

Who is least likely to attend? An analysis of outpatient appointment DNA data in NHS Highland

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Campbell K
Millard A
McCartney G
McCullough S

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1 Summary

Aim

This project aimed to identify potential inequities in access to NHS services in NHS Highland 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

Just over 7% of all first outpatient appointments in NHS Highland between 2002/03 and 2011/12 resulted in a DNA. Patterns in DNA reflected findings at the national level, however, NHS Highland experienced lower overall 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 13% and 16% for males; within the least deprived deciles the risk for females was 4% and 6% for males.

- **age group:** for those aged 15–29 years the risk for females was 11% and for males was 16%; whilst for those aged 65–74 years the risk for females was 3% and 4% for males.
- **specialty:** for all specialties the risk for females was 7% and for males was 8%; whilst for general psychiatry the risk for females was 17% and 18% 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, however, those in SIMD deciles 5, 6 and 7 accounted for the greatest number of appointments and DNAs.

Outpatients in general psychiatry had the greatest risk of DNA (females 17%; males 18%) compared to the mean for all specialties (females 7%; males 8%). Outpatients in neurology (females 9%; males 12%) and dental (females 9%; males 10%) were also at higher than average risk of DNA. General psychiatry also had the most marked social patterning in the provision of appointments, with the ratio between populations in the most deprived and least deprived areas being 15:1. This suggests that the DNAs for general psychiatry have one of the largest population impacts on inequity in access out of all the ten selected specialties.

In general, the patterning of DNAs by deprivation, sex and age was stable from 2002/03 to 2011/12. Patterning by specialty was less stable with the exception of general psychiatry, which almost always had the highest risk of DNA (gastroenterology had the highest risk in 2003/04).

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 10 specialties we studied. The patterning of DNAs by these groups 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 100,649 new (first) outpatient appointments (excluding Emergency Departments) in Highland in 2011/12. Of those, 6.9% 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 hours⁸ 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 Scotland¹⁶ 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 Programme¹⁸; Patient-Focused 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 Highland 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 Highland (including both numerators and denominators and 95% confidence intervals calculated using Poisson distribution²²) 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 follow up (return) 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

Just over 7% of all first outpatient appointments in NHS Highland between 2002/03 and 2011/12 resulted in a DNA (Table 1).

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

Total number of outpatient appointments (2002/03–2011/12)	940,876
Total number of DNAs (2002/03–2011/12)	69,567
Crude percentage DNA (2002/03–2011/12)	7.4%

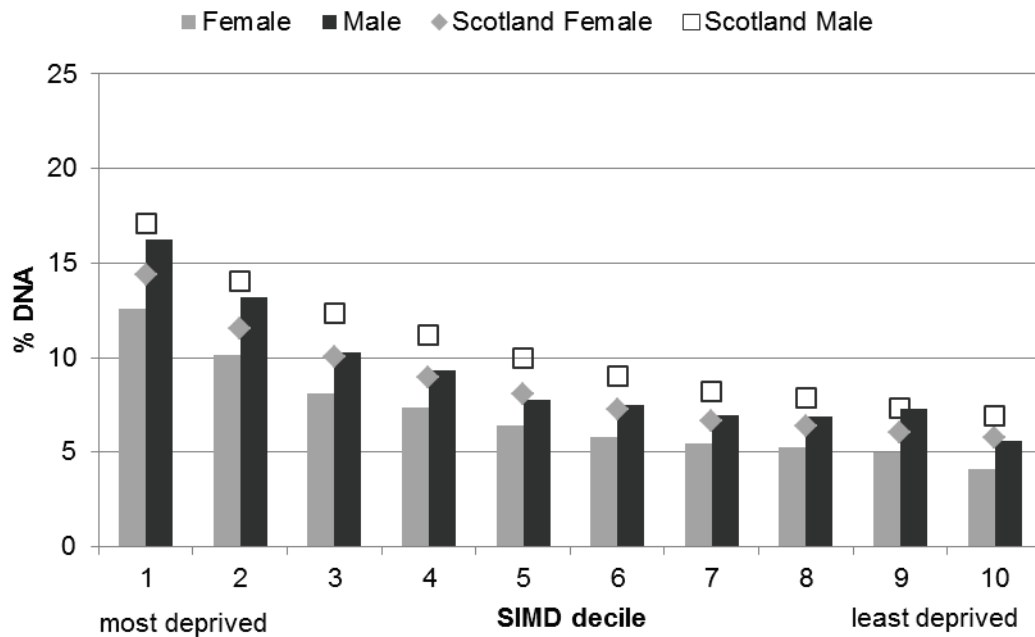
There was little change in the DNA percentage between 2002/03 and 2011/12, although there was a slight decrease from 8% to 7%. In this paper we report only the time trends where these show a change over time.

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, 13% and 16% of appointments for females and males respectively resulted in a DNA but only 4% and 6% in the least deprived decile. The risk of DNA in NHS Highland was lower than the NHSScotland findings, however, they were at their nearest in the most deprived decile with a difference of 1.8 and 0.9 percentage points for males and females respectively.

