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# Women and Birth

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## ABSTRACT

*Background:* There are high levels of consumer demand for homebirth in Australia, however access is limited due to a wide range of factors, including associated costs of a private midwife and the limited number of publicly funded homebirth models. Homebirth with a qualified midwife, networked into a health system, is a safe option for women with a low-risk pregnancy.

This paper has two aims. The first is to describe the implementation of a publicly funded homebirth service with an employed mentor. The second is to provide the outcomes from a matched cohort of women who received care from the same Midwifery Group Practice [MGP] who gave birth at home, compared with those who gave birth in hospital. *Methods:* The retrospective comparative cohort study used routinely collected perinatal data from the hospital's electronic database (eMaternity) from July 2018 – October 2021. The cohort of interest were women who received care through MGP. They were identically matched by parity, age, Body Mass Index (BMI), spontaneous labour and gestation of 37–42 weeks. A description of the employed midwifery mentor to implement this model of care is also provided. *Findings:* 100 women gave birth at home during the study period. They were more likely to have a physiological birth (p < 0.001), intact perineum (p < 0.0001), and less likely to have a postpartum haemorrhage (p < 0.0001) compared to the matched cohort of women who transferred from home to hospital (p < 0.0001). No statistical differences were seen between groups for postpartum haemorrhage, and Apgar score of < 7 at 5 minutes. *Conclusion:* This study demonstrated favourable outcomes for women receiving MGP who planned to birth at

Conclusion: This study demonstrated favourable outcomes for women receiving MGP who planned to birth at home compared to those women who chose a hospital birth. This is consistent with the existing literature that place of birth makes a difference. A description of the role of a mentor in supporting the sustainability of a publicly funded homebirth program is provided. Further research is recommended to evaluate the mentor's role in implementing and sustaining the model.

| Statement of<br>Significance. |   |
|-------------------------------|---|
| Problem or issue              | There are high levels of consumer demand for homebirth however access is limited due to the associated costs with a private midwife. There are also a limited numbers of publicly funded homebirth models.  |
| What is already known         | Homebirth with a qualified midwife, networked into a health system, is a safe option for women with a low-risl pregnancy. In Australia, these women have improved perinatal outcomes with no difference in neonatal morbidity and mortality. Publicly funded homebirth models are not always sustainable. |
| What this paper adds          | How to implement a sustainable publicly funded homebirth model from an existing midwifery continuity of car-<br>model. Using a matched cohort study, findings from the first three years have suggested improved outcomes fo<br>women being cared for by the same MGP midwives.                           |

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#### 1. Introduction

International evidence suggests that homebirth is safe for women and babies when the pregnancy is low-risk, and the woman is cared for by a qualified midwife who is networked into the healthcare system [1–4]. Australian national data demonstrates that the odds of women having a normal physiological labour and birth are twice as high in a birth centre and nearly six times as high in planned homebirths [5,6]. These outcomes were not associated with any significant differences in the proportion of intrapartum stillbirths and early or late neonatal deaths between the hospital, birth centre and home as planned places of birth [5–7]. Women who gave birth at home experienced less morbidity such as post-partum haemorrhage and severe perineal trauma than those in hospital [5,8].

In Australia, the vast majority of births (97%) occur in hospitals, 2.5 % in birth centres and only 0.5 % at home [9]. Women who birth at home are much more likely to do so under the care of a privately practicing midwife. Only a small number of women have access to publicly funded homebirth as there are less than 20 publicly funded homebirth services (PFHB) in Australia [10]. A decade ago, consumer consultation was undertaken for the proposed maternity services review [11]. Submissions were received from consumers, midwives, professional organisations, community groups, academics and other birth workers such as Doulas with 60 % of submissions mentioning homebirth as an option [11]. In the recent COVID-19 pandemic over 90% of the 103 privately practising midwives reported an increase in enquiries for a homebirth [12]. Demand for homebirth is not diminishing yet the number of maternity services that offer publicly funded homebirth remain stable somewhere between 15 and 19 services nationwide [13, 14]. Women who are unable to access homebirth either through publicly funded programs or privately practising midwives, may choose to birth without a midwife [15,16]. Implementing and scaling up publicly funded homebirth services is feasible but needs to be sustainable. Some homebirth services are not sustainable and/or service only a small number of women due to a limited number of midwives who feel confident to offer intrapartum care at home [17,18].

