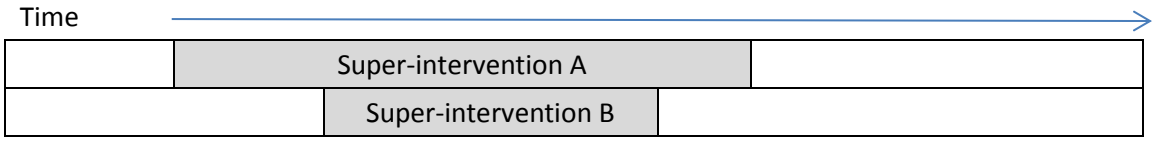
c. **Following**: A super-intervention (A) is considered as *following* another super-intervention (B) If the later-starting super-intervention starts on the end date of the other, or starts 21 days or less after the other super-intervention end date (**Figure 5.8**).

Figure 5.8 Example of a 'following' super-intervention



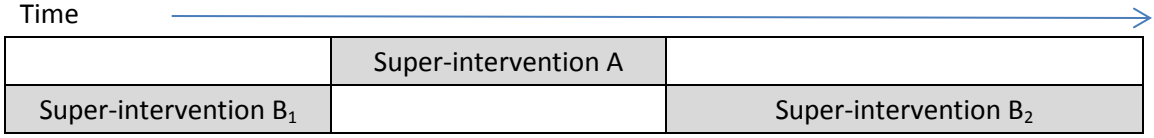
d. **Wrapping**: Where two super-interventions are concurrent, the longer one (A) is also considered 'wrapping' if it starts before and ends after the other 'wrapped' super-intervention (B) (**Figure 5.9**)

Figure 5.9 Example of a 'wrapping' super-intervention



e. Sandwiching: If a super-intervention of one type (A) is both preceded and followed by a super-intervention of another type (B), it is sandwiched (**Figure 5.10**).

Figure 5.10 Example of a 'sandwiched' super-intervention



4. Rules to form pathways from blocks and relationships

Having defined both the super-interventions and the ways in which they relate to one another within a single treatment journey, abstracted client treatment data was compared to the following pathway patterns to identify treatment pathways that were consistent with those defined in CG115, or other pathways, where the data did not conform to CG115. Twenty-two treatment pathways were formed using the following rules:

Pathway 1 Community psychosocial only

- Super-intervention: Community psychosocial
  - Pharmacological interventions or sub-interventions: None

Pathway 2 Community psychosocial AND Pharmacotherapy: relapse prevention

- Super-intervention: Community psychosocial

Concurrent with:

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Relapse prevention, but NOT withdrawal support

Pathway 3 Community psychosocial AND Pharmacotherapy: withdrawal

- Super-intervention: Community psychosocial

Concurrent with:

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Withdrawal support, but NOT relapse prevention

Pathway 4 Community psychosocial AND Pharmacotherapy: withdrawal & relapse prevention

- Super-intervention: Community psychosocial

Concurrent with:

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Withdrawal support AND relapse prevention

Pathway 5 Community psychosocial AND Pharmacotherapy: non-standard

- Super-intervention: Community psychosocial

Concurrent with:

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Neither withdrawal support nor relapse prevention, but at least one of maintenance and stabilisation, or where pharmacological intervention not known

Pathway 6 Other community psychosocial

This category included any treatment pathways with only community interventions, but which do not correspond to those detailed above. This included pathways which began as one of the pathways described above but included additional psychosocial or pharmacological interventions not specified above

Pathway 7 Inpatient psychosocial only

- Super-intervention: Inpatient psychosocial

Possibly preceded by, but not followed by:

- Super-intervention: Community psychosocial
  - Pharmacological interventions or sub-interventions: None

Pathway 8 Inpatient psychosocial treatment followed by community psychosocial

- Super-intervention: Inpatient psychosocial

Possibly preceded by:

- Super-intervention: Community psychosocial

Followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial
  - Pharmacological interventions or sub-interventions: None

Pathway 9 Inpatient pharmacotherapy: assisted withdrawal

- Super-intervention: Inpatient pharmacological
  - Pharmacological sub-interventions: Withdrawal support, but NOT relapse prevention

Possibly preceded by:

- Super-intervention: Community psychosocial

Then EITHER –

Concurrent with:

- Super-intervention: Inpatient psychosocial

OR –

- No other treatment recorded

Pathway 10 Inpatient pharmacotherapy: Assisted withdrawal then community psychosocial

- Super-intervention: Inpatient pharmacological
  - Pharmacological sub-interventions: Withdrawal support, but NOT relapse prevention

Then EITHER –

Concurrent with:

- Super-intervention: Inpatient psychosocial

OR –

- No other treatment recorded

Followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial

Pathway 11 Inpatient pharmacotherapy: Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment

- Super-intervention: Inpatient pharmacological
  - Pharmacological sub-interventions: Withdrawal support

Then EITHER –

Concurrent with:

- Super-intervention: Inpatient psychosocial

OR –

- No other treatment recorded

Followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial

Concurrent with:

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Relapse prevention

Pathway 12 Inpatient pharmacotherapy: other (non-standard)

- Super-intervention: Inpatient pharmacological

Then EITHER –

Concurrent with:

- Super-intervention: Inpatient psychosocial

OR –

- No other treatment recorded

Possibly concurrent with, preceded, followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial

AND/OR –

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Either relapse prevention without withdrawal support OR neither relapse prevention nor withdrawal support, but at least one of maintenance and stabilisation

Pathway 13 Composite inpatient treatment

- Super-intervention: At least one inpatient (psychosocial or pharmacological)

Followed by:

- Super-interventions: Two or more of the same type

Pathway 14 Other inpatient

This category includes any treatment pathways with one or more inpatient interventions, but which do not correspond to those detailed above. This included pathways which began as one of the pathways described above but included additional psychosocial or pharmacological interventions not specified above

Pathway 15 Residential psychosocial only

- Super-intervention: Residential psychosocial

Possibly preceded by, but not followed by:

- Super-intervention: Community psychosocial
  - Pharmacological interventions or sub-interventions: None

Pathway 16 Residential psychosocial treatment followed by community psychosocial

- Super-intervention: Residential psychosocial

Possibly preceded by:

- Super-intervention: Community psychosocial

Followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial
  - Pharmacological interventions or sub-interventions: None

Pathway 17 Residential pharmacotherapy: assisted withdrawal

- Super-intervention: Residential pharmacological
  - Pharmacological sub-interventions: Withdrawal support, but NOT relapse prevention

Possibly preceded by:

- Super-intervention: Community psychosocial

Then EITHER –

Concurrent with:

- Super-intervention: Residential psychosocial

OR –

- No other treatment recorded

Pathway 18 Residential pharmacotherapy: Assisted withdrawal then community psychosocial

- Super-intervention: Residential pharmacological
  - Pharmacological sub-interventions: Withdrawal support, but NOT relapse prevention

Then EITHER –

Concurrent with:

- Super-intervention: Residential psychosocial

OR –

- No other treatment recorded

Followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial

Pathway 19 Residential pharmacotherapy: Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment

- Super-intervention: Residential pharmacological
  - Pharmacological sub-interventions: Withdrawal support

Then EITHER –

Concurrent with:

- Super-intervention: Residential psychosocial

OR –

- No other treatment recorded

Followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial

Concurrent with:

- Super-intervention: Community pharmacological
  - Pharmacological sub-interventions: Relapse prevention

Pathway 20 Residential pharmacotherapy: other (non-standard)

- Super-intervention: Residential pharmacological

Then EITHER –

Concurrent with:

- Super-intervention: Residential psychosocial

OR –

- No other treatment recorded

Possibly concurrent with, preceded, followed, wrapped or sandwiched by:

- Super-intervention: Community psychosocial

AND/OR –

- Super-intervention: Community pharmacological

- Pharmacological sub-interventions: Either relapse prevention without withdrawal support OR neither relapse prevention nor withdrawal support, but at least one of maintenance and stabilisation

Pathway 21 Composite residential treatment

- Super-intervention: At least one residential (psychosocial or pharmacological)

Followed by:

- Super-interventions: Two or more of the same type

Pathway 22 Other residential

This category includes any treatment pathways with one or more residential interventions, but which do not correspond to those detailed above. This included pathways which began as one of the pathways described above but included additional psychosocial or pharmacological interventions not specified above

5. Dealing with mismatching sub intervention and super-intervention data

Some cases had sub-intervention pharmacological treatment recorded (i.e. withdrawal support or relapse prevention) without a corresponding pharmacological super-intervention being recorded (i.e. it is not clear what setting the sub-intervention was delivered in, community or residential). In these cases, pathways assignment was resolved as follows:

- If the client has only community psychosocial super-interventions, assume related to community pharmacological super-intervention and assign according to whether withdrawal support, relapse prevention, both or other pharmacological
- If the client has only residential/inpatient psychosocial super-interventions, assume related to residential/inpatient pharmacological super-intervention and assign according to whether withdrawal support or other pharmacological
- If a client has both community and residential/inpatient psychosocial super-interventions and the community psychosocial super-intervention wraps or follows the residential/inpatient super-intervention, assume any withdrawal support sub-intervention related to residential/inpatient pharmacological super-intervention and any relapse prevention sub-intervention related to community pharmacological super-intervention. If withdrawal support only; withdrawal support and relapse prevention; or relapse prevention only assign to pathway 12

If the client has multiple interventions of the same type either assign to composite residential/inpatient treatment (if there is a residential/inpatient super-intervention) or other community psychosocial.

If the journey has pharmacological sub-interventions without a corresponding pharmacological super-intervention then treat them as if they had had a compatible pharmacological super-intervention that was concurrent with the first psychosocial super-intervention in the same setting.

On the other hand, if there were pharmacological super-interventions without any corresponding sub-interventions, treat the super-intervention as if it had pharmacological sub-interventions of unknown motivation (e.g. withdrawal, relapse prevention).

Appendix 5.2 Treatment outcomes by Severity Group and pathway

Treatment pathway	Complete: Alcohol free (%)				Complete: Moderated non-problematic drinking (%)				Transferred (%)				Dropped out/left/died (%)			
Severity Group	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1. Community psychosocial only	34	28	28	25	33	30	24	28	4	5	8	8	29	36	39	40
2. Pharmacotherapy: relapse prevention	53	54	46	40	19	16	17	22	5	4	8	4	22	27	29	34
3. Pharmacotherapy: withdrawal	63	63	53	53	13	13	15	16	2	4	5	3	21	21	27	28
4. Pharmacotherapy: withdrawal & relapse prevention	62	62	54	60	17	13	18	12	1	2	5	6	20	23	22	23
5. Pharmacotherapy: other (non-standard)	41	39	36	35	22	24	25	22	6	5	7	7	32	32	32	36
6. Other community psychosocial	42	43	44	40	21	15	12	19	6	7	9	5	31	34	36	36
7. Inpatient psychosocial treatment only	65	26	31	25	9	13	0	0	3	4	15	8	24	57	54	67
8. Inpatient psychosocial treatment followed by community psychosocial treatment	25	23	20	17	25	23	30	0	0	8	10	0	50	46	40	83
9. Inpatient pharma: Assisted withdrawal	78	67	67	46	3	1	1	1	2	3	5	6	19	29	28	48
10. Inpatient pharma: Assisted withdrawal then community psychosocial treatment	62	56	58	47	10	11	11	15	3	7	8	12	25	25	23	26
11. Inpatient pharma : Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment	66	59	58	57	9	14	13	12	7	5	6	8	18	22	23	23
12. Inpatient pharma: other (non-standard)	70	67	78	62	16	9	10	7	3	8	2	7	10	16	10	24
13. Composite inpatient treatment[1]	57	57	41	57	11	18	3	5	0	13	18	19	32	13	38	19
14. Other inpatient	55	67	54	52	5	4	4	4	5	3	4	5	35	26	39	39
15. Residential psychosocial treatment only	66	65	70	51	3	5	3	8	3	3	6	5	28	27	22	36
16. Residential psychosocial treatment followed by community psychosocial treatment	88	63	72	50	0	13	11	7	6	4	6	0	6	21	11	43

17. Residential pharma: Assisted withdrawal	57	61	54	43	0	0	0	0	4	0	4	0	39	39	42	57
18. Residential pharma: Assisted withdrawal then community psychosocial treatment	78	73	59	63	0	7	18	6	11	2	6	6	11	17	18	25
19. Residential pharma: Assisted withdrawal then community psychosocial & pharmacological relapse prevention treatment	40	57	31	20	20	0	46	13	0	14	8	7	40	29	15	60
20. Residential pharma: other (non-standard)	67	63	60	86	0	0	40	0	0	13	0	0	33	25	0	14
21. Composite residential treatment[1]	0	100	100	33	0	0	0	33	50	0	0	33	50	0	0	0
22. Other residential	72	62	69	82	0	0	3	0	10	4	0	3	18	35	28	15

Key:

Appropriate	Appropriateness Uncertain	Probably Not Appropriate

Appendix 5.3 Treatment outcome by 'appropriateness' of pathway

Appropriateness of pathway	Treatment complete – 'success'		Treatment incomplete – 'not success'		Total	
	N	%	N	%	N	%
'Appropriate'	13773	67	6789	33	20562	100
'Appropriateness uncertain'	16578	56	12939	44	29517	100
'Not appropriate'	4321	66	2253	34	6574	100

6 Benchmarking Local Authority Access Rates to Pathways for Specialist Treatment for Alcohol Dependence in England

Alan Brennan, Daniel Hill-McManus, Tony Stone, Penny Buykx, Abdallah Ally, Robert E Pryce, Robert Alston, Andrew Jones, Donal Cairns, Mike Donmal, Colin Drummond,

6.1 Abstract

Introduction

Variations in access to treatment across Local Authorities in England are examined using recently developed estimates of the prevalence of people potentially in need of assessment for and treatment with specialist alcohol services combined with data from the national Drug treatment Monitoring System (NDTMS).

Methods

The analysis examines both the total number of people in the treatment system and the numbers of new people entering the system in one year to calculate access rates as a proportion of the estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services. Treatment journeys are classified into 22 different pathways based on NICE guidance and these are summarised into four main categories – psychosocial only, psychosocial with pharmacological treatments, residential based care and inpatient care. Analysis is also undertaken using an indicative measure of severity subgroups, and examining variations in treatment outcomes by LA.

Results

The overall rate of numbers of people in treatment at any point during 2013/14 was 14.1% of our estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services in England (penetration rate of 1 in 7.1). The access rate for clients starting new treatment journeys within 2013/14 was 10.6% of the estimated population with alcohol dependence (penetration rate 1 in 9.4). Local Authority rates varied substantially, from 2.3% to 26.6% i.e. more than 11 fold variation. Indicative analysis of severity groupings showed even larger variations. Similar order of magnitude variation across LAs existed for the proportion of clients receiving different pathways of care, and for successful treatment completion rates.

Conclusion

We strongly advise that national and local decision makers consider these benchmarking analyses as an aid to local commissioning and planning. Further data collection on severity of dependence within the NDTMS would be useful.

Acknowledgements:

We are grateful for the valuable contribution of our project stakeholder group, including service providers, service users, academics, commissioners and representatives from DH and Public Health England (PHE). We would particularly like to acknowledge the contribution of those local authorities involved in pilot testing the model. We also thank the Public Health England North West Knowledge Intelligence Team (PHE NW KIT) for their assistance in the provision of Hospital Episode Statistics data, especially Mr Sacha Wyke.

6.2 Introduction

Alcohol is responsible for a substantial burden of disease with the extent of alcohol related harms directly related to the volume of alcohol consumed. Alcohol dependence describes people at the upper end of a spectrum of alcohol use disorders and who are, therefore, those whose health are most likely to be adversely affected by alcohol. It is characterised by symptoms of addiction such as tolerance, withdrawal, craving, relief drinking and neglect of alternative activities [37]. Effective treatments for alcohol dependence aim for drinkers to become abstinent or have moderated non-problematic drinking. They include psychosocial interventions and pharmacology to assist during withdrawal and to reduce the likelihood of relapse in community, residential and inpatient settings [38].

In 2014, the Department of Health In England commissioned the research team to develop methods to support Local Authorities (LAs) in their role commissioning drug and alcohol specialist treatment services to meet the needs of their local population [9]. This work builds upon NICE Guidelines (CG115) which describe recommendations for identification, assessment and treatment for people with Alcohol Use Disorders [1]. NICE recommends the Alcohol Use Disorders Identification Test (AUDIT) questionnaire to identify 'harmful' drinking behaviour [6]. For people with an AUDIT score of 20+, NICE recommends referral for specialist assessment, including assessment of the severity of possible dependence and the need for structured treatment including detoxification, psychosocial and pharmacological relapse prevention. People with AUDIT score 16-19 are recommended extended brief intervention or brief treatment/stepped care, and for those who are unable to reduce their drinking after such interventions, NICE also recommends considering referral to specialist structured treatment. CG115 recommends more intensive treatments according to need including as indicated by the Severity of Alcohol Dependence Questionnaire (SADQ) [7]. People displaying symptoms of mild dependence, i.e. scoring <16 on SADQ, are unlikely to need assisted withdrawal treatment or relapse prevention medication, and will most likely require community based psychosocial therapy People with moderate dependence (i.e. an AUIDIT score of 20+and/or who consume 16-30 units per day, and SADQ score 16-30) should be considered for treatment which includes community based detoxification, followed by psychosocial intervention accompanied by pharmacological relapse prevention intervention. For those with severe dependence (indicated by drinking >30 units a day or an AUDIT score 20+ and SDAQ score >30) and those with moderate dependence with complex needs inpatient or residential detoxification with more intensive community psychosocial intervention and pharmacological relapse prevention are recommended. For homeless clients with moderate or severe dependency, residential rehabilitation is recommended.

The work here builds upon previous work to estimated prevalence of alcohol dependence and use of specialist alcohol treatment in each Local Authority in England. Prevalence of alcohol dependence in each

Local Authority has been estimated primarily using statistical modelling of data in the Adult Psychiatric Morbidly Survey (APMS) 2007 [2] with links to some other data sources. This provides estimates of numbers of people by gender, age (18-24, 25-34, 35-54, 55+) and also into mild, moderate and severe alcohol dependence defined using a combination of the AUDIT score and the SADQ [72]. Previous work analysing the National Drug Treatment Monitoring System (NDTMS) dataset has quantified: the number of people in treatment in each LA during a year; the number of new treatment journeys started, differentiated into 22 different pathways defined by setting (community, residential, inpatient), type of treatment (psychosocial only, use of withdrawal and or relapse prevention pharmacotherapy) and other factors; and the outcomes achieved (e.g. successfully completed treatment and no longer drinking, successfully completed treatment with moderated non-problematic drinking, dropped out of treatment, transferred service or into custody, died) [73]. Unfortunately, neither AUDIT nor SADQ are collected within the NDTMS, and so a proxy measure of the severity of dependence available is the number of alcohol units consumed by the client on a typical drinking day during the previous 4 weeks (One unit is 10ml of pure ethanol). These previous analyses provide the foundation to analyse rates of access to treatment per prevalent population.

In this paper, we analyse variations between Local Authorities in terms of access rates to different pathways for specialist treatment in England. The key questions addressed are as follows. How much variation is there in numbers of people in treatment at any point during the year (1st April to 31st March) per estimated prevalent population? What is the variation in the number of new treatment journeys started during the most recent year per prevalent population? How do patterns vary for subgroups of clients according to severity – including the receipt of treatments which are community based psychosocial treatments only, pharmacological treatments in a community setting, and inpatient / residential. In addition, we examine variations in the outcome of treatment (e.g. successful completion of treatment journey, with abstinence or moderated non-problematic drinking, retreatment within 6 months, drop out, transfers to other service or custody). In Figure 6.3, we present a Local Authority case study analysis for the city of Leeds showing how these various benchmarking analyses can be combined to provide evidence that may be beneficial for local commissioning. Finally, we discuss the implications of the variations seen across England for developing the commissioning of specialist alcohol treatment services.

6.3 Methods

Data and Measures

The estimated prevalence of people with alcohol dependence potentially in need of assessment for and treatment with specialist alcohol services in each Local Authority has been previously reported (Section 0). Briefly, we derived Local Authority estimates using information on alcohol use disorders available in the Adult Psychiatric Morbidly Survey (APMS) 2007. Statistical analysis combined this data with local level data on hospital admissions related to alcohol dependence, age and gender demographics and socioeconomic factors measured using the index of multiple deprivation (IMD). The resulting estimates of numbers of people with alcohol dependence for each Local Authority are separated by gender, age (18-24, 25-34, 35-554, 55+) and also into mild, moderate and severe alcohol dependence defined using a combination of the AUDIT score and the SADQ. A further adjustment is made to account for estimated prevalence amongst registered homeless people in each LA.

The National Drug Treatment Monitoring System (NDTMS) provides the data source for measuring the use of specialist treatment services. The NDTMS is the centralised reporting system for all publicly funded structured community and residential alcohol and drug treatment providers in England [64]. The data collected includes age, primary problem substance (recorded at initial triage assessment), adjunctive problem substance and interventions delivered (i.e. treatment type). We use the term treatment 'journey' to refers to a series of one or more adjoining structured treatment episodes, either overlapping in time or separated by fewer than 22 days between discharge and treatment start dates.

The cases included in the analysis comprised clients who reported alcohol as their primary problem substance and who did not report adjunctive opiate use i.e. clients whose substance misuse problem relates to alcohol only or primarily alcohol with adjunctive non-opiate use. We include those aged 18-99 years at journey start. Modifications to the NDTMS coding system in November 2012 enable us to differentiate whether any pharmacotherapy provided is for withdrawal or for relapse prevention, and we used only those cases for which the treatment intervention was recorded as per the latest coding system. We extracted data for all clients who were in treatment at any time during 2013/2014 (n=103,602). We also examined the number of people starting new treatment journeys within the year 2013/2014 (n=78,055). For analysis of treatment outcomes, we were particularly interested in the complete treatment pathway, and for this we examined only the subset of people whose most recent treatment journey ended in 2013/2014. This resulted in 60,947 individual treatment journeys for analysis.

Severity of dependence is not measured directly by the NDTMS, which does not include AUDIT or SADQ scores. Instead, we constructed an indicator of 'alcohol consumption level', categorised, using self-reported average number of units of alcohol consumed per typical drinking day in the last 28 days, into three groups (0-15 units, 16-30 units, 31 units plus, per day). To account for clustering of cases as defined per NICE CG115 guidelines, these groups were then considered as proxies for mild, moderate and severe dependence respectively, as there is evidence to indicate that higher levels of consumption are positively correlated with dependence [66] and these were recommended by NICE (CG115) as reasonable cut-offs equivalent to severity of dependence measures. For clients with complex needs, NICE guidelines suggest that more intensive pathways should be offered. The NDTMS lacks a single field indicating complex needs. Based on clinical advice and NICE guidelines, we defined clients as having 'complex needs' if they had one of: dual diagnosis of mental health problems (yes/no); urgent housing problem (no fixed abode, yes/no); adjunctive use of benzodiazepines (yes/no). While the data available did not map directly onto CG115-recommended tools for assessing severity of dependence, clinical advice confirmed that we had developed reasonable indicative proxies for severity and complex needs given available data, although this is likely to underestimate the true prevalence of complex needs which are more wide ranging than those recorded by NDTMS and there is well recognised under-identification of comorbidities.

We defined 22 pathways for specialist treatment for alcohol dependence in line with NICE guidance [73]. The 'treatment pathway' of each treatment journey in the dataset was constructed using NDTMS data regarding treatment interventions and settings by combining a number of data fields to assign each client journey into one of 22 different possible pathways. Appendix 6.1 lists these pathways which are defined by setting (community, residential, inpatient), type of treatment (psychosocial only, use of withdrawal and or relapse prevention pharmacotherapy) and other factors (e.g. ..... The 22 pathways can be categorised into four broad groups: community-based psychosocial treatment only, community-based psychosocial treatment with pharmacotherapy (withdrawal support and/or relapse prevention), residential treatment, and inpatient treatment (with or without additional community based treatment). For each journey we also identify a single treatment outcome, using data from the NDTMS which is based on the clinical judgement of the treatment provider. The possible outcomes are – completed treatment alcohol free, completed treatment with moderated non-problematic drinking, transferred to another service provider, dropped out/left treatment without completion, and died. Outcomes were then analysed by severity grouping and treatment pathway.

Analysis

We undertake detailed analyses of variations in the access rates to different pathways for specialist treatment for Local Authorities in England. We begin with analysis of numbers of people in treatment at

any point during the year (defined from 1st April to 31st March) per estimated prevalent population with alcohol dependence for each local authority. We then analyse the number of clients starting new treatment journeys within the year 2013/14 per prevalent population, including more detailed indicators of access rates using subgroups of the treated clients defined by 'number of units of alcohol on a typical drinking day in the last four weeks', and also separating clients according to whether they have received treatments in pathways which are community based psychosocial treatments only, pharmacological treatments in a community setting, and inpatient / residential care. Geographical variations of access rates are mapped. We also examine the use of the pathways we have classified indicatively as "more appropriate" and "less appropriate" as described in detail in Table 5.4 in Section 5. Alongside the benchmarking of access rates, we also present variations in the outcomes of treatments measured using categories based on the recording in the NDTMS (incorporating recording of successful completion of treatment journey, with abstinence or moderated non-problematic drinking, retreatment within 6 months, drop out, transfers to other service or custody).

6.4 Results

Error! Reference source not found. shows that the number of primary alcohol users in treatment during he year 2013/14 was 103,602, which represents 14.1% of our estimated prevalent population potentially in need. This represents a penetration rate of 1 in 7.1 people. Note, this penetration rate should not be compared with previous rates which have been calculated / reported (e.g. by the ANARP study or by PHE) because previously published rates will have used a different denominator in calculating the percentage of people accessing treatment. Access rates have previously been reported in terms of the estimated AUDIT 16+ population, or the estimated numbers of high risk drinkers (males drinking 50+ units, females drinking 35+ unit per week).

There were 78,055 people who started a new treatment journey within the year 1st April to 31 March 2014, which represents 10.62% of the prevalent population - a penetration rate of 1 in 9.4. These figures vary substantially by age and gender. Estimated new journey access rates are low for younger people (around 2% for 18-24 year olds and 7% for 25-34 year olds) but considerably higher for older age groups (21% for 35-54 year olds and 17% for 55+). In terms of volume of clients receiving treatment, the largest group is males aged 35-54. Estimated access rates are higher for females than for males, and are highest for females aged 35-54 years. Of course these access rates are determined based on estimates of the age gender mix of prevalence [72] and the limitations regarding that method need to be borne in mind when interpreting them.

6.4.1 Results for Benchmarking Access Rates to Specialist Treatment in England

Table 6.1 Access rates for Specialist Treatment Overall and by age/gender in England.

Part A: Overall Access rates for England			
Prevalent Population i.e. estimated numbers of people potentially in need of assessment for and treatment with specialist alcohol services	734,835		
Clients in treatment at any point in 2013/14	103,602		
Clients in Treatment per Prevalent Population in Need	14.10%		
Numbers of clients starting New Treatment Journeys during 2013/14	78,055		
Clients with New Treatment Journeys per Prevalent Population	10.62%		
Part B: Age and Gender			
	Males	**Females**	**Total**
Prevalent Population potentially in need			
18-24	150,700	61,359	212,058
25-34	206,695	22,398	229,092
35-54	175,520	39,360	214,879
55+	67,113	11,692	78,804
Clients in Treatment at any point in 2013/14			
18-24	3,612	2,251	5,863
25-34	13,183	6,997	20,180
35-54	38,485	22,199	60,684
55+	10,540	6,335	16,875
Proportion of Prevalent Population in need who accessed Treatment during 2013/14			
18-24	2.40%	3.67%	2.76%
25-34	6.38%	31.24%	8.81%
35-54	21.93%	56.40%	28.24%
55+	15.70%	54.18%	21.41%
New Treatment Journeys in 2013/14			
18-24	2,749	1,680	4,429
25-34	10,171	5,182	15,353
35-54	28,994	16,239	45,233
55+	8,228	4,812	13,040
Numbers of clients staring new Treatment Journeys per Prevalent Population in Need			
18-24	1.82%	2.74%	2.09%
25-34	4.92%	23.14%	6.70%
35-54	16.52%	41.26%	21.05%
55+	12.26%	41.16%	16.55%

Table 6.2 shows an indicative analysis by severity of dependence. The estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services for England show almost 400,000 mild dependent, 270,000 moderate and just over 70,000 with severe dependence (including an additional number of estimated homeless people in each LA) potentially in need. The number of clients starting a new treatment journey who were drinking 0-15 units on a typical drinking day in the last 4 weeks (assumed in the indicative analysis to most likely be in the mild dependence category) was 28,631. The indicative estimated new journey access rate for mild dependent clients potentially in need is just over 7%, almost 10% for moderate clients (assuming typical drinking day of 16-30 units are likely to be moderate), and almost 33% for severe clients (assuming typical drinking day of 31+ units are likely to be severe).

Table 6.2 Access rates for Specialist Treatment by Indicative Severity group (using NDTMS on Alcohol Units per Typical Drinking Day in previous 4 Weeks prior to assessment)

	Mild	**Moderate**	**Severe/ Complex**	**Mild & Moderate**	**Moderate & Severe**
Prevalent Population potentially in need	396,640	267,666	70,529	664,306	338,195
Grouping of Typical Drinking Day reported by Clients Treated	**0-15 Units per day**	**16-30 units per day**	**31+**	**0-30 units per day**	**16+ units per day**
Clients in Treatment at any point in 2013/14	38,086	34,586	30,930	72,672	65,516
Clients in treatment per Prevalent Population in Need	9.60%	12.92%	43.85%	10.94%	19.37%
Clients with New Treatment Journeys starting in 2013/14	28,631	26,457	22,967	55,088	49,424
Numbers of clients starting new Treatment Journeys per Prevalent Population in Need	7.22%	9.88%	32.56%	8.29%	14.61%

6.4.2 **Local Authority Variation**

Table 6.3 shows the variation in the estimated access rate for clients starting new treatment journeys per prevalent population in need across the 151 upper tier Local Authorities in England (final column) as well as for the indicative access rates by drinker group. The overall access rate ranges from the lowest LA at 2.3% to the highest at 26.6%, which is a more than 11 fold variation. The variation is even larger for the indicative access rates by severity group - mild, moderate and severe indicative rates vary 17 fold, 27 fold and 32 fold variation respectively. The range from the 5th to the 95th percentile is just below a 4-fold variation for the overall access rate and this rises to 5-fold when it is split into the severity groups.

Table 6.3 Estimated Variation in Local Authority New Journey Access Rates per Prevalent Population

Description	No. of clients starting new Journeys with typical drinking day 0-15 Units per Mild dependent prevalent population in need	No. of clients starting new Journeys with typical drinking day 16-30 Units per Moderate dependent prevalent population in need	No. of clients starting new Journeys with typical drinking day >30 Units per Severe dependent prevalent population in need	No. of clients starting New Journeys per total estimated prevalent population in need
Mean of 151 LAs	7.47%	10.53%	35.62%	11.06%
Min	1.60%	1.02%	3.31%	2.29%
5th percentile	3.37%	3.92%	13.99%	5.35%
95th percentile	13.37%	19.19%	67.86%	19.34%
Max	28.32%	27.60%	105.00%	26.62%

For overall numbers in treatment, Figure 6.1 shows the estimated numbers in treatment anytime during 2013/14 as a percentage of the 18+ population potentially in need of specialist treatment for alcohol dependence (ranked from lowest to highest local authorities). This shows that from the lowest LA estimate (around 4% of the prevalent population) to the highest (34%) there is an 8-fold variation. Figure 6.1 shows the equivalent variation for the estimated new journeys access rate.

Figure 6.1 Estimated Overall Numbers in Treatment in 2013/14 per Prevalent Population in 151 English Local Authorities

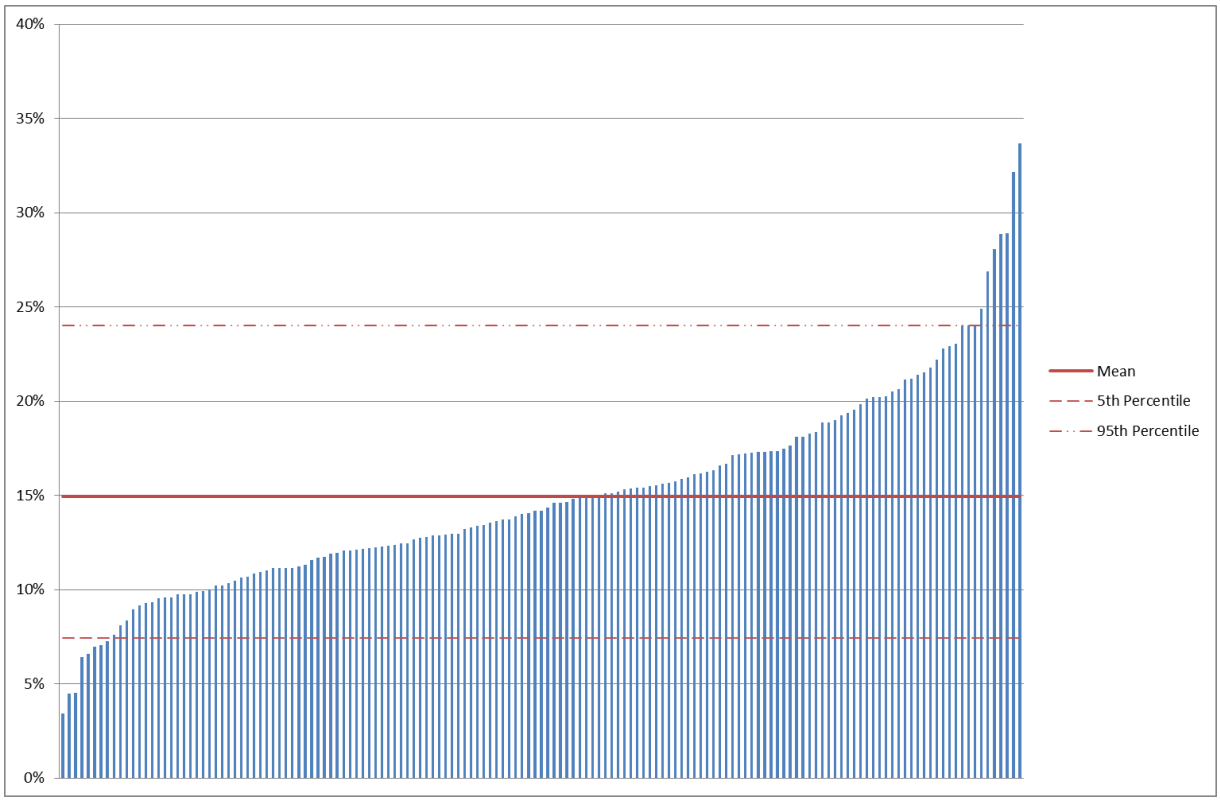


Figure 6.2 Estimated New Treatment Journeys in 2013/14 per Prevalent Population in 151 English Local Authorities

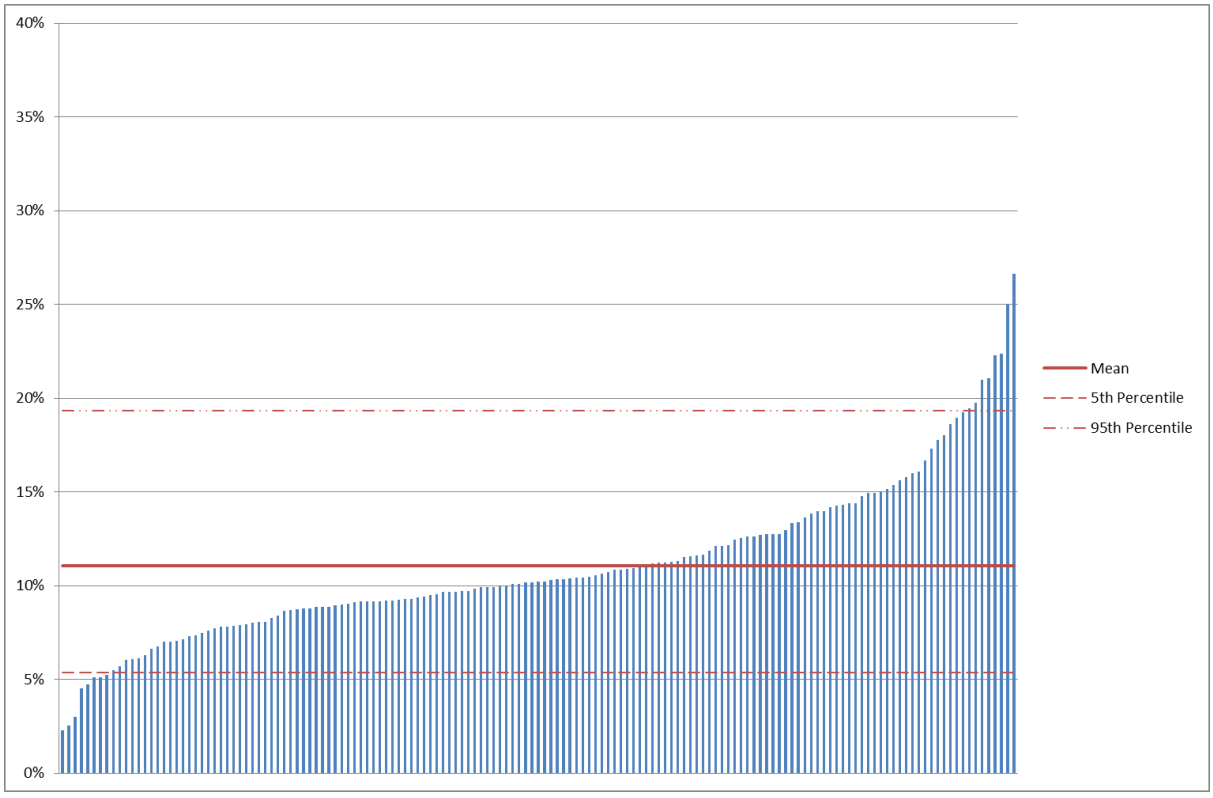


Figure 6.3, Figure 6.4, and Figure 6.5 show the percentage of the population that are estimated to be mild, moderate and severe in terms of dependence respectively. The figures use the same ordered ranking as for overall prevalence i.e. each LA is at the same place on the x axis. The figures show that those Local Authorities with high prevalence are generally also high in terms of the three indicative access rates for severity bands, though some variations do occur.

