



New Zealand Child and Youth  
Epidemiology Service

# Health and wellbeing of under-five year olds in the South Island 2017

## Antenatal care

Mavis Duncanson, Glenda Oben, Judith Adams, Andrew Wicken,

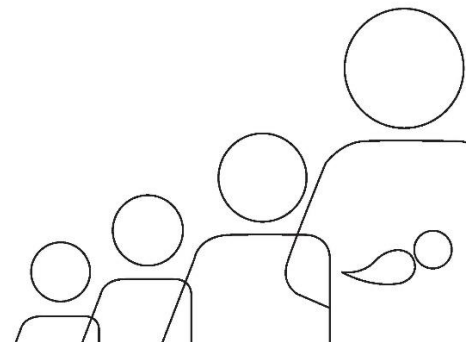
Simon Morris, Georgia Richardson and Magnus A McGee

New Zealand Child and Youth Epidemiology Service

Department of Women's and Children's Health

University of Otago

May 2018



This report has been prepared for the South Island Alliance: Nelson Marlborough, Canterbury, South Canterbury, West Coast and Southern District Health Boards.

While every endeavour has been made to use accurate data in this report, there are currently variations in the way data are collected from DHB and other agencies that may result in errors, omissions or inaccuracies in the information in this report. The NZCYES does not accept liability for any inaccuracies arising from the use of these data in the production of these reports, or for any losses arising as a consequence thereof.

Excerpt from:

Duncanson M, Oben G, Adams J, Wicken A, Morris S, Richardson G and McGee MA. 2018. Health and wellbeing of under-five year olds in the South Island 2017. Dunedin: New Zealand Child and Youth Epidemiology Service, University of Otago.



This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License <http://creativecommons.org/licenses/by-nc-nd/4.0/>

## II. ANTENATAL CARE

In 2017 the Ministry of Health published an action plan titled ‘A good start to life’ which included a focus on encouraging pregnant women to engage early with antenatal care.<sup>1</sup> Maternal factors, including nutrition, weight management and use of tobacco are associated with child health outcomes including fetal and neonatal death, preterm birth and low birthweight.<sup>2</sup> Intervening for best outcomes during pregnancy has the potential for substantial and long-lasting effects on individual and population health.<sup>2</sup> Antenatal care includes providing information to assist with decision-making during pregnancy, planning and preparation for birth, education, support, and preparation for parenting.<sup>3</sup> Lack of antenatal care is associated with delivery of preterm and low birthweight babies and with more neonatal deaths.<sup>4</sup>

Maternal smoking is associated with lower birthweights, and with adverse child health outcomes including increased risk of sudden unexpected death in infancy.<sup>2</sup> Maternal underweight and low weight gain in pregnancy are associated with preterm birth and low birthweight. Preconception obesity and excessive weight gain during pregnancy have been linked to neural tube and congenital heart defects as well as to adverse health effects in childhood.<sup>2</sup>

The State Services Commission has tasked the public service sector with ensuring pregnant women engage early with antenatal care to promote better pregnancy outcomes and normal healthy births.<sup>1</sup> The target set in 2017 stated, ‘By 2021, 90% of pregnant women are registered with a Lead Maternity Carer in the first trimester, with an interim target of 80% by 2019, with equitable rates for all population groups.’<sup>1</sup>

This section presents data on antenatal care from the Maternity dataset. Throughout this section, the terms ‘maternal weight’ and ‘maternal BMI’ refer to reported values at first registration for women who gave birth in 2015.

### Data sources and methods

#### Indicator

1. *Registration for antenatal care*
2. *Maternal smoking in pregnancy*
3. *Maternal weight*

#### Data source and definitions

National Maternity Collection (MAT)

#### Registration for antenatal care

Numerator: Number of women who register for antenatal care during their pregnancy (based on status at delivery)

Denominator: Total number of women that delivered

#### Maternal smoking in pregnancy

*Maternal smoking during antenatal and/or postnatal period*

Numerator: Number of registered women identified as smokers at either first registration or two weeks after delivery

Denominator: Total number of women that delivered and were registered with antenatal maternity service providers (LMC or DHB)

*Quantity of cigarettes smoked during antenatal and/or postnatal period*

Numerator: Number of cigarettes smoked per day at first registration and two weeks after delivery

Denominator: Total number of women that delivered, reported smoking and were registered with antenatal maternity service providers (LMC or DHB)

#### Maternal weight

*Registered women with reported BMI values at first registration*

Numerator: Number of registered women in each BMI weight range as reported at first registration

Denominator: Total number of women that delivered, with a documented BMI and were registered with antenatal maternity service providers (LMC or DHB)

BMI weight ranges

|                |                              |
|----------------|------------------------------|
| Underweight    | <18.5 kg/m <sup>2</sup>      |
| Healthy weight | 18.5–<25.0 kg/m <sup>2</sup> |
| Overweight     | 25.0–<30.0 kg/m <sup>2</sup> |
| Obese          | ≥30.0 kg/m <sup>2</sup>      |

### Additional information

This section presents information as held within the National Maternity Collection (MAT). An overview of MAT is provided in the appendices. Collection of the pregnant woman's height, weight and smoking status on the Section 88 registration form was implemented in July 2007.

Some district health boards have technical issues with the upload of data to MAT for women receiving antenatal care within their DHB. This means that the proportion of women registered with DHB maternity services at delivery may be under-represented and the proportion of 'unbooked' women at delivery may be overestimated

Analyses within the maternal smoking and weight sections have been limited to women registered with Lead Maternity Carer (LMC) or District Health Board (DHB) primary maternity services as documented at delivery.

Smokers classified as registered women that indicated 'Y' to smoking or stated a cigarette quantity at either time point

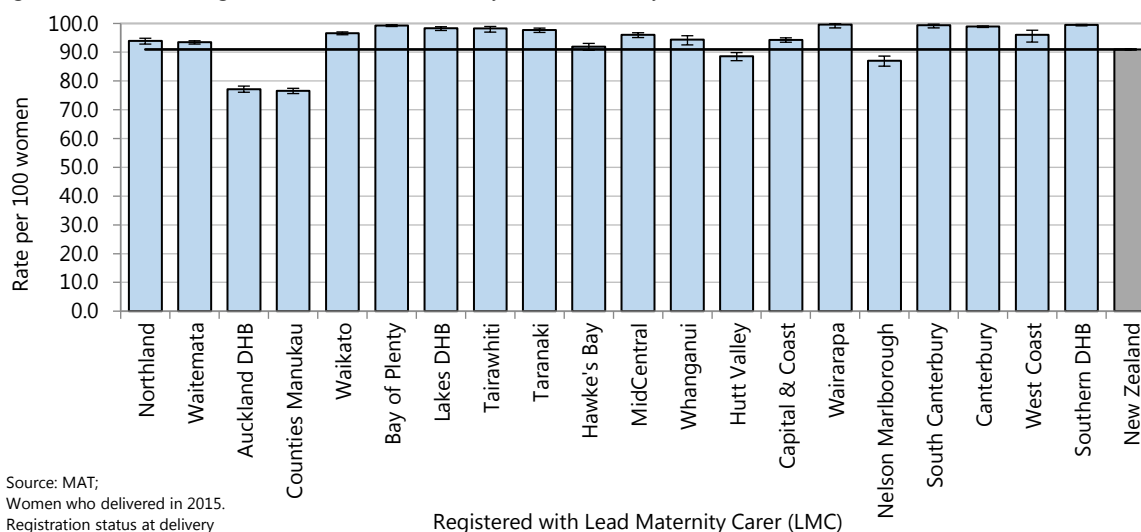
Body mass index (BMI) was calculated based on height (100–215 cm) and weight (40–180 kg) measurements considered valid. Analyses confined to women registered with LMC or DHB primary maternity services as documented at delivery

## Registration for antenatal care

The majority of women who delivered in South Island DHBs in 2015 were registered with a Lead Maternity Carer (LMC) at delivery (Figure II–1, Table II–1). Around 87% of women in Nelson Marlborough and over 96% of women in the remaining South Island DHBs were registered with a LMC.

Figure II–2 and Table II–1 present the proportion of women who were either not registered with a LMC (unbooked) at delivery or received antenatal maternity care from DHB-led primary maternity services. For some DHBs, the number of unbooked women may be an artefact of a technical issue with upload of information about women receiving DHB-based antenatal care to the National Collection. The proportion of women recorded as unbooked at delivery in this data collection was almost 13% of women in Nelson Marlborough and nearly 4% on the West Coast.

Figure II–1 Women registered with Lead Maternity Carer (LMC), by district health board, 2015



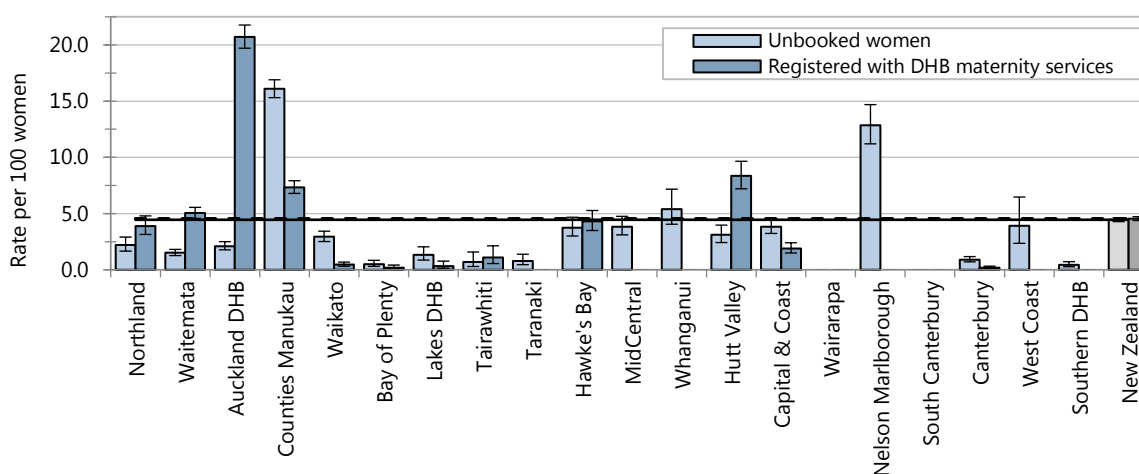
Source: MAT;  
Women who delivered in 2015.  
Registration status at delivery

Table II-1 Status of maternal registration for antenatal care at the time of delivery, South Island DHBs 2015

| DHB  | 2015 (n) | Rate per 100 women | Rate ratio | 95% CI    |
|--|----------|--------------------|------------|-----------|
| <b>Registration status (at delivery) of women who gave birth in 2015</b> |          |                    |            |           |
| <b>Not registered (unbooked)</b>   |          |                    |            |           |
| Nelson Marlborough   | 182      | 12.84              | 2.89       | 2.51–3.33 |
| South Canterbury   | <5       | s                  | s          | s         |
| Canterbury   | 56       | 0.90               | 0.20       | 0.16–0.26 |
| West Coast   | 14       | 3.92               | 0.88       | 0.53–1.48 |
| Southern   | 15       | 0.44               | 0.10       | 0.06–0.16 |
| New Zealand  | 2,620    | 4.45               | 1.00       |           |
| <b>Registered with Lead Maternity Carer (LMC)</b>                        |          |                    |            |           |
| Nelson Marlborough   | 1,233    | 87.01              | 0.96       | 0.94–0.98 |
| South Canterbury   | 655      | 99.39              | 1.09       | 1.09–1.10 |
| Canterbury   | 6,132    | 98.90              | 1.09       | 1.08–1.09 |
| West Coast   | 343      | 96.08              | 1.06       | 1.03–1.08 |
| Southern   | 3,396    | 99.47              | 1.09       | 1.09–1.10 |
| New Zealand  | 53,611   | 90.97              | 1.00       |           |
| <b>Registered with DHB maternity services</b>                            |          |                    |            |           |
| Nelson Marlborough   | <5       | s                  | s          | s         |
| South Canterbury   | 0        | ..                 | ..         | ..        |
| Canterbury   | 11       | 0.18               | 0.04       | 0.02–0.07 |
| West Coast   | 0        | ..                 | ..         | ..        |
| Southern   | <5       | s                  | s          | s         |
| New Zealand  | 2,678    | 4.54               | 1.00       |           |