## 1.1. Research aim

This paper has two aims.

- 1. To describe the role of a mentor midwife in the implementation and sustainability of a publicly funded homebirth service in a tertiary referral hospital that has approximately 4000 births each year.
- 2. Provide an overview of the perinatal outcomes for matched women who gave birth at home, through a publicly funded homebirth program, during the first three years compared with those who received MGP care but chose to birth in hospital.

**Hypothesis.** Perinatal outcomes for women who received MGP and gave birth at home will be improved compared to those who received MGP and gave birth in hospital

## 1.2. Setting

The tertiary referral hospital had 3680 births in 2020 [19], and of those, approximately 1050 women received their care through a midwifery continuity of care model called midwifery group practice (MGP). Twenty-five full-time equivalent hospital employed midwives work in MGP. The MGP midwives work in groups of five, they provide care through pregnancy, are on-call for birth and up to six weeks postpartum. Women who access MGP at booking are not limited to low risk and they are not excluded from MGP care if they develop complications during pregnancy. The midwives have an annual caseload of 35 – 40 women per midwife. The woman's primary midwife is available on-call

approximately five days per week. In the event the midwife is unavailable (e.g., days off or annual leave) the woman is cared for by another MGP midwife, who is in the same group. The women may or may not have met this backup midwife. Each group collaborates with a named obstetrician to discuss complexities or for referral. Since July 2018, a publicly funded homebirth program has been offered to interested women receiving care through MGP.

# 1.3. Implementation of the publicly funded homebirth service facilitators and barriers

In 2017, the hospital sought funding from the New South Wales Ministry of Health, Nursing and Midwifery Office to employ a midwifery leader to implement the homebirth service. The new midwifery role included education, mentorship and support for MGP midwives. Part of this role was to support the transition from providing intrapartum and postpartum care in the hospital setting, to care in the woman's home. Women were offered homebirth if they had booked with MGP and had a pregnancy classified as 'A' (low-risk and eligible for midwifery-led care) by the Australian College of Midwives National Guidelines for Consultation and Referral [20]. These guidelines were developed for midwives providing continuity of care to guide their practice for appropriate referrals and consultations to other health professionals when required [21].

The mentor, a midwife with 34 years of homebirth experience, was appointed to implement the program and support the MGP midwives in their transition to providing care at home. The mentor also had previously worked at the hospital in the MGP and was known to many of the MGP staff. The mentor was employed as a 0.6 full time equivalent (3 flexible days a week) and was paid as a midwifery educator under the State Industrial Award, plus an on-call allowance. The mentor attended most of the births alongside the midwives who were keen to support the women they were caring for who planned to birth at home. The mentor met the woman in the antenatal period with her named midwife to discuss the woman's reasons for choosing homebirth.

The women were given a suggested list of supplies to purchase. At around 36 weeks, homebirth kits and a birth pool were dropped off to the intended place of birth, (mostly the woman's home). The MGP midwife, with the support of the mentor, provided a preparation for birth discussion about how and when labour starts, when to call the midwife, what strategies the woman, her partner/support people can use to support the labouring woman at home. Midwives counselled women right from the start that there may be a possibility that the plans could change if complications arose, or if two midwives were unavailable when their labour commenced. Women were referred to the obstetrician who worked alongside the MGP at 36–37 weeks for assessment to determine the woman's suitability for a homebirth. This assessment forms part of the maternity service's guidelines (provided as supplementary file).

Within six weeks of the mentor commencing, the first baby was born at home. It took another two years for all the MGP midwives to attend a birth at home. To address the concerns voiced by the MGP midwives who were reluctant to provide homebirth, the mentor designed a homebirth skills and drills education program.

