NHS Health Scotland

Who is least likely to attend? An analysis of outpatient appointment DNA data in NHS Greater Glasgow & Clyde

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1 Summary

Aim

This project aimed to identify potential inequities in access to NHS services in NHS Greater Glasgow & Clyde (NHS GGC) by identifying differences in the risk of patients not attending outpatient appointments.

Methods

Routinely collected annual data on Did Not Attends (DNAs) for first outpatient appointments in Scotland were obtained from the Information Services Division (ISD) of NHS National Services Scotland (NSS) for 10 financial years (2002/03–2011/12). First, and not follow up (return) appointments, were used because of quality issues with the data for the later appointments. An appointment was defined as a Did Not Attend (DNA) if a patient did not attend and gave no prior warning. The data were supplied in crude and aggregated form, including the age-standardised percentage of appointments resulting in a DNA. The data were grouped by sex, age group, clinical specialty and Scottish area deprivation decile (Scottish Index of Multiple Deprivation (SIMD)).

Specialties were selected for analysis if they were found to have a large enough number of DNAs to enable analysis and these included: dental; dermatology; ear, nose and throat; gastroenterology; general medicine; general psychiatry; general surgery; gynaecology; neurology; and urology. Trends over the 10-year period were examined by sex, age group by sex and SIMD by sex.

Results

Twelve per cent of all outpatient appointments between 2002/03 and 2011/12 resulted in a DNA and in general, the patterning of DNAs by deprivation, sex and age was stable. Patterns in DNA reflected findings at the national level, however, NHS GGC experienced higher levels of DNA risk. There was a slight decline in DNA risk over time.

The risk of DNA was higher for men than women overall and for men within a variety of population groupings:

- **SIMD:** within the most deprived decile the risk for females was 15% and was 18% for males; within the least deprived deciles the risk for females was 7% and was 8% for males.

- **age group:** for those aged 15–29 years the risk for females was 15% and 19% for males; while for those aged 65–74 years the risk for females was 7% and 8% for males.
- **specialty:** for all specialties the risk for females was 11% and 14% for males; whilst for general psychiatry the risk for females 22% and 24% for males.

Although males were at higher risk of DNA, females accounted for a bigger percentage of all DNAs as a result of the greater number of appointments they had.

The DNA risk increased with greater deprivation in both men and women and those in SIMD decile 1 accounted for the greatest number of appointments and DNAs.

Outpatients in general psychiatry had the greatest risk of DNA (females 22%; males 24%) compared to the mean for all specialties (females 11%; males 14%). Outpatients with gastroenterology (females 15%; males 19%) and neurology appointments (females 14%; males 17%) were also at higher than average risk of DNA. General psychiatry also had the most marked social patterning in the provision of appointments with populations in the most deprived areas accounting for the majority of appointments. This suggests that the DNAs for general psychiatry have one of the largest population impacts on inequities in access out of all the 10 selected specialties.

In general, the patterning of DNAs by deprivation, sex, age and specialty was stable from 2002/03 to 2011/12, although there was a slight decline in DNA risk over time (14% to 12%).

Implications

More work is required to understand why DNAs occur differentially and this may help us reduce DNAs in the future. Both patient and service factors can contribute to DNAs and there are a number of practical steps that services can take to improve patient attendance and ultimately, retention across their care pathway. The results from this report highlight those population groups least likely to attend first outpatient appointments, and that these groups tend to be correlated with populations with poorer health, lower resource or more complex needs. To maximise services' effectiveness in mitigating the effects of health inequalities it is important that, as one of many actions towards achieving this outcome, universal approaches to reduce DNAs are both tailored and applied with a scale and intensity proportionate to need.

A number of existing and developing initiatives exist to support the reduction of DNAs. A number of local Health Boards are already using patient reminder systems such as the NHS 24 Patient Reminder Service. The National Services Scotland (NSS) Discovery tool, due for launch in April 2015, will enable NHS Boards to

monitor local DNA rates and potentially the impact of any new interventions by a number of factors including: DNA percentage, specialty and by quarter. Further information is available at: **www.nssdiscovery.scot.nhs.uk**

Conclusions

This study has shown that for every appointment, the risk of DNA is highest among those living in more deprived areas, males, young adults and in general psychiatry settings. General psychiatry also had the largest difference in number of appointments between the least and most deprived population deciles, suggesting that general psychiatry may be among the largest contributors to inequity in access out of the ten specialties we studied. The patterning of DNAs has been relatively stable for the past 10 years. Further work to examine why there is variation in the risk of DNA between groups is required, including potential differences in the barriers they face and differences in needs.

2 Definitions

An appointment was defined as a **Did Not Attend** (DNA) if a patient did not attend and gave no prior warning.[1]

An **outpatient attendance** was defined as the occasion of a patient attending a consultant or other medical clinic or meeting with a consultant or senior member of his/her team outside a clinic session.

If the patient was a new outpatient then the attendance was a **new (first)** outpatient attendance, otherwise it was a **follow-up (return)** outpatient attendance.[2]

Specialty groups were defined as those specialties with clinical commonalities as categorised by ISD.

3 Introduction

There were 494,875 new (first) outpatient appointments (excluding Emergency Departments) in Greater Glasgow and Clyde in 2011/12. Of those, 12% were coded as DNAs. Describing differences in DNA rates between population groups can help our understanding of patterns of non-uptake of health care among different population groups and may represent inequalities in access to healthcare. Definitions of inequality require an injustice to be present. Equity – or fairness – in service accessibility (from the points of view of use, experience and benefit) is recognised in the literature as a likely contributor to the mitigation of health inequalities.[3-5] NHS Health Scotland defines health inequalities as follows:

> 'Health inequalities are systematic differences in health between different groups within a society, which are potentially avoidable and deemed unacceptable,'[6]

DNAs can be caused by a variety of factors. Structural service factors relating to inaccessibility, including physical location,[7] opening hours[8] and barriers such as language, stigma and cultural differences,[9 10] may all be important. However, the interplay between the accessibility of a service and the perceived worthiness of the attendee, or 'candidacy'[11 12] (both self-perceived and as perceived by the service provider) can also lead to differences in how likely particular groups are to 'get into, through and on' with services.[13] Morbidity differences can also affect attendance where the illness reduces the ability to navigate access to the healthcare system.[14] Variation in social and economic circumstances may mean certain times are inconvenient,[15] and/or that the perceived importance of the appointment may vary

between social groups in and of itself, or in the context of wider life complexities. Within psychiatry for example, one study found that alcohol and drug users had particularly high DNA rates.[14]

While it is recognised that services may employ different levels of over-appointment in the expectation that some DNAs will occur, DNAs can have an adverse effect on both service providers and patients. NHS Health Scotland's Equally Well Review of Equality Health Data Needs in Scotland[16] stated:

- Each outpatient appointment DNA costs NHSScotland an estimated mean of £120 (2012 figure).[17]
- If patients fail to attend appointments the circumstances of the DNA and the urgency of the treatment will affect whether the patient is referred back to their GP or put back on the waiting list.
- Patients may also have a delay in treatment if their consultation cannot go ahead as planned if they had particular needs that required to be catered for at the appointment (e.g. translation services).

