QRESEARCH

The Population Prevalence and Inter-Practice Variation of Diabetes: Analysis of QRESEARCH Data

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2 SPECIFICATION

"We would like an analysis of the prevalence of diabetes using the definition from the new General medical Services Contract. We are interested in inter-practice variation in prevalence and trends over time"

3 OBJECTIVES

- To determine the crude and age standardised prevalence of diabetes per 1,000 patients
- To report on the inter-practice variation in crude prevalence of diabetes per 1,000 patients
- To report on trends in prevalence over 10 years 1994 to 2003.
- To determine the inter-practice variation in square root of the crude prevalence of diabetes per 1000 patients

4 METHOD

4.1 Version of database used
The 4th national version of the QRESEARCH database was used for this analysis. This database, which contains data until 1 August 2004 has been described in detail in "Report 14 (October 2004)".

4.2 Practice inclusion criteria

In order to be included in the analysis for any given year, practices had to have complete data for that year and have been using their current EMIS computer system for the previous two years.

4.3 Patient inclusion criteria

In order to be included in the analysis, patients had to be registered on the 1st January of the relevant year and have been registered for the previous 6 months.

4.4 Case definition for diabetes mellitus

Prevalent cases of diabetes mellitus were defined by the presence of a C10% code in their record prior to the end of the analysis period. No distinction has been made between type one and type two diabetes for this report.

4.5 Age standardisation

Direct age-standardisation was done using 5-year age groups, from age 0-4 years to ages 90 and over, using the UK Census 2001 population as the standard population.

5 RESULTS

5.1 Study population

The first chart shows the number of practices in each of the analyses years. There were 71 practices in 1994 (0.6 million patients) and 426 practices (2.9 million patients) in 2003. These data (including the number of patients registered in these practices on 1 January each year) are shown in tabular format in the table 1 (appendix).

**Number of practices in each of the analysis years**
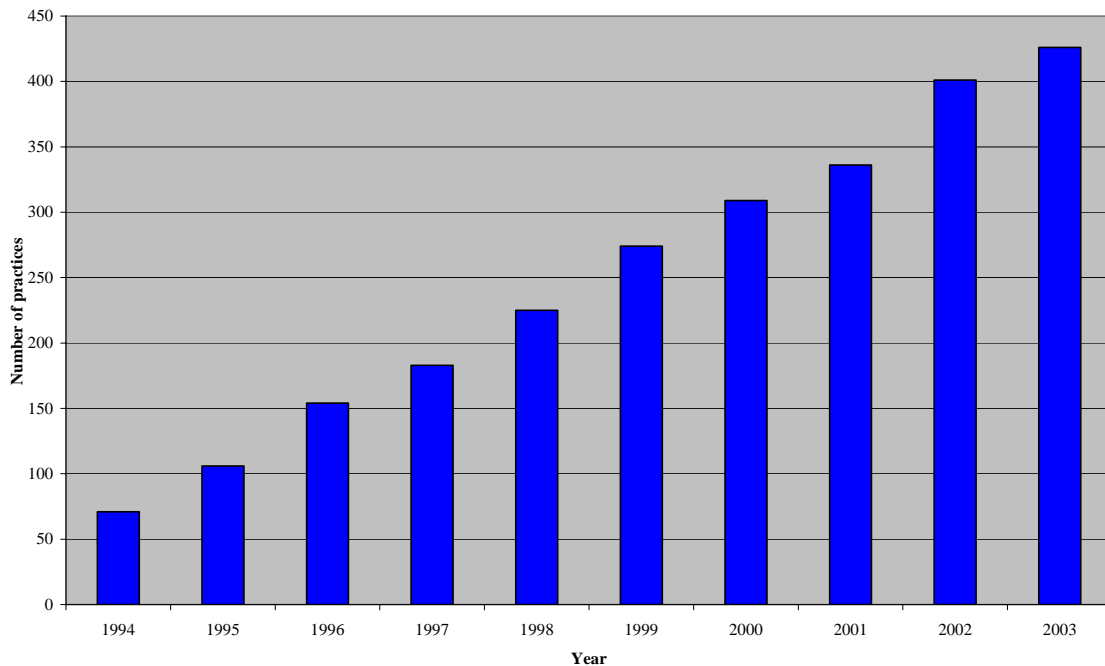
5.2   Trends in crude inter-practice variation

The overall crude prevalence rate of diabetes has more than doubled over the last ten years. In 1994 there were just over 9,613 patients with diabetes from a population of 0.6 million patients giving an overall crude rate of 16.8 per 1000 (95% CI 16.5 to 17.2). In 2003, there were over 93,941 patients with diabetes from a population of 2.9 million patients giving a crude prevalence rate of 32.0 per 1,000 (95% CI 31.8 to 32.2).