Figure 6.3 Mild Access Rates: - No. of new Journeys with typical drinking day 0-15 Units per Mild dependent prevalent population in 151 English Local Authorities

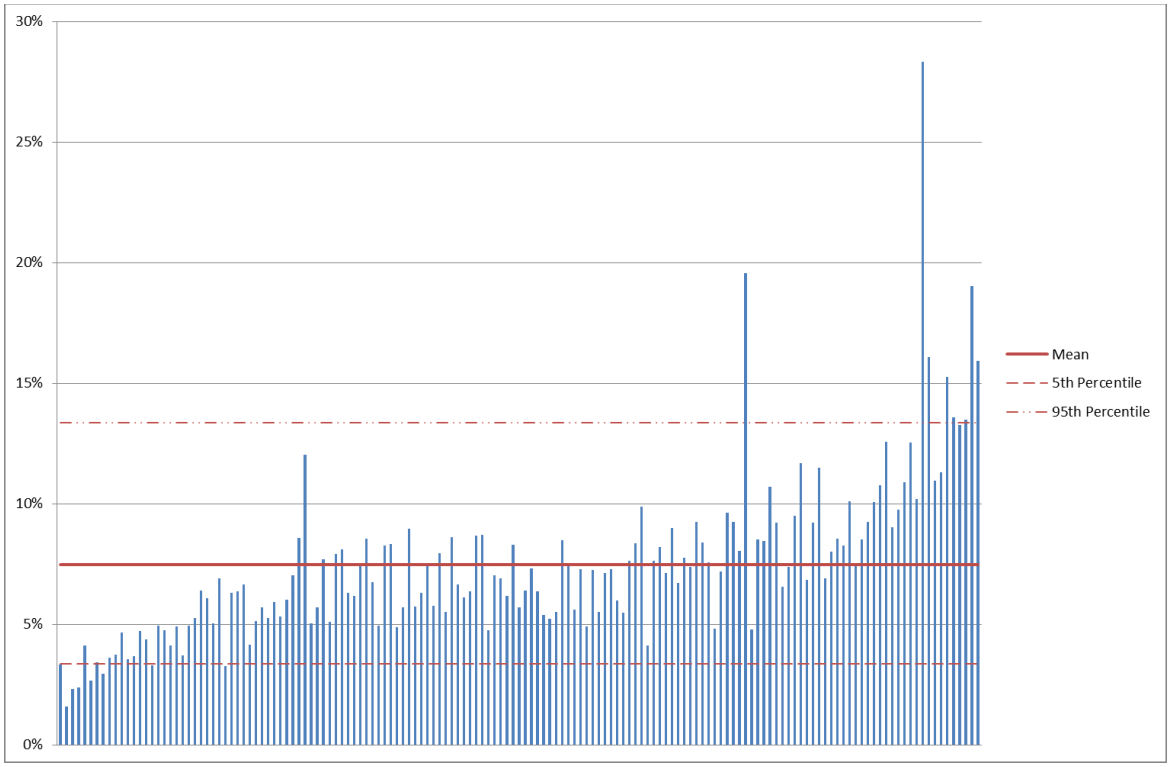


Figure 6.4 Moderate Access Rates:- No. of new Journeys with typical drinking day 16-30 Units per Moderate dependent prevalent population in 151 English Local Authorities

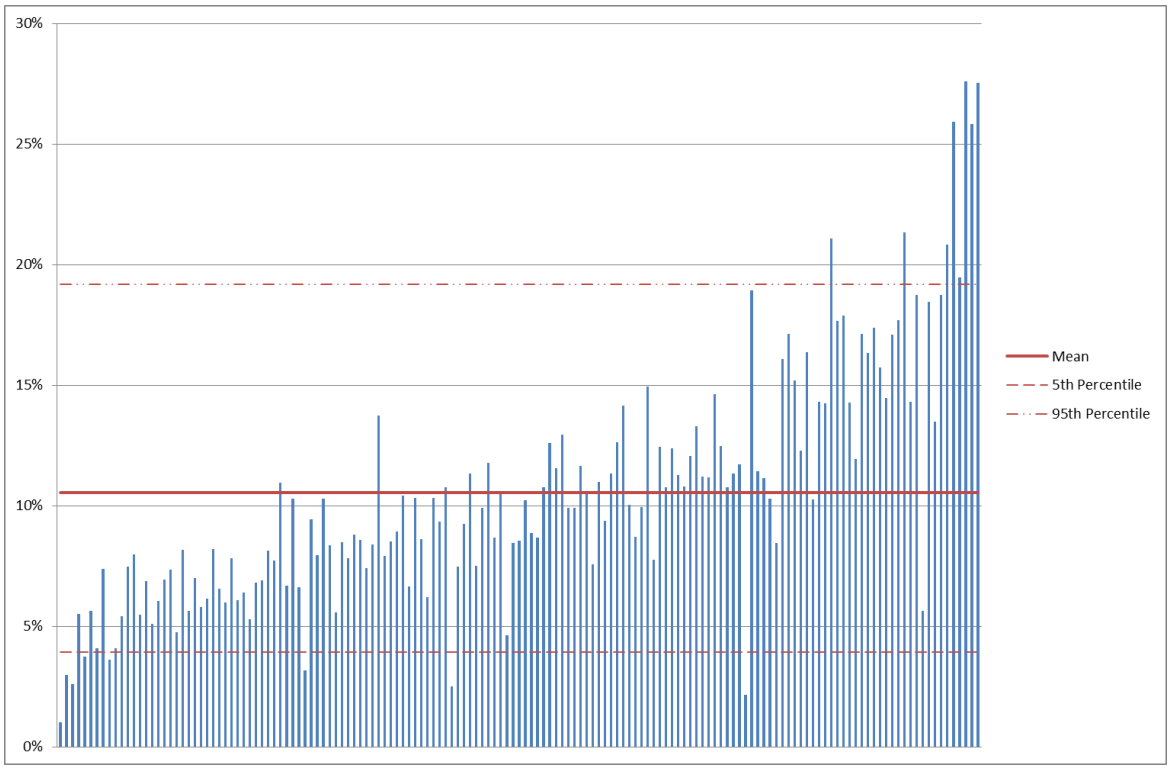
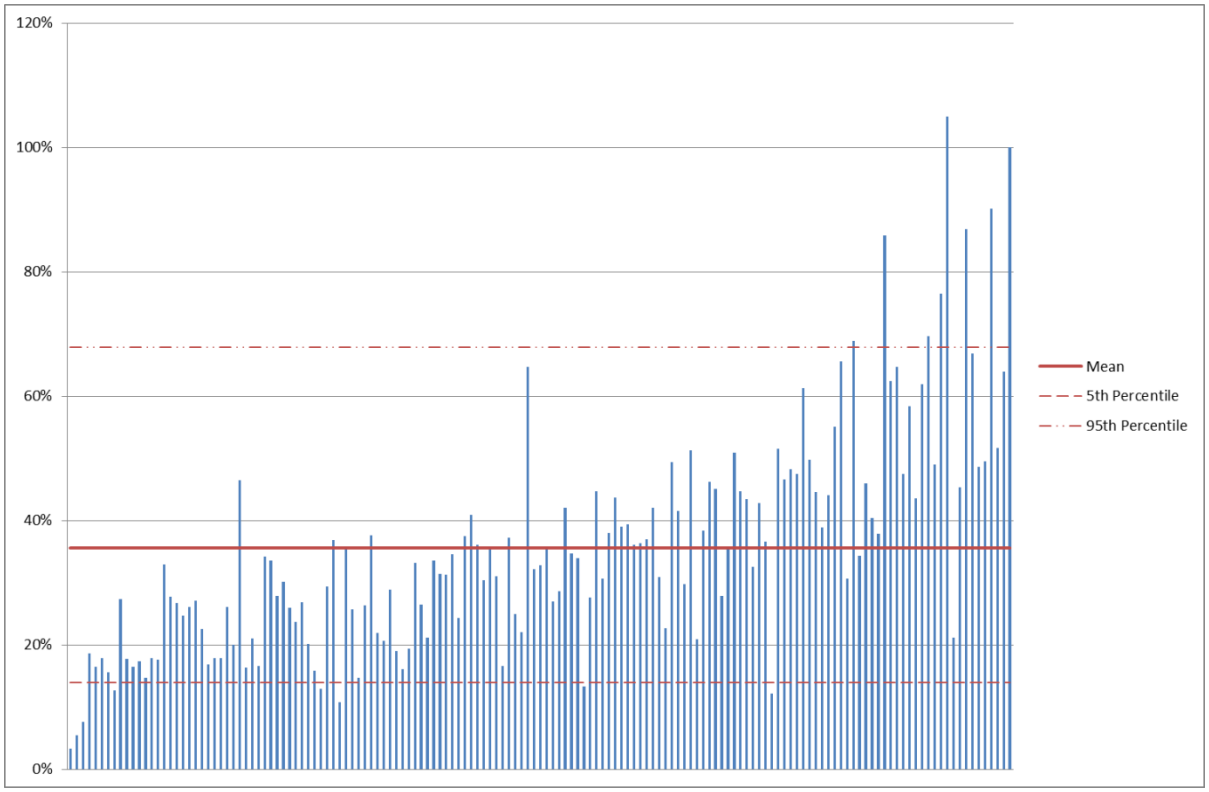


Figure 6.5 Severe and Complex Needs Access Rates: - No. of new Journeys with typical drinking day 31+ Units per Severe and Homeless dependent prevalent population in 151 English Local Authorities



6.4.3 **Geographical Variation**

Mapping both prevalence rates and access rates shows substantial variation. Figure 6.6 shows the prevalence rates for each Local Authority, where darker shades indicate higher prevalence, and indicates that greater need does not appear at random across England but tends to be concentrated in certain areas e.g. the North East and North West. Figure 6.7 shows the new journey access rates, with darker colours here indicating lower rates of access. The LAs around London and the South East tend to have higher access rates. A visual inspection of the maps does not clarify whether there is a relationship between access rates and prevalence rates. However, the scatterplot in Figure 6.8 shows that there is large variation in access rates even for Local Authorities with the same prevalence e.g. for LAs with estimated prevalence between 1.5% and 2.5%, the access rates range from 2.2% to 22.2% - a factor of 10. Statistically, there is a small negative relationship between a Local Authority's prevalence rate and access rate i.e. LAs with 10% higher prevalence have approximately a 1.8% lower access rate (significance of linear regression coefficient p=0.031). Of course, this cross sectional analysis cannot determine causal relationships, although one could interpret this finding to potentially indicate that Local Authorities with high access rates over the long term might be successful in reducing overall prevalence.

Figure 6.6 Alcohol Dependence Prevalence Rate

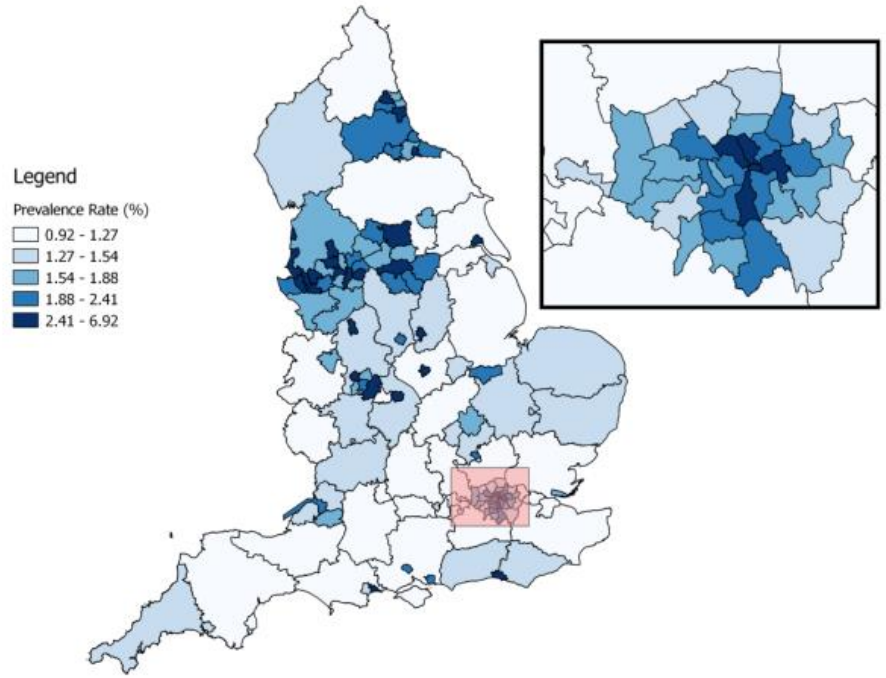


Figure 6.7 New Journeys Access Rate in 2013/14

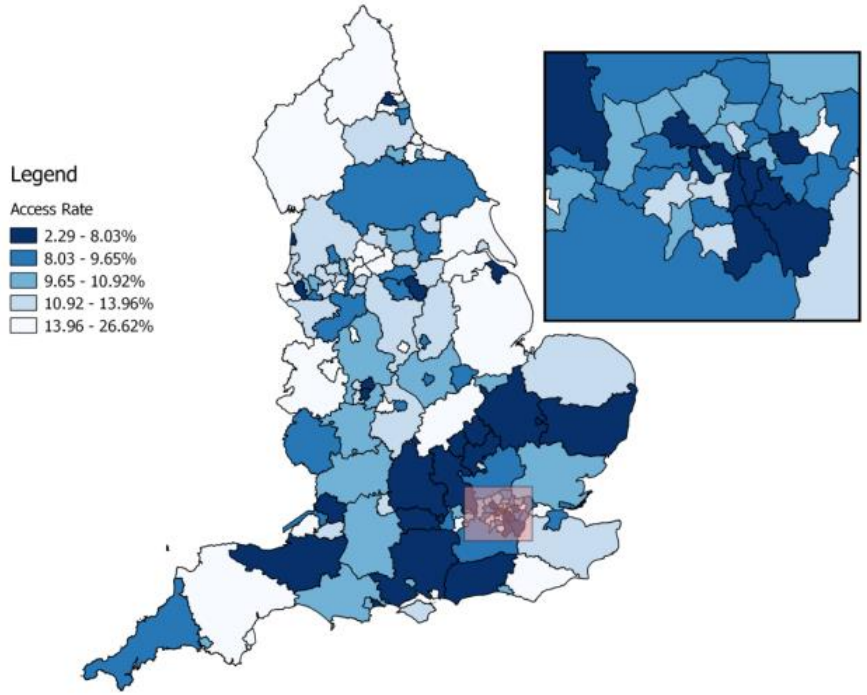
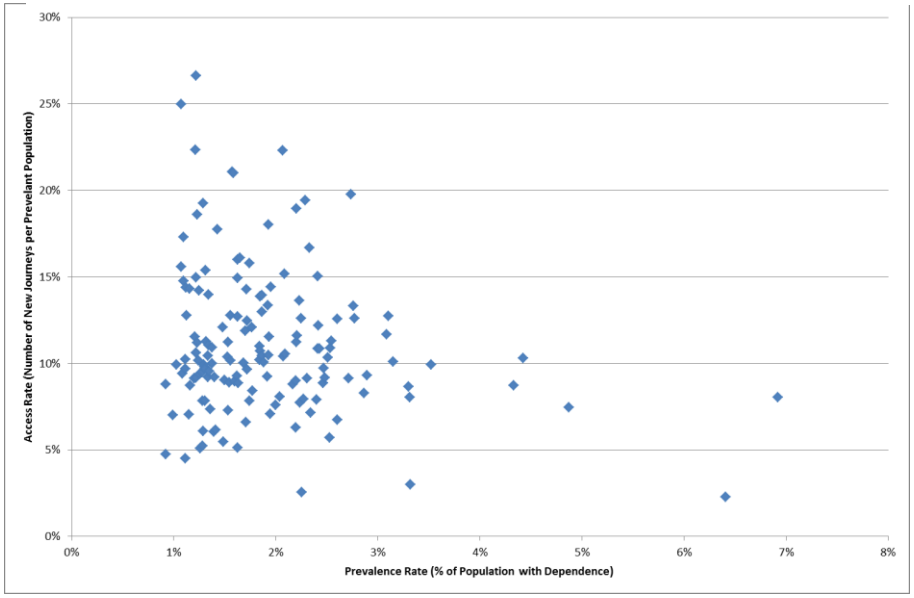


Figure 6.8 Scatterplot of Prevalence Rates and Access Rates



6.4.4 Results for Percentage of Clients Accessing Different Pathways

Table 6.4 National Proportions of Completed Treatment Journeys according to Pathways

	NDTMS Severity Group				
	0-15 Units per day	**16-30 units per day**	**31+**	**Medium or Higher Level plus Complex Needs**	**All**
Part A: Proportion receiving following types of treatment defined by setting					
Community psychosocial only	85%	74%	68%	76%	77%
Community with any pharmacology	10%	16%	16%	12%	14%
All residential	1%	2%	3%	3%	2%
All inpatient	4%	8%	13%	9%	7%
Total	100%	100%	100%	100%	100%
Part B: Proportion receiving treatments defined by use of pharmacology					
Any withdrawal only	4%	8%	11%	7%	7%
Any relapse prevention only	2%	3%	3%	2%	3%
Any withdrawal + relapse prevention	2%	4%	4%	4%	3%
Other, Undefined Pharmacology	5%	8%	9%	7%	7%
Subtotal Any Pharmacology (4 groups combined)	13%	23%	26%	20%	19%
Part C: Proportion receiving more or less "appropriate" pathways					
More appropriate	94%	2%	2%	2%	
possibly appropriate	1%	85%	76%	82%	
Less appropriate	5%	13%	21%	16%	
Total	100%	100%	100%	100%	

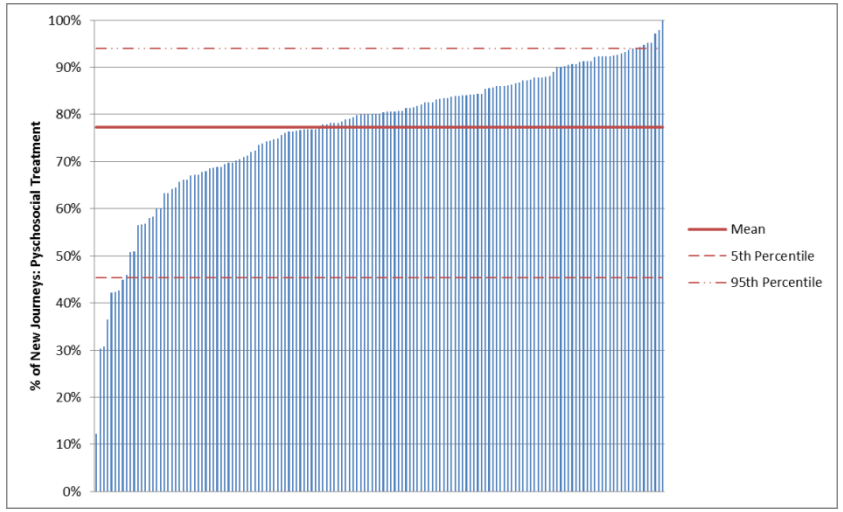
Table 6.4 Part A shows that 77% of client journeys were community psychosocial only, with 14% being in a community setting with pharmacological intervention alongside, 2% residential and 7% inpatient. This pattern is weighted more towards community psychosocial only pathways for the lower level drinking group (85%) and less so for the higher level (68% for those who are 31+ units per typical drinking day). Similarly, there is a higher rate of use of inpatient and residential based services for those with the higher level of drinking (13% and 3% for the 31+ group versus 4% and 1% for the <15 group).

Figure 6.9 examines the variation in these percentages by pathway across LAs. Figure 6.9a shows that the percentage of client journeys that were community psychosocial only ranges from the lowest LA at 13% to the highest at 100%, with the 5th and 95th percentile being 45% and 94% respectively. Comparison of Figure 6.9a with Figure 6.9b indicates that LAs with a low level of psychosocial only pathway use tend to be those with much higher use of community based pharmacological therapy e.g. the LA represented by the leftmost bar is 12% psychosocial only but 82% community based pharmacological therapy. The use of residential based therapy is more randomly patterned, ranging from less than 1% to 14% of client journeys. Similarly the use of inpatient based therapy ranges hugely across the LAs ranging from less than 1% to just over 40% of client journeys.

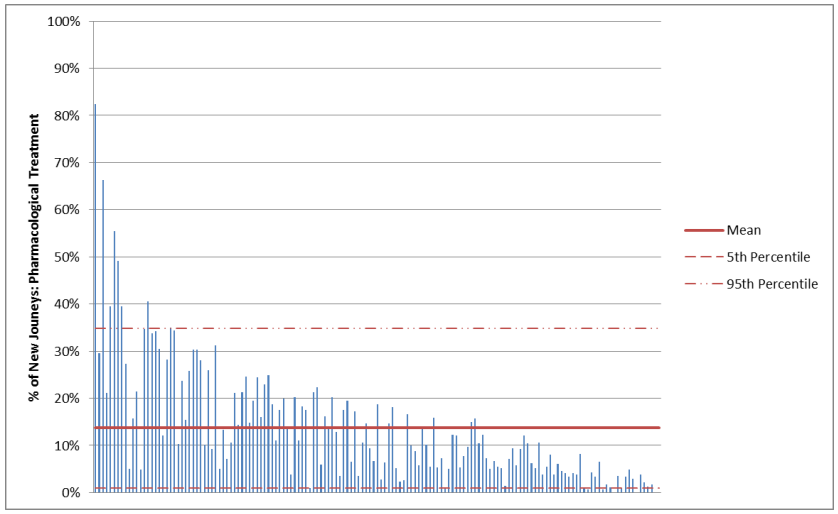
Table 6.4 Part B shows a similar pattern to Part A in that the use of pharmacological treatment is more substantially weighted towards clients with higher levels of drinking (26% for 31+ versus 13% for <15 units per day). These national average rates of use of pharmacological therapy for clients with the higher levels of consumption (16-30 and 31+) would be considered low in the light of NICE guidelines which indicate that people with moderate or severe dependence are recommended to have assisted withdrawal and relapse prevention medications.

Part C of Table 6.4 describes the use of the pathways we have classified indicatively as “more appropriate” and “less appropriate” as described in detail in Table 5.4 in Section 5. Amongst people drinking 0-15 units on a typical drinking day, 5% of clients were recorded as receiving a pathway considered “less appropriate”. This was higher however for those drinking 16-30 units (13%) and 31+ units (21%). Appendix 6.2 provides further detail on how the rates of use of the “more appropriate” pathway for each of the 4 client groups examined vary across Local Authorities.

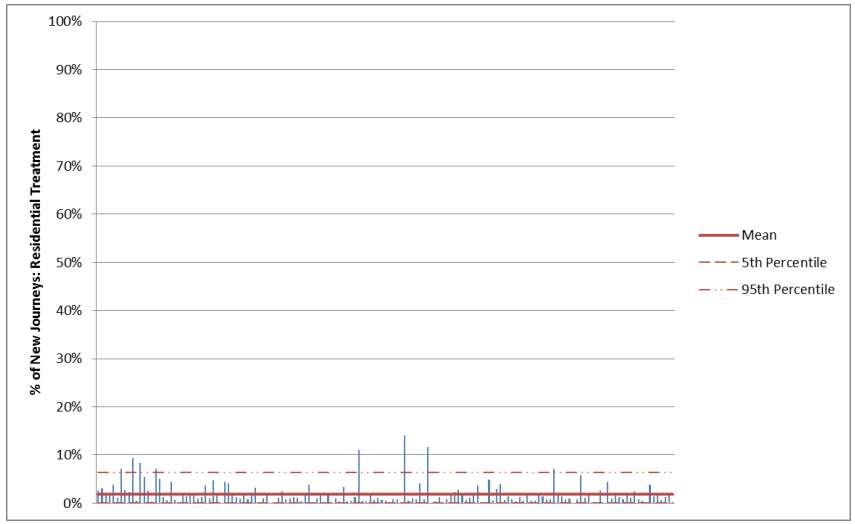
Figure 6.9 Setting / Type of Care across 151 Local Authorities - Proportions of Completed Treatment Journeys



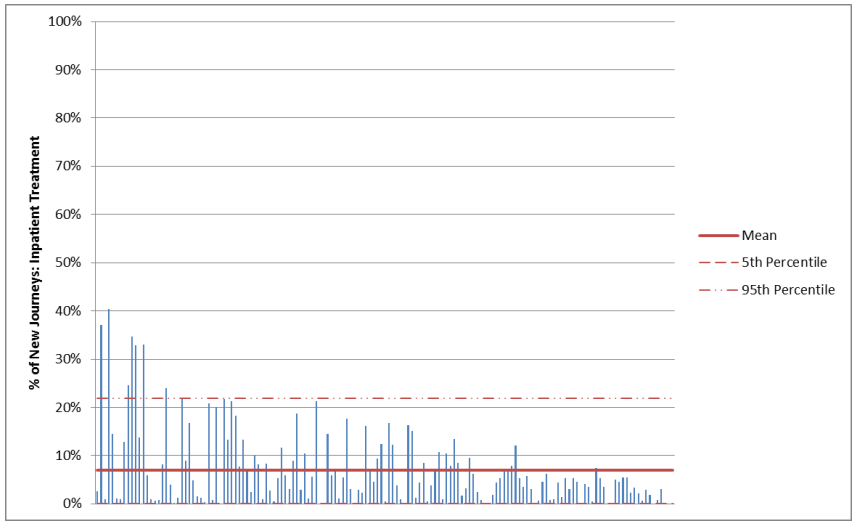
(a) % receiving psychosocial treatment only



(b) % receiving psychosocial and pharmacological treatment in community



(c) % receiving residential based care



(d) % receiving inpatient based care

6.4.5 **Results for Benchmarking Success Rates**

Table 6.5 summarises the overall outcomes of treatment with 61% of client journeys ending in a successful outcome nationally. This can be broken down into 33% of client journeys recorded as alcohol free and there being no further retreatment for that client within the next 6 months, a further 24% successfully treated with moderated non-problematic drinking and not retreated within 6 months and 2% alcohol free but retreated and 2% still drinking but then retreated within 6 months. The NICE CG115 guidelines suggested that abstinence would be a more appropriate outcome for moderate and severe dependence, whereas moderated non-problematic drinking outcome could be appropriate for mild dependence. For the remainder of clients 32% dropped out of treatment before successful completion, 6% were transferred to another service or police custody and 1% died. More detailed analysis on the proportion of successful outcomes achieved by setting and by client typical drinker day group is also given in section 5.3.

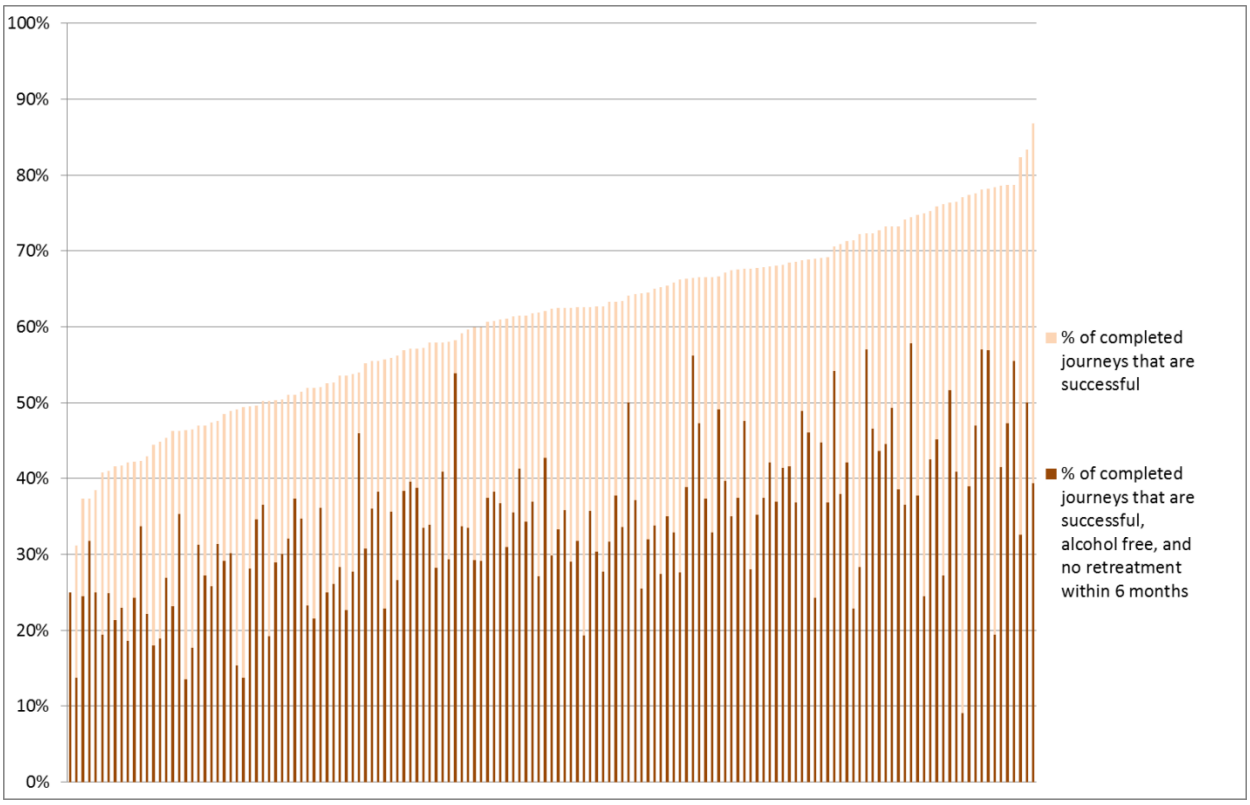
Table 6.5 National Proportions of Clients Achieving Successful Treatment Outcomes

Treatment Outcome	National
Success - Alcohol Free – Not Retreated within 6 months	33%
Success - Alcohol Free - Retreated within 6 months	2%
Success - Moderated Non-problematic Drinking - Not Retreated within 6 months	24%
Success - Moderated Non-problematic Drinking – Retreated within 6 months	2%
Subtotal of Successes	61%
Dropped Out	32%
Transferred to another Service or Placed into Custody	6%
Died	1%
Other/NK	0%
Total	100%

Figure 6.10 shows substantial local variation around the 61% national average success rate, with the lowest LA having a 25% success rate and the highest 86% (3.4 fold variation). The darker component of the bars in Figure 6.10 shows the percentage of client journeys which end successfully completed, alcohol free and not retreated within the following 6 months. Again, there is substantial, more than 6-fold, local variation around the 33% national average

for this statistic, with LAs ranging from as low as 9% up to as high as 57% of clients benefiting from this outcome.

Figure 6.10 Local Authority Variations in Proportions of Successful Treatment



6.5 Conclusions

This is the first study to analyse variations in access to specialist treatment services in Local Authorities in England using new estimates of prevalence of alcohol dependence. These are combined with measures of total numbers of clients accessing treatment and with numbers of new journeys to estimate access rates per prevalent population, including indicative analysis by severity groups. We split the treatment journeys into 22 different pathways reflecting recent clinical guidance from NICE and summarised these into four main categories for benchmarking purposes - psychosocial only, psychosocial with pharmacological treatments, residential based care and inpatient care. Analysis is also undertaken of variations in treatment outcomes. The key findings from the study are as follows:

F1. Overall access rates can be estimated by the numbers of clients in treatment at any point during the year 2013/14 which were 103,602, representing 14.1% of our estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services in England (penetration rate of 1 in 7.1).

F2. There were 78,055 people starting a new treatment journey within the year 1st April to 31 March 2014, 10.62% of the estimated prevalent population potentially in need (penetration rate 1 in 9.4). These figures vary by age and gender - 2% for 18-24 year olds, 7% for 25-34 year olds, 21% for 35-54 year olds and 17% for 55+.

F3. Indicative access rates by severity group can be estimated If we assume clients drinking 0-15 units on a typical drinking day in the last 4 weeks are most likely to be in the mild dependence, those drinking 16-30 units are likely to be moderate, those with 31+ units are likely to be severe. The indicative estimated clients starting a new journey access rate in 2013/14 is just over 7% for mild dependent clients, almost 10% for moderate clients, and almost 33% for severe clients.

F4. Variations are substantial across Local Authorities. Estimated prevalence of alcohol dependent people potentially in need of assessment for and treatment with specialist alcohol services after adjusting for local factors beyond age and gender shows roughly a seven-fold difference between the lowest and highest estimated Local Authorities.

F5. Variations in overall clients starting a new journey access rate across the 151 upper tier Local Authorities in England are even greater, from the lowest LA at 2.3% to the highest at 26.6% i.e. more than 11 fold variation. The variation is larger still for the indicative access rates by severity group, with mild, moderate and severe indicative rates varying

17 fold, 27 fold and 32 fold variation respectively. The range from the 5th to the 95th percentile in these rates is around 4-5 fold.

F6. Geographical analysis shows that estimated prevalence of dependence appears to be higher in certain areas e.g. the North East and North West. However for rates of access, the LAs around London and the South East tend to have higher access rates.

F7. Analysis of the different pathways used shows that 77% of client journeys were community psychosocial only, with 14% being in a community setting with pharmacological intervention alongside, 2% residential and 7% inpatient. This pattern is weighted more towards community psychosocial pathways for the lower level drinking group and more towards the use of inpatient and residential based services for those with the higher level of drinking.

F8. Variations in these percentages by pathway are substantial. The percentage of client journeys that were community psychosocial only from 13% up to 100%, with the 5th and 95th percentile being 45% and 94% respectively. LAs with a low level of psychosocial only pathway use tend to be those with much higher use of community based pharmacological therapy. The use of residential (ranging from less than 1% to 14% of client journeys) and inpatient based therapy (ranging from less than 1% to just over 40%) is more randomly patterned across the LAs.

F9. Use of pharmacological treatment is more substantially weighted towards clients with higher levels of drinking. The national average rates of use of pharmacological therapy for clients with the higher levels of consumption (16-30 and 31+) would be considered low in the light of NICE guidelines which recommend assisted withdrawal and relapse prevention medications.