Source: MAT; Rate ratios are unadjusted; Data as held within the National Maternity Collection

Figure II-2 Women who were recorded in National Maternity Collection as not registered (unbooked) or registered with DHB maternity services, by district health board 2015

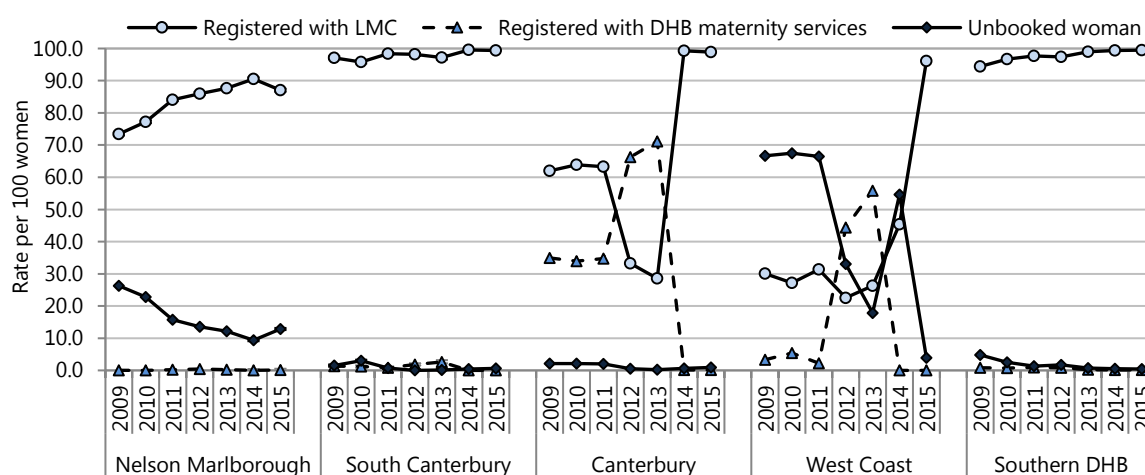


Source: MAT; Women who delivered in 2015. Registration status at delivery

The proportion of women registered with a LMC has generally increased since 2009 for all five South Island district health boards, although to a lesser extent in South Canterbury from a higher baseline (Figure II-3). In Canterbury and West Coast DHBs, there is the appearance of a potential reporting issue in 2012 and 2013.

Table II-2 to Table II-4 presents the proportion of women by their registration status (at delivery) for each district health board in the South Island during 2015. With the exception of South Canterbury, the majority of women in South Island DHBs had registered with a midwife (DHB range: 87% in Nelson Marlborough to almost 100% in Southern). In South Canterbury 57% of women were registered with an obstetrician.

Figure II-3 Trends in maternal registration status for antenatal care at the time of delivery, South Island DHBs 2009– 2015



Source: MAT; Registration status at delivery

Table II-2 Maternal registration status for antenatal care at the time of delivery, Nelson Marlborough and South Canterbury DHBs 2015

| Maternal registration status at delivery   | N     | Rate   |
|--|-------|--------|
| Women who gave birth in 2015               |       |        |
| Antenatal maternity provider (at delivery) |       |        |
| Nelson Marlborough                         |       |        |
| Unbooked                                   | 182   | 12.84  |
| Lead Maternity Carer (LMC)                 | 1,233 | 87.01  |
| GP   | <5    | s      |
| Midwife                                    | 1,229 | 86.73  |
| Obstetrician                               | <5    | s      |
| District Health Board (DHB) maternity team | <5    | s      |
| Other or unknown registration              | 0     | ..     |
| Total                                      | 1,417 | 100.00 |
| South Canterbury                           |       |        |
| Unbooked                                   | <5    | s      |
| Lead Maternity Carer (LMC)                 | 655   | 99.39  |
| GP   | 0     | ..     |
| Midwife                                    | 277   | 42.03  |
| Obstetrician                               | 378   | 57.36  |
| District Health Board (DHB) maternity team | 0     | ..     |
| Other or unknown registration              | 0     | ..     |
| Total                                      | 659   | 100.00 |

Source: MAT; Rate per 100 women that delivered

Table II-3 Maternal registration status for antenatal care at the time of delivery, Canterbury and West Coast DHBs 2015

| Maternal registration status at delivery   | N     | Rate   |
|--|-------|--------|
| Women who gave birth in 2015               |       |        |
| Antenatal maternity provider (at delivery) |       |        |
| Canterbury                                 |       |        |
| Unbooked                                   | 56    | 0.90   |
| Lead Maternity Carer (LMC)                 | 6,132 | 98.90  |
| <i>GP</i>                                  | 5     | 0.08   |
| <i>Midwife</i>                             | 6,104 | 98.45  |
| <i>Obstetrician</i>                        | 23    | 0.37   |
| District Health Board (DHB) maternity team | 11    | 0.18   |
| Other or unknown registration              | <5    | s      |
| Total                                      | 6,200 | 100.00 |
| West Coast                                 |       |        |
| Unbooked                                   | 14    | 3.92   |
| Lead Maternity Carer (LMC)                 | 343   | 96.08  |
| <i>GP</i>                                  | 0     | ..     |
| <i>Midwife</i>                             | 343   | 96.08  |
| <i>Obstetrician</i>                        | 0     | ..     |
| District Health Board (DHB) maternity team | 0     | ..     |
| Other or unknown registration              | 0     | ..     |
| Total                                      | 357   | 100.00 |
| Southern DHB                               |       |        |
| Unbooked                                   | 15    | 0.44   |
| Lead Maternity Carer (LMC)                 | 3,396 | 99.47  |
| <i>GP</i>                                  | 0     | ..     |
| <i>Midwife</i>                             | 3,396 | 99.47  |
| <i>Obstetrician</i>                        | 0     | ..     |
| District Health Board (DHB) maternity team | <5    | s      |
| Other or unknown registration              | 0     | ..     |
| Total                                      | 3,414 | 100.00 |

Source: MAT; Rate per 100 women that delivered

Table II-4 Maternal registration status for antenatal care at the time of delivery, Southern DHB 2015

| Maternal registration status at delivery   | N     | Rate   |
|--|-------|--------|
| Women who gave birth in 2015               |       |        |
| Antenatal maternity provider (at delivery) |       |        |
| Southern DHB                               |       |        |
| Unbooked                                   | 15    | 0.44   |
| Lead Maternity Carer (LMC)                 | 3,396 | 99.47  |
| <i>GP</i>                                  | 0     | ..     |
| <i>Midwife</i>                             | 3,396 | 99.47  |
| <i>Obstetrician</i>                        | 0     | ..     |
| District Health Board (DHB) maternity team | <5    | s      |
| Other or unknown registration              | 0     | ..     |
| Total                                      | 3,414 | 100.00 |

Source: MAT; Rate per 100 women that delivered

Table II-5 presents the trimester in which women first registered with an antenatal care provider whether that is a LMC or DHB primary maternity services. Of the women that were registered for antenatal care, either with a LMC or with DHB maternity services, most were registered in the first trimester. Over half of the registered women on the West Coast had registered in first trimester, over 70% for South Canterbury, Canterbury and Southern DHBs, and over 80% of the registered women in Nelson Marlborough. The 2015 rates for the all DHBs, with the exception of Nelson Marlborough, are lower than the interim Better Public Service 2019 target of 80% of pregnant women registered with a Lead Maternity Carer in the first trimester (90% by 2021).

Table II-5 Trimester of pregnancy in which registration occurred among all registered women, South Island DHBs 2015

|  | <i>n</i>           | Rate  | <i>n</i>         | Rate  | <i>n</i>   | Rate  | <i>n</i>   | Rate  | <i>n</i>     | Rate  |
|--|--------------------|-------|------------------|-------|------------|-------|------------|-------|--------------|-------|
| Registered women who gave birth in 2015                |                    |       |                  |       |            |       |            |       |              |       |
|  | Nelson Marlborough |       | South Canterbury |       | Canterbury |       | West Coast |       | Southern DHB |       |
| Trimester of registration for antenatal care*          |                    |       |                  |       |            |       |            |       |              |       |
| First  | 1,000              | 81.0  | 462              | 70.5  | 4,765      | 77.6  | 185        | 53.9  | 2,621        | 77.1  |
| Second   | 202                | 16.4  | 186              | 28.4  | 1,208      | 19.7  | 110        | 32.1  | 699          | 20.6  |
| Third  | 33                 | 2.7   | 7                | 1.1   | 170        | 2.8   | 48         | 14.0  | 79           | 2.3   |
| Total†   | 1,235              | 100.0 | 655              | 100.0 | 6,143      | 100.0 | 343        | 100.0 | 3,399        | 100.0 |
| Registered with a Lead Maternity Carer                 |                    |       |                  |       |            |       |            |       |              |       |
| First  | 999                | 81.0  | 462              | 70.5  | 4,757      | 77.6  | 185        | 53.9  | 2,620        | 77.1  |
| Second   | 201                | 16.3  | 186              | 28.4  | 1,207      | 19.7  | 110        | 32.1  | 697          | 20.5  |
| Third  | 33                 | 2.7   | 7                | 1.1   | 168        | 2.7   | 48         | 14.0  | 79           | 2.3   |
| Total†   | 1,233              | 100.0 | 655              | 100.0 | 6,132      | 100.0 | 343        | 100.0 | 3,396        | 100.0 |
| Registered with a District Health Board maternity team |                    |       |                  |       |            |       |            |       |              |       |
| First  | <5                 | s     | 0                | ..    | 8          | 72.7  | 0          | ..    | <5           | s     |
| Second   | <5                 | s     | 0                | ..    | <5         | s     | 0          | ..    | <5           | s     |
| Third  | 0                  | ..    | 0                | ..    | <5         | s     | 0          | ..    | 0            | ..    |
| Total†   | <5                 | s     | 0                | ..    | 11         | 100.0 | 0          | ..    | <5           | s     |

Source: MAT; Rate per 100 women that delivered. \*Registration with a LMC or a DHB maternity team. Total† includes those with an unspecified trimester; Data as held within the National Maternity Collection

The small number of unbooked women within South Canterbury, West Coast and Southern DHBs do not allow for meaningful comparisons by demographic factor and are therefore not presented.

Figure II-4 and Figure II-5 present the proportion recorded as unbooked women within Nelson Marlborough and Canterbury district health boards by the residential deprivation score (NZDep2013 index of deprivation score), maternal age, and ethnicity. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

- In both Nelson Marlborough and Canterbury DHBs, the unbooked rate was significantly higher for women residing in areas with the highest NZDep2013 scores (quintile 5; deciles 9–10) than the unbooked rate for women residing in areas with the lowest NZDep2013 scores (quintile 1; deciles 1–2). The unbooked rate in Canterbury was also significantly higher than quintile 1 for women residing in quintile 4 (deciles 7–8)
- The proportion of unbooked women in Canterbury was significantly higher for Māori and Pacific women, compared with European/Other. Pacific women in Nelson Marlborough DHB also had significantly higher rates of being unbooked compared with European/Pakeha
- In Canterbury, women under 20 years had significantly higher rates of being unbooked compared with women aged 30–34 years.



