

# A new model for preconception care in women with diabetes

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## Article points

1. In order to improve outcomes, there is a need for women with diabetes and healthcare professionals to be aware of the need for preconception care.
2. In this article, the author describes a new model for preconception care, PROCEED (Preconception Care in Diabetes for Derby and Derbyshire), which took a hospital-based service to the community and gave women the choice as to where and when they were seen, as well as how they were contacted.
3. It is concluded that, after 1 year, the service increased productivity, efficiency and preconception care rates, as well as being more responsive to user needs.

## Key words

- Preconception care
- Pregnancy

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**Women with diabetes are two-to-four times more likely to have a baby with an abnormality and five times as likely to experience a stillbirth as women without diabetes. Effective preconception care improves outcomes. This article describes the key components of preconception care, and the challenges in delivering it both nationally and at a local level in Derby. A new model for preconception care, PROCEED (Preconception Care in Diabetes for Derby and Derbyshire) is described, which integrates care both “horizontally” across diabetes and obstetrics specialities, and “vertically” across the boundaries of primary and secondary care.**

Glucose is a teratogen, and the fact that women with diabetes are at increased risk of congenital abnormalities is well established (Cousins, 1983; Freinkel et al, 1986; Hanson et al, 1990). It is more than 20 years since Steel et al (1990) demonstrated that preconception care, in particular tight glucose control around the time of conception, reduced the risks of congenital abnormalities. It was therefore shocking that the last national audit of pregnancies in women with diabetes in 2002, by the Confidential Enquiry in to Maternal and Child Health (CEMACH, 2005), showed that these women were still two-to-four times more likely to have a baby with a congenital abnormality and five times more likely to experience a stillbirth than a woman without diabetes. In addition, only 34% of women with diabetes accessed preconception care.

Extrapolating from Diabetes UK prevalence figures (Diabetes UK, 2010), it is estimated that there were 8000 women with diabetes in England and Wales who had pregnancies in 2011. Therefore, the adverse effects of diabetes in pregnancy are not just a tragedy for the individual

woman and her family, but are also a significant financial burden on the NHS. It is not surprising that, in 2006, NICE emphasised the importance of effective preconception care in improving the outcomes in pregnancies complicated by diabetes, and in 2011, preconception was listed as a NICE quality standard (NICE, 2006; 2011).

## What should we be doing?

In order to improve outcomes, there is a need for women with diabetes and healthcare professionals to be aware of the need for preconception care.

## Raising preconception awareness

It is important for women with diabetes to understand the importance of planning pregnancy. All professionals in contact with women of a childbearing age have a responsibility to remind women of this. If appropriate, pregnancy plans should be discussed and documented at the diabetes annual review. If a woman with diabetes is not planning pregnancy, then she should be advised to use effective contraception, and the contraception used documented.

### Preconception care

Ideally, preconception care should be undertaken by a multidisciplinary specialist team comprising obstetrics and diabetes team members (NHS Diabetes, 2013). They should have the appropriate competencies as described in Skills for Health (2011).

The components of preconception care are listed in *Box 1* and stated by NICE (2006). It is important for women to be aware of the risks of diabetes in pregnancy. Preparation for pregnancy requires self-management, and although women need to understand the risks of diabetes in pregnancy, this should be discussed in a manner that motivates and does not induce fear. It should be emphasised that preconception care will help to “de-medicalise” their antenatal care, and hopefully allow them to enjoy their pregnancies. The importance of psychological support should not be underestimated, particularly in people with a history of depression or other mental health problems.

The most important aspect of preconception care is providing adequate support to achieve tight glucose control. While NICE quotes a target HbA<sub>1c</sub> of 43 mmol/mol (6.1%), the upper limit of “normal”, a significant proportion, particularly with type 1 diabetes, struggle to achieve this target without problematic hypoglycaemia, and it is equally important not to set unrealistic targets that can be demotivating. The Derby approach is to support women to achieve glucose levels as

close to normal as possible, without problematic hypoglycaemia. They may require access to structured education or insulin pump therapy to help them optimise their glucose control.

