

no: 5

date: 21/06/2012

**title** Are midwifery-led models of care safe for mothers and babies?

**authors** Dr Meredith McIntyre

School of Nursing and Midwifery, Monash University, Victoria.  
Email: [meredith.mcintyre@monash.edu](mailto:meredith.mcintyre@monash.edu)

**Dr Anne-marie Boxall**

Director  
Deeble Institute  
Australian Healthcare and Hospitals Association, Canberra.  
Email: [aboxall@ahha.asn.au](mailto:aboxall@ahha.asn.au)

**policy issue**

Debates about different models of maternity care have been long-running in Australia. Disputes over evidence on the safety and quality of midwifery-led models of care – which include shared care, birth centres, and planned home births – are at the heart of the debate.

In an attempt to improve maternity services in Australia, the Federal Government has implemented a number of reforms.<sup>1</sup> In November 2010, the Government made some changes to the Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS), so that eligible, privately practising midwives working in collaboration with an obstetrician could prescribe some medications, provide antenatal and postnatal care, and deliver babies in a hospital setting. The Government also agreed to support a professional indemnity scheme for eligible, privately practising midwives.

Despite these reforms, debates about midwifery-led models of care, particularly homebirths, are ongoing.<sup>2</sup> Some privately practicing midwives are unhappy with the current arrangements. Reasons for this include:

- Despite the recent changes to the MBS and PBS, some privately practising midwives cannot get practice rights in public hospitals.<sup>3</sup>
- Private midwives who attend homebirths are not currently required to take out professional indemnity insurance, but some are concerned that this will change when the [Safety and Quality Framework for Privately Practising Midwives attending Homebirths](#) is reviewed in July 2013.<sup>4</sup>

- There are ongoing debates about the [National Midwifery Guidelines for Consultation and Referral](#) currently in use that help midwives decide when a woman should be referred to an obstetrician for assessment or ongoing care.<sup>5</sup>

## what does the evidence say?

In health care, the Cochrane Collaboration's reviews of evidence are generally considered to be authoritative. The Cochrane Collaboration has conducted three reviews on maternity-models of care: one each on midwifery-led models of care, hospital-based birth centres, and home births.<sup>6-8</sup> Taken together, the Cochrane reviews indicate that midwifery-led models of care have some benefits for low risk women and their babies, and are as safe as obstetric-led models of care.

When comparing midwifery-led models of care with obstetric-led and shared care models, the Cochrane review found 11 relevant studies.<sup>9</sup> Overall, the results of these studies indicate that low risk women in midwifery-led models of care are less likely than other women to have medical interventions during birth (including analgesia and instrumental delivery), more likely to feel in control during child birth and to initiate breastfeeding afterwards. The review also found that neonatal death rates for low risk women in midwifery-led models of care are no different from those in other settings, such as a hospital under the care of an obstetrician.

When they examined the evidence on birth-centres, the Cochrane reviewers found 9 relevant studies.<sup>10</sup> They concluded that, compared with women who receive conventional hospital care, low risk women who give birth in hospital-based birth centres are more likely to have a spontaneous vaginal delivery, less likely to have medical interventions, and more likely to be satisfied with their care. No significant differences were seen in perinatal or maternal morbidity or mortality.

The Cochrane review on home births found only one small study (it included only 11 women).<sup>11</sup> Although this study was of reasonable quality, the reviewers determined that it was too small to draw any conclusions from.

In recent years, the Cochrane Collaboration has been criticised for placing too much emphasis on methodological rigour (for example, only including randomised trials) and not enough on evidence that can be used to improve clinical practice.<sup>12</sup> In an effort to address this problem, a recent [review](#) published in the *Australian Health Review* analysed findings from 22 of the highest quality non-randomised studies on midwifery-led models of care.<sup>13</sup> Many of the studies used large aggregated data sets, and six of them included Australian data.

All studies in the review show that low risk women in midwifery-led models of care have lower rates of medical intervention than those in obstetric-led models of care. This is perhaps not surprising as minimising medical intervention during child birth is part of the ethos in midwifery-led care.

Most studies in the review (14 out of 18) show that low risk women giving birth in

midwifery-led models of care have similar outcomes to those giving birth in obstetric-led models of care (or standard hospital care). In all of these studies, qualified midwives were working within rigorous practice guidelines. However, 4 out of 18 studies in the review conclude that midwifery-led models of care increase the risk of adverse outcomes for babies.<sup>14</sup> Three of them were conducted in Europe (Sweden and the Netherlands), but the fourth pooled data from 12 separate studies (known as a meta-analysis), and included one Australian study (see below for more details).