Figure II-4 Unbooked women, by demographic factor, Nelson Marlborough DHB 2015

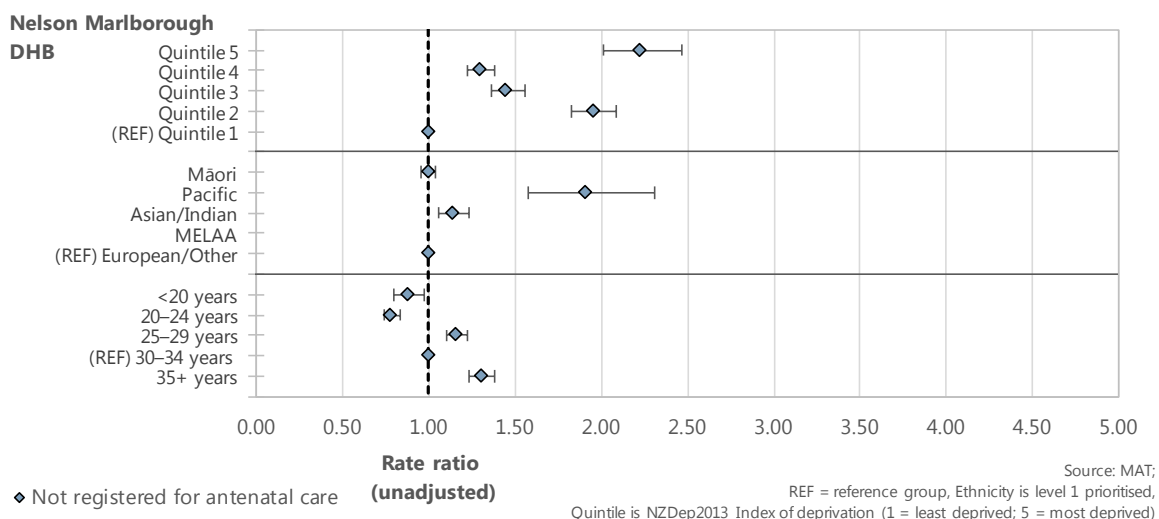
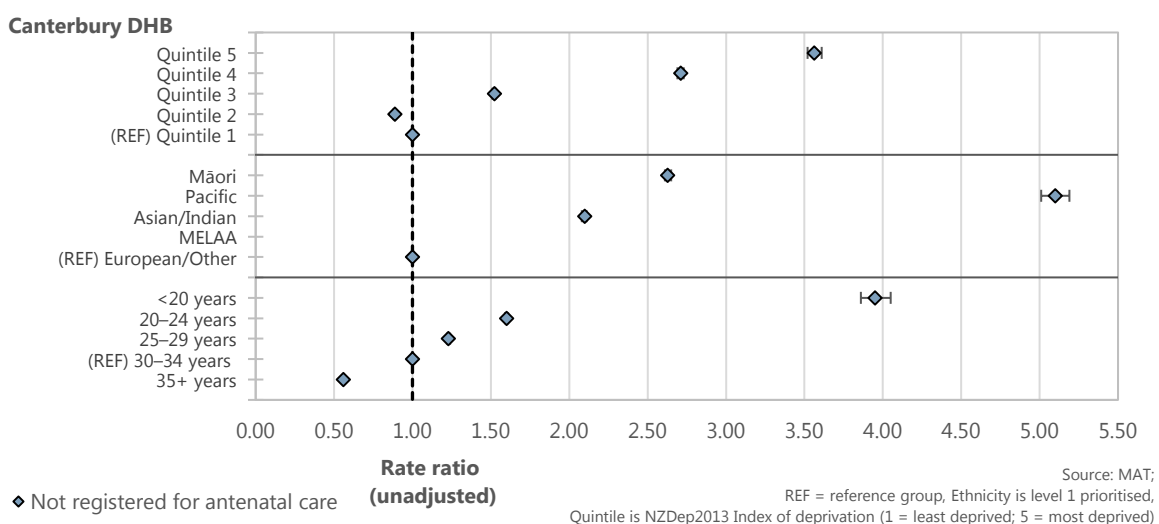


Figure II-5 Unbooked women, by demographic factor, Canterbury DHB 2015



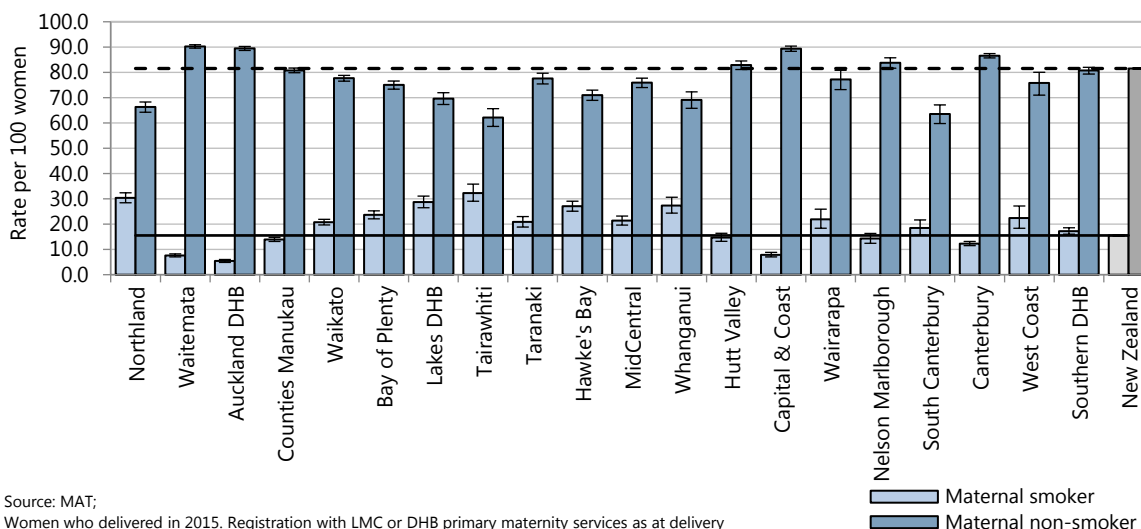
## Maternal smoking

Figure II-6 and Table II-6 present for each district health board the proportion of women who delivered in 2015 and who were registered either with a Lead Maternity Carer (LMC) or with DHB primary maternity services, by reported smoking status either at first registration and/or at two weeks post-delivery. The majority of registered women were recorded as not smoking (DHB range: 63.5% in South Canterbury to 86.6% in Canterbury). Canterbury DHB had a maternal non-smoking rate significantly higher than the national rate.

West Coast and Southern DHBs had significantly higher rates of maternal smoking than the national rate, while maternal smoking rates were significantly lower than national rate in Canterbury (Figure II-6, Table II-6).

The proportion of registered women reported as not smoking has gradually increased since 2008 for the South Island district health boards, with the exception of South Canterbury (Figure II-7).

Figure II-6 Maternal smoking status, by district health board 2015



Source: MAT; Women who delivered in 2015. Registration with LMC or DHB primary maternity services as at delivery

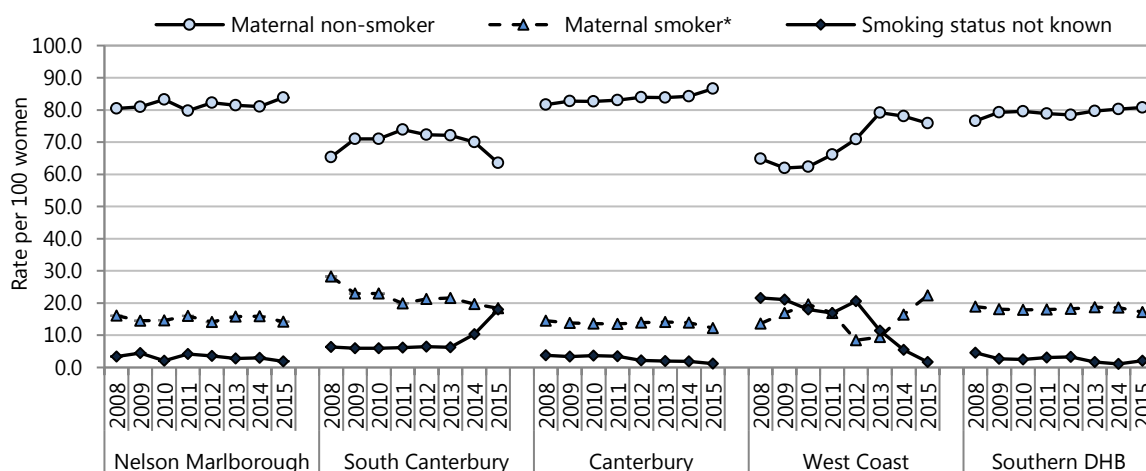
Maternal smoker  
Maternal non-smoker

Table II-6 Reported maternal smoking status, South Island DHBs 2015

| DHB  | 2015 (n) | Rate* | Rate ratio | 95% CI    |
|--|----------|-------|------------|-----------|
| Women registered for antenatal care who gave birth in 2015 |          |       |            |           |
| Maternal smoker  |          |       |            |           |
| Nelson Marlborough   | 176      | 14.3  | 0.92       | 0.80-1.05 |
| South Canterbury   | 121      | 18.5  | 1.19       | 1.01-1.40 |
| Canterbury   | 755      | 12.3  | 0.79       | 0.74-0.85 |
| West Coast   | 77       | 22.4  | 1.45       | 1.19-1.76 |
| Southern   | 586      | 17.2  | 1.11       | 1.03-1.20 |
| New Zealand  | 8,734    | 15.5  | 1.00       |           |
| Maternal non-smoker  |          |       |            |           |
| Nelson Marlborough   | 1,035    | 83.8  | 1.03       | 1.00-1.05 |
| South Canterbury   | 416      | 63.5  | 0.78       | 0.73-0.83 |
| Canterbury   | 5,319    | 86.6  | 1.06       | 1.05-1.07 |
| West Coast   | 260      | 75.8  | 0.93       | 0.88-0.99 |
| Southern   | 2,743    | 80.7  | 0.99       | 0.97-1.01 |
| New Zealand  | 45,892   | 81.5  | 1.00       |           |

Source: MAT; Rate\* per 100 registered women who delivered in 2015. Registration with LMC or DHB primary maternity services as at delivery. Rate ratios are unadjusted

Figure II-7 Trends in maternal smoking status, South Island DHBs 2008-2015



Source: MAT; Registration status at delivery

Table II-7 and Table II-8 present the proportion of registered women by their smoking status for each district health board in the South Island region during 2015. In the South Island DHBs, of the registered women that

reported smoking, many had indicated smoking at first registration and also at two weeks post-natal (DHB range: 9.45% of 121 in South Canterbury to 18% of 77 on the West Coast).

Table II-7 Maternal smoking status at first registration and/or at two weeks post-delivery, Nelson Marlborough, South Canterbury and Southern DHBs 2015

| Maternal smoking status                                      |                             | 2015 (n) | Rate per 100 women |
|--|-----------------------------|----------|--------------------|
| Women registered with antenatal care* who gave birth in 2015 |                             |          |                    |
| Nelson Marlborough   |                             |          |                    |
| Non-smoker   |                             | 1,036    | 83.82              |
| Smoker†  |                             | 176      | 14.24              |
| Unknown‡   |                             | 24       | 1.94               |
| Maternal smoking status by time point                        |                             |          |                    |
| first registration   | two weeks postnatal         |          |                    |
| Non-smoker at registration                                   | Non-smoker at 2wk postnatal | 1,036    | 83.82              |
|  | Smoker at 2wk postnatal     | 14       | 1.13               |
|  | Not known                   | 24       | 1.94               |
| Smoker at registration                                       | Non-smoker at 2wk postnatal | 23       | 1.86               |
|  | Smoker at 2wk postnatal     | 130      | 10.52              |
|  | Not known                   | 9        | 0.73               |
| Total  |                             | 1,236    | 100.00             |
| South Canterbury   |                             |          |                    |
| Non-smoker   |                             | 417      | 63.57              |
| Smoker†  |                             | 121      | 18.45              |
| Unknown‡   |                             | 118      | 17.99              |
| Maternal smoking status by time point                        |                             |          |                    |
| first registration   | two weeks postnatal         |          |                    |
| Non-smoker at registration                                   | Non-smoker at 2wk postnatal | 417      | 63.57              |
|  | Smoker at 2wk postnatal     | 6        | 0.91               |
|  | Not known                   | 118      | 17.99              |
| Smoker at registration                                       | Non-smoker at 2wk postnatal | 34       | 5.18               |
|  | Smoker at 2wk postnatal     | 62       | 9.45               |
|  | Not known                   | 19       | 2.90               |
| Total  |                             | 656      | 100.00             |
| Southern DHB   |                             |          |                    |
| Non-smoker   |                             | 2,743    | 80.72              |
| Smoker†  |                             | 585      | 17.22              |
| Unknown‡   |                             | 70       | 2.06               |
| Maternal smoking status by time point                        |                             |          |                    |
| first registration   | two weeks postnatal         |          |                    |
| Non-smoker at registration                                   | Non-smoker at 2wk postnatal | 2,743    | 80.72              |
|  | Smoker at 2wk postnatal     | 28       | 0.82               |
|  | Not known                   | 70       | 2.06               |
| Smoker at registration                                       | Non-smoker at 2wk postnatal | 110      | 3.24               |
|  | Smoker at 2wk postnatal     | 427      | 12.57              |
|  | Not known                   | 20       | 0.59               |
| Total  |                             | 3,398    | 100.00             |

