

# Primary care of women after gestational diabetes mellitus: mapping the evidence–practice gap

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**G**estational diabetes mellitus (GDM) is the strongest population predictor of type 2 diabetes mellitus,<sup>1</sup> with the cumulative incidence of type 2 diabetes ranging from 2.6% to 70% from 6 weeks to 28 years postpartum.<sup>2</sup> Women who have had GDM are also at greater risk of a recurrence of GDM, cardiovascular disease and metabolic syndrome.<sup>3</sup>

General practitioners have a key role in providing postpartum and long-term preventive health care.<sup>4–6</sup> While appropriate care and preventive health approaches in the weeks and months after childbirth provide an opportunity to improve health outcomes for mothers and infants, there are few comprehensive, evidence-based guidelines available.<sup>7</sup> Women who have had GDM, and their infants, are even more likely to benefit from proactive care during this period,<sup>8</sup> and there are several guidelines that cater to this group. For example, Australasian Diabetes in Pregnancy Society (ADIPS) guidelines (current at the time of study)<sup>9</sup> recommended an oral glucose tolerance test (OGTT) within 6–8 weeks (now 6–12 weeks<sup>10</sup>) of birth for women who had GDM. International guidelines also highlight the importance of lifestyle modification, breastfeeding, contraception and risk counselling to improve health outcomes for these women and their infants.<sup>11,12</sup>

There are several guidelines available to GPs when providing care after a GDM-affected pregnancy. Beyond the timing of testing regimens, recommendations regarding lifestyle interventions to prevent type 2 diabetes progression are absent in ADIPS, but the Diabetes Australia/Royal Australian College of General Practitioners (RACGP) *Diabetes management in general practice*,<sup>13</sup> and the RACGP *Guidelines for preventive activities in general practice* (the “red book”)<sup>14</sup> outline diabetes management and dietary advice for diagnosed cases in general practice and for diabetes prevention.

What informs, and the extent to which preventive health practices are consistently integrated into, postpartum GP visits in Queensland, are unknown.

We aimed to evaluate GPs’ awareness, perceived knowledge, and use of GDM guidelines, and to determine the extent to which care within the first 12 months postpartum of a woman with a history of GDM is delivered according to guidelines.

## Methods

We surveyed GPs who participated in a shared care arrangement with a south-east Queensland maternity hospital and undertook a retrospective chart audit of their patient records for women who were provided with maternity shared care between July 2011 and June 2012. Data collection occurred throughout 2013.

Eligible GPs were identified from the hospital’s database and invited by mail to participate in the study. A week after

## Abstract

**Objective:** To determine the extent to which preventive activities, including the ordering of an oral glucose tolerance test (OGTT) between 6 and 12 weeks of birth, are integrated into women’s primary care postpartum visits after a gestational diabetes mellitus (GDM)-affected pregnancy.

**Design and setting:** Prospective survey and retrospective chart audit of general practices that provide maternity shared care in south-east Queensland, July 2011 to June 2012.

**Participants:** General practitioners ( $n = 38$ ) and medical records of women to whom they provided care ( $n = 43$  women).

**Main outcome measures:** GPs’ awareness and knowledge of GDM guidelines and delivery of postpartum preventive care.

**Results:** The response rate for the survey/chart audit was 47%. All respondents recommended an OGTT between 6 and 12 weeks; a variety of guidelines informed practice; and weight, blood pressure and infant feeding practices were regularly checked. Mental health status and diet and exercise were discussed less consistently.

**Conclusions:** GPs surveyed knew guidelines around the timing and type of test for women who have experienced GDM, and the audit demonstrated that this knowledge is translated into practice. Adherence to preventive screening and advice was less consistent. This problem may exist due to the absence of a systems approach to care, resulting in a lost opportunity to systematically reduce the incidence of type 2 diabetes and promote the wellbeing of women and their infants.

the mail-out, practices were telephoned to explain the study requirements. Hard to reach or undecided practices were contacted by a GP member of the research team (some, numerous times).

