Using routine data to conduct small area health needs assessment through observing trends in demographics, recording of common mental health problems (CMHPs) and sickness certificates: longitudinal analysis of a northern and London locality

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ABSTRACT

Background Many practices in the UK have computerised information dating back to the 1990s. These health records provide contemporaneous collected longitudinal data for analysis of health trends and their management in primary care over time.

Objective This study examines the trends in common mental health problems (CMHPs), prescription of antidepressants, anxiolytics and hypnotics and medical certificates over four years to highlight the strengths and pitfalls in trends analysis using primary care data.

Method Relevant clinical information for the first six months of each of the calendar years 2004, 2005, 2006 and 2007 were extracted from participating practices in a London locality and in the North.

Results Between 2004 and 2007 recorded episodes of CMHPs rose from 33 to 45 per thousand adults in the northern site, and from 19 to 22 in the London site. Prescriptions of antidepressants, anxiolytics and hypnotics rose (from 381.4 to 418 per thousand adults) in the northern site but did not increase in the London site. Medical certificates increased steadily (from 32.7 to 61.6 per thousand adults with a CMHP) in the London site but not in the northern. Recorded episodes of CMHPs and prescriptions of antidepressants, anxiolytics or hypnotics are much higher in the northern site than the London site; the rate of medical certificates per thousand adults with CMHPs in the northern site is more than ten times that in the London site.

Conclusions Demographics, diagnostic and prescribing data are of high quality in primary care, and they could be used more to understand local health needs and inform commissioning decisions.

Keywords: computerised medical records, mental health, primary care, trends
Introduction

The UK has a new health strategy to delegate responsibility for commissioning services to local areas; for this commissioning to be effective small area health needs assessments will need to be able to be conducted. The new strategy, entitled *Equity and Excellence: liberating the NHS*\(^4\) has outlined the strategic plan for reform. A key component of this reform is the devolving of responsibility for commissioning of healthcare services to professionals closest to the patients. In order to achieve the expected improved health outcome for all, local areas are looking to organise more evidence-based local services than those provided by their predecessors across a wider geographical area. Local commissioners will need to understand the health needs of their local population and any trends in disease patterns; small area estimates of disease prevalence are a relatively new epidemiological technique.\(^5\)

Primary care in the UK is universally computerised and many practices have computerised information dating back to the early 1990s, routinely collected as part of clinical consultations.\(^6\) The implementation of payment for performance (P4P) for quality indicators for chronic disease management in April 2004,\(^7\) and measured using routinely collected computer data, further standardised and improved the quality of recording of computer data in primary care.\(^8\) These health records provide a set of contemporaneously collected longitudinal data free from some of the systematic biases of retrospective recall\(^9,10\) and offer a unique opportunity for identifying trends in ill-health and management of ill-health in primary care over time.

We carried out this comparative study of trends in recorded common mental health problems (CMHPs), prescription of antidepressants, anxiolytics and hypnotics and issuing of medical certificates over a four-year period. Our objective was to highlight the strengths and pitfalls in retrospectively looking at trends within a locality using routinely collected primary care data.

Method

We used routinely collected primary care computer data to explore trends in CMHPs, extracting and processing them using established methods.\(^11,12\) We used MIQUEST (Morbidity Information QUery and Export SynTax), a Department of Health approved data extraction application, to extract relevant clinical information for the first six months of each of the calendar years 2004, 2005, 2006 and 2007 for all patients from participating general practices currently registered at the end of 2007. The study population consisted of 61 220 people in a northern site (12 practices) and 87 697 in a London site (13 practices).

We extracted pseudonymised data, excluding strong identifiers such as name, NHS number or date of birth. The pseudonym, a unique patient identifier, could only be linked back to the patient identity by staff within the practice.

Demographic data such as age, gender and ethnicity were extracted. We standardised the age–sex profile using national census data.\(^13\) The data collection also included: diagnoses of mental health problems, prescriptions of psychotropic medications, medical certificates, common co-morbid long-term conditions (such as diabetes, chronic heart failure and chronic obstructive pulmonary disease), and lifestyle factors (such as smoking and alcohol consumption). The ethnicity coding hierarchies were converted into the ‘5+1’ Office of National Statistics categories: 1) White, 2) Mixed, 3) Asian or Asian British, 4) Black or Black British, 5) Chinese or other ethnic group and +1) No ethnicity data.\(^14\)

Postcodes were transformed into Index of Multiple Deprivation (IMD) scores within general practice computer systems. The IMD scores for England were divided into deciles of equal sizes. Each decile was assigned a specific numeric range. The first decile (IMD ≤5.63) indicated the least deprived, and the tenth decile (IMD ≥45.33) the most deprived.\(^15\)

The IMD scores for the study population were mapped onto the IMD deciles for England for direct comparison with the localities in England.