Source: MAT; Rate per 100 women that delivered. \*Maternal registration with LMC or DHB primary maternity service. †Smokers classified as registered women that indicated 'Y' to smoking or stated a cigarette quantity at either time point. ‡Unknown indicated at either time point

Table II–8 Maternal smoking status at first registration and/or at two weeks post-delivery, Canterbury and West Coast DHBs 2015

| Maternal smoking status                                      |                             | 2015 (n) | Rate per 100 women |
|--|-----------------------------|----------|--------------------|
| Women registered with antenatal care* who gave birth in 2015 |                             |          |                    |
| Canterbury   |                             |          |                    |
| Non-smoker   |                             | 5,325    | 86.59              |
| Smoker†  |                             | 754      | 12.26              |
| Unknown‡   |                             | 71       | 1.15               |
| Maternal smoking status by time point                        |                             |          |                    |
| first registration   | two weeks postnatal         |          |                    |
| Non-smoker at registration                                   | Non-smoker at 2wk postnatal | 5,325    | 86.59              |
|  | Smoker at 2wk postnatal     | 41       | 0.67               |
|  | Not known                   | 71       | 1.15               |
| Smoker at registration                                       | Non-smoker at 2wk postnatal | 116      | 1.89               |
|  | Smoker at 2wk postnatal     | 584      | 9.50               |
|  | Not known                   | 13       | 0.21               |
| Total  |                             | 6,150    | 100.00             |
| West Coast   |                             |          |                    |
| Non-smoker   |                             | 261      | 75.87              |
| Smoker†  |                             | 77       | 22.38              |
| Unknown‡   |                             | 6        | 1.74               |
| Maternal smoking status by time point                        |                             |          |                    |
| first registration   | two weeks postnatal         |          |                    |
| Non-smoker at registration                                   | Non-smoker at 2wk postnatal | 261      | 75.87              |
|  | Smoker at 2wk postnatal     | 7        | 2.03               |
|  | Not known                   | 6        | 1.74               |
| Smoker at registration                                       | Non-smoker at 2wk postnatal | 6        | 1.74               |
|  | Smoker at 2wk postnatal     | 63       | 18.31              |
|  | Not known                   | <5       | s                  |
| Total  |                             | 344      | 100.00             |

Source: MAT; Rate per 100 women that delivered. \*Maternal registration with LMC or DHB primary maternity service. †Smokers classified as registered women that indicated 'Y' to smoking or stated a cigarette quantity at either time point. ‡Unknown indicated at either time point

Table II–9 presents the quantities of cigarettes smoked daily by registered women who indicated smoking at both points. In all four South Island DHBs, the majority of women who smoked indicated smoking less than 10 cigarettes a day. However, a smaller proportion reported smoking 10–20 or more than 20 cigarettes a day, with a small number of women changing the quantity of cigarettes smoked between first registration and two week postnatal.

Table II–9 Reported quantities of cigarettes smoked daily at first registration and at two weeks post-delivery among all registered women who reported smoking, South Island DHBs 2015

|   |                            | <i>n</i> | Rate | <i>n</i> | Rate | <i>n</i> | Rate | <i>n</i> | Rate  |
|---|----------------------------|----------|------|----------|------|----------|------|----------|-------|
| Women registered with antenatal care* who gave birth in 2015 and reported smoking |                            |          |      |          |      |          |      |          |       |
| Number of cigarettes smoked daily   | At two weeks post-delivery |          |      |          |      |          |      |          |       |
|   |                            | <10      |      | 10–20    |      | >20      |      | Total    |       |
| Nelson Marlborough  |                            |          |      |          |      |          |      |          |       |
| At first registration   | <10                        | 69       | 53.1 | 11       | 8.5  | <5       | s    | 81       | 62.3  |
|   | 10–20                      | 10       | 7.7  | 34       | 26.2 | <5       | s    | 45       | 34.6  |
|   | >20                        | <5       | s    | <5       | s    | <5       | s    | <5       | s     |
|   | Total                      | 80       | 61.5 | 46       | 35.4 | <5       | s    | 130      | 100.0 |
| South Canterbury  |                            |          |      |          |      |          |      |          |       |
| At first registration   | <10                        | 30       | 48.4 | <5       | s    | <5       | s    | 33       | 53.2  |
|   | 10–20                      | 10       | 16.1 | 16       | 25.8 | 0        | ..   | 26       | 41.9  |
|   | >20                        | 0        | ..   | <5       | s    | <5       | s    | <5       | s     |
|   | Total                      | 40       | 64.5 | 19       | 30.6 | <5       | s    | 62       | 100.0 |
| Canterbury  |                            |          |      |          |      |          |      |          |       |
| At first registration   | <10                        | 326      | 55.8 | 46       | 7.9  | <5       | s    | 376      | 64.4  |
|   | 10–20                      | 45       | 7.7  | 136      | 23.3 | 6        | 1.0  | 187      | 32.0  |
|   | >20                        | <5       | s    | 5        | 0.9  | 14       | 2.4  | 21       | 3.6   |
|   | Total                      | 373      | 63.9 | 187      | 32.0 | 24       | 4.1  | 584      | 100.0 |
| West Coast  |                            |          |      |          |      |          |      |          |       |
| At first registration   | <10                        | 44       | 69.8 | <5       | s    | 0        | ..   | 45       | 71.4  |
|   | 10–20                      | 8        | 12.7 | 9        | 14.3 | 0        | ..   | 17       | 27.0  |
|   | >20                        | <5       | s    | 0        | ..   | 0        | ..   | <5       | s     |
|   | Total                      | 53       | 84.1 | 10       | 15.9 | 0        | ..   | 63       | 100.0 |
| Southern DHB  |                            |          |      |          |      |          |      |          |       |
| At first registration   | <10                        | 198      | 46.4 | 32       | 7.5  | <5       | s    | 234      | 54.8  |
|   | 10–20                      | 38       | 8.9  | 133      | 31.1 | <5       | s    | 175      | 41.0  |
|   | >20                        | <5       | s    | <5       | s    | 11       | 2.6  | 18       | 4.2   |
|   | Total                      | 239      | 56.0 | 169      | 39.6 | 19       | 4.4  | 427      | 100.0 |

Source: MAT; Rate per 100 maternal smokers. Quantities as reported at first registration and at two weeks post-delivery

Figure II–8 to Figure II–12 present the proportion of registered women who reported smoking for each district health board by the residential deprivation score (NZDep2013 index of deprivation score), maternal age, and ethnicity. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

- Maternal smoking rates were higher for those residing in areas with higher NZDep2013 scores (quintiles 4–5; deciles 7–10) compared with quintile 1 (deciles 1–2), although not statistically significant for South Canterbury and West Coast DHBs
- In the five DHBs the proportion of maternal smokers were significantly higher for Māori women, compared with European/Other
- The maternal smoking rates were significantly higher among registered women under 25 years of age compared with registered women aged 30–34 years on the West Coast, and among registered women under 30 years of age for the remaining South Island DHBs.

Figure II-8 Maternal smoking status, by demographic factor, Nelson Marlborough DHB 2015