Consenting practices were sent a survey, medical chart audit form, instructions, and a reply-paid envelope. Each practice was contacted after 1 week to confirm receipt and reiterate the instructions. Two follow-up reminders were made to non-responding practices by telephone at 2-week intervals. A gift voucher valued at \$100 was offered as an incentive for participation.

The GPs were asked to complete a one-page self-administered survey regarding postpartum management approach of women with a history of GDM. Before distribution, the survey was pilot-tested with two academic GPs independent of the study. Practice managers and/or nurses completed a one-page audit for each identified patient medical chart. The audit form was developed and revised based on a review of related literature, pilot testing at one practice, and review by two GPs independent of the study. The time frame of the audit covered a review of all GP consultations in the 12 months after the birth of the baby. The audit took about

**1 General practitioners' ratings of their awareness and usefulness of various guidelines (n = 18)\***

Guidelines or approaches used	Usefulness of the guideline/approach				
	Not familiar	Not useful	Somewhat useful	Useful	Very useful
<i>Diabetes management in general practice: guidelines for type 2 diabetes 2012/13</i> (Diabetes Australia) <sup>13</sup>	2/16	0	5/16	4/16	5/16
<i>Therapeutic guidelines: endocrinology, version 4</i> (2009) <sup>15</sup>	14/16	0	0	1/16	1/16
<i>ADIPS consensus guidelines for the testing and diagnosis of gestational diabetes mellitus in Australia</i> (Australasian Diabetes in Pregnancy Society, 2013) <sup>10</sup>	8/17	0	0	4/17	5/17
<i>Gestational diabetes mellitus – management guidelines</i> (ADIPS; 1998, 2003) <sup>9</sup>	9/16	0	3/16	2/16	2/16
Hospital discharge summary	0	1/18	7/18	4/18	6/18
Hospital general practice maternity shared care guideline (August 2012)	0	0	3/18	5/18	10/18
Other (please specify) — <i>Diabetes in pregnancy: women's experiences and medical guidelines</i> <sup>16</sup>				1/1	

\*Missing responses were excluded from totals.

10 minutes to complete. Patient names were not included on audit forms.

Ethics approval was granted by the Mater Health Services Human Research Ethics Committee.

### Outcome measures and data analysis

Outcomes in the GP survey included: awareness and usefulness of specific practice guidelines in addition to their nominated guidelines, information on use and effectiveness of postpartum reminder systems for patient follow-up, and information on recommended timing and type of test for postpartum diabetes testing.

Audit outcome measures were checking and recording of preventive health indicators including: blood testing for diabetes, weight, body mass index, blood pressure, breastfeeding, and mental health status. Other outcomes, such as provision of advice on contraception, diet, exercise and relevant referral to specialist or allied health services were also assessed.

Survey and audit responses were entered into SPSS, version 22.0 (SPSS Inc) and checked twice for accuracy. Descriptive statistics were calculated and reported as frequencies or medians and ranges.

## Results

### General practitioner survey

We identified 38 GPs from 35 practices who shared care for a woman with GDM ( $n=43$ ) within the study period. Of these, 18 consented and completed the questionnaire (47% response rate). No other demographic information was collected from participants.

Box 1 shows GPs' ratings of their familiarity with, and their perceived usefulness of, various guidelines. All GPs were familiar with the hospital's GP maternity shared care

guideline and rated it somewhat useful, useful, or very useful.

GPs had excellent knowledge of which diabetes test to order and timing of testing postpartum, with 100% stating that they order the OGTT and recommend testing within 6 to 8 weeks.

Fifteen of the 18 GPs used reminder systems to monitor postpartum women with prior GDM, with all but one GP indicating that it worked well. Although three GPs did not use a reminder system, all used record systems that had the capacity to set up reminders and recall. One GP indicated that they did not think the reminder system worked well, and stated it was because they had to remember to click "reminders" in the electronic medical record system as it did not come up automatically and thought it was easy to miss. Other barriers to the reminder system working well included patient non-compliance and the patient's choice as to whether to attend their follow-up appointment.