The two Swedish studies found higher neonatal death rates for women giving birth at home and in birth centres, but the results were not statistically significant.<sup>15</sup> The Dutch study found that low risk women who planned to birth at home with a midwife, experienced higher rates of neonatal death, and these results were statistically significant.<sup>16</sup> The findings of this study are particularly noteworthy because there is a strong culture of home-births in the Netherlands.

In the meta-analysis, researchers concluded that low risk women experience fewer medical interventions when giving birth at home, but the risk of neonatal death is significantly higher.<sup>17</sup> The Australian study included as part of the meta-analysis (conducted in Western Australia between 1981 and 1987) shows higher perinatal death rates for women who planned to give birth at home, but the results were not statistically significant.<sup>18</sup> The study also found that these women were less likely to have medical interventions during labour and, overall, were less likely to have complications resulting from labour. However, they were more likely to experience certain complications: postpartum haemorrhage or retained placenta.

It is common in maternity services to transfer low risk women from midwifery to obstetric-led care if their risk status increases. Although transfer rates from midwifery to obstetric-led care are important in practice, few studies report them. In the review being discussed here, only 6 of the studies included reported transfer rates, and they varied considerably.<sup>19</sup>

A British study found that about half of all women deemed to be low risk were transferred from the birth centre to a consultant obstetric service at some point during their maternity care.<sup>20</sup> First time mothers requesting pain management made up the bulk of the patients transferred out of midwifery-led care. At the other end of the spectrum, one small Australian study of rural midwifery-led services reported that only 14% of women were transferred to obstetric care.<sup>21</sup> These comprised 10% of women who were transferred prior to labour (mostly because of hypertension, preeclampsia, and preterm rupture of membranes), and 4% were transferred during childbirth (either because they requested an epidural or had a prolonged first stage of labour).

Most of the research on different models of maternity care examines outcomes for babies, not their mothers. This is because maternal mortality is rare in developed nations, making it impossible to reliably compare outcomes from different models of care.<sup>22</sup> Australian maternity services rely on mortality rather than serious morbidity as the index measure of quality and safety.<sup>23</sup> Changing the index measure to include serious morbidity would enable the collection of a complete data set and analysis of this important outcome.<sup>24</sup>

## what is the quality of the evidence available?

Compared with other areas of health care, there are only a relatively small number of recent, well-designed studies examining the safety and quality of different models of maternity care. The evidence on specific models of care, especially less common ones (for example home births) is even more limited. The evidence in this field is also strongly contested in the academic literature. Given all this, it is difficult to make definitive statements about the safety and quality of different models of maternity care.

Findings from randomised controlled trials (RCTs) are considered to be the most robust form of evidence in health care. For the most part, it is not feasible to conduct RCTs in maternity services. Women want to choose where they deliver; they do not want their decision to be made by researchers. The next best option is a retrospective cohort study. In this type of study, women choose a model of care from themselves, and then researchers compare the outcomes for women who choose different types of maternity care.

Most cohort studies use data from central registries, such as birth registries. It is necessary to rely on data from central registries to get the numbers needed to undertake statistical analyses of fairly rare events (e.g. neonatal deaths). One of the limitations of relying on aggregated data from central registries is that researchers are not able to assess the reliability, accuracy or completeness of data sets. As a result, there is always some uncertainty about findings.

Data collected in birth registries also varies from country to country, making it difficult to reliably compare findings from different countries. For example some countries report perinatal deaths while others report neonatal deaths, but they are different. Studies reporting neonatal deaths do not include foetal deaths (often due to congenital defects) or still births, but both of these are included in perinatal death statistics. As a result, studies from countries that report perinatal deaths are going to have higher mortality rates than studies from countries that report neonatal deaths.<sup>25</sup>

The uncertainty about the evidence in this field, however, cannot be attributed solely to differences in data definitions. Sometimes researchers come to different conclusions using the same data set. This happened recently in Australia. One study, which used data from the National Perinatal Data Collection records, found that perinatal death rates for babies were much higher in hospitals than birth centres.<sup>26</sup> Another study, performed subsequently, found there was no statistical difference in perinatal death rates in hospitals or birth centres.<sup>27</sup> The different outcomes came about because of confusion about where to report outcomes for women who start off in a midwifery-led model of care but, at some point during pregnancy or labour, are transferred to an obstetric-led model of care.<sup>28</sup>

Women do not always end up giving birth in the setting that they plan to, so it is important to consider transfer rates from one type of care to another when analysing the evidence. Standard scientific practice is to use 'intention to treat' analysis, which means that outcomes for women who start off in midwifery-led care should be counted in this group even though they may have been transferred to the care of an obstetrician at some point during the pregnancy or labour.