Women with diabetes are at risk of neural tube defects, such as spina bifida and anencephaly, and are therefore recommended to take higher doses of folic acid than the general population – for example, 5 mg instead of 400 µg. This should ideally be started 2–3 months preconceptually and continued until 12 weeks of pregnancy. The higher dose cannot be bought over the counter and needs to be prescribed.

A review of the woman’s medication is essential as the drugs may be teratogenic and, where possible, should be replaced by medication that is known to be safe. For example, hypertension is common in people with diabetes, and the first-line drug of choice is an angiotensin-converting enzyme (ACE) inhibitor, which can cause fetal abnormalities and impair fetal renal function, and therefore an alternative drug may be considered, such as labetalol or methyldopa. The benefits of the drug need to be balanced against the risks. For example, ACE inhibitors are also used in the treatment of diabetes-related kidney disease and diabetic nephropathy. A decision has to be made regarding weighing the risks of the ACE inhibitor on the fetus against the drug’s renoprotective effects and a risk of deteriorating renal function while the woman is waiting to conceive. While the majority of women are

### Page points

1. It is important for women to be aware of the risks of diabetes in pregnancy.
2. The most important aspect of preconception care is providing adequate support to achieve tight glucose control.
3. Women should be prescribed 5 mg folic acid and their medication should be reviewed; if possible, they should be given alternative drugs that are known to be safer during pregnancy.

#### Box 1. Components of preconception care (NICE, 2006).

- Facilitate empowerment by providing information to women regarding the risks of pregnancy with diabetes and how these can be reduced.
- Optimise blood glucose control.
- Prescribe 5 mg folic acid.
- Change teratogenic drugs to safer alternatives for use during pregnancy.
- Optimise complications and coexisting medical problems.
- Support weight reduction, if appropriate.
- Support lifestyle changes, such as smoking cessation.
- Consider psychological support if appropriate.

*“Obesity increases the risks associated with pregnancy independently of diabetes, and women should be offered support to lose weight, particularly if they are struggling to conceive.”*

advised to stop the drug preconceptually, I have come across instances in which it is continued until the woman becomes pregnant.

Any complications of diabetes or other medical problems should be optimised, particularly retinopathy, which can deteriorate during pregnancy.

Obesity increases the risks associated with pregnancy independently of diabetes, and women should be offered support to lose weight, particularly if they are struggling to conceive. In women with polycystic ovarian syndrome, a risk factor for type 2 diabetes, weight loss can improve ovulation rates (Stankiewicz and Norman, 2006).

Women should be advised to stop smoking, ideally stop or at least limit alcohol consumption and avoid recreational drugs (Mitchell et al, 2012).

**Preconception care for diabetes in Derby and Derbyshire**

In Derby, we serve a greater population of 600 000 and the obstetrics unit handles 6000 deliveries a year; 35–50 of these involve mothers with diabetes, and a further 300 mothers develop diabetes in pregnancy. This article relates to the first group, those with pre-existing

diabetes. In 2002, 32% of women with diabetes accessed preconception care (preconception care rate), in line with the national figure of 34%. At this time, preconception care was undertaken by a multidisciplinary team in the hospital antenatal clinic. While we transiently improved the percentage of women accessing preconception care through raising awareness, diabetes service restructuring resulted in some team members taking up posts in primary care, and a loss of capacity. This meant that women became pregnant while waiting for preconception care. Moreover, it became clear that this model was not suitable for all women, and 18% of appointments were not attended. By 2009–2010, the percentage of pregnant women with diabetes receiving preconception care (preconception care rate) fell from 68 to 48%, and the number of adverse outcomes from pregnancy, particularly stillbirths, increased. In addition, there was considerable variation in the care received – from none at all to full multidisciplinary care. A number of women reported that attending a hospital-based clinic on the outskirts of Derby was inconvenient as it was not local to their place of work, and that the antenatal clinic environment was stressful, particularly if they had a history of infertility or