The practice list population in this study included only those who were still alive and registered with the practice at the time of data collection in 2007. The overall percentage of new patients each year is estimated to have been between 7.5% and 8.1% for the northern site and between 10.6% and 14% for the London site over the period. The number of records of diagnosis and prescriptions were smaller for previous years due to sample attrition from turnover of practice populations for which we no longer have the clinical data. We calculated the denominator population across all the practices in each year of our analysis to take account of this turnover. Age of the patients was re-calculated for each year of the analysis to ensure that we were comparing like with like.

The presence of a CMHP was indicated by a recorded diagnosis of depression or neurotic disorders (such as anxiety and stress-related disorders, mixed anxiety and depression or obsessive compulsive disorders) in the general practice information system.\(^16,17\) The codes for the diagnoses of depression and neurotic disorders used in this study are shown in Appendix 1.

Data from the final dataset were imported into the Statistical Package for Social Sciences (SPSS) for analysis. We used descriptive statistics quoting mean and
median, displaying the data visually using bar charts where appropriate.

The present study is conducted as part of a Department of Health funded project to evaluate the effectiveness of a new service model ‘Improving Access to Psychological Therapy’ (IAPT). The IAPT evaluation project was approved by a research ethics committee and by the local NHS primary care trust’s research management and governance offices prior to data collection.

Results

Population demographics

The general practice list populations for the two study sites have very different characteristics in terms of age–sex profile and ethnicity. The age–sex profiles are presented as a population pyramid of five-year age bands (Figure 1). Compared to the national population age profile, the London site has a younger population profile: over-represented in the younger

![Figure 1 Age–sex profiles of locality populations: London (left) and northern locality (right)](image)

### Table 1 Ethnicity recording in the study localities

<table>
<thead>
<tr>
<th></th>
<th>London locality</th>
<th>Northern locality</th>
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<tbody>
<tr>
<td></td>
<td>Study sample (%)</td>
<td>% where recorded</td>
</tr>
<tr>
<td>No ethnicity records</td>
<td>32.6</td>
<td>–</td>
</tr>
<tr>
<td>White</td>
<td>24.9</td>
<td>37.2</td>
</tr>
<tr>
<td>Mixed</td>
<td>1.5</td>
<td>2.6</td>
</tr>
<tr>
<td>Asian or Asian British</td>
<td>20.2</td>
<td>29.9</td>
</tr>
<tr>
<td>Black or Black British</td>
<td>17.5</td>
<td>25.9</td>
</tr>
<tr>
<td>Chinese or other</td>
<td>3.2</td>
<td>4.4</td>
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<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
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age bands, particularly in the age 20 to 44 age groups, and under-represented in the older age bands; whereas the population structure of the northern site is much closer to the national population profile, apart from having a smaller proportion of adults in the 25 to 29 and 30 to 34 age bands.

Ethnicity

The northern study site had a predominantly white population (96.6%) in 2007. At the time of data collection, ethnicity was very poorly recorded in the northern study site. Table 1 shows that only 18.8% of the patients in the participating general practices in the northern site had an ethnicity recorded, but 18.2% (97% of those with an ethnicity record) are recorded as white.

The level of recording of ethnicity was much higher in the London site with over two-thirds of the patients having had their ethnicity recorded (Table 1). The proportion of each ethnic group in the London site, where ethnicity was recorded, was very similar to that for the area in the 2001 Census: 37.2 white in the study population against 39.4 in the 2001 Census; 60% were non-white.

Over 99% of people were mapped to an appropriate IMD decile – only 565 (0.38%) out of the total of 148,916 patients could not be mapped due to invalid postcodes. Both the London and northern sites are in the more deprived areas of England, with many more people in the London study site living in the 20% most deprived areas (the 9th and 10th deciles) than those in the northern study site.

