AN EXPLORATORY ANALYSIS OF LINKED DATA FROM HEALTH, SOCIAL CARE & CITIZEN'S ADVICE CASE MANAGEMENT SYSTEMS

Abstract

An exploratory analysis of four years of person-level data from clinical and social case-management systems April 2015 – September 2018, carried out in order to improve the capability of Liverpool health care services to respond to non-clinical risk among people with multi-morbidities.

Contents

LIVERPOOL CLINICAL COMMISSIONING GROUP
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For note:

The report is not in any sense aiming to present a 'finished' view of the data, but offers a summary of this exploratory phase. It is an evolving piece of work, and as such includes a number of 'thinking' points and caveats, highlighted in grey.

Report authors:	Helen Duckworth, Liverpool CCG
	Clare Mahoney Liverpool CCG
Charts:	Simon Goodchild, Hartree
	Humzah Javid, Hartree
Additional contributions	Melisa Campbell, Public Health, Liverpool City Council
	Debbie Nolan, Citizen's Advice South Liverpool
	Maria Vaccarello, Citizen's Advice South Liverpool
	Adam McCamley, Liverpool City Council
	Andy Kerr, Liverpool CCG

1. Introduction

The *Liverpool Advice on Prescription* project, run by Citizens Advice South Liverpool, was set up in 2014 in order to help alleviate poverty and hardship among people with long-term conditions and/or co-morbid mental health problems. The service takes direct referrals from GPs and mental health services, responding to urgent need as well as providing practical advice and support relating to wider determinants of health. Confident that the service was having a positive impact on outcomes for patients, Liverpool Clincial Commissioning Group (CCG) and partners asked what else could be done to reach vulnerable patients and help remove barriers to health and wellbeing. Should the service offer be targeted along additional health and care pathways and if so which ones?

Determining that a greater understanding of the relationship between illness and social and economic hardship in the Liverpool context was needed, three main objectives were agreed:

- To link person-level data from clinical and social case-management systems
- To conduct a preliminary analysis of linked data
- To test out and evaluate the effectiveness of the model in an acute care setting.

An award from the Health Foundation Innovation for Improvement fund provided Liverpool with the opportunity to pursue these objectives.

This report describes how the data was analysed and what the preliminary analysis revealed. It aims to answer the following questions:

- What is the demographic, socio-economic and health profile of the clients that have utilised the *Advice on Prescription* service?
- What health and social care service utilisation patterns does the population who use the service have?
- What impact has the service had on health outcomes and health service utilisation?

A separate report describes the learning from our 'test and learn' project, available on request.

The report is not in any sense aiming to present a 'finished' view of the data, but offers a summary of this exploratory phase. It is an evolving piece of work, and includes our ideas for what we would like to do next, in order to ensure that future service models in Liverpool grow in timeliness and effectiveness, to reach those who need support and services most.

2. Main Observations

It is no surprise that the study confirms an already well-established association between poverty and ill-health, the data suggesting that there is a triple jeopardy associated with deprivation, mental ill-health and respiratory conditions. Comorbidities in the study cohort were high: almost 20% had five or more health conditions, 17% had four, 25% three conditions, 23% had two conditions.

The household incomes of those patients accessing the *Advice on Prescription* service are some of the lowest in Liverpool, and at initial presentation to the service (prior to assistance), 17% had an income below £400 per calendar month, 51% had an income below £799 per calendar month.

The split of clients by household type shows that 47% were single. A fifth of clients had at least one dependent child under the age of 18, and that approximately two thirds of this group were single parents. Of this group, 92% had a woman as head of household. Over half of initial presenting issues were benefits/tax credit advice, followed by debt at 12%, then housing at 7.5%. Clients receive support with an average of four different issues each.

At least a quarter of all users of the *Advice on Presciption* service are only in contact with primary care. Though a third of all users were known to mental health services, we find that the majority were referred by primary care; 80% of all referrals into *Advice on Prescription* came via general practice. This appears to confirm that general practice has a key role in supporting patients to access non-clinical and clinical services.

A large number of the study cohort had been admitted to an inpatient bed as an emergency with a noticeable proportion of these related to gastro and mental health conditions. This was a much higher number than expected. The literature supports our finding that high users of emergency services are likely to have a combination of physical and mental health needs, and be of working age[i]. Those in the study cohort were also of working age. A statistical test was beyond the scope of this exploratory analysis.

All but two wards with the highest levels of deprivation had good rates of referral into *Advice on Prescription*. These same wards also had lower rates of access for other health services, for example, vaccination and immunisations[ii].

3. Methodology for data linkage

3.1 Data Content

The work involved linking person level datasets across the following sectors, with timeframes and broad data content:

Dataset	Timeframe
Advice on Prescription	April 2015 – September 2018
Primary Care	N/A – Latest data
Secondary Care	January 2015 – July 2018
Mental Health (excluding IAPT data)	April 2015 – June 2018
Adult Social Care	April 2016 – October 2018

There are gaps and limitations to the data:

- One month of data (Dec/Jan 2018) is missing from the analysis, an omission that came to light too late in the writing up process to be rectified for this draft report.
- The adult social care data was also incomplete, as some NHS numbers were missing from cases and could not be linked.
- A future task is to list the missing data variables, important not just as a way of understanding the limitations of the analysis, but also in terms of where to focus on improving recording/ data input.
- Note also that this study has used 'unique issues' as a key metric, rather than the more useful 'unique enquiries' metric, which will be used in future studies. This is explained further in section 4.1.

3.2 Scope of the analysis

A framework outlining the scope of the analysis was prepared (see Appendix A), though not all of the issues were able to be addressed within timeframes, particularly the creation of a control group. The preliminary analysis focused on asking:

- What is the demographic, socio-economic and health profile of the clients that have utilised the *Advice on Prescription* service?
- What health and social care service utilisation patterns does the population who use the service have?
- What impact has the service had on health outcomes and health service utilisation?

3.3 The role of the project group

To support the process, a project group was set up, with a membership drawn from the Citizen's Advice, general practice, health and local authority commissioners, public health academics, senior analysts (see Appendix B). A key role for group members was to bridge disciplines, connecting science and practice, and sense-checking the data, ensuring that the currencies of each of the various data-sets were understood by all partners to the process. One of the roles of public health was to help practitioners and data-scientists maintain a focus on health inequalities.

During the initial stages, a CCG analyst led on linking and quality assuring the data. Owing to circumstances, the analysis was handed over to an external company in September 2018. Shortly afterwards, the CCG, Citizen's Advice and the analysts were invited to discuss progress via fortnightly conference calls. In retrospect, more time should have been assigned to this part of the process in order to allow the new analysts to familiarise themselves with the data-sets and case-management systems, as well as the data owners.

The project group were also tasked with championing the project. For interest, a list of conferences and events where we have presented and discussed our approach is found in Appendix C.

3.4 Information Governance and Data Flow

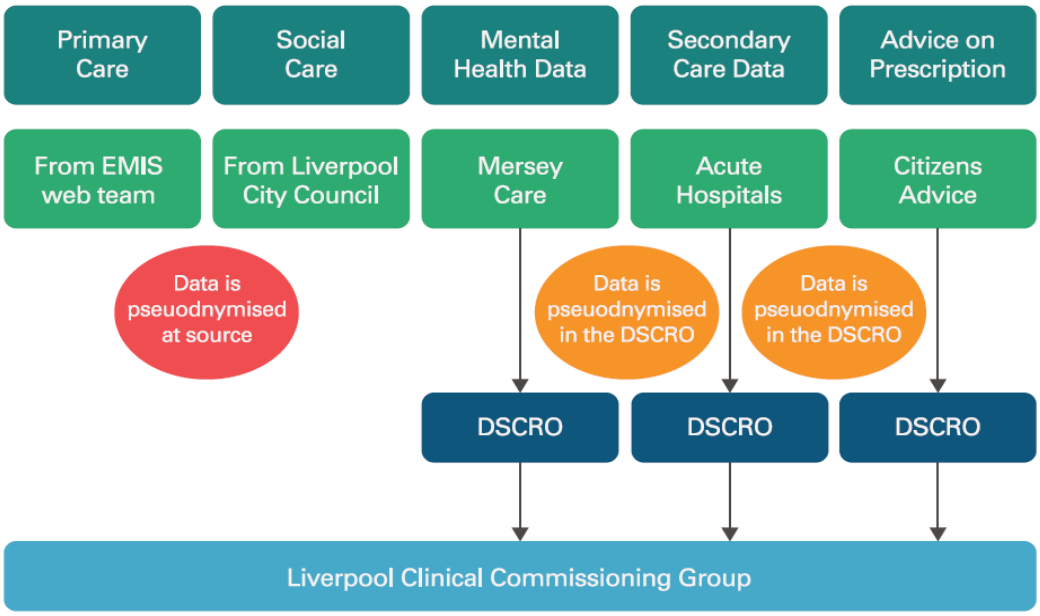
A technique called pseudonymisation was used on all datasets so that patient identifiable data was supressed, but still allowed for linkage between datasets. The date of birth is changed to age, the post code is shortened, (only first 4 digits) and the NHS number is changed to a random numeric string using an open source pseudonymisation tool. The open source tool uses a common encryption key that consistently changes the same NHS number to the same numeric string, enabling data linkage. Using this process, the pseudonymised NHS number was introduced as the common ID across all datasets.

Data Sharing Agreements were put in place with all organisations. A privacy statement was developed for display at *Advice on Prescription* delivery sites and a separate statement also displayed in Liverpool VCCG (see Appendix A)

The following diagram, Fig 1, explains how the data flowed in the system. Primary care data was extracted from EMIS web centrally by the EMIS web team in Liverpool CCG and pseudonymised on landing, then sent to the Liverpool CCG Business Intelligence (BI) Team. Social Care data was pseudonymised by Liverpool City Council and sent directly to Liverpool CCG BI Team. Mental health and secondary care data was sent in the 'clear' (ie identifiable) to the Data Services for Commissioners Regional Office (DSCRO) for consistent pseudonymisation, and only then shared with Liverpool CCG BI Team. The *Advice on Prescription* data was also sent to the DSCRO for a batch trace of the NHS number using

identifiable fields. The NHS number was then added to the dataset and consistently pseudonymised before being sent to Liverpool CCG BI Team.

Figure 1. Data Flows



3.5 Other Data Processing Activities

Below lists the data processing activates that were undertaken to get the data in the structure required and of good quality to use.