F10. Analysis of pathways we have classified indicatively as “more appropriate”, “possibly appropriate” and “less appropriate” shows that only 5% of clients drinking 0-15 units on a typical drinking day, were recorded as receiving a pathway considered “less appropriate”, but this was slightly higher for those drinking 16-30 units (13%) and 31+ units (21%).

F11. Outcomes of treatment were successful for 61% of client journeys nationally. This included 33% of client journeys recorded as alcohol free with no further retreatment within 6 months, 24% successfully treated with moderated drinking and not retreated within 6 months, 2% alcohol free but retreated and 2% successful whilst still drinking and retreated within 6 months. 32% dropped out of treatment before completion, 6% were transferred to another service or police custody and 1% died.

F12. Variation in success rates is large, with the lowest LA having a 25% success rate and the highest 86%. For the outcome of successfully completed, alcohol free and not retreated within the following 6 months, LAs range from 9% up to 57%.

F13. Measures of AUDIT and SADQ are crucial to benchmarking of access rates by severity groupings and we strongly advise that they be collected at assessment and recorded routinely within the National Drug Treatment Monitoring System for clients with alcohol problems coming in to treatment.

There are several limitations to the evidence and analysis. Firstly, the denominator in the calculation of these access rates is the estimated prevalence of people potentially in need of assessment for and treatment with specialist alcohol services. Limitations in these prevalence estimates are discussed in detail in previous work (Section 0) These include the limitations of the APMS 2007 household survey and possible under-sampling of people with alcohol dependence, limitations of the statistical modelling in which APMS participants' geographical location is only known to government office region level, and the difficulties in quantifying an uncertainty range for the denominator. Secondly, the numerator in the calculation of the access rates is based entirely on the analysis of the NDTMS. Of course this excludes treatment providers and treatments which do not provide their data to that system, though all publicly funded structured community and residential treatments should be included. The limitations in both the numerator and denominator estimation mean that the access rate comparisons made here need to be considered carefully. We cannot be exactly certain that the access rates and other benchmark comparisons for each LA are exactly as estimated here, but these methods do represent the best use of the data and evidence available and are a substantial step forward from previous benchmarks of numbers treated per estimated people with a score of AUDIT 16+. Thirdly, we have presented two access rates – one for clients in the system at any point during the year, and one for the number of clients starting a new treatment journey during the calendar year. We present both because some LA's could have a high access rate for numbers in due to people staying in treatment for a long time beyond the calendar year before but might not provide high access to very many new clients per year. Fourthly, a classification of severity is lacking within the NDTMS. It would be useful to have both AUDIT and SADQ recorded at the point of triage assessment at the beginning of the treatment journey. The units consumed on a typical drinking day in the previous four weeks does provide some proxy for severity but is indicative rather than a validated clinical or research tool.

Returning to the relationship between our prevalence estimates and utilsation of specialist treatment, we want to emphasise that our aim in the project is to estimate both met and unmet need and hence provide quantification of geographic disparities in access rates. Specialist treatment utilisation data on their own are not appropriate to inform unmet need (for this we need prevalence estimates) but are useful as the numerator for benchmarking access rates. We determined that HES admission rates for alcohol dependence related diagnoses (although also a form of utilisation variable – in this case of hospital services) were more fit for purpose for estimating prevalence than were the direct data on specialist service use from NDTMS because the former are much less subject to variations in the supply, organisation and capacity of specialist treatment service.

In spite of the limitations in the evidence available to estimate prevalence, the research team does not consider the local estimates we have generated to be subject to any systematic bias aside from the issue that homeless people are not sampled in the APMS. We did not conceive of any other substantive reasons for specific biases or a hypothesised direction of bias. One reviewer did comment that there could be variations in access to other providers, who are not captured in the NDTMS data system, but discussions with stakeholders did not identify any evidence or datasets which would enable such analysis or help quantify the relationship between such services and the levels of commissioned specialist treatment in this report.

The implications of these analyses for decision makers at local and national level are important. Such large variations in estimated access rates, use of different treatment pathways and success rates do not appear to be justified by differences in local estimated needs. LAs should consider using these statistics to plan the development of their services. It is planned that these benchmarking analyses will be made available to both commissioners and providers through Public Health England. Further updating over time will also be needed as new data become available each year from NDTMS and as the new APMS 2014 data becomes available to researchers. The research team has also worked to combine these data to undertake what if modelling of changing access rates on future prevalence, costs of services, costs to the NHS and mortality. This has been done using the Sheffield STreAM Scenario Modeller version 1.0.

Our research finds substantial variations in access rates per population in need and this generates an interesting set of research questions regarding the underlying causes of access

rate variations in practice, future investigation of which would best involve a mixed methods qualitative and quantitative research design.

These methods are potentially generalisable to other localities and countries. One would be able to generate the denominator of the prevalent population potentially in need estimates if equivalent data to APMS were available i.e. on the population age/gender/ deprivation measure quintiles structure, and on hospital admission rates as measured using ICD10. The analysis of treatment access rates and pathways would also depend upon the availability of a national monitoring system for specialist treatments in alcohol dependence. Many countries or regions have some form of system, and where systems are comparable, it could potentially be useful to undertake national level comparisons across countries using some of the measures developed here.

By combining estimates of the local prevalence of people potentially in need of assessment for and treatment by specialist alcohol services with NDTMS data on numbers of clients accessing those services we have, for the first time, compared the penetration rates of treatment services across Local Authorities. The services that were commissioned in Local Authorities in 2013/14 varied dramatically in terms of the proportion of the in-need population in treatment and starting treatment, as well as in the types of treatments delivered and in the outcomes achieved. The variation does not appear to be explained by the make-up of the estimated local in-need population. The results presented here should be carefully considered by Local Authorities and services should be commissioned to reflect current best-practice guidelines and tailored to the local in-need population. We advise that national and local decision makers make use of this work as an aid to achieving this goal.

6.6 Appendices

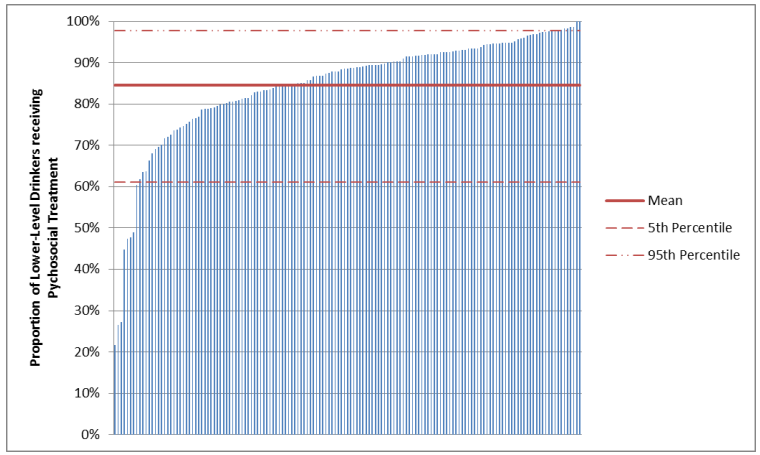
Appendix 6.1

Pathways

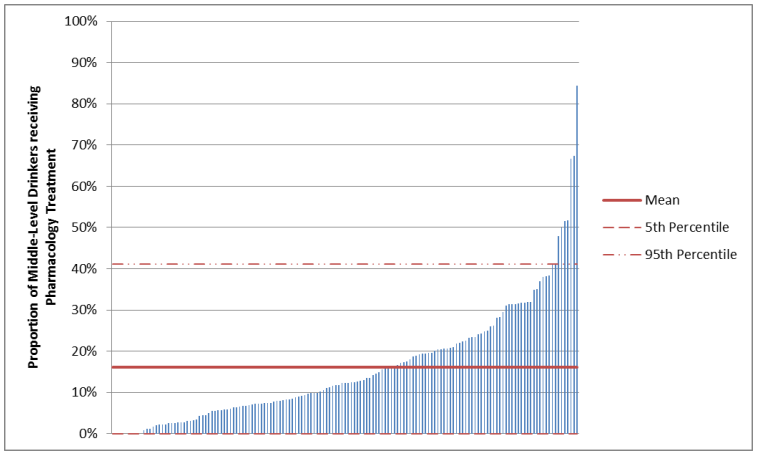
No	Pathway Name	Setting Category	Pharmaco-logical
1	Community psychosocial only	Community	No
2	Community with pharmacologically assisted withdrawal	Community	Yes
3	Community with pharmacologically assisted relapse prevention	Community	Yes
4	Community with pharmacologically assisted withdrawal and relapse prevention	Community	Yes
5	Community treatment with-non-standard pharmacological treatment	Community	Yes
6	Community pharmacology of unknown type in an incorrect order	Community	Yes
7	Inpatient treatment without any pharmacological treatments	Inpatient	No
8	Inpatient treatment without pharmacological components but ongoing community psychosocial	Inpatient	No
9	Inpatient assisted withdrawal	Inpatient	Yes
10	Inpatient assisted withdrawal followed by community psychosocial	Inpatient	Yes
11	Inpatient assisted withdrawal followed by community psychosocial and pharmacological	Inpatient	Yes
12	Inpatient treatment with non-standard pharmacological treatment	Inpatient	Yes
13	Composite inpatient interventions	Inpatient	Yes
14	Anything else with any inpatient treatment	Residential	No
15	Residential treatment without any pharmacological treatments	Residential	No
16	Residential treatment without pharmacological components but ongoing community psychosocial	Residential	No
17	Residential assisted withdrawal	Residential	Yes
18	Residential assisted withdrawal followed by community psychosocial	Residential	Yes
19	Residential assisted withdrawal followed by community psychosocial and pharmacological	Residential	Yes
20	Residential treatment with non-standard pharmacological treatment	Residential	Yes
21	Composite residential interventions	Residential	Yes
22	Anything else with any residential treatment	Unknown	No

Appendix 6.2

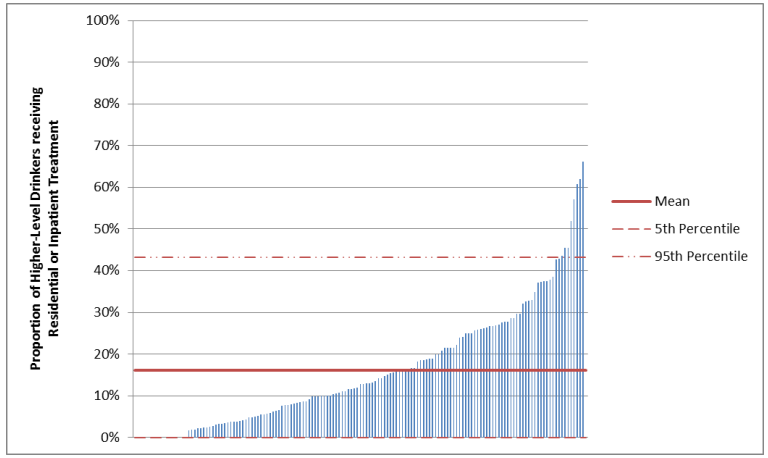
Figure 6.11 National Proportions of Completed Treatment Journeys by Drinker Groups



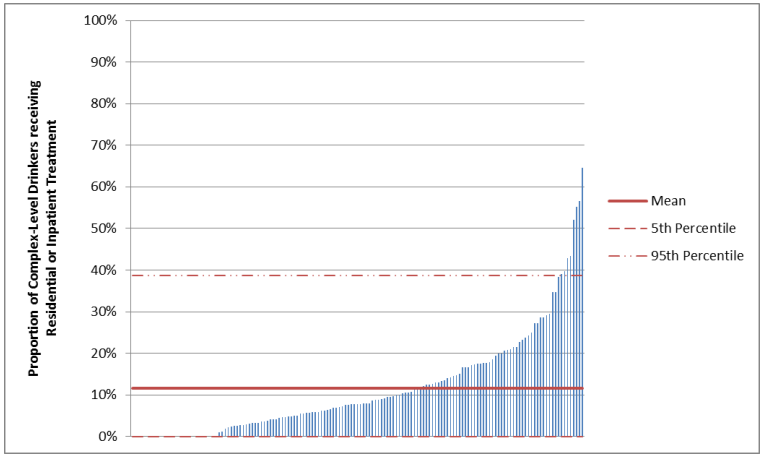
(a) % typically drinking 0-15 units a day receiving psychosocial treatment only



(b) % typically drinking 16-30 units a day receiving psychosocial and pharmacological treatment in community



(c) % typically drinking 31+ units a day receiving inpatient or residential based care

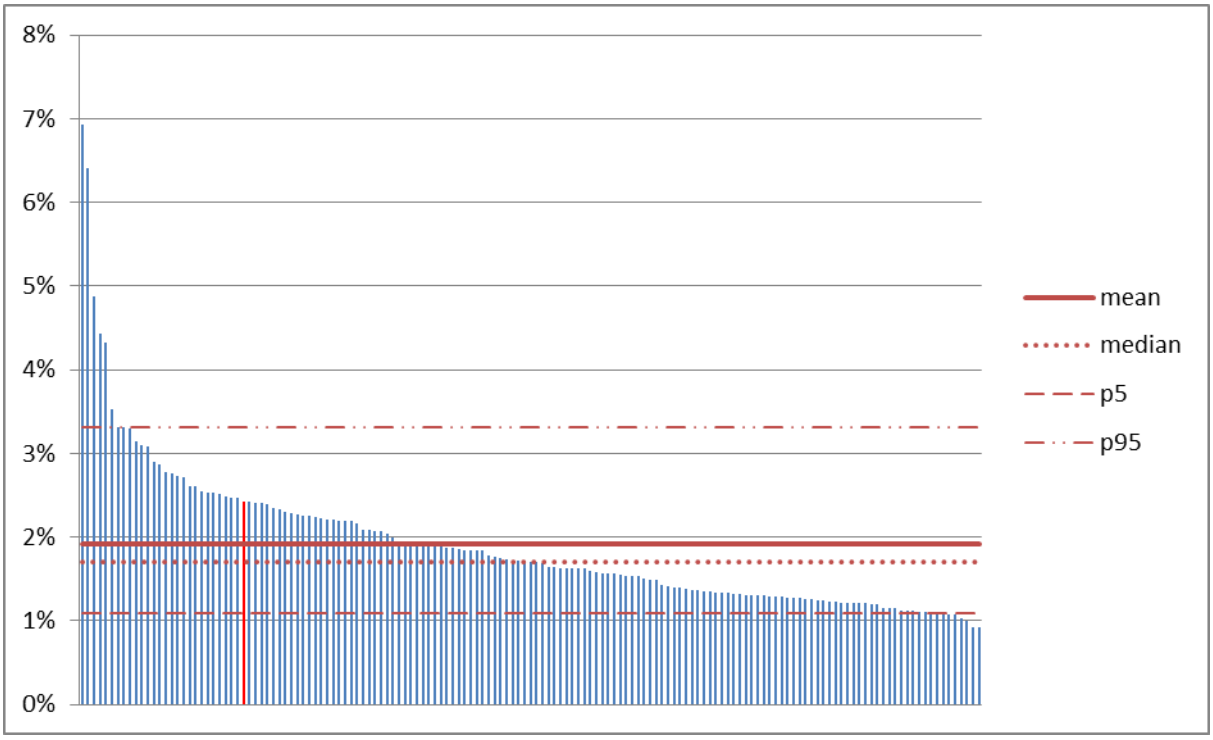


(d) % typically drinking 16+ units a day with complex needs receiving inpatient or residential based care

Appendix 6.3 A Case Study Example of the Benchmarking Analysis: Leeds

In this Appendix, we report a series of benchmarking analyses for the Leeds Local Authority. We chose Leeds as a case study to examine because it is a large service with several notable features some of which make it quite typical of LAs across the country and others which make it different. The analysis and interpretation is purely that of the authors based on the statistical data alone.

Figure 6.12 Leeds Benchmarked - Estimated Prevalence of People with Alcohol Dependence potentially in need of specialist assessment and treatment



Leeds has a slightly higher level of dependence than the national average.

Figure 6.13 Leeds Benchmarked - Estimated Overall Numbers in Treatment in 2013/14 per Prevalent Population in 151 English Local Authorities

Specialist Treatment Services - Total In Treatment Numbers

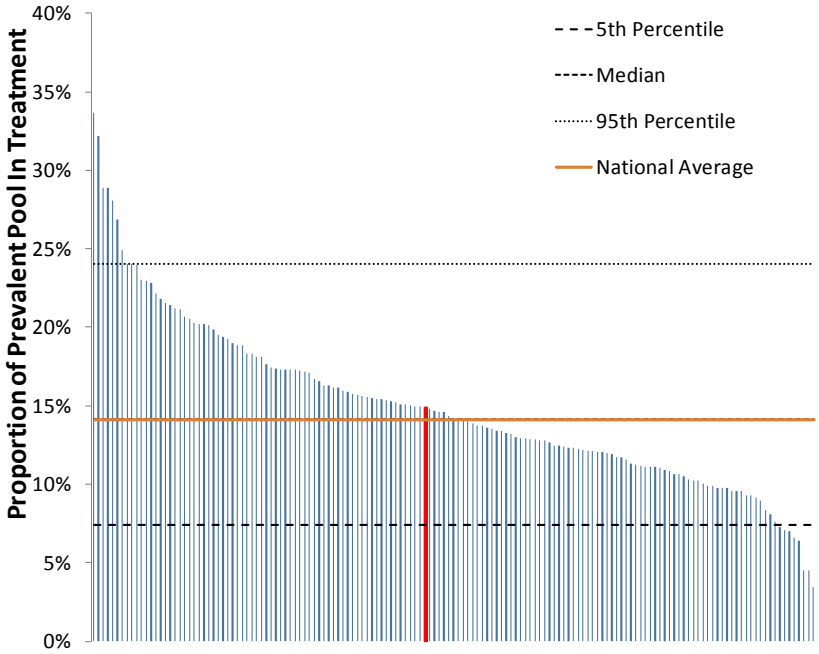
- As apposed to the access numbers presented above, which present the total number of new journeys starting in the year, the in treatment numbers present the numbers of people in treatment at any point during the year regardless of when their journey began or ended

	Number of people	In treatment (% of prevalent)	Ranking (1 high - 151 low)
All in treatment	2,169	14.9%	70
Low and middle level in treatment	1,387	19.8%	71
Higher level in treatment	848	61.3%	35

The proportion of the estimated prevalent population in treatment each year is high, more than the 75th percentile of all Local Authorities

The proportion of the estimated prevalent population in treatment each year is low, less than the 25th percentile of all Local Authorities

Plot: All in treatment



Overall Leeds has around the national average rate for the number of people accessing treatment at some point during 2013/14 – a figure of 14.9% of the estimated prevalent in need population. The table shows a rank of 70 out of 151 LAs. The indicative rate of numbers of clients with the higher level of typical drinking day (31+ units) per estimated number of people in Leeds with severe dependence is slightly higher than the national average with a rank of 35 out of 151 LAs.

Figure 6.14 Leeds Benchmarked - Estimated New Treatment Journeys in 2013/14 per Prevalent Population in 151 English Local Authorities

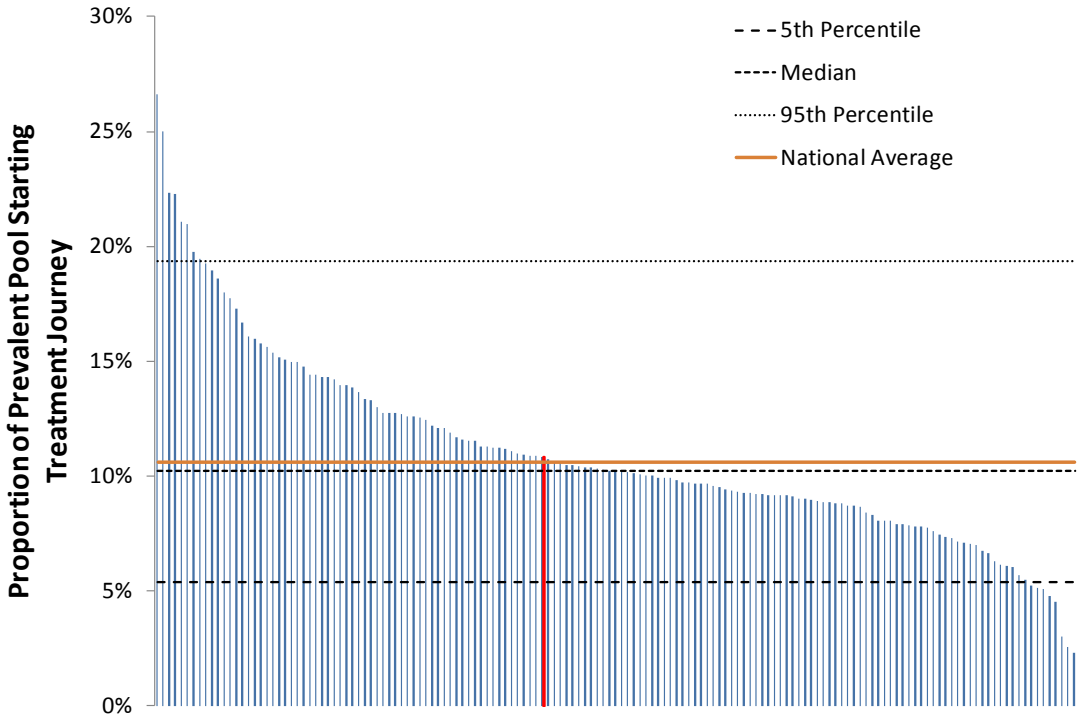
Specialist Treatment Services - New Journeys

Local Authority: Leeds Plot: All in treatment

	Number of people	Access Rate (% of prevalent)	Ranking (1 high - 151 low)
All in treatment	1,580	10.8%	64
Low and middle level start treatment	1,030	14.7%	74
Higher level start treatment	604	43.7%	41

The proportion of the estimated prevalent population starting treatment each year is high, more than the 75th percentile of all Local Authorities

The proportion of the estimated prevalent population starting treatment each year is low, less than the 25th percentile of all Local Authorities



The access rate for Leeds is marginally higher than the national average i.e. the number of new client journeys per estimated prevalent population is 10.8% which is ranked 64th out of 151 LAs.

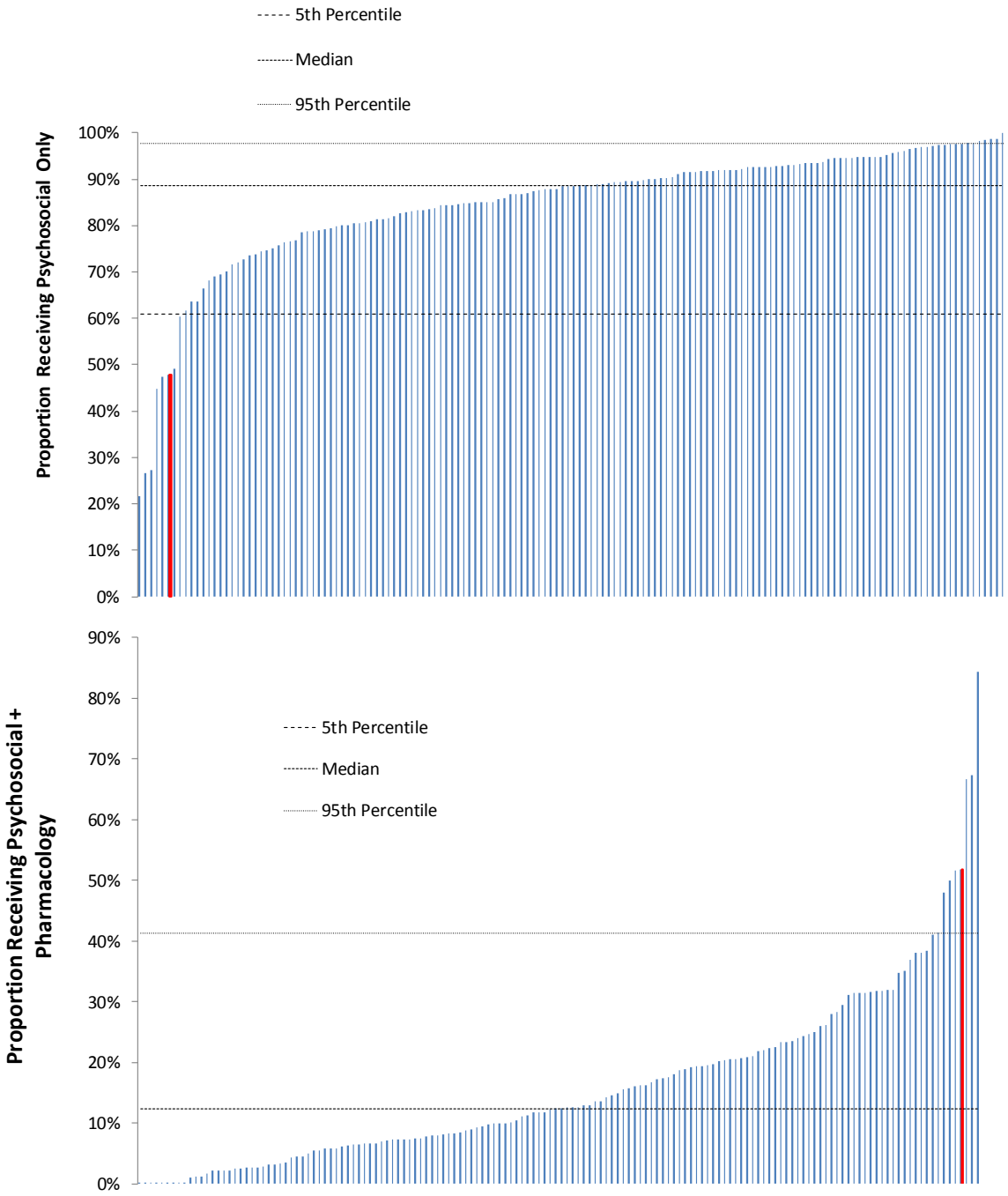


Figure 6.15 (a) % typically drinking 0-15 units a day receiving psychosocial only (b) % typically drinking 16-30 units receiving psychosocial & pharmacological treatment in community

The percentage of clients that are assigned to different pathways shows Leeds with a substantially different pattern to that nationally. There is a much lower proportion of people receiving psychosocial only treatment (rank 147 out of 151) and a correspondingly higher proportion receiving pharmacological and psychosocial treatment in the community setting (rank 5 out of 151)

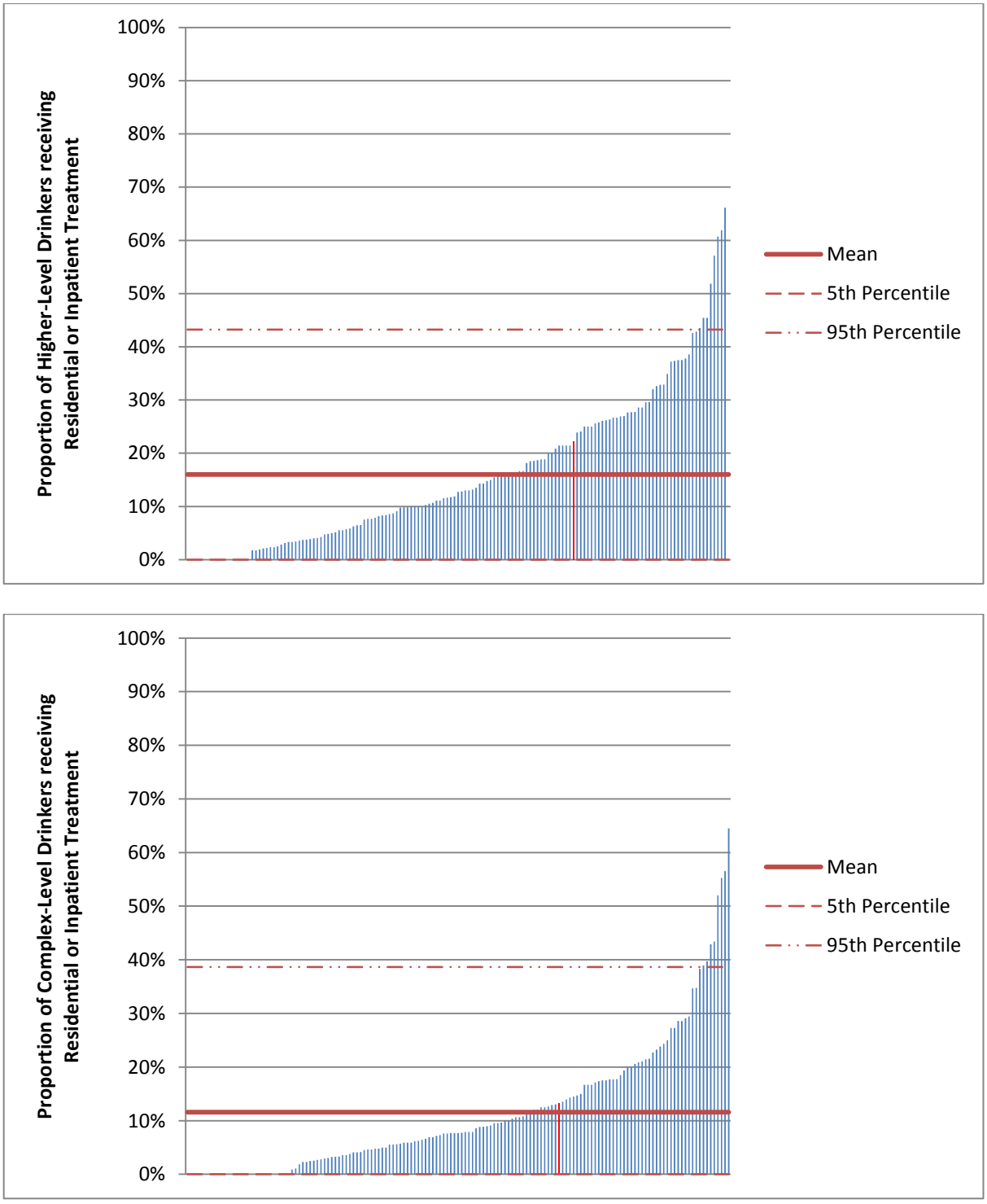


Figure 6.16 (c) % typically drinking 31+ units a day receiving inpatient or residential based care (d) % typically drinking 16+ units/day & complex needs receiving inpatient/residential based care

Leeds has a higher than national average proportion of those drinking 31+ units per day that receive residential or inpatient based treatment. This is also true for the people who are typically drinking 16+ units/day and have complex needs.

Treatment Pathway Usage by Setting

- Treatments can be categorised by the setting in which they are delivered: Community, Community with Pharmacology, Inpatient or Residential
- Treatment pathways can occur in multiple settings (e.g. 'Residential assisted withdrawal followed by community psychosocial'), but each pathway has been assigned a subjective 'most intensive' setting which is shown in the first table above
- The proportion of clients receiving a treatment pathway under each setting is summarised in this section, with a comparison against the national average

Proportion receiving following types of treatment	NDTMS Severity Group				
	Lower Level	Middle Level	Higher Level	Medium or Higher Level plus Complex Needs	All
Leeds					
Community psychosocial only	48%	34%	28%	62%	43%
Community with any pharmacology	49%	52%	50%	24%	49%
Any residential	3%	13%	19%	10%	7%
Any inpatient	0%	1%	3%	3%	1%
National					
Community psychosocial only	85%	74%	68%	76%	77%
Community with any pharmacology	10%	16%	16%	12%	14%
All residential	1%	2%	3%	3%	2%
All inpatient	4%	8%	13%	9%	7%

Below the national average

Above the national average

Table 6.6 Benchmarking Leeds – Access to Pharmacology as part of Treatment

Treatment Pathway Usage of Pharmacology Summary

- The 22 treatment pathways can be categorised by whether or not they include any type of pharmacology
- The proportion of clients receiving pharmacology is summarised below
- Only those pathway where the pharmacology is known to have either been of a 'relapse prevention' type or to assist with 'withdrawal' have been included (e.g. Residential treatment with non-standard pharmacological treatment is not included)

Proportion of clients receiving following types of treatment	NDTMS Severity Group				
	Lower Level	Middle Level	Higher Level	Medium or Higher Level plus Complex Needs	All
Leeds					
Any withdrawal only	0%	5%	13%	6%	3%
Any relapse prevention only	0%	0%	0%	0%	0%
Any withdrawal + relapse prevention	1%	1%	2%	2%	1%
Other Undefined Pharmacology	49%	55%	50%	27%	50%
National					
Any withdrawal only	4%	8%	11%	7%	7%
Any relapse prevention only	2%	3%	3%	2%	3%
Any withdrawal + relapse prevention	2%	4%	4%	4%	3%
Other Undefined Pharmacology	5%	8%	9%	7%	7%

Below the national average

Above the national average

This table shows Leeds with a lower rate of use of withdrawal and relapse prevention pharmacology overall than the national average. However this excludes the pathway “Community with Other Pharmacology” and it appears that coding of the pharmacological treatments in terms of sub-interventions in Leeds does not specify the type of pharmacology as withdrawal or relapse prevention but rather other codes such as maintenance. When we compare this table to the previous one in which the “Community with Other Pharmacology” pathway is included and which shows Leeds considerably above national average rates for treatment in the setting “Community with any pharmacology”. This demonstrates that interpretation of the figures presented here requires some knowledge of the datasets locally.

Table 6.7 Benchmarking Leeds – Access to "More Appropriate" and "Less Appropriate" Pathways

Treatment Pathway Appropriateness Summary

- By considering the NICE CG 115 Guidelines (1) it is possible to classify pathways according to whether or not they are likely to represent more or less appropriate treatment for a client in a severity group
(1) NICE, 2011. *Alcohol-Use Disorders: The NICE Guideline on Diagnosis Assessment and Management of Harmful Drinking and Alcohol Dependence* ,
- The proportion of clients being treated using the naïve interpretation of appropriateness based on the NICE CG115 guidelines are presented below

Proportion of clients receiving following types of treatment		NDTMS Severity Group			
		Lower Level	Middle Level	Higher Level	Medium or Higher Level plus Complex Needs
Leeds					
	More appropriate	97%	0%	2%	2%
	possibly appropriate	0%	86%	41%	70%
	Less appropriate	3%	14%	57%	28%
National					
	More appropriate	94%	2%	2%	2%
	possibly appropriate	1%	85%	76%	82%
	Less appropriate	5%	13%	21%	16%

Below the national average

Above the national average

The indicative analysis suggests that Leeds has a slightly lower percentage of people in the lower level drinking group (0-15 units per day) receiving what we have classified as potentially "less appropriate" pathways. However – there are slightly more than the national average receiving "less appropriate" pathways in the middle and higher drinking groups.

