# Quality of care provided by general practitioners using or not using Division-based diabetes registers

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## ABSTRACT

***Objective:*** To compare the quality of care provided by general practitioners participating in diabetes shared-care registers with that provided by GPs not using registers.

***Design:*** Cross-sectional comparison using Health Insurance Commission (HIC) data for patients attending the GPs.

***Participants and setting:*** 155 GPs using diabetes registers, 459 GPs not using registers, and their patients with diabetes (as identified by HIC criteria). The study analysed data for the period January 1996 to December 1998 and was based on Divisions of General Practice within the South Western Sydney Area Health Service.

***Main outcome measures:*** Frequency of visits to GPs and tests ordered within each of six six-month periods.

***Results:*** GPs using the registers had more patients with diabetes, and saw those patients more frequently, than GPs not using registers. "Register" GPs also ordered tests (for $HbA_{1c}$ and microalbuminuria) more frequently than "non-register" GPs.

***Conclusion:*** GPs who participated in diabetes registers were more likely to provide patient care that more closely adhered to evidence-based guidelines than those who did not. Further research is needed to determine whether this was the result of characteristics of the GPs themselves, or their practices, or a was a consequence of their participation.


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IN AUSTRALIA, general practitioners play an important role in the management of diabetes.[1] This involves careful monitoring of behavioural risk factors, blood pressure, glycaemic control and lipids; early detection of complications; and management according to evidence-based guidelines.[2,3]

There is increasing evidence that care for patients with diabetes in general practice needs to be "structured and systematic".[4,5] Having a computerised register,[6,7] agreed clinical management guidelines and a system for auditing standards of care generally results in better quality of care.[8-10]

In Australia, many Divisions of General Practice have established programs with some elements of systematic care in partnership with local diabetes services.[11] Program components vary, but a frequent strategy has been to establish a district register, often in collaboration with local diabetes centres. GPs submit data from consenting patients to be entered on a computer register maintained by the Division. The Division then mails reminders to GPs, at various time intervals, to assist in patient recall, and issues audit reports on the GPs' adherence to diabetes management guidelines (Box 1). The participation of GPs and patients in divisional diabetes programs has been shown to increase over time and to be higher in the smaller Divisions.[12]

The Australian Health Insurance Commission (HIC) maintains a database of medical practitioners and the services they provide. Through its Medicare Benefits Schedule, the HIC remunerates GPs, specialists and pathology service providers for consultations and services.

Using data from HIC records, we sought to determine whether GPs using diabetes shared-care registers had different patterns of practice from GPs not using registers.

## METHODS

Our study was based in the South Western Sydney Area Health Service (SWSAHS), which includes five Divisions of General Practice (Bankstown, Liverpool, Fairfield, Macarthur and Southern Highlands). At the time of our study, the SWSAHS served a population of 793 000 people, of whom 19 826 were expected to have diabetes in 1997.[13] All of the Divisions within the SWSAHS had established voluntary shared-care programs using diabetes registers and following NSW Health guidelines.[14] The guidelines recommend six-monthly measurement of haemoglobin $A_{1c}$ ($HbA_{1c}$), blood pressure, lipids and body weight, and checking of feet; yearly testing for microalbuminuria; and two-yearly eye examination and assessment of educational needs.

Our study was carried out over the three-year period 1996–1998. We identified 155 GPs practising within the SWSAHS who were using the diabetes registers and 459 who were not. From the HIC database we obtained information on patients with diabetes attending GPs in either of these two groups in each six-month time period over the three years. A patient with diabetes was

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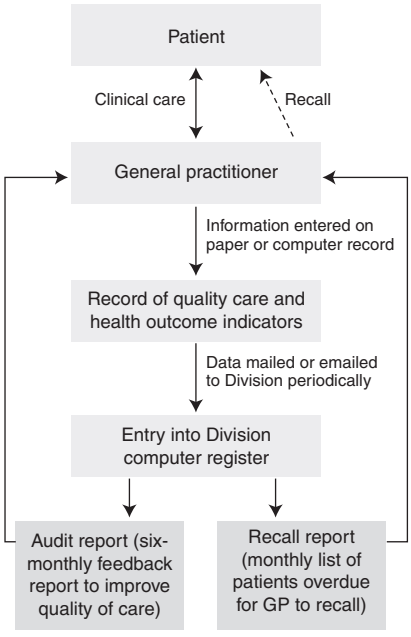
**1: Operation of a typical Division of General Practice diabetes register**




**2: Patients with diabetes: number and attendances per general practitioner for GPs using or not using diabetes registers**

| | Attendances per GP | | Number of patients per GP | |
|---|---|---|---|---|
| Period | "Register" GPs | "Non-register" GPs | "Register" GPs | "Non-register" GPs |
| Jan–Jun 1996 | 79.24 | 73.95* | 11.77 | 11.13* |
| Jul–Dec 1996 | 86.15 | 74.12* | 13.03 | 11.25* |
| Jan–Jun 1997 | 93.28 | 80.04* | 14.01 | 12.43* |
| Jul–Dec 1997 | 93.68 | 78.28* | 14.02 | 12.00* |
| Jan–Jun 1998 | 96.05 | 85.45* | 14.66 | 13.07* |
| Jul–Dec 1998 | 103.73 | 86.79* | 15.40 | 12.99* |

*Asterisks indicate a statistically significant difference ($P \leq 0.05$) between register and non-register GPs.

identified from HIC data as a patient having at least one test for $HbA_{1c}$ or fructosamine ordered over the time period.

