

Maternal overweight and obesity in Queensland, 2008 to 2017

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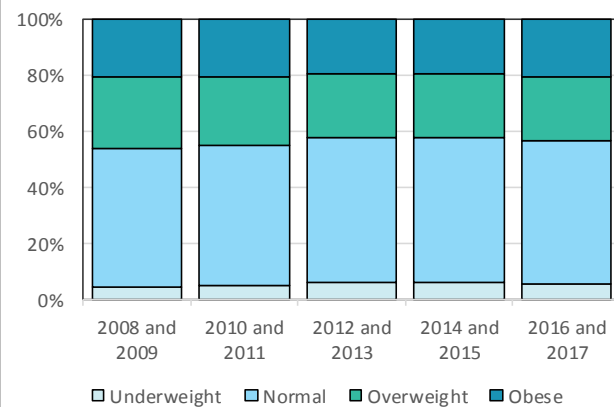
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Maternal overweight and obesity in Queensland, 2008 to 2017

Maternal overweight and obesity is a risk factor for pregnancy and birth complications. Maternal obesity has been linked to a greater risk of gestational diabetes and hypertension, pre-eclampsia, caesarean section, postpartum haemorrhage and wound infections, while babies of obese mothers have a higher risk of macrosomia, preterm birth, various congenital anomalies, stillbirth and neonatal death¹⁻¹⁰. This Statbite explores the relationship between maternal BMI and various characteristics of mothers in Queensland and identifies the magnitude of increased risk of certain morbidities and outcomes for overweight and obese mothers and their babies.

Data between 2008 and 2016 calendar years were extracted from the Queensland Perinatal Data Collection (PDC), with emphasis on the latest biennium 2016 and 2017. Self-reported weight and self-reported or measured height were used to calculate BMI at the time of conception. Categories of BMI were defined as underweight (<18.5 kg/m²), normal (18.5-24.9 kg/m²), overweight (25.0-29.9 kg/m²) and obese (30+ km/m²). Records where BMI could not be determined were excluded from analyses (2.3% from 2008 to 2017; 1.6% of records in 2016 and 2017).

Figure 1 Distribution of maternal BMI by biennium, Queensland, 2008 to 2017



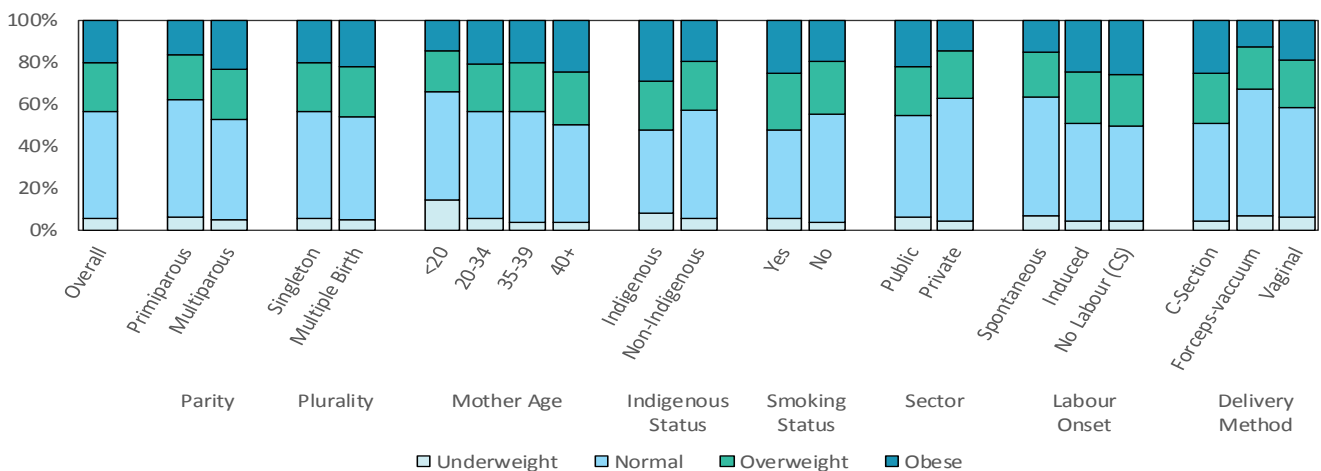
Source: Perinatal Data Collection

Descriptive Statistics

There has been little change in the distribution of BMI categories over the last 10 years (Figure 1). In 2016 and 2017, 43.3% of mothers were overweight or obese at the time of conception, with 20.3% in the obese category. This is a slight reduction compared with 2008 and 2009, where 46.2% of mothers were overweight or obese.

