Midwifery Group Practice v Standard Hospital Care: a Cost and Resource Study

*Findings of this Project demonstrate that Midwifery Group Practice (MGP) improves clinical outcomes and resource use in women whose pregnancies are classified as moderate obstetric risk. Further, that MGP is cost effective when compared with Standard Hospital Care (SHC) and MGP can be a safe, all-risk model when services are well integrated within the public maternity system in South Australia.*

**Background**

Outcomes for moderate risk pregnant women undertaking integrated caseload midwifery care is of considerable interest given international and Australian research evidence that demonstrates effective clinical outcomes and lower rates of medical intervention frequently occur in healthy ‘low’ risk women receiving care through midwifery led models. ¹² This includes various models of continuity of midwifery care. ³⁴⁵ It may also include cost savings for care undertaken through these services. ⁶⁷⁸ A recent Australian randomized controlled trial undertaken in New South Wales supports this evidence base with respect to women of any obstetric risk, in addition to finding significant cost savings for women who are cared for in the public health Midwifery Group Practice model. ⁹

**Overview – Retrospective and Prospective Arms of Maternity Service Data Linkage Project**

The following summary provides an overview of findings in the retrospective arm of a data linkage project undertaken in South Australia. ¹⁰ This integrated data linkage project consists of retrospective and prospective study arms comparing public sector maternity service outcomes in two groups of women whose pregnancies have been classified as moderate obstetric risk. Women undertook care within either Midwifery Group Practice model (MGP) or Standard Hospital Care model (SHC) during the years 2004 - 2010. Both MGP and SHC models studied are located in a metropolitan tertiary referral hospital. This project examined apriori defined clinical, resource and cost indicators in the two service groups for the purpose of analyzing quality, efficiency and equity in public sector maternity services over a seven year timeframe. The retrospective arm compares aggregate outcomes between a standard hospital maternity service and an integrated midwifery maternity service for women with a moderate risk pregnancy over the seven year time horizon. The prospective arm examines short term postpartum Medicare and Pharmaceutical Benefits use, including costs in a smaller moderate risk cohort of women during the period 2010 - 2012. The study received approvals from Ethics Committees at the hospital, University, and Medicare Australia Statistical Services Division External Requests Evaluation Committee in 2010. ¹¹

**Overview of a Retrospective Study of Moderate Risk Pregnancies – A Comparison of MGP and SHC**

**Objective:** To compare clinical and resource outcomes in a moderate obstetric risk group of women (Table 1) undertaking care in two different service models provided by the same public hospital

**Design:** A retrospective comparative study.
Setting: Midwifery Group Practice (MGP) and Standard Hospital Care (SHC) services in a university affiliated metropolitan maternity hospital in South Australia.

Population: All women classified with a ‘moderate’ obstetric risk pregnancy receiving care through MGP service, n = 3,385 or SHC service, n = 10,077 as a public patient during years 2004 – 2010 residing in Adelaide metropolitan postcodes 5000 – 5174 at time of booking.

Methods: This arm of the study examined outcomes for 13,462 women classified as having ‘moderate obstetric risk’. 5,523 nulliparous women and 7,939 multiparous women were included. Aggregate outcomes for SHC and MGP service groups were compared after proportional matching for parity 74.9% v 24.1% (nulliparous) and 74.8% v 25.2% (multiparous), respectively.

Analysis: Standardised risk matching and data collection were performed independently of the researcher from the High Risk Obstetric Database (HRPS) by statisticians at the Public Health Research Unit at the hospital. Statistical analysis used univariate logistic regression to estimate odds ratios with 95% confidence intervals to compare groups on a number of apriori defined obstetric and resource indicators using Stata Version 10. Statistical tests used included the non-parametric Wilcoxon rank-sum test and Pearson chi-square test to calculate p values comparing proportions between MGP and SHC groups. Clinical indicators included: induction of labour, use of epidural anaesthesia during labour, mode of birth (vaginal, instrumental, elective or emergency caesarean section) including standard AR DRG cost data for mode of birth, perineal status (intact, episiotomy, first, second, third or fourth degree tear), postpartum haemorrhage (> 500 mls and > 1500 mls), postnatal infection rates prior to discharge, and numbers of babies either directly rooming in with their mothers after birth, or admitted to the Special Care Baby Nursery (SCBN) Levels 1, 2 and 3. Previous studies have identified these indicators as important comparative indices from which to benchmark clinically effective service delivery. 12,13,14,15,16,17,18,19 Resource indicators included the number of visits and hospital emergency presentations and admissions, as well as length of postnatal maternal bed stay. These measures are nationally and internationally recognized as important indices of resource use and cost. 20,21,22,23