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



There has been a small decline in the risk of female outpatient appointments resulting in DNA over time across SIMD deciles. The risk for males in the most deprived decile has been relatively flat, however, it rose in 2011/12. The difference between deciles has remained similar for females in the 10-year period; males, however, have experienced spikes in the time period where the difference has increased (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 Highland (2002/03–2011/12 combined for all specialties)

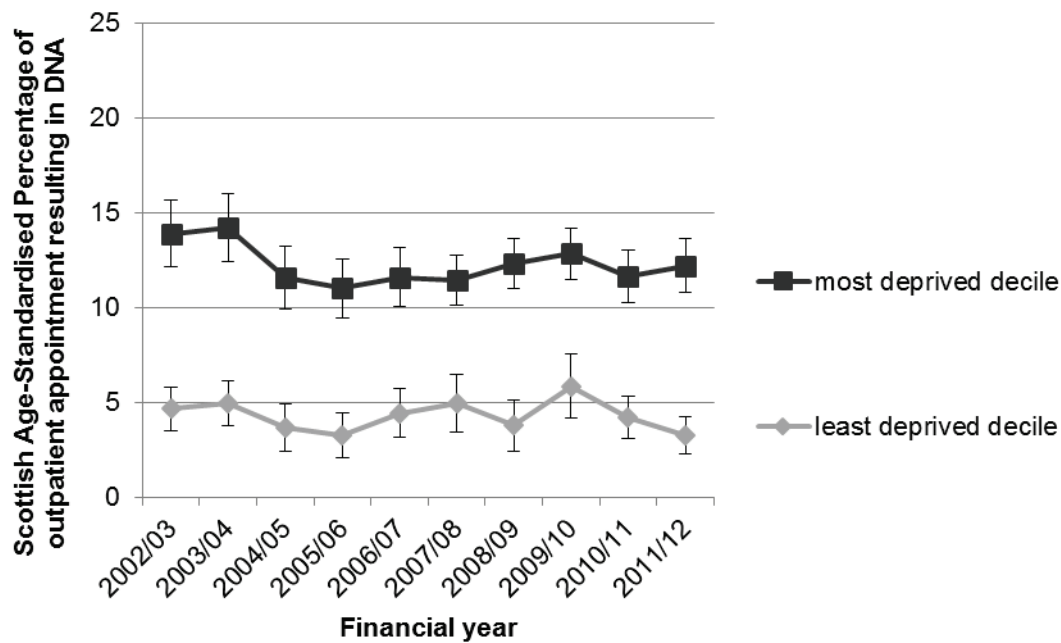


Figure 3: Trend in age-adjusted percentage DNA (with 95% confidence intervals) by highest and lowest Scottish SIMD deciles for males in NHS Highland (2002/03–2011/12 combined for all specialties)

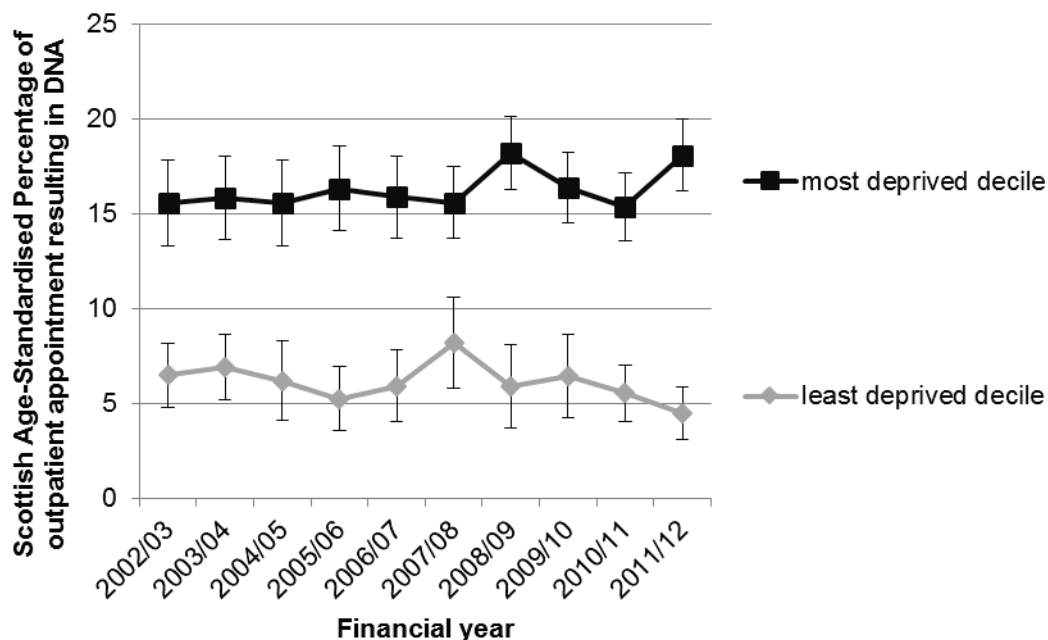


Table 2 provides the crude number of DNAs and percentages of appointments resulting in DNA by sex and SIMD decile in 2011/12. This shows that, although males with appointments were more at risk of DNA, females accounted for a bigger

percentage of the total DNAs across all deprivation deciles (owing to females holding a larger proportion of overall appointments).

It also shows that although males and females in the most deprived decile were more at risk of DNA, those in SIMD deciles four, five, six and seven had the greatest number of appointments and DNAs. This reflects the population distribution within Highland across Scottish deprivation deciles.

The percentage of appointments that became DNAs was between eight and 14 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 12% for females and 18% for males in the most deprived decile, while in the least deprived these were 3% and 5%.