Ensuring that all groups access services according to their needs has the potential to reduce health inequalities and ensure equity between groups. A number of national and local initiatives are underway to improve equity in access to outpatient appointments: these include the Transforming Outpatients Programme[18]; Patient-Focussed booking advocated within the Delivering Waiting Times CEL (2012)[19]; and Management of Waiting Lists: Patients with additional support needs.[20]

4 Aim of report

This project aimed to identify potential inequities in access to NHS services in Greater Glasgow and Clyde by identifying differences in the risk of not attending outpatient appointments.

To that end, the objective was to describe the population rates and risk per outpatient appointment of DNA, by age, sex and area deprivation (using the Scottish Index of Multiple Deprivation (SIMD))[21] for all NHS outpatient appointments.

5 Methods

Data source

An appointment was defined as a DNA if a patient did not attend and gave no prior warning.[1]

Aggregated first outpatient appointment DNA data were obtained from the Information Services Division (ISD) of NHS National Services Scotland for each financial year from 2002/03 to 2011/12 for NHS Greater Glasgow and Clyde (including both numerators and denominators and 95% confidence intervals calculated using Poisson distribution[22]) for all specialties and ten selected specialties as follows:

a) number and percentage of DNAs by age group (0–14 years, 15–29 years, 30–44 years, 45–59 years, 60–64 years, 65–74 years, 75–89 years, 90+ years) by sex
b) number and percentage of DNAs by sex
c) number and percentage of DNAs by SIMD deciles by sex

Data were not provided at individual level and where there were categories containing less than five DNAs the data were suppressed. First, and not second or third appointments were used because of quality issues with the data for the later appointments. There were missing demographic data for a small number of DNAs and these were excluded from the analysis.

Data analysis

For the analyses of DNAs by age strata, data were analysed in 15-year age bands with the exception of one five year age band (60–64 years) and one 10-year age band (65–74 years) to account for the working age difference for males and females. Females in this sample were eligible to receive state pension five years earlier than the males, at age 60 years.

Scottish Index of Multiple Deprivation (SIMD) deciles were used as reporting categories for DNA percentage. The deciles were obtained by ranking the 6,505 Scottish datazones from most to least deprived, then splitting the ranked datazones into ten deciles with approximately 10% of the population in each decile.[23] The most deprived were coded ‘1’ and the least deprived coded ‘10’.

Age standardisation

The percentage of new outpatient appointments that were DNAs (DNA percentage) were age-standardised to ensure that the comparisons between the population groups were not distorted by the proportions of the population in each age group.

DNA percentage

The DNA percentages were age-standardised by ISD (except for the results by age group) using a reference population of the first outpatient appointment numbers for Scotland 2002/03. This allowed us to compare DNAs by age standardised percentage (ASP) over the 10-year period.

Specialties

Specialties were selected for analysis based on NHSScotland national data if they were found to have a large enough number of DNAs to enable analysis (>4,000 in at least two of the previous three years).

Specialties with less than a total of 4,000 DNAs were excluded because they were likely to yield small numbers for smaller NHS Boards and area classifications (urban-rural), thereby making those estimates too imprecise for interpretation. The included specialties were dental; dermatology; ear, nose and throat; gastroenterology; general medicine; general psychiatry; general surgery; gynaecology; neurology; and urology.

Local analyses were offered to all local NHS Boards in Scotland to provide a local comparison to a national report of NHSScotland DNAs during the same period. Three reports were requested and produced.[24-26]

We use the term NHSScotland to collectively define all NHS Health Boards in Scotland.

6 Results

Background information

Twelve per cent of all first outpatient appointments in NHS Greater Glasgow & Clyde (NHS GGC) between 2002/03 and 2011/12 resulted in a DNA (Table 1).

Table 1: First outpatient appointment and DNA numbers and percentages for NHS GGC (2002/03–2011/12)

Total number of outpatient appointments (2002/03–2011/12)	4,620,124
Total number of DNAs (2002/03–2011/12)	564,680
Crude Percentage DNA (2002/03–2011/12)	12.0%

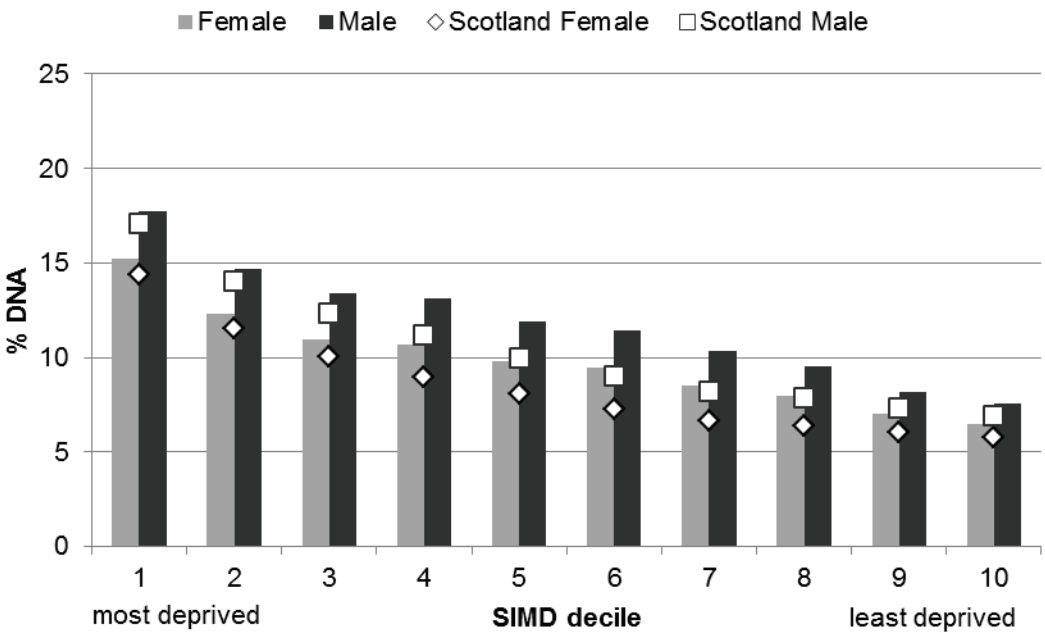
The risk of DNA reduced between 2002/03 and 2004/05 (14% to 12%), however, there has been little change thereafter. In this paper we report only the time trends where these show a change over time.