For both "register" and "non-register" GPs in each six-month period, we determined (a) the number of discrete patients with diabetes; (b) the number of attendences by patients with diabetes; and (c) the number of patients having a lipid test, a microalbuminuria test, or an $HbA_{1c}$ test. For each test type, we calculated rates of testing per patient and statistically compared the rates for patients attending register and non-register GPs. Statistical significance was set at $\alpha = 0.05$.

## RESULTS

The proportion of register GPs ordering $HbA_{1c}$ tests for their patients increased from 82.3% in January–June 1996 to 91.0% in July–December 1998. The number of their patients for whom the test was ordered correspondingly rose from 1483 to 3172 during this period. There was also a rise in the proportion of non-register GPs ordering $HbA_{1c}$ tests, from 74.9% in January–June 1996 to 91.9% in July–December 1998, with the number of their patients for whom tests were ordered rising from 3828 to 5481.

The average number of patients with diabetes per GP and the average number of attendances by patients with diabetes per GP were higher for register GPs than non-register GPs throughout the study period (Box 2).

For the first two years of the study period, patients of register GPs were more likely to have more than one $HbA_{1c}$ test ordered within a six-month period than patients of non-register GPs (Box 3). They were also more likely to have at least one microalbuminuria test performed in each of the six-month time periods. The rate of lipid testing was low in both groups, and differences between the groups were non-significant in all but one of the six-month periods (Box 3).

## DISCUSSION

GPs who were linked with shared-care diabetes registers had more patients with diabetes attending them, reviewed the patients more frequently, and were generally more likely to conduct tests recommended in evidence-based guidelines than GPs not using registers. A number of factors may contribute to this difference. Firstly, participation in a register and shared-care program is likely to promote and maintain greater awareness of the needs of patients with diabetes. Secondly, GPs who are more concerned with providing high-quality care may also be more likely to enrol their patients in a register. Thirdly, characteristics of the practice itself (eg, practice size, location, management practices) may influence the quality of care and the likelihood of participating in a register. (We were unable to assess this possibility, as information on practice characteristics was not available to us from the Divisions or the HIC.)

The proportion of patients having $HbA_{1c}$ tests rose considerably for both GP groups over the study period, although the level of excessive testing (ie, testing more frequently than once every six months) did not change. This coincided, during 1997 and 1998, with a great deal of education on diabetes care provided to GPs in south-western Sydney based on the introduction of guidelines by the NSW Department of Health.[14] By contrast, the frequency of testing for microalbuminuria increased more markedly among register GPs, suggesting that education alone had little effect on this aspect of quality care.

There is a need for further research to evaluate diabetes registers both at Division and practice levels, especially as levels of participation are likely to increase now that the Commonwealth Government has introduced incentives. Since 2001, the government has provided practice incentive program payments to practices using diabetes registers (either at practice or Division levels) and incentive payments for each patient whose care meets certain standards over a 12-month period.[15] Our study is consistent with other research that suggests that registers with patient recall and audit feedback to clinicians are associated with improved quality of care.[7-9] Reminder systems have been shown to be effective in improving GP compliance with guidelines in diabe-

**3: Proportion of patients with diabetes for whom tests were ordered by GPs using or not using diabetes registers**

| | Proportion of patients having more than one $HbA_{1c}$ test (95% CI) | | Proportion of patients having at least one lipid test (95% CI) | | Proportion of patients having at least one microalbuminuria test (95% CI) | |
|---|---|---|---|---|---|---|
| Period | "Register" GPs | "Non-register" GPs | "Register" GPs | "Non-register" GPs | "Register" GPs | "Non-register" GPs |
| Jan–Jun 1996 | 16.3% (14.4%–18.2%) | 12.7% (11.6%–13.8%)* | 2.8% (2.0%–3.7%) | 3.9% (3.3%–4.5%) | 10.7% (9.1%–12.3%) | 6.9% (6.1%–7.7%)* |
| Jul–Dec 1996 | 17.5% (15.7%–19.3%) | 13.4% (12.3%–14.5%)* | 4.8% (3.8%–5.9%) | 4.1% (3.5%–4.7%) | 15.6% (13.9%–17.3%) | 8.0% (7.2%–8.8%)* |
| Jan–Jun 1997 | 16.1% (14.4%–17.8%) | 12.8% (11.8%–13.8%)* | 4.9% (3.9%–5.9%) | 4.4% (3.8%–4.9%) | 15.6% (13.9%–17.3%) | 9.9% (9.0%–10.8%)* |
| Jul–Dec 1997 | 15.9% (14.3%–17.5%)* | 13.9% (12.9%–14.9%)* | 5.5% (4.5%–6.5%) | 4.4% (3.8%–5.0%) | 13.6% (12.1%–15.1%) | 8.4% (7.6%–9.2%)* |
| Jan–Jun 1998 | 14.7% (13.2%–16.2%) | 14.1% (13.8%–14.4%) | 4.6% (3.7%–5.5%) | 4.1% (3.6%–4.7%) | 15.8% (14.2%–17.4%) | 9.7% (8.9%–10.5%)* |
| Jul–Dec 1998 | 14.9% (13.4%–16.4%) | 13.6% (12.7%–14.5%) | 6.4% (5.4%–7.4%) | 4.6% (4.1%–5.2%)* | 20.8% (19.1%–22.5%) | 10.2% (9.4%–11.0%)* |

*Asterisks indicate a statistically significant difference ($P \leq 0.05$) between register and non-register GPs.

tes.[4,16] Clinical audit and educational feedback to GPs have been shown to produce moderate changes in clinician behaviour.[17]

Our study and overseas research suggest that rewarding practices who use shared-care register systems to assist in the structured care of their patients with diabetes will reward those who provide better quality of care. The next challenge will be to evaluate whether these incentives give rise to better quality of care across all general practice and associated benefits in terms of health outcomes for patients.

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## COMPETING INTERESTS

None identified.

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