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

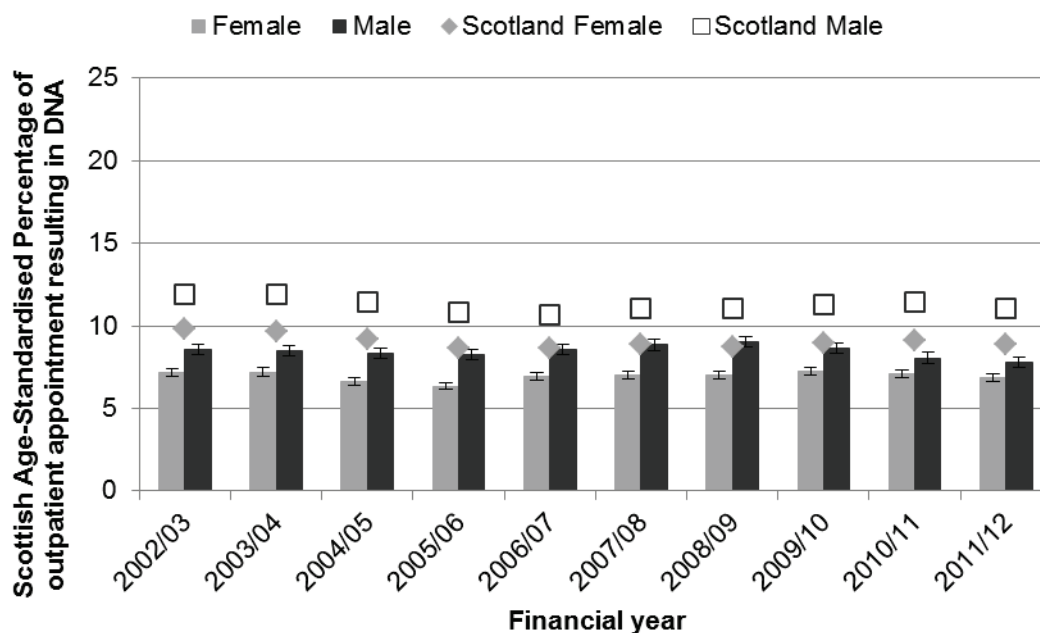
Table 2: Crude percentage of total DNAs and age-standardised percentage DNA occurring within each Scottish SIMD and sex strata for NHS Highland (2011/12 combined for all specialties)

Scottish SIMD decile	Female appointments	Female DNAs	Age-standardised % DNA (female)	Scotland female age-standardised % DNA	Crude appointment rate per 1,000 population (female)	% of total female DNAs	Male appointments	Male DNAs	Age-standardised % DNA (male)	Scotland male age-standardised % DNA	Crude appointment rate per 1,000 population (male)	% of total male DNAs
1 most deprived	2,373	300	12.0	14.0	466.9	4.3	1,989	364	18.0	17.0	406.9	5.2
2	3,804	355	9.6	11.0	458.5	5.1	2,543	332	14.0	14.0	326.7	4.7
3	4,587	373	8.5	10.0	411.6	5.3	3,438	312	10.0	13.0	329.6	4.5
4	7,417	507	7.4	9.2	376.8	7.3	5,501	468	9.4	12.0	303.1	6.7
5	8,457	497	6.4	8.2	373.5	7.1	6,538	487	8.6	10.0	303.9	7.0
6	9,999	534	5.9	7.4	339.1	7.6	7,772	505	7.5	9.3	269.7	7.2
7	10,766	582	5.8	6.7	292.1	8.3	8,301	500	6.9	8.3	232.1	7.2
8	4,916	229	5.2	6.3	310.5	3.3	3,713	191	6.0	8.0	247.5	2.7
9	3,206	166	5.6	6.1	332.4	2.4	2,748	199	7.4	7.3	290.9	2.8
10 least deprived	1,509	47	3.3	5.6	307.0	0.7	1,072	42	4.5	7.1	243.0	0.6
Total	57,034	3,590	6.8	8.9	348.6	51.0	43,615	3,400	7.8	11.0	279.2	49.0

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 (7% compared to 9%).

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

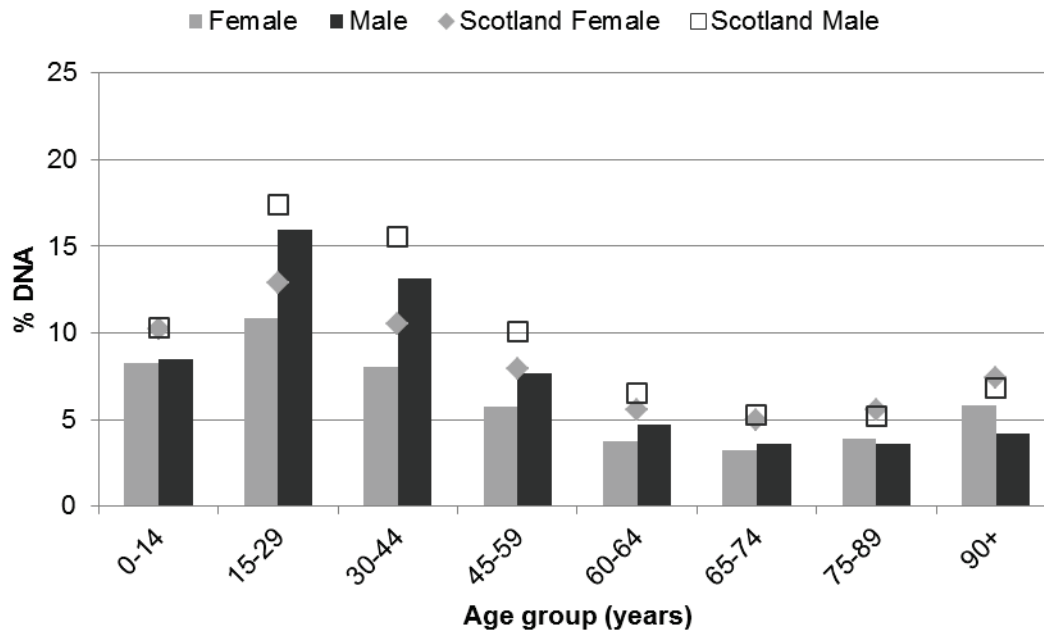


In 2011/12 the risk of DNA was 7% for females and 8% for males, which reflects little variation from 2002/03 (Figure 4). NHS Highland had a consistently lower risk of DNA than NHSScotland (females 2.1 and males 3.3 percentage points in 2011/12) with little change in the difference over the time period.

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 7%; males 9%) and this matched the pattern found at the national level.