DNA risk

SIMD and sex

The risk of DNA was greater with increasing deprivation, with the risk higher for men than women in each decile (Figure 1). In the most deprived decile, 15% and 18% of appointments for females and males respectively resulted in a DNA but only 7% and 8% in the least deprived decile. The risk of DNA in NHS GGC was slightly above those for Scotland overall in the most deprived deciles, however, as deprivation decreased, a greater risk of DNA was evident (especially for men) at the local level compared to Scotland overall.

Figure 1: Crude percentage DNA by Scottish SIMD deciles and sex for Scotland and NHS GGC (2002/03–2011/12 combined for all specialties)



There was a gradual decline in the percentage of outpatient appointments resulting in DNA over time across SIMD deciles, although the differences between deciles remained similar for men and women (Figures 2 and 3).

Figure 2: Trend in age-adjusted percentage DNA (with 95% confidence intervals) by highest and lowest Scottish SIMD deciles for females in NHS GGC (2002/03–2011/12 combined for all specialties)

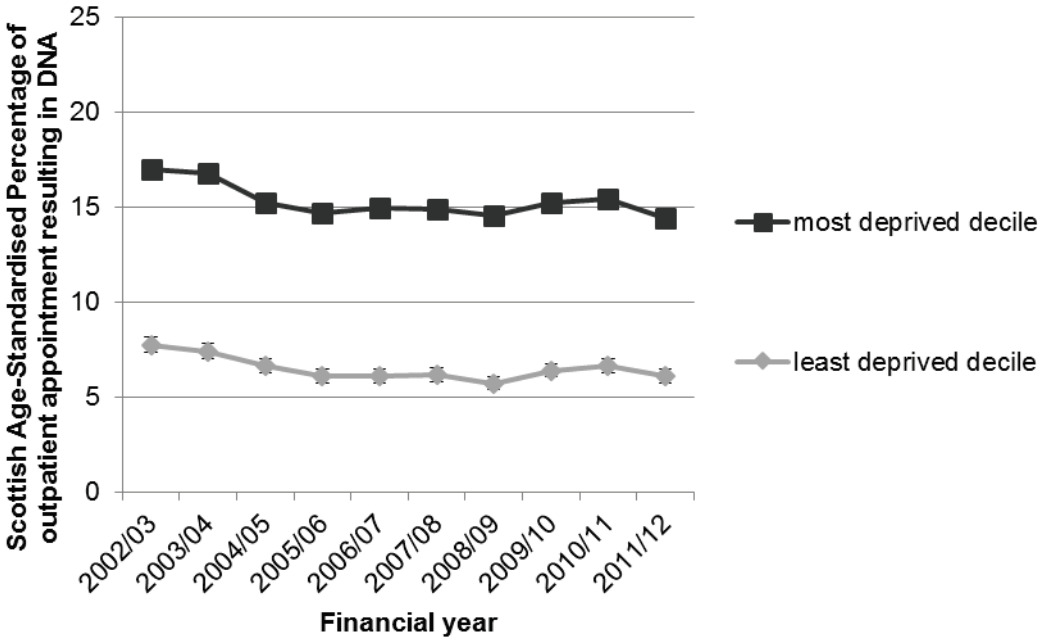


Figure 3: Trend in age-adjusted percentage DNA (with 95% confidence intervals) by highest and lowest Scottish SIMD deciles for males in NHS GGC (2002/03-2011/12 combined for all specialties)

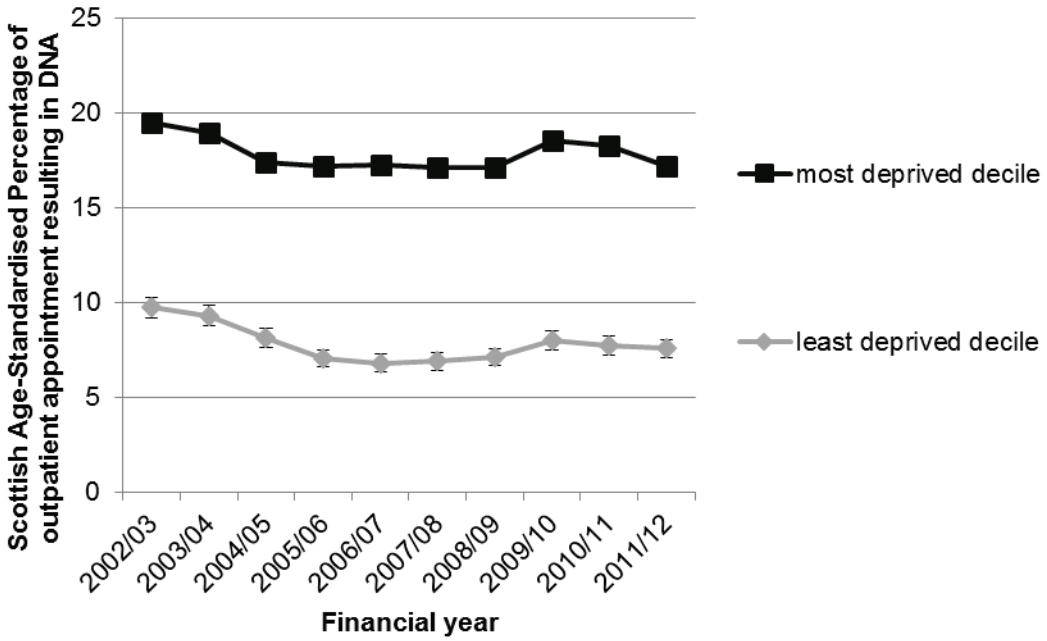


Table 2 provides the crude number of DNAs and percentages of appointments resulting in DNA by sex and SIMD decile. This shows that, although males with appointments were more at risk of DNA, females accounted for a bigger percentage of the total DNAs across all deprivation deciles (owing to females holding a larger proportion of overall appointments).

For females and males, and across all specialties, there were more appointments in the most deprived decile compared to the least deprived decile.