The graph below shows median crude prevalence rates over the last 10 years. The overall median rate in 1994 was 17.7 per 1,000 (IQR 15.1 to 20.3). In 2003 the median rate across all the practices was 32.6 per 1,000 (IQR 27.5 to 38.1). The graph also shows the rise in age standardised rates which shows a similar trend which shows that rise in prevalence holds despite changes in the age –sex structure of the population.

**Trends in practice median crude and age standardised rate
in QRESEARCH practices, 1994 to 2003**
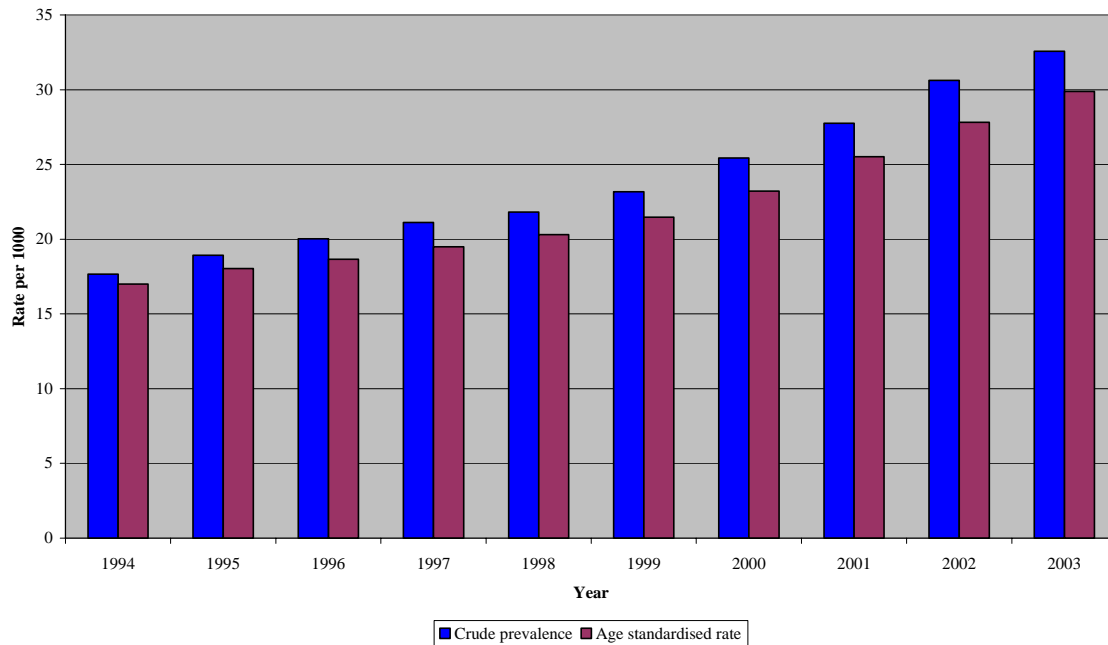
5.3   Inter-practice variation in crude prevalence in 2003

The next chart is a histogram showing the spread of crude prevalence rates in 426 practices in 2003. There is a large inter-practice variation in crude prevalence rates.

