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<th>ATLANTIC DIP: pregnancy outcome for women with pregestational diabetes along the Irish Atlantic seaboard.</th>
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<tr>
<td>Author(s)</td>
<td>Dunne, Fidelma; Avalos, Gloria; Durkan, Meave; Mitchell, Yvonne; Gallacher, Therese; Keenan, Marita; Hogan, Marie; Carmody, Louise A.; Gaffney, Geraldine</td>
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OBJECTIVE — Prospective evaluation of pregnancy outcomes in pregestational diabetes along the Atlantic seaboard 2006–2007.

RESEARCH DESIGN AND METHODS — The Atlantic Diabetes in Pregnancy group, representing five antenatal centers in a wide geographical location, was established in 2005. All women with diabetes for >6 months before the index pregnancy were included. Results were collected electronically via the DIAMOND Diabetes Information System. Pregnancy outcome was compared with background rates.

RESULTS — There were 104 singleton pregnancies. The stillbirth rate (25/1,000) was 5 times, perinatal mortality rate (25/1,000) 3.5 times, and congenital malformation rate (24/1,000) 2 times that of the background population. A total of 28% of women received prepregnancy care, 43% received prepregnancy folic acid, and 51% achieved an A1C ≤7% at first antenatal visit.

CONCLUSIONS — Women are not well prepared for pregnancy, and outcomes are suboptimal. A regional prepregnancy care program and centralized glucose management are urgently needed.

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ATLANTIC DIP: Pregnancy Outcome for Women With Pregestational Diabetes Along the Irish Atlantic Seaboard

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For the ATLANTIC DIP collaborators

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CONCLUSIONS — Women are not well prepared for pregnancy, and outcomes are suboptimal. A regional prepregnancy care program and centralized glucose management are urgently needed.
There was no significant difference in A1C achieved in central compared with peripheral hospital sites.

Pregnancy-induced hypertension/preeclampsia was three times more common in women with (14%) than in those without (5%) diabetes. Caesarean section rates were greater in women with (43%) than in those without (27%) diabetes. The elective caesarean section rate was similar at 18 and 14%, but emergency caesarean section rates were greater in women with (25%) than in those without (13%) diabetes.

There were 23 (22%) miscarriages, 79 (76%) live births, 2 (2%) stillbirths, and no neonatal deaths. The stillbirth rate (2.5/1,000) was 5 times greater and the perinatal mortality rate 3.5 times greater than background but similar to reported U.K. Confidential Enquiry to Maternal and Child Health figures. Two babies were born with congenital abnormalities (congenital malformation rate 24/1,000) to mothers with A1C levels of 6.6 and 5.4% at booking. All stillbirths and malformations occurred at peripheral sites, as did a great proportion of miscarriages (Table 1). A total of 83% of babies were born at term. A total of 12 and 3% of babies from mothers with and without diabetes were delivered preterm, and 32 and 17%, respectively, weighed >4 kg at birth. There was a greater proportion of large-for-gestational-age babies at peripheral (30%) compared with central sites (20%). All small-for-gestational-age babies (7%) were born at peripheral sites (Table 1).

There were 48% with, compared to 11% without, diabetes admitted for neonatal unit care. A total of 83 and 20% of babies at peripheral and central locations, respectively, received neonatal unit care (Table 1). Hypoglycemia (32%), polyolnenaemia (14%), jaundice (5%), and respiratory distress (5%) were reported on admission.

CONCLUSIONS — The ATLANTIC DIP program is well established, and a number of projects are ongoing. This is the first attempt to systematically examine regional pregnancy outcomes and use a novel mode of data collection (DIAMOND). Diabetic pregnancy outcomes have been reported to be better in central compared with peripheral locations (2), and these findings have been confirmed by this study, where perinatal mortality (stillbirth rate/perinatal mortality rate) and morbidity (neonatal unit admissions, congenital malformation rate, infant size at birth) are more satisfactory at the central compared with the peripheral sites.

Prepregnancy care plays an important role in reducing congenital malformations and improving perinatal (3,4) and infant morbidity (5–10) through a combination of factors such as glucose control, folic acid uptake, and removing teratogenic drugs. Prepregnancy care is lacking in the region, with only 14% in peripheral sites and 65% centrally receiving it. A total of 50% have a suboptimal booking A1C and folic acid uptake. Suboptimal outcomes are proportionally greater in peripheral compared with central locations, where formal prepregnancy care is unavailable. Although A1C values do not differ between locations, prepregnancy care will have addressed the impact of teratogenic drugs, rubella screening, folic acid uptake, and smoking and alcohol intake factors known to influence pregnancy outcome.

Pregnancy outcomes therefore may be improved by a regional protocol-driven prepregnancy care program. The literature would suggest a 50% reduction in adverse events with such a program. Centralization of glucose management using telemedicine technology would complement a prepregnancy care program. These interventions are likely to make a significant contribution to the health of these women and significantly improve the outcome of their pregnancies.

Acknowledgments — No potential conflicts of interest relevant to this article were reported.

Parts of this article were presented at the 5th International Symposium on Diabetes in Pregnancy, Sorrento, Italy, 26–28 March 2009.

We are grateful to the staff and patients along the Atlantic Seaboard, to collaborators at each center, and to the Health Research Board for funding.

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The ATLANTIC DIP program

Table 1—Pregnancy outcomes in peripheral and central hospitals of the ATLANTIC DIP collaboration

<table>
<thead>
<tr>
<th></th>
<th>Peripheral</th>
<th>Central</th>
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<tr>
<td>n</td>
<td>73</td>
<td>31</td>
</tr>
<tr>
<td>Live births</td>
<td>54 (74)</td>
<td>25 (81)</td>
</tr>
<tr>
<td>Miscarriage</td>
<td>17 (23)</td>
<td>6 (19)</td>
</tr>
<tr>
<td>Stillbirth</td>
<td>2 (3.6)</td>
<td>0</td>
</tr>
<tr>
<td>Malformations</td>
<td>2 (3.6)</td>
<td>0</td>
</tr>
<tr>
<td>Small for gestational age</td>
<td>4 (7)</td>
<td>0</td>
</tr>
<tr>
<td>Large for gestational age</td>
<td>16 (30)</td>
<td>5 (20)</td>
</tr>
<tr>
<td>Neonatal unit care</td>
<td>45 (83)*</td>
<td>5 (20)</td>
</tr>
<tr>
<td>Prepregnancy care</td>
<td>10 (14)*</td>
<td>20 (65)</td>
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</table>

Data are n (%). *P = 0.0001.