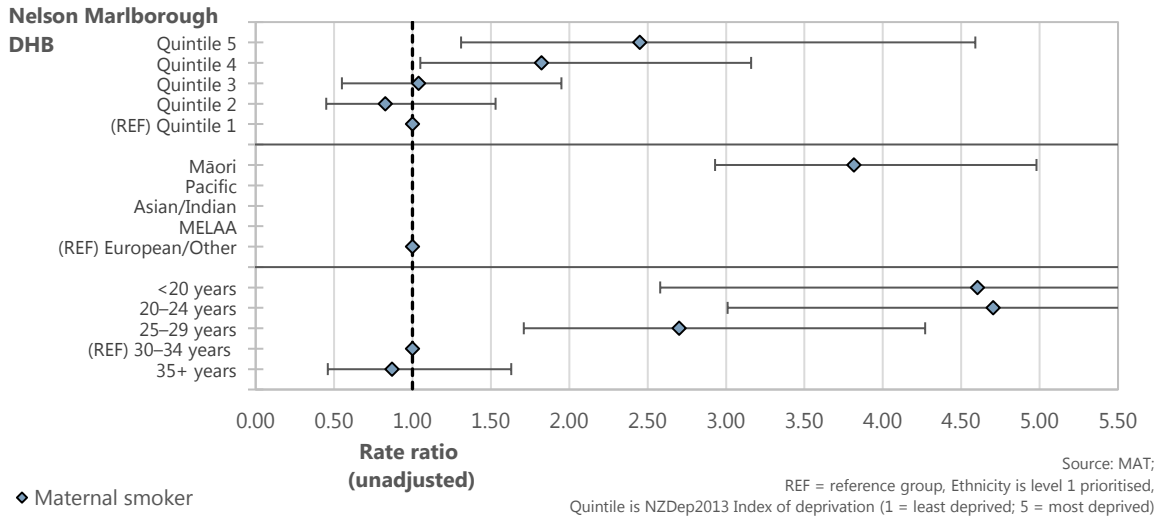


Figure II-9 Maternal smoker, by demographic factor, South Canterbury DHB 2015

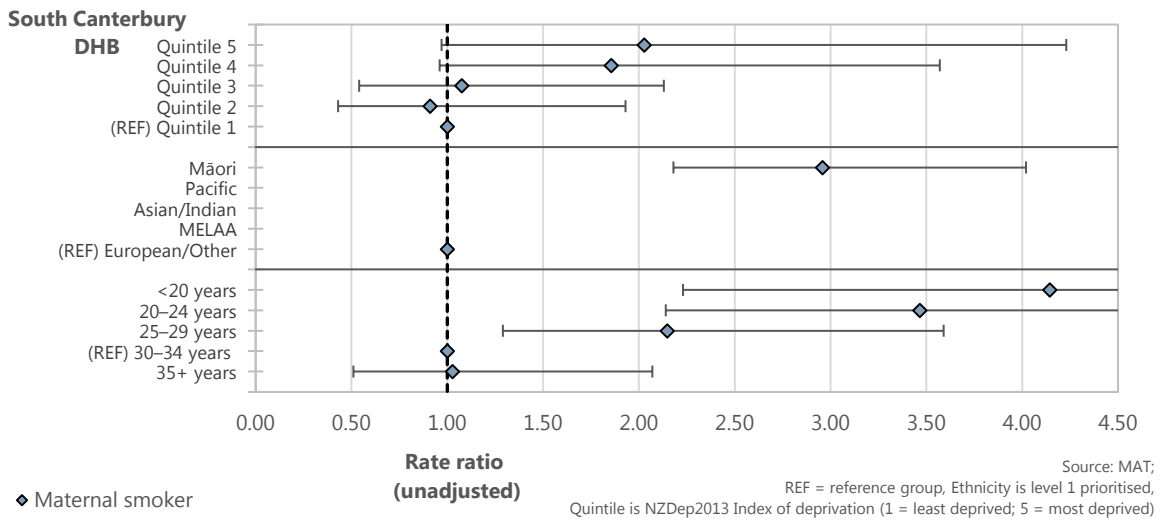


Figure II-10 Maternal smoker, by demographic factor, Canterbury DHB 2015

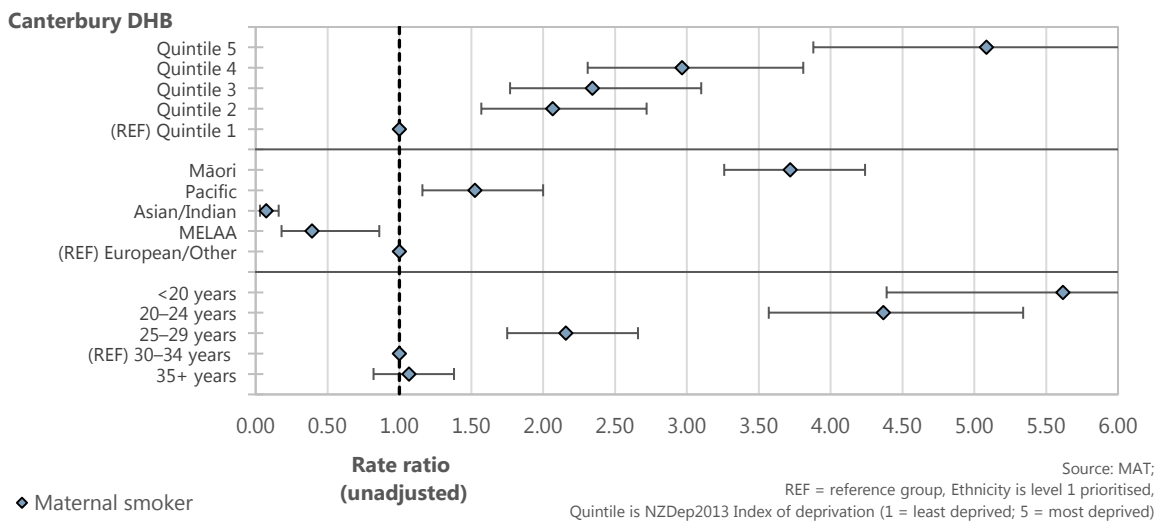


Figure II-11 Maternal smoker, by demographic factor, West Coast DHB 2015

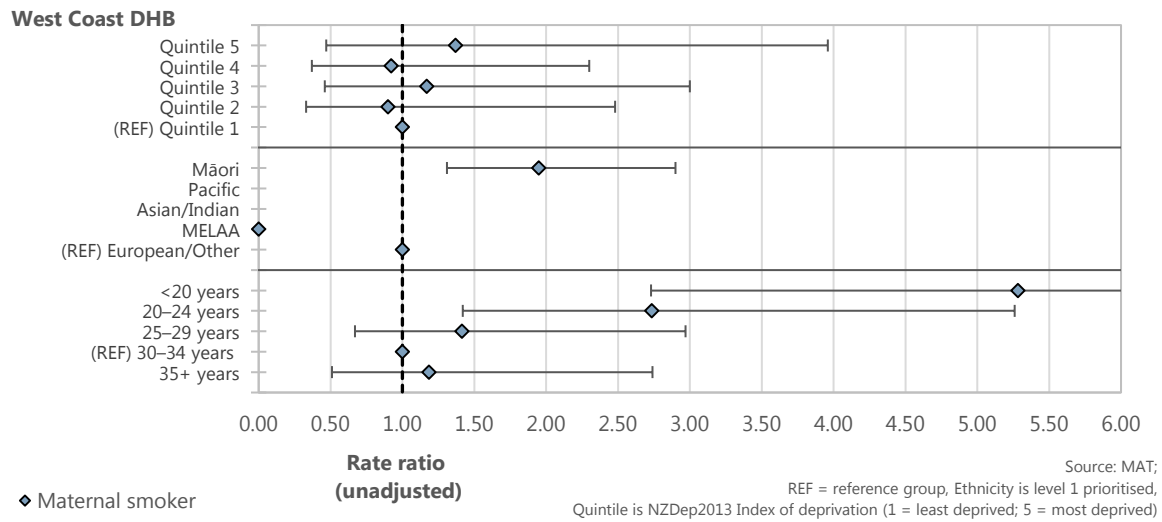
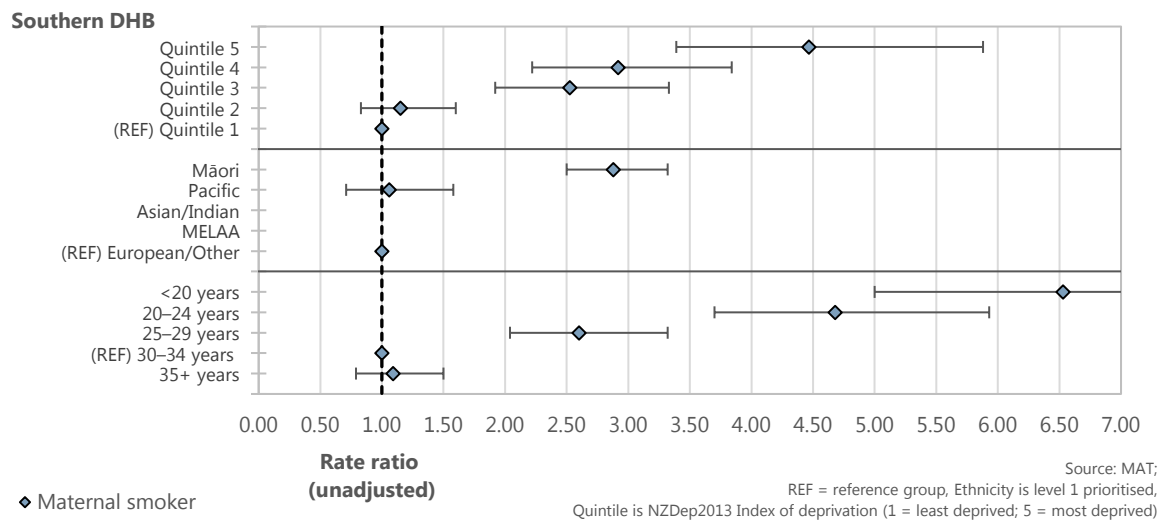


Figure II-12 Maternal smoker, by demographic factor, Southern DHB 2015



## Maternal weight

Figure II–13 presents the spread of BMI values reported to the National Maternity Collection (MAT) for women who delivered in 2015. Given the wide range of BMI values reported (range from 1 to 3954 kg/m<sup>2</sup>), subsequent analyses have been limited to values between 10 and 80 kg/m<sup>2</sup> for women who were registered either with a Lead Maternity Carer (LMC) or with DHB primary maternity services.

The proportions of registered women who delivered in 2015 with BMI values reported at first registration are presented in Table II–10. In South Canterbury DHB over 40% of the registered women had a reported BMI within the healthy/normal weight range, whereas around 50% of women were in this range in the other South Island DHBs. Obesity rates ranged from 18.5% in Nelson Marlborough to 28% in South Canterbury (Table II–10).

Figure II–13 Distribution of BMI values at first registration, New Zealand 2015

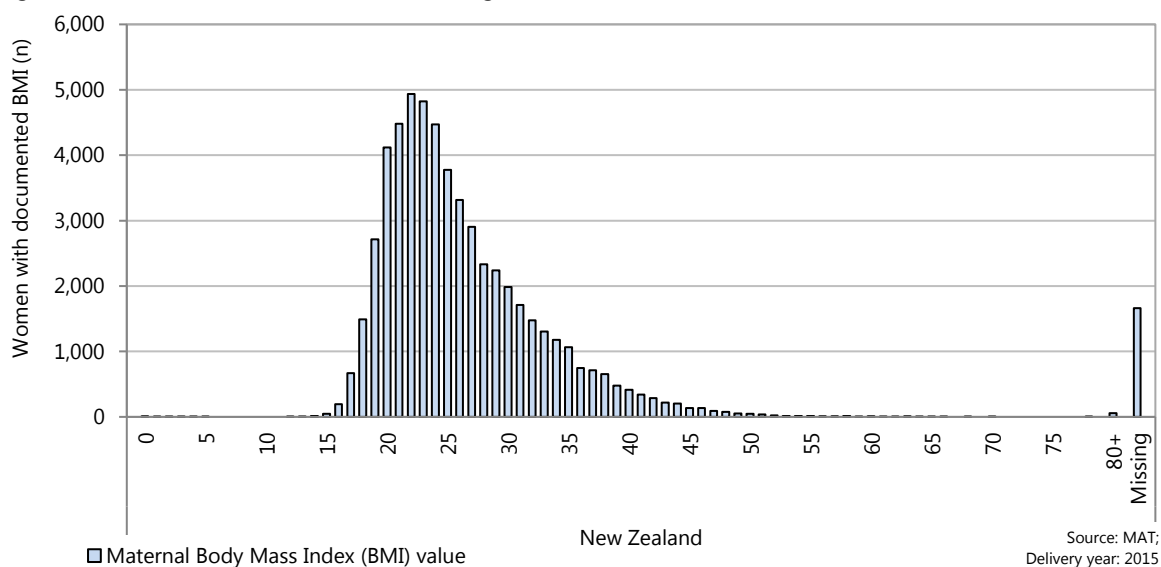


Table II–10 Maternal weight at first registration, South Island DHBs 2015

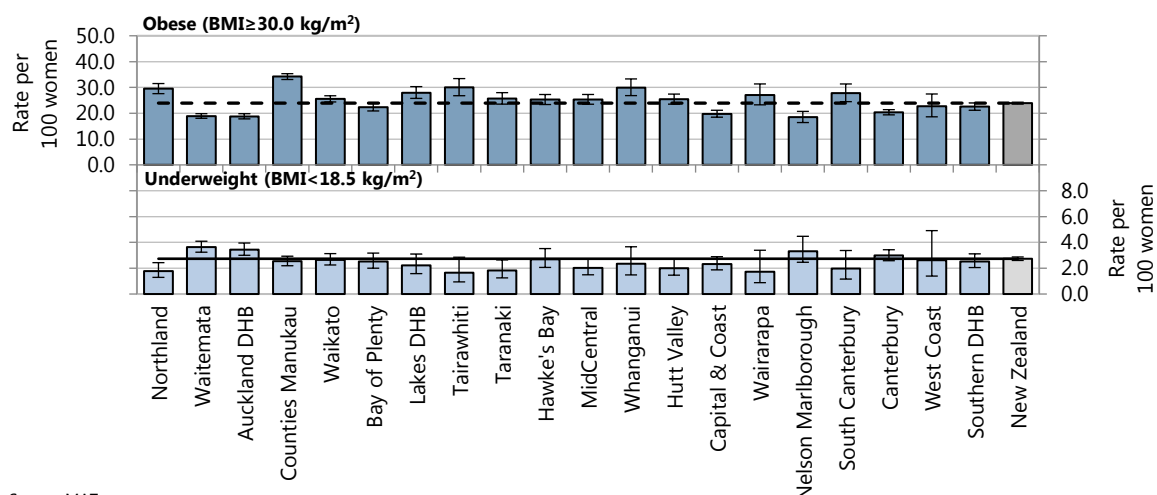
| BMI (kg/m <sup>2</sup> ) at first registration                     | 2015 (n) | Rate   | BMI (kg/m <sup>2</sup> ) at first registration | 2015 (n) | Rate   | BMI (kg/m <sup>2</sup> ) at first registration | 2015 (n) | Rate   |
|--|----------|--------|--|----------|--------|--|----------|--------|
| <b>Women registered with antenatal care who gave birth in 2015</b> |          |        |  |          |        |  |          |        |
| Nelson Marlborough   |          |        | South Canterbury                               |          |        | Southern DHB                                   |          |        |
| Underweight (<18.5)  | 41       | 3.32   | Underweight                                    | 13       | 1.98   | Underweight                                    | 86       | 2.53   |
| Healthy weight (18.5–<25.0)  | 642      | 51.98  | Healthy weight                                 | 270      | 41.22  | Healthy weight                                 | 1,611    | 47.40  |
| Overweight (25.0–<30.0)  | 322      | 26.07  | Overweight                                     | 182      | 27.79  | Overweight                                     | 932      | 27.42  |
| Obese (≥30.0)  | 228      | 18.46  | Obese  | 182      | 27.79  | Obese  | 766      | 22.54  |
| Not stated   | <5       | s      | Not stated                                     | 8        | 1.22   | Not stated                                     | <5       | s      |
| Total  | 1,235    | 100.00 | Total  | 655      | 100.00 | Total  | 3,399    | 100.00 |
| Canterbury   |          |        | West Coast                                     |          |        | New Zealand                                    |          |        |
| Underweight (<18.5)  | 183      | 2.98   | Underweight                                    | 9        | 2.62   | Underweight                                    | 1,538    | 2.73   |
| Healthy weight (18.5–<25.0)  | 3,083    | 50.19  | Healthy weight                                 | 162      | 47.23  | Healthy weight                                 | 26,468   | 47.02  |
| Overweight (25.0–<30.0)  | 1,621    | 26.39  | Overweight                                     | 92       | 26.82  | Overweight                                     | 14,480   | 25.72  |
| Obese (≥30.0)  | 1,251    | 20.36  | Obese  | 78       | 22.74  | Obese  | 13,466   | 23.92  |
| Not stated   | 5        | 0.08   | Not stated                                     | <5       | s      | Not stated                                     | 337      | 0.60   |
| Total  | 6,143    | 100.00 | Total  | 343      | 100.00 | Total  | 56,289   | 100.00 |

Source: MAT; Rate per 100 women that delivered. \* Maternal registration with LMC or DHB primary maternity service

Figure II–14 and Table II–11 present for each district health board the proportion of women who delivered in 2015 with BMI values reported in the underweight or obese weight ranges. The rate of women who were obese at first registration in South Canterbury was significantly higher than to the national maternal obesity rate, while rates were significantly lower for women in Nelson Marlborough and Canterbury DHBs (Figure II–14 and Table II–11). Rates of maternal underweight were not statistically significantly different from the national rate in the South Island DHBs. In all five district health boards, around 20% of registered women were reported with weights within the overweight range (Table II–11).