The percentage of appointments that became DNAs was between seven and ten percentage points higher for females and males in the most deprived decile compared to the least deprived. Across all specialties, the risk of DNA was 14% for females and 17% for males in the most deprived decile, while in the least deprived these were 6% and 8%. Aggregating the deciles into quintiles[a], the two most deprived quintiles (deciles 1 – 4) accounted for 71% of all appointments resulting in DNAs.

The appointment rate for each decile is higher for females than for males. Although there was fluctuation in the trend across deciles, the rate for both males and females in the most deprived decile was highest out of all deciles. The least deprived decile

[a] Quintiles split up the dataset into 5 groups, each containing 20% of the data. Deciles split up the dataset into 10 groups, each containing 10% of the data.

did not show the lowest appointment rate, but the less deprived deciles (nine and ten) tended to have the lowest rates.

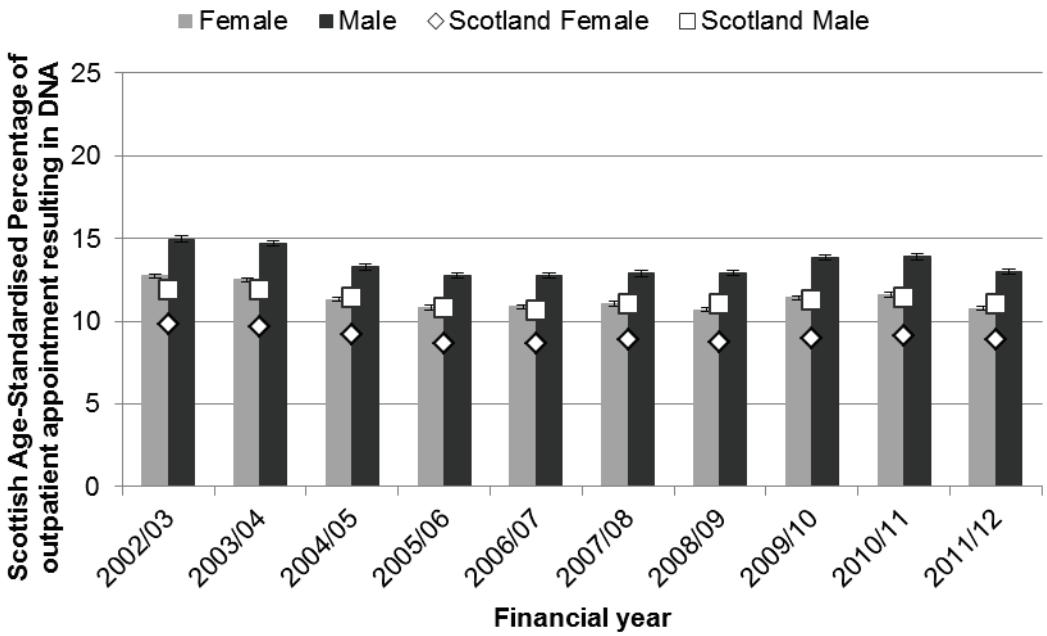
Table 2: Crude percentage of total DNAs and age standardised percentage DNA occurring within each Scottish SIMD and sex strata for NHS GGC (2011/12 combined for all specialties)

Scottish SIMD decile	Female appointments	Female DNAs	Age-standardised % DNA (female)	Scotland age-standardised % of DNA (female)	Crude appointment rate per 1,000 population (female)	% of total female DNAs	Male appointments	Male DNAs	Age-standardised % DNA (male)	Scotland male age-standardised % of DNA	Crude appointment rate per 1,000 population (male)	% of total male DNAs
1 most deprived	81,370	11,583	14.0	14.0	573.0	20.0	58,316	9,939	17.0	17.0	453.4	17.0
2	43,136	5,010	12.0	11.0	510.3	8.8	29,508	4,121	14.0	14.0	390.1	7.2
3	27,106	2,910	11.0	10.0	479.4	5.1	18,849	2,519	14.0	13.0	358.7	4.4
4	24,303	2,590	11.0	9.2	456.2	4.5	17,103	2,196	13.0	12.0	336.5	3.8
5	21,436	2,068	9.6	8.2	423.3	3.6	14,448	1,689	12.0	10.0	304.8	3.0
6	15,885	1,440	9.0	7.4	385.4	2.5	11,116	1,283	11.0	9.3	279.9	2.2
7	14,940	1,221	8.3	6.7	432.2	2.1	10,193	935	9.4	8.3	317.1	1.6
8	20,957	1,593	7.7	6.3	399.3	2.8	14,091	1,245	9.0	8.0	288.0	2.2
9	21,842	1,427	6.8	6.1	357.2	2.5	15,196	1,142	7.9	7.3	266.1	2.0
10 least deprived	20,593	1,261	6.3	5.6	381.3	2.2	14,487	1,054	7.6	7.1	286.2	1.8
Total	291,568	31,103	10.8	8.9	462.5	54.0	203,307	26,123	13.0	11.0	348.4	46.0

Sex

Females consistently accounted for over 50% of DNAs in the time period. This is related to the greater number of appointments for females than for males. However, the risk of DNA was higher in males per appointment (14% compared to 11%).

Figure 4: Trend in age-adjusted percentage DNA (with 95% confidence intervals) for females and males for Scotland and NHS GGC (2002/03–2011/12 combined for all specialties)