Even if all researchers conducted their analyses on an intention to treat basis, some doubts would remain about the veracity of findings in this field. The number of women transferred from one model of care to another (usually from midwifery-led models to obstetric care) is determined largely by practice guidelines, and these differ from country to country. The Canadian and Dutch guidelines, for example, exclude women from midwifery-led care if they have previously had a caesarean section, have a post-term pregnancy, are pregnant with twins, or have a breech presentation. In Sweden, guidelines allow women having multiple births or with post-term pregnancies to deliver in birth centres co-located with a hospital, but not at home. And in recent years, guidelines in the Netherlands and New Zealand have tightened up the exclusion criteria for midwifery-led models of care.

In Australia, the National Midwifery [Guidelines](#) for Consultation and Referral have been developed by the Australian College of Midwives in conjunction with a multi-disciplinary expert panel and with public consultation. The Guidelines are considered to be internationally comparable and were developed using the latest available research evidence at the time of publication. The Guidelines are used widely to inform midwifery practice and have similar exclusion criteria to the Canadian and Dutch guidelines. Therefore, findings from these countries have some relevance here. Study findings from countries where practice guidelines are, or were, substantially different to the Australian ones, or where practitioners do not adhere to them, have much less relevance – for example, study findings from the Netherlands and New Zealand that are more than 5 years old.

## what does this mean for policymakers?

The key to making sense of the conflicting international evidence in maternity services is to acknowledge that most of the contradictions can be attributed to two things:

- methodological flaws – for example, failing to ensure that all the women in the study fit the definition of ‘low risk’ or to conduct analyses on an ‘intention to treat’ basis, or
- variations in practice across countries – that is, how maternity services are run, organised and monitored.

It is relatively easy to resolve disputes about the quality of evidence that stem from methodological flaws; evidence generated from studies with the fewest methodological weaknesses is more compelling (it is worth noting, however, that it is impossible to design and conduct a flawless study in health services research).

It is more difficult to make sense of contradictory findings that arise because of variations in practice. One option is to reanalyse the available evidence, sifting out those studies that have (or did have) vastly different practices from those in Australia – for example, studies that do not use qualified midwives, or allow women having twins, a breech birth or who are considered to be clinically post mature to have homebirths. When this is done (see [here](#) for a more detailed discussion), it becomes apparent that women are much more likely to experience poor outcomes

if they are transferred from midwifery-led care to obstetric care urgently during labour.<sup>29</sup> In light of this, the key to minimising the risk of adverse outcomes for low risk women in midwifery-led care is to adopt and adhere to the National Midwifery Guidelines for Consultation and Referral, as promoted by the Australian College of Midwives. When working within these Guidelines, the available evidence indicates that midwifery-led care for low risk women is as safe as standard hospital or obstetric care.

## key readings

MJ McIntyre, 'Safety of non-medically led primary maternity care models: a critical review of the international literature', *Australian Health Review*, 2012;36(2):140-147.

MJ McIntyre, K Francis, Y Chapman, 'Hidden costs associated with universal application of risk management in maternity care', *Australian Health Review*; 2011:35(2) 211 – 215.

D Davis, S Baddock, S Pairman, M Hunter, C Benn, D Wilson, et al, 'Planned place of birth in New Zealand: does it affect mode of birth and intervention rates among low-risk women?', *Birth*, 2011;38(2):111-119.

A Evers, H Bouwers, A van Egmond-Linden, J Hillegrsberg, Y Snuif, S Sterken-Hooisma et al, 'Perinatal mortality and severe morbidity in low and high risk term pregnancies in the Netherlands: prospective cohort study', *British Medical Journal*, 2010;341:5639.

PJ Laws, SK Tracy, EA Sullivan, 'Perinatal outcomes of women intending to give birth in birth centres in Australia', *Birth*, 2010;37(1):28-36.