Figure 5: Crude percentage DNA by age and sex for Scotland and NHS Highland (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 16%; females 11%) and 30–44 years age group (males 13%; females 8%). Both sexes shared a similar patterning of DNAs across age bands. The difference in percentage DNA between age groups remained relatively constant over the 10-year 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 group had more DNAs than other males. Females in the 15–29 years age group had the most DNAs and accounted for 14% of all DNAs in 2011/12.

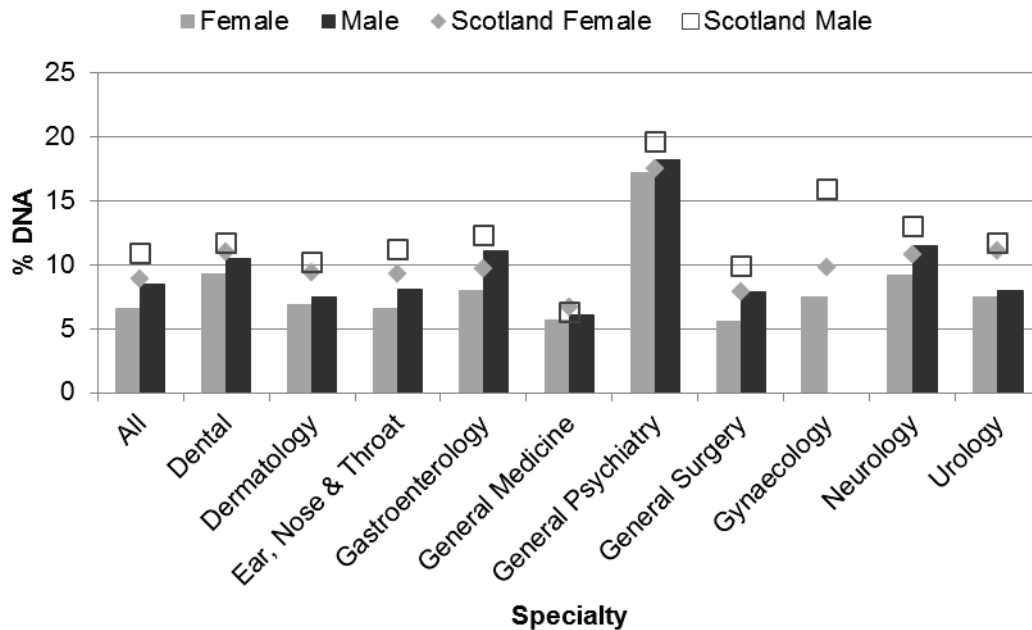
Table 3: Crude percentage of total DNAs and percentage DNA occurring within each age group for each sex for NHS Highland (2011/12 combined for all specialties)

Age group (years)	Female appointments	Female DNAs	Crude % female DNA	Scotland crude % female DNA	% of total female DNAs	Male appointments	Male DNAs	Crude % male DNA	Scotland crude % male DNA	% of total male DNAs
0–14	3,312	224	6.8	9.4	3.2	3,940	296	7.5	9.5	4.2
15–29	8,704	989	11.0	13.0	14.0	5,258	823	16.0	17.0	12.0
30–44	11,424	913	8.0	11.0	13.0	6,920	874	13.0	16.0	13.0
45–59	13,866	793	5.7	7.9	11.0	10,064	743	7.4	10.0	11.0
60–64	4,369	144	3.3	5.2	2.1	4,137	175	4.2	6.3	2.5
65–74	7,872	229	2.9	4.7	3.3	7,452	269	3.6	4.9	3.8
75–89	6,971	268	3.8	5.7	3.8	5,592	213	3.8	5.1	3.0
90+	516	30	5.8	7.7	0.4	252	7	2.8	6.2	0.1
Total	57,034	3,590	6.3	8.6	51.0	43,615	3,400	7.8	10.0	49.0

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 Highland experienced slightly lower levels 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: Crude percentage DNA for selected specialties in NHS Highland (2002/03–2011/12)



Over the ten year period, general psychiatry (females 17%; males 18%) and neurology (females 9%; males 12%) had a crude DNA percentage greater than the mean for all specialties (females 7%; males 9%), showing a higher risk of DNA. Appointments were also at greater risk of DNA for both sexes in dental (females 9%; males 10%) and gastroenterology services (females 8%; males 11%). In general medicine (females 6%; males 6%), outpatients had the least risk of DNA.

Most specialties followed the local trend of males being more likely to DNA than females, other than gynaecology where only female data were available (national gynaecology data included DNAs by both male and female patients).

Of the selected specialties in 2011/12, general surgery had the greatest number of DNAs for both sexes and gynaecology had the greatest number of DNAs for women alone (Table 4). Table 4 highlights differences between specialties. For instance, ear, nose and throat had over 2,000 more appointments than general psychiatry, yet general psychiatry had more DNAs.

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

Specialty	Female appointments	Female DNAs	Age-standardised % female DNA	Scotland age-standardised % female DNA	% of total female DNAs	Male appointments	Male DNAs	Age-standardised % male DNA	Scotland age-standardised % male DNA	% of total male DNAs
All	57,034	3,590	6.8	8.9	51.0	43,615	3,400	8.9	11.0	49.0
Dental	1,308	117	9.6	11.0	1.7	1,034	111	13.0	12.0	1.6
Dermatology	2,931	202	7.3	8.6	2.9	2,277	177	8.8	9.4	2.5
Ear, nose and throat	3,737	151	4.2	9.2	2.2	3,665	203	6.3	11.0	2.9
Gastroenterology	1,184	84	7.2	8.8	1.2	875	75	9.0	12.0	1.1
General medicine	351	21	6.1	8.4	0.3	286	14	4.5	7.2	0.2
General psychiatry	1,306	216	17.0	18.0	3.1	1,327	230	18.0	20.0	3.3
General surgery	7,514	403	6.0	7.4	5.8	6,468	431	8.0	9.5	6.2
Gynaecology	7,100	529	7.9	9.7	7.6	-	-	-	11.0	-
Neurology	1,301	107	8.2	11.0	1.5	1,100	126	12.0	13.0	1.8
Urology	628	36	5.8	11.0	0.5	1,911	145	9.0	13.0	2.1

There are differences in the patterning of appointments and DNAs by specialty and SIMD decile (Figures 7 and 8^a). Across the 10 specialties analysed, there were more appointments offered (as well as more DNAs) in the most deprived deciles than the least deprived deciles.