The data was extracted from databases and sent to the processors as a set of CSV files. These were read into Jupyter Notebook, a Python-based data analysis tool. A major difficulty was that many of the files contain free-text fields as well as numerical ones, and these often contained commas themselves; in this case the parser cannot split the data correctly. Many of these commas were found and removed (as text commas are followed by spaces) but some of the files required more complex parsing to correctly read the data.

Once the data was parsed by Jupyter Notebook, it was analysed using standard data science Python libraries (numpy, scipy, pandas), to reshape and group the data, perform statistical tests and plot the results.

3.6 Terminology

The word 'client', in this report, refers to all those people who have accessed the *Advice on Prescription* service

4. Analysis

4.1 The Advice on Prescription Service

Advice on Prescription aims to improve health and wellbeing by addressing underlying and non-medical issues such as poverty, debt, job insecurity and job loss, bereavement, benefit sanctions, threats of eviction, bailiff action. As a Citizen's Advice service, it uses a case management system call Casebook. One *Advice on Prescription* client may present many times with different issues requiring a different intervention each time.

In this report, key metrics are used to describe *Advice on Prescription* activity as follows:

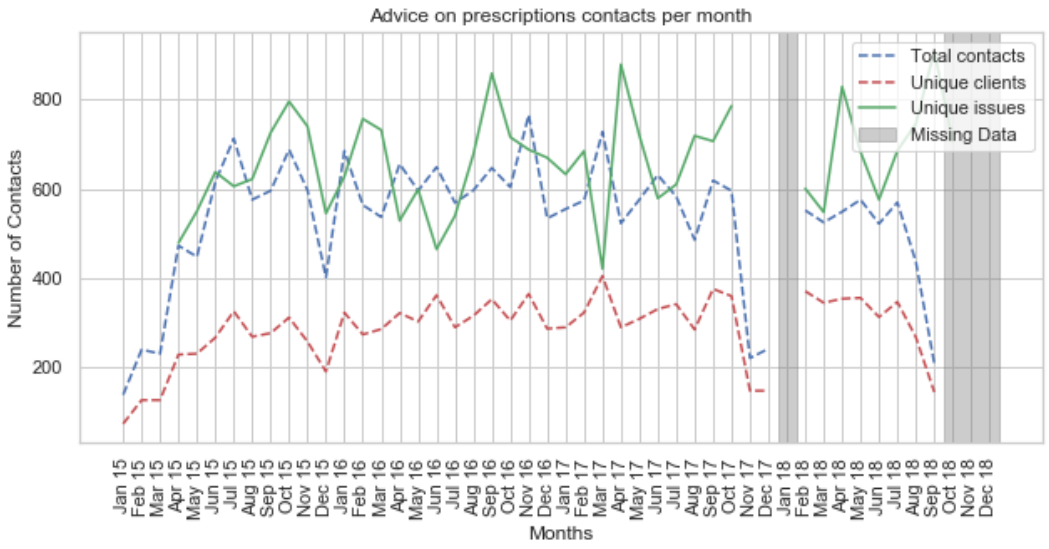
Unique Clients: this is a count of the number of unique individuals the service has seen over the entire time period of the data set. The number is calculated by counting unique pseudonymised NHS numbers.

Contacts: this is count of all the contacts with client which include any interaction type, including phone calls and case notes added. The count is made by totalling the usage of all client reference numbers in Casebook.

Unique issues: The CAB Casebook case management systems generates a reference for the primary presenting advice issues ("issue part 1" in Casebook), as well as secondary or sub-issues ("issue part 2" in Casebook). This is a heirarchical relationship, with 'primary presenting advice issue' being a grouping up of the 'secondary presenting advice issue'. Whilst used in the report, it is acknowledged this is a less useful metric than 'unique enquiries' below is actually a more useful metric. Future analyses will not use the unique issues metric, replacing it with the unique enquiries metric, described below.

Unique enquiries: This is a count of the case reference numbers. These are assigned to individual enquiries from clients. An enquiry may contain a number of related issues. There can be more than one enquiry for one client. *NB This measure was identified as a more meaningful metric as it represented a truer picture of activity, however this was understood and agreed only towards the end of the project. It is used only once in the analysis that follows. Further analysis and stratification of unique enquiries will be carried out at a future date.*

Figure 2: Advice on Prescription: total contacts, unique issues and clients per month



The service has seen 7,402 unique clients over the period April 2015 to October 2018. These clients have generated 55,049 contacts, presented with 11,460 main or primary issues, and 29,702 unique enquiries. The number of individuals presenting to the service remains comparatively constant, with peaks and troughs in numbers of presenting issues and service activity.

One month of data (Dec/Jan 2018) is missing from the analysis, an omission that came to light too late in the writing up process to be rectified for this draft report.

The chart also shows two dips in activity relating to contacts and numbers of unique clients, during Oct to Dec 2017 and Aug to Oct 2018. This was as a result of the introduction of two major welfare reforms:

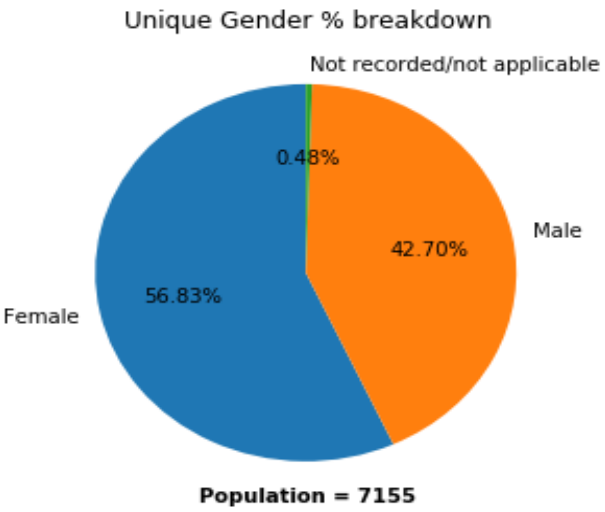
- During October – December 2017, those on Disability living Allowance (DLA) were required to migrate to a new system of Personal Independence Payments (PIP).
- During August – October 2018 many clients diagnosed with a severe mental impairment (SMI) were required to undergo assessments to establish eligibility for Employment Support Allowance (ESA).

Many existing clients, particularly those with mental ill-health conditions, were adversely affected by these reforms, and faced a significant reduction household income as result. During this period, the service prioritised these clients, providing intensive and specialist support in order to help manage ensuing assessments, claims and appeals.

4.2 Advice on Prescription: demographic profile

55.5% of the unique clients were female, 44.5% are male, 0.5% sex not recorded/not applicable. This confirms the finding of other studies [iii] [iv] showing that women have been disproportionately affected by welfare reforms introduced since 2010.

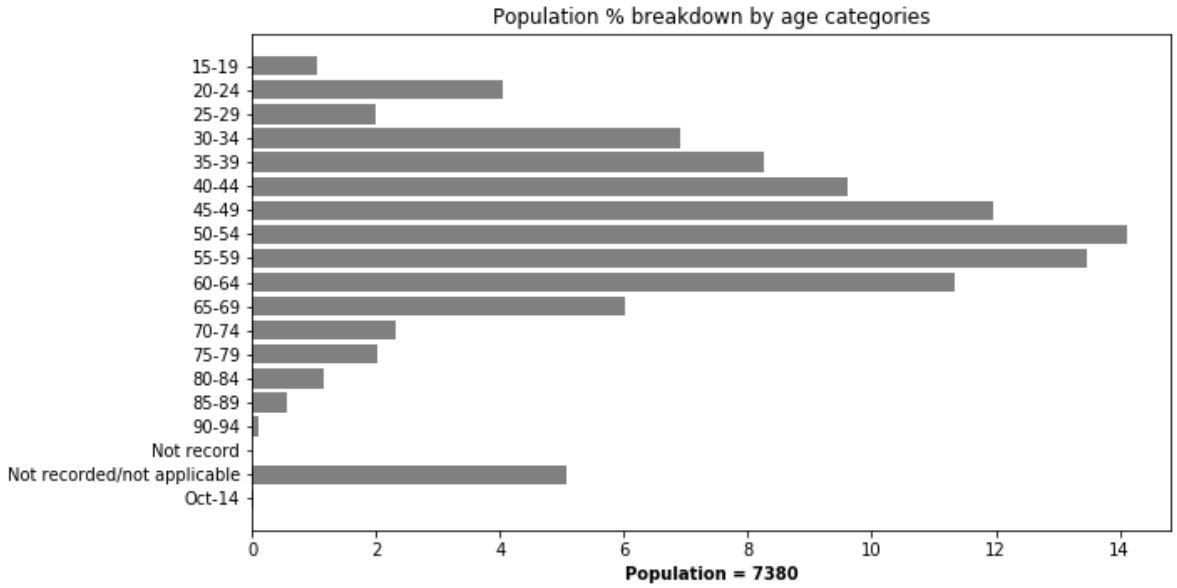
Figure 3: Gender of unique clients



To be amended in future versions as sex age distribution pyramid with shadow of the entire population pyramid in the background to distinguish from the larger population (GP reg, residential, etc.)

The largest proportion of the population accessing the Advice on Prescription service is between the ages of 40-65.

