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# Multidisciplinary care plans and diabetes

## Benefits for patients with poor glycaemic control

### Background

The authors have previously found that multidisciplinary care plans are associated with improved processes and outcomes of care for diabetic patients. This article examines whether care plans are more likely to be implemented and have greater benefit for patients with poor metabolic control.

### Methods

Retrospective before and after medical record audit of 230 type 2 diabetic patients with care plans.

### Results

There was more multidisciplinary care provided and a significant decrease in mean post-care plan glycated haemoglobin (HbA1c) in patients who had a pre-care plan HbA1c level of more than 7%, but no significant change in those patients with HbA1c of 7% or less.

### Discussion

Care plans are beneficial and more often implemented for patients with poor metabolic control. If this positive impact is due to the implementation of multidisciplinary care, questions are raised about the relative effectiveness of general practitioner management plans and team care arrangements, as the former do not necessarily involve other health professionals.

■ **The provision of Medicare items numbers for multidisciplinary care plans, introduced as part of the Australian Government's Enhanced Primary Care (EPC) package in 1999,<sup>1</sup> changed the way chronic diseases such as diabetes are managed in primary care settings in Australia. In 2005, the original care plan item was replaced by two new items: a General Practitioner Management Plan (GPMP) and a Team Care Arrangement (TCA).<sup>2</sup> A GPMP is intended for patients with a chronic or terminal medical condition who will benefit from a structured approach to their management. A TCA is intended for patients with the same need but who also require ongoing care from a multidisciplinary team comprising their GP and at least two other health care providers.**

Medicare claims data suggests that the uptake of GPMPs has been much higher than for TCAs. In 2006 and 2007, 1.4 million GPMP claims were made by Australian GPs, compared with 0.8 million TCA claims.<sup>3</sup> In 2003–2004, the authors conducted a study to evaluate whether multidisciplinary EPC care planning for patients with type 2 diabetes resulted in improved processes and patient outcomes. The results showed that when a care plan was followed, the care provided to patients adhered significantly more closely to process guidelines in relation to weight, foot and microalbumin examinations. It was also found that metabolic control and cardiovascular risk factors improved in those patients who received multidisciplinary care.<sup>4</sup>

A number of further questions arose from the study. Were the improvements in the patient outcomes due to multidisciplinary input into the care of these patients or the more systematic nature of care from the GP alone,<sup>5</sup> and did care plans have greater benefits for some patients compared with others?

Data were further analysed to examine whether there were differences in metabolic outcomes and processes of care between

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patients with high and low levels of pre-care plan glycosylated haemoglobin (HbA1c).

## Methods

The methods of the study have been described in detail.<sup>4</sup> A retrospective medical record audit was conducted to describe the provision and outcomes of diabetic care in the year before and after the preparation of a care plan. A data collection tool was developed based on national guidelines for the process and outcomes of diabetes care.<sup>6</sup> Data obtained included frequency, dates and results of HbA1c, eye, body mass index (BMI), blood pressure (BP), foot, serum lipids, and urinary microalbumin checks, and visits to GPs and other health care providers.

All GPs practising in the five divisions of general practice in southwest Sydney (New South Wales) (845) were invited to take part. General practitioners were eligible if they had performed care plans for their diabetic patients. Patients of these GPs were eligible if they had type 2 diabetes diagnosed at least 1 year before the care plan was initiated, had a written care plan performed between November 2000 and March 2003, and had received care from the GP for at least 1 year before and after the care plan. Patients provided written consent for the audit.

The study was approved by the University of New South Wales Human Research Ethics Committee.

## Analysis

For the purpose of this article the analysis was focused on patients' glycaemic control and whether they met the study definition of multidisciplinary care as defined in *Table 1*. SPSS statistical software was used to analyse the data.

The study cohort was divided into two groups based on their pre-care plan HbA1c levels. One group had a pre-care plan HbA1c level of  $\leq 7\%$ , and the other group had pre-care plan HbA1c level of  $>7\%$ . This threshold was based on the then current diabetes management guidelines.<sup>6</sup> The last value of HbA1c in the 12 months before the care plan was considered to be the pre-care plan HbA1c level, and the last value of HbA1c in the 12 months after the care plan was considered to be the post-care plan HbA1c level.

The means of pre- and post-care plan HbA1c were calculated for each group and a paired sample t-test was performed to examine the statistical significance of any change in the pre- and post-care plan HbA1c. Paired sample t-test was also performed to examine the impact of multidisciplinary care on patients' pre- and post-care plan HbA1c levels.

Analysis was also undertaken to examine the proportion of patients in each group who met the study definition of multidisciplinary care, and a chi-square test was undertaken to examine the statistical significance of any difference.

## Results

Telephone contact was made with 519 of the 845 GPs approached. Of the 519, only 301 (59.7%) stated that they performed care plans and were eligible. Forty-seven GPs (15.6%) consented to take part; eight subsequently withdrew and another 13 were excluded because their care plans did not contain sufficient data, reducing the number of participating GPs to 26.