Table 6.8 Benchmarking Leeds – Outcomes

Below are the proportion of journeys with each type of outcome, with successes/not success combined into a single category in the second column

National		
Treatment Outcome		
Success - Alcohol Free - NR6M	33%	61%
Success - Alcohol Free - R6M	2%	
Success - Drinking - NR6M	24%	
Success - Drinking - R6M	2%	
Dropped Out	32%	39%
Trans-in Custody	6%	
Died	1%	
Other/NK	0%	

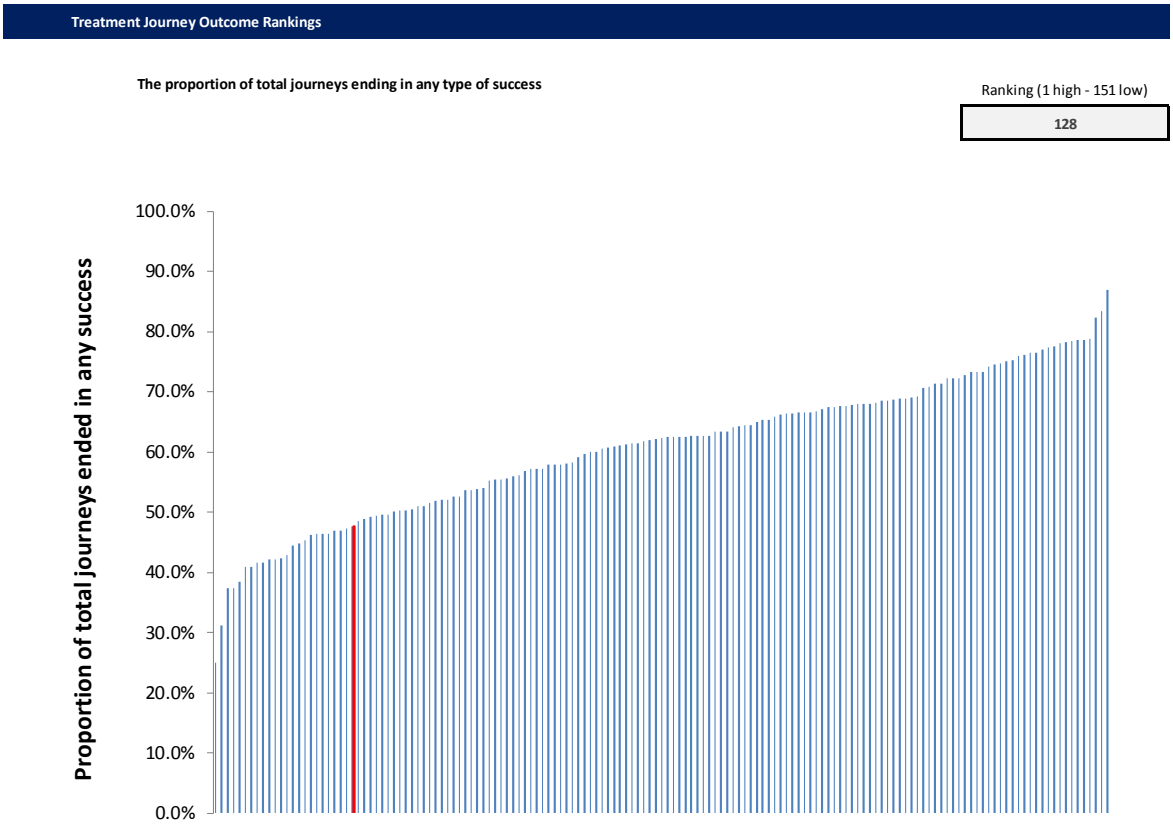
Leeds		
Treatment Outcome		
Success - Alcohol Free - NR6M	31%	47%
Success - Alcohol Free - R6M	2%	
Success - Drinking - NR6M	13%	
Success - Drinking - R6M	1%	
Dropped Out	45%	53%
Trans-in Custody	6%	
Died	1%	
Other/NK	0%	

Leeds has slightly lower levels of success rates than the national average – 47% for Leeds versus 61% nationally. The rates for the outcome – successfully completed journey, alcohol free with no retreatment within 6 months are very close to national average. The percentage achieving success with moderated drinking is much lower – 13% for Leeds versus 24% nationally. This is reflected in the higher dropout before completion percentage – 45% in Leeds versus 32% nationally.

Figure 6.17, Figure 6.18, Figure 6.19 show that (a) Leeds has a lower level of success overall than the national average, (b) Leeds is close to the average level of alcohol free and not retreated within 6 months and (c) and a slightly lower percentage of successful journeys which do not require retreatment within 6 months.

Figure 6.17 Benchmarking Leeds – percentage of journeys ending in any success

Figure 6.18 Benchmarking Leeds – % journeys success, alcohol free, not retreated in 6 months



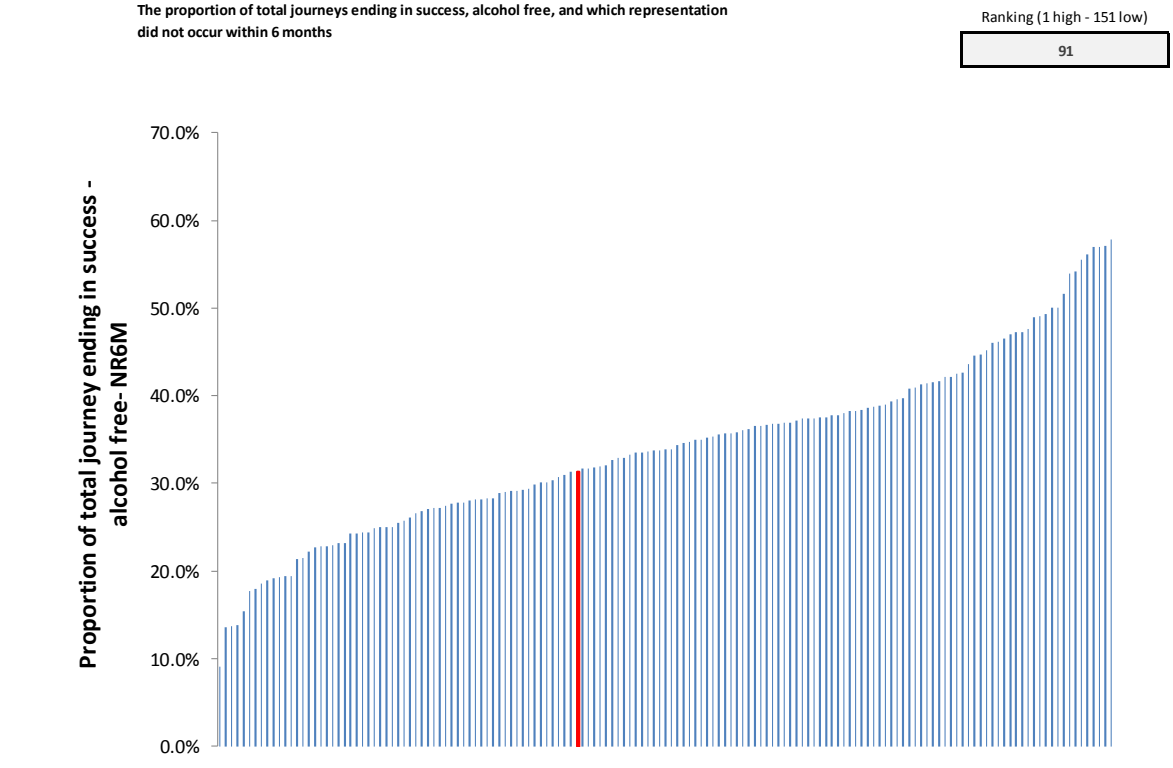


Figure 6.19 Benchmarking Leeds – percentage of successful journeys which do not require retreatment within 6 months

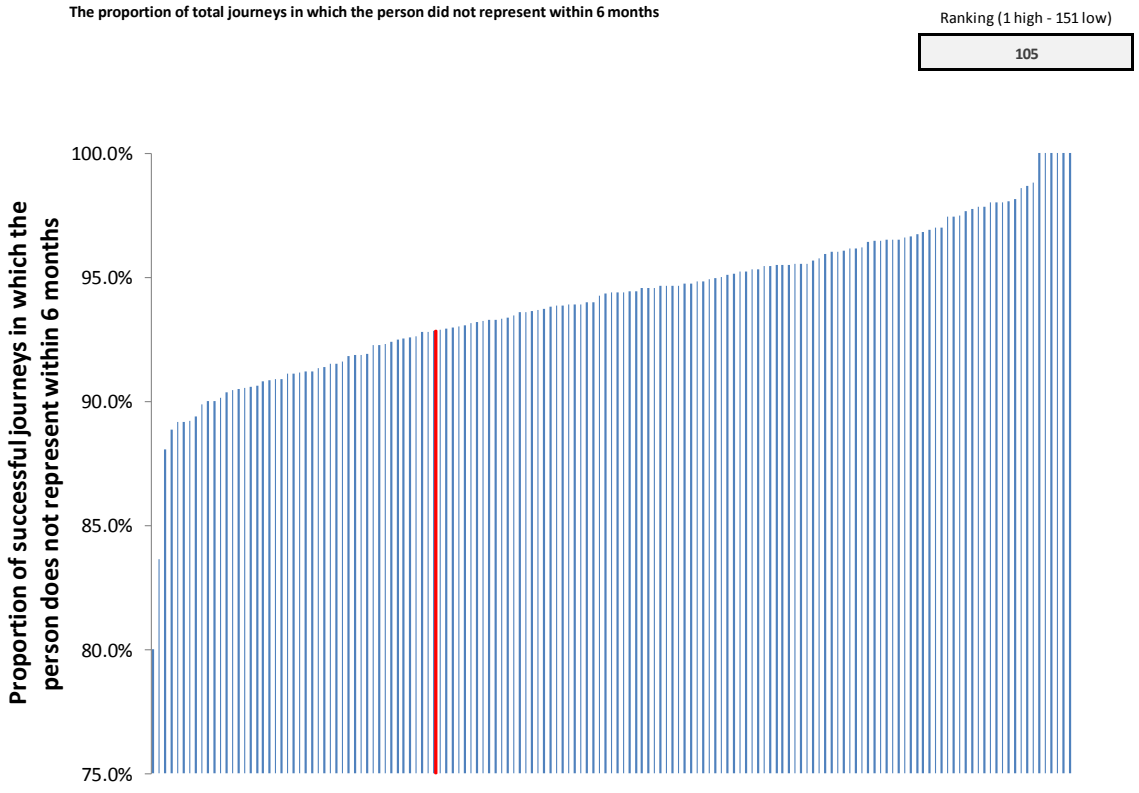


Figure 6.17, Figure 6.18, Figure 6.19 show the position of Leeds in relation to outcomes from treatment.

Leeds is ranked 128th in terms of percentage of journeys ending in any success. The ranking is higher (91st) for the percentage of journeys with the outcome successful, alcohol free, and not receiving retreatment within 6 months. The ranking is similar (105th) for percentage of successful journeys which do not require retreatment within 6 months.

7 Estimating the proportion of people with alcohol dependence who would be amenable to specialist alcohol treatment in England using Alcohol Toolkit Survey data on past year motivation to cut down drinking

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7.1 Abstract

Background: Among people who are alcohol dependent, at any point in time there is a proportion who are *not* currently accessing specialist treatment, but who *would do so* if it was available and accessible (i.e. *amenable* to treatment). The size of the amenable population is a relevant consideration for commissioners because it signifies the extent to which a service system could potentially be expanded while still remaining in demand. However, there is a lack of published evidence with which to inform an estimate of amenability. In this paper we aim to use an existing dataset, the Alcohol Toolkit Study (ATS), a monthly cross sectional survey of approximately 1,700 adults, to produce an estimate of the proportion of people with alcohol dependence who would be amenable to treatment.

Method: We used data from 19 monthly waves of the ATS including data from 7,948 individuals aged 18+ years who completed the Alcohol Use Disorders Identification Test (AUDIT) (scoring >4 on AUDIT-C or >7 on AUDIT) and who also provided data on the ATS question on 'motivation to reduce' alcohol use. Weighted logistic regression analysis was undertaken to explore the relationship of age group, sex, and AUDIT category (8-16, 16-19 and 20+) as predictor variables two bivariate variables based on responses to the 'motivation to reduce' item; *Desire AND intention to cut down* (i.e. in the near future) and *Desire to cut down* (within any time frame). These outcome variables were considered as proxies for amenability. The results of the regression analysis were used to estimate the proportion of people with possible alcohol dependence (i.e. AUDIT score 20+) who may be amenable to treatment.

Results: Motivation to cut down drinking in the near future was significantly associated with age and AUDIT score category, with 35-54 year olds and the heaviest drinkers being likely to want to cut

down. Among the heaviest drinking group (AUDIT score 20+), we estimate 33.2% would be willing to consider treatment in the near future and 51.0% within an unspecified time frame.

Conclusion: Using existing data, we have been able to provide an estimate of the proportion of people drinking at a level consistent with alcohol dependence who may be amenable to treatment. This information may be useful to those planning treatment service systems in determining the likely scale of unmet need.

7.2 Background

Alcohol dependence, estimated to affect 3.6% of adults in England[5], is associated with many negative health and social consequences[53]. Specialist alcohol treatment services are available to assist people with alcohol dependence and may involve a range of interventions from community based psychosocial treatment (e.g. counselling), through to medically managed withdrawal, residential rehabilitation and pharmacological and non-pharmacological relapse prevention. There is a body of evidence for the effectiveness of different treatment interventions and this is captured in current UK guidelines for alcohol treatment which recommends treatment type according to the severity of alcohol dependence and the circumstances of the individual (for example, whether there are complex needs present such as comorbid mental health problems).[1] However, there is also evidence to suggest that there is a substantial gap between treatment need as measured by prevalence of alcohol dependence and actual treatment provision as measured by treatment access rates.[5] Further, there is disparity between geographic areas in England in treatment availability that is not accounted for by differences in underlying prevalence.[5]

The apparent gap between potential specialist alcohol treatment need and actual treatment provision, and the geographic inequities in treatment access rates across England, suggests it may be useful for treatment commissioners to have information specific to their area available to inform service system planning and resource allocation decision making. In 2014, the Department of Health commissioned our research group to develop a dynamic computerised model to: provide information to alcohol treatment commissioners regarding the prevalence of alcohol dependence in their local area relative to current levels and mix of specialist alcohol treatment service provision (i.e. treatment access rates); compare their current treatment access rates with other areas and the national average; and to model alternative scenarios of service provision. Outputs for the scenario modelling include impact on treatment outcomes, treatment capacity requirements, resource costs, alcohol-related deaths and prevalence of alcohol dependence. The intention is that improved information will support commissioners in their decision making to improve specialist alcohol treatment access rates and reduce geographic inequity.

Although there is evidence for its effectiveness, not all people who are alcohol dependent and who might benefit from treatment will seek or receive it.[74] Among people who are alcohol dependent, at any point in time there is a proportion who are *not* currently accessing specialist treatment, but who *would do so* if it was available and accessible. We call this the proportion of people with alcohol dependence who are *amenable* to treatment. The size of the amenable population is an indicator of the scale of service need within a service system and is a relevant consideration for commissioners because it signifies the extent to which a service system could potentially be expanded while still remaining in demand. An estimate of amenability is therefore an important parameter for our dynamic scenario modelling.

We initially sought to use an existing estimate (or estimation method) for determining amenability. However, academic database searching revealed only a small literature, some of which was dated and none of which was directly suitable for our purpose. For example, Rush estimated that each year a treatment system should aim to treat 10-20% of "problem drinkers and alcohol dependent drinkers" [4]. This figure took account of not only the size of the target population, but also the anticipated growth of this with newly alcohol dependent people and the relapse rate to alcohol dependence among those who have received treatment. However, this Canadian figure was published a quarter of a century ago. More recently, data from the US National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative longitudinal population survey, showed only 8.5% of those meeting the criteria for substance abuse or dependence (i.e. a broader group than 'alcohol dependent') perceived the need for treatment. [75] This perception was associated with significantly greater likelihood of having used services by 3-year follow up. In a separate analysis of the same dataset, half of those with a previously untreated substance use disorder at baseline remitted without treatment within 3 years compared to 18% who sought treatment during the follow up period [76]. Together, these two studies support the argument that not all people with a substance use disorder necessarily require treatment; however, these studies were not specific to alcohol *dependence*, so may under-estimate the need and willingness for treatment among a more narrowly defined group. Finally, considering population prevalence of alcohol dependence relative to treatment utilization, it has been found that in England only a small proportion of the potentially in-need population access treatment (6%) relative to other comparable countries (e.g. Switzerland 15%, Spain 18%, Italy 24%).[77] As there is no reason to suppose there would be a difference in the uptake of available treatment between countries, this suggests amenability is higher than current England access rates (i.e. we can infer that there are more people with alcohol dependence in England who would be willing to access treatment than who currently do). In summary, the literature supports the argument that the size of the amenable population is

smaller than the total population with alcohol dependence, and larger than the number of people actually receiving treatment, but does not provide us with a current estimate relevant to England.

In addition to published evidence, we also sought the advice of our project stakeholder group (including service users, service providers, Local Authority commissioners, clinical experts, Public Health England and the Department of Health). Specifically, we asked whether an elicitation exercise conducted with experts might yield an estimate of the proportion of people with alcohol dependence amenable to treatment. The group identified that a single estimate was unlikely to be appropriate, as there are several factors which may potentially be related to higher or lower amenability – especially age, gender, and severity of dependence; a view supported by NESARC treatment utilization data.[74] However, stakeholders also indicated that it was unclear what effect these factors would exert (for example, more severely dependent individuals might be closer to seeking treatment due to accumulation of negative consequences, but may also be less able to self-organise to access). The consensus in the group was that expert elicitation was unlikely to yield a satisfactory estimate of amenability because there is little literature in this area and therefore any estimates provided were likely to be conjecture.

Given the lack of published evidence to inform an estimate of amenability, the perceived unsuitability of expert elicitation for this purpose, and the unfeasibility of conducting primary research within the scope of the treatment capacity modelling project, we instead sought to use an existing dataset to produce an estimate. Specifically, we identified the NIHR-funded Alcohol Toolkit Study (ATS)[78] repeat cross-sectional survey as a potential data source. The ATS started in March 2014 and is a monthly repeat cross-sectional survey of nationally-representative samples of approximately 1,700 adults (16+) living in private households in England.[78] The survey includes socio-demographic information, drinking behaviour, and motivation to reduce alcohol consumption (our indicator for 'amenability'). Our aim was to use ATS data to provide an up-to-date estimate for England of the proportion of people who are alcohol dependent who may be amenable to treatment. Further, in line with the input of our expert stakeholder group, we sought to examine patterns of 'amenability' by age, sex and severity of dependence.

7.3 Method

Our goal was to estimate what proportion of people who have alcohol dependence would be willing to enter treatment if it were available (i.e. are 'amenable' to treatment). However, in the absence of existing data specific to these variables, we instead used two ATS variables which can be considered indicators for alcohol dependence and amenability.

7.3.1 **Data source and key variables**

The ATS was initiated in March 2014 as a sister survey to the Smoking Toolkit Study (STS), with the aim of measuring alcohol consumption and key related parameters. The ATS involves monthly cross-sectional household computer-assisted interviews, conducted by Ipsos Mori of approximately 1,700 adults aged 16+ in England. The baseline survey uses a type of random location sampling, which is a hybrid between random probability and simple quota sampling. The survey methods have been shown to result in an adult population that is nationally representative in its socio-demographic composition.[79]

Data from 19 monthly waves of the ATS (March 2014-September 2015) were combined into a single data set with responses from a total of 31,878 individuals. We included data from 7,948 individuals aged 18+ years who completed the Alcohol Use Disorders Identification Test (AUDIT) [6] (10 items, each scored 0-4) and scored >4 on AUDIT-C or >7 on AUDIT, and who also provided data on the ATS question on 'motivation to reduce' alcohol use.[78]

AUDIT score as an indicator of dependence

We divided AUDIT scores into three categories: 8-16, 16-19 and 20+. The rationale for these categories is that current guidelines for alcohol treatment in England identify an AUDIT score of 16-19 as an indicator that treatment for mild dependence should be considered, while a score of 20+ is the threshold at which treatment for at least moderate dependence should be considered. [55]

'Motivation to reduce as an indicator of amenability to treatment

'Motivation to reduce' alcohol use was assessed by the question "Which of the following best describes you?" for which seven single-choice response options were presented (

Table 7.1). The response options were adapted from a similar question intended to measure motivation to reduce smoking included in the parallel Smoking Toolkit Study. [79] That question has been shown to have predictive validity in terms of whether or not an attempt to quit smoking was made in the subsequent 6 months, with a linear relationship between response options and the odds of a quit attempt (i.e. with those selecting response option 1 most likely to attempt to quit and option 7 least likely).[80] For the alcohol version of the question in this study, however, we used the question as an indicator of people likely to be amenable to treatment. We therefore used the 'motivation to reduce' question to define two indicators of amenability using two different responses as the threshold:

1. **Desire AND intention to cut down**: a 'yes' response to options 1, 2 or 3, indicating a desire to cut down drinking in the near future
2. **Desire to cut down**: a 'yes' response to 1, 2, 3, 4 or 5, indicating a desire to cut down drinking within any time frame

Discussion with key stakeholders to the project within Public Health England identified a preference for the broader indicator of amenability (Desire to cut down), and this was subsequently the parameter used for the treatment capacity model. However, we have included analysis by both indicators in this paper. Respondents who answered 'Don't know' or 'Refused' were assumed to not be motivated to reduce consumption.

7.3.2 **Analysis**

Descriptive statistics were generated for demographic variables age group (18-24, 25-34, 35-54, 55+), sex (male/female), AUDIT score category and the two 'motivation to reduce' variables (Desire AND intention to cut down, Desire to cut down). All data were weighted according to the survey weights provided with ATS data. Weights bring the survey sample into line with nationally representative target profiles for gender, working status, prevalence of children in the household, age, social grade and region.[78, 79] Weighted logistic regression analysis was then undertaken to explore the relationship of age group, sex, and AUDIT category as predictor variables to the bivariate 'motivation to reduce' variables. Our models included the main effects of each predictor variable and all two-way interactions.

7.4 Results

Demographic characteristics of the weighted sample, their AUDIT category and motivation to reduce drinking are shown in

Table 7.1. The majority (94.5%) of people who drink at higher-risk fell below the AUDIT threshold at which treatment for mild dependence should be considered (<16), however, 3.2% had a score indicative that treatment for mild dependence may be appropriate and 2.4% indicative of at least moderate dependence. Across all age, gender and AUDIT score groups, the most commonly endorsed option for motivation to reduce drinking was “I want to cut down on drinking alcohol and hope to soon”.

Motivation to reduce drinking as measured by endorsing one of the three response options indicating an intention to cut down in the near future was significantly associated with age and AUDIT score category, with 35-54 year olds being most likely to want to cut down compared to the youngest age group, and the heaviest drinkers being especially likely to want to cut down (Table 7.2). The general pattern was consistent between the two ‘motivation to reduce’ variables. Regarding interaction effects, there were no significant effects for AUDIT of 20+ by either age group or sex. For AUDIT score 16-19, irrespective of sex, people aged 35-54 were significantly more likely to be motivated to reduce their drinking than other age groups (for both variables). The estimated proportion and 95% confidence intervals of individuals motivated to reduce drinking as measured by ‘Desire AND intention to cut down’ and ‘Desire to cut down’ by sex, age and AUDIT score category are shown in Figures 6.1 and 6.2.

Table 7.1 Sample characteristics of higher-risk drinkers, AUDIT score category and motivation to reduce (n=7,948)

Response to survey items	N	%
Sex		
Male	5,154	64.8
Female	2,794	35.2
Age group		
18-24	1,633	20.5
25-34	1,197	15.1
35-54	2,639	33.2
55+	2,479	31.2
AUDIT score		
8-16	7,507	94.5
16-19	252	3.2
20+	189	2.4
Motivation to reduce drinking ("Which of the following best describes you?")		
1. I REALLY want to cut down on drinking alcohol and intend to in the next month	294	3.7
2. I REALLY want to cut down on drinking alcohol and intend to in the next 3 months	88	1.1
3. I want to cut down on drinking alcohol and hope to soon	365	4.6
4. I REALLY want to cut down on drinking alcohol but I don't know when I will	172	2.2
5. I want to cut down on drinking alcohol but haven't thought about when	272	3.4
6. I think I should cut down on drinking alcohol but don't really want to	869	10.9
7. I don't want to cut down on drinking alcohol	5,888	74.1
Desire AND intention to cut down (endorsed item 1, 2 or 3 above)	747	9.4
Desire to cut down (endorsed item 1, 2, 3, 4 or 5 above)	1,191	15.0

Table 7.2 Odds ratios (95% CI) of 'motivation to reduce' as measured by *Desire AND intention to cut down* and *Desire to cut down* by sex, age and AUDIT category (n=7948)

	Desire AND intention to cut down			Desire to cut down		
	Odds ratio	95% CI	p	Odds ratio	95% CI	p
Sex						
Female	Ref			Ref		
Male	0.94	0.63-1.40	0.75	0.90	0.66-1.23	0.52
Age group						
18-24	Ref			Ref		
25-34	1.07	0.68-1.67	0.78	0.85	0.59-1.21	0.37
35-54	1.94	1.37-2.78	<0.01	1.65	1.26-2.18	<0.01
55+	1.55	1.05-2.31	0.03	1.33	0.97-1.81	0.07
AUDIT score						
<16	Ref			Ref		
16-19	3.29	1.47-6.85	<0.01	4.09	2.17-7.61	<0.01
20+	7.64	3.58-15.87	<0.01	4.25	2.08-8.51	<0.01
AUDIT score x Sex (male)						
16-19	0.52	0.25-1.07	0.07	0.75	0.39-1.43	0.38
20+	0.69	0.33-1.41	0.30	1.24	0.62-2.45	0.54
Age group x Sex (male)						
25-34	1.22	0.70-2.12	0.48	1.22	0.78-1.91	0.39
35-54	0.69	0.44-1.09	0.11	0.65	0.46-0.94	0.02
55+	0.67	0.41-1.11	0.12	0.41	0.14-1.07	0.19
Age group x AUDIT score (16-19)						
25-34	2.29	0.88-6.05	0.09	1.86	0.85-4.08	0.12
35-54	2.75	1.19-6.66	0.02	2.31	1.15-4.69	0.02
55+	0.71	0.18-2.33	0.59	0.41	0.14-1.07	0.08
Age group x AUDIT score (20+)						
25-34	0.57	0.20-1.52	0.27	2.07	0.88-4.98	0.10
35-54	1.05	0.48-2.35	0.91	1.52	0.73-3.20	0.27
55+	2.03	0.70-5.96	0.19	1.89	0.68-5.43	0.22

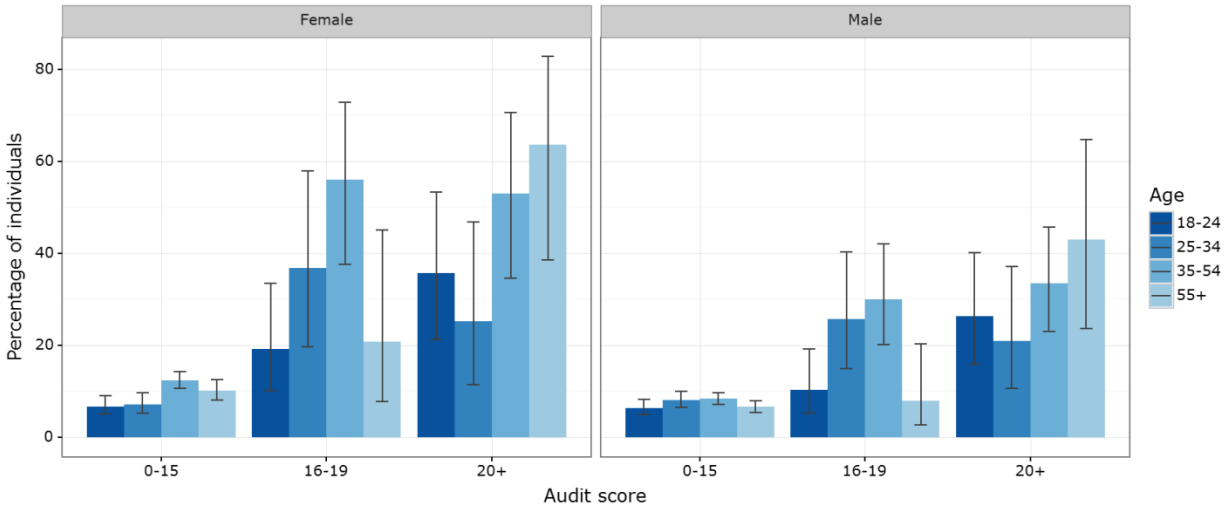

Figure 7.1 **Percentage (and 95% CI) of individuals estimated by logistic regression to be motivated to reduce drinking in the near future (Desire AND intention to cut down) by sex, age group and AUDIT score (asked only of those scoring 5+ on first three questions of AUDIT or 8+ on full AUDIT, n=7948)**

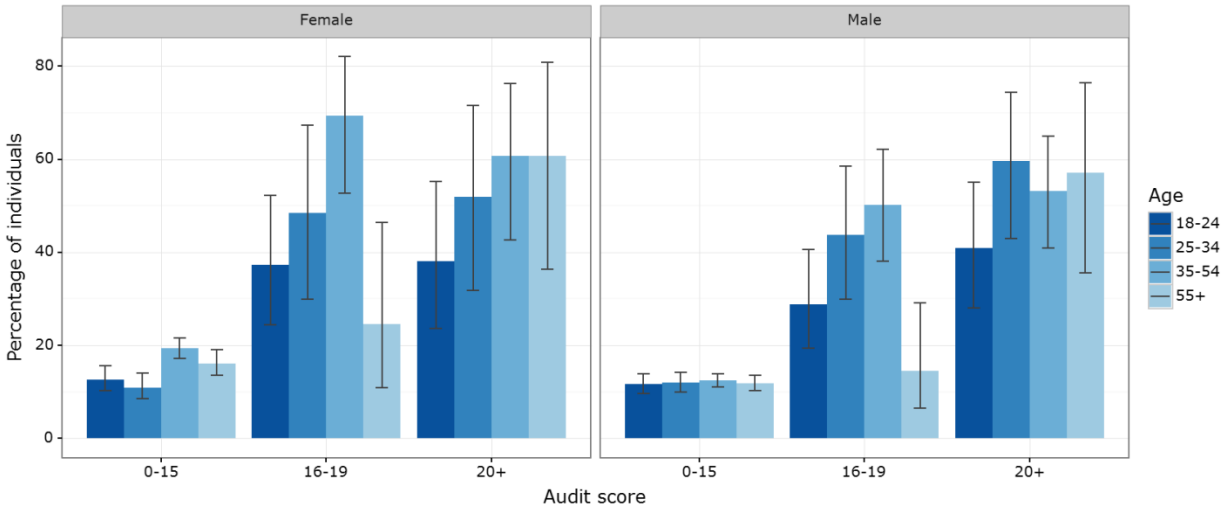

Figure 7.2 Percentage (and 95% CI) of individuals estimated by logistic regression to be motivated to reduce drinking within any timeframe (Desire to cut down) by sex, age group and AUDIT score (asked only of those scoring 5+ on first three questions of AUDIT or 8+ on full AUDIT, n=7948)

As noted earlier, our purpose was to determine what proportion of the population with alcohol dependence might be amenable to receiving treatment, and to determine whether this was related to age and sex. We therefore used the logistic regression results to estimate the proportion of people scoring 20+ on the AUDIT (i.e. people who are likely to be alcohol dependent and for whom it is recommended treatment be considered) who could be expected to be 'motivated to reduce' drinking either in the near future (Desire AND intention to cut down) or at an unspecified time (Desire to cut down). Percentages were derived from the transformation of the model predictions

back to the probability scale and then multiplied by a hundred to get percentages. We have assumed that these proportions are indicators of amenability to treatment among people who are alcohol dependent. Overall, we therefore estimate 33.2% of people who are alcohol dependent would be willing to consider treatment in the near future and 51.0% within an unspecified timeframe (Table 7.3).

Table 7.3 Estimated percentage of population with AUDIT score 20+ who would be motivated to reduce drinking by age group and sex

Age group	Estimated percentage of population (and 95% CI) with AUDIT score 20+ motivated to reduce drinking					
	Desire AND intention to cut down			Desire to cut down		
	Male	Female	Total	Male	Female	Total
18-24 years	26.4 (15.6-39.7)	35.8 (20.9-53.1)	29.7 (19.1-42.0)	40.9 (27.8-55.0)	38.2 (23.3-55.0)	39.9 (28.1-52.6)
25-34 years	21.0 (10.0-36.2)	25.3 (11.0-46.0)	22.1 (10.9-36.9)	59.6 (43.1-74.7)	52.0 (31.8-71.8)	57.7 (41.8-72.6)
35-54 years	33.5 (22.9-45.6)	53.1 (34.6-70.8)	37.4 (26.6-49.0)	53.1 (41.0-65.0)	60.7 (42.7-76.5)	54.6 (42.9-66.0)
55+ years	43.1 (23.4-65.0)	63.6 (38.7-83.3)	49.2 (29.0-69.6)	57.2 (35.6-76.9)	60.8 (36.5-81.3)	58.2 (37.3-77.3)
Total	30.0 (22.8-38.0)	42.0 (29.0-55.8)	33.2 (26.8-40.2)	51.5 (43.1-59.7)	49.7 (36.2-63.3)	51.0 (43.9-58.1)

7.5 Discussion

Our analysis provides a proxy estimate of amenability to treatment among people whose drinking level is such that treatment for alcohol dependence could, according to current treatment guidelines[55], be recommended. Our findings support the view that, at a given time, only a proportion of those individuals who show signs of alcohol dependence will wish to reduce their drinking and could therefore be considered potentially amenable to treatment. However, we have been able to quantify this: among people who scored 20+ on the full AUDIT (the threshold at which alcohol treatment guidelines suggest treatment for moderate dependence should be considered) we estimate approximately half want to reduce their drinking and a third would like to do so soon. We have also identified socio-demographic differences in amenability: generally, older people compared to younger are more likely to want to reduce their drinking. Further, when the full range of AUDIT scores is considered, it also appears that people who drink more heavily are more likely to wish to reduce their consumption. These findings suggest that estimates of the size of the population potentially amenable to treatment should take account of these factors.

Our use of survey data from a nationally representative sample is of course only one possible method by which the concept of amenability to treatment could be empirically explored. We initially pursued another, less successful, avenue for investigating amenability by using National Drug Treatment Monitoring System (NDTMS) data.[64] The NDTMS database is a repository for all client treatment information collected from specialist alcohol and drug treatment services in England. Using data available for the overall Specialist Alcohol Treatment Capacity Project, we considered specialist alcohol treatment exit rate by Local Authority (that is, the proportion of the adult Local Authority population exiting treatment annually). We then plotted the treatment drop-out rate against treatment exit rate for each Local Authority, where the drop-out rate was defined as the proportion of those clients exiting treatment who declined treatment or dropped-out before completion (data not shown). Our hypothesis was that Local Authority areas with higher treatment rates might be closer to providing enough treatment to meet the demand from those who were actually amenable to treatment. Therefore, near to this point we might expect a rise in drop-out rates as "less amenable" individuals enter treatment. However, no relationship was found between the overall number of people exiting treatment and the proportion of these which dropped-out. We have interpreted this finding as suggesting it is unlikely that current access levels to specialist alcohol treatment England access rates are close to the proportion of people who would be amenable to treatment if it were available and further, that NDTMS treatment exit data do not provide an indirect estimate how many people would access treatment if it were available to them.

Although we chose to use the ATS to estimate the proportion of people with alcohol dependence who might be amenable to treatment, we acknowledge the limitations of our method. The ATS was not specifically designed to estimate amenability, and therefore only indirectly measured the key concepts of alcohol dependence and willingness to enter treatment. While we used AUDIT as a proxy measure for alcohol dependence, a prospectively designed study would ideally use a more specific tool, such as the Severity of Alcohol Dependence Questionnaire (SADQ). [7] Similarly, the ATS did not have a question that directly addressed participants' willingness to consider treatment, but rather enquired about whether the person was motivated to reduce drinking. It is likely that at least some of those people scoring 20+ on the AUDIT who identified that they wanted to reduce drinking would not be prepared to consider treatment as a means by which to do so. As a general population survey, the ATS provided an opportunity to examine motivation to reduce drinking across a range of age and gender groups, and also by alcohol use as measured by AUDIT score; however, only broad categories of drinker type could be formed with the sample and data available to us. A prospectively designed study could ensure inclusion of a greater proportion of people with more severe alcohol dependence to allow greater discrimination among those meeting the threshold for specialist

treatment, that is, the proportion amenable to treatment may differ according to severity, even among those who are all 'eligible' for treatment. It is also possible that our age group variable is a proxy for duration of alcohol consumption, with those with longer drinking histories more likely to want to reduce.

One peer reviewer suggested that the analysis of amenability should have included data on attitudes to treatment goals, whether abstinence or non-abstinence. Because we used the Alcohol Toolkit Study data to inform our estimates of amenability, our choice of variables was limited to those within the dataset and did not include attitudes to treatment goals; specifically, whether a goal of abstinence is required or not. A concern of the reviewer appears to be that some heavy drinkers may be unwilling to enter treatment because they perceive a goal of abstinence to be a requirement i.e. in estimating amenability they may be counted as 'not amenable', whereas if they understood abstinence is not necessarily a required treatment goal, they would be 'amenable'. Our analysis in fact avoids this difficulty, because the Toolkit questions used refer only to preferences to "cut down on drinking alcohol", which can include both abstinence and non-abstinence. Use of this question as a proxy for potential willingness to enter treatment is therefore independent of beliefs about expected treatment goals. If future research does quantify a relationship between heavy drinking, amenability for treatment and treatment goals more directly then our modelling could be developed to include this.