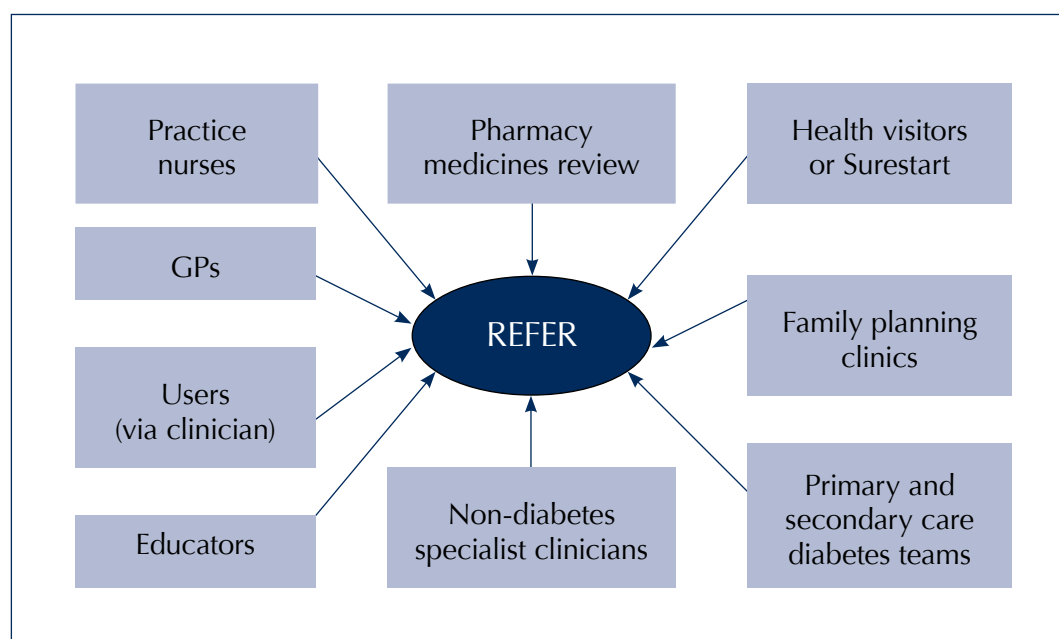


Figure 1. Raising awareness of the need for preconception care.

miscarriage. We therefore considered our options as to how we could improve service capacity, as well as redesign a service to better meet our users' needs. We considered working with the team members who were now working in primary care to increase our capacity and to also operate clinics outside of the hospital. PROCEED (Preconception Care for Diabetes in Derby and Derbyshire) evolved from these ideas.

We were fortunate in receiving 12 months funding from The Health Foundation to pilot PROCEED. PROCEED has 2 components – raising preconception awareness and undertaking preconception care.

### PROCEED: Preconception awareness

We targeted all professionals in contact with women with diabetes, as well as the women themselves (see *Figure 1*). Specifically:

- Professionals were reminded of the need to ask women with diabetes of childbearing age about pregnancy plans and, if they were not planning pregnancy, advise them to use effective contraception. This was undertaken by visiting different groups of professionals in the context of team meetings, and reinforced with the use of written material (NHS Diabetes, 2013). The effect of this was evaluated through monitoring referral rates.
- Community pharmacists were engaged through presentations at educational meetings organised by the local pharmaceutical committee. They were encouraged to discuss pregnancy plans with women as part of their medications review service.
- All GP practices were sent information about preconception care, user information leaflets and posters (NHS Diabetes, 2013).
- All women with diabetes aged 18–45 years were sent an information leaflet (NHS Diabetes, 2013).
- User awareness was also raised through local media (television, radio and newspapers), as well as via pages on the acute trust website and Twitter. The need to use contraception and to plan pregnancies was discussed, and the benefits of preconception care in reducing birth defects were emphasised.

- Group sessions were organised for young women aged 18–25 years and South Asian women from low socioeconomic backgrounds, two groups that rarely access preconception care in the area. We had a good uptake for the group for 18–25 year olds but less so for the group for South Asian women. The group for 18–25 year olds was called “Just for girls”. A total of six to eight women were seen in each group. They set the agenda for most of the session, but the facilitator, a DSN and educator, steered the discussions to include our key messages. Contraception was discussed in terms of both the importance of its use and the different methods available. A Diabetes UK video “Rebel Rebel”, which discussed aspects of preconception care, was also shown (Diabetes UK, 2013).