Histogram showing inter-practice variation in crude prevalence of diabetes per 1000 population in 426 QRESEARCH practices in 2003
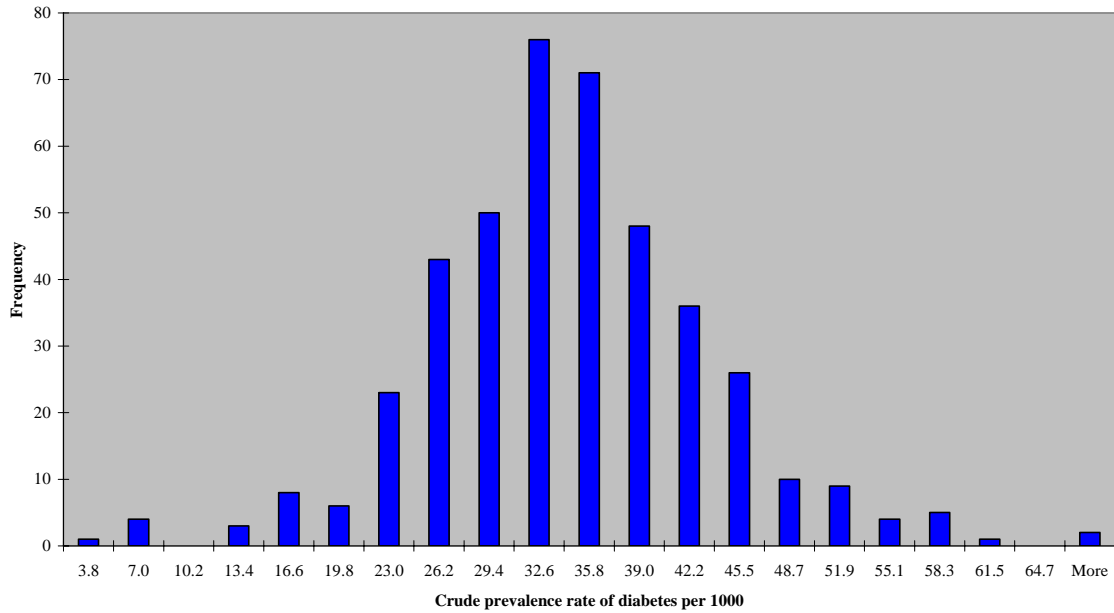
5.4   Inter-practice variation in age standardised prevalence in 2003

The next chart shows the variation between the practices in the age standardised rates and shows that there is a substantial variation despite the standardisation.

Inter-practice variation in age standardised prevalence rate of diabetes per 1000 patients in 426 QRESEARCH practices in 2003
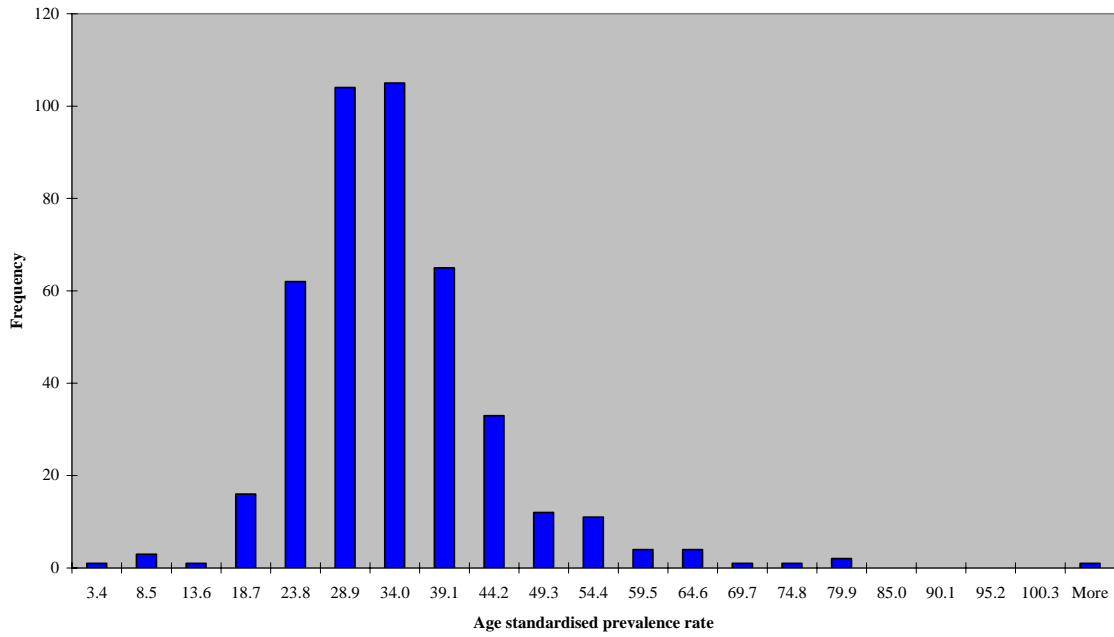
5.5 Square root of the median prevalence rate

The next chart shows the distribution of the crude prevalence rates after the data have been transformed by taking the square root. This transformation will be done as part of the GMS calculations but it is important to note that the data presented here include all patients [rather than those over 17 only]. Also, we have not up-rated the rates for the lowest 5% of practices as will be done in the ADPF calculations.