Medical records of 230 patients who attended the 26 GPs were audited. Analysis showed that patients who had pre-care plan HbA1c levels of  $\leq 7\%$  had lower post-care plan HbA1c levels than patients who had pre-care plan HbA1c levels  $>7\%$  (*Table 1*). However, there was a small increase in the mean HbA1c in this group from 6.2% pre-care plan to 6.5% post-care plan ( $t_{85}=-2.09$ ,  $p=0.039$ ; mean difference = -0.25, 95% CI: -0.48 to -0.01).

In the group of patients who had a pre-care plan HbA1c level of  $>7\%$  the mean HbA1c level fell from 8.2 to 7.9% ( $t_{126}=3.9$ ,  $p<0.001$ ; mean difference = 0.37, 95% CI: 0.18–0.56).

Another key finding of the analysis was the proportion of people in each group meeting the study definition of multidisciplinary care (*Table 1*). Patients in the group who had pre-care plan HbA1c levels  $>7\%$  were more likely (76.5%) to receive multidisciplinary care than those who had pre-care plan HbA1c levels of  $\leq 7\%$  (44.9%). This difference was statistically significant ( $\chi^2=22.9$ ,  $p<0.001$ ).

Analysis also showed that post-care plan HbA1c levels dropped significantly compared with pre-care plan HbA1c levels among patients who had HbA1c levels  $>7\%$  and who received multidisciplinary care ( $t_{97}=5.1$ ,  $p<0.001$ ; mean difference=0.54, 95% CI: 0.33–0.74) (*Table 2*).

## Discussion

The results of this study demonstrate better outcomes for patients who had poorer metabolic control at the time the care plan was developed. These patients were also more likely to have been provided with multidisciplinary care as defined in the study.

These results could have several possible explanations. First, GPs may be focusing their efforts to implement multidisciplinary care on patients with greater needs in terms of metabolic control. Second, changes observed in patients with higher HbA1c may not

Table 1. Pre- and post-care plan mean HbA1c and proportion of patients who met the study definition of multidisciplinary care

	Mean HbA1c		Proportion of patients meeting study definition of multidisciplinary care*	
	Pre-care plan	Post-care plan	Pre-care plan	Post-care plan
Patients with HbA1c level $\leq 7\%$	6.2	6.5 ( $p=0.039$ )	53.9%	44.9%
Patients with HbA1c level $>7\%$	8.2	7.9 ( $p<0.001$ )	41.7%	76.5%

\* Patient was seen by at least two care providers other than the GP and at least one of these was diabetes related (eg. podiatrist, diabetes educator, dietician, endocrinologist, ophthalmologist, optometrist)

Table 2. Impact of multidisciplinary care on patients' pre- and post-care plan mean HbA1c

	Mean HbA1c of patients who received multidisciplinary care		Mean HbA1c of patients who did not receive multidisciplinary care	
	Pre-care plan	Post-care plan	Pre-care plan	Post-care plan
Patients with HbA1c level $\leq 7\%$	6.3	6.3	6.2	6.6
Patients with HbA1c level $>7\%$	8.3	7.8	8.0	8.2

be due to multidisciplinary care, but to intensified management efforts by GPs themselves.

Another explanation may be the difficulty in detecting the impact of care planning in patients with good control at baseline ('floor effect'). However, a small decline was observed in the proportion of patients with HbA1c levels of  $\leq 7\%$  who met the study definition of multidisciplinary care in the year after the care plan. This drop is difficult to explain, as it would be expected that a care plan would trigger the provision of multidisciplinary care. One possible explanation is that GPs are directing their efforts – and possibly the limited resources of other health professionals – to those patients whose diabetes is not well controlled.

Fourth, it is also possible that the group with good glycaemic control at baseline has recently received multidisciplinary care, and this has contributed to their good control (as suggested by their higher level of multidisciplinary care before the care plan).

The finding that patients with higher HbA1c were more likely to receive multidisciplinary care suggests the first explanation. Multidisciplinary care, on the other hand, resulted in better outcomes for patients whose pre-care plan HbA1c level was higher. This is consistent with the comments made by Segal<sup>5</sup> that multidisciplinary care improves patient outcomes, which may be facilitated by care planning.

There are significant policy implications if care planning has its positive impact because of the implementation of multidisciplinary care. The Medicare data previously cited shows that GPMPs are more frequently claimed than TCAs.<sup>3</sup> Segal<sup>5</sup> raised the question about the effectiveness of the GPMP, as this item does not require multidisciplinary inputs which support a structured approach to the provision of diabetes care by the GP. However, the evidence supports the fact that structured care by GPs can improve metabolic control and cardiovascular risk factors in diabetic patients.<sup>7</sup>

The authors suggest that further research is needed before any conclusion is drawn about the roles of the two new Medicare items in the management of chronic diseases. This is of substantial policy relevance given the significant costs of EPC items to the health budget.

Conflict of interest: none declared.

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