In addition to undertaking a prospectively designed study of amenability, there is scope to explore access to treatment as a function of motivation (and covariates) longitudinally within the ATS. The ATS has a longitudinal panel element, with a sample of hazardous drinkers (i.e. AUDIT score of 8+) being followed-up at six months. Data are also collected on whether participants have made a serious attempt to cut down their drinking in the previous year, and if so what strategies were tried to help with this (treatment-relevant response options were included) and what factors contributed to the attempt (again, with health and treatment related response options provided). It may be possible among those who were followed up to analyse attempts to reduce drinking (including strategies used and contributing factors) by age group, sex, baseline AUDIT score and baseline motivation. This would allow us to determine to what extent self-reported motivation to reduce drinking is associated with actual engagement in treatment in the short term and whether this differs by demographic and drinking subgroups.

The developers of the ATS note that data collection is currently limited to England, but promote the study protocol as a framework which could be used in national surveys elsewhere.[78] Adoption of the longitudinal element of the ATS, in combination with questions designed to specifically measure both willingness to access treatment in the future and actual use of treatment (both current and

past), would allow validation of our current estimates of amenability. It would also allow comparison between countries with different levels of alcohol dependence and/or different treatment access rates. Such surveys could also include information about other non-treatment strategies used to reduce drinking.

Updated estimates of amenability to treatment for alcohol dependence are important from a system planning perspective. The size and distribution of the amenable population is a useful additional parameter for commissioners to consider in addition to the prevalence of alcohol dependence and existing system capacity. While financial constraints make it unlikely that treatment capacity will ever fully reflect treatment need, and not everyone who might benefit from treatment is necessarily willing to engage with it, the proportion of people who would be amenable to treatment is a useful indicator of potential treatment demand. Further, understanding which people are most likely to want (or not want) to access treatment as defined by their age group and level of dependence is important for maximising opportunities for clinical engagement.[81, 82]

Our analysis of ATS survey data is a useful first step in quantifying what level of treatment capacity might be required to meet the needs of people with alcohol dependence who may wish to enter treatment. However, there are various other system and individual level factors affecting access to health services beyond whether or not services are available, including how they are organized, consumer awareness of services and what they might offer, and whether the services on offer are suitable to the sociocultural needs of the intended target group.[83, 84] Additional barriers specific to alcohol treatment have also been identified, including not regarding oneself as in need of treatment, scepticism that treatment might be of value, and fear of stigma.[74, 85] Our estimates of amenability do not address these issues and it is possible that interventions aimed at addressing any one of these might influence future estimates of amenability to treatment.

8 Modelling the Potential Impact of Changing Access Rates to Specialist Treatment for Alcohol Dependence for Local Authorities in England – the Specialist Treatment for Alcohol Model (STreAM)

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8.1 Abstract

Introduction

Variations in estimated access rates to specialist treatment services for alcohol dependence between Local Authorities in England are substantial. In this study we develop a modelling framework - Specialist Treatment for Alcohol Model (STreAM) version 1.0 – to enable national and local decision makers to explore the impact of changing access rates to different treatment pathways on future prevalence of alcohol dependence, service capacity, costs, treatment outcomes and mortality rates.

Methods

The model's baseline is estimated Local Authority prevalence of people potentially in need of assessment for and treatment in specialist services for alcohol dependence. This is separated into mild, moderate and severe dependence and includes complex need. Baseline access rates are estimated combining these potentially in need prevalence rates with data from the National Drug Treatment Monitoring System (NDTMS). The model examines 'what-if' consequences of a change to access rates by a LA. It can also model changes to the proportion of clients assigned to 22 different treatment pathways, which have been constructed to reflect NICE guidance. To examine impact, the model also utilises published information on natural remission without treatment, and relapse rates following treatment. Outputs include the change in future prevalence rates up to the next 10 years, comparing the proposed change in access to current baseline access. The results also estimate

commissioning costs for NICE guidelines compliant treatment provision (assuming a national average cost for each pathway), impact on successful treatment completion rates, indicative impacts on costs of NHS care for the alcohol dependent population, and mortality rates.

Results

We illustrate the functionality of the model with three hypothetical scenarios for an example local authority in England: 1) achieving access rates at the 70th percentile nationally for each age / gender group; 2) increasing access rates by 25% across all population subgroups and 3) increasing access rates by a factor of three (approximately to estimated access rates in Scotland). Baseline prevalence of people potentially in need in the exemplar LA is estimated at 14,581. The impact of the scenarios examined is greater as access rates are increased. Compared incrementally against a strategy of keeping access rates at current baseline levels, achieving the 70th percentile access rates nationally is estimated to reduce prevalence of the population potentially in need by 191 (1.3%) after 5 years, a 25% increase in access rates is estimated to reduce prevalence by 477 (3.3%), whilst increasing access rates approximately to those currently achieved in Scotland results in an estimated reduction of almost 2800 (19.2%). This relative scale of impact is reflected in each of the other model outputs including mortality averted, increase in community based, inpatient and residential places provision, additional costs of specialist treatment as well as the indicative estimated NHS costs averted.

Conclusion

The STreAM framework version 1.0 enables national and local authority decision makers to estimate the potential impact for alternative plans of changing access to specialist treatment services for alcohol. The model is to be made available through Public Health England. Further development as new evidence and data emerges on prevalence of alcohol dependence and on service use would be useful.

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8.2 Introduction

Alcohol dependence causes a substantial burden on individuals and wider society, including increased risk of mortality and costs to health services[36]. . Assessment and structured treatment pathways s exists, and guidelines such as those by the National institute for health and Care Excellence (NICE) set out recommendations for their use for different groups of clients [1].

Previous work by the authors of this research has shown that there are substantial Local Authority (LA) variations in prevalence estimates of the number of people potentially in need of assessment for and treatment with structured treatment services for people with alcohol dependence (section 4). This work has also established that access rates to treatment vary substantially. For example, the access rate as measured by the ratio defined with the numerator as number of clients beginning a new treatment journey in the year 1st April 2013 to 31st March 2014, and the denominator of the estimated prevalence of people potentially in need of structured alcohol treatment services, shows an 11-fold variation across upper tier Local Authorities in England (section 6). A comparison of numbers of structured treatments given per year in Scotland[61] with the number in England per overall populations, suggests that recent substantial investments in treatment services in Scotland have produced access rates that are approximately three times higher than those currently achieved on average in England (see Appendix 8.1 for details).

Within published literature, the most complete approach to modelling the potential system impact of changing access rates to alcohol treatment services was undertaken by Rush in the late 1980s in Ontario, Canada[4]. This followed a four step approach as follows: (1) determine the geographic area and size of the population to be served; (2) estimate the number of problem drinkers and alcohol dependent drinkers within each population unit (i.e. the in-need population); (3) estimate the number of individuals from step two that should be treated in a given year (i.e. the demand population); (4) estimate the number of individuals from step three that will require service from each component of the treatment system. Within England, the ANARP study in 2004 undertook to estimate the number of people at certain levels of alcohol use, as measured by the AUDIT scores, and to consider this against the numbers of people treated to calculate a penetration rate (number of people in the prevalent population per person treated [86]. The ANARP calculations utilised AUDIT scores as a basis for assessing need, and the study did not undertake any modelling work to estimate future system capacity effects.

This study reports work undertaken by the research team, which was commissioned by the UK Department of Health Policy Research Programme, to develop a capacity model to estimate the effects of changing access rates to specialist treatment. A model of the potential impact of changing

access rates from current levels, either at national or local level, needs to account for several including baseline prevalence of people in need, numbers of people treated over future periods of time, successful completion rates, natural remission without treatment, relapse rates after treatment, mortality and ageing effects, and the resources required to treat clients including places in community, residential and inpatient settings and the costs of commissioning such services. In this study we present the Specialist Treatment for Alcohol Model (STreAM) version 1.0 and an illustrative case study in one exemplar Local Authority showing the potential impact of four scenarios for changing access rates (a) no change from current access rates, (b) achieve access rates equivalent to the 70th percentile nationally for each of the 8 age/gender subgroups in the model, (c) increase access rates by 25% in each age/gender group, and (d) increase access rates 3 fold to approximately the levels currently achieved in Scotland.

8.3 Methods

8.3.1 **STreAM Model Framework**

We have developed a model which benchmarks local authorities across England on prevalence of people potentially in need of assessment for and treatment with specialists services for alcohol dependence. Benchmarking has also been undertaken for access rates, percentage of clients assigned to different pathways, and outcomes of treatment. The model also enables users to explore 'what if' questions on the impact of changing access rates and pathways assignment.

A statistical model has been developed to estimate the prevalence of people potentially in need of assessment and specialist treatment for alcohol dependence in each local authority in England (see detailed publication [72]). Briefly, this model follows three steps. Step 1 uses the Adult Psychiatric Morbidity Survey 2007 (APMS) [2] to develop a statistical regression model of the probability that an individual has an Alcohol Use Disorders Identification Test (AUDIT)[6] score in the one of 4 bands (AUDIT 0-7, 8-15, 16 to 19, 20+). The covariates are age, gender, deprivation (IMD quintile) and the rate of person specific hospital admissions with a diagnosis code of alcohol dependence. Step 2 also uses the APMS to model the probability that the level scored on the Severity Of Alcohol Dependence Questionnaire (SADQ) is in one of four bands (0-3, 4-15, 16-30, 31+) – again with covariates age, gender, deprivation (IMD quintile), rate of person specific hospital admissions with a diagnosis code of alcohol dependence, as well as additionally the AUDIT band (0-7, 8-15, 16-19, 20+). We define people who are potentially in need of assessment and specialist treatment for alcohol dependence as those with an AUDIT score 20 +, or those with a score of AUDIT 16 to 19 and a score of 16+ on SADQ. We also defined three severity subgroups based on SADQ 4-15 (mild), SADQ 16-30 (moderate) and SADQ 31+ (severe), and can separate into gender and 4 age groups (18-24, 25-34,

35-54, 55+). Step 3 makes a final adjustment for the number of homeless people, using data on people registered as homeless in each local authority and evidence on the proportion with alcohol dependence, and assuming, in the absence of data that there is an equal number in each of the 8 age/gender groups. The resulting estimated prevalence of people potentially in need of assessment and specialist treatment for alcohol dependence becomes the denominator in the calculation of access to specialist treatment rates used in the model.

The model uses the number of clients starting a new treatment journey during the past NHS a year (1 April 2013 – 31 March 2014) as the numerator for the calculation of the new treatment journeys access rate.[87] The National Drug Treatment Monitoring System (NDTMS) provides the data on clients' treatment journeys, which refers to a series of one or more adjoining structured treatment episodes, either overlapping in time or separated by fewer than 22 days between discharge and treatment start dates. We separate into gender and 4 age groups (18-24, 25-34, 35-54, 55+). We also defined three subgroups related to severity. Unfortunately, the NDTMS does not record either AUDIT or SADQ at baseline assessment. Our indicative severity groups are based on the recorded number of units consumed in a typical drinking day in the previous 28 days, with 3 bands using 0-15 units, 16-30, and 31+ units.

Modelling the potential impact of changing access to services is able to be performed in several ways in the STreAM model. An increase in access rates can be applied overall. Increases can also be applied differently for each age gender group. The user can also change the pathway assignment. Baseline data has been analysed for each UTLA setting out the percentage of clients who receive treatment classified into one of 22 pathways defined by setting (community, residential, inpatient), type of treatment (psychosocial only, use of withdrawal and or relapse prevention pharmacotherapy) and other factors. We further group these up into four broad pathway groups: pathways which are community-based psychosocial treatment only, pathways incorporating community-based psychosocial treatment with pharmacotherapy (withdrawal support and/or relapse prevention) but no residential or inpatient component, pathways with residential treatment, and pathways with inpatient treatment. The model also incorporates national average data on percentage of clients successfully treated. For the 3 typical drinking day subgroups, the % of clients completing their treatment journey successfully is used. This is based on NDTMS classifications of outcomes including successful completion of treatment journey, with abstinence or moderated non-problematic drinking, re-treatment within 6 months, drop out, transfers to other service or custody. To illustrate the parameters that are crucial to the model inputs on prevalence, access rates, pathways and outcomes, Table 8.1 shows a summary of the key statistics for our exemplar local authority in England (Leeds).

Table 8.1 Summary of key model inputs for an individual exemplar Local Authority

	All	Male				Female			
		18-24	25-34	35-54	55+	18-24	25-34	35-54	55+
A: Population of exemplar Local Authority									
	600,830	49,070	56,789	97,948	87,621	51,295	56,882	98,356	102,869
B: Estimated prevalence of alcohol dependence in Local Authority									
Total	14581	3533	3982	3052	1121	1555	443	700	197
Mild[a]	7572	1591	1904	1664	738	805	284	444	142
Moderate[b]	5626	1540	1671	1152	314	607	117	200	25
Severe[c]	1145	372	377	206	39	113	12	26	0
Severe & Complex[c]	238	30	30	30	30	30	30	30	30
C: Number individuals in exemplar Local Authority beginning a new treatment journey 2013/14 (NDTMS)									
Total	1580	48	214	612	139	36	126	302	103
0-15 units/week[e]	550	17	76	144	39	16	50	135	73
16-30 units/week[f]	426	16	61	185	50	8	18	73	15
31+ units/week[g]	208	5	26	108	23	0	21	20	5
Complex needs[h]	396	10	51	175	27	12	37	74	10
D: New journey access rate (no. of new journeys divided by estimated prevalence) - %									
Total	10.84	1.36	5.37	20.05	12.40	2.32	28.46	43.16	52.37
Mild (e/a)	7.26	1.07	3.99	8.65	5.28	1.99	17.61	30.41	51.41
Moderate & Severe (f+g)/(b+c)	9.36	1.10	4.25	21.58	20.68	1.11	30.23	41.15	80.00
Moderate & Severe + complex (f+g+h)/(b+c+d)	14.70	1.60	6.64	33.73	26.13	2.67	47.89	65.31	54.85

E: Completed journeys according to pathway (4 broad categories) - %					
	Community Psychosocial	**Community Pharmacology**	**Residential**	**In-patient**	**Total**
Exemplar Local Auth	43	49	7	1	100
National	77	14	2	7	100
Difference	-34	35	5	-6	

F: Completed journeys according to outcome - %							
	All success	**Success (abstains)**	**Success (occas. drinker)**	**Dropout**	**Transfer**	**Died**	**Total**
Exemplar Local Auth	61	35	26	32	6	1	100
National	47	33	14	45	6	1	100
Difference	14	2	12	-13	0	0	

The model examines the dynamics of prevalence over time considering factors including successful completion of treatment, natural remission from dependence without treatment, relapse back to dependence for people who are former dependent drinkers, mortality rates for different groups, and new 18-19 year olds entering the model each year.

Evidence on natural remission comes from long term NESARC studies in the US. We differentiate remission to becoming an abstainer from remission to drinking at moderate levels, the split being 26% abstainers and 74% continuing to drink based on Table 1 of Dawson et al, 2009.[88] For 1172 clients dependent at baseline, there were 76 in an abstinent remission state 3 years later and 216 in a non-abstinent remission state – a total of 292, giving an average remission rate of 9.1% per annum. Remission rates are lower for older age groups based on evidence from Table 4 Dawson et al 2006,[89] which we have used to estimate a hazard of remission function related to age – giving relative hazards of 1.36 for 18-24, 1.1 for 25-34, 0.85 for 35-54, 0.69 for 55+. This enables disentangling of the overall 9.1% rate into annual remission rates for the model age groups of 12%, 10%, 8% and 6% as shown in Table 8.2 Part A below. We have not been able to identify differential remission rates for different severity of dependence groups and have assumed they are equal for mild, moderate, severe and complex needs groups.

Relapse rates for people who are formerly dependent current abstainers or formerly dependent current moderate drinkers have also been estimated from a US study.[90] We used a previously published statistical model predicting recurrence of DSM alcohol dependence conditional on age and current drinking status (see Table 4 of Dawson et al 2007[90]). This statistical model is used to derive single year age band probabilities of relapse, for both former dependent people who are abstainers and for those former dependent but still drinking, which are then averaged into our model age groups as summarised in Table 8.2 Part B. We did not find any sources of evidence to indicate the severity of dependence for those relapsing. In the absence of specific data we have assumed that the proportion of relapsed people flowing into each dependence severity group is the same as the proportions in mild, moderate, severe, and complex needs from our baseline prevalence estimates. This is written into the STreAM model as an assumption, and is different for (i.e. specific to) each LA, because each LA has a different prevalence estimate by age/gender/severity.

To model the number of people currently in the formerly alcohol dependent state (i.e. at the start of the model run) we examine the linkage between current prevalence estimates and these natural remission and relapse rates. We already have the estimates of the numbers of people with varying severities of alcohol dependence, according to the AUDIT and SADQ screening tools (see **Table 8.1**). We also have relapse and remission rates, into and out of alcohol dependence groups respectively, from the literature as described earlier. We have used our literature derived relapse and remission

rates to derive the size of the former dependent groups under a specific assumption. We assume that, if relative size of the dependent and formerly dependent groups can only change via relapse and remission, they are in equilibrium. We can then calculate what the size of the formerly-dependence groups would need to be such that when relapse/remission rates are applied, the numbers leaving the groups is exactly equal to the numbers entering. This is likely to be a reasonable assumption if prevalence trends are gradual and if we are looking ahead a small number of years.

The model also accounts for new incidence and ageing. Conceptually, as each year is modelled, a new set of 18-19 year olds prevalent with the same rate of alcohol dependence as the subgroup of 18-24 year olds at baseline (see part B of Table 8.1) is incorporated into the model. People in a particular age group also age up to the next cohort group. So, for example, 1 /10^{th} of the people in the 25-34 age group transfer in to the subgroup 35-54 year olds every year. In fact, within the dynamics of the model structure, the process described happens weekly as each modelled week progresses over the 10 year horizon of the model.

Mortality rates for the general population in each age/gender group were calculated using the 2012 ONS Death Registrations for England and Wales dataset's single year age mortality rate per 1000[91] and ONS England population estimates for each single year age and sex. To estimate mortality rates for people with current alcohol dependence we used published evidence from a general population sample in northern Germany which reports that annualized death rates were 4.6-fold higher for women and 1.9-fold higher for men with alcohol dependence compared to the age- and sex-specific general population.[92] To estimate mortality rates for people in the formerly alcohol dependent groups, we used evidence from a 2013 meta-analysis by Roerecke et al.[93] This showed an odds ratio of 0.35 for abstainers compared to continued heavy drinking in alcohol use disorders (Figure 2 of Roerecke et al. [93]), and an odds ratio of 0.61 for those still drinking but with reduced alcohol consumption (abstainers excluded) compared to continued heavy drinking in alcohol use disorders (Figure 3 of Roerecke et al. [93]).

Table 8.2 Model parameters affecting the dynamics of prevalence over time

Table 2 PART A: Natural Remission Parameters Derived from NESARC Study							
Gender	Age Band	**Prob. entering subgroup given remission**		**Annual natural remission rates (without treatment)**			
		Former AD Abstainer	*Former AD Drinker*	*Mild AD*	*Moderate AD*	*Severe AD*	*Complex Needs*
Male	18 to 24	26%	74%	12%	12%	12%	12%
	25 to 34	26%	74%	10%	10%	10%	10%
	35 to 54	26%	74%	8%	8%	8%	8%
	55 +	26%	74%	6%	6%	6%	6%
Female	18 to 24	26%	74%	12%	12%	12%	12%
	25 to 34	26%	74%	10%	10%	10%	10%
	35 to 54	26%	74%	8%	8%	8%	8%
	55 +	26%	74%	6%	6%	6%	6%
Table 2 PART B: Relapse parameters							
Gender	Age Band	**Annual relapse rate to alcohol dependence from former dependence**		**Probability of entering each subgroup given relapse (Assumed the same %'s as baseline prevalence for the example Local Authority)**			
		Former AD Abstainer	*Former AD Drinker*	*Mild AD*	*Moderate AD*	*Severe AD*	*Complex Needs*
Male	18 to 24	3.4%	12.2%	45.0%	43.6%	10.5%	0.8%
	25 to 34	2.8%	10.2%	47.8%	42.0%	9.5%	0.7%
	35 to 54	1.9%	7.4%	54.5%	37.7%	6.8%	1.0%
	55 +	1.0%	4.5%	65.9%	28.0%	3.5%	2.6%
Female	18 to 24	3.4%	12.2%	51.8%	39.0%	7.3%	1.9%
	25 to 34	2.8%	10.2%	64.2%	26.4%	2.7%	6.7%
	35 to 54	1.9%	7.4%	63.5%	28.6%	3.7%	4.2%
	55 +	1.0%	4.5%	72.2%	12.7%	0.0%	15.1%
Table 2 PART C: Mortality Rates Per 1000 Population per Annum parameters							
Gender	Age Band	*Never Alcohol Dependent*	*Former AD Abstainer*	*Former AD Drinker*	*Currently Alcohol Dependent*		
Male	18-24	0.00048	0.00047	0.00083	0.00135		
	25-34	0.00066	0.00066	0.00116	0.00190		
	35-54	0.00220	0.00228	0.00397	0.00650		
	55+	0.02897	0.03262	0.05551	0.08789		
Female	18-24	0.00019	0.00047	0.00082	0.00134		
	25-34	0.00034	0.00083	0.00144	0.00235		
	35-54	0.00144	0.00361	0.00627	0.01024		
	55+	0.02838	0.08109	0.13330	0.20137		

In summary, the modelling of the dynamics of future prevalence follows the simple principle of an arithmetic process. The prevalence of alcohol dependence in the next period is basically the prevalence now, minus those who achieve stable abstinence/moderated non-problematic drinking following treatment, minus also the proportion of people who achieve natural remission, plus the number of people who relapse from their state of former dependence, minus the number in the cohort who died. This is done for each of the 8 age/gender subgroups, with an adjustment in the youngest age band to account for new 18-19 year olds with dependence entering the model each year. It is operationalised within the model on a weekly basis, for 52 weeks in each year. The number of people entering treatment each week is calculated from the user input annual access rate for new treatment journeys divided by 52 (with the default being the 2013/14 baseline rate for the LA being modelled). The numbers assigned to each different pathway is calculated from the user input proportions (with the default being the 2013/14 percentage assignments for the LA being modelled). The proportions achieving different outcomes (successful and abstaining, successful drinking moderately, dropped out etc.) are also user input (with the default being the national average outcome percentages for each pathway).

The model also utilises information on the national average duration of treatment for each categorised pathway and outcome combination to calculate the time to leaving the treatment system and hence the capacity required. Appendix 8.2 describes the specification of the NDTMS analysis to generate estimated treatment durations. The approach is best illustrated with examples. Consider first people who at baseline were drinking 0-15 units per typical drinking day. The model will have a number of these who are accessing treatment in say week 10 of the first modelled future year. A proportion of these will receive community psychosocial only treatment, and a proportion of those will be successful but still drinking at moderate levels. Their duration of treatment based on national average durations calculated for each pathway from the NDTMS is 19 weeks, meaning that this group will leave treatment and enter the former dependent but still drinking state within the model in week 29. As another example, for people who at baseline were drinking more than 30 units per typical drinking day, the model will have a number of these accessing treatment in say week 10 of the first modelled future year. A proportion of these will receive the pathway number 11 in the model, i.e. “Inpatient assisted withdrawal followed by community psychosocial and pharmacological relapse prevention”, and a proportion of those will be successful and abstaining from alcohol at the end of treatment. Their duration of use of different types of service in the model based on national average durations calculated for each pathway from the NDTMS is 26 weeks community based treatment plus 2 weeks inpatient treatment, meaning that this group will leave treatment and enter the former dependent and abstaining drinking state within the model in week

38. Table 8.22 in the Appendix shows for people drinking 15-30 units, a description of which components of treatment are included into the modelling for each pathway. Table 8.23 through to Table 8.26 show, for people drinking 15-30 units, the estimated average duration of treatment in weeks for each pathway ~ outcome combination for inpatient, residential, community and the sum of all three settings respectively. By undertaking these calculations for all of the drinker groups (0-15 units, etc.), pathways, and outcomes combinations, and then summing up each week across the three broad service types of community based, residential and impatient treatment, we can compute the total number of people in each service setting each week. This enables an understanding of capacity requirements over time for scenarios modelled.

These processes of modelling the weekly transitions between the states of currently alcohol dependent, formerly alcohol dependent and abstaining, formerly alcohol dependent still drinking, and the rest of the population who have never been the alcohol dependent, is also undertaken going backwards in time in the model for the previous four years. This is done to ensure that at the point of the start of the model, there are already people in the states of the formerly alcohol dependent and abstaining, and formerly alcohol dependent still drinking moderately. These are necessary so that relapse from these states can be modelled as we begin with modelling time into the future. The transitions between these states are assumed to be occurring in such a way that the current level of alcohol dependence is at an overall steady level during the previous four years. (Future versions of the model would benefit from a more detailed analysis of the historical dynamics of prevalence and former dependence, but it was not possible within the scope of this work and the evidence available to go beyond this broad assumption at this stage).

Costs of specialist treatment are also incorporated within the model. We updated analyses previously undertaken as part of the NICE CG115 guidelines,[1] on the resource requirements and associated costs for each of the component interventions of specialist treatment. Appendix 8.3 provides full technical details of this costing method and assumptions. Table 8.3 shows the resulting estimated costs per week for each component of the resources and illustrates how these are combined to generate costs of pathways. For each pathway, we have made assumptions about the use of these different components. Within the model, the costs per week for each component are then multiplied by the actual national average durations observed in the NDTMS for each pathway-outcome combination for each drinker group. Hence each pathway – outcome – drinker group combination in the model has a different unit cost applied. Alternatives to these national average cost estimates can be entered into the model if more accurate local costings are available. In addition to these treatment specific costs, we also utilise previously published evidence on the annual unit cost of general NHS care for a person dependent on alcohol. Again, this is taken from

the NICE guidelines.[1] Total annual costs attributable to alcohol dependency were estimated at £1,800, giving a monthly cost of £150. Within the model, when people move from a state of alcohol dependence to one of the states of formerly alcohol dependent, we assume that NHS general costs will reduce by this £1800 per person per year.

Table 8.3 Costs inputs for the specialist treatment intervention components

Intervention Component	Estimated Weekly Cost based on 2013/14 update of NICE CG115 costings (£)
Community Psychosocial	99.00
Community Pharmacological	9.71
Community Assisted Withdrawal	254.10
Intensive Community Programme	814.00
Residential Assisted Withdrawal	2390.00
Residential Rehabilitation	633.00
Comprehensive assessment	454.00

8.3.2 **Analysis**

To undertake analysis using the STreAM model, the model examines two scenarios and compares the difference. The user can define both but usually, one of the scenarios will be the "same as last year" i.e. leave the access rates and percentage assignment pathways at last year's level for the local authority. Options for the other scenario might include increasing access rates (particularly if the benchmark analysis suggests that local authority access rates are relatively low) or changing the percentage of people assigned to different pathways. The model then allows analysis of up to ten future years. Discounting of costs is undertaken at 3.5%. The main results analyse the difference between the two scenarios modelled e.g. the change in prevalence of alcohol dependence, the change in the number of people successfully treated, changes in costs, change in capacity (i.e. number of people in the each of the community, residential and inpatient settings after point in time), and change in the mortality over the five year period.

The exemplar case study site chosen is the local authority of Leeds, but it is important to emphasise that the scenarios examined are entirely illustrative and have not been discussed with local authority commissioners or service providers in that area. We examine three scenarios for changing access

rates, each compared against keeping access rates at the same level as 2013/14. The three scenarios are:

- Set access rate for each of the 8 age/gender subgroups to be at the 70th percentile level (i.e. Only 30% of LAs have a higher access rate for the that age/gender subgroup)
- Increase access rate by 25%
- Increase access rates to approximately the levels currently achieved in Scotland

8.4 Results

8.4.1 Detailed Analysis of Results for One Scenario

Table 8.4 shows the results for the first scenario examined compared with a strategy of keeping access rates constant at their current baseline rates for each age/gender group. Changing access rates to the 70th percentile nationally for each age/gender group, implies a slightly higher number of new journeys overall - 1713 compared with 1580, an increase of 8.4%. This would imply a move from being ranked 64th out of 151 UTLAs for overall access rates to 50th. Changes in access rates vary by age/gender and are highest for the 18-24 males and females, and for males 55+, with small decreases for 35-44 year old males and females.

Table 8.4 Change in number of journeys under the scenario of achieving 70th percentile of access rates nationally

		Original Access Rate	70th percentile Access Rate	Prevalence By Age and Gender	Original New Journey Numbers	Implied New Journeys if 70th percentile
Male	18-24	1.4%	2.3%	3533	48	80
Male	25-34	5.4%	6.3%	3982	214	251
Male	35-54	20.1%	19.1%	3052	612	582
Male	55+	12.4%	16.3%	1121	139	183
Female	1824	2.3%	3.5%	1555	36	54
Female	18-24	28.5%	28.2%	443	126	125
Female	25-34	43.2%	47.8%	700	302	334
Female	35-54	52.4%	52.3%	197	103	103
Total				14581	1580	1713
Access Rate					10.8%	11.7%
Rank (1 = highest)					64	50
Implied percentile					58th	67th

Table 8.5 shows the difference in prevalence of people with alcohol dependence by the end of 5 years is estimated to be 191 lower than if there were no change in access rates. This incremental reduction in prevalence of 191 is a small difference (approximately 1.3% of) the baseline 14,851 estimate of the prevalence of people potentially in need of assessment for and treatment with specialist treatment for alcohol dependence. In fact the estimated prevalence rate per total adult population for the LA after 5 years is 2.23% under the 70th percentile versus 2.26% under no change in access rates. Most of the change is occurring in the mild (-102) and moderate (-72) subgroups.

Table 8.5 Impact of scenario 1 (achieve 70th percentile of national access rates) on the estimated population in need prevalence by severity subgroup

Year on year comparison of Scenario B (achieve 70th percentile access rates) with Scenario A (no change in access rates)

Prevalence scenario B - prevalence scenario A

	Alcohol Dependence subgroups				
Future time point	Mild	Moderate	Severe	Complex Needs	Total
Now	0	0	0	0	0
After 1 year	-23	-15	-3	-1	-42
After 2 years	-51	-34	-7	-2	-95
After 3 years	-73	-49	-10	-2	-135
After 4 years	-89	-62	-12	-3	-166
After 5 years	-102	-72	-14	-3	-191

Table 8.6 shows that, in total over the 5 years, an additional 449 people are estimated to exit treatment under the 70th percentile scenario. This includes 282 successful treatments of which 171 are alcohol free.

Table 8.6 Impact of scenario 1 (achieve 70th percentile of national access rates) on number of treatment exits by outcome

Year on year comparison of Scenario B with Scenario A (treatment exits scenario B - treatment exits scenario A)

Number of treatment exits by outcome

	Complete (drinking)	Complete (Alcohol Free)	Transferred	Dropped out	Total
Now	0	0	0	0	0
After 1 year	17	27	4	23	70
After 2 years	42	66	9	55	173
After 3 years	66	103	15	86	269
After 4 years	89	138	20	115	361
After 5 years	111	172	24	143	450

The estimated impact on mortality is 8 fewer deaths over the 5 year period. All of these are estimated to occur in the male 55+ population group.

Our analysis also models the number of people in contact with services on a typical day. Table 8.7 show that, at the point of year 5, we estimate the additional number of people receiving care under community based services is 31. The additional capacity required in residential based care is around 1 extra place on a typical day. The model estimates no additional capacity required in the inpatient service. The tables in Appendix 8.4 show that in year 5 the total estimated capacity under the 70th percentile scenario in each setting is 488 community places, 13.3 residential places and 0.5 inpatient places on a typical day.

Table 8.7 Change in service capacity requirements on a typical day after five years due scenario 1 (achieve 70th percentile of national access rates)

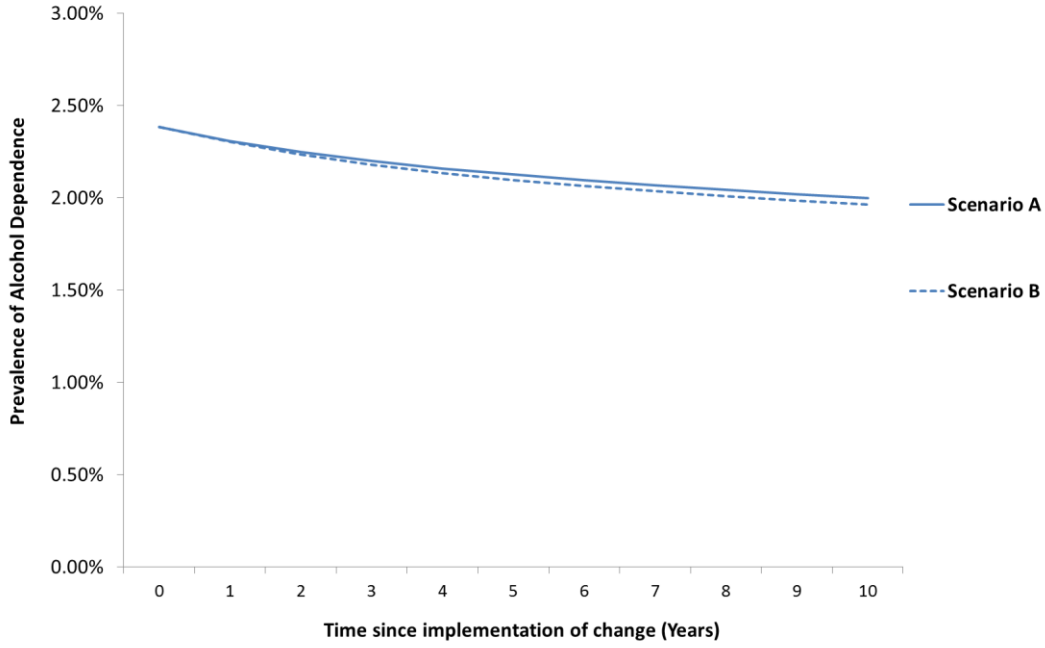
Changes in capacity requirements

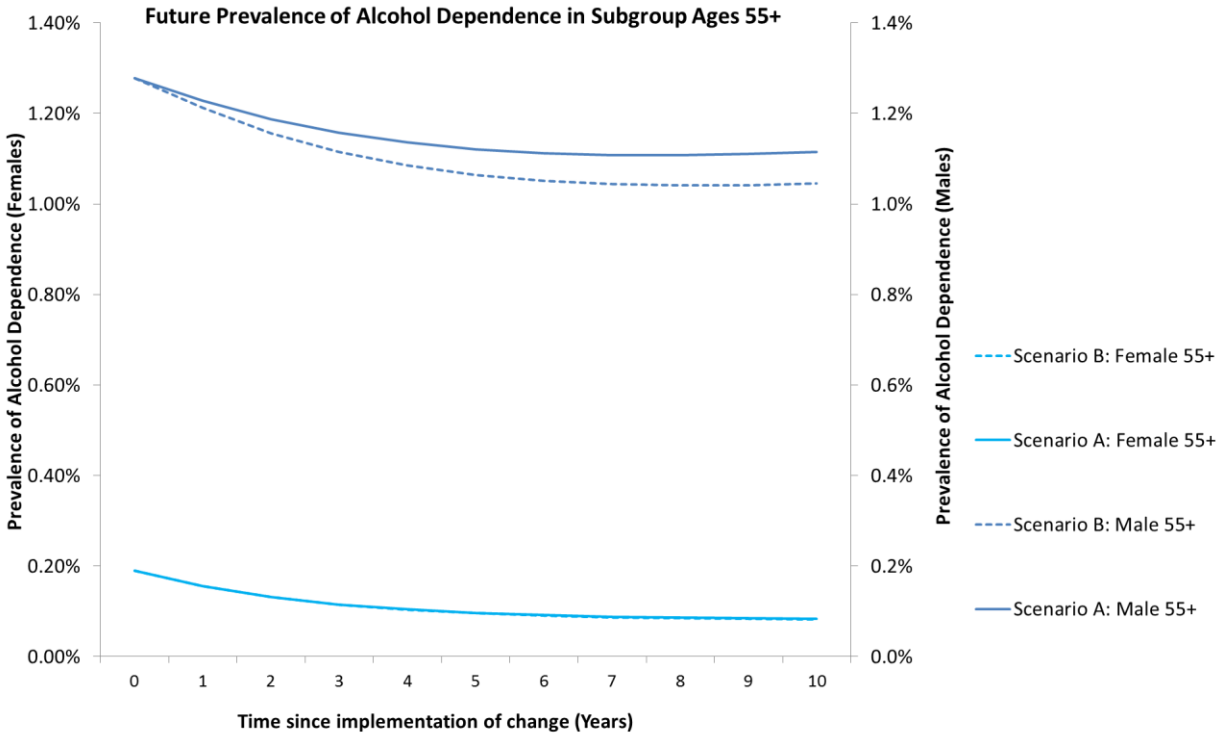
Community Increase	Residential Increase	Inpatient Increase
30.9	0.9	0.0

The extra cost of providing the additional services required to achieve the 70th percentile access rates is estimated to be around £2,126,000 cumulatively over 5 years (discounted at 3.5% per annum). If we assume that for each person comprising reduced prevalence over this period there is an annual cost saving in terms of other NHS care of £1800, then the cumulative cost saving over 5 years is estimated to be approximately £1,000,000 (again discounted at 3.5% per annum). In other words, the additional estimated service costs would be half outweighed by the modelled savings to the NHS.