#### 1.3.1. Description of the education program

The education program provided an opportunity for the midwives to become familiar with the homebirth kit, water birth in the home setting and working in pairs in and out of the hospital setting. The program of study was accredited by NSW Health Learning platform that provides high-quality evidence informed education and training to clinical staff across one state in Australia's Health System [22]. The education program was included in the hospital homebirth policy as a mandatory requirement for all midwives attending homebirths. Midwives had the opportunity to consolidate skills in the homebirth context through simulation. Simulation includes a suite of emergency skills including shoulder dystocia, neonatal resuscitation, unexpected breech birth and postpartum haemorrhage in the home setting (Box 1). The midwives practise these skills in pairs including timekeeping, contemporaneous documentation and simulating escalation and calling the NSW Ambulance Paramedics and hospital referral teams. The workshops aimed to increase the midwives' confidence in initiating escalation of care to the ambulance and hospital referral teams. The education sessions took 2 -3 h and were provided every six months. Initially more frequent and then mandatory every six months.

To enable sustainability of the service, the MGP midwives were required to become mentors. There was no prescribed number of homebirths the potential mentor had to attend. This could have been two or more births, the individual midwife decided when they felt ready and confident enough to mentor. Within three years, each of the five MGP groups had at least one midwife as a mentor, which was important to sustain the service.

## 2. Methods

## 2.1. Study design

The study design was a retrospective comparative cohort study using routinely collected perinatal data from the hospital's electronic database (eMaternity) during the period July 2018 – October 2021. This date range was chosen as the hospital had their first birth at home in July 2018. The outcomes were compared from two mutually exclusive study groups: (1) women who chose homebirth, and women who chose hospital birth with both groups receiving MGP. The women were defined in one of these groups on commencement of labour/birth.

#### 2.2. Study population

The cohort of interest were women who were received MGP and were low risk at the time their labour commenced spontaneously. Women in the study were identically matched by parity, age, Body Mass Index (BMI) within 3 units and with a gestation of 37–42 weeks. The ratio of primigravida to multipara was 45:55.

## 2.2.1. Inclusion criteria

Women classified as 'A', having a low-risk pregnancy as per the Australian College of Midwives National Consultation and Referral guidelines [21].

#### 2.3. Data analysis and causal inference

All women who planned birth at home from the commencement of the homebirth program (2018) were consecutively included in the cohort (n = 118). Women with a singleton pregnancy, cephalic presentation <u>and</u> were matched with a group according to the age, parity, BMI, spontaneous labour, absence of medical conditions, absence of previous LSCS, and must have been cared for by MGP. The matched cohort group included 370 women who planned a hospital birth and who had the same MGP as their lead carer, within the same time frame. Data were analysed using descriptive statistics for the two groups, continuous and categorical data. Outcomes were compared in the two groups using chi squared and relative risk for proportions (with corresponding 99% confidence intervals). The two groups were carefully matched: women who planned to birth at home with women who planned to birth in the hospital. This is a formal process of adjustment based on causal inference principles [23].

The third author VS collected and deidentified the data for export to the statistical package. The second author AB carefully entered the data

| Skill                      | Facilitator         | Simulation set up   | Participants work in pairs  |
|----------------------------|---------------------|---|---|
| Shoulder Dystocia          | Homebirth<br>mentor | Simulated home like setting<br>Lifelike mannequin<br>Mat on the floor   | Practise HELPERR mnemonie<br>Time keeping<br>Contemporaneous note<br>keeping<br>Calling ambulance<br>Calling hospital team                        |
| Neonatal<br>resuscitation  | Homebirth<br>mentor | Simulated home like setting<br>Lifelike baby mannequin<br>Use of neonatal Bag and Mask following the Australian and New<br>Zealand Resuscitation Council (ANZCOR) guidelines  | Practise ventilation and<br>cardiac compressions<br>Time keeping<br>Contemporaneous note<br>keeping<br>Calling ambulance<br>Calling hospital team |
| Post-partum<br>haemorrhage | Homebirth<br>mentor | Simulated in homelike setting; uterine massage, inserting an<br>indwelling urinary catheter, insertion of two large bore cannulas,<br>bimanual uterine compression, administering the necessary drugs,<br>IV fluids | Time keeping<br>Contemporaneous note<br>keeping<br>Calling ambulance<br>Calling hospital team<br>Accurate measurement of<br>blood loss            |
| Unexpected<br>breech birth | Obstetrician        | Simulated response to unexpected breech birth and any associated complications is taught by the author (AB) an expert in breech birth in any setting.   | Time keeping<br>Contemporaneous note<br>keeping<br>Calling ambulance<br>Calling hospital team   |

into the Stata software for matching and analysis. The two groups were matched using CALIPER MATCH, a module attached to the Stata Statistical software [23] to match the homebirth women with a similar group in the hospital birth group. The following variables were matched exactly through the automated statistical program:

- 1. Age exact
- 2. Parity exact
- 3. BMI within 3 units
- 4. Spontaneous labour
- 5. An absence of medical conditions including diabetes, hypertension, previous LSCS or spontaneous rupture of membranes without commencing labour for 24 hours.
- 6. MGP midwives employed by the hospital, i.e., the same midwifery group practice midwives were providing care for the matched cohort.

The control group were selected to be comparable to the homebirth group, in key variables except for homebirth exposure. These key variables were known confounders. The larger control group was chosen to legitimately increase the power of the study, to show a true difference (one beyond the play of chance). The larger control group allowed a more stable estimate of the baseline incidence of the key outcomes.

Variables of interest

- 1. Normal birth
- 2. Caesarean births
- 3. Instrumental births
- 4. Postpartum haemorrhage > 1000 ml
- 5. Apgar scores (as there were no admission of to the nursery)
- 6. Birthweight
- 7. Major perineal trauma- third- or fourth-degree tears
- 8. Episiotomy

#### 2.4. Ethics

Ethics approval was provided by the participating health service Ethics Committee (project ID: 2022/ETH00399) South Eastern Local Health District. Data was managed and stored securely, accessible only to the research team approved in the ethics application. Ethical clearance was granted.

## 2.5. Findings

During the study period 139 women planned to have a homebirth, 15 cancelled for a variety of reasons at or after 36 weeks. Out of the remaining 124, 118 laboured spontaneously. Spontaneous labour was part of the matching criteria so the remaining six who were induced were not included in the data analysis. There were 118 women who planned a homebirth matched with 349 women who planned to birth in hospital in the cohort of interest. In the first three years, a total of 100 women gave birth at home with MGP midwives. The findings of this study report the outcomes of the women who planned birth in their chosen setting regardless of the actual place of birth.

The women who gave birth at home were more likely to have a normal physiological birth (p < 0.006) more likely to have an intact perineum (p < 0.001) and fewer postpartum haemorrhages (p 0.172). There were less assisted births and caesarean section births for women who planned to give birth at home but transferred to hospital (p < 0.006). No statistical differences were seen between groups for postpartum haemorrhage and Apgar Score of < 7 at five minutes. (Tables 1 and 2)

## 3. Discussion

The results of the matched cohort of women in the current study

| Table 1      |
|--------------|
| Demographics |

| 8F                             |                 |                       |  |
|--------------------------------|-----------------|-----------------------|--|
| Age <u>i</u> n years           | Homebirth (118) | Hospital births (349) |  |
| 18–24                          | 1 (0.9%)        | 1 (0.78%)             |  |
| 25–30                          | 19 (16.1 %)     | 47 (13.46 %)          |  |
| 31–36                          | 76 (64.4 %)     | 246 (70.48%)          |  |
| Older than 37                  | 22 (18.6 %)     | 52 (14.89%)           |  |
| Parity                         |                 |                       |  |
| Primiparous                    | 63 (53 %)       | 185 (53%)             |  |
| Multiparous                    | 55 (47 %)       | 164 (47 %)            |  |
| *Gestational range             | 40 weeks        | 39.9 weeks            |  |
| (37–42 weeks)                  |                 |                       |  |
| BMI at booking                 |                 |                       |  |
| 18–21                          | 58 (49 %)       | 130 (37 %)            |  |
| 22–25                          | 47 (40 %)       | 181 (52%)             |  |
| 26–30                          | 13 (11 %)       | 34 (10%)              |  |
| > 30                           | 0               | 1 (1%)                |  |
| 37–42 weeks spontaneous labour | 118 (100 %)     | 349 (100 %)           |  |
| MGP midwives –                 | 118 (100 %)     | 349 (100 %)           |  |
| same group practice            |                 |                       |  |
| providing care                 |                 |                       |  |