K Gottvall, U Waldenstrom, C Tingstig, C Grunerwald, 'In-hospital birth-centre with the same medical guidelines as standard care: comparative study of obstetric interventions and outcomes', *Birth*, 2011;38:120-128.

EK Hutton, AH Reitsma, K Kaufman, 'Outcomes associated with planned home and planned hospital births in low risk women attended by midwives in Ontario, Canada, 2003-2006: a retrospective cohort study', *Birth*, 2009;36(3):180-189.

RM Kennare, MJ Keirse, GR Tucker, AC Chan, 'Planned home and hospital births in South Australia, 1991-2006: differences in outcomes', *Medical Journal of Australia*, 2010;192(2):76-80.

PA Janssen, E Ryan, D Etches, M Klein, B Reime, 'Outcomes of planned hospital birth attended by midwives compared with physicians in British Columbia', *Birth*, 2007;34(2):140-147.

ED Hodnett, S Downe, D Walsh, J Weston, 'Alternative versus conventional institutional settings for birth (Review)', *Cochrane Database of Systematic Reviews*, 2010, Issue 9.

O Olsen, D Jewell, 'Home versus hospital birth (Review)', *Cochrane Database of Systematic Reviews*, 1998, Issue 3, reviewed and republished 2009.

## references

- <sup>1</sup> Australian Government, Department of Health and Ageing, 'Maternity Services reform', viewed 21 June 2012, <http://www.health.gov.au/internet/main/publishing.nsf/Content/pacd-pdb-maternity-professionals>
- <sup>2</sup> See for example: <http://blogs.crikey.com.au/croakey/2012/06/08/are-australian-women's-birthing-rights-now-perched-on-a-slippery-slope/>
- <sup>3</sup> See for example: Midwives Victoria, blogspot, 'Collaboration gone wrong', 19 June 2012, viewed 21 June 2012, <http://midwivesvictoria.blogspot.com.au/>; Australian Private Midwives Association blogspot, 'Where are the midwives who practice privately?', 21 March 2012, viewed 21 June 2012, <http://australianprivatemidwivesassociation.blogspot.com.au/2012/03/where-are-midwives-who-practise.html>
- <sup>4</sup> H Dahlen, 'Are Australian women's birthing rights now perched on a slippery slope?' *Croakey*, 8 June 2012, viewed 21 June 2012, <http://blogs.crikey.com.au/croakey/2012/06/08/are-australian-women's-birthing-rights-now-perched-on-a-slippery-slope/><http://blogs.crikey.com.au/croakey/2012/06/08/are-australian-women's-birthing-rights-now-perched-on-a-slippery-slope/>
- <sup>5</sup> See for example: Midwives Victoria, blogspot, 'Looking for a homebirth midwife', 16 August 2008, viewed 21 June 2012, [http://midwivesvictoria.blogspot.com.au/2008\\_08\\_01\\_archive.html](http://midwivesvictoria.blogspot.com.au/2008_08_01_archive.html); Homebirth: a midwifery mutiny blogspot, viewed 21 June 2012, <http://www.homebirth.net.au/2011/05/acm-homebirth-position-statement.html>
- <sup>6</sup> M Hatem, J Sandall, D Devane, H Soltani, S Gates, 'Midwife-led versus other models of care for childbearing women (Review)', *Cochrane Database of Systematic Reviews*, 2008, Issue 4, viewed 21 June 2012, <http://summaries.cochrane.org/CD004667/midwife-led-versus-other-models-of-care-for-childbearing-women>
- <sup>7</sup> ED Hodnett, S Downe, D Walsh, J Weston, 'Alternative versus conventional institutional settings for birth (Review)', *Cochrane Database of Systematic Reviews*, 2010, Issue 9, viewed 21 June 2012, <http://www.ncbi.nlm.nih.gov/pubmed/20824824>
- <sup>8</sup> O Olsen, D Jewell, 'Home versus hospital birth (Review)', *Cochrane Database of Systematic Reviews*, 1998, Issue 3, reviewed and republished 2009, viewed 21 June 2012, <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD000352/pdf>
- <sup>9</sup> Hatem, Sandall, Devane et al, 2008.
- <sup>10</sup> Hodnett, Downe, Walsh et al, 2010.
- <sup>11</sup> Olsen and Jewell, 2009.
- <sup>12</sup> CM Court-Brown, MM McQueen, How useful are meta-analyses in orthopedic trauma? *Journal of Trauma, Injury, Infection and Critical Care*. 2011;71(5):1395-1399; E Hodnett, HM Reisman, Response to critique of Cochrane Systematic Review of home-like setting for birth in the *International Journal of Evidence-Based Healthcare, International Journal of Evidence-Based Healthcare*, 2007;5(3):365-366.
- <sup>13</sup> MJ McIntyre, Safety of non-medically led primary maternity care models: A critical review of the international literature, *Australian Health Review*, 2012;36(2):140-147.