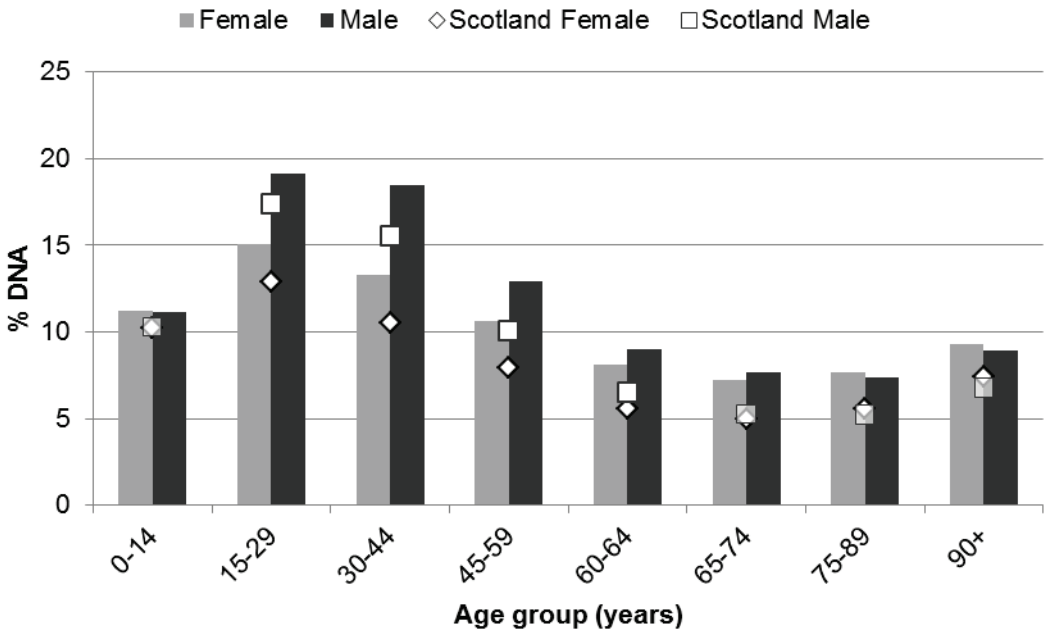


In 2011/12 the risk of DNA was 11% for females and 13% for males (Figure 4). The risk of DNA has decreased from 2002/03 (females 13%; males 15%) but has remained relatively unchanged from 2005/06. NHS GGC had a consistently higher risk of DNA than NHSScotland (two percentage points for each sex in 2011/12) with little change in the difference over the time period.

Age group and sex

The age groups 15–29 years and 30–44 years had the highest risk of DNAs for both sexes (Figure 5) compared to the local mean (females 11%; males 14%) and this matched the pattern found at the national level.

Figure 5: Crude percentage DNA by age and sex for Scotland and NHS GGC (2002/03–2011/12 combined for all specialties)



For the majority of age groups, males had a higher risk of DNAs than females. This was especially so in the 15–29 years age group (males 19%; females 15%) and 30–44 years age group (males 19%; females 13%). Both sexes shared a similar patterning of DNAs across age bands. The difference in percentage DNA between age groups remained relatively constant over the10-year period. NHS GGC had a consistently higher risk of DNA than NHSScotland with little change in the difference over the time period.

Given the high risk of DNAs within the young adult male population it is useful to establish how the actual number of missed appointments compares with the rest of the population. Table 3 gives a breakdown of the number of appointments, DNAs and each age group's percentage of total DNAs for 2011/12. It shows that, although males had the highest DNA risk per appointment in the 15–29 years age group, males in the 30–44 years age groups had more DNAs than other males. Out of both sexes and all age groups, females aged 30–44 years had the most DNAs accounting for 15% of all DNAs in 2011/12.

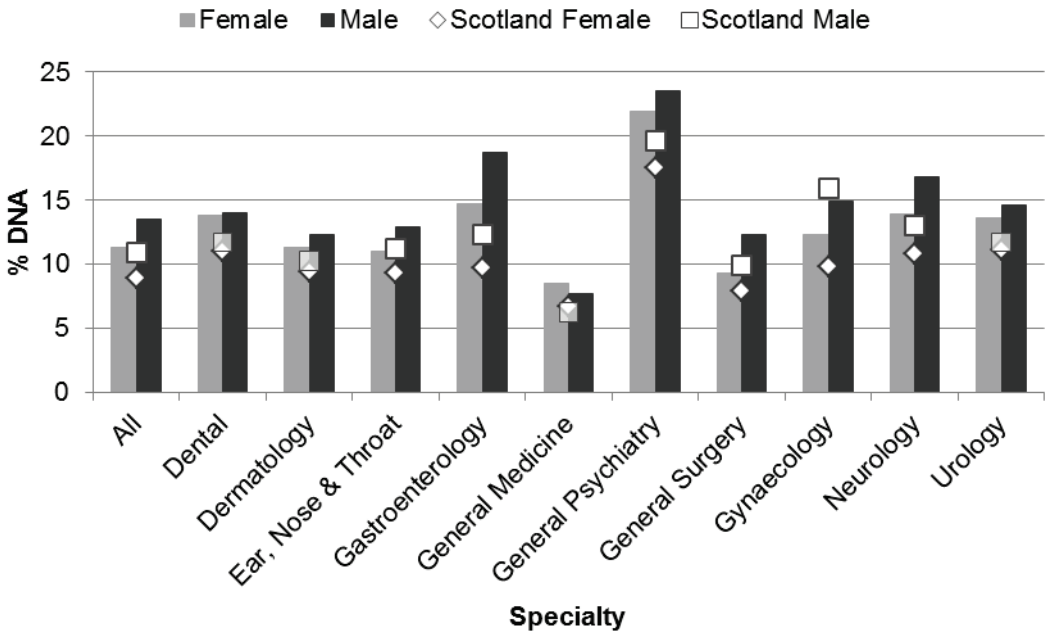
Table 3: Crude percentage of total DNAs and percentage DNA occurring within each age group for each sex for NHS GGC (2011/12 combined for all specialties)

Age group (years)	Female appointments	Female DNAs	Crude % DNA (female)	Scotland crude % DNA (female)	% of total female DNAs	Male appointments	Male DNAs	Crude % DNA (male)	Scotland crude % DNA (male)	% of total male DNAs
0–14	18,471	1,597	8.6	9.4	2.8	21,252	1,886	8.9	9.5	3.3
15–29	54,870	7,880	14.0	13.0	14.0	31,754	5,882	19.0	17.0	10.0
30–44	65,126	8,429	13.0	11.0	15.0	40,592	7,385	18.0	16.0	13.0
45–59	65,898	6,644	10.0	7.9	12.0	47,784	6,215	13.0	10.0	11.0
60–64	17,928	1,353	7.5	5.2	2.4	14,773	1,258	8.5	6.3	2.2
65–74	31,827	2,161	6.8	4.7	3.8	25,277	1,836	7.3	4.9	3.2
75–89	34,511	2,739	7.9	5.7	4.8	20,845	1,571	7.5	5.1	2.7
90+	2,937	300	10.0	7.7	0.5	1,030	90	8.7	6.2	0.2
Total	291,568	31,103	11.0	8.6	54.0	203,307	26,123	13.0	10.0	46.0

Specialties

Outpatient appointments in general psychiatry had the greatest risk of DNA out of all specialties considered within the 10-year period (Figure 6). This was also found at the national level (females 18%; males 20%), however NHS GGC experienced a higher level of DNAs. The pattern of specialties that had a higher risk of DNA than the mean for all specialties also followed the national pattern.