Figure II-14 Maternal weight, by category and district health board, 2015



Source: MAT;  
Women who delivered in 2015. Registration with LMC or DHB primary maternity services as at delivery

Table II-11 Maternal BMI, by BMI grouping, South Island DHBs 2015

| DHB  | 2015 (n) | Rate per 100 women | Rate ratio | 95% CI    |
|--|----------|--------------------|------------|-----------|
| Women who gave birth in 2015                     |          |                    |            |           |
| BMI: underweight (<18.5 kg/m <sup>2</sup> )      |          |                    |            |           |
| Nelson Marlborough                               | 41       | 3.32               | 1.22       | 0.90-1.65 |
| South Canterbury                                 | 13       | 1.98               | 0.73       | 0.42-1.25 |
| Canterbury                                       | 183      | 2.98               | 1.09       | 0.94-1.27 |
| West Coast                                       | 9        | 2.62               | 0.96       | 0.50-1.83 |
| Southern   | 86       | 2.53               | 0.93       | 0.75-1.15 |
| New Zealand                                      | 1,538    | 2.73               | 1.00       |           |
| BMI: overweight (25.0- <30.0 kg/m <sup>2</sup> ) |          |                    |            |           |
| Nelson Marlborough                               | 322      | 26.07              | 1.01       | 0.92-1.11 |
| South Canterbury                                 | 182      | 27.79              | 1.08       | 0.95-1.22 |
| Canterbury                                       | 1,621    | 26.39              | 1.03       | 0.98-1.07 |
| West Coast                                       | 92       | 26.82              | 1.04       | 0.87-1.24 |
| Southern   | 932      | 27.42              | 1.07       | 1.01-1.13 |
| New Zealand                                      | 14,480   | 25.72              | 1.00       |           |
| BMI: obese (≥30.0 kg/m <sup>2</sup> )            |          |                    |            |           |
| Nelson Marlborough                               | 228      | 18.46              | 0.77       | 0.69-0.87 |
| South Canterbury                                 | 182      | 27.79              | 1.16       | 1.03-1.32 |
| Canterbury                                       | 1,251    | 20.36              | 0.85       | 0.81-0.90 |
| West Coast                                       | 78       | 22.74              | 0.95       | 0.78-1.16 |
| Southern   | 766      | 22.54              | 0.94       | 0.88-1.00 |
| New Zealand                                      | 13,466   | 23.92              | 1.00       |           |

Source: MAT; Rate ratios are unadjusted

Figure II-15 presents the trends for the various maternal weight ranges. The proportion of registered women reported within the healthy maternal weight range has gradually declined since 2008 for all South Island DHBs (Figure II-15).

Figure II-15 Trends in maternal BMI, by BMI grouping, South Island DHBs 2008-2015

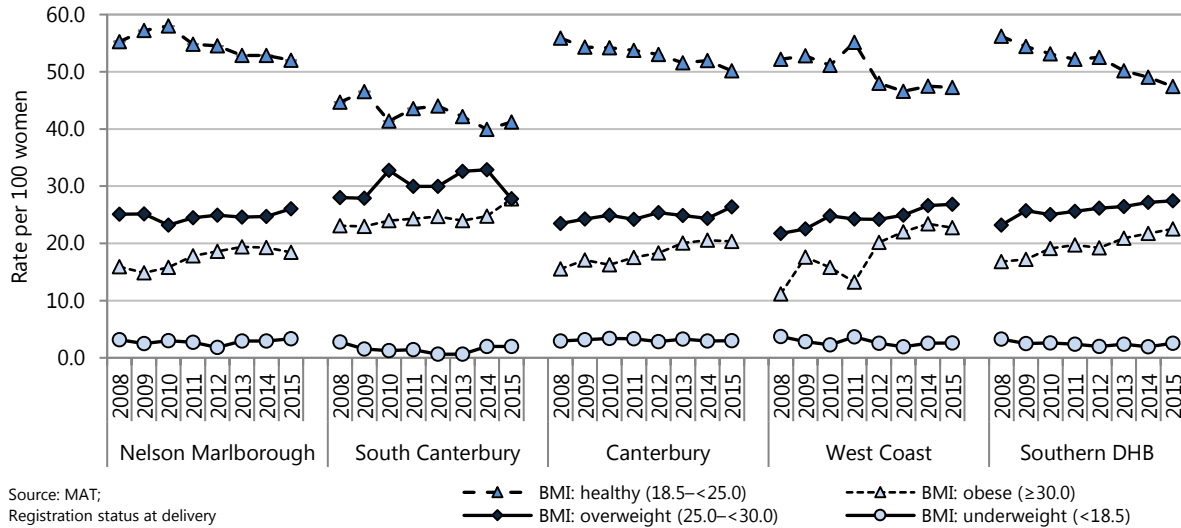


Figure II-16 to Figure II-20 present for each district health board the proportion of registered women who were reported with weight in the obesity range within each district health board by the residential deprivation score (NZDep2013 index of deprivation score), maternal age, and ethnicity. The unadjusted rate ratio presents the gap, if any, between the groups and the reference group. The following associations were observed, bearing in mind that this univariate analysis does not quantify the independent effect of each demographic factor:

- In Canterbury and Southern DHBs, maternal obesity rates were significantly lower among registered women residing in areas with the lowest (quintile 1; deciles 1-2) NZDep2013 scores compared with quintiles 2-5. Rates for Nelson Marlborough, South Canterbury, and the West Coast were not significantly different by NZDep2013 score
- The proportion of registered women with weight in the obese range was significantly higher for Pacific and Māori women in Canterbury and Southern DHB, compared with European/Other, while the proportion for Pacific women was significantly higher in Nelson Marlborough and South Canterbury DHBs. There was no significant difference in maternal obesity rates by ethnicity on the West Coast
- Compared with registered women aged 30-34 years, maternal obesity rates were significantly higher among women aged 25-29 years in South Canterbury, women aged 20-29 years in Canterbury and Southern DHBs, and 35 years and older in Canterbury and on the West Coast. For Nelson Marlborough there was no significant difference by maternal age.

Figure II-16 Obesity in pregnant women, by demographic factor, Nelson Marlborough DHB 2015

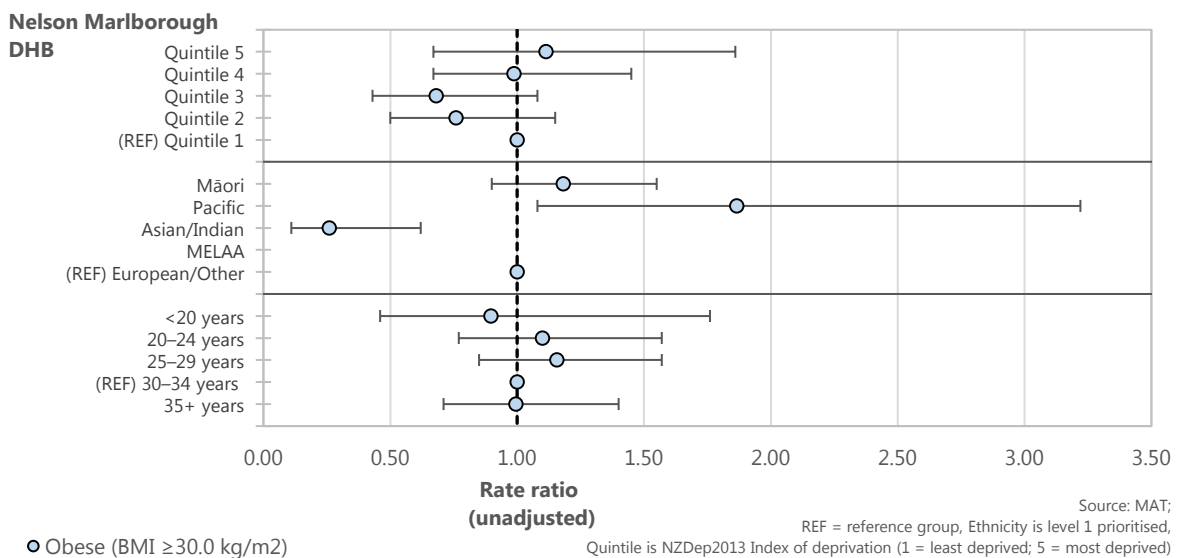


Figure II-17 Obesity in pregnant women, by demographic factor, South Canterbury DHB 2015

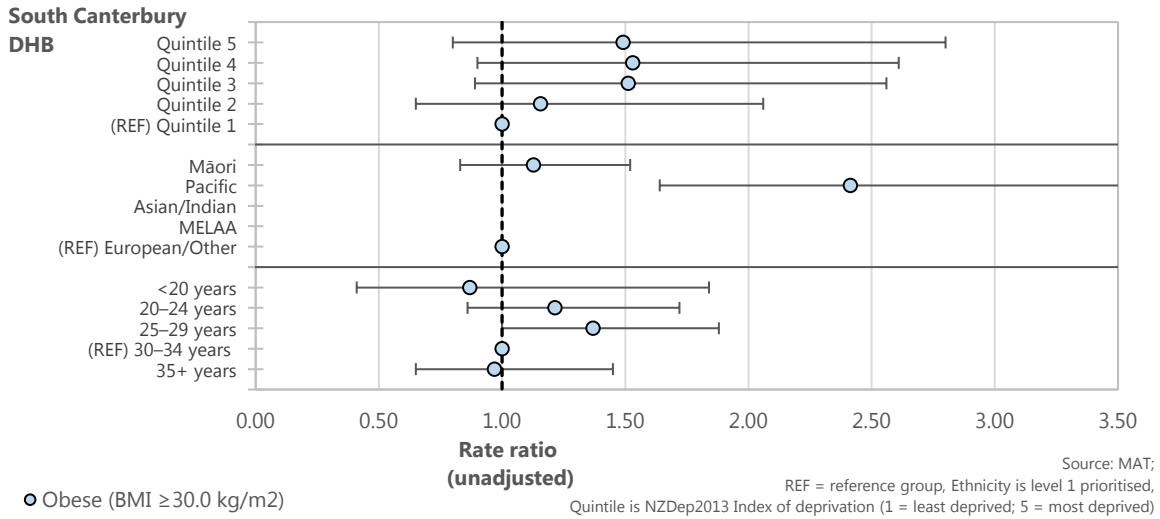


Figure II-18 Obesity in pregnant women, by demographic factor, Canterbury DHB 2015

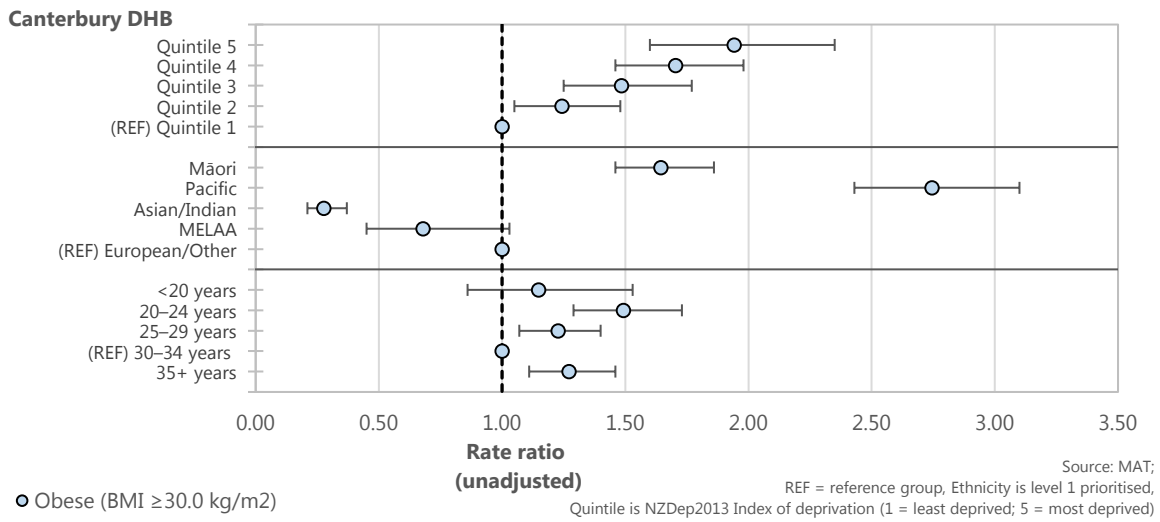


Figure II-19 Obesity in pregnant women, by demographic factor, West Coast DHB 2015