^a Figures 7 and 8 combine SIMD deciles 1 and 2, and deciles 9 and 10. This is owing to the small numbers involved if only considering deciles 1 and 10.

Figure 7: Total attendances and DNAs for females and males in most deprived areas (Scottish SIMD deciles 1 and 2 combined) for selected specialties in NHS Highland (2011/12)^b

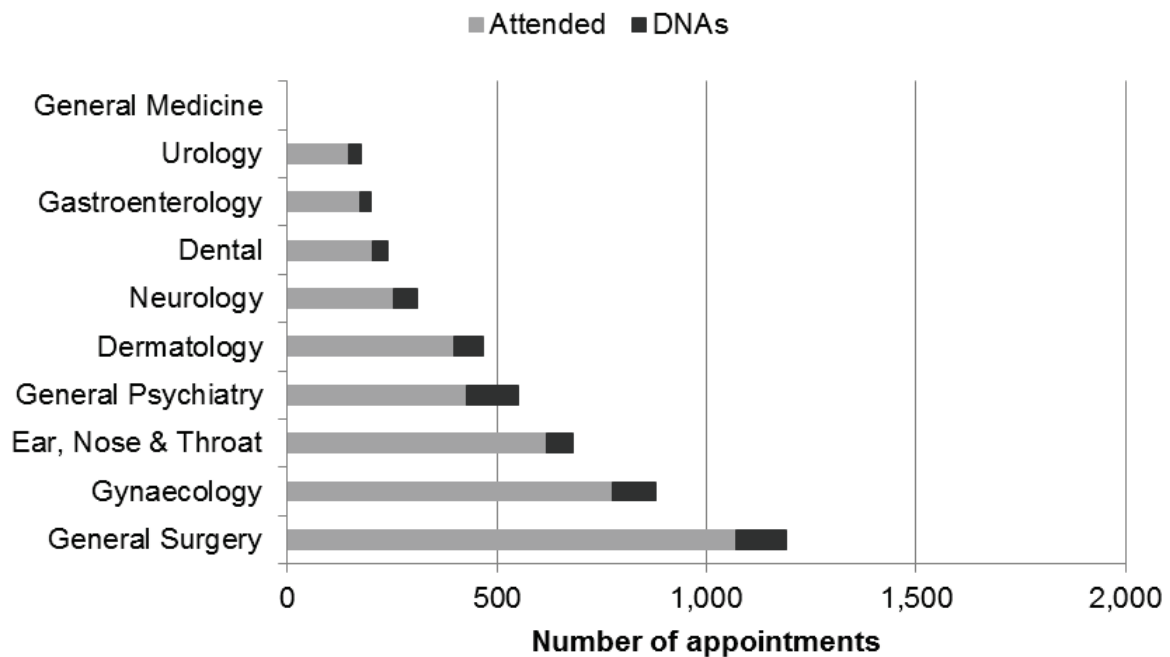
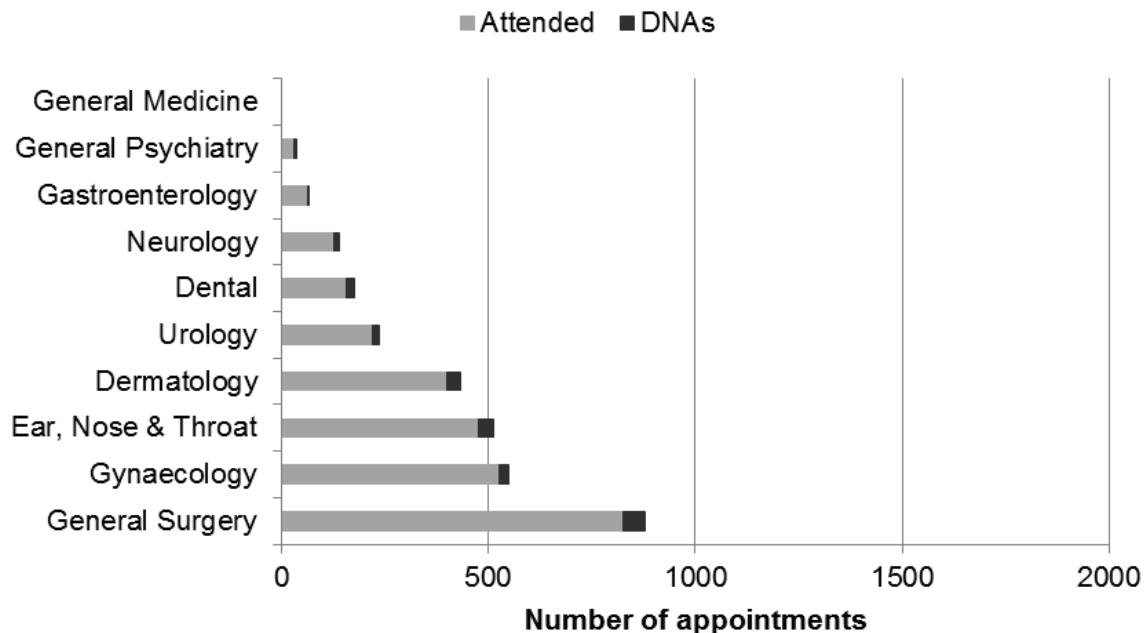


Figure 8: Total attendances and DNAs for females and males in least deprived areas (Scottish SIMD deciles 9 and 10 combined) for selected specialties in NHS Highland (2011/12)



^b Figures 7 and 8: Data for general medicine were suppressed due to low numbers in these SIMD deciles

General psychiatry had the most marked social patterning in the provision of appointments, with the ratio between populations in the most deprived areas (SIMD deciles 1 and 2 combined) and least deprived areas (SIMD deciles 9 and 10 combined) being 15:1 (Table 5). The specialty with the least difference in appointments offered was dermatology (a ratio of 1.1:1).