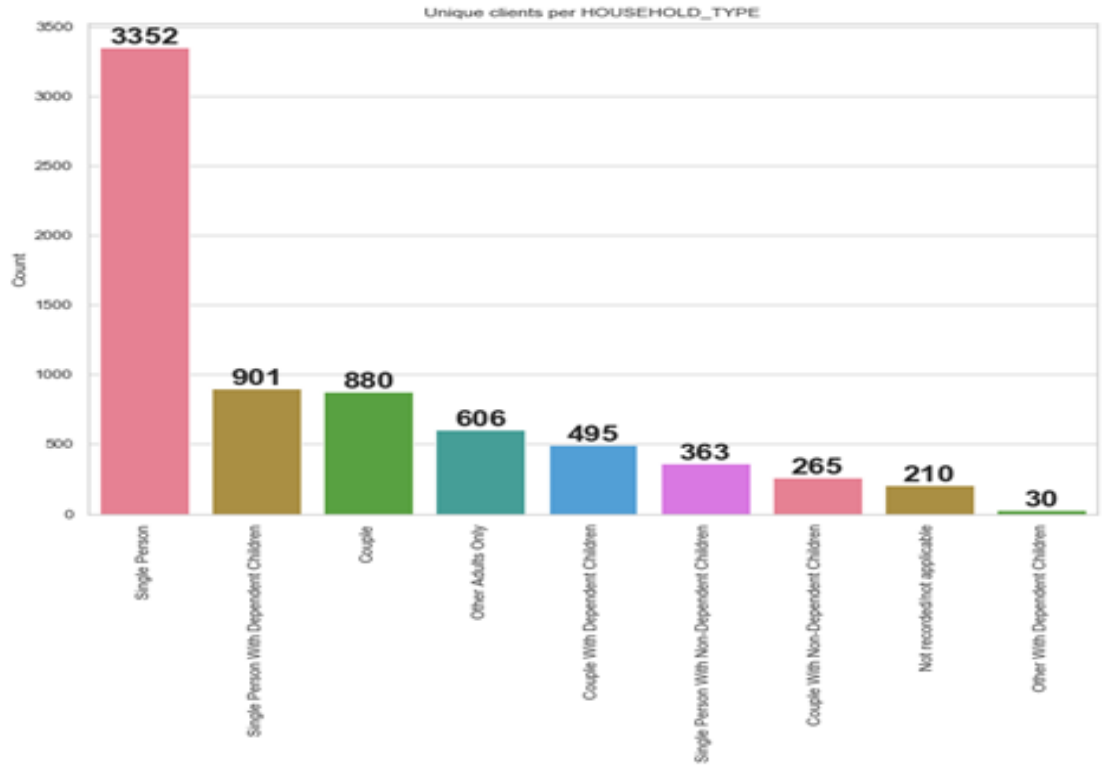
Figure 4: Age profile of unique clients



The split of clients by household type shows that 47% were single. A fifth of clients had at least one dependent child under the age of 18, and that approximately two thirds of this group were single parents.

Future iterations of this graph to show age and sex - would be most useful because it explains more about the person e.g. "young, male, single", "young, female dependents" Think about the format.

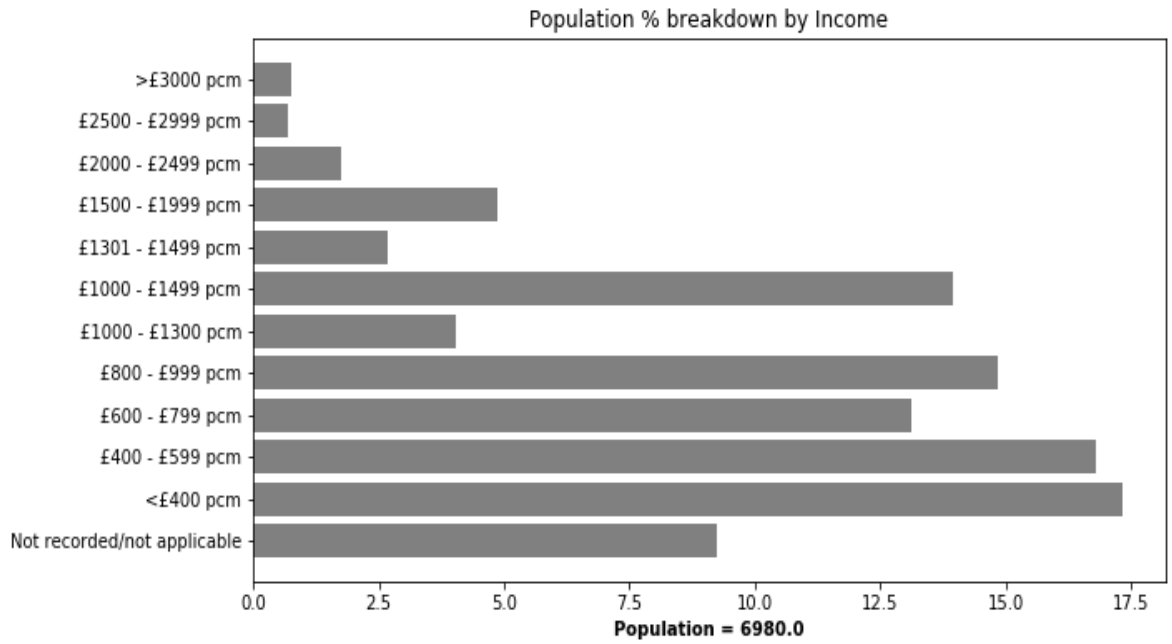
Figure 5: Household type



Future iterations if possible to show the differenceof income by demographics e.g. "young, male, single <400pcm", "young, female dependents 400-599pcm" We want to build a picture about who (beyond basic statistics) is using the service.

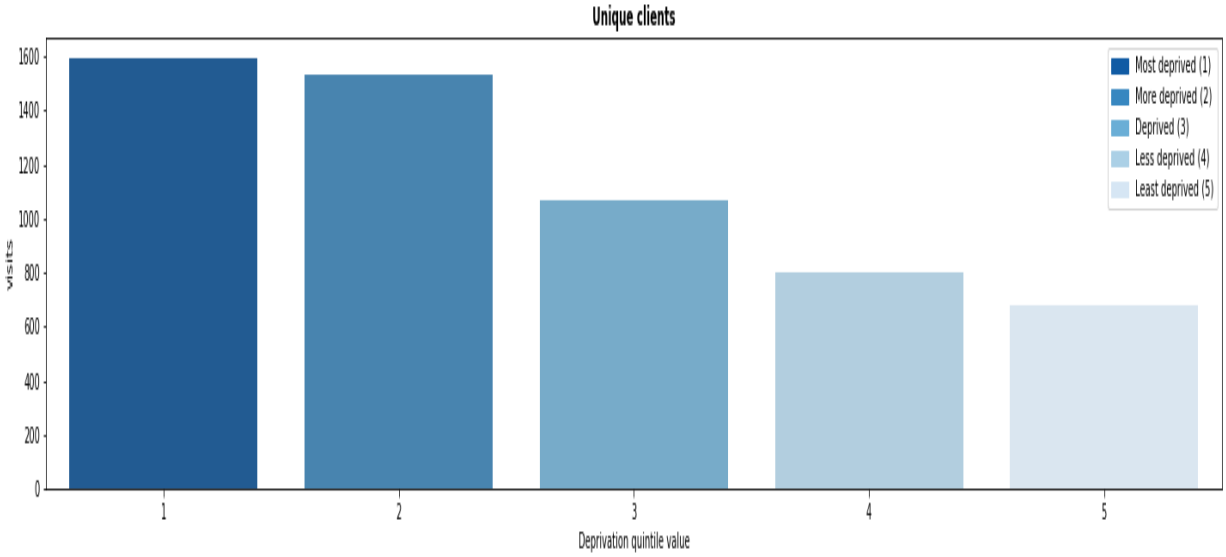
The household incomes of those patients accessing the *Advice on Prescription* service are some of the lowest in Liverpool, and at initial presentation to the service (prior to assistance), 17% had an income below £400 per calendar month, 51% had an income below £799 per calendar month.

Figure 6: Household Income



4.3 Advice on Prescription: access and usage

Figure 7: Usage of Advice on Prescription linked to deprivation rates



The above chart, Fig 7, shows the volume of unique clients by ward, colour coded for deprivation quintiles (darker colour = more deprived). When broken down to ward level, as in Figure 8, the most deprived wards appear to correlate to higher numbers of clients accessing the service, the exceptions being Anfield, County and Clubmoor.

Figure 8: Access to service: unique clients per 1000 weighted population

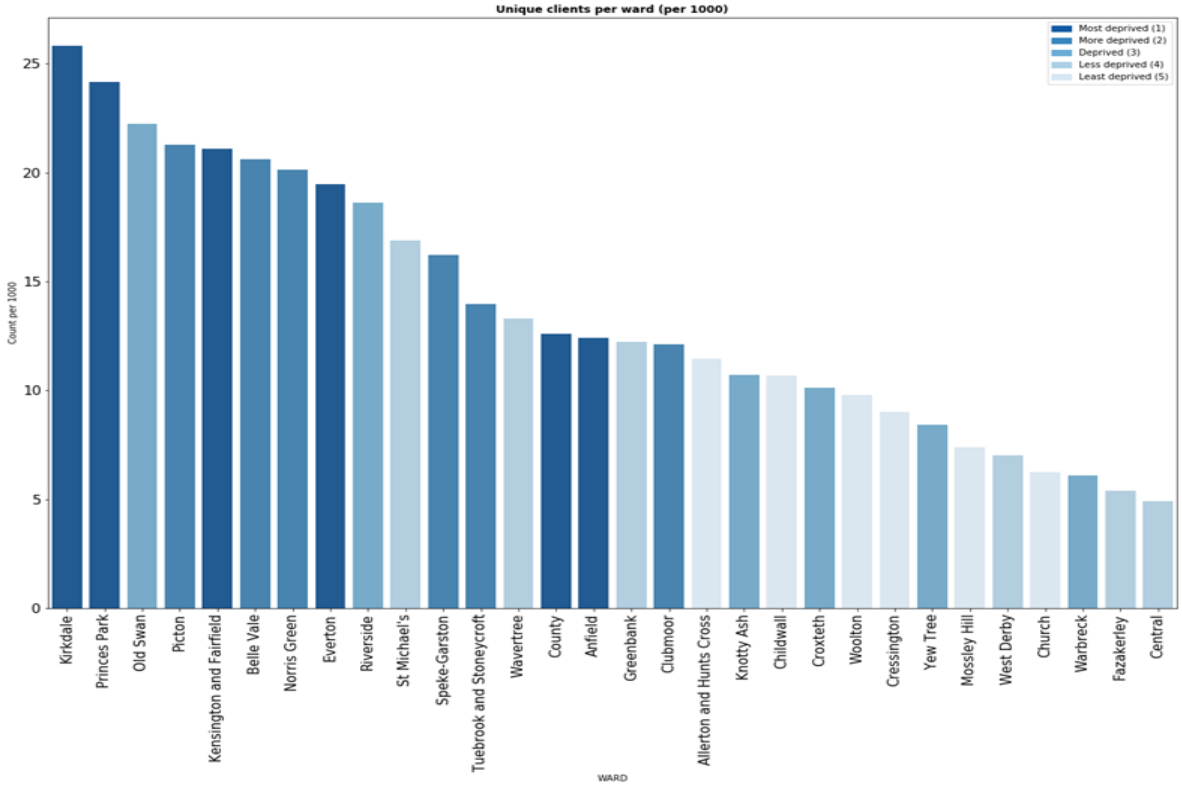
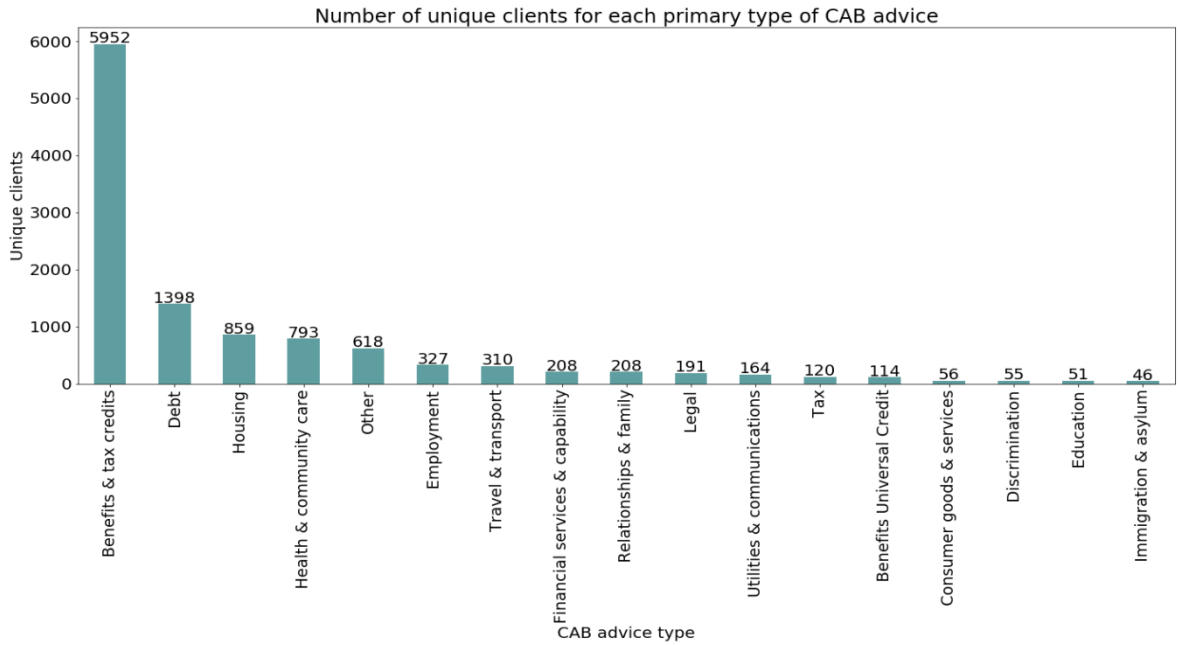