\*Median gestational age.

suggest women are more likely to have a normal physiological birth without interventions if they birth at home. These findings are consistent with large international and national studies that demonstrate the improved outcomes and safety of giving birth at home [5,6,24,25]. The Birthplace in Australia study found women with a low-risk pregnancy who gave birth at home were significantly more likely to have a normal physiological labour and birth compared with women in who gave birth in the hospital [6]. In this national study there no statistically significant differences in stillbirth and early neonatal deaths between home, birth centre and hospital setting [6]. Although the authors do state there was insufficient statistical power to test reliably for the differences in stillbirth and early neonatal death[6]. Women with complications such as hypertension, diabetes and antenatal admission to hospital were excluded [6]. The current study compared similar variables however the difference between the current study and the larger data linkage studies are the care providers. The Birthplace in New South Wales Australia study were unable to determine if the care providers were midwives employed in a publicly-funded homebirth model or privately practising midwives [26]. At the time there were only four publicly-funded homebirth programs indicating they were unlikely to have contributed to the large number of women included in the cohort [26]. The Birthplace in Australia study stated that most homebirths were at that time attended by privately practising midwives due to the low number of publicly funded models available and go on to explain the constraints of the available data [6]. In this study the care providers are midwives employed in MGP who offered care for women either in hospital or at home birth. The care providers in this study were midwives providing continuity of care through pregnancy, birth and postnatally working across the full scope of midwifery practice. These MGP midwives were committed to promoting normal physiological birth in the home setting, supported by the mentor, and they attended the regular professional development sessions.

The Australian publicly funded homebirth consortium list 19 services [27]. At first glance the availability of publicly funded homebirth appears to be increasing, however there are some services that have been paused, closed or the number of midwives available to provide homebirth are so small that access remains difficult. One well established homebirth service that had reported excellent outcomes for 10 years closed in 2015 [18]. Another publicly funded service requires midwives to attend a minimum of ten homebirths as a second midwife prior to becoming the primary midwife [17]. This model is possibly unattainable when only a very small number of women are choosing homebirth. Consequently, women's access to homebirth is limited. A pathway to implementing publicly funded homebirth was published in 2020 with detailed processes including wide consultation of all stakeholders with

#### Table 2

Birth and neonatal outcomes.

| Outcomes                                | Homebirth<br>n118 (100 %) | Hospital birth<br>n349 (100 %) | Relative risk     | 95 % Confidence intervals | P value  |
|---|---------------------------|--------------------------------|-------------------|---------------------------|----------|
| Normal birth                            | 104 (88 %)                | 255 (73%)                      | .65               | 0.56, 0.76                | < 0.006  |
| *Assisted birth                         | 9 (7.7)                   | 56 (16)                        | .47               | 0.23, 0.93                | < 0.006  |
| Episiotomy                              | 8 (6.8 %)                 | 65 (18%)                       | .36               | 0.18, 0.73                | < 0.002  |
| Lower Segment                           | 5 (4.24 %)                | 38 (10.9%)                     | .3                | 0.12, 0.75                | < 0.006  |
| Caesarean Section                       |                           |                                |                   |                           |          |
| ^Apgar < 7                              | 0 (100 %)                 | 6 (1.61 %)                     | Risk difference01 | 0.03, 0.003               | 0.540    |
| @ 5 minutes^                            |                           |                                |                   |                           |          |
| Post-partum haemorrhage (PPH) > 1000mls | 3 (2.54 %)                | 21 (5.66)                      | .42               | 0.13, 1.39                | 0.172    |
| Intact perineum                         | 26 (23 %)                 | 28 (9.4)                       | .14               | 0.06, 0.22                | < 0.001  |
| Major Perineal trauma                   | 3 (2.6 %)                 | 14 (4%)                        | .63               | 0.18, 2.17                | < 0.47   |
| (3rd degree tear or more)               |                           |                                |                   |                           |          |
| <sup>#</sup> Birthweight Mean           | 3566                      | 3557                           | Diff -9g          | -101g, 83 g               | < 0.5812 |

\*Composite value – vacuum and forceps births

relative risk is negative due to zero Apgar < 7 at 5 mins at home

<sup>#</sup>birthweights were not significantly different so the difference in the mean is provided.

strong governance systems to support the service during the implementation phase [28]. The pathway is a valuable tool in the scale up of publicly funded homebirth however there needs to be a plan for sustaining the service. The findings from the current study offer a description of how to implement a sustainable model for publicly funded homebirth services through the employment of a dedicated mentor.

