classified by quintiles and determined for each trimester and the total pregnancy period.

The study included 4830 births, 2979 in the unexposed and 1851 in the exposed group, by 3676 women (2275 unexposed and 1401 exposed). The mean number of weekly alarams in the exposed group was 2.16 ± 2.71 (range, 0 to 71). The mean pregnancy duration in the total study population was 275.6 ± 13.2 days and mean birth weight was 3227 ± 503 g: rates of LBW, PTB, and SGA were 6.5%, 7.7%, and 3.1%, respectively. In exposed women, pregnancy duration was shorter by a mean 0.9 day compared with unexposed women (P = 0.02). The groups did not differ significantly in mean birth weights or SGA rates. Rates for PTB and LBW were 9.1% and 7.6% in the exposed group compared with 6.8% and 5.8% in unexposed women, respectively (P = 0.018). Among women with a PTB, the primary reason for any hospital admission did not differ significantly between the groups. When controlling for maternal age, origin, parity, gestational diabetes, and pregnancy-induced hypertension, stress exposure remained a risk factor for PTB and LBW. For primiparous women only, the rates of PTB were 10.8% (52/478) and 7.5% (57/760) in exposed and unexposed women, respectively. After controlling for potential confounders, the risks for PTB and LBW remained significantly higher in the exposed group (PTB: adjusted odds ratio, 1.3; 95% confidence interval, 1.03-1.7). No linear association was apparent between the intensity of exposure and the risk of PTB or LBW. Before the onset of rocket attacks, the PTB rates were similar in the 2 towns (7.2% in Sderot; 7.3% Kiryat Gat). After the onset of attacks, the PTB rate was 9.1% in Sderot and 6.8% in Kiryat Gat. LBW increased from 5.8% to 7.6% in Sderot and decreased from 7.5% to 5.8% in Kiryat Gat. The differences in the rates of LBW and PTB between the 2 time periods did not differ significantly in either group.

These results indicate that women exposed to chronic stress may be at risk for higher rates of PTB and LBW. Intervention programs to reduce stress may help lower the risk of these adverse pregnancy outcomes.

### Availability and Access in Modern Obstetric Care: A Retrospective Population-based Study

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*(BJOG. 2014;121(3):290–299)*

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DOI: 10.1097/01.aoa.0000460392.52478.ee

**Topic:** Systems-based Practice

Within various fields of medicine, centralization to larger care units has improved patient outcomes. In obstetrics, however, low-risk deliveries at large institutions have been associated with an increased frequency of maternal interventions, and it has not been established if this centralization results in improved neonatal outcomes for low-risk infants. Other than access to neonatal intensive care units, little attention has been paid to the availability of and access to obstetric institutions in developed countries. This retrospective population-based study was undertaken to assess the availability of obstetric institutions, the risk of unplanned delivery outside an institution, and maternal morbidity in Norway.

The study included 3 cohorts and 2 cross-sectional analyses. Data from the Medical Birth Registry of Norway were used for the retrospective cohort analysis of unplanned deliveries outside institutions from 1979 to 2009. The number of women of childbearing age who lived >1 or 2 hours away from the nearest obstetric institution was determined. The 2 retrospective cohort analyses used all deliveries during 2000 (n = 58,632) and 2009 (n = 61,895). Cross tables were used to calculate the risk of unplanned delivery outside an institution in all 5-year groups from 1979 to 1983 to 2004 to 2009. Time trends across these groups were evaluated using logistic regression analyses. Cross tables were also used to calculate odds ratios with 95% confidence intervals (CIs) for maternal morbidity in 2009 relative to 2000. Regional differences in maternal morbidity and delivery-related perinatal mortality were analyzed using the region with the lowest risk as reference. Logistic regression analyses were used to adjust for confounding factors of maternal age, parity, education, smoking status, and partner status.

From 2000 to 2010, the proportion of women who lived outside the 1-hour zone of all institutions increased from 7.9% to 8.8% (relative risk, 1.11; 95% CI, 1.10-1.12). Increases in these percentages were noted in counties in which obstetric care institutions closed during this period. The percentage of women living outside the 1-hour zone for emergency obstetric care institutions increased from 11.0% to 12.1% during the study period (relative risk, 1.1; 95% CI, 1.09-1.11). The number of counties in which >10% of women lived outside the 1-hour zone increased from 9 to 11. From 1979 to 2009, the number of institutions declined from 95 to 51, and 11, 537 deliveries occurred outside an institution among 1,807,714 deliveries. The risk of unplanned delivery outside an institution increased from 0.4% in 1979 to 1983 to 0.8% in 1994 to 1998, and to 0.7% in 1999 to 2003 and 2004 to 2009. From 2000 to 2009, the number of emergency obstetric care institutions decreased from 47 to 31. The national average cesarean delivery rate was 14% in 2000 and 17% in 2009, with a regional range of 11% to 15% in the first period and 13% to 19% in the later period. Twelve institutions in 2000 and 10 in 2009 provided only basic obstetric care; most of these were in rural settings, with a helicopter response time >20 minutes and a road ambulance time of 1 to 3 hours to the nearest emergency facility. Maternal morbidity rates were 1.7% in 2000 and 2.2% in 2009 (adjusted odds ratio, 1.4; 95% CI, 1.2-1.5).

The changes reported in this study coincided with an increasing proportion of women of childbearing age living a longer distance from obstetric facilities and the number of emergency obstetric care institutions declining. Availability and access to obstetric facilities must be considered when planning for health care services. Additional research is needed to further evaluate the effects of centralization of obstetric care.