Fig.9 below shows the main types of primary advice issues that clients present with, over half being benefits/tax credit advice, followed by debt at 12%, then housing at 7.5%. Clients receive help with an average of four different types of practical issues.

Figure 9. Numbers of unique clients grouped by the primary presenting advice issue



This figure below shows the range of advice issues in greater detail. For particular note are advice issues relating to priority debt. Priority debts are those that could impact upon security of accommodation, health or liberty. This includes rent arrears, mortgage repayments, loans secured on a person's home, council tax, gas, electricity, court costs and fines. These debts must be dealt with before other non-priority debts in order to avoid severe consequences for example:

- Rent and mortgage debt can result in eviction
- Gas and electricity debt can lead to the installation of prepayment meters – so that when there is no money for the meter, fuel is disconnected. This means that some people live without the means to light or heat their homes, or afford hot food.
- Non-payment of a TV license court-fine can result in imprisonment

Throughout the 41 month period of this study the % of priority debt presented rose from 21% to 37%[v].

Figure 10. Numbers of unique clients grouped by the secondary presenting advice issue. (Issues with less than 100 clients are omitted for clarity)

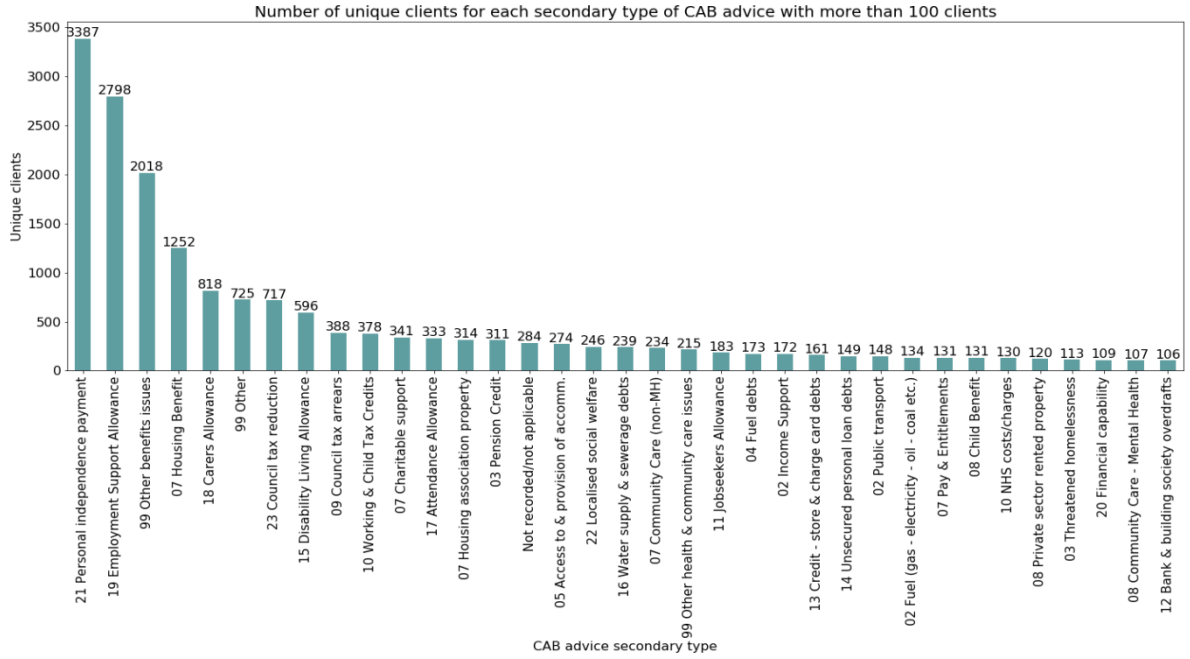


Figure 11. Numbers of primary presenting advice issues per unique client

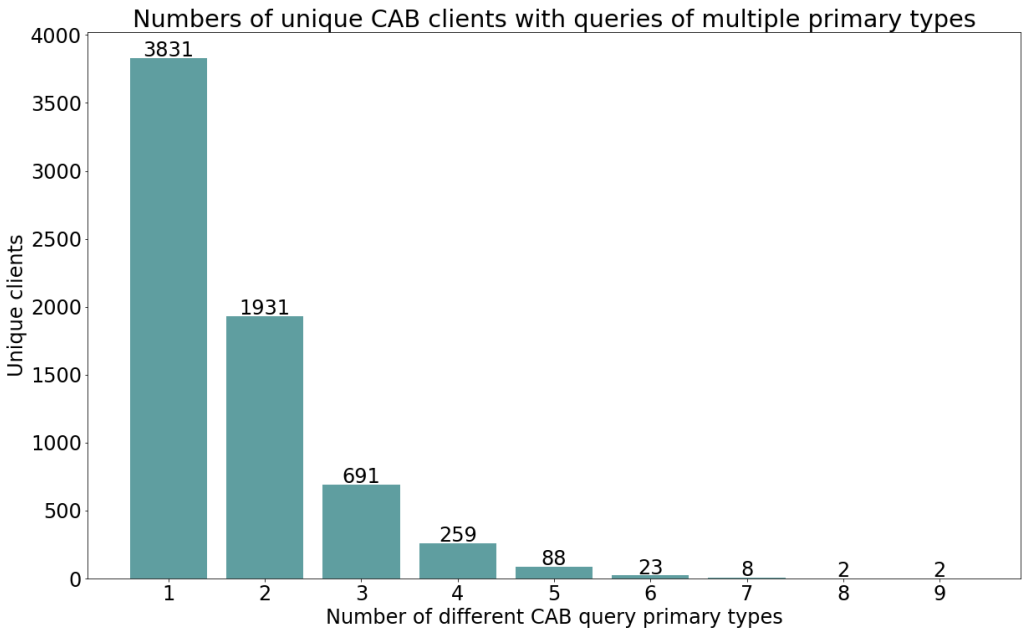
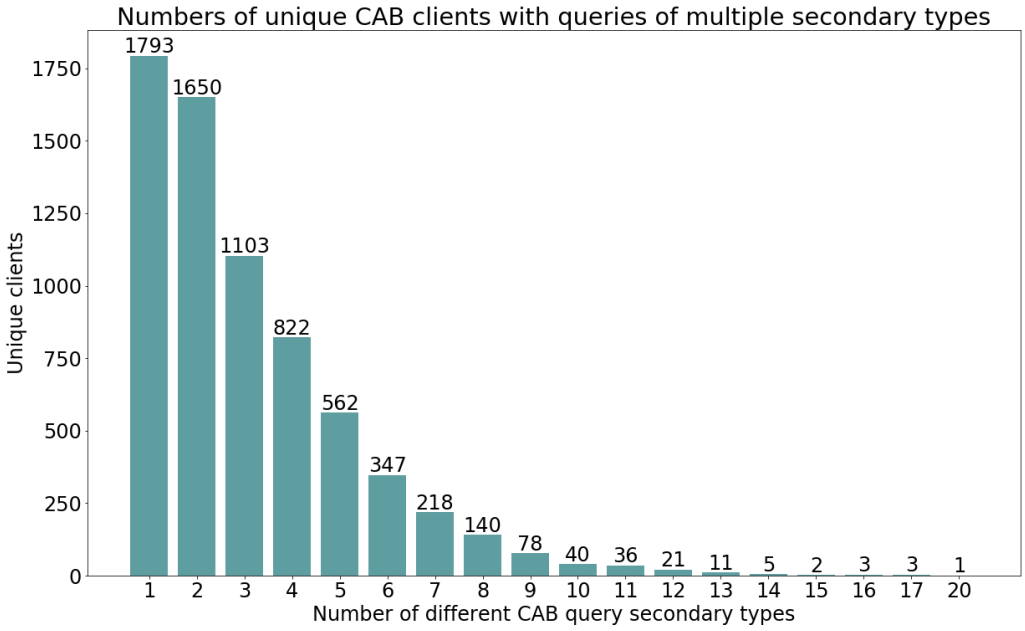