Table 5: Ratios (to a factor of 1) for number of appointments for most deprived compared to least deprived decile (Scottish SIMD deciles 1 and 2 combined and SIMD deciles 9 and 10 combined) for selected specialties in NHS Highland (2011/12)

Specialty	Females	Males	All
General medicine	n/a ^c	n/a	n/a
Urology	n/a	1.0	0.7
Dermatology	1.3	0.8	1.1
Ear, nose and throat	1.5	1.2	1.3
Dental	1.4	1.4	1.4
General surgery	1.7	1.1	1.4
Gynaecology	1.6	n/a	1.6
Neurology	2.2	2.3	2.2
Gastroenterology	1.3	n/a	3.0
General psychiatry	6.4	n/a	15.0
All appointments across the 10 specialties	1.6	1.5	1.6

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

7 Discussion

Main results

The risk of DNA over the ten year period has been relatively stable, however, there has been a slight decline from 8% to 7%. The patterning of DNAs matched that of Scotland as a whole, however NHS Highland experienced lower levels of DNA risk across all selected specialties. 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 SIMD decile 7 (reflective of the population distribution within Highland across Scottish deprivation deciles), and females had the greatest number of appointments and DNAs. For age, those aged 45–59 had the greatest number of appointments; whilst females aged 15–29 and males aged 30–44 had the greatest number of DNAs. So, although the greatest number of DNAs occurred in these groups; to reduce inequities in health care 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 and on psychiatry.

Outpatients in general psychiatry had the greatest risk of DNA (females 17%; males 18%) compared to the mean for all specialties (females 7%; males 8%). Those with neurology (females 9%; males 12%), as well as dental (females 9%; males 10%) and gastroenterology appointments (females 8%; males 11%) were also at greater risk of DNA.

There were more appointments offered for all specialties in the most deprived decile than the least deprived decile. This may 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 (most deprived: females 26%, males 21%, data were unavailable for least deprived due to the low number of appointments). General psychiatry also had the most marked social patterning in the provision of appointments, with a ratio between appointments offered to populations in SIMD deciles 1 and 2, and those in SIMD deciles 9 and 10 of 15:1. The specialty with the least difference in appointments offered was dermatology (a ratio of 1.1:1). 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.

Strengths and weaknesses

Strengths

Our data covered all NHS outpatient appointments in NHS Highland 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/or use board-specific deprivation deciles. Furthermore, where a population is widely dispersed and there is relatively greater mixing of socioeconomic groups within datazones (as is the case with Highland), area-based measures of deprivation such as SIMD may not be a good discriminator of populations who are more and less deprived. 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 second or third appointments were used because of quality issues with the data for the later appointments. The circumstances of the DNA and the urgency of the referral 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.

How our results fit with other evidence

Population groups at higher risk of DNA in NHS Highland were similar to those across 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 law²⁹ 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 attend³⁵ 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 poverty³⁵ 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 commitments¹⁵ 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 countries³⁴ 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

beliefs⁴⁵⁻⁴⁸ 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 DNAs 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 likely to be due to structural-patient factors, 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 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 greatest ratio between appointments in populations in the most deprived and least deprived areas of 15:1. 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.

References

- 1 ISD Scotland. SMR Datasets, SMR00 – Outpatient Attendance, Attendance Status. Internet 2013; Accessed: 16 May 2013.
www.datadictionary.scot.nhs.uk/SMR-Datasets/SMR00-Outpatient-Attendance/Attendance-Status/
- 2 ISD Scotland. Data Dictionary A–Z, Definitions: Outpatient Attendance. Internet 2013. Accessed: 16 Sep 2013. www.datadictionary.scot.nhs.uk/Dictionary-A-Z/Definitions/index.asp?Search=O&ID=374&Title=Outpatient%20Attendance
- 3 MacIntyre S. Inequalities in Health in Scotland: What are they and what can we do about them? Internet 2007; Accessed: 25 May 2012.
www.sphsu.mrc.ac.uk/reports/OP017.pdf
- 4 Scottish Government. Equally Well Review 2010: Report by the Ministerial Task Force on implementing Equally Well, the Early Years Framework and Achieving Our Potential. 2010.
www.scotland.gov.uk/publications/2010/06/22170625/0
- 5 Christie C. Report on the Future Delivery of Public Services by the Commission chaired by Dr Campbell Christie. 2011.
www.scotland.gov.uk/Publications/2011/06/27154527/0
- 6 NHS Health Scotland. A Fairer Healthier Scotland: Our strategy 2012–2017. Internet 2012. Accessed: 23 Sep 2013.
www.healthscotland.com/documents/5792.aspx
- 7 Lasser KE, Mintzer IL, Lambert A, Cabral H, Bor DH. Missed appointment rates in primary care: the importance of site of care. *Journal of Health Care for the Poor & Underserved* 2005 Aug;16(3):475–86.
- 8 Chariatte V, Michaud PA, Berchtold A, Akre C, Suris JC. Missed appointments in an adolescent outpatient clinic: descriptive analyses of consultations over 8 years. *Swiss Medical Weekly* 2007 Dec 1;137(47–48):677–81.
- 9 Franks W, Gawn N, Bowden G. Barriers to access to mental health services for migrant workers, refugees and asylum seekers. *Journal of Public Mental Health* 2007 Mar;6(1):33–41.
<http://search.proquest.com/docview/212402649?accountid=145959>
- 10 Burns F, Imrie J, Nazroo J, Johnson A, Fenton. Why the(y) wait? Key informant understandings of factors contributing to late presentation and poor utilization of HIV health and social care services by African migrants in Britain. *AIDS Care* 2006;19(1):102–8.
- 11 Dixon-Woods M, Kirk D, Agarwal S, Annandale E, Arthur T, Harvey J, et al. Vulnerable groups and access to health care: a critical interpretive review.