**Inter-practice variation in square root of crude diabetes prevalence per 1000
in 426 QRESEARCH practices in 2003**
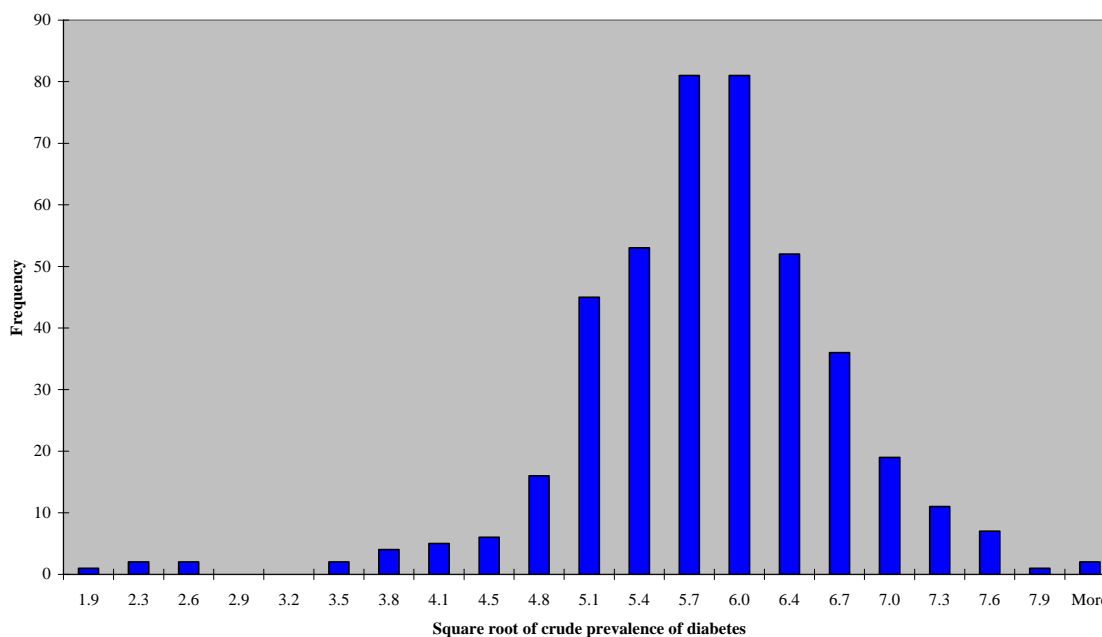
6   DISCUSSION

This report has presented data on inter-practice variation in the crude and age standardised prevalence diabetes. It complements Report 13 (Diabetes in the UK 1994 to 2003) which was based on an analysis of an earlier version of the QRESEARCH database but which presented alternative breakdowns included analyses by type of diabetes, age, sex, government office region, deprivation and ethnicity. The data presented here correspond well with the overall rates obtained in that report.

Our rates also compare well with data derived from other sources. For example, the prevalence rates derived from the General Practice Research Database was 18.9 per 1,000 persons in 1994 and 22.3 per 1000 persons in 1998[1]; the RCGP weekly return service reported a prevalence of 16 per 1000 in 1993 in its network of 60 practices[2] and a study of 17 practices in London reported a prevalence of 2.54 in 2003[3].

Understanding the rise in prevalence of diabetes

Possible explanations for the increase in prevalence of diabetes include the following:

1. ascertainment

The increase in prevalence of recorded diabetes could reflect better ascertainment of cases due to improved computer recording of diagnoses.