Findings

Service Model and Demographics

The MGP described in this study commenced in 2004 as an ‘all-risk’ model. 24 It is now an established part of SA integrated maternal and child health services, providing caseload midwifery care for approximately 1000 women and babies per year within a defined geographic catchment. It is one of the longest sustained public health Midwifery Group Practices caring for women of all-risk obstetric profiles in Australia. 25 Whilst service capacity expanded four times between the years 2004 – 2006 and a proportion of places are reserved for indigenous women, demand for service continues to exceed supply of available midwifery caseload places. More than half the women in the service are classified as having a ‘moderate risk’ profile (Table 1). When matched against obstetric risk profile with women having Standard Hospital Care, MGP group were older with nearly double the proportion of women in ‘above trade’ occupations. These findings reflect some common population features of women who access midwifery lead care, and their potential confounding effect is acknowledged. 26 Whilst these
demographic variables were not controlled for in the logistic regression in this study, women who received care in the MGP model, despite being older, demonstrated better clinical outcomes than women with the same features in SHC. Women and babies in MGP service classified at moderate obstetric risk experienced lower rates of medical intervention and serious morbidity than women and babies in SHC service, despite the increased risk profile, matched in both groups.

**Medical Intervention and Morbidity**

Women undertaking care in MGP experienced lower rates of induced birth compared to SHC (24.9% v 31.2% p<0.001). Odds of epidural in labour were 0.70 times lower in MGP [95% CI 0.64 – 0.76] compared to SHC. More women in MGP had a spontaneous vaginal birth (67.1% v 57.4% p < 0.001). They were also less likely to experience instrumental birth, odds 0.80 [95% CI 0.71 – 0.91] (11.2% v 13.6%). A significant association for women having elective caesarean section and SHC group was demonstrated (6.3% v 13.0% p <0.001), with odds of having an elective caesarean section 0.45 times lower in MGP [95% CI 0.39 – 0.52]. Odds of an intact perineum were 1.13 times > in the MGP [95% CI 1.03 – 1.24]. Fewer MGP women had an episiotomy (9.5% v 12.2% p < 0.001), although the odds of having a first degree perineal tear were 1.5 times increased. Women in MGP were 0.83 time less likely to have a PPH ≥ 500mls than women in SHC [95% CI 0.75 – 0.92]. A greater number of MGP babies direct roomed in with mother as compared to SHC (75.2% v 64.7% p < 0.001).

**Hospitalisation and Resource Consumption**

Hospitalisation rates and longer bed stay were significantly associated with service group and were lower in MGP (p< 0.001). These trends were evident in both the antenatal and immediate postnatal periods. They include fewer women’s assessment and emergency presentations to hospital in the antenatal period and fewer instances of antenatal admissions > 1% in the MGP service (1.4% v 3.4% p< 0.001). The range for hospital antenatal admission and bed stay for MGP was also lower overall at 0 - 12 days as compared to SHC which spanned 0 - 40 days. There was a significant association between service group and number of antenatal visits, MGP 10 v SHC 9 (p < 0.0001). Length of maternal bed stay in the postnatal period was equivalent MGP 3.2 days v SHC 3.9 days (p < 0.0001). Fewer MGP babies were admitted to SCBU across all levels of acuity (24.8% v 35.3% p < 0.001).