### PROCEED: Undertaking preconception care

We redesigned a secondary care service and took it to the community by working in partnership with clinicians and organisations to improve quality through six “Cs”:

1. **Cross-boundary** integration, in which patient care is delivered by clinicians in primary and secondary care working together.
2. Maintaining care by **competent** clinicians. Clinicians were classified as “competent” if they had worked in a diabetes antenatal clinic within the past 3 years and possessed the appropriate competencies as listed by Skills for Health (2011).
3. For the first time, providing a **choice** of venue, timing and mode of contact through telephone, email and face-to-face consultations.
4. Providing **consistency** of information.
5. Ensuring **continuity** into pregnancy – two team members at each PROCEED clinic also work in antenatal clinics.
6. **Changing the consultant role** from seeing all women to concentrating on those at highest risk, and ensuring the smooth delivery of the pathway by leading a monthly review of users in the service and, for example, avoiding duplication of appointments, as well as prioritising women waiting for structured education or treatment with insulin pumps.

### Page points

1. To raise awareness of preconception care, the PROCEED (Preconception Care in Diabetes for Derby and Derbyshire) team targeted all professionals in contact with women with diabetes.
2. In order to improve the quality of preconception care, the PROCEED team worked in partnership with clinicians across organisational boundaries.

**Page points**

1. The results of a questionnaire exploring women’s knowledge showed that the knowledge gained from PROCEED (Preconception Care in Diabetes for Derby and Derbyshire) was similar to that gained from traditional consultations, demonstrating that changing the service model did not compromise user empowerment.
2. It is reported that 2.5 times as many women were given preconception care in the first year of PROCEED compared with the previous 12 months in the secondary care service, and that the median waiting time fell from 13 to 5 weeks.

All relevant healthcare professionals and the women themselves, as outlined in *Figure 1*, can refer into the service by letter, email or telephone. Following referral, each woman has a multidisciplinary consultation with members of the diabetes and obstetrics team in a location of their choice. The risks are discussed and an individualised care plan with achievable targets is made to address how these risks can be reduced. She is then referred to the appropriate resources across primary and secondary care to implement this plan.

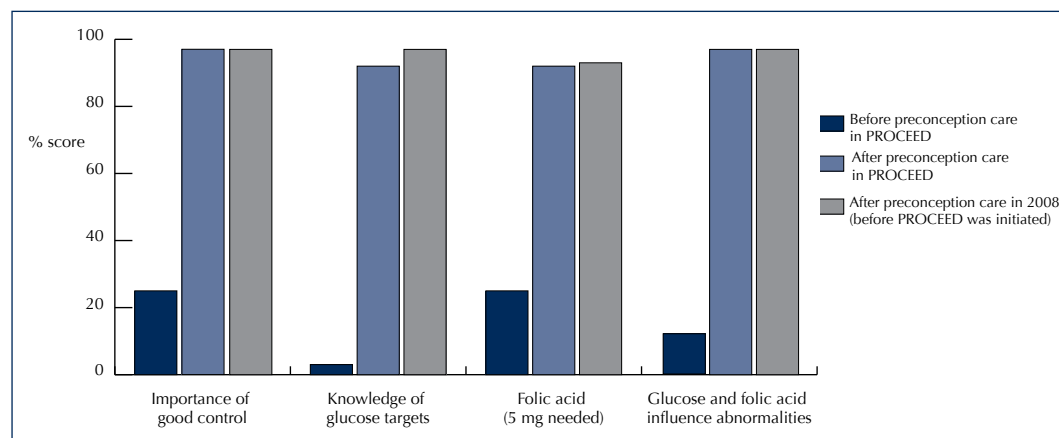
**Non-inferiority of PROCEED**

It was important to establish whether spreading the project across a wider geographical area, and reducing consultant-led consultations would affect the quality of the service. We assessed this using a questionnaire to ascertain