2. screening

A higher proportion of patients with type 2 diabetes are now being diagnosed. This could be due to better screening since studies over a decade ago suggested that less than half all true cases have been diagnosed[4] yet recent evidence[5] suggests a third are still undiagnosed. Such an increase in case finding might, without any change in underlying prevalence, give a 25% increase in apparent prevalence.

3. Ageing population

Changes in age structure of the population are unlikely to explain the rise in prevalence since there was an increase in age standardised rates

4. improved survival

There is some evidence to support the hypothesis that the increase in prevalence is due to improved survival since the standardised mortality rates have declined over the last ten years.

5. change in diagnostic criteria

There has been a shift in recommendations for the diagnosis of diabetes from a 2 hour glucose concentration of over 11.0 mmol/l to a fasting glucose of greater than, or equal to, 7.0 mmol/l and inevitably this will have contributed to the increase in diagnosed cases[6].

5. true increase in incidence of type 2 diabetes

Analysis of prescription and mortality data from Denmark concluded that incidence was stable and that mortality was falling and that this accounted for the increase in observed prevalence[7]. However, the analysis had a number of clear limitations[8] and the authors themselves called for further work using databases which allowed access to individual diagnoses. It had a risk of counting cases twice and omitted patients with diet treated diabetes. It didn't account for type one or type two diabetes or for the effect of deprivation, ethnicity or obesity. The stable rate of incidence, for example, might have been explained by constant [rather than rising] levels of obesity[8].

Inter-practice variation may reflect the real differences in population, including geography, deprivation and ethnicity. However outliners at the lower end may represent under-recording; low case finding or aberrant application of diagnostic criteria. Outliners with a high prevalence of diabetes might be good case finders in a high-risk population; but they may have a problem with data accuracy, their denominator or with their diagnostic criteria.

We expect to see a movement towards the mean in 2004/5 through the introduction of the new GMS contract.

7   REFERENCES

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8   APPENDIX

Table 1: Crude and age standardised prevalence per 1000 (95% CI) for diabetes mellitus 1994 to 2003 using nGMS definition

Year	No of practices included	No of patients registered on Jan 1 and 6 months prior	No of patients with Diabetes	Diabetes crude rate per 1000	Diabetes crude rate 95% LCL	Diabetes crude rate 95% UCL	Diabetes age standardised rate 1000
1994	71	571,281	9,613	16.83	16.49	17.17	15.68
1995	106	768,102	13,871	18.06	17.76	18.36	16.7
1996	154	1,066,011	20,656	19.38	19.11	19.64	17.86
1997	183	1,268,780	25,893	20.41	20.16	20.66	18.95
1998	225	1,570,367	33,322	21.22	20.99	21.45	19.68
1999	274	1,918,571	43,745	22.8	22.59	23.02	20.93
2000	309	2,164,407	53,818	24.87	24.66	25.08	22.82
2001	336	2,360,984	63,592	26.93	26.73	27.14	24.76
2002	401	2,781,948	82,226	29.56	29.36	29.76	27.29
2003	426	2,932,780	93,941	32.03	31.83	32.24	29.48

Table 2: Inter-practice variation in crude and age standardised prevalence rate for diabetes per 1000 1994 to 2003

Year	No of practices included	No of patients registered on Jan 1 and 6 months prior	Median of the practice crude prevalence rate for diabetes	25th centile	75th centile	Median of the age standardised prevalence rate for diabetes per 1000	25th centile	75th centile
1994	71	571,281	17.66	15.05	20.25	16.99	14.41	19.14
1995	106	768,102	18.93	15.49	21.41	18.03	14.52	20.21
1996	154	1,066,011	20.02	17.3	22.91	18.65	15.72	21.59
1997	183	1,268,780	21.12	17.5	24.31	19.49	16.72	22.68
1998	225	1,570,367	21.81	18.61	25.5	20.31	17.58	23.81
1999	274	1,918,571	23.18	19.7	27.24	21.47	18.47	25.14
2000	309	2,164,407	25.43	21.66	29.63	23.22	20.11	27.32
2001	336	2,360,984	27.75	23.38	32.15	25.51	21.48	29.82
2002	401	2,781,948	30.62	25.58	35.38	27.81	23.47	33.22
2003	426	2,932,780	32.56	27.48	38.01	29.88	24.7	35.98