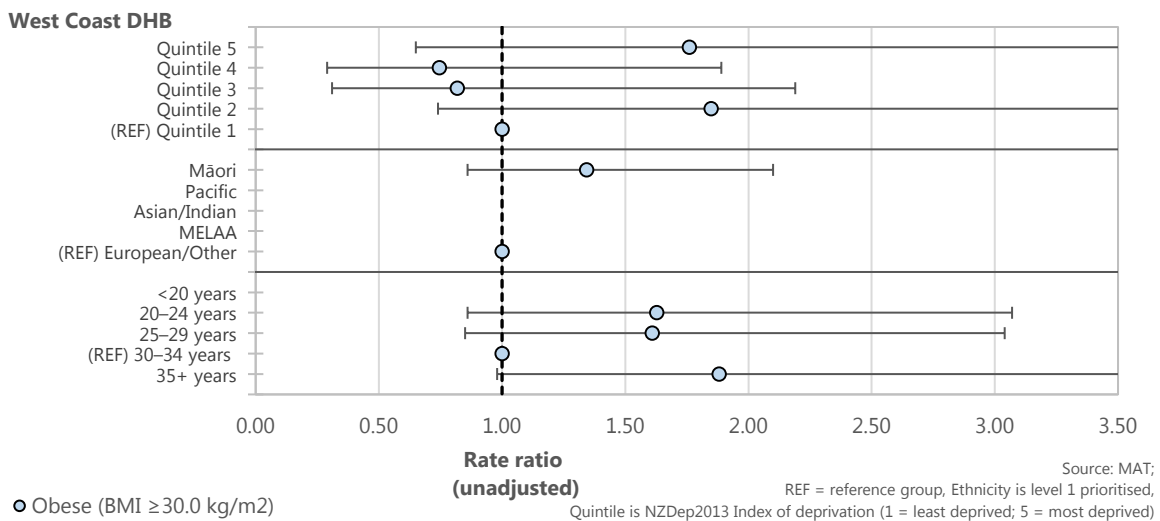
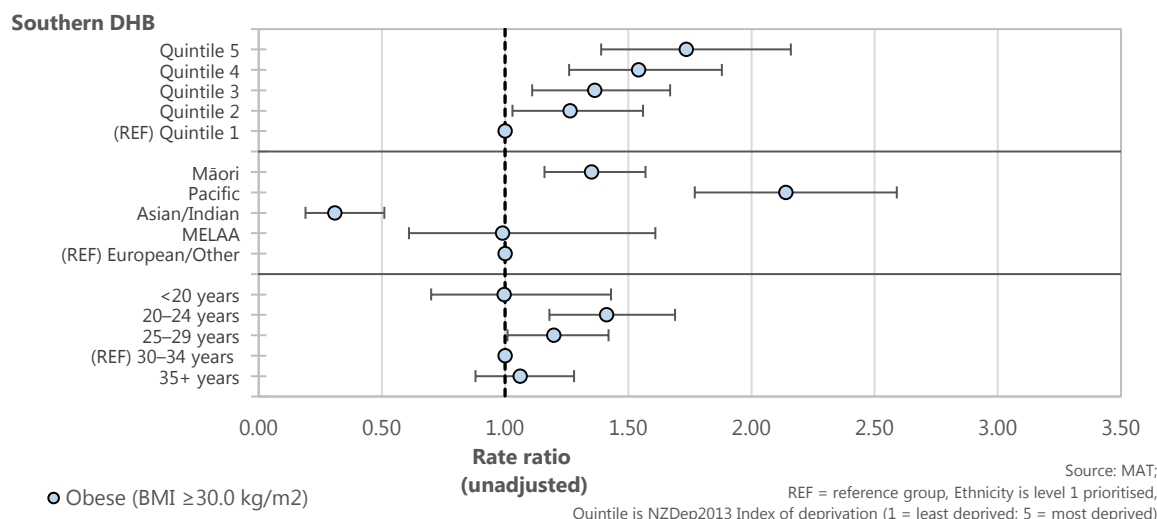


Figure II–20 Obesity in pregnant women, by demographic factor, Southern DHB 2015



## Evidence for good practice

A baby’s growth and development in the womb affects not only their health as a newborn but also their health in childhood and adulthood. The evidence for good practice includes evidence to improve provision of, and women’s engagement with, antenatal care, and evidence for the prevention of preterm birth and for smoking cessation interventions for pregnant women. For an overview of good practice regarding preterm births, refer to the Birth Outcomes section of this report.

### Antenatal care

Common causes of problems at birth are prematurity, fetal growth restriction, congenital abnormalities and asphyxia.<sup>5</sup> Good antenatal care can prevent or ameliorate some of these problems.<sup>5</sup> Early engagement with antenatal care facilitates screening for sexually transmitted infections, congenital abnormalities, maternal mental health issues and family violence.<sup>6</sup> It also allows identification of any medical conditions that may affect the pregnancy, such as diabetes, hypertension, a family history of genetic disease, or a previous history of preterm delivery or preeclampsia.<sup>6</sup>

There is increasing evidence that a person’s chronic disease risk in adulthood is affected by their mother’s nutrition during pregnancy.<sup>7</sup> Attention to modifiable lifestyle risks such as smoking, alcohol and drug abuse, obesity, malnutrition, and inadequate folic acid intake is especially important.<sup>5</sup>

### Smoking cessation in pregnancy

Tobacco smoking in pregnancy is probably the single most important modifiable risk factor for adverse pregnancy outcomes.<sup>8,9</sup> It is associated with fetal growth restriction, and increased risks of premature delivery, placental abruption, stillbirth and sudden unexpected death in infancy.<sup>10</sup> Children of women who smoked during pregnancy have measureable impairment in lung function, increased hospitalisation for respiratory infections, and increased prevalence of wheeze and asthma.<sup>11</sup>

There is high quality evidence that counselling increases smoking cessation in late pregnancy.<sup>12</sup> There is also high quality evidence that financial incentive interventions are more effective than alternative interventions.<sup>12</sup> There is moderate quality evidence that feedback increases smoking cessation (compared to usual care) when it is provided together with other strategies such as counselling.<sup>12</sup> The effects of health education and social support are less certain.<sup>12</sup>

Nicotine replacement therapy (NRT) is effective in helping non-pregnant smokers to quit.<sup>13</sup> The SNAP RCT of nicotine replacement patches in pregnant women (15mg per 16 hours) found that the patches had no significant effect on smoking cessation rates at delivery (9.4% in the NRT and 7.6% in the placebo group, odds ratio 1.26, 95% CI 0.82 to 1.96); however, at two years old the children born to the mothers who took NRT were more likely to have no developmental impairment (72.6% vs. 65.5%, OR 1.40, 95% CI 1.05 to 1.86).<sup>14</sup> Numbers of adverse pregnancy and birth outcomes were similar in trial groups, except that there were more caesarean deliveries in the NRT group. A 2017 review<sup>15</sup> of the possible adverse effects of NRT concluded that, for the more commonly studied reproductive/developmental outcomes (including fetal loss, spontaneous abortion,

birthweight, prematurity, neonatal intensive care admissions, overall incidence of congenital abnormalities and ADHD), the available evidence suggests a lack of effect of NRT.

## **Equity**

There are large disparities in perinatal health between countries and between different population groups within countries.<sup>16</sup> The latest report from New Zealand's Perinatal and Maternal Mortality Review Committee<sup>17</sup> indicates that increasing socioeconomic deprivation is associated with increasing odds of stillbirth and neonatal death (after adjusting for maternal age, ethnicity, multiple pregnancy, baby sex and year of birth). The Growing Up in New Zealand (GUiNZ) study conducted in 2009-10 found that factors independently associated with delayed engagement with lead maternity carer were non-European ethnicity, first pregnancy, age < 20 years and socio-economic deprivation.<sup>18</sup> Research conducted in Counties Manukau DHB in 2011 found that women were more likely to book late (after 18 weeks' gestation) if they had limited resources, no tertiary education or were not living with a husband or partner.<sup>19</sup> Women who have lives complicated by difficult social circumstances, or psychiatric or addiction problems, need appropriate care from multidisciplinary services.<sup>6</sup>

The research conducted in Counties Manukau DHB in 2011 also found that Māori and Pacific women were almost six times more likely to book late than European/other women.<sup>19</sup> Research that interviewed young Māori women (aged < 20 years) about their experiences with maternity care found that, contrary to other published literature, young pregnant Māori women were engaging early with health services (GP services and school and youth health services), but that they faced system level barriers connecting with midwifery care.<sup>20</sup> It was common for the women to be given a list of midwives' phone numbers and left to find their own midwife. They often found the process difficult, having to ring a number of midwives to find one who was available to care for them. Support from health professionals and family and whānau helped some of these young women connect with a midwife. It is clearly important for the first health professional a woman sees in her pregnancy to offer to help with finding a lead maternity carer.

Smoking in pregnancy is a major contributor to the inequality in birth outcomes between high and low socioeconomic status women, as the prevalence of smoking in pregnancy is much higher among disadvantaged women.<sup>21</sup> One of the barriers to Māori women quitting smoking in pregnancy is living or socialising with others who smoke so it is important to include the family in smoking cessation interventions.<sup>22</sup> Anti-smoking campaigns need to beware of stigmatising already marginalised groups and recognise the low self-esteem, low self-efficacy, poverty, stress and increased caring responsibilities that are common in women who continue to smoke in pregnancy.<sup>12,23</sup>

## **New Zealand guidelines**

- Ministry of Health. 2014. **Screening, Diagnosis and Management of Gestational Diabetes in New Zealand: A clinical practice guideline**. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/screening-diagnosis-and-management-gestational-diabetes-new-zealand-clinical-practice-guideline>
- Ministry of Health. 2014. **Diabetes in Pregnancy: Quick reference guide for health professionals on the screening, diagnosis and treatment of gestational diabetes in New Zealand**. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/diabetes-pregnancy>
- Ministry of Health. 2014. **Guidance for Healthy Weight Gain in Pregnancy**. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/guidance-healthy-weight-gain-pregnancy>
- Ministry of Health. 2013. **National Consensus Guideline for Treatment of Postpartum Haemorrhage**. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/national-consensus-guideline-treatment-postpartum-haemorrhage>
- Ministry of Health. 2012. **Guidelines for Consultation with Obstetric and Related Medical Services (Referral Guidelines)**. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/guidelines-consultation-obstetric-and-related-medical-services-referral-guidelines>
- Ministry of Health. 2010. **Alcohol and Pregnancy: A practical guide for health professionals**. Wellington: Ministry of Health. <https://www.health.govt.nz/publication/alcohol-and-pregnancy-practical-guide-health-professionals>

## **International guidelines**

- National Institute for Health and Care Excellence pathways and guidelines
- National Institute for Health and Care Excellence. 2017. **Antenatal care for uncomplicated pregnancies overview**. <https://pathways.nice.org.uk/pathways/antenatal-care-for-uncomplicated-pregnancies>
- National Institute for Health and Care Excellence. 2010. **Smoking: Stopping in pregnancy and after childbirth. Public health guidance [ph26]**. <https://www.nice.org.uk/guidance/ph26>
- National Institute for Health and Care Excellence. 2017. **Maternal and child nutrition overview**. <https://pathways.nice.org.uk/pathways/maternal-and-child-nutrition>
- National Institute for Health and Care Excellence. 2017. **Multiple pregnancy overview**. <https://pathways.nice.org.uk/pathways/multiple-pregnancy>

Royal College of Obstetricians and Gynaecologists (UK) guidelines <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/>

The RCOG has numerous clinical guidelines relating to aspects of maternity care, some of the more general of which are listed below.