### Chart audit

Eighteen GPs completed one chart audit and one GP completed two. The total number of completed audits was 19 (19/43 audits). No pregnancies were recorded during the 12-month postpartum period.

The median number of times that a woman consulted her GP during the year after her pregnancy with GDM was five (range, 1–14). All women visited their GP at least once in the 12 weeks after the birth. All women were offered type 2 diabetes screening by their GP (18/19) or the hospital (1/19). The most frequently ordered test was an OGTT (15/19). Other tests ordered included glycated haemoglobin ( $HbA_{1c}$ ) (1/19), fasting blood glucose level including full blood count (1/19) and electrolyte and liver function tests (2/19).

More than half (10/19) of the women had their OGTT ordered between 6 and 12 weeks (9/19 ordered between 6 and 8 weeks). The test was ordered earlier than 6 weeks for about one-third of the women (6/19), and after 12 weeks for two women. Of the women who had the OGTT performed, more than half had their OGTT between 6 and 12 weeks (10/19) (8/19 between 6 and 8 weeks). One woman had her test before 6 weeks, and three after 12 weeks. Five women did not have a test result recorded in their chart.

The chart audit indicated that each of the additional elements of care were recorded at least once in the 12-month postpartum period (Box 2). Body mass index, weight, diet, exercise and breastfeeding status were generally checked in the first 3 months, but not subsequently, while mental health status was checked within the first 3 months, and often had a second follow-up recorded. Blood pressure was checked regularly over the 12 months and contraception had more follow-up than other elements of care. Only one woman was referred to a dietitian.

Open-ended responses indicated each consultation generally focused on presenting symptoms or requests for tests or vaccinations.

## Discussion

Our study demonstrated that GPs who participated in a shared care program with a major maternity hospital have an excellent awareness of the timing and practices around the OGTT for women who have had GDM. GPs in our

## 2 Preventive health care indicators recorded as discussed by a general practitioner with a woman who had gestational diabetes mellitus within 12 months of birth (n = 19)

	Body mass index recorded	Weight recorded	Blood pressure recorded	Mental health assessed	Breastfeeding status recorded	Contraception discussed	Diet discussed	Exercise discussed
Number of women with health care indicator recorded	4	6	14	7	18	15	9	8
Median time of first discussion, weeks postpartum (range)	2.5 (1–6)	2.5 (1–20)	2.0 (1–37)	6.0 (1–31)	2.0 (1–13)	7.0 (1–33)	7.0 (2–27)	6.5 (2–27)
Number of women with health care indicator recorded more than once in the 12-month period	2	3	8	3	10	4	3	3

study were informed by a range of guidelines, and placed a great emphasis on guidance from the maternity hospital with which they collaborate. Knowledge, opinions, and practices regarding other postpartum preventive health indicators also reflect behaviour previously documented among maternity patients and the wider population,<sup>17,18</sup> with blood pressure measurement, and discussions about contraception and infant feeding/breastfeeding occurring in most consultations. Mental health assessments and discussions occur less often, and measurements and discussion around lifestyle indicators occur much less frequently.

In previous research, GPs reported not being well versed in guidelines for GDM follow-up care, potentially reflecting the lack of clarity in the literature and their varying knowledge and confidence in provision of lifestyle advice and interventions.<sup>19</sup>

Further, although GPs viewed follow-up care as their role and within the broader context of general health screening and promotion, it was often opportunistic.<sup>19</sup> We found that women generally presented for another issue, rather than a post-GDM check-up, resulting in a conflict in priorities. Consequently, the discussion about preventive health measures, particularly within the context of limited consulting time and the current remuneration system, is often overlooked. These results are partially reinforced by previous findings that GPs generally give appropriate exercise advice, but can be less clear about dietary or weight-loss goals,<sup>19</sup> despite the fact that advice from GPs is a powerful motivator for women to adopt lifestyle modification.<sup>20</sup>