In 2016 and 2017, overweight and obese mothers were overrepresented in multiparous mothers (47.2% vs 37.5% in primiparous mothers), older mothers (49.7% in mothers aged 40+ vs 43.3% in mothers aged 20-34), mothers who smoked during pregnancy (48.8% vs 42.5% in mothers who did not smoke), public hospitals (45.3% vs 37.3% in private hospitals), and mothers who were induced or had a caesarean section without labour (48.8% and 50.6% respectively vs 36.7% in mothers whose labour was spontaneous) (Figure 2).

Figure 2 Distribution of maternal BMI by selected characteristics, Queensland, 2016 and 2017



Source: Perinatal Data Collection

Over half of Indigenous mothers were overweight or obese (52.5% vs 42.6% in non-Indigenous mothers) and the proportion varied within the Indigenous population (Torres Strait Islander mothers: 65.6%; Aboriginal mothers: 50.0%; both Aboriginal and Torres Strait Islander mothers: 56,3%). The proportion of overweight/obese mothers was similar between multiple births and singleton births (45.6% vs 43.2%).

Method of delivery

The proportion of mothers delivering by caesarean section increased with increasing maternal weight, with 41.7% of obese mothers delivering by caesarean section vs 26.0% of underweight mothers (Figure 3). The interplay between method of delivery, BMI and sector is displayed in Figure 4. To enable a clearer comparison between sectors, Figure 4 is limited to mothers classified in group 1 of the Robson Ten Group Classification System

(i.e. births that were nulliparous, single cephalic, 37+ weeks gestation at birth, spontaneous labour). This group is comprised of women with uncomplicated obstetric characteristics who generally have a low caesarean section rate. In both sectors, the proportion of caesarean deliveries increased with BMI. In public hospitals, the proportion of caesarean deliveries increased from 10.4% in underweight mothers to 19.4% in obese mothers, compared with an increase from 14.7% to 34.9% in private hospitals.

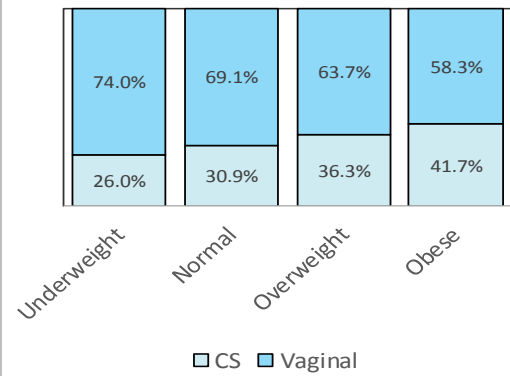
In public hospitals, the proportion of caesarean deliveries increased from 10.4% in underweight mothers to 19.4% in obese mothers, compared with an increase from 14.7% to 34.9% in private hospitals.

Maternal Complications/Outcomes

Rate ratios of selected complications and outcomes for obese, overweight and underweight mothers versus mothers in the normal weight BMI category are displayed in Figure 5. All rate ratios are adjusted for potentially confounding factors including maternal age, parity, plurality and smoking status. Complications and outcomes that have previously been linked^{1-4,9} with overweight/obese mothers were included in the analysis. Morbidity details were sourced from the Queensland Integrated Mothers and Babies Information (QIMBI) file*.