- Royal College of Obstetricians and Gynaecologists (RCOG). 2013. **The investigation and management of the small-for-gestational-age fetus**. London (UK): Royal College of Obstetricians and Gynaecologists (RCOG). <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg31/>
- Royal College of Obstetricians and Gynaecologists (RCOG). 2016. **The Management of Nausea and Vomiting of Pregnancy and Hyperemesis Gravidarum**. London (UK): Royal College of Obstetricians and Gynaecologists (RCOG). <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg69/>
- Royal College of Obstetricians and Gynaecologists (RCOG). 2011. **Reduced Fetal Movements**. London (UK): Royal College of Obstetricians and Gynaecologists (RCOG). <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/gtg57/>
- Australian Health Ministers' Advisory Council. 2012 (Module 1) and 2014 (Module 2). **National evidence-based antenatal care guidelines**. Canberra: Australian Government Department of Health and Aging. <http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-antenatal-care-index>
- World Health Organization. 2016. **WHO recommendations on antenatal care for a positive pregnancy experience**. Geneva: World Health Organization. [http://www.who.int/reproductivehealth/publications/maternal\\_perinatal\\_health/anc-positive-pregnancy-experience/en/](http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en/)
- World Health Organization. 2014. **Guidelines for identification and management of substance use and substance use disorders in pregnancy**. Geneva: World Health Organization. [http://www.who.int/substance\\_abuse/publications/pregnancy\\_guidelines/en/](http://www.who.int/substance_abuse/publications/pregnancy_guidelines/en/)
- World Health Organization. 2013. **WHO recommendations for the prevention and management of tobacco use and second-hand smoke exposure in pregnancy**. Geneva: World Health Organization. <http://www.who.int/tobacco/publications/pregnancy/guidelines/tobaccosmokeexposure/en/>

## **Reviews**

- Kvalsvig A. 2016. **Better health for the new generation: Getting it right from the start**. In Simpson J, Oben G, Craig E, et al. (Eds.), *The determinants of health for children and young people in New Zealand* (2014). Dunedin: New Zealand Child and Youth Epidemiology Service.
- Malouf R, Redshaw M. 2017. **Specialist antenatal clinics for women at high risk of preterm birth: a systematic review of qualitative and quantitative research**. *BMC Pregnancy Childbirth*, 17(1) 51. <http://dx.doi.org/10.1186/s12884-017-1232-9>
- Sandall J, Soltani H, Gates S, et al. 2016. **Midwife-led continuity models versus other models of care for childbearing women**. *The Cochrane database of systematic reviews*, 4. <http://dx.doi.org/10.1002/14651858.CD004667.pub5>
- Homer CS, Ryan C, Leap N, et al. 2012. **Group versus conventional antenatal care for women**. *The Cochrane database of systematic reviews*, 11. <http://dx.doi.org/10.1002/14651858.CD007622.pub2>
- Dodd JM, Dowswell T, Crowther CA. 2015. **Specialised antenatal clinics for women with a multiple pregnancy for improving maternal and infant outcomes**. *The Cochrane database of systematic reviews*(11). <http://dx.doi.org/10.1002/14651858.CD005300.pub4>



- Haddrill R, Jones GL, Anumba D, et al. 2017. **A tale of two pregnancies: A Critical Interpretive Synthesis of women's perceptions about delayed initiation of antenatal care.** *Women and Birth*. <http://dx.doi.org/10.1016/j.wombi.2017.09.017>
- Wadehul F, Jones C, Jomeen J. 2016. **The Impact of Antenatal Psychological Group Interventions on Psychological Well-Being: A Systematic Review of the Qualitative and Quantitative Evidence.** *Healthcare (Basel)*, 4(2). <http://dx.doi.org/10.3390/healthcare4020032>
- Dowswell T, et al. 2015. **Alternative versus standard packages of antenatal care for low-risk pregnancy.** *The Cochrane Database of Systematic Reviews* (7). <http://dx.doi.org/10.1002/14651858.CD000934.pub3>
- Chamberlain C, O'Mara-Eves A, Porter J, et al. 2017. **Psychosocial interventions for supporting women to stop smoking in pregnancy.** *The Cochrane database of systematic reviews*, 2. <http://dx.doi.org/10.1002/14651858.CD001055.pub5>
- Patnode CD, Henderson JT, Thompson JH, Senger CA, Fortmann SP, Whitlock EP. 2015. **Behavioral Counseling and Pharmacotherapy Interventions for Tobacco Cessation in Adults, Including Pregnant Women: A Review of Reviews for the U.S. Preventive Services Task Force.** Rockville (MD): Agency for Healthcare Research and Quality (US). <https://www.ncbi.nlm.nih.gov/pubmed/26491759>

## Websites

- Ministry of Health. 2016. **Services and support during pregnancy** <https://www.health.govt.nz/your-health/pregnancy-and-kids/services-and-support-during-pregnancy>

## Other relevant publications

- Allen and Clarke. 2015. **Evaluation of the Maternity Quality and Safety Programme.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/evaluation-maternity-quality-and-safety-programme>
- Research New Zealand. **Maternity Consumer Survey 2014.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/maternity-consumer-survey-2014>
- Workbase Education Trust. 2014. **Māori health literacy research: Gestational diabetes mellitus.** Wellington: Ministry of Health. <https://www.health.govt.nz/publication/maori-health-literacy-research-gestational-diabetes-mellitus>
- Moewaka Barnes H, Moewaka Barnes A, Baxter J, Crengle S, Pihama L, Ratima M, and Robson B. 2013. **Hapū Ora: Wellbeing in the Early Stages of Life.** Auckland: Te Ropu Whariki, SHORE and Whariki Research Centre, Massey University. <https://www.health.govt.nz/publication/hapu-ora-wellbeing-early-stages-life>

## References

1. Ministry of Health. 2017. **Delivering Better Public Services: A good start to life.** Result Action Plan for Result 2: Healthy mums and babies and Result 3: Keeping kids healthy. Wellington: New Zealand Government. <http://www.health.govt.nz/publication/delivering-better-public-services-good-start-life>
2. Kvalsvig A. 2016. **Better health for the new generation: Getting it right from the start.** In Simpson J, Oben G, et al. (Eds.), *The determinants of health for children and young people in New Zealand* (2014). Dunedin: New Zealand Child and Youth Epidemiology Service.
3. Ministry of Health. 2015. **Pregnancy services** <https://www.health.govt.nz/new-zealand-health-system/publicly-funded-health-and-disability-services/pregnancy-services> accessed November 2017.
4. Mbuagbaw L, Medley N, Darzi AJ, et al. 2015. **Health system and community level interventions for improving antenatal care coverage and health outcomes.** *Cochrane Database of Systematic Reviews*, (12) <http://dx.doi.org/10.1002/14651858.CD010994.pub2>
5. EBCOG Scientific Committee. 2015. **The public health importance of antenatal care.** *Facts, Views & Vision in ObGyn*, 7(1) 5-6. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4402443/>
6. National Collaborating Centre for Women's and Children's Health, (commissioned by the National Institute for Health and Clinical Excellence). 2008. **Antenatal care: routine care for the healthy pregnant woman.** London: National Collaborating Centre for Women's and Children's Health, RCOG. <https://www.nice.org.uk/guidance/cg62/evidence/full-guideline-corrected-june-2008-pdf-196748317>
7. Barker D, Barker M, Fleming T, et al. 2013. **Developmental biology: Support mothers to secure future public health.** *Nature*, 504(7479) 209. <http://dx.doi.org/10.1038/504209a>

8. Gould GS, Lim LL, Mattes J. 2017. Prevention and treatment of smoking and tobacco use during pregnancy in selected indigenous communities in high-income countries of the United States, Canada, Australia, and New Zealand: An Evidence-Based Review. *Chest*, 152(4) 853-66. <http://dx.doi.org/10.1016/j.chest.2017.06.033>
9. Cnattingius S. 2004. The epidemiology of smoking during pregnancy: Smoking prevalence, maternal characteristics, and pregnancy outcomes. *Nicotine and Tobacco Research*, 6(SUPPL. 2) S125-S40. <http://dx.doi.org/10.1080/14622200410001669187>
10. Banderali G, Martelli A, Landi M, et al. 2015. Short and long term health effects of parental tobacco smoking during pregnancy and lactation: a descriptive review. *Journal of translational medicine*, 13 327. <http://dx.doi.org/10.1186/s12967-015-0690-y>
11. McEvoy CT, Spindel ER. 2017. Pulmonary effects of maternal smoking on the fetus and child: effects on lung development, respiratory morbidities, and life long lung health. *Paediatric respiratory reviews*, 21 27-33. <http://dx.doi.org/10.1016/j.prrv.2016.08.005>
12. Chamberlain C, O'Mara-Eves A, Porter J, et al. 2017. Psychosocial interventions for supporting women to stop smoking in pregnancy. *The Cochrane database of systematic reviews*, 2. <http://dx.doi.org/10.1002/14651858.CD001055.pub5>
13. Stead LF, Perera R, Bullen C, et al. 2012. Nicotine replacement therapy for smoking cessation. *The Cochrane database of systematic reviews*, 11. <http://dx.doi.org/10.1002/14651858.CD000146.pub4>
14. Cooper S, Lewis S, Thornton JG, et al. 2014. The SNAP trial: a randomised placebo-controlled trial of nicotine replacement therapy in pregnancy--clinical effectiveness and safety until 2 years after delivery, with economic evaluation. *Health technology assessment*, 18(54) 1-128. <http://dx.doi.org/10.3310/hta18540>
15. Lee PN, Fariss MW. 2017. A systematic review of possible serious adverse health effects of nicotine replacement therapy. *Archives of Toxicology*, 91(4) 1565-94. <http://dx.doi.org/10.1007/s00204-016-1856-y>
16. de Graaf JP, Steegers EA, Bonsel GJ. 2013. Inequalities in perinatal and maternal health. *Current opinion in obstetrics & gynecology*, 25(2) 98-108. <http://dx.doi.org/10.1097/GCO.0b013e32835ec9b0>
17. Perinatal and Maternal Mortality Review Committee. 2017. Eleventh Annual Report of the Perinatal and Maternal Mortality Review Committee: Reporting mortality 2015. Wellington: Health Quality & Safety Commission. [https://www.hqsc.govt.nz/assets/PMMRC/Publications/2017\\_PMMRC\\_Eleventh\\_Annual\\_Report.pdf](https://www.hqsc.govt.nz/assets/PMMRC/Publications/2017_PMMRC_Eleventh_Annual_Report.pdf)
18. Bartholomew K, Morton SMB, Atatoa Carr PE, et al. 2015. Early engagement with a Lead Maternity Carer: Results from Growing Up in New Zealand. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 55(3) 227-32. <http://dx.doi.org/10.1111/ajo.12291>
19. Corbett S, Chelimo C, Okesene-Gafa K. 2014. Barriers to early initiation of antenatal care in a multi-ethnic sample in South Auckland, New Zealand. *The New Zealand Medical Journal*, 127(1404). <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-127-no-1404/6331>
20. Makowharemahihi C, Lawton BA, Cram F, et al. 2014. Initiation of maternity care for young Māori women under 20 years of age. *The New Zealand Medical Journal*, 127(1393). <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2014/vol-126-no-1393/article-makowharemahihi>
21. Lumley J, Chamberlain C, Dowswell T, et al. 2009. Interventions for promoting smoking cessation during pregnancy. *The Cochrane database of systematic reviews*, (3). <http://dx.doi.org/10.1002/14651858.CD001055.pub3>
22. Glover M, Kira A. 2011. Why Māori women continue to smoke while pregnant. *The New Zealand Medical Journal*, 124(1338). <https://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2011/vol-124-no-1339/article-glover>
23. Gilbert E. 2005. Contextualising the medical risks of cigarette smoking: Australian young women's perceptions of anti-smoking campaigns. *Health, Risk & Society*, 7(3) 227-45. <http://dx.doi.org/10.1080/13698570500229655>