Southampton:National Co-ordinating Centre for NHS Service Delivery and Organisation; 2005.

- 12 Mackenzie M, Conway E, Hastings A, Munro M, O'Donnell C. Is 'Candidacy' a Useful Concept for Understanding Journeys through Public Services? A Critical Interpretive Literature Synthesis. *Social Policy & Administration*. 1 Sep 2012. <http://dx.doi.org/10.1111/j.1467-9515.2012.00864.x>
- 13 Hirst A, Delvaux J, Rinne S, Short C, McGregor A. Multiple and Complex Needs Initiative: Programme Evaluation Report. Scottish Government Social Research; 2009. www.scotland.gov.uk/Resource/Doc/286668/0087270.pdf
- 14 Mitchell AJ, Selmes T. A comparative survey of missed initial and follow-up appointments to psychiatric specialties in the United kingdom. *Psychiatric Services* 2007 Jun;58(6):868–71.
- 15 Neal RD, Hussain-Gambles M, Allgar VL, Lawlor DA, Dempsey O. Reasons for and consequences of missed appointments in general practice in the UK: questionnaire survey and prospective review of medical records. *BMC Family Practice* 2005 Nov 7;6:47–53. www.biomedcentral.com/content/pdf/1471-2296-6-47.pdf
- 16 NHS Health Scotland. Review of equality health data needs in Scotland. Internet 2012. Accessed: 1 Aug 2013. www.scotpho.org.uk/publications/reports-and-papers/920-review-of-equality-health-data-needs-in-scotland
- 17 Information Services Division. Cost Book. 2012. www.isdscotland.org/Health-Topics/Finance/Costs/
- 18 Scottish Government Directorate of Health Workforce and Performance Quality & Efficiency Support Team (QuEST). CEL 11 2012: Transforming Outpatient Services: Improving Quality and Efficiency. Edinburgh; 2012. www.sehd.scot.nhs.uk/mels/CEL2012_11.pdf
- 19 Scottish Government. Delivering Waiting Times (CEL 33 (2012)). 2012. www.sehd.scot.nhs.uk/mels/CEL2012_33.pdf
- 20 Audit Scotland. Management of Patients on NHS waiting lists. 2013. www.audit-scotland.gov.uk/docs/health/2013/nr_130221_nhs_waiting_lists.pdf
- 21 Scottish Government. Scottish Index of Multiple Deprivation. Internet 2013. Accessed: 19 Sep 2013. www.scotland.gov.uk/Topics/Statistics/SIMD/
- 22 Association of Public Health Observatories. Technical Briefing 3: Commonly Used Public Health Statistics and their Confidence Intervals. Public Health England; 2013.
- 23 Scottish Government. SIMD Background Data – SIMD ranks to quintiles, deciles and vigintiles. Internet 2012. Accessed: 19 Sep 2013. Available from: www.scotland.gov.uk/Topics/Statistics/SIMD/simdbackgrounddataannexb

- 24 Campbell K, Millard A, McCartney G, McCullough S. Who is least likely to attend? An analysis of outpatient appointment 'Did Not Attend' (DNA) data in Greater Glasgow & Clyde. Glasgow:NHS Health Scotland; 2015.
- 25 Campbell K, Millard A, McCartney G, McCullough S. Who is least likely to attend? An analysis of outpatient appointment 'Did Not Attend' (DNA) data in NHS Highland. Glasgow:NHS Health Scotland; 2015.
- 26 Campbell K, Millard A, McCartney G, McCullough S. Who is least likely to attend? An analysis of outpatient appointment 'Did Not Attend' (DNA) data in NHS Dumfries & Galloway. Glasgow:NHS Health Scotland; 2015.
- 27 Campbell K, Millard A, McCartney G, McCullough S. Who is least likely to attend? An analysis of outpatient appointment 'Did Not Attend' (DNA) data in NHS Scotland. Glasgow:NHS Health Scotland; 2015.
- 28 Tomlinson J, MacKay D, Watt G, Whyte B, Hanlon P, Tannahill C. The shape of primary care in NHS Greater Glasgow and Clyde. Glasgow: Glasgow Centre for Population Health; 2008.
www.gcph.co.uk/assets/0000/0423/The_Shape_of_Primary_Care_FinalFull.pdf
- 29 Tudor-Hart J. The Inverse Care Law. *The Lancet* 1971;297(7696):405–12.
[http://dx.doi.org/10.1016/s0140-6736\(71\)92410-x](http://dx.doi.org/10.1016/s0140-6736(71)92410-x)
- 30 Krieger N. *Epidemiology and the Peoples' Health: Theory and Context*. New York: Oxford University Press; 2011.
- 31 O'Connor ME, Matthews BS, Gao D. Effect of open access scheduling on missed appointments, immunizations, and continuity of care for infant well-child care visits. *Archives of Pediatrics & Adolescent Medicine* 2006 Sep;160(9):889–93.
- 32 Whittle J, Schectman G, Lu N, Baar B, Mayo-Smith MF. Relationship of scheduling interval to missed and cancelled clinic appointments. *Journal of Ambulatory Care Management* 2008 Oct;31(4):290–302.
- 33 Perron NJ, Dao MD, Kossovsky MP, Miserez V, Chuard C, Calmy A, et al. Reduction of missed appointments at an urban primary care clinic: a randomised controlled study. *BMC Family Practice* 2010;11:79.
- 34 Coodin S, Staley D, Cortens B, Desrochers R, McLandress S. Patient factors associated with missed appointments in persons with schizophrenia. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 2004 Feb;49(2):145–8.
- 35 Van der Meer G, Loock JW. Why patients miss follow-up appointments: a prospective control-matched study. *East African Journal of Public Health* 2008 Dec;5(3):154–6.
- 36 Quinn GP, Detman LA, Bell-Ellison BA. Missed appointments in perinatal care: response variations in quantitative versus qualitative instruments. *Journal of Medical Practice Management* 2008 Mar;23(5):307–13.

