

The Relationship Between Maternal Diabetes and Birth Defects

Infants reported to the Illinois Department of Public Health's Adverse Pregnancy Outcome Reporting System (APORS) with one or more birth defects are significantly more likely to have diabetic mothers than other Illinois newborns ($p < 0.001$). Hospitals are required to report newborns with birth defects or other specified adverse pregnancy outcomes to APORS. [Further information is then collected about the infant and mother by APORS field staff, including whether the mother had gestational (pregnancy induced) or pre-existing diabetes.] The birth certificate also contains a field that indicates whether the mother had diabetes during pregnancy, but does not distinguish between gestational vs. pre-existing diabetes.

Table 1. The rate (per 10,000 live births) of maternal diabetes among different populations of Illinois children, 1994-1998

Population	Number of Births	Rate of Maternal Diabetes ¹	95% CI ²
All Illinois newborns	921,214	213.8	(210.8, 216.8)
APORS without birth defects ³	29,208	226.0	(209.1, 243.9)
APORS with birth defects	21,225	455.1	(426.9, 484.8)

¹ Rate per 10,000 live births

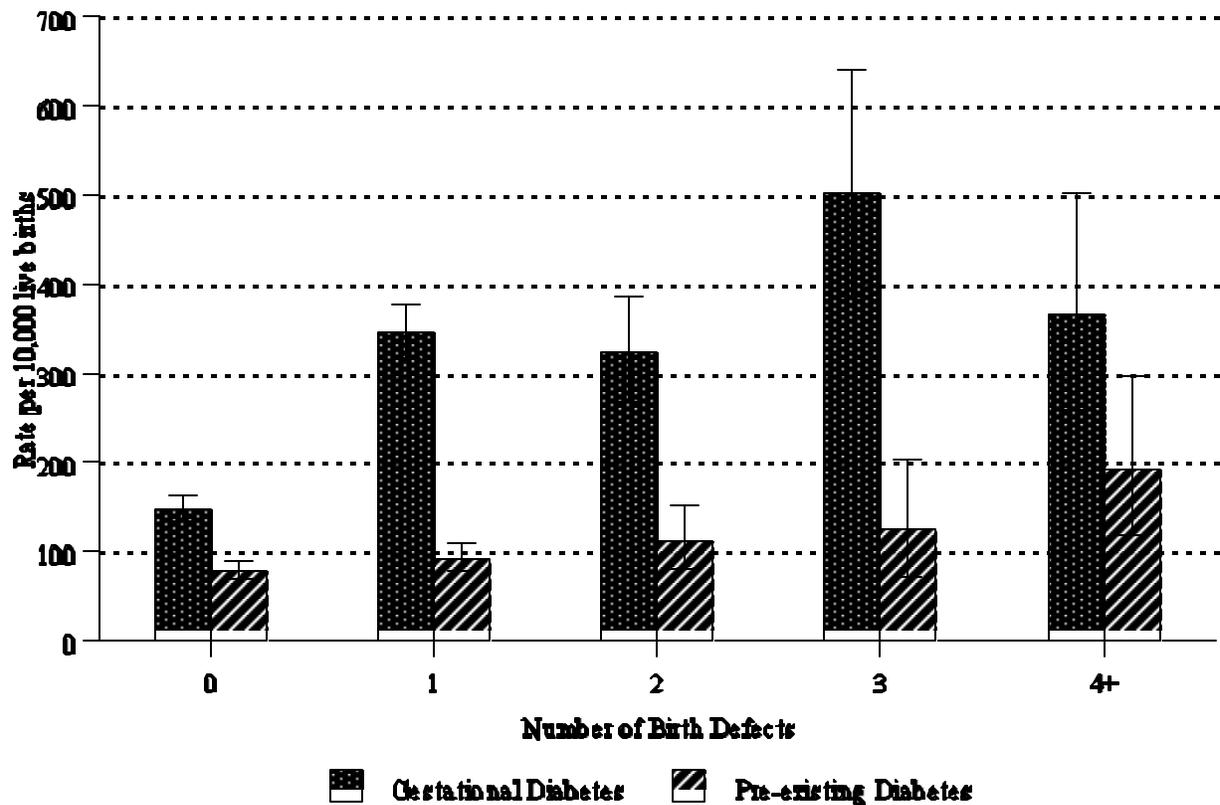
² confidence interval

³ These children were reported to APORS with a medical condition, such as very low birth weight or fetal alcohol syndrome, but no birth defect.

Source: Illinois Department of Public Health, 2002

Gestational diabetes and pre-existing diabetes cause problems when a developing baby is exposed to markedly elevated glucose levels.¹ The two forms of diabetes may have different effects because they impact different stages of the pregnancy. Babies of women with poorly controlled pre-existing diabetes will be exposed to elevated glucose levels throughout pregnancy, including the first two or three weeks after conception when many developmental processes are especially vulnerable to disruption. Generally, gestational diabetes develops later in pregnancy and, therefore, impacts fewer developmental processes. However, gestational diabetes may lead to miscarriage or early delivery of the baby. Gestational diabetes also may indicate a mother with undiagnosed diabetes or a lower tolerance for glucose. Figure 1 shows the rates of maternal diabetes among children with different numbers of birth defects. Regression analysis indicates that there is a significant increasing trend ($P < 0.0001$ for either pre-existing or gestational diabetes) in the probabilities that mothers will have diabetes given children with increasing numbers of birth defects.

Figure 1. The rate (per 10,000 live births) of maternal diabetes among children with different numbers of birth defects, 1994-1998



Source: Illinois Department of Public Health, 2002

A study published in 2001 demonstrated that diabetic women who received preconception care were less likely to have babies with birth defects than those who did not receive such care.² Diabetic women in Illinois, and those at greatest risk for gestational diabetes, should be aware of the need to achieve glycemic control before conception. The data in this report emphasize the need for such education in Illinois because increasing control should lead to a reduction in the number of children born with birth defects.

References

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2. Ray JG, O'Brien TE, Chan WS. Preconception care and the risk of congenital anomalies in the offspring of women with diabetes mellitus: a meta-analysis. QJM: Monthly Journal of the Association of Physicians. 2001, 94(8): 435-44.