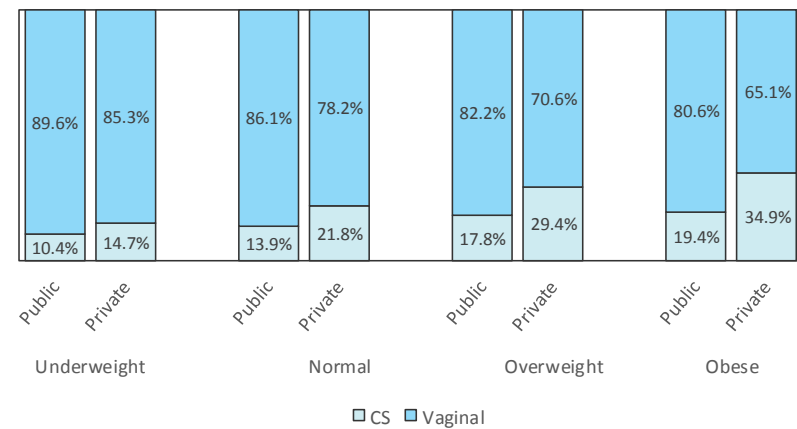
In 2016 and 2017, compared to mothers in the normal weight category, obese mothers were 3.02 times as likely to have gestational diabetes, 3.26 times as likely to have gestational hypertension, 2.45 times as likely to have pre-eclampsia, 1.90 times as likely to have eclampsia, 1.37 times as likely to deliver by caesarean section, 1.62 times as likely to have wound infection and 1.26 times as likely to have a postpartum haemorrhage. Overweight mothers also showed increased risks of these conditions/outcomes compared with normal weight mothers, but to a lesser magnitude than that observed for obese mothers.

Figure 3 Distribution of delivery method by maternal BMI category, Queensland, 2016 and 2017



Source: Queensland Perinatal Data Collection

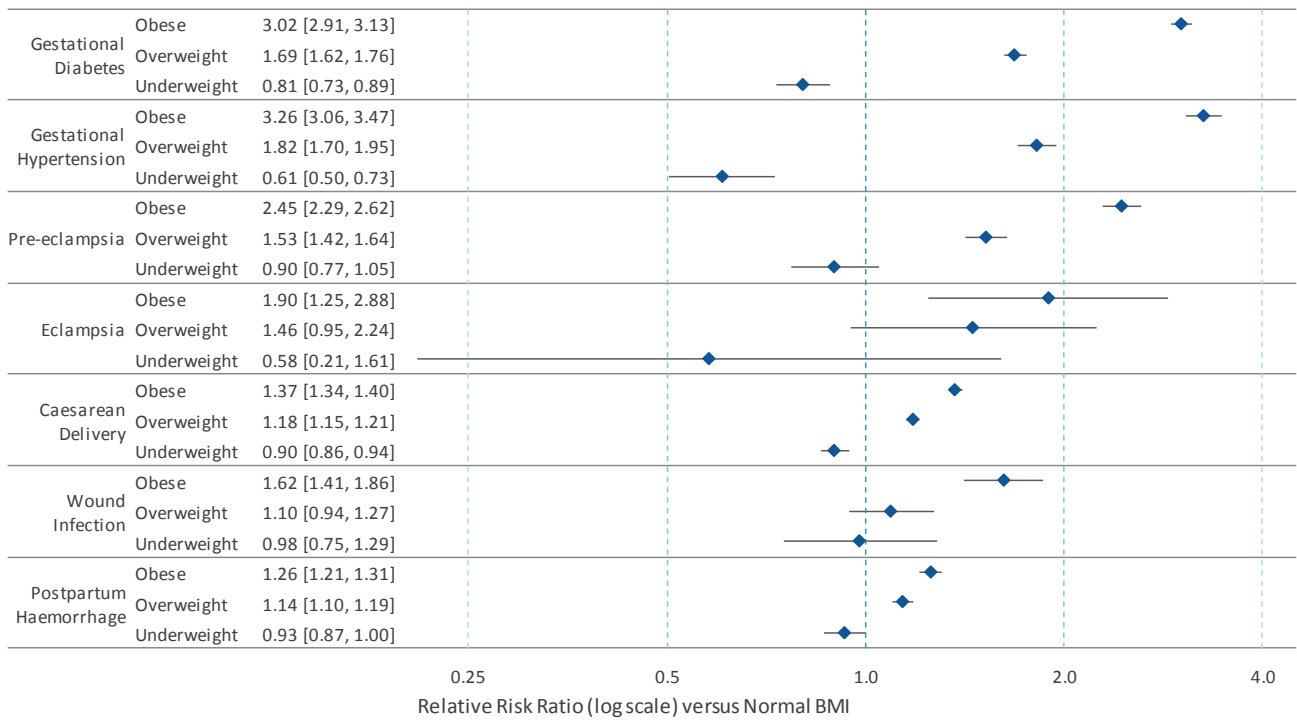
Figure 4 Distribution of delivery method by maternal BMI category and sector, for mothers categorised in group 1 of the Robson Ten Group Classification System, Queensland, 2016 and 2017