The complex dynamics of the system mean it is important for users to remember that the model input default rates for relapse after treatment and for natural remission without treatment are based on literature estimates from long term studies in the USA. This means that the model outputs for the no change scenario do not produce a steady state 'flat line' for prevalence in each LA in the model. In a sense the model is not a really a prediction of what will happen in our local LA under no change, because we cannot be sure whether the natural remission and post treatment relapse rates used from US studies are reflective of Leeds in 2105/16. Rather, we think of it in terms of what-if scenarios i.e. "what if under scenario A there is no change in access rates and the US remission and relapse rates were to apply to this LA?" We then ask a 2nd what if question under scenario B i.e. "what if the access rates were at the 70th percentile nationally and the US remission and relapse rates were to apply to this LA?" As a user or analyst, we feel much more confident about the differences between these scenarios (e.g. 191 fewer prevalent people at a discounted extra service cost of £2,126,000, with a mortality reduction of 8 deaths avoided over 5 years), than we do about the absolute levels of estimated prevalence in either arm (because we cannot be sure that the US relapse and remission rates apply to pour local LA). Figure 8.1A shows that in our exemplar scenario, the overall prevalence is shown to be falling under scenario A, and falling very marginally more under scenario B. Figure 8.1B shows that the difference in prevalence rates is larger for the male 55+ age group than for the females 55+, which reflects the fact that access rates are increased more for males 55+ than females 55+ under this scenario (see Table 8.3) and explains why it is that the modelled reductions in mortality are estimated to be occurring in the males 55+ group.

Figure 8.1 Example Trends in Modelled Prevalence for Scenario 1 – 70th percentile in each age group versus no change in access rates





The model also estimates the additional number of former dependent drinkers who are in the population over time. By the end of year 5, under the 70th percentile scenario, it is estimated that an additional 199 people are in the former dependent group, with 145 of these abstaining. Most of these former dependent drinkers are in the male groups aged 18-24 (46 of them), aged 25-24 (68 of them) and 55+ (63 of them). The estimated mortality reduction is mainly in the males aged 55+, because although prevalence is lowered in these other age groups, they are not at such high absolute risk of death at such a young age. In fact, the model is estimating small mortality reductions in these groups but with rounding to zero decimal places they show up in the model results tables as zero.

Table 8.8: Detailed age-sex breakdown of the difference between the achieving 70th percentile of access rates nationally, and a scenario of no change in access rates.

LEEDS	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
Former Dependents	**0**	**43**	**96**	**138**	**171**	**199**
Abstainers/Alcohol Free	0	27	63	93	121	145
Moderate Drinker	0	16	33	44	51	54
Male 18-24	0	11	25	34	41	46
Male 25-34	0	13	31	45	58	68
Male 35-54	0	-8	-16	-21	-24	-26
Male 55+	0	14	31	44	54	63
Female 18-24	0	6	14	19	23	25
Female 25-34	0	0	1	2	3	4
Female 35-54	0	6	11	14	16	18
Female 55+	0	0	0	1	1	1
Prevalence	**0**	**-42**	**-95**	**-135**	**-166**	**-191**
% prev	0.00%	-0.01%	-0.02%	-0.02%	-0.03%	-0.03%
Estimated In Treatment at 1 April	2	34	28	23	19	16
Not in Treatment	-2	-77	-122	-157	-185	-207
Male 18-24	0	-11	-25	-34	-41	-45
Male 25-34	0	-13	-31	-45	-58	-68
Male 35-54	0	8	16	21	24	26
Male 55+	0	-13	-29	-41	-50	-56
Female 18-24	0	-6	-14	-19	-23	-25
Female 25-34	0	-0	-1	-2	-3	-4
Female 35-54	0	-6	-11	-14	-16	-18
Female 55+	0	-0	-0	-1	-1	-1

LEEDS	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
Mild	0	-23	-52	-73	-89	-102
Moderate	0	-15	-35	-50	-62	-72
Severe	0	-3	-7	-10	-12	-14
Complex	0	-1	-2	-2	-3	-3
Treatment Journeys	0	**73**	**102**	**96**	**92**	**89**
% access rate	0	**0.53%**	**0.77%**	**0.75%**	**0.74%**	**0.74%**
Successful	0	45	65	60	58	56
Not Successful	0	28	38	36	34	33
Male 18-24	0	21	31	31	30	30
Male 25-34	0	22	33	32	32	31
Male 35-54	0	-14	-20	-19	-19	-19
Male 55+	0	23	32	30	28	27
Female 18-24	0	12	17	17	17	17
Female 25-34	0	0	-1	-2	-2	-3
Female 35-54	0	10	11	8	7	6
Female 55+	0	0	0	0	0	-1
Number of People in Contact with Service on a Typical Day						
Community	2.1	37.1	34.5	32.8	31.6	30.9
Residential	0.1	1.0	1.0	0.9	0.9	0.9
Inpatient	0.0	0.0	0.0	0.0	0.0	0.0

8.4.2 Results Comparison across scenarios for change in access rates

Figure 8.2 Comparison of the Impact of Three Different Scenarios for Increased Access rates

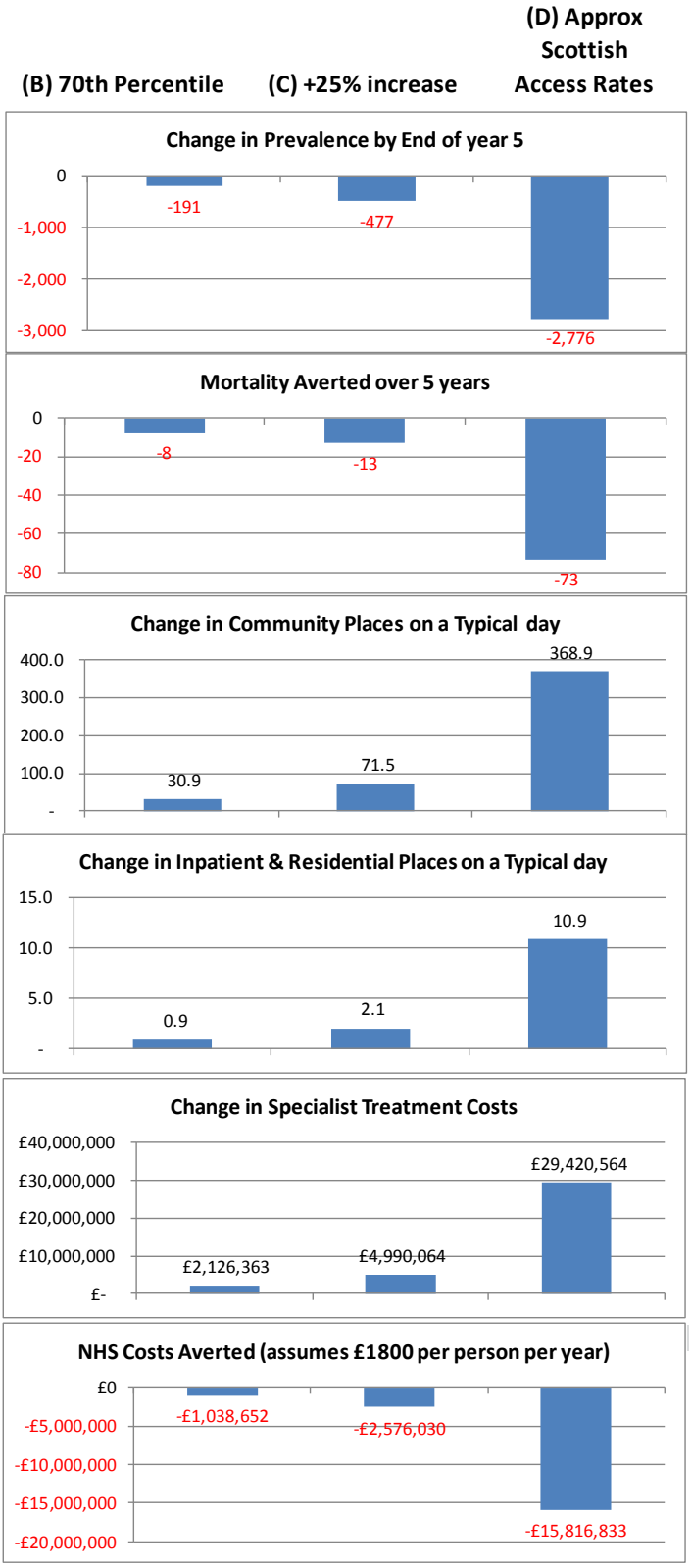


Figure 8.2 shows the impact of three different scenarios for increased access rates. The first chart shows that the impact on prevalence is greater as access rates are increased–the 70th percentile access rates that achieves a reduction of 191, a 25% increase in access rates achieves an estimated reduction of 477, whilst increasing access rates by a factor of around three (approximately to Scottish access rates) results in an estimated reduction in prevalence of almost 2800. This relative scale of impact is reflected in the each of the other model outputs. Mortality averted is almost 10 times higher when comparing the approximate Scottish rates of access with achieving the 70th percentile in England. In terms of capacity, a substantial increase in community based provision would be required with an additional 370 people under community based care on a typical day and approximately 11 additional inpatient/residential places being required. The cumulative additional costs of specialist treatment are also 10 times higher for the third scenario of compared with the first (almost £29m discounted over five years compared with £2.1m). And the indicative estimated NHS costs averted are almost 16 times higher.

8.5 Discussion

This is the first study is to set up a framework for modelling the impact of changing access rates and treatment pathway assignment for specialist treatment for alcohol dependence in England. The study has incorporated evidence from English national surveys and sources of routine data wherever possible, particularly using the adult psychiatric morbidity survey and the national drug treatment monitoring system. This work substantially extends the work of Rush et al.[4] We have developed this framework to allow all individual local authorities to consider their commissioning decisions and the potential impact on a wide range of outputs including future prevalence of alcohol dependence, service capacity required to achieve the changes modelled, potential impact on mortality, services commissioning costs, and NHS costs averted if future alcohol dependence prevalence can be reduced. This work has been set out in a user friendly excel spreadsheet format in the form of the STreAM model version 1.0, and it is intended to be disseminated to local authorities and across England through the government agency Public Health England. The results of our example analyses, which are only illustrative and did not reflect real planned for service developments in the locality modelled, suggest that higher access to specialist treatment would have three main benefits of reducing prevalence, reducing mortality, and reducing associated NHS costs.

There are several limitations to our analysis. Firstly this does not represent a full cost effectiveness in the way that the national institute for health and care excellence (NICE) would like to see with costs of service and interventions compared alongside quality adjusted life years (QALYs). Such an

analysis is possible in principle but estimating the quality adjusted life year impact requires a detailed understanding of the disease profile suffered by people who have alcohol dependence and the potential reductions in impact of such diseases. It would not be impossible in principle to link together the work undertaken here with that done separately in the Sheffield alcohol policy model which takes a wider public health perspective of the whole population and models 43 different health conditions. However, it was not within the scope of the current project to achieve this synthesis of the two modelling approaches. Instead our modelling of health benefits is relatively simple with a lifetable approach and a relative risk of mortality when people are in the alcohol dependent state, compared with people who are formerly alcohol dependent and the general population. A further limitation of our modelling is that it does not cover some of the impacts of dependence. For example, we have not modelled the reductions in crime, the reductions in harm to others including children or partners of people who are alcohol dependent, and we have not analysed wider social care costs.

Several components of further model development would be useful. In particular the APMS 2014 is expected to be reporting at some point during 2016. It would be useful to update the estimates of numbers of people potentially in need of assessment and specialist treatment for alcohol dependence. At present at the piloting process for the 'what if' model has been relatively brief, with several local authority commissioners and our wider stakeholder group commenting on the inputs and outputs which would be most useful for planning and commissioning decisions. It will be useful to gather information on how local authorities and national bodies, particularly Public Health England, utilise the model. We would expect feedback from these users to enable us to further refine the presentation of the results and the outcomes of interest which planners and decision makers find most useful.

In undertaking this analysis, several evidence gaps have emerged as important. Firstly, since the APMS is only undertaken every 7 years or so and, the prevalence estimation is somewhat out of date, it is difficult to estimate trends in prevalence. At present the model simply starts with the latest year's estimated prevalence, rather than utilising trend evidence which, if it were available, would be a useful addition. Secondly, the national drug treatment monitoring system does not collect any information routinely on the severity of alcohol dependence, other than the number of units drunk on a typical drinking day in the last month. We would strongly advise incorporation of the AUDIT and the SADQ into NDTMS, so that benchmarking across local authorities in relation to the rates of access for severity subgroups can be undertaken. Despite there being considerable evidence for the effectiveness of specialist treatments for alcohol dependence, it is less clear what the wider natural history of alcohol dependence looks like in England. For the modelling of relapse

rates after specialist treatment, and the natural remission of people who are untreated, we have had to rely on published literature estimates from the long term U.S. studies. It would be useful if some research were undertaken in England to attempt to quantify both natural remission and relapse rates.

There are several implications for national and local policy makers. Our previous studies have shown substantial local variation in the prevalence of alcohol dependence, and in the access rates to specialist treatment. It is crucial that both local and national policy makers understand the scale of this variation and that local decision makers understand where they fit in a benchmarked analysis. We have developed this model for use by decision makers and it will be important to review its usefulness over the coming months and years.

Generalisability of this modelling framework to other countries is possible, but would require either that the datasets available are very similar to those in England, or that adaptation of the model framework be undertaken to reflect different countries data availability. Our understanding of the data available in the other countries within the UK is that similar datasets to those used here for England are available in Scotland, Wales and Northern Ireland. It would be useful to consider more globally whether a standardised framework for estimating prevalence of people in need of assessment and specialist treatment for alcohol dependence, access rates to treatment, and the potential impact of changing access rates or assignment to different treatment pathways, would be possible.

In summary, this new model provides a framework and quantitative methodology for analysing the potential impact of increasing access to specialist treatment for alcohol dependence in England. We hope this will be useful to both national and local decision makers, policy makers and commissioners.

8.6 **Appendices** Appendix 8.1 Estimation of Access Rates in Scotland Compared to England

Table 8.9 Estimation of Access Rates in Scotland Compared to England

			a	b	c	d	e
					b/a	a/b	
	Population 18+	Access	Access Rate	Prevalence	Prevalence to Service Use Ratio (PSUR)	Numbers Accessing per Prevalent AUDIT 16+ Population	Estimated Ratio of Scotland to England Access Rates
ENGLAND Alcohol Primary (modelled 4.1% prevalence, AUDIT 16+)	42455773	109683	0.26%	4.14%	16.0	6.2%	
ENGLAND Alcohol Primary or Adjunctive (modelled 4.1% prevalence, AUDIT 16+)	42455773	143497	0.34%	4.14%	12.3	8.2%	
SCOTLAND (SHeS 2012: 3.1% prevalence, AUDIT 16+)	4275136		0.74%	3.10%	4.2	24.0%	24.0% : 8.2% = 2.9
SCOTLAND (Sensitivity analysis: 4.1% prevalence, AUDIT 16+)	4275136		0.74%	4.14%	5.6	18.0%	

Note: Based on 31796 service users reported by SHeS 2012 from an adult population of 4,275,136, which gives a rate of 0.0074 per overall population.

(see http://findings.org.uk/PHP/dl.php?file=Beeston_C_3.txt)

Appendix 8.2 Specification of NDTMS Duration of Treatment analysis

Aim: We investigated the duration of the treatment clients undergo based on their cluster, pathway and outcome. We also examined the duration clients spent in each setting within their treatment to investigate how this varied by cluster, pathway and outcome.

Method: Standard NDTMS journey processing rules were applied, see Appendix A. Journeys were categorised into journey-type groups, see Appendix B. Journeys were selected using the following rules:

1) Journeys not categorised as either "Primary problem alcohol with no other adjunctive problem substances" or "Primary problem alcohol with adjunctive problem substance(s) not including opiates" were excluded.
2) Journeys with any modality codes not consistent with the NDTMS Data Set L coding book were excluded.
3) Journeys not ending in 2013/2014 were excluded.

For each selected journey values for the following variables were assigned:

a) Most recent journey indicator: Whether the selected journey was the most recently ended journey (in 2013/2014) for the client.
b) Cluster (see Appendix C)
c) Pathway (see [most recent pathway spec])
d) Outcome (see Appendix D)
e) Duration of time in each treatment setting (see Appendix E)

Analyses

Analysis 1

Using only those journeys indicated as the most recent ended journey, the sample size (number of clients) and the mean duration of time spent in each setting were tabulated for groups defined by:

- cluster
- pathway
- outcome

Analysis 2

Using all journeys, the sample size (number of journeys) and the mean duration of time spent in each setting were tabulated for groups defined by:

- cluster
- pathway
- outcome

8.6.1 **Format of Results**

Analysis 1

Cluster	Pathway	Outcome	Sample Size	Mean Duration as inpatient	Total Days as inpatients	Mean duration as residential	Total days as residential

Continued...	Mean duration as community	Total duration as community	Mean Days in any treatment	Total days in any treatment

Appendix A NDTMS data processing

NDTMS journeys were calculated from modalities in which all problem substances (alcohol and non-alcohol) were allowed within any given journey.

Modalities were excluded before building journeys if they:

- were for nicotine and/or caffeine but no other drugs.
- were unstructured modalities (but including LASARS, which is an artificial modality)
- had an inconsistent date structure (e.g. end date before start date)
- were for clients aged 8 or under or 100 and over at triage date

Constructed journeys were then excluded if:

- the only modality is LASARS.
- the clients was under 18 years of age at journey start
- alcohol was not recorded as the primary problem substance at first triage

Journeys were taken as starting from the start date of the first modality within the journey rather than the earliest triage date for a (structured or LASARS) modality in the journey. This is done in order to avoid overlapping journeys. Journeys end on the last discharge date recorded for any (structured or LASARS) modality.

Appendix B Journey-type groups

Journeys were categorised into one of the following mutually exclusive and exhaustive groups:

A. Primary problem alcohol with no other adjunctive problem substances
B. Primary problem alcohol with adjunctive problem substance(s) not including opiates
C. Primary problem alcohol with adjunctive problem substance(s) including opiates
D. Primary problem not alcohol with adjunctive problem substance(s) including alcohol
E. Primary problem not alcohol with or without adjunctive problem substance(s), these not including alcohol

Primary problem substance was identified as that recorded as primary problem substance at first triage of the selected journey.

Adjunctive problem substance(s) were identified as those in any other (than primary) position in the first triage or in any position in any other triage assessments within the selected journey. Nicotine and caffeine were ignored.

A number of journeys contained more than one “first triage” assessments. For these journeys, if alcohol was recorded as primary problem substance in any “first triage” assessment then alcohol was identified as the primary problem substance for the journey.

Appendix C Clusters

Clusters were derived from “units of alcohol” (typical number of units consumed on a drinking day in the 28 days prior to initial assessment) recorded at first triage and an additionally set of variables also recorded at first triage in the journey. The set of additional variables were used to identify “complex need”, these are:

- Benzodiazepines recorded as adjunctive problem substance
- Dual diagnosis recorded
- Accommodation status of Urgent Housing Problem recorded

If any one (or more) of the above were present at first triage then the client was deemed to have “complex need”.

Clusters were defined thus:

- Cluster 1: 0 to 15 units with or without “complex need”
- Cluster 2: 16 to 30 units without “complex need”
- Cluster 3: 31 or more units without “complex need”
- Cluster 4: 16 or more units with “complex need”

Appendix D Outcomes

Outcomes were defined as follows:

	Outcome	NDTMS Outcomes	Notes
1	Success – alcohol free – did not re-present within 6 months	Success – alcohol free	Client identifier not recorded in NDTMS data within 183 days following the journey end date for any subsequent journey categorised as either “Primary problem alcohol with no other adjunctive problem substances” or “Primary problem alcohol with adjunctive problem substance(s) not including opiates”.
2	Success – alcohol free – re-presented within 6 months	Success – alcohol free	Client identifier recorded in NDTMS data within 183 days following the journey end date

			for one or more subsequent journeys categorised as either “Primary problem alcohol with no other adjunctive problem substances” or “Primary problem alcohol with adjunctive problem substance(s) not including opiates”.
3	Success – moderated non-problematic drinking – did not re-present within 6 months	Success – moderated non-problematic drinking	Client identifier not recorded in NDTMS data within 183 days following the journey end date for any subsequent journey categorised as either “Primary problem alcohol with no other adjunctive problem substances” or “Primary problem alcohol with adjunctive problem substance(s) not including opiates”.
4	Success – moderated non-problematic drinking – re-presented within 6 months	Success – moderated non-problematic drinking	Client identifier recorded in NDTMS data within 183 days following the journey end date for one or more subsequent journeys categorised as either “Primary problem alcohol with no other adjunctive problem substances” or “Primary problem alcohol with adjunctive problem substance(s) not including opiates”.

5	Dropped out	Dropped out Client declined further treatment Transferred – not in custody	
6	Transferred – in custody	Transferred – in custody	
7	Died	Died	
8	Other/NK	All other NDTMS outcomes	

Appendix E Setting

All interventions are assigned a setting in the NDTMS data. The settings investigated are listed in Table 8.10.

Table 8.10: List of intervention settings

	Setting	NDTMS settings
1	Community	Community Primary Care
2	Inpatient	Inpatient Unit
3	Other residential	Residential

From the data it is known that interventions with setting recorded as "community" intersect (in time) with interventions with setting recorded as "inpatient" and "other residential".

We make the following assumption:

- The three settings in Table 8.10 are mutually exclusive; a client may receive treatment in only one of the three settings at any given time.

Appendix E.1 Method of Calculation

Using modality setting and modality start and end dates, the total duration each client spent in each setting was calculated using the following method.

1. From the data, calculate the total time spent in any intervention regardless of setting.

2. From the data, calculate the total time spent in any intervention with setting recorded as “inpatient”.
3. From the data, calculate the total time spent in any intervention with setting recorded as “other residential”.
4. Set the time spent in interventions with setting of “community” as (1) - [minus] (2) - [minus] (3).

The smallest unit of time used is “days”. Any portion of a day is counted as a full day. Both start and end days contribute to duration in any treatment setting. Thus, starting and ending treatment on the same day produces a duration of 1 day.

Appendix 8.3 Resource Costs

Objective

The cost of specialist treatment for alcohol-use disorders is a crucial factor in estimating potential costs or savings from increasing or re-configuring treatment services. The treatment capacity model will provide expenditure estimates for specialist treatment services given predicted service utilisation and case mix. We identify costs associated with key component interventions of specialist alcohol treatment in order to produce a total expenditure estimate.

We have examined the resource requirements and associated costs for the component interventions included in the modelled pathways. Where possible, resource requirements were identified from NICE CG115 guideline and recalculated using the most recently available unit costs data (Curtis, 2014; Department of Health, 2014). Where it was not possible to recalculate a cost, the stated cost were inflated to 2013/14 prices using hospital and community health services indices (Curtis, 2014).

Key components of specialist alcohol (Tier 3 and Tier 4) treatment are identified as:

- Comprehensive Assessment
- Psychosocial interventions
- Pharmacological interventions for relapse prevention
- Community Assisted Withdrawal
- Inpatient/Residential Assisted Withdrawal
- Intensive Community Programme
- Residential Rehabilitation

8.6.2 **Costing Interventions**

8.6.2.1 **Comprehensive Assessment**

The guideline states that comprehensive assessment should be considered for all adults referred to specialist treatment services with an AUDIT score of 16 or more.

The guideline does not explicitly state the resource use or costs of a comprehensive assessment. Expert clinical opinion from a former member of the GDG of CG115 was that a comprehensive assessment fulfilling the expectations of the guideline would take approximately two hours split over two sessions usually with a band 6/7 nurse or equivalent, or consultant psychiatrist or a combination of the two. It was also stated that a further additional hour or two (approximately) would be required to complete associated paperwork for NDTMS, electronic patient record entry and

correspondence with GP. Lastly, a multidisciplinary case discussion for 15 minutes per patient would be required to discuss the patient's care plan.

We assume the costs relating to administration and case discussion are accounted for in the face-to-face hourly costs[2].

Table 8.11: Staff costs from PSSRU Unit Costs of Health & Social Care 2014 (Curtis, 2014)

Staff	Hourly cost	Notes
Nurse Specialist (Community) - Band 6	£86	In the absence of face to face costs, the face to face ratio of Nurse Advanced was used.
Nurse Advanced - Band 7	£90	
Consultant psychiatrist	£366	In the absence of face-to-face costs, the face-to-face ratio from 2012/13 was used.

This unit cost includes salary, salary oncosts, capital and revenue overheads, as well as qualification costs.

We have assumed that Band 6 and Band 7 nurses were equally likely to conduct an assessment and that a nurse or consultant psychiatrist where equally likely to conduct an assessment. Hence, the total cost for a single comprehensive assessment was estimated to be £454.

8.6.2.2 **Psychological interventions**

The guideline states that a psychological intervention should be offered to all harmful and mildly dependent drinkers. Additionally a psychological intervention should be offered to moderately and severely alcohol dependent patients after successful assisted withdrawal (and any subsequent intensive community programme).

[2] The face-to-face ratio is the relationship between the time spent on direct activities (such as face-to-face contact) and time spent on other activities. For example, if the ratio of face-to-face contact to other activities is 1:1.5, each hour spent with a client requires 2.5 paid hours. Face-to-face costs include the cost of the face-to-face contact and related other activities per hour of face-to-face contact.

A summary of the interventions were produced in the guideline and are reproduced here with updated staffing and related costs.

Table 8.12: Staff costs - PSSRU Unit Costs of Health & Social Care (Curtis, 2014)

Staff	Hourly cost	Notes
Nurse Specialist (Community) - Band 6	£86	In the absence of face-to-face costs, the face-to-face ratio of Nurse Advanced was used.
Clinical psychologist	£138	

This unit cost includes salary, salary oncosts, capital and revenue overheads, as well as qualification costs.

Table 8.13: Summary of resource use and costs associated with psychological interventions

Intervention	Staff	Length/Frequency	Weekly Cost (mean)
Cognitive behavioural therapies	Clinical psychologist	1 hour, weekly for 12 weeks	£86
	Nurse Specialist (Community) - Band 6	1 hour, weekly for 12 weeks	£138
Behavioural therapies	Clinical psychologist	1hour, weekly for 12 weeks	£138
Social network and environment-based therapies	Nurse Specialist (Community) - Band 6	50mins per session, 8 sessions over 12 weeks	£48

We assume, as per the CG115 costing report, that equal numbers of Cognitive behavioural therapies are delivered by Clinical psychologists as by Band 6 nurses. We further assume, as per the CG115

costing report, equal numbers of the three interventions are delivered. Thus, the mean weekly cost of a 12 week psychological intervention was estimated to be £99.

8.6.2.3 **Pharmacological interventions for relapse prevention**

The guideline states that pharmacological interventions for relapse prevention should be considered for all moderately and severely alcohol dependent patients after successfully completing assisted withdrawal.

The guideline presents a summary of drug acquisition costs and resources required for a 12 month pharmacological intervention for relapse prevention. These are reproduced here with updated costs.

Table 8.14: Summary of drug costs for pharmacological relapse prevention

Drug	Daily dose	Unit Cost (BNF, Feb 2015)	Annual Cost
Acamprosate	1998mg	333mg, 168 tab £28.80	£376
Naltrexone	50mg	50mg, 28 tab £22.34	£291

Table 8.15: Summary of resource use and costs for pharmacological relapse prevention

Service	Usage	Unit cost	Source
Outpatient visit	1 x 15minutes with consultant psychiatrist	£92	Consultant psychiatrist hourly face-to-face cost (Curtis, 2014)
GP visit	1	£46	GP 11.7min surgery consultation (Curtis, 2014)
Laboratory test: Liver function	3	£6.20	Cost from guideline inflated using Community Health Services pay and prices index (Curtis, 2014)
Laboratory test: Urea	3	£5.04	Cost from guideline inflated using

and electrolytes			Community Health Services pay and prices index (Curtis, 2014)
Total		£171.72	

We assume, as per CG115, Acamprosate and Naltrexone are prescribed to an equal number of patients. The total annual cost of pharmacological interventions for relapse prevention was estimated to be £505.

8.6.2.4 **Community Assisted Withdrawal**

The guideline states that community assisted withdrawal should be considered for moderately dependent drinkers.

The health economic evidence given in the guideline assumes a community assisted withdrawal consisting of 6 outpatient attendances over 10 days.

F1. Drug component

Drug costs were estimated based on the average of the fixed-dose chlordiazepoxide protocols for treatment of alcohol withdrawal in moderate dependent patients as reproduced in the guideline (originally from Ghodse *et al*, 1998; South West London and St George's Mental Health NHS Trust, 2010). Unit drug costs were taken from the BNF, February 2015. Drug costs were estimated to be £4.

F2. Outpatient component

The cost estimate provided in CG115 was based on costs for:

Table 8.16: 2008/09 Community Assisted Withdrawal non-drug costs

Service	Usage	Unit cost (2008/09 prices)	Source
first face to face outpatient attendance	1	£198	(Department of Health, 2010)
follow-up face to face outpatient	5	£84	(Department of Health, 2010)

attendance			
Total		£618	

NHS reference costs 2013 to 2014 (Department of Health, 2014) for outpatient attendance for adult alcohol services based in mental health do not specify separate costs by attendance type based on whether the attendance is:

- first or follow-up

1 face to face or non-face to face

The 2013/14 reference unit cost for an outpatient attendance is £60. This is considerably lower than the 2008/09 reference cost for the average weighted outpatient attendance (after accounting for inflation).

Total costs

Table 8.17: 2013/14 Community Assisted Withdrawal total costs

Service	Usage	Unit cost (2013/14 prices)	Source
Outpatient attendance	6	£60	(Department of Health, 2014)
Drug costs	N/A	£4	(BNF, Feb 2015)
Total		£364	

The estimated cost, using 2013/14 data, of a community assisted withdrawal is £364.

8.6.2.5 **Inpatient/Residential Assisted Withdrawal**

The guideline states that inpatient or residential detoxification should be considered for patients with severe alcohol dependence or those with moderate dependence and complex needs.

The guideline assumed that an inpatient/residential withdrawal would last between two and three weeks and would include an additional face-to-face outpatient contact.

Inpatient/residential withdrawal component

The guideline calculated costs based on the 2008/09 DH Reference cost for NHS adult acute mental health inpatient care. An alternative cost is now available from PSSRU Unit Costs of Health & Social

Care 2014 (Curtis, 2014). A comparison of the two available weekly costs for residential detoxification services is provided below.

Table 8.18: Summary of cost data available for inpatient/residential assisted withdrawal from two sources

Description	Inpatient detoxification for people who misuse drugs or alcohol	Mental health, alcohol services, adult, inpatient care
Source	PSSRU Unit Costs of Health & Social Care 2014 (Curtis, 2014)	NHS reference costs 2013 to 2014, (Department of Health, 2014)
Weekly cost	£1061	£2366
Setting	General hospital psychiatric units Specialist drug misuse inpatient units in hospitals Residential rehabilitation units	Inpatient treatment in Alcohol Services within Mental Health only
Costing	Based on data from NTA supplied in 2010 (these based on 2007/08 costs), uprated using GDP index to 2012/13 prices (explicitly not uprated to 2013/14, although relatively small effect).	Based on returns from 17 trusts in 2013/14
Inclusions	The provision of services with 24 hour cover, seven days per week, from a multidisciplinary clinical team who have had specialist training in managing addictive behaviours. Treatment in an inpatient setting may involve one or more of the following interventions: (a) assessment, (b) stabilisation and (c) assisted withdrawal (detoxification). A combination of all three may be provided, or one followed by another.	Not specified.

We chose to use the cost of adult inpatient care in mental health alcohol services from NHS reference costs 2013 to 2014, (Department of Health, 2014) as this is consistent with the approach taken in CG115 guideline. We assume the average length of treatment is the mid-point of the range, 2.5 weeks.

Face to face outpatient attendance component

The cost estimate provided in CG115 was based on costs for a follow-up face-to-face outpatient attendance. As previously noted, NHS reference costs 2013 to 2014 (Department of Health, 2014) do not specify separate costs for adult alcohol outpatient attendance by attendance type, based on whether the attendance is:

- first or follow-up

2 face to face or non-face to face

The 2013/14 reference cost for outpatient attendance for adult alcohol services is £60 (Department of Health, 2014).

Total costs

The estimated cost of inpatient/residential assisted withdrawal using NHS reference costs 2013 to 2014, (Department of Health, 2014) data is £5975.

We note using the alternative cost from PSSRU Unit Costs of Health & Social Care 2014 (Curtis, 2014) for inpatient detoxification for people who misuse drugs or alcohol gives a substantially lower figure of £2713.

8.6.2.6 **Intensive Community Programme**

The guideline states intensive community programmes should be offered to all severely dependent drinkers and moderately dependent drinkers with complex needs after successful assisted withdrawal.

The guideline specified that intensive community programmes should involve the client attending a day programme on between 4 and 7 days per week over a 3 week period. The intensive community programme should also consist of a drug regimen which we consider separately (see Pharmacological interventions for relapse prevention).

The guideline used the mean of the unit cost of NHS mental health day care (Department of Health, 2010) - assumed to provide non-specialist services and so considered an under-estimate - and a local unit cost from a day hospital assisted withdrawal and rehabilitation service for people who are alcohol dependent (report by Parrott, 2006).

The unit cost of NHS mental health day care is not explicitly reported in Department of Health reference costs 2013 to 2014 (Department of Health, 2014). A reference cost for NHS Community Health Services for adult day facilities regular attendance (excluding stroke and elderly patients) was recorded.

Table 8.19: Summary of cost data available for intensive community programme

Description (Source)	NHS mental health day care facilities: regular attendances – adult care (Department of Health, 2010)	Day hospital assisted withdrawal and rehabilitation service for people who are alcohol dependent (Parrott, 2006).	NHS community health services day care Facilities: regular attendances – other patients (Department of Health, 2014)
Daily Cost (Year)	£105 (2008/09)	£109 (2004/05)	£148 (2013/14)
2013/14 price	£114	£136	£148

We chose to use the cost of NHS community health services day care facilities regular attendances – other patients (Department of Health, 2014) as this was the only recent comparable data available.

We assume the number of days in treatment per week takes the mid-point value of 5.5days.

The total cost of an intensive community programme is estimated to be £2442.

8.6.2.7 **Residential Rehabilitation**

The guideline states Residential Rehabilitation should be considered for homeless clients with alcohol dependence for a maximum of 3 months.

We consider homelessness as indicating “complex needs”. We assume moderate and severe dependent clients who are homeless will receive inpatient/residential assisted withdrawal before commencing residential rehabilitation.

The guideline stated costs from the PSSRU Unit Costs of Health and Social Care 2008/09 (Curtis, 2010) for “residential units for people who misuse drugs/alcohol provided by the voluntary sector”

as no unit costs for NHS residential treatment for people with an alcohol-use disorder were available.

Unit Costs of Health and Social Care 2013/14 (Curtis, 2014) states unit costs of £633 per resident week based on a sample of 34 residential rehabilitation programmes in 2007/08 with costs uprated to 2013/14 prices using the GDP index.