Figure 12. Numbers of secondary presenting advice issues per unique client



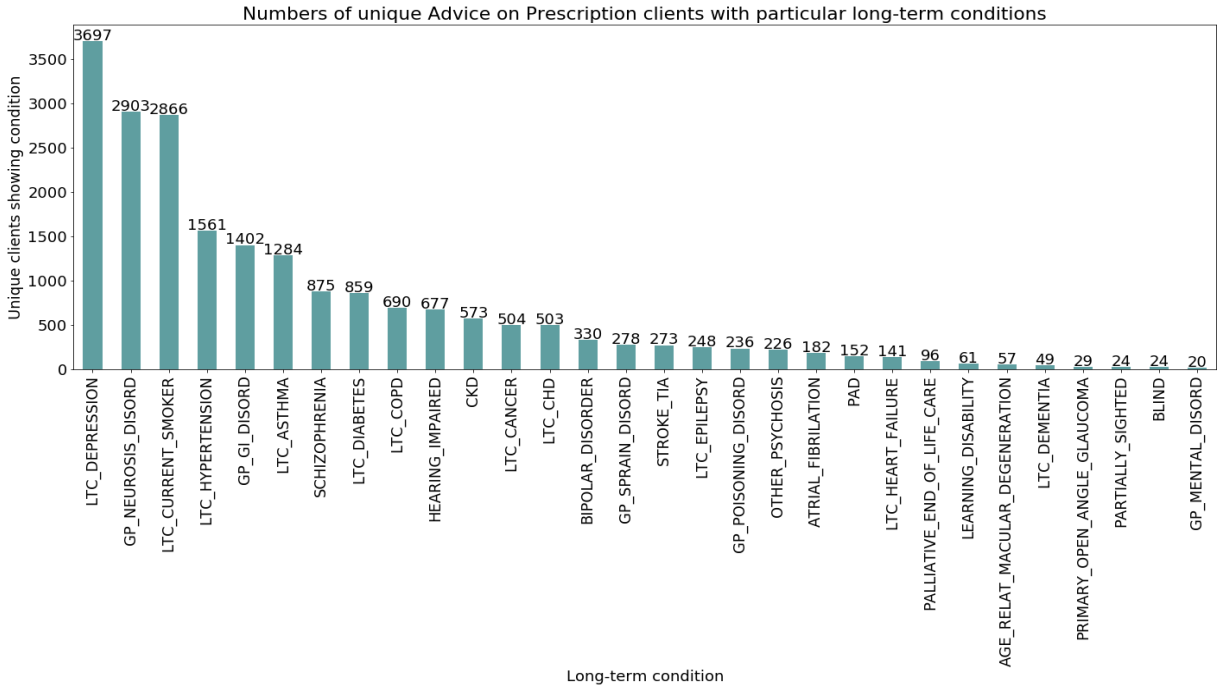
Next iteration to include a calculation of the average of issues per unique client and compare to the ratio in Mette Isaksen's CA study.[vi] The count here is unique issues part 2 and it needs to be unique enquiries.

4.4 Advice on Prescription: long-term conditions

Advice on Prescription data was linked with Primary Care data from GP systems to understand the recorded prevalence of long-term conditions within the cohort. For definitions of the Long Term Conditions used in the analysis please see Appendix D. A full read code specification is available but not appended to the report as it is too big.

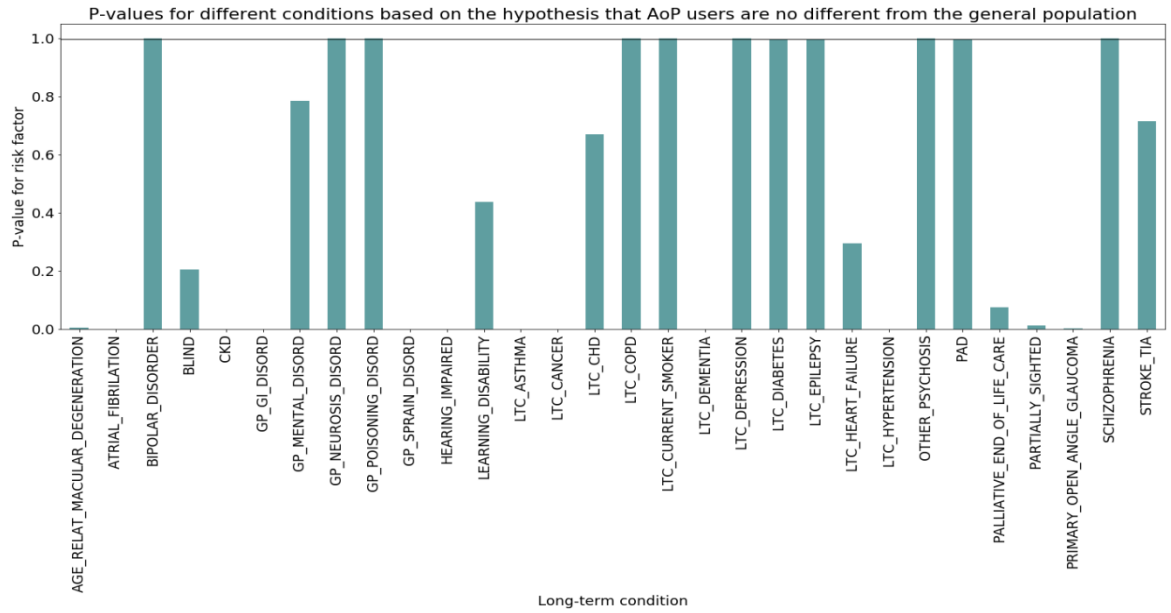
We can observe from the chart below that approximately 50% of the unique clients who presented at the service have a diagnosis of depression, 40% having anxiety, and 38% being a smoker.

Figure 13: Long-term conditions in the *Advice on Prescription* cohort



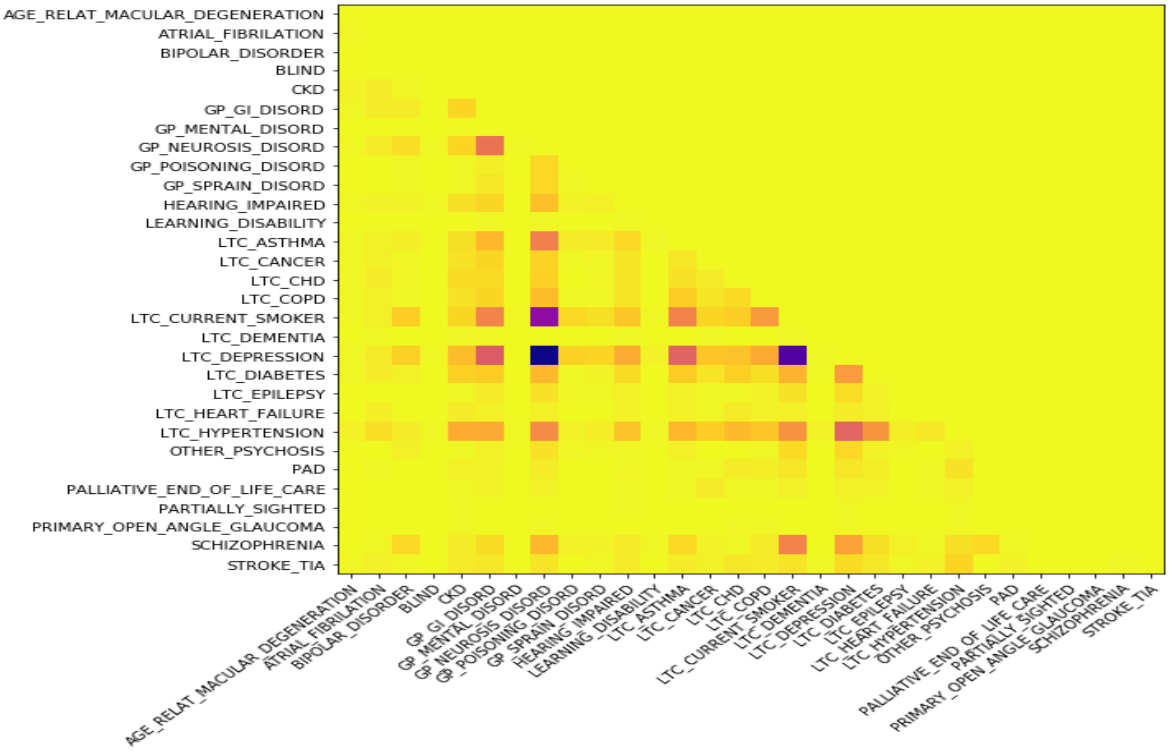
Further analysis exploring the prevalence of conditions in this cohort compared to the general population in Liverpool showed that the following conditions were significantly higher in this cohort: bipolar disorder, neurosis (anxiety), poisoning, depression, diabetes, epilepsy, schizophrenia, psychosis, COPD, and smokers.

Figure 14: Long-term conditions compared to the general population



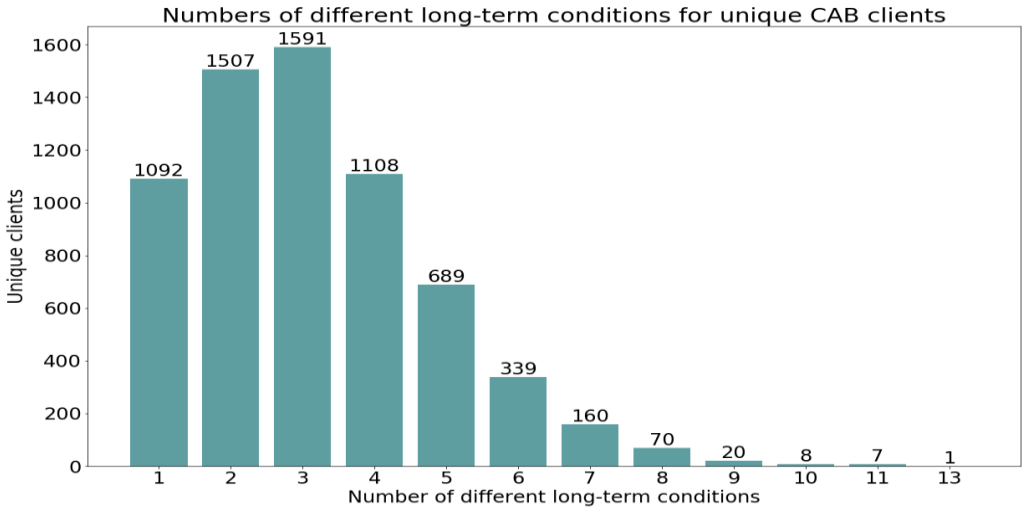
On the next page is a heat map showing the proportion of clients who have one condition, who also have anther. A darker square means there is a higher proporiton of clients with both conditons. This shows the clear relationship between mental and physical health need, with many people who have depression, anxiety and severe mental health also having physical long-term conditons.