Figure 6: Percentage DNA for selected specialties in NHS GGC (2002/03–2011/12)



Over the ten year period, general psychiatry (females 22%; males 24%), gastroenterology (females 15%, males 19%) and neurology (females 14%; males 17%) had a crude DNA percentage greater than the mean for all specialties (females 11%; males 14%), showing a higher risk of DNA. Females with dental appointments (14%) were also at greater risk of DNA, as were men accessing gynaecology services (15%)[b]. In general medicine (females 8%; males 8%), outpatients had the least risk of DNA.

Most specialties followed the trend of males being at greater risk of DNA than females, other than general medicine.

Of the selected specialties in 2011/12, dermatology, and ear, nose and throat, had the greatest number of DNAs (Table 4) but the risk of DNA was close to the mean for all specialties. Gynaecology also had a large number of DNAs for females. The table also highlights differences between specialties. For instance, in general psychiatry males had over 10,000 fewer appointments than dermatology, yet only two fewer DNAs.

[b] Male attendance at gynaecology clinics may be a coding error (we were unable to verify this) but may reflect appointments by those who are considering or are in gender transition or invited to fertility clinics.

Table 4: Crude percentage of total DNAs and age standardised percentage DNA occurring within selected specialties for each sex in NHS GGC (2011/12)

Specialty	Female appointments	Female DNAs	Age-standardised % DNA (female)	Scotland female age-standardised % DNA	% of total female DNAs	Male appointments	Male DNAs	Age-standardised % DNA (male)	Scotland male age-standardised % DNA	% of total male DNAs
All	291,568	31,103	11.0	8.9	54.0	203,307	26,123	13.0	11.0	46.0
Dental	11,827	1,362	12.0	11.0	2.4	9,345	1,108	12.0	12.0	1.9
Dermatology	25,809	2,584	9.9	8.6	4.5	18,648	1,906	11.0	9.4	3.3
Ear, nose and throat	20,618	2,205	11.0	9.2	3.9	18,173	2,191	12.0	11.0	3.8
Gastroenterology	9,693	1,179	12.0	8.8	2.1	8,198	1,414	17.0	12.0	2.5
General medicine	5,143	540	11.0	8.4	0.9	3,099	275	8.5	7.2	0.5
General psychiatry	7,078	1,549	22.0	18.0	2.7	8,148	1,904	24.0	20.0	3.3
General surgery	6,428	531	8.4	7.4	0.9	3,605	414	12.0	9.5	0.7
Gynaecology	36,172	4,239	12.0	9.7	7.4	-	-	-	11.0	-
Neurology	6,884	949	14.0	11.0	1.7	5,480	935	17.0	13.0	1.6
Urology	7,006	987	14.0	11.0	1.7	14,788	2,215	15.0	13.0	3.9

There are differences in the patterning of appointments and DNAs by specialty and SIMD decile (Figures 7 and 8). Across all specialties, there were four times more appointments offered to people in the most deprived decile than those in the least deprived decile. The highest age-standardised percentage of appointments that were DNAs was found for general psychiatry (least deprived: women 20%[c], men 16%; most deprived: women 23%, men 26%).

[c] There was an unexpected rise in general psychiatry DNAs for women in the least deprived areas in 2011/12. In 2010/11 DNAs reduced to 11% from 15% in 2009/10.

Figure 7: Total attendances and DNAs for females and males in most deprived areas for selected specialties in NHS GGC (2011/12)

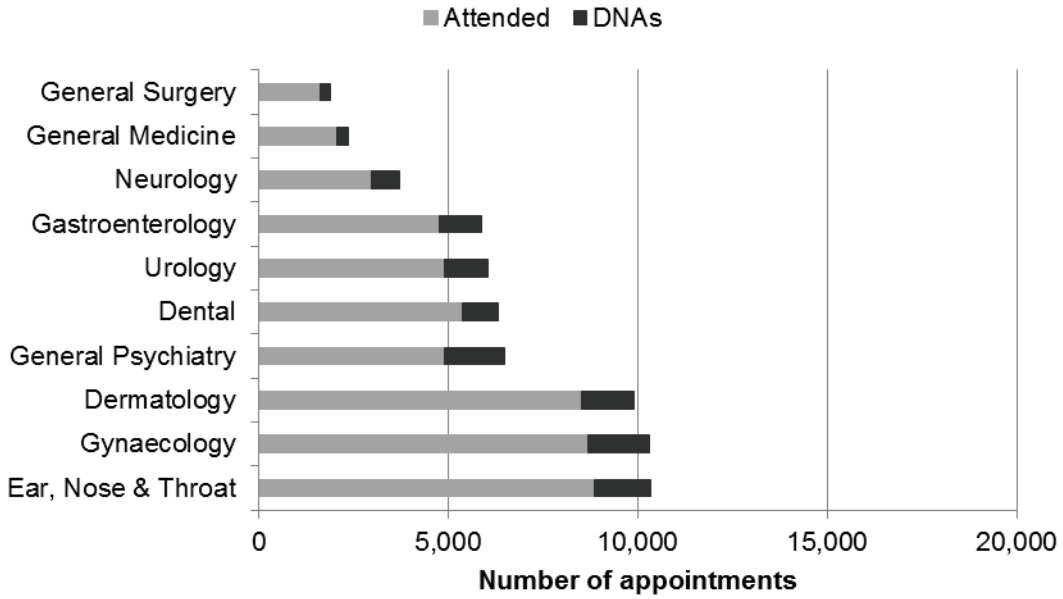
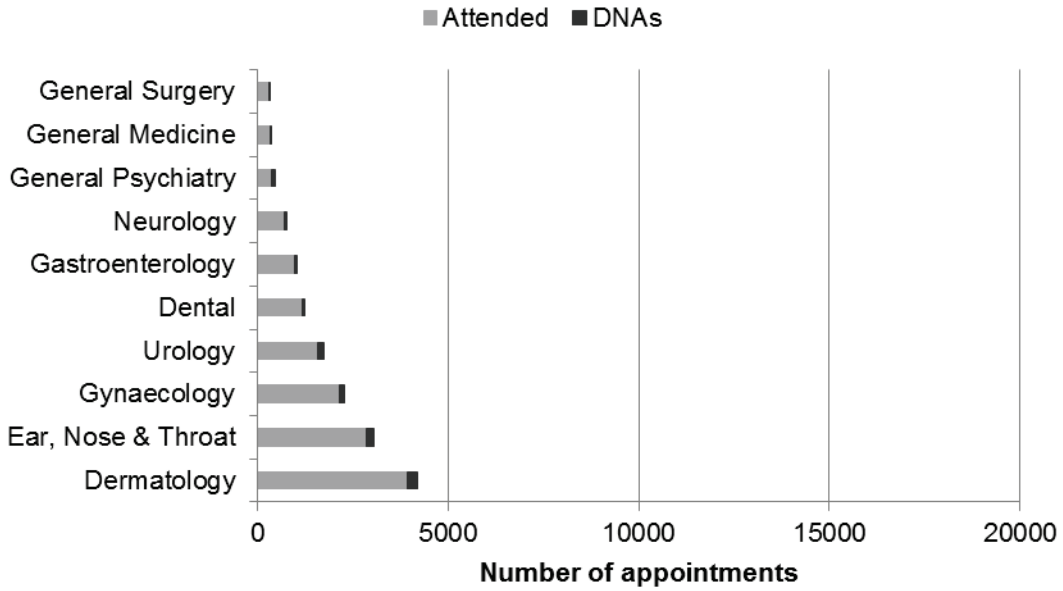