The role of the mentor in this program was to support and enable the MGP midwives to feel confident in providing homebirth and becoming a mentor themselves when they felt ready. The dedicated education program was run every six months and provided a safe space for midwives to address their fears of experiencing an emergency at home. Other homebirth programs have provided simulation workshops and found the participants developed clear communication and teamwork to guide their practice [29]. The midwives are required to work to their full scope of practice when transitioning from providing hospital birth care to homebirth care and this requires educational skill and support [30]. Midwifery students are prepared to work across the full scope of practice towards providing continuity of care and having placement experience within midwifery continuity of care models prepare them to provide continuity [31,32] [33] however they rarely have homebirth experience [30,34]. When the midwives are supported adequately by midwifery managers and colleagues, midwives transition into providing homebirth care with ease and may discover unexpected benefits to working within this model of care [30]. In our study, support included collaborating and clarifying any concerns with the mentor and colleagues from those providing homebirth. Engaging with colleagues for support whenever there is any uncertainty for clarification, is evident in the successful transition for midwives from providing hospital to homebirths [30]. Participants in a larger Australian study all had recent relevant experience of working in publicly funded homebirth models of care and were recruited through the Australian National Publicly Funded Homebirth Consortium [30]. They described the importance of mentoring and working with one or two other midwives at a birth, which rarely happens in other models of care in hospital [30]. These findings are consistent with the current study where the mentor enhanced the support for skill development, and this has not been documented elsewhere.

#### 3.1. Strengths and limitations

The strength of this paper is the carefully matched comparison group which resulted in two groups with very similar demographic and clinical features, having the same care provider and the main difference was the intended place of birth. The observational design of the study is a limitation because some confounding variables have not been measured. Women choosing homebirth may have a different attitude that cannot be measured from routinely collected data. Women who choose homebirth have made a conscious decision not to have pharmaceutical pain relief for labour which may impact on the outcomes (23). The study is a limited, retrospective cohort study with a small sample size that reduces the ability to adequately power for some variables. Future research is needed to address gaps in the literature and any unanswered questions from this study, such as how midwives felt the mentor role supported them to work to full scope, the mentor's role in capacity building and confidence and any strategies to address sustainability.

## 4. Conclusion

The findings in this study suggest that place of birth make a difference to perinatal outcomes, consistent with large national and international studies. Having an employed mentor midwife; to support the transition of hospital midwives to provide homebirth, provide simulated homebirth skills and drills, be the spokesperson for homebirth, keep accurate records and statistics and to mentor midwives to become homebirth mentors, may contribute to the sustainability of a publicly funded homebirth service. Implementing and sustaining homebirth as an option of care within an established MGP may provide an opportunity to increase women's access and meet consumer demand.

## Funding

There was no funding for the project.

## Ethical statement

Ethics approval was provided by the participating health service. Ethics Committee (project ID: 2022/PID00455) South Eastern Sydney Local Health District. Data was managed and stored securely, accessible only to the research team approved in the ethics application. Ethical clearance was granted.

## CRediT authorship contribution statement

Sheryl Sidery: Conceptualisation, investigation, data acquisition, writing-original draft preparation of manuscript, writing the manuscript. Allison Cummins: contributing to conceptualisation, investigation and writing the manuscript. Andrew Bisits: contributing to conceptualisation, data gathering and analysis. Virginia Spear: Providing and cleaning data; reviewing, and editing manuscript

## **Declaration of Competing Interest**

The authors have no conflict of interest to declare.

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Anne Lainchbury: Clinical Midwifery Consultant, Royal Hospital for Women, South Eastern Sydney Area Health District.

#### Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.wombi.2024.101864.

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