Figure 15: Chart showing the proportion of clients who have the same conditions



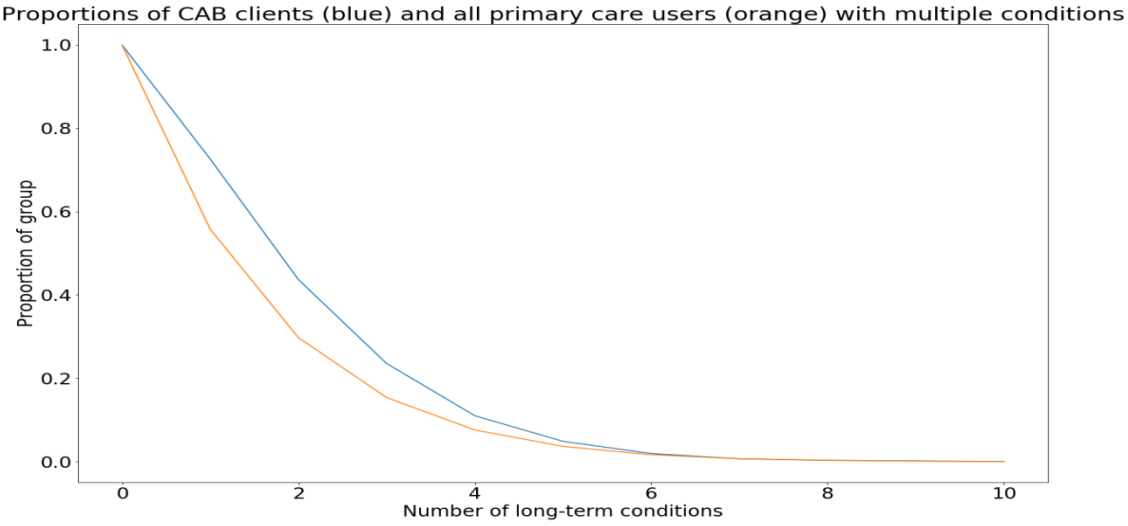
The chart below shows the average number of comorbidities per client, nearly 23% with two conditions, 25% with three conditions, 17% with four. Almost 20% had five or more health conditions.

Figure 16: Number of different long-term conditions for unique clients



The below chart shows the relative prevalence of long –term conditions in unique *Advice on Prescription* clients, when compared to the general population. Those accessing *Advice on Prescription* have significantly higher rates of multiple morbidities.

Figure 17: Number of comorbidities compared to the general population



4.5 Advice on Prescription: use of health and social care services

Many clients seen by the *Advice on Prescription* Service were also seen in secondary/community mental health services, social care, accident and emergency. Some were also emergency admissions to secondary care during the data periods listed in section 1, noting the limitations of the data regarding timeframes.

The venn diagram below shows the relationshiop between service usage in these segments.

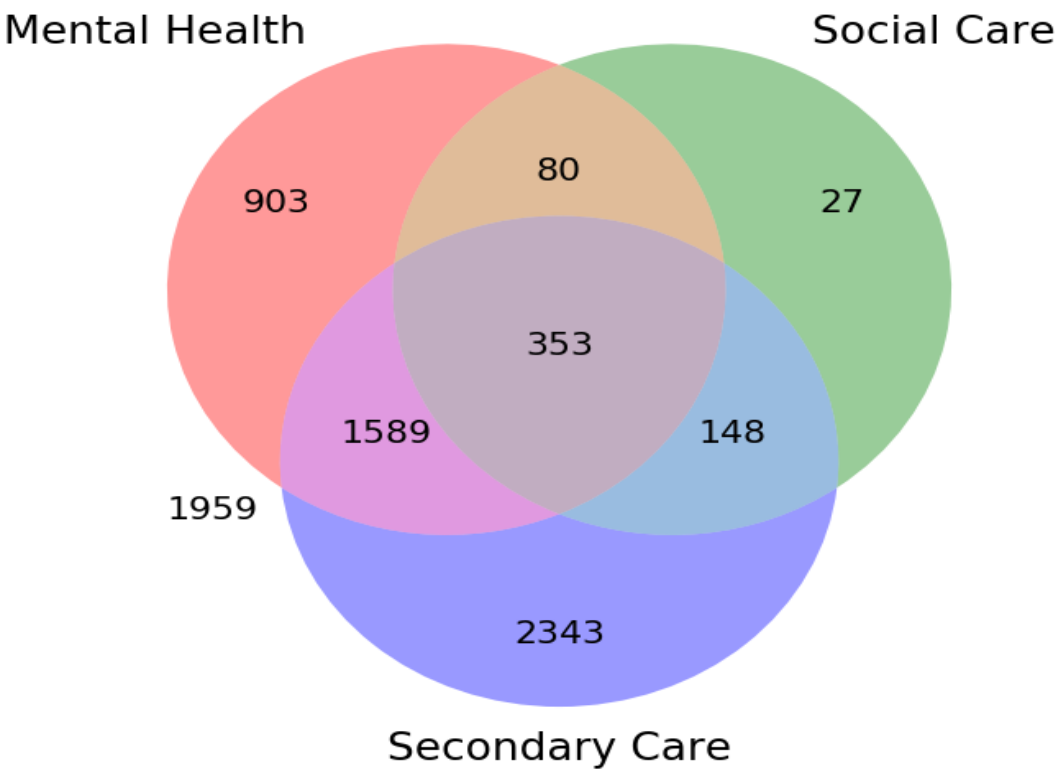
Mental Health: is any mental health contact in Mersey Care with a mental health team. A list of teams can be found in Appendix F. For note, the data in this study doesn not include psychological therapies.

Social care: is any social care assessment with an adult social worker in Liverpool City Council. This does not include mental health assessments. Please note, the time period for this data is only April 2016 to October 2018, with the *Advice on Prescription* clients being from April 2015, and so social care contacts are underestimated by one year.

Secondary care: is an emergency admission to secondary care. It does not include contacts for planned care services.

Of the *Advice on Prescription* cohort 39.6% (n= 2925) were known to mental health services, 8.3% (608) were known to social care services and 60% (n=4422) had an emergency admission to secondary care. 26.5% of people (n= 1959) had contact with primary care only.

Figure 18 Utilisation of health and social care services



4.5.1 Secondary Care

A large cohort were admitted in an emergency (n=4422). This was a much higher number than anticipated prior to data linkage. Given the age profile of clients, this might have been expected to be lower, however the analysis clearly shows these are populations with physical and mental health needs, which the literature supports[vii].

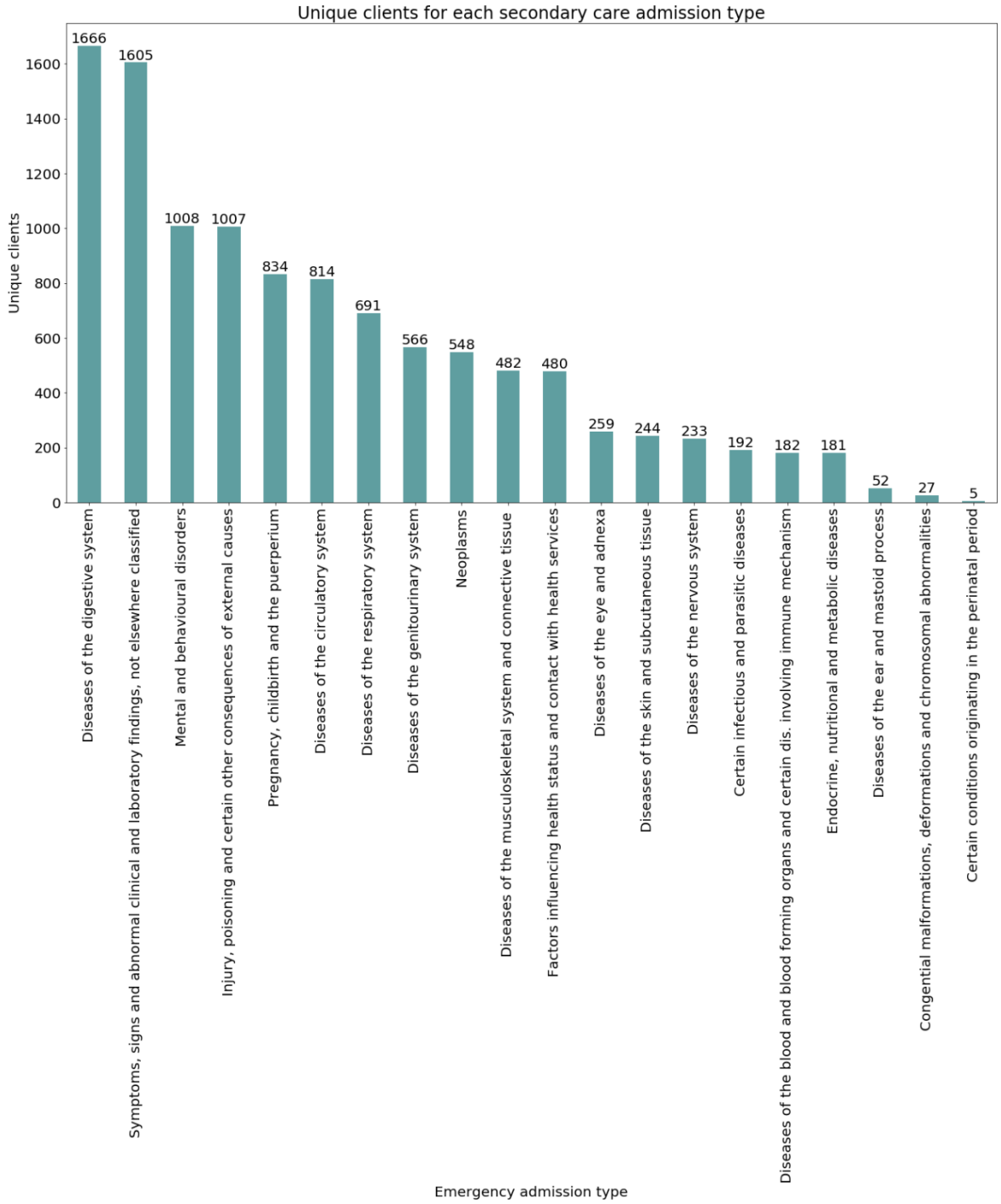
Data was linked with secondary care emergency admissions to further understand the profile of these admissions, and showed that the highest number of emergency admissions during the time period was for 'diseases of the digestive system'. This was followed by 'signs and symptoms', which is a general category for conditions such as abdominal pain, chest pain etc. 'Mental and behavioural disorders', and 'injury and poisoning' were next highest. These reflects the mental health need seen in the primary care long-term conditions data, and suggests some of this population is in mental health crisis for some of the time.