Source: Queensland Perinatal Data Collection

*A linked data resource that combines mother and baby morbidity details from the Queensland Perinatal Data Collection and the Queensland Hospital Admitted Patient Data Collection (QHAPDC)

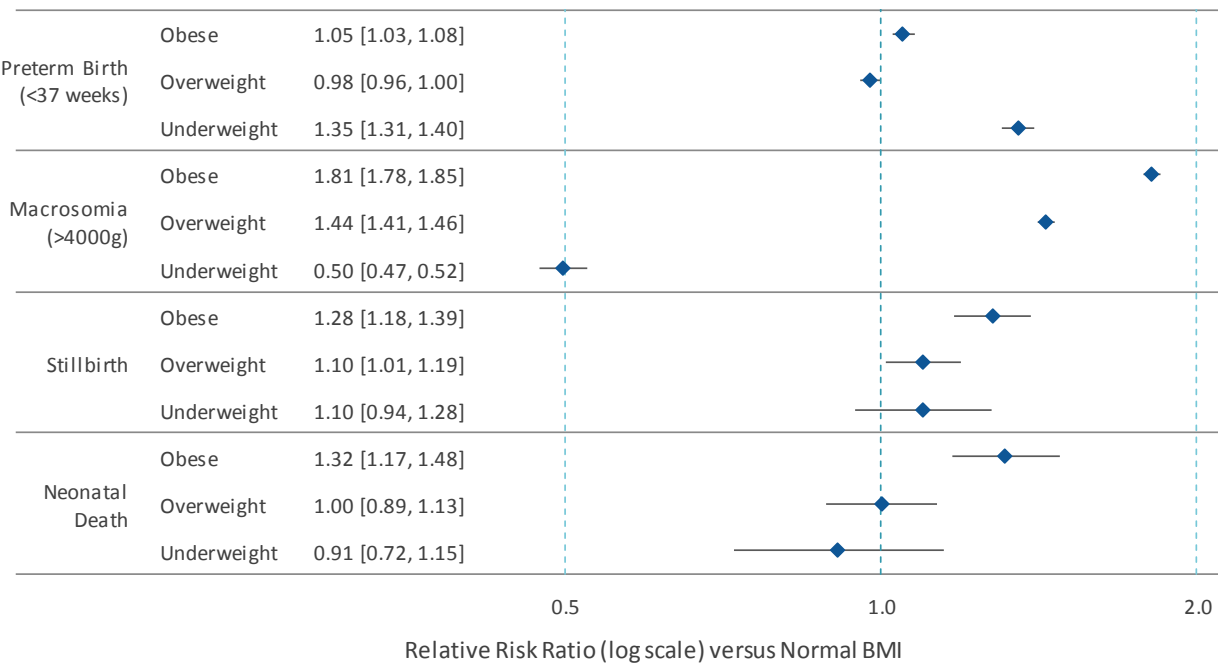
Figure 5 Adjusted rate ratios for selected complications for obese, overweight and underweight mothers vs mothers in the normal weight BMI category, Queensland, 2016 and 2017



Rate ratios adjusted for maternal age, parity, plurality and smoking status.