Figure 8: Total attendances and DNAs for females and males in least deprived areas for selected specialties in NHS GGC (2011/12)



General psychiatry also had the most marked social patterning in the provision of appointments, with the ratio between men in the most deprived and least deprived areas being 19:1. The ratio between women in the most deprived and least deprived areas was 11:1 (Table 5). The specialty with the least difference in appointments offered was dermatology (2.4:1) with general surgery the largest specialty other than psychiatry (6.4:1).

Table 5: Ratios (to a factor of 1) for number of appointments for most deprived compared to least deprived decile for selected specialties in NHS GGC (2011/12)

Specialty	Females	Males	All
Dermatology	2.4	2.3	2.4
Ear, nose and throat	3.5	3.3	3.4
Urology	4.4	3.2	3.5
Gynaecology	4.5	n/a[d]	4.5
General medicine	4.5	n/a	4.5
Neurology	5.0	4.7	4.9
Dental	4.8	5.7	5.2
Gastroenterology	5.5	6.0	5.7
General surgery	6.3	6.4	6.4
General psychiatry	11.0	19.0	15.0
All appointments across the 10 specialties	4.1	4.2	4.1

[d] n/a signifies that data were suppressed due to low numbers, therefore a calculation of ratio could not be made.

7 Discussion

Main results

There has been a slight decline in the risk of DNA over the ten year period however it has been relatively stable from 2005 to 2012. The patterning of DNAs matched that of Scotland as a whole, however NHS GGC experienced higher levels of DNA risk across all selected specialties, and across all SIMD deciles. This may be reflective of the population need at the local level.

For those with an appointment, the DNA risk was highest among those living in more deprived areas, males and young adults. In 2011/12, for all specialties, those in the most deprived areas, females and those aged 15–59 had the greatest number of appointments and DNAs. So, although the greatest number of DNAs was among women and those aged 15–59 years; to reduce inequities in healthcare access most efficiently, the greatest improvement effort to reduce DNAs would be best focused on young adults, especially men, living in the most deprived areas.

The two most deprived quintiles (deciles 1–4) accounted for 71% of all appointments resulting in DNAs, which highlights that inequities in access to healthcare could be best improved by facilitating better access for this population group.

Outpatients in general psychiatry had the greatest risk of DNA (females 22%; males 24%) compared to the mean for all specialties (females 11%; males 14%). Gastroenterology (females 15%; males 19%) and neurology (females 14%; males 17%) were also at greater risk of DNA.

Across the ten specialities analysed, the ratio between appointments offered in the most deprived decile and the least deprived decile was 4.0:1. This is likely to represent the interplay between the greater need in more deprived areas and differences in the demands for services and the availability and supply of services. In 2011/12 the highest age standardised percentage of appointments that were DNAs was found for general psychiatry (least deprived: females 20%[e], males 16%; most deprived: females 24%, males 26%). General psychiatry also had the most marked social patterning in the provision of appointments. The ratio between appointments offered to men in the most deprived and least deprived areas was 19:1, and for women the ratio was 11:1. The specialty with the least difference in appointments offered was dermatology (a ratio of 2.4:1) with general surgery the largest ratio other than psychiatry (at 6.4:1). This means that the DNAs for general psychiatry have one of the largest population impacts on inequity in access out of all the 10 selected specialties.

[e] There was an unexpected rise in general psychiatry DNAs for women in the least deprived areas in 2011/12. In 2010/11 DNAs reduced to 11% from 15% in 2009/10.

Strengths and weaknesses

Strengths

Our data covered all NHS outpatient appointments in NHS Greater Glasgow & Clyde over a 10-year period. These data are likely to be complete as they form part of a central registry using routine administrative data returns. When examining the risk of DNA by particular characteristics of the population we were able to standardise or stratify by other potentially important confounders (we were able to standardise by age; and also stratify by age, sex and SIMD decile).

Weaknesses

The results should be interpreted with caution because the risk of DNA may reflect differences in how services are provided in different areas and how this is recorded (e.g. whether services are provided via primary or secondary care). We were able to analyse the data for only a limited number of equality groups (age group and sex) because of a lack of available data by other characteristics. The SIMD includes aspects of income deprivation, rurality/remoteness and health outcomes and is, therefore, not an ideal measure of socioeconomic deprivation for our purpose. In the future, further analysis might benefit from using only the income deprivation domain of SIMD and Board-specific deciles. We did not have individual measures of deprivation available to us and we did not perform multivariate analysis to consider multiple characteristics together (e.g. SIMD, sex and age). First, and not follow up (return) appointments were used because of quality issues with the data for the later appointments. The circumstances of the DNA and the urgency of the treatment will affect whether the patient is referred back to their GP or put back on the waiting list, therefore, it may be that second or third appointment patterns would look different. The DNA risk for males in gynaecology relates to a small number of appointments. Male attendance at gynaecology clinics may be a coding error (we were unable to verify this) but may reflect appointments by those who are considering or are in gender transition or invited to fertility clinics.

How our results fit with other evidence

Population groups at higher risk of DNA in NHS Greater Glasgow & Clyde were similar to those at NHSScotland as reported in our national report.[27]

In relation to the patterning of outpatient appointments, the SIMD profile of both appointments made and resulting in a DNA challenges earlier reporting that the socio-economic profile of the number of NHSScotland outpatient appointments is relatively ‘flat’.[28] It demonstrates well the inverse care law[29] in highlighting a profile of need that does not progress throughout the system, at least at the first appointment stage. These findings provide some insight into the profile of need and the basis for targeted work to support improved equity in access to services.