The need for a systematic approach to delivery of care to women after a pregnancy affected by GDM is recognised.<sup>21,22</sup> Another article in this supplement calls for a clear pathway and one recognised and endorsed guideline to ensure best-practice care is provided to this high-risk group by all health care professionals.<sup>21</sup> A review of the topic noted that systems-based approaches are associated with a larger potential impact to improving testing rates, and appear easily generalisable.<sup>22</sup> Essential elements of a system to increase a woman's engagement with her GP in the postpartum period should be aligned with other key milestones in the postpartum period<sup>23</sup> and involve proactively contacting patients.<sup>22</sup> Diabetes Australia's National Gestational Diabetes Register, part of the National Diabetes Services Scheme, already functions to remind women and their doctors of relevant testing and lifestyle modifications, and could be adapted to provide further clinical guidance to GPs.<sup>21</sup>

A targeted approach to translate guidelines into practice is required to complement the systemic approach to care, as awareness and dissemination of guidelines alone does

not change practice.<sup>24</sup> The assessment of influencing factors and implementation and evaluation design must be theory-driven.<sup>25</sup> The implementation should address the knowledge gaps in guideline identification and content, and other barriers, such as time constraints and recall of new protocols. Recognition of other locally relevant barriers and enablers that facilitate implementation of clinical guidelines should also be identified and explored.

Despite our survey and chart audit returning a 47% response rate, slightly below the return rate noted for primary care surveys,<sup>26</sup> it reflects the challenge of research in the context of the heavy workload of many practices. The chart audit demonstrated quite clearly the concerted efforts of many GPs to provide best-practice care to women in the postpartum period. Another limitation of this study is capping the analysis of the provision of preventive health care at 12 months. A longer follow-up period could have provided a stronger insight into the delivery of care to this patient cohort.

Our research provides new knowledge around care provided to women by GPs in the 12 months after birth. We have demonstrated that GPs from our surveyed cohort knew guidelines around the timing and type of test for women who have experienced GDM in their pregnancy, and our chart audit has demonstrated that this knowledge is translated into practice. Less ideal were the practices and beliefs around the provision of other preventive health behaviours. This problem exists due to the absence of a systems approach to care, resulting in a lost opportunity to work systematically to reduce the incidence of type 2 diabetes and promote the wellbeing of these women, who are at high risk of chronic disease, and their infants.

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- 1 Ratner RE, Christophi CA, Metzger BE, et al. Prevention of diabetes in women with a history of gestational diabetes: effects of metformin and lifestyle interventions. *J Clin Endocrinol Metab* 2008; 93: 4774–4779.
- 2 Kim C, Newton KM, Knopp RH. Gestational diabetes and the incidence of type 2 diabetes: a systematic review. *Diabetes Care* 2002; 25: 1862–1868.
- 3 Tieu J, Crowther CA, Middleton P. Dietary advice in pregnancy for preventing gestational diabetes mellitus. *Cochrane Database Syst Rev* 2008; (2): CD006674.
- 4 Mielke RT, Kaiser D, Centuolo R. Interconception care for women with prior gestational diabetes mellitus. *J Midwifery Womens Health* 2013; 58: 303–312.
- 5 Gabbe SG, Landon MB, Warren-Boulton E, Fradkin J. Promoting health after gestational diabetes: a National Diabetes Education Program call to action. *Obstet Gynecol* 2012; 119: 171–176.
- 6 McElduff A. Shared care: gestational diabetes. *Aust Fam Physician* 2003; 32: 113–117.