Source: Queensland Perinatal Data Collection, Queensland Integrated Mothers and Babies Information

Figure 6 Adjusted rate ratios for selected complications/outcomes for babies born to obese, overweight and underweight mothers vs babies born to mothers in the normal weight BMI category, Queensland, 2016 and 2017



Rate ratios adjusted for maternal age, parity, plurality and smoking status.

Source: Queensland Perinatal Data Collection

Baby Complications/Outcomes

Rate ratios of selected complications/outcomes for babies born to obese, overweight and underweight mothers versus babies born to mothers in the normal weight BMI category are displayed in Figure 6. All rate ratios are again adjusted for potentially confounding factors including maternal age, parity, plurality and smoking status. Complications and outcomes that have previously been linked^{1-4 10} with overweight/obese mothers were included in the analysis.

In 2016 and 2017, compared to babies born to mothers in the normal weight BMI category, babies born to obese mothers were slightly more likely to be born preterm, 1.81 times as likely to be macrosomic, 1.28 times as likely to be stillborn and 1.32 times as likely to die in the neonatal period. Babies born to overweight mothers were 1.44 times as likely to be macrosomic and 1.10 times as likely to be stillborn. Babies born to underweight mothers were 1.35 times as likely to be born preterm.

Congenital Anomalies

Rate ratios of incidence of selected congenital anomalies in babies born to obese, overweight and underweight mothers versus babies born to mothers in the normal weight BMI category are displayed in Figure 7. Data were sourced from the Congenital Anomaly Linked File[†] (CALF). All congenital anomaly categories from the CALF were assessed, but only categories that had significant results for overweight or obese mothers are included. Ten years of data, from 2008 to 2017, were utilised to increase cell counts for statistical analyses. However, some congenital anomalies are very rare, and caution should be exercised in interpreting the results of these analyses due to the small number of cases involved. The full listing of available congenital anomalies and corresponding counts are available at <https://www.health.qld.gov.au/hsu/dashboards/calf.xlsm>. Rate ratios are adjusted for potentially confounding factors including maternal age, parity, plurality, smoking status, mother's Indigenous status, whether the mother had diabetes and whether the mother had hypertension.