Krieger suggests that differences in outcomes for equality groups could be driven by two possible classes of cause.[30] First are the equality characteristics of individuals, which can confer genetic and biological vulnerabilities and are associated with culturally determined health-related behaviours. Second, the ways society discriminates (intentionally or not) against people with those characteristics may bring about material disadvantage. Social action may correct the effects of both discrimination and any remediable biological inequalities. In studies researching reasons for DNA, service and patient factors have been identified, though not always explicitly classified, into these two groups. Service factors include appointment timings[8 31] service location,[7] and the waiting time for the appointment.[32] Patient factors include youth and male gender,[33] addiction problems[14 34] being too ill to attend[35] and human error (forgetting).[15 36] Possible reasons for DNA can also be divided into structural factors and equality group factors. Structural factors embrace material circumstances such as poverty[35] and deprivation,[15] and factors closely related to this, such as access to transport and services.[35 36] Inequality/equality group factors point to behaviours determined by group characteristics associated with differing roles, norms, resource and values in distinct population strata. These include how services respond to different cultural understandings and language needs,[9 10] and gender-related needs and power differentials,[36] as well as in factors relating to life circumstance such as employment status, income level and educational attainment.[37] These four factors (service, patient, equality group and structural) interact, and it is possible to envisage four potential classes of explanations for DNA:

1 Structural patient factors: These are the impacts of poverty and deprivation on patients which make it more likely that they will DNA.[38] This may be realised through access to the resources (both material and non-material) required to attend (e.g. transport,[35 36] work flexibility,[39] family commitments[15] and candidacy[11 12]); and differences in the severity of illness[15 34] which may impact on the ability of individuals to attend.

2 Equality group patient factors: These relate to how people within particular equality groups are treated by the services and aspects of lived experience which differ between groups. Younger adults have been found to be associated with a higher risk of DNA in other countries[34] as well as the UK, (e.g. a similar pattern is seen in the US).[14 40] Increasing age has been found to be associated with a lower tendency to DNA in the UK.[15] For some ethnic and religious groups, the effects of specific cultures may add barriers within the peer group around the stigma of illness.[41-44] Holding health knowledge and beliefs[45-48] that are different from those of generally accepted medical science may cause a disconnect between the solutions offered by health professionals and those deemed effective by patients.

3 Structural service factors: These include: the timing of appointments;[8 49] the time to wait for the appointment to start once arrived at the venue; the distance of the health care venue from home;[50 51] and the offer of a choice of individual health professional.[52] For public services in general the capacity of public transport systems could affect patients' ability to attend appointments.[35] DNA may be partially due to service design, such as inconvenient timing which may especially affect certain groups such as working age people and those with both work and caring responsibilities.[15]

4 Equality group service factors: These include discriminatory attitudes within a service (explicit or implicit) which may affect patients' willingness to both make and attend medical appointments. Discrimination by service providers is a service rather than a patient factor. The adaptation of access arrangements for equality groups falls within this category. For example people with disabilities may require adaptations to help sensory impairment,[53] and ethnic minorities may need information leaflets to be translated, and require interpreting services in consultations.[54]

This is an imperfect classification as some factors are not exclusive to one category (e.g. 'choice of individual health professional' and 'candidacy' could be both service- and patient-related). However, our four part classification provides a framework for understanding some of the possible causes of DNA. The downward gradient we found with decreasing deprivation is a structural-patient factor, while the variation by specialty may result from factors in all four classifications.

If DNAs are to be reduced, services may need to change their procedures. Possible changes might include different appointment timing systems, greater patient choice of health professional, and support for people with additional needs (e.g. informing patients who struggle with reading about their appointments in an alternative way). Among interventions that may reduce the rate of missed appointments, open access scheduling has been found effective for infant well child care visits,[31] but may suit emergency and acute problems better than chronic illnesses where patients may have to book time off work or arrange childcare. Other interventions found to be effective in reducing DNA risk include reminder systems for already booked appointments, using text messages and telephoning.[33 55] Reminders are recognised as part of patient focussed booking which is recommended best practice in Scotland.[19] The inclusion of data on additional needs and on ethnicity by referrers is required in Scottish government waiting times guidance.[19] This is labour intensive for services but these data might be used to contribute further to existing understanding about the needs of more at risk populations where a targeted approach of effective interventions to support attendance could have an impact.

Implications

More work is required to understand why DNAs occur differentially and this may help us reduce DNAs in the future. For example more work is required to understand the differences in DNA risk for specialties, sexes, age groups and in urban and rural areas. The four category framework we put forward above would be a way of planning further research and designing and testing further interventions. Most ethnicity and health research in the UK has concentrated on cultural and genetic differences rather than on material disadvantage.[56]

A number of existing and developing initiatives exist to support the reduction of DNAs. A number of local Health Boards are already using patient reminder systems such as the NHS 24 Patient Reminder Service,[57] as outlined by the NHSScotland Quality Improvement Hub.[58]

The Transforming Outpatient Services Programme supported by the Scottish Government's Quality and Efficiency Support Team (QuEST) aims in 2014/15 to support NHS Boards to increase the adoption and spread of improved booking practices and use of reminder services in outpatient services. It has developed a Patient Reminder Services Change Package[18 59 60] to better enable patients to utilise appointments and to support NHS Boards to reduce the number of Did Not Attends (DNAs). The range of actions includes the use of propensity tools to identify groups least likely to attend, and those specialties with high DNA volumes. The results from this report support the programme by highlighting those population groups least likely to attend first outpatient appointments, and support the identified need for targeted approaches by population group and within specialties. To support services' role in the reduction of health inequalities, it is important that actions to reduce DNAs are tailored, and undertaken with a scale and intensity proportionate to need.

Currently under development, the National Services Scotland (NSS) Discovery tool is due for completion by April 2015 and will enable NHS Boards to assess DNA rates by a number of factors, including percentage, specialty and by quarter. The Discovery Team have been engaging with Health Board nominees since May 2014, using improvement methodology to develop the tool over a six-stage cycle. Further information is available at: **www.nssdiscovery.scot.nhs.uk**

8 Conclusions

This study has shown that those living in more deprived areas, males, young adults and those accessing general psychiatry outpatient services were at greater risk of DNAs when they had an appointment. General psychiatry also had the largest difference in number of appointments between the least and most deprived population deciles. These factors together suggest general psychiatry may be among the largest contributors to inequity in access out of the 10 specialties we studied. These patterns have been relatively stable for the past 10 years. Further work to examine why these particular groups are at higher risk is required. This will include work to examine differences in the needs of these groups (e.g. different types of health problems or issues with negotiating through the health system) and differences in the services provided for them.

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