- 37 Dixon A, Le Grand J, Henderson J, Murray R, Poteliakhoff E. Is the British National Health Service equitable? The evidence on socioeconomic differences in utilization. *Journal of health services research & policy* 2007;12(2):104–9.
- 38 Bottle A, Tsang C, Parsons C, Majeed A, Soljak M, Aylin P. Association between patient and general practice characteristics and unplanned first-time admissions for cancer: observational study. *British Journal of Cancer* 2012 Oct 9;107(8):1213–9.
- 39 Park WB, Kim JY, Kim SH, Kim HB, Kim NJ, Oh MD, et al. Self-reported reasons among HIV-infected patients for missing clinic appointments. *International Journal of STD & AIDS* 2008 Feb;19(2):125–6.
- 40 Weingarten N, Meyer DL, Schneid JA. Failed appointments in residency practices: who misses them and what providers are most affected? *Journal of the American Board of Family Practice* 1997 Nov;10(6):407–11.
- 41 Yu J. Qualitative research on the attitudes toward teenage sexual behavior of Chinese British families: methodological issues. *Journal of Transcultural Nursing* 2009 Apr;20(2):156–63.
<http://tcn.sagepub.com/content/20/2/156.full.pdf+html>
- 42 Yu J. Young people of Chinese origin in western countries: a systematic review of their sexual attitudes and behaviour. [Review] [59 refs]. *Health & Social Care in the Community* 2010 Mar;18(2):117–28.
- 43 Knifton L, Gervais M, Newbigging K, Mirza N, Quinn N, Wilson N, et al. Community conversation: addressing mental health stigma with ethnic minority communities. *Social Psychiatry & Psychiatric Epidemiology* 2010 Apr;45(4):497–504.
<http://search.ebscohost.com/login.aspx?direct=true&db=mnh&AN=19629361&site=ehost-live>
- 44 Koo K. Carers' representations of affective mental disorders in British Chinese communities. *Sociology of Health & Illness* 2012 Nov;34(8):1140–55.
- 45 Banning M. Black women and breast health: a review of the literature. [Review]. *European Journal of Oncology Nursing* 2011 Feb;15(1):16–22.
- 46 Banning M. Perceptions of breast health awareness in Black British women. *European Journal of Oncology Nursing* 2011 Apr;15(2):173–7.
- 47 Brown JS, Casey SJ, Bishop AJ, Prytys M, Whittinger N, Weinman J. How black African and white British women perceive depression and help-seeking: a pilot vignette study. *INT J SOC PSYCHIATRY* 2011 Jul;57(4):362–74.
- 48 Codjoe L, Byrne M, Lister M, McGuire P, Valmaggia L. Exploring perceptions of "wellness" in black ethnic minority individuals at risk of developing psychosis. *Behavioural & Cognitive Psychotherapy* 2013 Mar;41(2):144–61.

- 49 Iacobucci G. Appointments later in week are less likely to be missed, finds study. *BMJ* 2012;345:e8534.
- 50 Charupanit W. Factors related to missed appointment at psychiatric clinic in Songklanagarind Hospital. *Journal of the Medical Association of Thailand* 2009 Oct;92(10):1367–9.
- 51 Campbell B, Staley D, Matas M. Who misses appointments? An empirical analysis. *Canadian Journal of Psychiatry - Revue Canadienne de Psychiatrie* 1991 Apr;36(3):223–5.
- 52 Rubin G, Bate A, George A, Shackley P, Hall N. Preferences for access to the GP: a discrete choice experiment. *British Journal of General Practice* 2006 Oct;56(531):743–8.
- 53 Gavin NI, Benedict MB, Adams EK. Health service use and outcomes among disabled Medicaid pregnant women. *Womens Health Issues* 2006 Nov; 16(6):313–22.
- 54 Aung NC, Rechel B, Odermatt P. Access to and utilisation of GP services among Burmese migrants in London: a cross-sectional descriptive study. *BMC Health Services Research* 2010;10:285.
- 55 Junod PN, Dao MD, Righini NC, Humair JP, Broers B, Narring F, et al. Text-messaging versus telephone reminders to reduce missed appointments in an academic primary care clinic: a randomized controlled trial. *BMC Health Services Research* 2013;13:125.
- 56 Nazroo JY. Genetic, Cultural or Socio-economic Vulnerability? Explaining Ethnic Inequalities in Health. *Sociology of Health & Illness* 1998;20(5):710-30. <http://dx.doi.org/10.1111/1467-9566.00126>
- 57 NHS 24. Annual Report and Accounts 2012/13. 2013. www.nhs24.com/aboutus/nhs24board/
- 58 NHSScotland Quality Improvement Hub. NHSScotland Patient Reminder Services – current state October 2013. 2013. www.qihub.scot.nhs.uk/media/509048/board%20status%20and%20contacts.docx
- 59 Scottish Government Directorate of Health Workforce and Performance Quality & Efficiency Support Team (QuEST). CEL 30 2013: Transforming Outpatient Services: Change Package and Return Outpatient Data Group. Edinburgh; 2013. www.sehd.scot.nhs.uk/mels/CEL2013_30.pdf
- 60 NHSScotland. Transforming Outpatient Services: Patient Reminder Services, Change Package. Edinburgh; 2014. www.scotland.gov.uk/Resource/0044/00446471.pdf



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