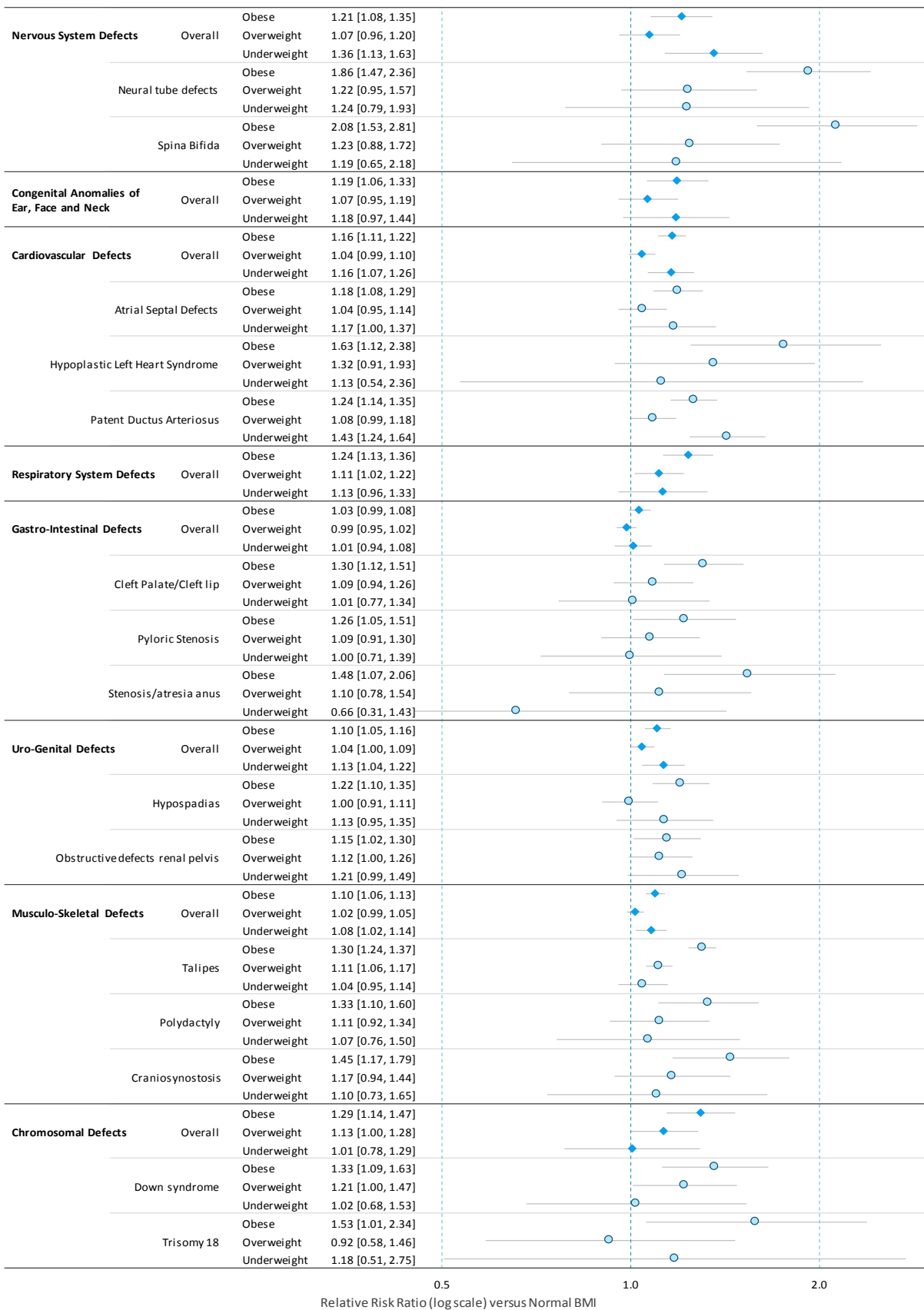
Compared to babies born to mothers in the normal weight BMI category, babies born to obese mothers had higher rates of:

- Nervous System Defects (RR: 1.21; 95% CI: 1.08-1.35);
- Congenital Anomalies of Ear, Face and Neck (RR: 1.19; 95% CI: 1.06-1.33);
- Cardiovascular Defects (RR: 1.16; 95% CI: 1.11-1.22);
- Respiratory System Defects (RR: 1.24; 95% CI: 1.13-1.36);
- Uro-Genital Defects (RR: 1.10; 95% CI: 1.05-1.16);
- Musculoskeletal Defects (RR: 1.10; 95% CI: 1.06-1.13); and
- Chromosomal Defects (RR: 1.29; 95% CI: 1.14-1.47)

Within these categories, many specific congenital anomalies showed higher rates in babies born to obese mothers, particularly neural tube defects (*RR: 1.86; 95% CI: 1.47-2.36*), spina bifida (*RR: 2.08; 95% CI: 1.53-2.81*), hypoplastic left heart syndrome (*RR: 1.63; 95% CI: 1.12-2.38*), stenosis/atresia anus (*RR: 1.48; 95% CI: 1.07-2.06*) and trisomy 18 (*RR: 1.53; 95% CI: 1.01-2.34*).

[†]A linked data resource that combines records from the Queensland Perinatal Data Collection, the Queensland Hospital Admitted Patient Data Collection (QHAPDC) (including terminations of pregnancy prior to 20 weeks gestation) and Queensland Death Registration Data where a congenital anomaly has been recorded.

Figure 7 Adjusted rate ratios for selected congenital anomalies for babies born to obese, overweight and underweight mothers vs babies born to mothers in the normal weight BMI category, Queensland, 2008 to 2017



Rate ratios adjusted for maternal age, parity, plurality, smoking status, mother's Indigenous status and whether mother had pre-existing diabetes/hypertension.

Source: Queensland Perinatal Data Collection, Congenital Anomaly Linked File

Acknowledgements

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