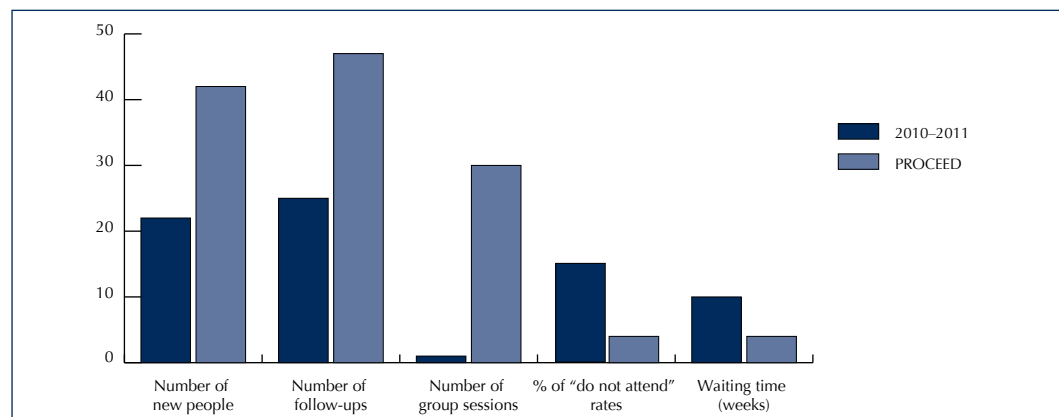
the knowledge of women before and after their experience with PROCEED, compared with the data we had previously obtained in 2008 from women who had pregnancies and had accessed preconception care (*Figure 2*). Women’s knowledge improved as a result of preconception care to a similar level to that observed in 2008 showing that the quality of care was not inferior to the traditional model.

**What have we achieved?**

*Figure 3* demonstrates that we saw 2.5 times as many women in the first year of PROCEED (April 2011–March 2012) compared with during the previous 12 months in the secondary care service, and the median waiting time fell from 13 to 5 weeks. As we only increased staffing levels by 50%, we were providing a more productive and efficient service. A total of 70% of women who



*Figure 2. Knowledge of participants before and after experience with PROCEED (Preconception Care for Diabetes in Derby and Derbyshire) on the basis of the percentage of correct answers.*



*Figure 3. Activity, productivity and efficiency of PROCEED (Preconception Care for Diabetes in Derby and Derbyshire).*

became pregnant in the PROCEED evaluation period accessed preconception care. To date, there have been no stillbirths. Our users have been positive, with comments including:

*“Without doubt, the continuity is excellent. It’s lovely to see the same person each time.”*

*“100% thumbs up.”*

*“More comfortable seeing Dr King and Karen (Nurse Specialist) than ever felt before. Ripley is so convenient, it takes the stress away.”*

*“I just want to say how much more convenient it is for us diabetic ‘wannabe’ mothers to have support out of hours and also by e mail. I work 9am–5pm 5 days a week, and when you are keeping it quiet at work that you are even trying to conceive it is more helpful to speak to someone after work, via email and also by telephone. Also the e mail or telephone contact is especially handy when you physically don’t have enough hours in the day to get to the hospital to see somebody.”*

*“I know that a lot of women don’t plan pregnancy and I can understand why. There is a lot to worry about between blood glucose levels and the worry about complications such as heart defects. However, the close contact that I have had with Dr King and her team has transformed my experience from a potentially very stressful one into an enjoyable one. They run a first class service and I have felt very privileged to be part of the service.”*

### The future of PROCEED

PROCEED has been commissioned by the Southern Derbyshire Clinical Commissioning Group, and will be delivered and administered through InterCare Health, one of our integrated diabetes services. This allows us to embed PROCEED into our routine practice and to continue to provide high-quality preconception services for Derby and Southern Derbyshire.

We have been awarded a further grant from The Health Foundation to spread our learning, and it is hoped that this will give other centres the opportunity to adopt our model. ■

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**“PROCEED  
(Preconception Care  
in Diabetes for Derby  
and Derbyshire) will  
be delivered and  
administered through  
one of our integrated  
diabetes services,  
allowing us to embed  
it into our routine  
practice and to continue  
to provide high-quality  
preconception services  
for Derby and Southern  
Derbyshire.”**

For further resources regarding preconception care for women with diabetes, please see the **NHS Diabetes** website at: <http://bit.ly/12RXdMC>