- <sup>14</sup> A Evers, H Bouwers, A van Egmond-Linden, J Hillegrsberg, Y Snuif, S Sterken-Hooisma et al, 'Perinatal mortality and severe morbidity in low and high risk term pregnancies in the Netherlands: prospective cohort study', *British Medical Journal*, 2010;341:5639; K Gottvall, C Grunewald, U Waldenstrom, 'Safety of birth centre care: perinatal mortality over a 10-year period', *British Journal of Obstetrics and Gynecology*, 2004;30:622-627; JR Wax, FL Lucas, M Lamont, MG Pinette, A Cartin, J Blackstone, 'Maternal and newborn outcomes in planned home birth vs planned hospital births: a metaanalysis', *American Journal of Obstetrics and Gynecology*, 2010;203(3):243; H Lindgren, I Radestad, K Christensson, I Hildingsson, 'Outcome of planned home birth compared to hospital births in Sweden between 1992 and 2004', *Acta Obstetrica et Gynecologica*, 2008;87:751-759.
- <sup>15</sup> Gottvall, Grunewald, Waldenstrom, 2004; Lindgren, Radestad, Christensson, Hildingsson, 2008.
- <sup>16</sup> Evers, Bouwers, van Egmond-Linden, 2010.
- <sup>17</sup> Wax, Lucas, Lamont, 2010.
- <sup>18</sup> HC Woodcock, AW Read, C Bower, FJ Stanley, DJ Moore, 'A matched cohort study of planned home and hospital births in Western Australia 1981-1987', *Midwifery*, 1994; 10:125-135.
- <sup>19</sup> McIntyre, 2012.
- <sup>20</sup> C Rodgers, J Pickersgill, M Broadbent, 'Informing choices: outcomes for women at a stand-alone birth centre', *British Journal of Midwifery*, 2010;18(1):8-15.
- <sup>21</sup> S Scherman, J Smith, M Davidson, 'The first year of a midwifery-led model of care in Far North Queensland', *Medical Journal of Australia*, 2008;188(2):85-88.
- <sup>22</sup> M McIntyre, 2012.
- <sup>23</sup> CL Roberts, JB Ford, CS Algert, JC Bell, JM Simpson, JM Morris, 'Trends in adverse maternal outcomes during childbirth: a population-based study of severe maternal morbidity', *BMC Pregnancy & Childbirth*;2009;9:7.
- <sup>24</sup> MJ McIntyre, K Francis, Y Chapman, 'Hidden costs associated with universal application of risk management in maternity care', *Australian Health Review*; 2011;35(2) 211 – 215.
- <sup>25</sup> J Sandall, M Hatem, D Devane, H Soltani, S Gates, 'Discussions of findings from a Cochrane Review of midwife-led versus other models of care for childbearing women: continuity, normality and safety', *Midwifery*;2009;25(1):8-13.
- <sup>26</sup> SK Tracy, H Dahlen, S Caplice, P Laws, YA Wang, MB Tracy, et al 'Birth centres in Australia: a national population-based study of perinatal mortality associated with giving birth in a birth centre', *Birth*, 2007;34(3):194-201.
- <sup>27</sup> PJ Laws, SK Tracy, EA Sullivan, 'Perinatal outcomes of women intending to give birth in birth centres in Australia', *Birth*, 2010;37(1):28-36.
- <sup>28</sup> M McIntyre, 2012.
- <sup>29</sup> M McIntyre, 2012.

© Australian Healthcare and Hospital Association, 2013. All rights reserved.

## contact

Dr Anne-marie Boxall  
Director  
Deeble Institute  
Australian Healthcare and Hospitals Association  
E: [aboxall@ahha.asn.au](mailto:aboxall@ahha.asn.au)