Recording of depressive symptoms and CMHPs for adults in primary care

The trends of recorded episodes of symptoms of depression and CMHPs between 2004 and 2007 differed between the study sites (Table 2). In the London study site, new episodes of depression symptoms and CMHPs (i.e. anxiety and stress-related disorders, mixed anxiety and depression, phobias etc) per thousand adults were relatively static between 2004 and 2006 but increased in 2007: the rate of new episodes of depression per thousand was 9, 8, 8 and 11 in the London site, and there was a rate of 19, 19, 18 and 22 new episodes of CMHPs per thousand. In the northern site, recorded episodes of depression symptoms and CMHPs per thousand rose progressively between 2004 and 2007: recorded episodes of depressive symptoms rose from 18 to 25 per thousand adults between 2004 and 2007, and CMHPs from 33 to 45. It seems clear that there had been an overall increase in the recorded episodes of depressive symptoms and CMHPs between 2004 and 2007.

The rate of recorded episodes of depression symptoms and CMHPs per thousand adults in the northern site is about twice as high as the rate in the London site for the study period.

Use of antidepressants, anxiolytics and hypnotics in primary care

The pattern of prescriptions of antidepressants, anxiolytics and hypnotics for the first six months between 2004 and 2007 also differed between the two study sites, reflecting the trends in diagnosis (Table 3). Overall, in the London site there was no readily observable upward trend for the prescription of antidepressants, anxiolytics or hypnotics in the study period. But an

<table>
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<tr>
<th>Table 2 Number of adults (aged 16 and over) with a new record of depressive symptoms or common mental health problems in London and northern localities</th>
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<tbody>
<tr>
<td><strong>London locality</strong></td>
</tr>
<tr>
<td>Depressive symptoms (n)</td>
</tr>
<tr>
<td>Incident cases CMHP (n)</td>
</tr>
<tr>
<td>Adult population (n)</td>
</tr>
<tr>
<td>Incident depression (n/1000)</td>
</tr>
<tr>
<td>Incident CMHP (n/1000)</td>
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<tr>
<td><strong>Northern locality</strong></td>
</tr>
<tr>
<td>Depressive symptoms (n)</td>
</tr>
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</tr>
<tr>
<td>Adult population (n)</td>
</tr>
<tr>
<td>Incident depression (n/1000)</td>
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<tr>
<td>Incident CMHP (n/1000)</td>
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upward trend is clear for the northern study site, rising from 235.9 prescriptions of antidepressants per thousand adults in the first six months of 2004 to 295 in 2007. Apart from the first six months in 2004, a similar upward trend in the number of prescriptions of antidepressants, anxiolytics and hypnotics was observed between 2005 and 2007 in the northern site, rising from 377.9 prescriptions of antidepressants, anxiolytics or hypnotics per thousand adults to 418 in 2007.

The rate of prescription of antidepressants, anxiolytics and hypnotics in the northern study site was roughly twice that of the London study site in the study period, which was compatible with the higher rate of depression.

We observed a similar overall difference in the rate of prescribing in our analysis between the study populations; the northern locality had a higher rate of prescription of antidepressants compared with England as a whole, and the London locality a lower rate (Table 4). Our sample populations are approximately one-fifth of the adult population in the northern locality (49K/234K) and one-third of the adult population in the London locality (63K/189K).

Comparison of the estimated annual rates of prescriptions in the study sites in the first six months (multiplied by a factor of two) with that of the localities showed that our sample data consistently reported a lower rate than national data. For example, there were 295 for the first six months in 2007 (590 over one year) in the northern study site against 985 in the financial year 2006 to 2007 in the northern locality, and 141 in the London study site against 445 in the London locality. It is acknowledge that there may be seasonal variations in the prescriptions of antidepressant, and doubling the rate of prescription for the first six months of the year is an expedient but perhaps not accurate estimate for the full-year effect.
Medical certificates for adults with CMHPs

The number of people with CMHPs for the study sites who received medical certificates or ‘sick notes’ in the first six months of the calendar year between 2004 and 2009 is shown in Table 5. In the northern site, a ‘surge’ in the number of medical certificates was recorded in 2005 with 903 sick notes per thousand being issued in the first six months, but no obvious gradients were observed in the study period. In the London study site, a clear upward gradient is noted between 2004 and 2007, with 32.7 recorded sick notes in the first six months of 2004, rising gradually to 61.5 in 2007 (Table 5). Consistent with previous findings on recorded prescriptions and episodes of CMHPs, it is noted that up to tenfold the number of sick notes were recorded by general practices in the northern than in the London study site, both in terms of actual number of certificates and as a rate per thousand adults with CMHPs.