8.6.3 Comparison between guideline costs and re-calculated cost

Inflated guideline costs were compared with recalculated costs. The hospital and community health services index (Curtis, 2014) was used to inflate the guideline costs to 2013/14 prices.

Table 8.20: Comparison between inflated guideline costs and re-calculated costs, 2013/14 prices

Description	Inflated cost	Re-calculated cost	Cost Change	(%)
Comprehensive Assessment (unit cost)	None given	£454	N/A	
Psychosocial interventions (weekly cost)	£67	£99	+£32	(+47.8%)
Pharmacological interventions for relapse prevention (annual cost)	£469	£505	+£36	(+7.7%)
Community Assisted Withdrawal (10 day cost)	£660	£364	-£296	(-44.8%)
Inpatient/Residential Assisted Withdrawal (17.5 day cost)	£5614	£5975	+£361	(+6.4%)
Intensive Community Programme (3 week cost)	£2073	£2442	+£329	(+17.8%)
Residential Rehabilitation (weekly cost)	£879	£633	-£246	(-28.0%)

8.6.4 Costs applied to journeys

Table 8.21: Costs inputs for the specialist treatment intervention components

Intervention Component	Research team's estimated 2013/14 update to NICE CG115 costings (£)	Duration of component as costed in NICE CG115 (weeks)	Implied Weekly Cost (£)	Implied Daily Cost (£)
Community Psychosocial	99.00	1.00	99.00	£14.14

Pharmacological interventions for relapse prevention	505.00	52.00	9.71	£1.38
Community Assisted Withdrawal	363.00	1.43	254.10	£36.40
Intensive Community Programme	2442.00	3.00	814.00	£116.29
Residential Assisted Withdrawal	5975.00	2.50	2390.00	£341.43
Residential Rehabilitation	633.00	1.00	633.00	£90.43
Comprehensive assessment	454.00	1.00	454.00	£454

These costs are used to calculate cost of pathways in the treatment capacity model.

Table 8.22 Example of which components of Interventions are included into each of the 22 Pathways – Middle level drinkers (15-30 units per typical drinking day)

Subgroup 2 / Middle Level Drinkers Pathway	Intervention Component Community Psychosocial Interventions	Community Pharmacological Interventions	Community Assisted Withdrawal	Intensive Community Programme	Residential Assisted Withdrawal	Residential Rehabilitation	Comprehensive assessment
Community psychosocial only	Yes	No	No	No	No	No	Yes
Community with pharmacologically assisted withdrawal	Yes	Yes	No	No	No	No	Yes
Community with pharmacologically assisted relapse prevention	Yes	No	Yes	No	No	No	Yes
Community with pharmacologically assisted withdrawal and relapse prevention	Yes	Yes	Yes	No	No	No	Yes
Community treatment with-non-standard pharmacological treatment	Yes	Yes	Yes	No	No	No	Yes
Community pharmacology of unknown type in an incorrect order	Yes	Yes	Yes	No	No	No	Yes
Inpatient treatment without any pharmacological treatments	Yes	No	No	No	Yes	Yes	Yes
Inpatient treatment without pharmacological components but ingoing community	Yes	No	No	No	Yes	Yes	Yes
Inpatient assisted withdrawal	Yes	No	No	No	Yes	Yes	Yes
Inpatient assisted withdrawal followed by community psychosocial	Yes	No	No	No	Yes	Yes	Yes
Inpatient assisted withdrawal followed by community psychosocial and pharmacological	Yes	Yes	No	No	Yes	Yes	Yes
Inpatient treatment with non-standard pharmacological treatment	Yes	No	No	No	Yes	Yes	Yes
Composite inpatient interventions	Yes	Yes	No	No	Yes	Yes	Yes
Anything else with any inpatient super-modalities	Yes	Yes	No	No	Yes	Yes	Yes
Residential treatment without any pharmacological treatments	Yes	No	No	No	Yes	Yes	Yes
Residential treatment without pharmacological components but ingoing community	Yes	No	No	No	Yes	Yes	Yes
Residential assisted withdrawal	Yes	No	No	No	Yes	Yes	Yes
Residential assisted withdrawal followed by community psychosocial	Yes	No	No	No	Yes	Yes	Yes
Residential assisted withdrawal followed by community psychosocial and pharmacological	Yes	Yes	No	No	Yes	Yes	Yes
Residential treatment with non-standard pharmacological treatment	Yes	No	No	No	Yes	Yes	Yes
Composite residential interventions	Yes	Yes	No	No	Yes	Yes	Yes
Anything else with any residential super-modalities	Yes	Yes	No	No	Yes	Yes	Yes

Table 8.23 Middle Level Drinkers - Average National Pathway Duration in Weeks - Inpatient

Average National Pathway Duration in Weeks - Inpatient

Middle Level Drinker	Complete (Moderated non-problematic drinking)	Complete (Alcohol Free)	Transferred	Dropped out/left	Died
ComPsyOnly					
ComRePr					
ComWith					
ComWithRePr					
ComOthPha					
ComOthOth					
IPPsyOnly	4	16	3	5	7
IPPsyComPsy	3	3	1	2	2
IPWith	2	2	2	2	6
IPWithComPsy	2	2	2	2	2
IPWithComRePr	2	2	2	2	4
IPPhaOth	2	2	2	2	1
IPComplex	4	3	4	4	2
IPOth	2	3	2	2	2
ResNoIPPsyOnly	-	-	-	-	-
ResNoIPPsyComPsy	-	-	-	-	-
ResNoIPWith	-	-	-	-	-
ResNoIPWithComPsy	-	-	-	-	-
ResNoIPWithComRePr	-	-	-	-	-
ResNoIPPhaOth	-	-	-	-	-
ResNoIPComplex	-	-	-	-	-
ResNoIPOth	-	-	-	-	-

Table 8.24 Middle Level Drinkers - Average National Pathway Duration in Weeks - Residential

Average National Pathway Duration in Weeks - Residential					
Middle Level Drinker	Complete (Moderated non-problematic drinking)	Complete (Alcohol Free)	Transferred	Dropped out/left	Died
ComPsyOnly					
ComRePr					
ComWith					
ComWithRePr					
ComOthPha					
ComOthOth					
IPPsyOnly					
IPPsyComPsy					
IPWith					
IPWithComPsy					
IPWithComRePr					
IPPhaOth					
IPComplex					
IPOth					
ResNoIPPsyOnly	13	17	5	9	11
ResNoIPPsyComPsy	11	5	1	11	16
ResNoIPWith	11	7	7	4	7
ResNoIPWithComPsy	4	3	2	6	4
ResNoIPWithComRePr	2	2	1	2	2
ResNoIPPhaOth	4	2	1	1	1
ResNoIPComplex	10	10	10	10	10
ResNoIPOth	12	9	14	7	3

Table 8.25 Middle Level Drinkers - Average National Pathway Duration in Weeks - Community

Average National Pathway Duration in Weeks - Community					
Middle Level Drinker	Complete (Moderated non-problematic drinking)	Complete (Alcohol Free)	Transferred	Dropped out/left	Died
ComPsyOnly	18	18	15	15	16
ComRePr	24	25	26	24	18
ComWith	16	23	19	21	13
ComWithRePr	20	25	22	20	22
ComOthPha	21	18	20	19	19
ComOthOth	14	15	10	13	28
IPPsyOnly	-	2	-	-	1
IPPsyComPsy	23	20	8	22	18
IPWith	2	7	3	1	-
IPWithComPsy	22	26	20	20	36
IPWithComRePr	23	29	20	21	51
IPPhaOth	19	18	27	19	25
IPComplex	27	25	27	25	23
IPOth	6	11	7	8	8
ResNoIPPsyOnly	3	-	3	3	3
ResNoIPPsyComPsy	21	19	40	15	16
ResNoIPWith	3	2	2	2	2
ResNoIPWithComPsy	20	27	15	31	23
ResNoIPWithComRePr	26	28	22	37	28
ResNoIPPhaOth	22	24	23	41	12
ResNoIPComplex	18	18	18	18	18
ResNoIPOth	10	10	4	9	18

Table 8.26 Middle Level Drinkers - Average National Pathway Duration in Weeks - All Settings Added Together

Average National Pathway Duration in Weeks - All Settings Added Together					
Middle Level Drinker	Complete (Moderated non-problematic drinking)	Complete (Alcohol Free)	Transferred	Dropped out/left	Died
ComPsyOnly	18	18	15	15	16
ComRePr	24	25	26	24	18
ComWith	16	23	19	21	13
ComWithRePr	20	25	22	20	22
ComOthPha	21	18	20	19	19
ComOthOth	14	15	10	13	28
IPPsyOnly	4	18	3	5	8
IPPsyComPsy	26	23	9	24	20
IPWith	4	9	5	3	6
IPWithComPsy	24	28	22	22	38
IPWithComRePr	25	31	22	23	55
IPPhaOth	21	20	29	21	26
IPComplex	31	28	31	29	25
IPOth	8	14	9	10	10
ResNoIPPsyOnly	16	17	8	12	14
ResNoIPPsyComPsy	32	24	41	26	32
ResNoIPWith	14	9	9	6	9
ResNoIPWithComPsy	24	30	17	37	27
ResNoIPWithComRePr	28	30	23	39	30
ResNoIPPhaOth	26	26	24	42	13
ResNoIPComplex	28	28	28	28	28
ResNoIPOth	22	19	18	16	21

8.6.5 **Wider Health Service Costs of Alcohol Dependence**

NICE CG 115 Alcohol Use Disorders (2011): The survey also estimated the proportion of healthcare service use by people identified as dependent or hazardous drinkers[2]. It was estimated that 10% of hazardous drinkers (but not dependent) and 21% of people with alcohol dependence used healthcare services in England during 2007. Assuming a ratio of 2:1, it was possible to estimate the total annual and monthly NHS costs attributable to people who relapse to alcohol dependency. The costs were inflated from 2006/07 prices using the Hospital and Community Health Services pay and prices index[94]. Total annual NHS costs attributable to alcohol dependency per person were estimated at £1,800.

Appendix 8.4 – Table of Results for Each scenario

Table 8.27 Model Results for Exemplar LA - Scenario A - No Change in Access Rates

LEEDS		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
	offsetting ->->->->->->->->->->	5	57	109	161	213	265
Population		**601106**	**615,444**	**629,781**	**644,119**	**658,457**	**672,795**
Former Dependents		**26,368**	**28,075**	**29,682**	**31,216**	**32,693**	**34,123**
	Abstainers/Alcohol Free	15,081	16,096	17,078	18,039	18,985	19,918
	Moderate Drinker	11,286	11,979	12,603	13,176	13,708	14,205
	Male 18-24	5957	5979	5993	6003	6010	6014
	Male 25-34	6650	6933	7175	7385	7567	7726
	Male 35-54	5690	6331	6936	7513	8064	8592
	Male 55+	2892	3137	3395	3665	3946	4237
	Female 18-24	2622	2639	2651	2659	2665	2669
	Female 25-34	746	1084	1402	1697	1970	2220
	Female 35-54	1304	1420	1539	1669	1812	1969
	Female 55+	508	552	590	624	659	696
Prevalence		**14,576**	**14,430**	**14,374**	**14,379**	**14,427**	**14,505**
	% prev	2.42%	2.34%	2.28%	2.23%	2.19%	2.16%
	Estimated In Treatment at 1 April	1,845	1,649	1,486	1,344	1,218	1,107
	Not in Treatment	12,731	12,781	12,888	13,035	13,209	13,398
	Male 18-24	3,532	3,503	3,481	3,466	3,454	3,445
	Male 25-34	3,981	3,964	3,960	3,965	3,976	3,992
	Male 35-54	3,050	2,996	2,973	2,970	2,983	3,007
	Male 55+	1,120	1,103	1,093	1,091	1,095	1,104
	Female 18-24	1,554	1,534	1,519	1,508	1,500	1,495
	Female 25-34	445	559	650	723	783	833
	Female 35-54	697	609	559	533	522	520
	Female 55+	196	162	140	125	115	108
	Mild	7,568	7,398	7,299	7,248	7,233	7,243
	Moderate	5,626	5,644	5,677	5,719	5,767	5,818
	Severe	1,145	1,166	1,186	1,205	1,222	1,238
	Complex	237	221	212	207	205	205
Treatment Journeys			**1,181**	**1,177**	**1,198**	**1,229**	**1,266**
	% access rate		**8.18%**	**8.19%**	**8.33%**	**8.52%**	**8.73%**
	Successful		745	742	754	773	797
	Not Successful		436	436	444	455	469
	Male 18-24		47	47	47	47	47
	Male 25-34		199	200	202	204	206
	Male 35-54		470	470	477	488	501
	Male 55+		117	114	113	112	113
	Female 18-24		35	35	34	34	34
	Female 25-34		95	126	154	177	197
	Female 35-54		167	145	136	135	138
	Female 55+		50	40	34	31	29
Number of People in Contact with Service on a Typical Day							
	Community	425	415	421	430	443	457
	Residential	11.0	11.0	11.3	11.6	12.0	12.5
	Inpatient	0.4	0.4	0.4	0.4	0.4	0.4

Table 8.28 Model Results for Exemplar LA - Scenario B – Achieve 70th Percentile Access Rates Nationally for each Age/Gender Band

LEEDS		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
	offsetting ->->->->->->->->->->	5	57	109	161	213	265
Population		**601106**	**615,444**	**629,781**	**644,119**	**658,457**	**672,795**
Former Dependents		**26,368**	**28,117**	**29,777**	**31,353**	**32,864**	**34,322**
	Abstainers/Alcohol Free	15,081	16,123	17,141	18,133	19,105	20,063
	Moderate Drinker	11,286	11,995	12,637	13,221	13,759	14,259
	Male 18-24	5957	5990	6018	6037	6050	6060
	Male 25-34	6650	6946	7206	7430	7625	7794
	Male 35-54	5690	6323	6920	7492	8040	8566
	Male 55+	2892	3151	3426	3709	4000	4300
	Female 18-24	2622	2645	2665	2678	2687	2694
	Female 25-34	746	1084	1402	1699	1973	2224
	Female 35-54	1304	1426	1550	1683	1828	1986
	Female 55+	508	552	590	625	660	697
Prevalence		**14,576**	**14,387**	**14,280**	**14,245**	**14,261**	**14,314**
	% prev	2.42%	2.34%	2.27%	2.21%	2.17%	2.13%
	Estimated In Treatment at 1 April	1,847	1,683	1,514	1,367	1,237	1,123
	Not in Treatment	12,729	12,704	12,766	12,878	13,023	13,191
	Male 18-24	3,532	3,491	3,457	3,432	3,413	3,399
	Male 25-34	3,981	3,951	3,929	3,919	3,919	3,924
	Male 35-54	3,050	3,004	2,989	2,991	3,007	3,033
	Male 55+	1,120	1,089	1,064	1,050	1,045	1,048
	Female 18-24	1,554	1,527	1,505	1,489	1,478	1,469
	Female 25-34	445	559	649	721	780	829
	Female 35-54	697	603	548	518	505	503
	Female 55+	196	162	140	124	114	107
	Mild	7,568	7,375	7,247	7,175	7,143	7,141
	Moderate	5,626	5,629	5,643	5,670	5,705	5,746
	Severe	1,145	1,163	1,179	1,195	1,210	1,224
	Complex	237	221	211	205	202	202
Treatment Journeys			**1,253**	**1,280**	**1,294**	**1,321**	**1,355**
	% access rate		**8.71%**	**8.96%**	**9.09%**	**9.26%**	**9.47%**
	Successful		790	806	815	831	853
	Not Successful		464	474	479	490	502
	Male 18-24		68	78	77	77	77
	Male 25-34		222	233	234	236	238
	Male 35-54		456	450	458	469	481
	Male 55+		140	146	142	140	140
	Female 18-24		46	52	52	51	51
	Female 25-34		94	125	152	175	194
	Female 35-54		177	156	144	142	145
	Female 55+		50	40	34	31	29
Number of People in Contact with Service on a Typical Day							
	Community	427	452	455	463	474	488
	Residential	11.1	12.0	12.2	12.5	12.9	13.3
	Inpatient	0.4	0.4	0.4	0.4	0.4	0.5

Table 8.29 Model Results for Exemplar LA - Scenario C – 25% Increase in each age gender group

LEEDS		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
	offsetting ->->->->->->->->->->	5	57	109	161	213	265
Population		**601106**	**615,444**	**629,781**	**644,119**	**658,457**	**672,795**
Former Dependents		**26,368**	**28,181**	**29,918**	**31,554**	**33,114**	**34,614**
	Abstainers/Alcohol Free	15,081	16,162	17,231	18,265	19,276	20,268
	Moderate Drinker	11,286	12,018	12,687	13,289	13,838	14,346
	Male 18-24	5957	5983	6002	6016	6025	6031
	Male 25-34	6650	6951	7217	7445	7641	7811
	Male 35-54	5690	6373	7031	7649	8233	8788
	Male 55+	2892	3149	3424	3709	4004	4308
	Female 18-24	2622	2642	2657	2668	2676	2681
	Female 25-34	746	1093	1423	1730	2014	2273
	Female 35-54	1304	1434	1566	1703	1852	2013
	Female 55+	508	556	597	634	670	708
Prevalence		**14,576**	**14,324**	**14,140**	**14,046**	**14,014**	**14,027**
	% prev	2.42%	2.33%	2.25%	2.18%	2.13%	2.08%
	Estimated In Treatment at 1 April	1,851	1,732	1,554	1,400	1,266	1,148
	Not in Treatment	12,725	12,592	12,587	12,646	12,748	12,879
	Male 18-24	3,532	3,498	3,472	3,453	3,438	3,428
	Male 25-34	3,981	3,945	3,918	3,905	3,902	3,907
	Male 35-54	3,050	2,954	2,878	2,835	2,815	2,814
	Male 55+	1,120	1,091	1,066	1,050	1,041	1,040
	Female 18-24	1,554	1,531	1,512	1,499	1,489	1,482
	Female 25-34	445	550	629	690	739	781
	Female 35-54	697	596	533	498	482	476
	Female 55+	196	159	133	116	106	99
	Mild	7,568	7,338	7,168	7,064	7,007	6,985
	Moderate	5,626	5,607	5,594	5,599	5,616	5,641
	Severe	1,145	1,160	1,171	1,183	1,194	1,205
	Complex	237	219	208	201	198	197
Treatment Journeys			**1,359**	**1,421**	**1,422**	**1,441**	**1,471**
	% access rate		**9.49%**	**10.05%**	**10.13%**	**10.28%**	**10.49%**
	Successful		855	896	895	907	926
	Not Successful		504	526	527	534	546
	Male 18-24		55	58	58	58	58
	Male 25-34		232	248	249	251	252
	Male 35-54		541	567	565	570	579
	Male 55+		135	139	135	133	132
	Female 18-24		41	43	43	43	43
	Female 25-34		110	151	182	207	228
	Female 35-54		190	169	153	148	149
	Female 55+		57	46	38	33	31
Number of People in Contact with Service on a Typical Day							
	Community	430	505	502	506	516	528
	Residential	11.2	13.3	13.5	13.7	14.1	14.5
	Inpatient	0.4	0.4	0.5	0.5	0.5	0.5

Table 8.30: Incremental Results - 25% Increase in each age gender group Minus No Change (Scenario C minus Scenario A)

LEEDS		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
	offsetting ->->->->->->->->->->	5	57	109	161	213	265
Population		**0**	**0**	**0**	**0**	**0**	**0**
Former Dependents		**0**	**106**	**236**	**339**	**422**	**491**
	Abstainers/Alcohol Free	0	66	152	226	291	351
	Moderate Drinker	0	40	84	112	130	141
		0	0	0	0	0	0
	Male 18-24	0	4	9	13	15	17
	Male 25-34	0	19	42	60	74	85
	Male 35-54	0	43	95	136	169	195
	Male 55+	0	12	28	44	58	71
	Female 18-24	0	3	7	9	11	13
	Female 25-34	0	8	21	33	43	53
	Female 35-54	0	14	26	34	40	45
	Female 55+	0	4	8	10	11	12
Prevalence		**0**	**-106**	**-234**	**-333**	**-413**	**-478**
	% prev	0.00%	-0.02%	-0.04%	-0.05%	-0.06%	-0.07%
	Estimated In Treatment at 1 April	6	84	67	56	48	41
	Not in Treatment	-6	-189	-301	-389	-460	-519
	Male 18-24	0	-4	-9	-13	-15	-17
	Male 25-34	0	-19	-42	-60	-74	-85
	Male 35-54	0	-42	-95	-135	-167	-194
	Male 55+	0	-11	-27	-41	-53	-64
	Female 18-24	0	-3	-7	-9	-11	-12
	Female 25-34	0	-8	-21	-33	-43	-52
	Female 35-54	0	-14	-26	-34	-40	-44
	Female 55+	0	-4	-7	-8	-9	-9
	Mild	0	-60	-131	-184	-226	-259
	Moderate	0	-37	-83	-121	-152	-178
	Severe	0	-6	-15	-22	-28	-34
	Complex	0	-2	-5	-6	-7	-8
Treatment Journeys		0	**179**	**244**	**224**	**212**	**206**
	% access rate	0	**1.31%**	**1.86%**	**1.79%**	**1.76%**	**1.76%**
	Successful	0	111	154	141	134	129
	Not Successful	0	68	90	83	79	76
	Male 18-24	0	8	12	11	11	11
	Male 25-34	0	32	48	47	46	46
	Male 35-54	0	71	97	88	82	78
	Male 55+	0	18	25	22	20	19
	Female 18-24	0	6	8	8	8	8
	Female 25-34	0	15	25	28	30	31
	Female 35-54	0	23	23	16	13	11
	Female 55+	0	6	6	3	2	1
Number of People in Contact with Service on a Typical Day							
	Community	5	89	81	76	73	72
	Residential	0.2	2.4	2.2	2.1	2.0	2.0
	Inpatient	0.0	0.1	0.1	0.1	0.1	0.1

Table 8.31 Model Results for Exemplar LA - Scenario D – Trebled Access Rates (Similar order of magnitude to Scotland)

LEEDS		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
	offsetting ->->->->->->->->->->	5	57	109	161	213	265
Population		**601106**	**615,444**	**629,781**	**644,119**	**658,457**	**672,795**
Former Dependents		**26,368**	**28,811**	**31,228**	**33,330**	**35,224**	**36,978**
	Abstainers/Alcohol Free	15,081	16,557	18,079	19,460	20,750	21,981
	Moderate Drinker	11,286	12,254	13,149	13,870	14,474	14,997
	Male 18-24	5957	6013	6066	6104	6130	6148
	Male 25-34	6650	7077	7492	7829	8106	8338
	Male 35-54	5690	6640	7568	8357	9055	9691
	Male 55+	2892	3224	3594	3954	4309	4662
	Female 18-24	2622	2664	2704	2732	2751	2764
	Female 25-34	746	1144	1537	1894	2217	2509
	Female 35-54	1304	1484	1652	1806	1965	2135
	Female 55+	508	566	614	654	692	731
Prevalence		**14,576**	**13,696**	**12,841**	**12,295**	**11,946**	**11,724**
	% prev	2.42%	2.23%	2.04%	1.91%	1.81%	1.74%
	Estimated In Treatment at 1 April	1,887	2,189	1,876	1,639	1,452	1,299
	Not in Treatment	12,689	11,506	10,965	10,656	10,494	10,425
	Male 18-24	3,532	3,469	3,408	3,365	3,334	3,312
	Male 25-34	3,981	3,819	3,644	3,522	3,438	3,382
	Male 35-54	3,050	2,687	2,343	2,130	2,000	1,920
	Male 55+	1,120	1,017	902	820	764	727
	Female 18-24	1,554	1,509	1,466	1,436	1,414	1,399
	Female 25-34	445	499	514	526	536	545
	Female 35-54	697	545	446	396	371	357
	Female 55+	196	149	118	99	89	82
	Mild	7,568	6,988	6,453	6,115	5,902	5,767
	Moderate	5,626	5,380	5,118	4,947	4,835	4,762
	Severe	1,145	1,119	1,083	1,059	1,043	1,032
	Complex	237	209	186	173	166	163
Treatment Journeys			**2,422**	**2,713**	**2,495**	**2,388**	**2,346**
	% access rate		**17.68%**	**21.13%**	**20.29%**	**19.99%**	**20.01%**
	Successful		1,515	1,711	1,571	1,503	1,476
	Not Successful		907	1,002	924	885	870
	Male 18-24		108	138	136	135	134
	Male 25-34		450	557	539	528	522
	Male 35-54		988	1072	950	885	854
	Male 55+		253	281	244	218	202
	Female 18-24		80	101	99	97	96
	Female 25-34		198	277	304	328	350
	Female 35-54		272	232	182	163	158
	Female 55+		72	56	41	33	29
Number of People in Contact with Service on a Typical Day							
	Community	465	994	899	851	830	825
	Residential	12.3	26.7	24.6	23.5	23.0	22.9
	Inpatient	0.4	0.9	0.8	0.8	0.8	0.8

Table 8.32: Incremental Results - Trebled Access Rates (Similar order of magnitude to Scotland) Minus No Change (Scenario D minus Scenario A)

LEEDS		Baseline	Year 1	Year 2	Year 3	Year 4	Year 5
	offsetting ->->->->->->->->->>	5	57	109	161	213	265
Population		**0**	**0**	**0**	**0**	**0**	**0**
Former Dependents		**0**	**736**	**1,547**	**2,114**	**2,531**	**2,855**
	Abstainers/Alcohol Free	0	461	1,001	1,420	1,765	2,063
	Moderate Drinker	0	275	546	694	766	791
		0	0	0	0	0	0
	Male 18-24	0	34	73	101	120	134
	Male 25-34	0	144	316	444	539	612
	Male 35-54	0	309	632	844	990	1099
	Male 55+	0	87	199	289	363	425
	Female 18-24	0	25	53	73	86	96
	Female 25-34	0	60	136	197	247	289
	Female 35-54	0	64	113	138	153	166
	Female 55+	0	14	25	30	33	35
Prevalence		**0**	**-734**	**-1,534**	**-2,084**	**-2,481**	**-2,781**
	% prev	0.00%	-0.12%	-0.24%	-0.32%	-0.38%	-0.41%
	Estimated In Treatment at 1 April	42	541	390	295	233	192
	Not in Treatment	-42	-1,275	-1,923	-2,379	-2,714	-2,973
	Male 18-24	0	-34	-73	-100	-120	-133
	Male 25-34	0	-144	-316	-443	-538	-610
	Male 35-54	0	-309	-630	-839	-983	-1,087
	Male 55+	0	-85	-191	-270	-331	-377
	Female 18-24	0	-25	-53	-73	-86	-95
	Female 25-34	0	-60	-136	-197	-247	-288
	Female 35-54	0	-64	-113	-136	-151	-163
	Female 55+	0	-13	-22	-25	-26	-26
	Mild	0	-410	-846	-1,133	-1,331	-1,476
	Moderate	0	-264	-559	-772	-932	-1,056
	Severe	0	-47	-103	-145	-179	-206
	Complex	0	-13	-26	-34	-39	-42
Treatment Journeys		0	**1,241**	**1,536**	**1,297**	**1,159**	**1,080**
	% access rate	0	**9.50%**	**12.94%**	**11.96%**	**11.47%**	**11.28%**
	Successful	0	770	969	817	729	679
	Not Successful	0	471	567	480	430	401
	Male 18-24	0	61	91	90	89	88
	Male 25-34	0	250	356	337	324	316
	Male 35-54	0	518	602	473	397	353
	Male 55+	0	136	167	131	106	89
	Female 18-24	0	45	66	64	63	62
	Female 25-34	0	103	151	150	151	153
	Female 35-54	0	105	87	46	28	20
	Female 55+	0	22	16	6	2	0
Number of People in Contact with Service on a Typical Day							
	Community	40	579	478	420	387	369
	Residential	1.3	15.7	13.3	11.9	11.0	10.5
	Inpatient	0.1	0.5	0.5	0.4	0.4	0.4

9 Research project management processes

9.1 Proposed aims and objectives

The stated aim of the project as outlined in the original proposal was as follows:

The overarching aim of the study is to develop an evidence- and consensus-based capacity model to estimate the number of individuals who would access specialist alcohol treatment services and require different types of treatment options in England each year at both national and local levels.

The six project objectives were to:

1. Identify key specialist treatment options and combinations of treatments and care packages; then investigate the effectiveness and resource uses of these treatment modalities, taking into account the severity of patients' alcohol dependence and other patient characteristics.
2. Estimate the prevalence of harmful and dependent drinkers by the severity of alcohol dependence, gender, age and other relevant patient characteristics in England at both national and local levels over time.
3. Engage with stakeholders to reach consensus on England-specific "amenable" and "acceptable" levels of service provision and other key model assumptions.
4. Estimate the annual demand for specialist alcohol treatment services at national and local levels; both the overall individuals accessing the service and the specific demand for each treatment option.
5. Estimate the impact of specialist alcohol treatment in terms of resource usage and reduced alcohol-related health (mortality, hospital admissions) and crime harms.
6. Cooperate with the Department of Health (DH) and Public Health England (PHE) to develop clear advice and process for model implementation and maintenance.

9.2 Ethics and governance

Advice was sought from the School of Health and Related Research (ScHARR) ethics committee at the University of Sheffield and it was confirmed that a full ethics application was not required for the proposed project. Specific project activities considered were as follows:

Stakeholder engagement: The role of stakeholders in this project was considered to be similar to a trial steering committee, with the purpose of the group to steer the direction of research rather than to participate as research participants. We consulted with the project funders (DH) who contributed to and approved the list of stakeholders as would be the case with a trial steering committee.

Secondary data analysis: Data synthesis for the project involved a combination of published information and secondary analysis of existing data sets. All data included was anonymised and the NDTMS data were provided in aggregate form. Model outputs generated at the Local Authority and National level are a synthesis of the anonymised and aggregated data inputted; therefore the model does not produce individually identifiable information. The data analysis and outputs can be characterised as a combination of audit and service evaluation and were therefore be exempted from full ethical review.

9.3 Stakeholder engagement processes

Key stakeholders were identified in consultation with the Department of Health (DH) and included service providers, service users, academics, commissioners and representatives from DH and Public Health England (PHE). Engagement activities were as follows:

9.3.1 **Stakeholder meeting 1**

The first day-long stakeholder meeting was held during the scoping and feasibility stage (July 2014) to seek general suggestions for the overall project and specific advice on the development of the capacity model including model structure, data requirements and functionality of the model (see Appendix 9.1 for attendees).

9.3.2 **Stakeholder meeting 2**

The second stakeholder meeting (March 2015) provided an opportunity for the research team to present progress on model development and seek feedback on the appropriateness of the datasets used, analyses conducted and assumptions to be made regarding model parameters (see Appendix 9.1 for attendees).

9.3.3 **PHE engagement**

Several face to face, video and teleconference meetings were held with PHE key staff regarding model inputs (e.g. for the prevalence estimation, what SADQ threshold should be used), outputs, and compatibility with existing PHE tools. The primary model developer from University of Sheffield provided both face to face and online training with PHE staff regarding how to use the spreadsheet models. Advice was also provided to PHE regarding model maintenance requirements and foreseeable triggers for a model upgrade (e.g. emergence of new evidence in relation to inputs or assumptions). PHE provided assistance to the research team in identifying Local Authorities to approach to pilot test the model.

9.3.4 **Local Authority engagement**

To ensure the modelling tool was suitable for its intended purpose, it was essential that it be pilot tested by end users to ensure its validity and usability. Pilot testing was conducted in two regions in July 2015, London (Camden/Islington/Westminster) and Yorkshire and Lincolnshire (Leeds/Bradford/North East Lincolnshire/Rotherham). In both instances, members of the research team met with Local Authority staff

with responsibility for the commissioning of specialist alcohol treatment services. We provided an overview of the project and outlined the purpose of pilot testing, the model was then demonstrated highlighting the benchmarking and 'what if' scenario modelling capabilities, using one of the Local Authorities present at the pilot testing as a test case. Attendees were invited to give feedback on the demonstration. More general discussion around their commissioning information needs and preferences was also encouraged.

9.3.5 **Service user engagement**

In addition to their contribution to the stakeholder meetings above, additional feedback was sought via email from three service user representatives regarding their views on the face validity of our estimates of prevalence of alcohol dependence, treatment access rates, proportion of people amenable to treatment amenability and treatment pathways. The service user representatives were provided with summary information, guidance on how to interpret any graphical information presented and then asked to respond to the material. For example, in relation to the information on treatment access rates, service user representatives were asked "Do you have any comments on the access rate information?", "Is there anything missing?", and "Thinking about the subgroups (age, gender, level of drinking), is there anything else we should take into account?"

9.3.6 **Additional expert input**

In addition to the formal stakeholder meetings, the clinical expert advice available within the project team from Professor Colin Drummond (Professor of Addiction Psychiatry and Consultant Psychiatrist) was supplemented by advice from Mr Tom Phillips (CNO/NIHR Clinical Doctoral Research Fellow and Consultant Nurse in Addiction). Two earlier reports for the project (i.e. the Scoping & Feasibility Report DATE and Interim Project Report DATE) were anonymously reviewed by DH-appointed reviewers. Their comments were also considered as the project proceeded.

9.3.7 **Impact of engagement on key project decisions**

9.3.7.1 **Prevalence estimation**

The first stakeholder meeting confirmed that there was considerable sector interest in the project, with need to better understand the prevalence of alcohol dependence in comparison to the extent of current specialist alcohol treatment provision in each LA. Input from the second stakeholder meeting, clinical experts and engagement with PHE, contributed to our decision-making about the methods for prevalence estimation, particularly in relation to the thresholds used for identifying those in need of treatment. Other specific considerations arising from engagement included:

1. Data sources used in prevalence estimation

In our initial proposal we identified APMS, General Lifestyle Survey (GLF) and Health Survey for England (HSE) as potential data sources to underpin prevalence estimation. The limitations of these were discussed

at the first stakeholder meeting and Hospital Episode Statistics (HES) was identified as a useful additional dataset for consideration. Ultimately, APMS and HES contained the most useful data for our purpose and were therefore used.

2. Factors included in prevalence estimation

Stakeholders emphasised the importance for system planning of estimating not only the overall prevalence of alcohol dependence within Local Authorities, but also the distribution of *severity* of dependence – this is a key feature of our prevalence estimation work. Stakeholders also raised the need to ensure differences between Local Authorities in their *age*, *sex,* and *deprivation* profile are reflected in the prevalence estimates - our method achieves this. Stakeholders and the reviewers of our earlier reports emphasised the importance of adjusting the prevalence estimates for *homelessness*. Despite difficulty in locating routinely collected data suitable for this purpose, we were ultimately able to adjust for homelessness. There was also a preference expressed by some stakeholders that the prevalence estimates account for those in the *criminal justice* system (stakeholders also acknowledged that the data available to do this may be limited). However, we did not address this because the project focussed on specialist treatment for alcohol services commissioned in the community and explicitly excluded modelling or analysis of treatment in custodial settings.

3. Comparison of prevalence estimates between areas

Reviewers of the scoping report encouraged us to consider how areas might be able to compare themselves to others. Our final tool allows users to benchmark their area against all other Local Authorities and the national average (and the 5^{th} and 95^{th} percentile) on a range of measures.

4. Statistical Modelling

Stakeholders wondered about differences in ethnic mix between areas and how this may affect estimates. We undertook statistical analysis of the relationship between estimated AUDIT and SADQ scores and proportion of people in different ethnic groups and found no statistically significant effects (See detail on Prevalence Estimation). PHE were very keen to try to calculate confidence intervals for Local Authority estimates of the prevalence of people in need of assessment for and treatment with specialist alcohol treatments services. Unfortunately, due to the nature of our method which synthesises evidence from different sources, we have been unable to generate confidence intervals (See detail on Prevalence Estimation). Reviewers encouraged validation of estimates against other unique non-standardised sources of information that might be available in specific Local Authorities. We did undertake a comparison of our early prevalence estimates for against a Bolton study which had attempted to collect AUDIT scores on around 96,000 people. The estimates from the early modelling were slightly higher than from the GP based study. As our method developed further to rely both on AUDIT and SADQ scores, we did not find any local datasets which had both measures against our modelled estimates.