A large number of the study cohort had been admitted to an inpatient bed as an emergency with a noticeable proportion of these related to gastro and mental health conditions. This was a much higher number than expected. The literature supports our finding that high

users of emergency services are likely to have a combination of physical and mental health needs, and be of working age[viii].

A statistical test was beyond the scope of this exploratory analysis. Noted that it would be useful to undertake further work to understand whether the intervention had an impact on reducing emergency admissions.

Figure 17: Emergency admissions by diagnosis for unique clients

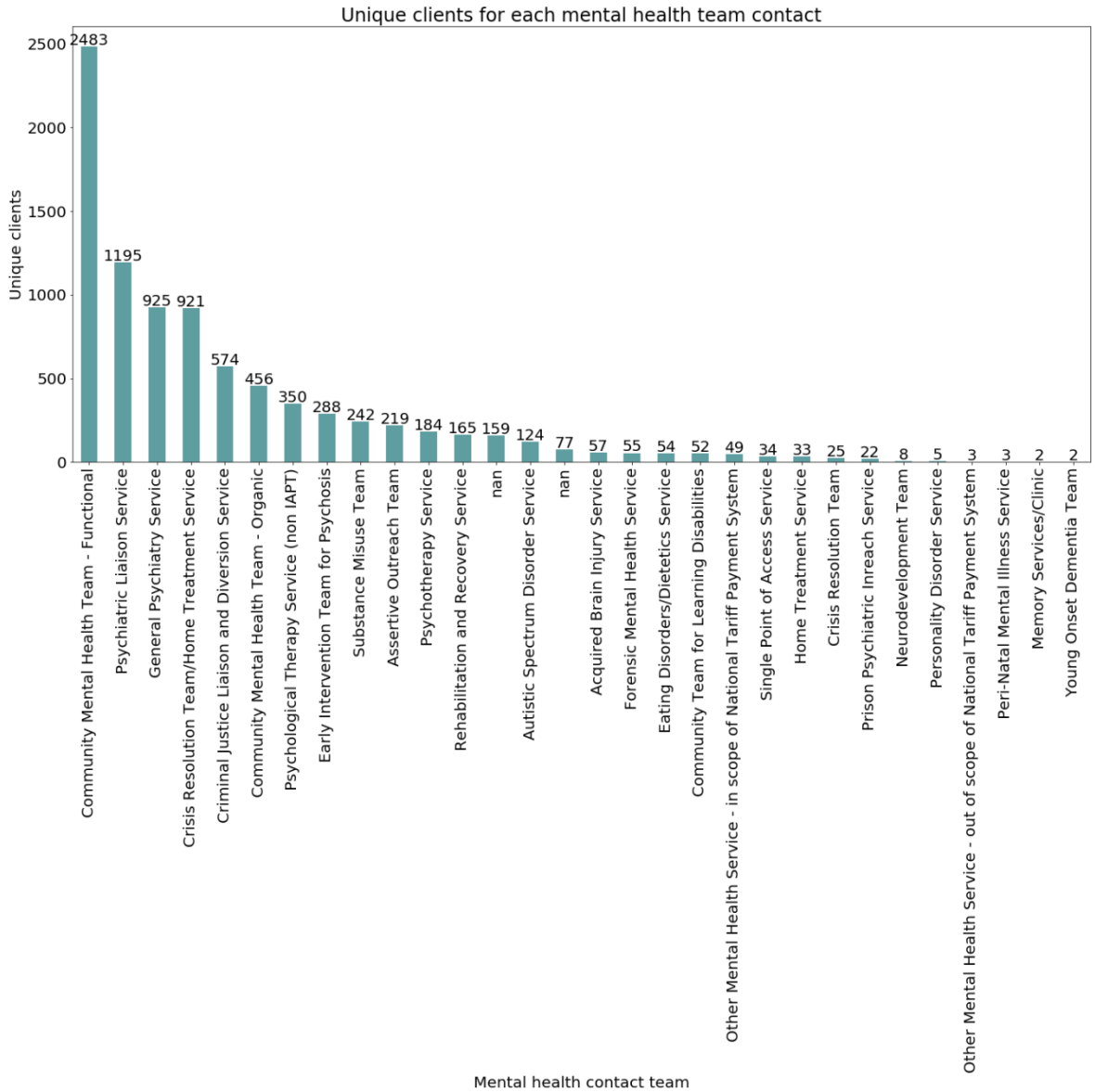


4.5.2 Mental Health *For note, this section needs further input from mental health services – they've had little opportunity to comment yet on this section*

Of those known to mental health services (n=2,925), the client breakdown is below, with the largest percentage, 85% known to community mental health services . Psychiatric liaison services, co-located with accident and emergency services was the second highest. This data does not include Improving Access to Psychological Therapies (IAPT) service data.

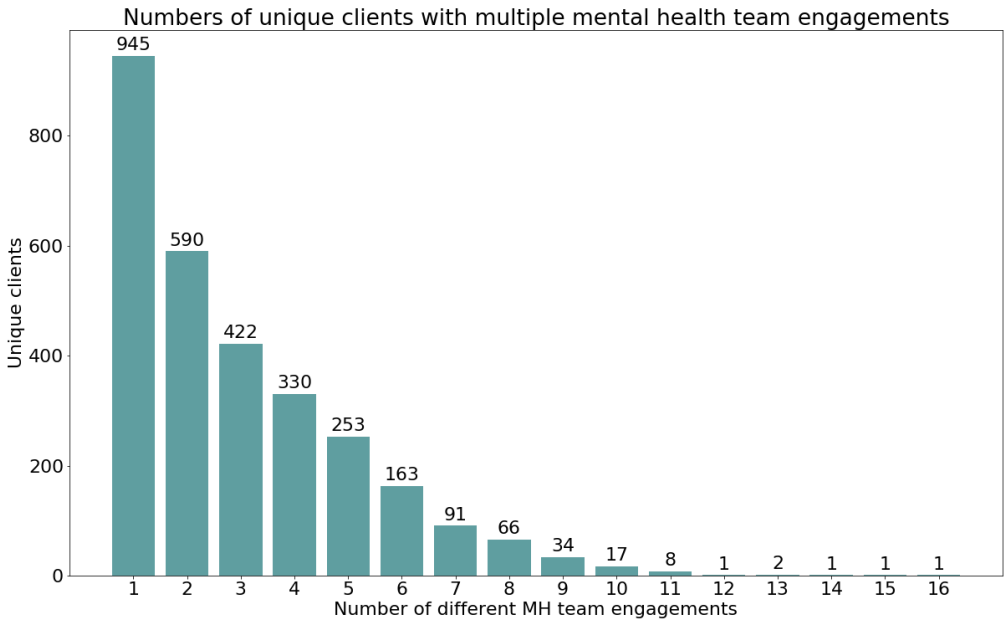
For note, *Advice on Prescription* has established referral pathways for Mersey Care patients, by liaising directly with community mental health teams (CMHTs) and in-patient units. Patients under the care of Community Mental Health Teams may also be referred to further tertiary services within the Trust, or present independently at A&E (Core 24) services.

Figure 18 Contact with mental health services by team



A further breakdown of the data shows many clients are known to individual mental health teams within the same Trust, suggesting that many clients who are mental health users are known to multiple teams.

Figure 19 Frequency of contact with mental health teams in Mersey Care



4.5.3 Social Care

The number of adult social care cases for this client base was observed to be low against an expected volume of mental health services users estimated as 1,200 - 1,300 people per annum. On discussion with social care a number of issues were highlighted: the gap in data from April 2015 to April 2016 for social care will have a lowering effect on the total number for adult social care cases in the study cohort; the biggest single group of adult social care users are older people (ages 65 years and over); because the client base is of a lower age, it is less likely they would be identified as having an adult social need. Notwithstanding these caveats, the view from adult social care is that adult social care cases may still be lower than would be expected given the health profile of this group. It was also noted that mental health social care assessments are not included in the linked data.

This is an area of interest and warrants further investigation as it may be that Advice on Prescription intervention confers a degree of resilience which helps protect demand for services.

5. Conclusions

The preliminary study confirms that the data has the potential to contribute powerfully to an integrated bio-psycho-social needs assessment of the local population, and that this in turn can contribute valuable insight to inform future service models, particularly in relation to social prescribing and proactive care.

It is no surprise that the study shows an already well-established association between poverty and ill-health. Our preliminary analysis suggests that material deprivation is so intrinsically connected to ill-health, that when used as a screening criterion for social prescribing, it is also effective as a stratification tool for identifying population sub-groups at significant risk of physical and mental ill-health. The data suggests that there is a triple jeopardy associated with deprivation, mental ill-health and respiratory conditions, and that this warrants further exploration, particularly in relation to the potential for delivery of proactive care for this group.

When combined with the learning from the test and learn pilot and other service evaluations, the case for screening for social and financial hardship is strengthened, not just because it creates the opportunity to provide stress relieving practical advice and support but also because it provides an opportunity for a proactive approaches to preventative care and promotion of well-being. Given the age range of the study cohort, future service models also need to include a focus on working-age adults, as well as women. We noted that our study suggests that the health of local women has been disproportionately and adversely impacted by austerity, and that this needs to be taken into account when developing future service models. Similarly, other studies[ix] show that the England's radical programme of welfare reform since 2010 has had a disproportionate impact on people with serious mental ill-health conditions.

We also learnt that at least a quarter or all users of the *Advice on Prescription* service are only in contact with primary care. Though a third of all users were known to mental health services, we infer that many were referred by primary care as we know that 80% of all referrals into *Advice on Prescription* came via general practice. All but two wards with the highest levels of deprivation also had the highest rates referral into Advice on Prescrption. These wards also had lower rates of access for other services, such as vaccination and immunizations. We think that this suggests that general practice has an important role in supporting patients to access non-clinical and clinical services. Locally, it challenges us to think differently about how we enable primary care to become better advocates for their patients in those wards where the population has high levels of health and social need, but lower rates of access into essential services. We need to tackle the inverse care law, as well as health inequalities.