Table 4

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<tbody>
<tr>
<td><strong>Northern study site locality:</strong> total antidepressant drugs</td>
<td>209 082</td>
<td>212 898</td>
<td>219 657</td>
<td>230 319</td>
</tr>
<tr>
<td>Adult population (ONS mid-year, estimated in thousands)</td>
<td>230.6</td>
<td>231.6</td>
<td>232.9</td>
<td>233.7</td>
</tr>
<tr>
<td>Px per thousand adult population</td>
<td>906.7</td>
<td>919.2</td>
<td>943.1</td>
<td>985.5</td>
</tr>
<tr>
<td><strong>London study site locality:</strong> total antidepressant drugs</td>
<td>74 932</td>
<td>76 259</td>
<td>76 769</td>
<td>84 650</td>
</tr>
<tr>
<td>Adult population (ONS mid-year, estimated in thousands)</td>
<td>191.4</td>
<td>191.5</td>
<td>190.3</td>
<td>189.9</td>
</tr>
<tr>
<td>Px per thousand adult population</td>
<td>391.5</td>
<td>398.2</td>
<td>403.4</td>
<td>445.8</td>
</tr>
<tr>
<td><strong>England:</strong> total antidepressant drugs</td>
<td>27 733 601</td>
<td>28 534 689</td>
<td>29 500 973</td>
<td>31 327 193</td>
</tr>
<tr>
<td>Adult population mid-year estimated (thousands)</td>
<td>40 054.6</td>
<td>40 356.2</td>
<td>40 753.1</td>
<td>41 089.0</td>
</tr>
<tr>
<td>Px per thousand adult population</td>
<td>692.4</td>
<td>707.1</td>
<td>723.9</td>
<td>762.4</td>
</tr>
</tbody>
</table>

Population estimates source: ONS
Prescription data source: Prescription Pricing Division, NHS Business Services Authority

Discussions

Principal findings

Routine primary care data provide insights into different health needs in these two localities. The demographics, trends in recorded episodes of CMHPs and antidepressant prescribing differ between the two areas, as do their rates of sickness certification.

The localities have very different population characteristics: the population of the northern site is predominantly white with an age–sex profile similar to that of England, whilst over 60% of the population of the London site are from an ethnic minority background, with many more people aged between 25 and 45 and fewer people aged 50 and above.

The recorded episodes of CMHPs in primary care per thousand adults were rising for the total study population between 2004 and 2007, with a greater upward trend for the northern site than for the London site of this study. The prescriptions of antidepressants, anxiolytics and hypnotics per thousand adults were also rising for the northern site but not for the London site. The annual rates of prescription of antidepressants, anxiolytics and hypnotics per thousand adults were lower than that national data for the localities.
Sickness absence is dependent on other socio-economic factors of the locality, and not just being ill. Social expectations and general practitioner attitudes to sickness certificates all play a role in the number and duration of sick notes issued. The recorded rates of medical certificates per thousand adults with CMHPs increased steadily over the four calendar years for the sample population in the London site. In the northern site the rates fluctuated, with a surge in 2005 the result of local socio-economic factors beyond the scope of the present paper.

Implications of the findings

Very different population profiles provide insight into why disease profiles might be different, and disparities in the ways that conditions are presented and represented in the clinical computer records.

Electronic records held in general practice information systems potentially offer localities which are looking to commission insights into local health needs analysis. They also offer the possibility of evaluating the impact of new service models at individual patient, practice and population levels in order to inform commissioning decisions. The present study has shown the potential for using electronic data in primary care to explore the local trends in the recorded episodes of CMHPs and some of their management in primary care. Commissioning consortia need to develop the capacity and capability to investigate local health needs and trends against national norms or meaningful comparative localities, using their unique primary care datasets to inform commissioning.

Comparison with the literature

Deriving change in incidence and prevalence from longitudinal routine data is an emerging discipline. This has been done for diabetes and heart disease; but flux in the population creates challenges. The change in data recording in 2007 may have reflected changes to the P4P in 2006. This assumption has been made in other studies.