- 7 Haran C, van Driel M, Mitchell BL, Brodribb WE. Clinical guidelines for postpartum women and infants in primary care – a systematic review. *BMC Pregnancy Childbirth* 2014; 14: 51.
- 8 Buchanan TA, Xiang AH, Page KA. Gestational diabetes mellitus: risks and management during and after pregnancy. *Nat Rev Endocrinol* 2012; 8: 639-649.
- 9 Hoffman L, Nolan C, Wilson JD, et al. Gestational diabetes mellitus – management guidelines. The Australasian Diabetes in Pregnancy Society. *Med J Aust* 1998; 169: 93-97.
- 10 Nankervis A, McIntyre HD, Moses R, et al; Australasian Diabetes in Pregnancy Society. ADIPS consensus guidelines for the testing and diagnosis of gestational diabetes mellitus in Australia. Sydney: ADIPS, 2013. <http://www.adips.org/downloads/ADIPSConsensusGuidelinesGDM-03.05.13VersionACCEPTEDFINAL.pdf> (accessed Apr 2014).
- 11 National Institute for Health and Clinical Excellence. Diabetes in pregnancy: management of diabetes and its complications from pre-conception to the postnatal period. London: NICE, 2008. <http://www.nice.org.uk/nicemedia/pdf/CG063Guidance.pdf> (accessed May 2014).
- 12 Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Clinical practice guidelines for the prevention and management of diabetes in Canada. *Can J Diabetes* 2013; 37 Suppl 1: S1-S216.
- 13 Diabetes Australia, Royal Australian College of General Practitioners. Diabetes management in general practice 2011-12. Sydney: RACGP, 2011. <http://www.racgp.org.au/download/documents/Guidelines/Diabetes/201107diabetesmanagementingeneralpractice.pdf> (accessed May 2014).
- 14 Royal Australian College of General Practitioners. Guidelines for preventive activities in general practice. 8th ed. Melbourne: RACGP, 2012. <http://www.racgp.org.au/download/Documents/Guidelines/Redbook8/redbook8.pdf> (accessed May 2014).
- 15 Therapeutic guidelines: endocrinology. Version 4. Melbourne: Therapeutic Guidelines Limited, 2009.
- 16 Nankervis A, Costa J, editors. Diabetes and pregnancy: a woman's experiences and medical guidelines. Melbourne: Miranova, 2000.
- 17 Gunn J, Lumley J, Young D. The role of the general practitioner in postnatal care: a survey from Australian general practice. *Br J Gen Pract* 1998; 48: 1570-1574.
- 18 Harris M. The role of primary health care in preventing the onset of chronic disease, with a particular focus on the lifestyle risk factors of obesity, tobacco and alcohol. 2008. [http://www.preventativehealth.org.au/internet/preventativehealth/publishing.nsf/Content/OFBE203C1C547A82CA257529000231BF/\\$File/commppaper-primary-hlth-care-harris.pdf](http://www.preventativehealth.org.au/internet/preventativehealth/publishing.nsf/Content/OFBE203C1C547A82CA257529000231BF/$File/commppaper-primary-hlth-care-harris.pdf) (accessed May 2014).
- 19 Lindström J, Peltonen M, Eriksson J, et al. Improved lifestyle and decreased diabetes risk over 13 years: long-term follow-up of the randomised Finnish Diabetes Prevention Study (DPS). *Diabetologia* 2013; 56: 284-293.
- 20 Ball L, Hughes R, Desbrow B, Leveritt M. Patients' perceptions of nutrition care provided by general practitioners: focus on type 2 diabetes. *Fam Pract* 2012; 29: 719-725.
- 21 Wilkinson SA, Lim SS, Upham S, et al. Who's responsible for the care of women during and after a pregnancy affected by gestational diabetes? *Med J Aust* 2014; 201 (3 Suppl): S78-S81.
- 22 Carson MP, Frank MI, Keely E. Postpartum testing rates among women with a history of gestational diabetes – systematic review. *Prim Care Diabetes* 2013; 7: 177-186.
- 23 Lie ML, Hayes L, Lewis-Barned NJ, et al. Preventing type 2 diabetes after gestational diabetes: women's experiences and implications for diabetes prevention interventions. *Diabet Med* 2013; 30: 986-993.
- 24 Grol R, Wensing M. What drives change? Barriers to and incentives for achieving evidence-based practice. *Med J Aust* 2004; 180 (6 Suppl): S57-S60.
- 25 French SD, Green SE, O'Connor DA, et al. Developing theory-informed behaviour change interventions to implement evidence into practice: a systematic approach using the Theoretical Domains Framework. *Implement Sci* 2012; 7: 38.
- 26 Creavin ST, Creavin AL, Mallen CD. Do GPs respond to postal questionnaire surveys? A comprehensive review of primary care literature. *Fam Pract* 2011; 28: 461-467. 