6. Recommendations

Further segmentation of the populations who have a social need in relation to disease and service utilisation

A) Further segmented analysis is needed to improve understanding of the particular health and social needs of specific groups within the study cohort, ie: parents, particularly single parents; people with medically unexplained symptoms; people with serious mental illness; people with common mental health problems; people with respiratory conditions; single people living on their own.

B) Preliminary analysis suggests that a significant number of clients being supported by *Advice on Prescription* are users of secondary care, mental health, acute services, and social care services. Further analysis is required to understand the nature of the relationship with services, controlling for frequency and intensity of service utilisation by sub-groups within the *Advice on Prescription* cohort.

C) For those patients that are known to multiple services - ie community and inpatient mental health services, acute services, and/or adult social care – are there any distinguishing characteristics such as higher levels of social need, or health need, gender, age or health inequalities?

D) The study confirms the link between deprivation and ill-health, however further analysis would be required to control for the impact of age, income, length of illness or chronic health conditions. Is there any evidence of a correlation between severity or complexity of health need and higher levels of social need, or higher usage of acute services.

Further analysis to understand the impact of *Advice on Prescription* on service utilisation

A) Further work is needed to understand the impact of *Advice on Prescription* and whether patterns in service utilisation and risk of admission has lessened as a result of the intervention, against a control group with similar charachteristics adding to the evidence base that interventions have an impact.

B) Analysis to identify for what cohorts the intervention are most effective, and whether there are different effects for different levels of deprivation or disease.

Further analysis to understand the impacts of changes in policy

A) Wider analysis shows that particular groups in the population have been affected by changes to benefit and welfare reforms. Could further analysis show whether this effect is apparent for this cohort eg young people, parents, people with serious mental health illness who may have greater need than previously for benefits advice?

Analysis to understand if positioning advisors in different settings has a greater impact/reach

A) It would be useful to compare and contrast the needs of people with respiratory conditions who are referred by primary care, compared to those who were referred by respiratory services after September 2018. Are there any apparent differences in the presenting needs of the two groups?

Health and well-being improvements

The findings of the study suggest that *Advice on Prescription,* with its focus on wider determinants and common mental health problems, appears to be an effective method of identifying patients whose health is in jeopardy. The association between deprivation, mental health and respiratory illness appears particularly strong on the basis of this preliminary study.

A) It is recommended therefore that the learning from *Advice on Prescription* be disseminated across priority care pathways, in order to explore the potential for identifying other patient groups, whose health is at risk of compromise as a result of financial and social hardship.
B) It is also recommended that *Advice on Prescription* be treated as a segmented population group cohort, with some clients targeted for non-stigmatising proactive preventative care and promotion of well-being as appropriate.
C) Develop and test-out an algorithm to measure health and well-being outcomes – perhaps using a combination of proxy measures retrievable from the data-sets, such as reduced secondary service utilisation, prevention of homelessness or prosecution for debt, reduction in food, fuel or prescription poverty could be weighted and combined to create a bespoke well-being score.

Appendix A: Original Scope of Analysis

1. Introduction

1.1 Service description including focus for provision

1.2 Purpose of the analysis e.g. is to gain some insight into the health profile of the population that use Advice on prescription in order that the service can be targeted more appropriately along various health pathways (need to expand on this and make more clear)

1.3 The analysis will answer the following questions (NB: Need to make a connection to what the literature says):-

- What is the demographic, socio-economic and health profile of the clients that have utilised the AoP service?
- What health and social care service utilisation patterns does the population who use the service have?
- What impact has the service had on health outcomes and health service utilisation?

2. Methodology

2.1 The work involves linking patient level datasets from the advice on prescription service, primary care, secondary care, community care and social care.

2.2 The approach and analytical techniques used are… e.g. segmentation and the identification of control group, relationship analysis using regression etc etc (we may not use anything that sophisticated).

2.3 Data was stored and extracted using an SQL warehouse and x y z statistical software (if we use any)

3. Analysis

3. The Advice on Prescription Service (using AoP dataset)

3.1 Number of clients, number of contacts over time, gender, employment, benefit type, household income, types of advice given, outcomes, any info on demographic etc - things we can learn from their own data

4. Profile of clients (link with primary care data)

4.1 Profile of clients by age, deprivation, ethnicity, anything else? Segment by types of advice given or APP outcomes – are there are relationships to draw out?

4.2 Profile clients by lifestyle choices e.g. smokers, physical activity, alcohol consumption

4.3 Profile of clients by disease register and multiple morbidity including. Segment by types of advice given or APP outcomes – are there are relationships to draw out?

4.4 Profile clients specifically by mental health, common and severe

4.5 Profile clients by number of prescriptions are they polypharmacy?

4.6 Profile of risk stratification score – are these clients those at risk of hospital admission?

5. **Control Group**

5.1 Using the above and literature identify characteristics to control for and a control group who did not refer for the service (can only really use variables form the health data that we have for general population)

6. **Impact on health processes**

6.1 Profile clients by management indicator/outcome against control group and general population? e.g. number with managed BP, number with managed cholesterol , depression score?– need to think of a few indicators for each disease register (succinct list though)– small numbers may be an issue if not many of them have a diagnosed condition – this section depends on results from above.

6.2 Segment above for types of advice/APP outcomes – are there any relationships we can draw out

7. Impact on Health Service utilisation (link with secondary care data)

7.1 Profile clients use of AED, emergency admissions inc types e.g. COPD, Mental health etc, planned admissions and outpatients services. Is this more or less than a population with the same characteristics?

7.2 Segment above for types of advice/APP outcomes – are there any relationships we can draw out

8. Social Care Service utilisation/profile (NB: liquid logic data already flows at a patient level into Liverpool CCG)

8.1 Profile clients' use of social care and social care type against control group using

8.2 Segment for types of advice and app outcomes

9. Community Service Utilisation (NB: community data already flows at a patient level into Liverpool CCG, however DQ is questionable so may not be able to use)

9.1 As above for community

10. Main observations and conclusions

10.1 This all needs to be tied together to the literature, the original questions and tied to service delivery e.g. in conclusion we think that the service would be most effective if it operated out of x y z pathways or on x health groups.

Appendix B: Membership of the Project Group

Clare Mahoney	Social Model of Health, Liverpool CCG
Bliss Janet	GP, Community model lead, Liverpool CCG
Duckworth Helen	Head of Business Intelligence, Liverpool CCG
Renwick Sue	Respiratory, Liverpool CCG
Roberts Jane	GP, CAMHS lead, Liverpool CCG
Kerr Andy	Mental health, Liverpool CCG
Debbie Nolan	Health programmes, Liverpool Citizen's Advice
Claire Driffield	Health Policy and Partnerships, National Citizen's Advice
Maria Vaccarello	Advice on Prescription
Sophie Wickham	Public Health, University of Liverpool
Tanith Rose	Public Health, University of Liverpool
Melisa Campbell	Public Health, Liverpool City Council
Richard Jones	Public Health, Liverpool City Council
Adam McCamley	Senior Analyst, Adult Social Care, Liverpool City Council
AnnMarie Daley	Business Intelligence Liverpool CCG
Wesam Baker	Mersey Care
Simon Goodchild	Hartree
Humzah Javid	Hartree

Appendix C: Dissemination October 2017 – March 2019

	Event/conference
1	March 21st 2019 Forthcoming – National Local Government Association/Public Health conference, London
2	January 28th 2019 Innovation Agency, Health, Environment and Wellbeing Conference, Liverpool: *Can social prescribing help tackle the inverse care law?*
3	9th October 2018 Communities are the best medicine, Kings Fund, London: *Joining the dots- a social model for mental health support*
4	4th Oct 2018 Presentation at initial workshop to launch of DHSC Health and Wellbeing Fund Social Prescribing Programme
5	11th September 2018 Public Health England national conference in Warwick, *Using data and improvement methods to drive prevention.*
6	21st June 2018 Breakfast briefing & round table, chaired by Helen Stokes Lampard, Citizens Advice London: *Getting it right: effective social interventions in primary care*.
7	21st March 2018 Priorities for social prescribing, Westminster Health Forum Keynote Seminar
8	31st January 2018 Site visit from National Collaborating Centre for Mental Health and NHS England
9	17th October 2017. Breakfast briefing and round table, Citizens Advice London: *Integrating Advice in Mental Health Care Settings*

Appendix D: Advice on Prescription Privacy Notice

The Advice on Prescription service is funded by Liverpool NHS via the Clinical Commissioning Group (CCG), the body responsible for planning NHS services across the city, and working with clinicians and healthcare providers to ensure they meet the needs of local people and improve services. The CCG requires us to share data and produce reports on the work of the Advice on Prescription service on a regular basis for this purpose. No personal or confidential data e.g. information that identifies you such as your name or address are shared with the CCG or any other organisation such as your GP, unless you specifically ask us to do so. If you would like to know more about the Advice on Prescription service get in touch with Maria.Vaccarello@caliverpool.org.uk or tel. 0151 494 1605

[i] eg Analysis of A&E attendances 2017 – 18, Dr Foster

[ii] Buckles L (January 2019) Review of Liverool General Practice Specification and impact on health inequalities. Liverpool CCG

[iii] Statement on Visit to the United Kingdom, by Professor Philip Alston, United Nations Special Rapporteur on extreme poverty and human rights, 16th November 2018. https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23881&LangID=E

[iv] https://www.independent.co.uk/voices/austerity-misogyny-britain-un-report-universal-credit-domestic-abuse-conservatives-a8641236.html

[v] Taken from Advice on Prescription annual reports 2015 - 2017

	Debt Managed	Priority Debt	Non Priority Debt
2015/16	1,673,578	351,451	21%
2016/17	2,872,149	947,809	33%
2017/18	1,256,106	467,759	37%

[vi] Isaksen Mette, Williams Richard (2017) Joining the Dots: Integrating practical support in mental health care settings. Citizen's Advice Bureau. https://www.citizensadvice.org.uk/Global/CitizensAdvice/Public%20services%20publications/Joining%20the%20dots%20-%20Citizens%20Advice%20report%20(1).pdf (Last accessed 31st January 2019)

[vii] eg Analysis of A&E attendances 2017 – 18, Dr Foster

[viii] ibid

[ix] Statement on Visit to the United Kingdom, by Professor Philip Alston, United Nations Special Rapporteur on extreme poverty and human rights, 16th November 2018. https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=23881&LangID=E (Last accessed 31st January 2019.)