The rate of prescription of antidepressants, anxiolytics or hypnotics and recorded episodes of CMHPs per thousand adults is much higher in the northern site than the London site. The rate of recorded numbers of medical certificates per thousand adults with CMHPs in the northern site is more than ten times that of the London site. The Psychiatric Morbidity Survey among adults living in private households found that the prevalence of depression and anxiety disorders are broadly similar in the two regions (the smallest stratifying unit of area available) in which the two study sites are located; and both regions have a higher prevalence of depression and anxiety disorders than is the average for England, Scotland and Wales. The finding from the present study suggests significant unmet mental health needs in the London study site.

Limitations of the method

Some general practice data is complete and accurate in some areas (e.g. prescribing, laboratory test results and chronic disease diagnosis) but weaker in others (e.g. encounter data and sick notes); we have documented common difficulties across several localities.
Technical problems include the different ways the various brands of computer system interface with the same coding system, and the use of system specific codes; no standard has ever been mandated for the recording of encounter data.

There are methodological issues in using general practice data for analysis of health trends. The principal issue is the turnover of practice list population with patients leaving and new patients joining the practice. Patients who left the practice or died are lost to the sample, resulting in the data for a smaller list population from earlier years being available for analysis. The methodological decision to collect data only for the first six months of each of the four calendar years is likely to result in an undercounting of episodes of CMHPs, prescriptions or medical certificates, as newly registered patients who joined the practice in the latter part of the calendar year would have no clinical records in the earlier months. The date of registration offers a means to disentangle the changes in denominator population over time. However, we have no information on people who left the practice, and could not assess their impact on the observed trend, which is likely to vary from locality to locality depending on the characteristics and economy of the locality. For example, in towns with declining economies, people who leave are likely to be people of working age (and likely to be healthier people) who are seeking work elsewhere.

Another issue in using general practice data in trend analysis is the overlap of data in sequential sweeps of data extraction. For example, the latest 15 records of antidepressant prescriptions or the ten latest medical certificates extracted at one point in time may overlap with some records extracted 12 months later. Vectorising of data, with careful use of associated dates, offers a means to ensure that no double counting could occur.

Call for further research

A disadvantage of cross-sectional data is that it does not provide evidence about the causal direction of many of the interesting associations found. Information collected routinely as part of clinical consultations over time offers longitudinal data for health researchers to explore health trends and causal direction for many conditions without the systematic biases of retrospective recall. The longitudinal nature of primary care data offers the opportunity to follow up longer-term impacts of health or policy initiatives at local or national level at relatively economical cost. A case in mind is the evaluation of IAPT; a longer term follow-up of people referred to IAPT services without the biases of retrospective recall would be of value to the effective management of resources.

Conclusion

Basic demographic, diagnostic and prescribing data are of high quality in primary care. The trends, as shown here in the incidence and prevalence of CMHPs, are readily demonstrated from routine data. They could be used more to understand local health needs and help to inform commissioning decisions. However, when looking retrospectively at routine general practice data this effectively become an analysis of ‘survivors’ who remain with the practice. Those who have left the practice or died are lost to the analysis and need to be taken into consideration.

Analysed routine data is a powerful tool for understanding population demographics, diseases, use of medication and sickness absence – where data quality is good, and where adjustment is made when comparing historic with current data.

ACKNOWLEDGEMENTS

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**CONFLICTS OF INTEREST**

None.

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Appendix 1

READ codes used for the diagnosis of depression

H/O: depression
Depressed
Depressed mood
Single major depressive episode
Anxiety with depression
Neurotic depression reactive type
Depressive disorder NEC
Chronic depression
Depressive episode
Mild depressive episode
Severe depressive episode without psychotic symptoms
Depressive episode, unspecified
Recurrent depressive disorder
Recurrent depressive disorder, currently in remission
Dysthymia
Mixed anxiety and depressive disorder
Moderate depressive episode

READ codes used for anxiety, phobia, panic and obsessive–compulsive disorders

Stress at home
Problems at work
Nerves – nervousness
Stress related problem
Panic disorder
Generalised anxiety disorder
Agoraphobia with panic attacks
Acute reaction to stress
Stress reaction causing mixed disturbance of emotion and conduct
Acute stress reaction NOS
Agoraphobia
Generalised anxiety disorder
Mixed anxiety and depressive disorder
Anxiety disorder, unspecified
Post-traumatic stress disorder
Obsessive–compulsive disorder