9.3.7.2 **Demand / treatment pathways estimation**

This component of the work involved quantifying current provision of alcohol treatment in each Local Authority and nationally, developing a method for estimating the proportion of alcohol dependent people amenable to treatment and discussion of acceptable levels of service provision. All decisions regarding inclusion of cases, definition of treatment pathways, severity/complexity, and treatment outcomes were made in consultation with clinical experts to ensure these were as clinically accurate and relevant as possible. Further detail of stakeholder input is as follows:

1. Scope of Need and Services

There was a consensus amongst the stakeholders that the specialist treatment as recorded in the NDTMS and commissioned by local authorities should be the key focus. This does not mean that the stakeholders have no interest in wider provision. But it does mean that, during the stakeholder workshop conversations on availability of useful data and evidence and other issues, there was a clear consensus that the focus the research team was taking on "people potentially in need of specialist treatment for alcohol dependence" for prevalence estimation and on treatment pathways was felt to be correct. This correctness of focus is further evidenced by the fact is that our progress reports to DH policy research programme (which these clearly set out our developing methods and focus) were accepted as showing a solid and acceptable way forward.

2. Definition of treatment pathways

A reviewer of the scoping report queried whether by our use of NDTMS data we were reflecting 'as usual' rather than 'recommended' treatment pathways. We have clarified that in our analysis, although we have identified pathways observable from the data, this has been done in relation to CG115 recommended pathways. In meetings with PHE it was noted that some level of aggregation of the 22 pathways may be useful for end users and in communicating broad level findings. This has been done at the setting level (i.e. community psychosocial, community pharmacological, residential, inpatient).

3. Definition of severity/complexity

Stakeholders at the first meeting identified that while the severity of alcohol dependence is a key consideration in determining 'treatment need', it is also crucial to consider the complexity (i.e. other needs the client may have). Further, in allocating resources, it is not only the total service provision that is considered, but the 'case-mix'. In this project we have therefore used NDTMS data to reflect indicators of both clients' severity of dependence (using the measure of units consumed on a typical drinking day in the 4 weeks previous to assessment) and complexity (e.g. using indicators of comorbidity and urgent need of housing) and analysed these in relation to specific treatment pathways. The limitations of the available NDTMS data to inform severity/complexity were noted at the second stakeholder meeting (i.e. AUDIT data would be a useful indicator if available in future). Stakeholders at the second meeting were asked to

comment on whether our cross-tabulation of patient severity/complexity and treatment pathways reflected their clinical experience (i.e. do most people follow Pathway 1, irrespective of cluster?) and it was generally agreed that this is the case, giving us confidence in our definitions of these. Following the 2nd stakeholder meeting, we also analysed the data from a Payment by results pilot study which was supplied by PHE. In a small sample of 150 clients, this showed a 0.61 correlation between the severity as we defined it using the NDTMS variables and the severity as defined by the 'cluster tool' used in the PBR pilot study.

A further point made at each stakeholder meeting and in the visits to LA commissioners was that routinely recording both AUDIT and SADQ within NDTMS would be a useful addition to enabling analysis of service use by severity.

4. Definition of treatment outcomes

At the second stakeholder meeting and in the interim report we presented our analysis to date on quantifying treatment pathways taken by client severity/complexity and reporting treatment outcomes. Stakeholders and reviewers encouraged us to consider including the outcome of successful completion without re-treatment in the following six months, which has been done.

5. Amenability to treatment

Discussion at the first stakeholder meeting indicated that it may not be straightforward to estimate amenability. Possible options for estimation included referring to the literature, stakeholder consensus elicitation and empirical methods. At the second stakeholder meeting we presented a summary of the scarce literature available to inform this model parameter and asked whether anyone knew of further information sources or whether an elicitation exercise would be useful. The lack of additional information available convinced us that additional empirical investigation was required. We have now undertaken such an analysis using the Alcohol Toolkit Study. (Please see section 7)

6. Acceptable levels of treatment provision

The second stakeholder meeting included discussion regarding 'acceptable levels of treatment'.

The first aspect concerned the definition of the in need of treatment population. This covered which subgroups within population should be included in our modelling (and hence considered in potential specialist alcohol treatment resource allocation decisions). Stakeholders were presented with data which showed the number of people who could potentially be considered as 'in need' depending on the AUDIT and SADQ score thresholds used. This highlighted that the lower threshold selected has substantial implications for the size of the estimated in need population. Subsequent analyses and evidence review by the project team focussed on developing a prevalence of people in need estimate that is consistent with NICE CG115 guidance.

The second aspect concerned whether there was an understanding of an 'acceptable' proportion of people in 'need' that should receive treatment. Again, in the stakeholder meetings, several options were presented, positing for example that all people in need should be treated or that enough people should be treated each year to ensure a downward trajectory in the overall prevalence. While stakeholders did not identify a consensus preference among these options, there was recognition of the need for local decision makers to make a judgement about priorities and comments that information to support that judgement could be a useful addition to the process. In particular, it was felt that our preliminary modelling which distinguished different levels or 'clusters' of potential need was useful. In defining such clusters, stakeholders suggested local estimates could potentially reflect a number of factors including age (as a proxy for how 'entrenched' alcohol use might be), prevalence of liver disease, and severity of dependence.

At the second stakeholder meeting, preliminary benchmarking analysis of the prevalence of alcohol dependence and treatment access rates were shown in graphical form and it was agreed that these were a potentially useful aid to understanding for Local Authority Commissioners and so were incorporated into the model. The subsequent STreAM model benchmarking function was discussed in detail at the pilot testing stage with PHE and Local Authorities. Local Authority end users were particularly interested to see data for their area relative to others. They confirmed that much of the information presented reflected their pre-existing understanding of the extent of local treatment provision. In some cases, and for some measures, there were things which were discovered as new understandings of the LA benchmark position and these were considered helpful. We concluded from this stakeholder engagement that the both the content of the benchmarking models and the presentation format were perceived to be credible and useful in assisting Local Authorities consider the acceptability of current treatment provision in their area, given the prevalence of dependence and taking into account different age and gender groups.

The STreAM model provides information which can be used by Local Authorities in weighing up the 'acceptability' of their current service provision relative to other areas (i.e. the benchmarking function of the model) and what are the most desirable outcomes when making changes in how investment in treatment is targeted (i.e. the 'what if' scenario modelling function – see 'outcomes estimation' below for further detail).

9.3.7.3 **Outcomes estimation**

As noted above, the STreAM model includes a 'what if' scenario modelling function; whereby users are able to see the what occurs under two different treatment access scenarios (of which one would usually be assuming the same level and mix of service provision as for the previous year). The main outcomes modelled are treatment outcomes, resource costs, capacity requirements, mortality, and prevalence. Stakeholder engagement influenced our work on these outcomes in the following ways:

1. Selection of treatment access scenarios to be modelled

In addition to the status quo, end users are able to model the following treatment access scenarios

- Specifying the level of overall change in access rates (e.g. increase by 25%, set access rate at 70th percentile, etc.)
- Specifying the level of change in access rates for each age and gender group and by severity/complexity
- Changing the treatment pathway assignment so that the proportion of clients receiving different treatments (by setting and type) alters

Feedback from the pilot testing indicated these 'levers' were considered useful. In particular, Local Authority users indicated that being able to estimate the likely impact of trying to improve access for particular sub groups would be a useful function, especially if considering targeting young drinkers, for example. The Local Authority stakeholders also identified different areas have different priorities in the type of treatment offered (i.e. more or less inpatient/residential treatment relative to community based) and so were in favour of being able to model this. Feedback from both PHE and Local Authorities indicated that it was preferable to be able to model different pathways at the aggregate level, rather than by all 22 pathways, which we have reflected in the final product.

2. Treatment outcomes

Stakeholder input suggested treatment outcomes (e.g. whether or not successfully completed treatment) may involve small numbers when considered by sub group and pathway at the local level and so will be highly variable from year to year. Therefore, even though we have data on outcomes at the Local Authority level, the model uses national average data on treatment outcomes.

3. Crime

There is limited evidence on the extent to which reducing alcohol dependence causally reduces crime. Whilst it is known that there are strong links between alcohol misuse (e.g. acute intoxication) and criminal behaviour (particularly violence), and that there is also a high prevalence of alcohol dependence amongst those in prison (whose imprisonment may or may not be directly related to their drinking), the evidence is limited on the extent to which reducing alcohol dependence causally reduces crime. The limited literature available suggests that alcohol dependence is associated with recidivism, and is a factor in nearly half of domestic violence offences [95]. It is also possible that criminality and alcohol are both caused by common underlying confounding factors, which alcohol treatment may only partly address. At the second stakeholder meeting we requested that anyone aware of additional relevant literature (e.g. baseline crime rates among people with alcohol dependence, causal connection between dependence and crime) share it with us. However, to date no additional information has been identified. This evidence gap meant that we were unclear how to model the impact of changing access to treatment services on crime.

4. Resource costs

Our estimates of resource costs used national level data. It emerged at the second stakeholder meeting that Local Authorities differ greatly in their costs (e.g. as some choose to commission less expensive providers) and it was therefore suggested that the 'what if' scenario modelling allow Local Authorities to be able to input their own costs. This capability has been built into the model. Liaison has also occurred with PHE to ensure this project does not duplicate other work currently being conducted to develop 'return on investment' tools.

5. Capacity requirements
6. Visits to LAs with the pilot model confirmed that separately quantifying the numbers of people requiring community, residential and inpatient services would be useful. Mortality Rates

Although we had ONS data with which to calculate mortality rates for the general population, we required evidence specific to annual mortality rates for people with alcohol dependence. In addition to being an important outcome of the 'what if' modelling in their own right, these estimates are important as they feed into the ongoing prevalence estimates. We asked our stakeholders whether they were aware of any relevant evidence on this point. There was no feedback beyond the literature which we identified.

7. Prevalence Dynamics including Natural Remission and Relapse Rates

In addition to the mortality rates discussed above, the ongoing prevalence estimates of the model require us to estimate relapse and remission rates. Once again, input was sought from stakeholders, but no additional sources were identified beyond the published literature identified by the project team.

9.4 Changes between original objectives and final research

Here we outline the extent to which each of the stated objectives was addressed in the final project:

Original research objective	Final research project
1. Identify key specialist treatment options and combinations of treatments and care packages; then investigate the effectiveness and resource uses of these treatment modalities, taking into account the severity of patients' alcohol dependence and other patient characteristics	Fully met. • This objective was addressed in the update of the evidence review presented in section 3 • We have also undertaken detailed analysis of the NDTMS dataset to characterise 22 treatment pathways, to quantify the outcomes of treatments, and to quantify the average duration of treatment in each setting • We have also updated the estimated costings for different treatment modalities originally undertaken in NICE guidelines CG115
2. Estimate the prevalence of harmful and	Fully met.

Original research objective	Final research project
dependent drinkers by the severity of alcohol dependence, gender, age and other relevant patient characteristics in England at both national and local levels over time	• This objective was addressed through the development of a new method for estimating the prevalence of people in need of assessment for and treatment by specialist alcohol treatment services both nationally and by local authority, incorporating age, gender, IMD, severity of dependence, and homelessness. This is presented in Chapter 4. Note that the wording of the study objective 2 was to estimate the prevalence of harmful and dependent drinkers. We have done this, for example in Table 4.5 we explicitly show the national estimate of people in each AUDIT/SADQ category. In this revised report we now also present the modelled estimates of the number (and percentage) of people aged 18+ with an AUDIT score of 16+ in each UTLA. Our focus has of course been to estimate need for specialist services i.e. objectives 4 and 5, and this is why our analyses focus upon the "prevalence of people with alcohol dependence likely to be in need of specialist treatment" and disentangling estimates by severity group. This extends Objective 2 into the requirements necessary for Objectives 4 and 5.
3. Engage with stakeholders to reach consensus on England-specific "amenable" and "acceptable" levels of service provision and other key model assumptions	Met - with different approaches. • As outlined in the stakeholder engagement processes above, we have engaged with stakeholders throughout the course of the project regarding model inputs, outputs and assumptions. The second stakeholder meeting specifically included information about and discussion of the concepts of amenability and acceptability • Amenability - It became apparent that elicitation of consensus would not be a suitable method for setting this parameter. We therefore pursued an alternative method to produce empirical amenability estimates from the Alcohol Toolkit Study as described in X (cross ref amenability paper) • Acceptable levels of service provision - The second stakeholder meeting showed that consensus building was unlikely to yield a single agreed threshold. Instead, the final product of the project allows national and LA level users to benchmark existing levels of access and provision on a range of measures. The 'what if' scenario modelling tool also enables users to examine the potential impact of changing taking levels of access and mix of pathways used, and hence inform local priorities and judgements for future

Original research objective	Final research project
	commissioning.
4. Estimate the annual demand for specialist alcohol treatment services at national and local levels; both the overall individuals accessing the service and the specific demand for each treatment option	Fully met. • This objective was met through the development of our analysis of treatment pathways for different treatment options using NDTMS data, as outlined in section 5 in combination with the functionality of the what-if scenario modelling tool which enables analysis of changes in access rates for future services and the impact of this on system capacity requirements.
5. Estimate the impact of specialist alcohol treatment in terms of resource usage and reduced alcohol-related health (mortality, hospital admissions) and crime harms	Mostly met. • Our 'what if' model includes estimated outcomes for different levels of treatment access on resource use, mortality, capacity requirements and prevalence • Crime not included - We have not at this stage included the impact on crime harms, because there was limited evidence on how reducing the prevalence of alcohol dependence would impact on crime rates. • Hospitalisations not explicitly included – We considered utilising previously published risk functions for hospitalisation of 43 different conditions from the existing Sheffield Alcohol Policy Model work. This was felt to be too detailed and complex an approach. A broader assessment, utilising evidence from the NICE CG115 guidelines, has estimated the expected reduced costs to NHS services (much of which will be hospitalisation related) as prevalence of dependence reduces.
6. Cooperate with the Department of Health (DH) and Public Health England (PHE) to develop clear advice and process for model implementation and maintenance	Fully met. • In addition to the model and this report, we have prepared a user guide for the model and a document outlining how to update the data inputs (e.g. NDTMS data, APMS data) • We have strongly advised undertaking an update to the prevalence modelling when APMS 2014 data becomes available. We have set out for PHE how NDTMS data has been used in the project and how it can be updated year on year.

9.4.1 **Current evidence gaps and potential future research directions**

Our prevalence estimates rely on the APMS which is conducted only every seven years. As the 2014 data were unavailable, we could only use the 2007 data. Therefore not only do our estimates rely on old data, we have limited capacity to model time trends, as the data points available are infrequent.

As neither the AUDIT nor the SADQ are available in the NDTMS data set, we used an alternative variable, the number of units drunk on a typical day on which consumed alcohol in the last month to estimate severity of alcohol dependence. We recognise the limits of this method and strongly advise that a validated measure of dependence should be collected and recorded in NDTMS.

As noted earlier, this project did not investigate crime and morbidity outcomes. Future research would be useful to further develop these outcomes and potentially also additional outcomes including harm to others and social care costs.

While we have sought input from Local Authority end users and the piloting stage to ensure the model functionality was relevant to their commissioning decision needs, it is likely that additional areas for refinement will emerge as the model is implemented. We are interested in continuing to gather information from end users regarding the preferred scenarios to include in the modelling, what other outcomes would be useful to include, and the presentation of results.

In conducting this project, we became aware of the lack of evidence to inform typical trajectories of alcohol dependence in England. Specifically, our estimates of both relapse and natural remission are based on studies from the US rather than longitudinal data specific to England.

9.5 Quality control measures

Given the complexity of the data synthesis informing the model and the structure of the computer model itself, we implemented thorough quality control measures:

9.5.1 **Checking model computer code**

The STreAM model is in two main Excel spreadsheets incorporating VBa code. All code was double checked by the two modellers employed to work on the project, and then independently checked by a third modeller with no previous involvement in the project.

9.5.2 **Testing of model outputs**

The project involves the synthesis of several different data sources and the setting of model assumptions based on published evidence (e.g. estimated mortality rates). Therefore there is scope for minor issues with the data used or the assumptions made to amplify through the model, resulting in the production of results unlikely to be a true reflection of what would happen under different conditions. For example, if the risk of death for people with alcohol dependence who have successfully completed treatment relative to the general population is over-estimated; model outputs might erroneously indicate that increased treatment access would result in more deaths. To check for this, extensive testing of alternative modelling scenarios was undertaken once all data inputs and key parameter assumptions had been finalised. Testing was undertaken by both a modeller involved in the project and another experienced modeller not involved in the project.

9.6 Dissemination plans

9.6.1 **STreAM Benchmark and What-If Models version 1.0**

The final product of the project, the *STreAM Benchmark and What-If Models version 1.0*, will be handed over to DH at the conclusion of the project, including provision of the EXCEL software for the model and associated data scripts.

The plan is for PHE to be custodian of the model.

A Licensing agreement for the model needs to be finalised.

9.6.2 **Guidance for users**

A power point user guide has been prepared for Local Authorities and PHE including an introduction to what the model is and its benchmarking and scenario modelling functions, how to run different models, and how to interpret the output.

9.6.3 **Data Updates**

A document had been prepared outlining which model data will require updating by PHE (for example, treatment data from NDTMS) and how to do this.

9.6.4 **Version updates**

The research team is available to be commissioned to update either model functions or underlying model inputs and assumptions. For example, when new key evidence such as APMS 2014 data are available (anticipated to be 2016), the prevalence of alcohol dependence estimator will require updating.

Since our core project work on this study was completed, PHE and NDEC have updated the way treatment pathways are reported and how individuals are categorized by substance. The research team understands that PHE want to update the model with NDTMS 15/16 data. It is important to emphasise that parts of the model use "all clients" and other parts use "new treatment starts" depending on the purpose. The benchmark model does include all clients – see for example the data presented in **Error! Reference source ot found.** on "Clients in Treatment at any point in 2013/14", and also in Figure 6.1. The analysis also includes new treatment starts during the year. The what-if scenario model takes as input for future scenarios the number of new starters during the next year. This does not mean that the model ignores all clients in treatment, rather the model estimates as an output the total number of clients in treatment each week by using data on the duration of treatment journeys. This is needed to keep track of the requirements for capacity – in particular the number of residential and inpatient places required. The research team is very happy to discuss with Public Health England the steps required to ensure updating

the model to 2015/16 data can be undertaken to account for the issue of the revised reporting methodology.

9.6.5 **Formal Publication of the Report**

This will be undertaken in line with policies and procedures of the DH Policy research programme

9.6.6 **Other forms of dissemination**

The report has been prepared so that each of the key chapters can be readily adapted for peer review publication. We anticipate submitting these for publication following the DH PRP peer review process.

An earlier version of the treatment pathways analysis was presented at the KBS alcohol conference in June 2015. An overview of the project was provided at the Society for the Study of Addiction conference in York in November 2015.

The key dissemination processes to users in Local Authorities will be agreed with DH and PHE.

9.7 Appendices

Appendix 9.1 List of stakeholder names and organisations in attendance at the first (4th July 2014) and/or second (10 March 2015) stakeholder meetings

Name (organisation)	04/07/14	10/03/15
Mr Crispin Acton (Department of Health)	✓	✓
Dr Robert Alston (University of Manchester)*	-	✓
Dr Matthew Andrews (South London Academic Health Science Network)	✓	-
Professor Alan Brennan (University of Sheffield)*	✓	✓
Mr Adrian Brown (Central Middlesex & Northwick Park Hospitals)	✓	✓
Dr Penny Buykx (University of Sheffield)*	-	✓
Dr Ruth Chadwick (Department of Health)	✓	-
Professor Penny Cook (University of Salford)	✓	-
Mr Chris Crouch (Lewisham Service User Consultancy)	✓	-
Professor Colin Drummond (Institute of Psychiatry, KCL)*	✓	✓
Ms Catherine Elzerbi (Institute of Psychiatry, KCL)*	✓	✓
Ms Annette Fleming (Aquarius, Birmingham)	✓	✓
Ms Jayne Gosnall (Salford Drug & Alcohol Forum)	✓	✓
Mr Clive Henn (Public Health England)	✓	✓
Mr Andrew Jones (University of Manchester)*	✓	✓
Mr Jon Knight (Public Health England)	✓	✓
Mr Don Lavoie (Public Health England)	✓	✓
Ms Helen Leake (Darlington Drug & Alcohol Team)	✓	-
Mr Neil Martin (Balance North East Alcohol Office)	✓	✓
Mr Daniel McManus (University of Sheffield)*	-	✓
Professor Petra Meier (University of Sheffield)*	-	✓
Dr Yang Meng (University of Sheffield)*	✓	-
Dr Tim Millar (University of Manchester)*	✓	-
Dr Kieran Moriarty (Royal Bolton Hospital)	✓	-
Mr Steve Morton (Public Health England)	✓	✓
Ms Stephanie Noble (Broadway Lodge)	-	✓
Mr Tom Phillips (Humber NHS Foundation Trust)	✓	✓
Dr Duncan Raistrick (Leeds & York Partnerships NHS Foundation Trust)	✓	-
Ms Kulvir Randhawa (Public Health England)	-	✓
Ms Silvia Rojano-White (Institute of Psychiatry, KCL)*	✓	✓
Ms Susi Sadler (University of Sheffield)*	✓	-
Dr Nick Sheron (Southampton University)	✓	-
Mr Tony Stone (University of Sheffield)*	-	✓
Ms Lucy Thorpe (Last Orders Recovery Service, Nottingham)	✓	-
Dr Ira Unell (University of Leicester)	✓	-
Mr Rod Watson (Academic Health Science Network for South London)	✓	-
Ms Elaine Winter (Lewisham Service User Consultancy)	✓	✓
Ms Helen Willey (Public Health England)	✓	-
Ms Amy Wolstenholme (Institute of Psychiatry, KCL)*	✓	✓
Ms Gina Villa (Lambeth, Service User Representative)	✓	✓

* *Member research team or staff member*

10 Specific Options for Next Development of This Work

10.1 Introduction

This revised report follows a total of 6 formal peer reviewer commentaries and a response from PHE. The reviewers recommended making use of new evidence which has emerged since the report work was undertaken, including most especially the Adult Psychiatric Morbidity Survey (APMS) data for 2014. This is about to become available for research purposes and substantially updates the APMS 2007 version which has been used as the basis of prevalence of alcohol dependence estimates in our report. The reviewers also recommended attempting to address concerns about the statistical regression models used by trying alternative methods and enabling national and local decision makers with a better understanding of uncertainty.

This section of the revised report, which is for discussion with DH and PHE, sets out some technical discussion of possible components of further analyses and research. It has 4 parts

- Prevalence - Testing alternative regression models for AUDIT and SADQ
- Prevalence - Updating with APMS 2014
- Prevalence - Estimating Confidence Intervals
- Benchmarking Access - Updating the model with the latest year data for NDTMS (and revising definitions of categories in the benchmark model in line with new PHE approaches)

10.2 Prevalence -Testing a series of alternative regression models for AUDIT and SADQ using APMS 2007 data.

The regression models used in our report took the form of ordered probit regressions in which the probability of an individual in APMS being within a particular category of AUDIT score (0-7, 8-16, 16-19, 20+) and SADQ score (0-3, 4-15, 16-30, 31+) were predicted using the following covariates:

<u>AUDIT covariates</u>:

- 8 sex-age dummies (males and females in 4 age groups i.e. 18-24, 25-34, 35-54, 55+),
- 5 deprivation dummies (2010 Index of Multiple Deprivation (IMD) national quintiles), and
- the GOR person-specific hospital admissions rate for alcohol dependence related conditions [More details - We have available hospital admission data quantifying the numbers of individuals admitted to hospital, i.e. the same person admitted twice was only counted once, by LA of residence in the years 2006 through to 2012. A person was counted if his or her admission contained an ICD-10 diagnosis code related to alcohol dependence or withdrawal using ICD-10 codes F10.2, F10.3,

F10.4, F10.5, or F10.6 either as a primary or secondary diagnosis.).In the regression we append the 2007 (i.e. same year as APMS) overall average person-specific hospital admissions rate for people aged 18+ to each individual APMS record based on their GOR of residence. To estimate the proportion of people in each age/gender/ IMD/AUDIT/SADQ category for prevalence we used the latest year available 2012 HES rate for the UTLA and apply the regression coefficient to the 2012 HES rate.

SADQ covariates:

- 8 sex-age dummies,
- 5 IMD quintile dummies,
- GOR hospital admissions rate for F10 conditions (alcohol dependence), and
- the AUDIT group (3 groups: 0-15, 16-19, 20+) of the respondent.

To demonstrate the effect of the structural form of the model, we would advise additional robustness checks where variables are included and excluded in different regressions. The additional covariates which could be examined are as follows:

- Ethnicity (from APMS data subgroups “White British”, “White non-British”, “Black”, “South Asian”, and “Mixed or Other”. In our original models we did not find ethnicity statistically significant and did not use it to estimate prevalence.)
- HES F10 Age-Sex interactions at GOR level, interacting the age-sex categories with the appropriate HES F10 rate to allow differential HES effects for the 8 age gender groups.
- Alcohol-attributable HES at GOR level “Unique patients admitted for all alcohol-specific condition – broad measure by age-band, sex and UTLA” – taken from Public Health England LAPE data for 2007 (statistical analysis) and 2012 (prevalence estimation).
- Alcohol-related recorded crime at GOR level, taken from PHE LAPE data for 2007 and 2012
- Alcohol-related mortality at GOR level - Deaths from alcohol-related conditions, all ages, directly age-standardised rate per 100,000 population (standardised to the European standard population) – for 2007 and 2012
- NDTMS specialist treatment access rate at GOR level, the number of individuals treated at any point during the year per total resident pop over 18. For 2013-14 financial year. (We did not feel it is coherent to include NDTMS specialist treatment access in the regressions because this is the main variable in subsequent modelling of prevalence to access ratios. Also previous analyses show a weak relationship between prevalence and NDTMS access. However, it will be useful to examine this again across the various regression models and test our prior hypothesis that it is not a statistically significant predictor of AUDIT or SADQ).

Overall, we suggest examining 13 models based on combinations as detailed below.

- Model (1) is the current (base) model.
- Model (2) allows differences between Local Authorities to arise only because of age-gender differences in the population (i.e. ignores deprivation and HES admissions).
- Model (3) includes IMD, such that Local Authorities' prevalence rates differ by demographic characteristics.
- Model (4) only allows prevalence rates to differ in line with hospital admissions for dependence related conditions.
- Model (5) uses 8 Age-Sex-specific HES rates, as opposed to a single HES rate, for each GOR. Note we will also investigate pooling over more than one year for this (e.g. using say the sum of 2005, 2006, & 2007 admission rates to increase precision of estimates)
- Model (6) only allows prevalence rates to differ according to the number of people accessing specialist treatment, from NDTMS data.
- Models (7) to (13) extend the base model (1) by including an extra variable each time, in turn adding Ethnicity, NDTMS Access Rate GOR, HES-Age-Sex interaction GOR, Alcohol-attributable HES GOR, Alcohol-attributable crime GOR, Alcohol-related mortality GOR, and alcoholic liver disease admissions along with F10 (as this is the second largest category of alcohol specific admissions).

Table 10.1 Summary of 13 proposed regression models to test for prevalence of people with alcohol dependence potentially in need of specialist treatment

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
8 Age-Sex dummies	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓
5 IMD quintile dummies	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓
GOR HES F10 Rate 2007	✓			✓			✓						
Ethnicity							✓	✓	✓	✓	✓	✓	✓
NDTMS Access Rate GOR						✓		✓	✓	✓	✓	✓	✓
HES-Age-Sex interact GOR								✓	✓	✓	✓	✓	✓
Alc-attributable HES GOR										✓	✓	✓	✓
Alc-attributable crime GOR											✓	✓	✓
Alc-related mortality GOR												✓	✓
GOR HES Alc liver Disease													✓

Model fit statistics that we suggest could be examined include the adjusted R^2, AIC, BIC, and log-likelihood statistics. One could estimate the results of applying each of these 13 models by calculating the following statistical summaries of the prevalence estimates.

Table 10.2 Proposed statistical summary data for comparison in 13 regression models

Statistic from Models	Compared with
1. National estimates for numbers of people with symptoms of alcohol dependence potentially in need of specialist treatment, And within that the numbers in mild, moderate and severe categories (for 11 models)	Raw National APMS figures
2. 1 above but by GOR (for 11 models)	Raw GOR APMS figures
3. 1 above but by 8 age gender groups (for 11 models)	Raw age/gender APMS figures
4. UTLA total estimated prevalence (151 by 11 models)	Between models 1 to 13 (no external comparator available)

An additional robustness check is to use the bivariate ordered probit model, which estimates the two ordered probit models for AUDIT and SADQ simultaneously.

We would suggest analysing the model fit statistics for two other structures for the statistical models and if substantively better then investigate their use

(i) a multinomial logit (rather than ordered probit) specification of Model 13.

(ii) a Generalised Additive Model (GAM) ordered categorical specification of Model 13 using the mgcv package in statistical software R.

10.3 Prevalence -Using updated APMS 2014 data

We would propose to repeat the full process of analyses in section 1 using instead the APMS 2014 data when it is available. Depending on the results of analyses using 2014 APMS, one could consider combining 2014 and 2007 data together to boost the number of more severe cases in the analysis and increase precision.

10.4 Prevalence -Approaches to Estimating Confidence Intervals for Prevalence of People with Alcohol Dependence who are potentially in need of specialist treatment in England

There are several difficulties in undertaking CI estimates on our prevalence estimates. As we discussed earlier in the report in section 4.5:

"Ideally, confidence intervals for the prevalence estimates for each LA would have been provided but this has several challenges. It is possible to quantify some of the uncertainty in the parameter estimates for the two multinomial regression models (standard errors shown in Tables 3 and 4). However, there is no easy method to determine the extent of uncertainty that should be added on top of this in the next step of our method i.e. the uncertainty due to our making the assumption that the regional hospital admission rate coefficient can be applied at LA level. This would require making an informed judgement using Bayesian elicitation methods but there is little literature on how this could be achieved in such a case. Indeed, as we move down to the LA level for both regression models, there is a question as to whether the nationally derived statistical model is reasonable at local level and whether other unobserved local factors (for example ethnic mix) would add additional uncertainty. Again, there is no easy method to determine the extent of uncertainty that should be added do reflect this structural issue. We did consider using a very simplistic approximation formula for a binomial confidence interval to estimate uncertainty in the proportion of people estimated as alcohol dependent [95% CI = +/- 1.96 sqrt {(1/n) * p_hat*(1-p_hat) , where p_hat is the proportion of successes in a Bernoulli trial process estimated from n samples], but the problem at LA level is to have a reasonable way of deciding what the 'n' sample size to use in such a formula would be – since we have not directly used sample data from an particular LA to make the estimates. Our final judgement has been that presenting such a simplistic CI would both under-estimate and misrepresent the uncertainty in our LA level prevalence estimates. One reviewer suggested a bootstrapping approach using the AMPS data, but we do not consider there to be an additional benefit in doing this because it simply provides another way of estimating the uncertainty in the coefficients of the regression, which is already quantified using the variance standard errors (or covariance matrix) in the STATA output, and bootstrapping would not address the other key methodological difficulties in estimating confidence intervals."

Having considered further and examined the reviewer comments, we propose a Monte Carlo Simulation approach as follows:

a. Allow for <u>uncertainty in estimated regression parameters</u> for the two ordered probit models

The variance covariance matrix for the estimated parameters in both of the statistical models is available from STATA output. We will sample from the multivariate normal distribution for the regression parameters 100 times.

b. Allow for <u>uncertainty in values of covariates at UTLA level</u>.

The estimated distribution of AUDIT and SADQ at UTLA level is, or will be, based on

- Population in 40 age/gender/deprivation subgroups (8 age/gender times 5 IMD quintiles)
- Hospitalisation rate at UTLA level for alcohol dependence related diagnoses for 8 subgroups (4 times age =18-24, 25-34, 53-54, 55+, 2 times gender)

We would assume that the population is not subject to uncertainty given that it is based on ONS / census estimates. However the Hospitalisation rates are subject to some uncertainty because the numbers might fluctuate year to year. We would propose to calculate a CI for each of the 8 UTLA HES

rates assuming a Poisson distribution with a rate based on the numbers of people admitted divided by the number in the population. The Normal approximation for Poisson when the mean and the variance are both lambda (λ). The standard error is calculated as: sqrt(λ /n) where λ is Poisson mean and n is sample size or total exposure (total person years, total time observed,…). The 95-percent confidence interval is calculated as: λ ±1.96*sqrt(λ/n). This is fine when nλ is large (>20), for then the Poisson is adequately approximated by a Normal distribution For example, if there are 50,000 people in males aged 35-54, and there are 50 admitted with a diagnosis of F10.x, then the CI for the rate is 50 +/- 1.96* sqrt(50/50000) = 50 +/- 0.0619 = [49.9380, 50.0620]. We will then Monte Carlo sample 100 different rates of hospitalisation. The confidence interval for the number of admissions is λ ±1.96*sqrt(λ), so 50+/- 13.85= [36.14, 63.86].

Having completed steps (a) and (b), we would then propose to repeat the process of estimating the prevalence for each UTLA in STATA 100 times using each of the different sampled possible values of the set of regression parameters and UTLA HES rates. We would then sort the resulting 100 estimates from smallest to largest total prevalence of People with Alcohol Dependence who are potentially in need of specialist treatment, and compute a 95% CI by eliminating the 5 values furthers from the mean. We would then compute a national confidence interval similarly i.e. add up the 152 UTLAs for each of the simulated beta/hospitalisations and take the 95% CI of those summed figures.

There are two components of uncertainty that will remain after undertaking the work above. Firstly, there is the question of structural uncertainty i.e. what would happen if we used differently structured regression models for AUDIT or SADQ or both. This we propose could partly be addressed by investigating a series of new proposed alternative regression models before selecting a final version to use (See section 1). Secondly, there is the fact that we are estimating the relationship between AUDIT / SADQ and the GOR level alcohol dependence related hospitalisation rates. But we apply the parameters derived here to the UTLA level alcohol dependence related hospitalisation rates. That is, we assume the relationship between GOR level admissions and AUDIT/SADQ applies exactly the same at UTLA level. There is no way to address this uncertainty with a confidence interval approach unless one somehow elicits expert judgement as to the extent to which the 'beta's might be different if UTLA level data were available. On the one hand, if the APMS did have UTLA available for the individuals then one could use UTLA level HES rate as covariate and the likelihood is that this would explain more of the variability in probability of being in different categories for AUDIT/SADQ and therefore the CI on the betas would possibly be smaller than the beta_GOR CIs. On the other hand, it is plausible that patterns at UTLA level are different from at GOR level which averages out certain effects and therefore that the actual betas (were they able to be calculated) could be say higher than is found at GOR level.

A note on Bootstrapping: One reviewer discussed bootstrapping the APMS to derive uncertainty. As discussed earlier, we believe there is no need to do this because it simply provides another way of estimating the uncertainty in the betas. Their uncertainty is already quantified using the variance covariance matrix in the STATA output.

A note on Poisson CIs overall. One reviewer is suggesting using Poisson CIs using the raw APMS data. This does not help to adjust the estimates of prevalence to local level. This would not account for any of the uncertainty in UTLA level covariates.

10.5 Benchmarking Access - Updating the model with 2015/16 data for NDTMS

The modelling in the report used 2013/14 data from NDTMS. The data for 2015/16 is now available.

During the fulfilment of our work, PHE developed a revised reporting approach to summary statistics from NDTMS. In our original work we used an approach actually very close to the new method but excluded records where alcohol was not the primary problem. We categorised records into four groups, using only the latter two for analysis:

- Problem involves opiates.
- Primary problem is non-opiates but there are secondary problems with alcohol
- Primary problem is alcohol but there are secondary drug problems with non-opiates.
- Alcohol only

The NDTMS records are now combined within the same journey structure and PHE now categorises the reporting of the records into four groups using the new method as follows

1. Opiates (includes opiates with alcohol)
2. Non-opiates only
3. Non-opiate and alcohol (the distinction between primary and secondary is removed here)
4. Alcohol only

An update to the model which focusses on categories 3 and 4 to account for this revised reporting needs communication with PHE and with NDEC at the University of Manchester to ensure that the NDTMS data incorporated within the model is compatible with this reporting structure.

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