**Outcomes with no substantive difference**

Indicators for which there was no substantive difference in MGP and SHC include the emergency caesarean section rate. Whilst women in MGP experienced lower rates of caesarean section overall (21.4% v 28.7%) there was no significant association between group and women having an emergency caesarean (15.1% v 15.8% p 0.34), odds 0.95 [95% CI 0.85 -1.06]. The catastrophic PPH rate > 1500 mls was also equivalent in both services (2.4% v 2.6%), odds 0.93 [95% CI 0.69 – 1.25]. Perineal tear rates for second degree, odds 1.03 [95% CI 0.94 – 1.13], third degree, odds 1.01 [95% CI 0.81 – 1.27], fourth degree, odds 1.04 [95% CI 0.46 – 2.32] tears also showed no difference as did rates of infection prior to discharge from hospital, odds 0.64 [95% CI 0.40 – 1.02].
Service Cost Trends for Mode of Birth

Top down costing for both service models from the hospital ISAAC database analysing AR – DRG aggregate cost and revenue trends across the seven year fiscal timeframe is illustrated in Table 2. Trends for aggregate mode of birth cost and funding streams favour the MGP service moderate risk women in which it is demonstrated costs are lower, as compared to revenue generated for the hospital. This is significant, given both services are funded through identical AN DRG reimbursement episodes, although these differences are often not identified in whole of hospital acute care institutional budget analysis or resource allocation.

Implications for Policy and Practice

MGP care model integrated with collaborative medical and allied public health services can improve outcomes for parturient women and their babies where moderate obstetric risk status is identified at booking or develops during pregnancy. MGP can reduce use of routine interventions that contribute to maternal and infant morbidity and create a burden to scarce health resources. Demand for MGP and the demographic of women accessing this service suggest that equity of access is an issue that needs to be addressed. Broader consideration needs to be given to the expansion of integrated caseload midwifery services to childbearing women of all risk status as an important consideration in public health policy and future reconfiguration of maternity services in Australia.\textsuperscript{27, 28, 29, 30}

References

### Table 1 Criteria for Moderate Risk Pregnancy Classification

**Categories for Inclusion in the High Risk Perinatal Service Data Base**  
**Category 2 Moderate / High Risk Factors**

<table>
<thead>
<tr>
<th>Obstetric History</th>
<th>Medical</th>
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<tbody>
<tr>
<td>Scarred uterus</td>
<td>Anaemia &lt; 105</td>
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<tr>
<td>Mid trimester abortion</td>
<td>Minor cardiac disease</td>
</tr>
<tr>
<td>Three or more 1st trimester abortions</td>
<td>Minor/Moderate Hypertension</td>
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<tr>
<td>Previous difficult labour/delivery</td>
<td>Sexually transmitted diseases</td>
</tr>
<tr>
<td>Previous low birth weight infant</td>
<td>Epilepsy (mild controlled)</td>
</tr>
<tr>
<td>Previous perinatal death/non recurrent factors</td>
<td>Asthma (mild, controlled)</td>
</tr>
<tr>
<td>Previous preterm labour</td>
<td>Previous venous thrombosis/embolism</td>
</tr>
<tr>
<td>Previous preterm rupture of membranes</td>
<td>Rheumatoid arthritis</td>
</tr>
<tr>
<td>Previous retained placenta</td>
<td>Glucose intolerance including:</td>
</tr>
<tr>
<td>Previous postpartum haemorrhage</td>
<td>* diet controlled gestational diabetes</td>
</tr>
<tr>
<td></td>
<td>* impaired carbohydrate metabolism</td>
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</tbody>
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**Obstetric Complications (Current Pregnancy)**  
Mild pre-eclampsia  
Uncomplicated twin pregnancy  
Suspected cephalo pelvic disproportion  
Pregnancy greater than 42 weeks gestation  
Malpresentation including breech  
Polyhydramnios  
Grande Multipara  
PPROM/threatened prem labour < 37 weeks  
Pregnancy related skin disease eg: Herpes

**Assisted Reproduction Pregnancy**

**Medical History**  
Previous eye surgery  
Family history pre-eclampsia/eclampsia

**Anaesthetic Risk Factors**  
Women with potential airway problems

**Age**  
* teenage < 20 years  
* mature >35 years

**Height < 150 cms**  
Weight – underweight/overweight  
< 45 kg > 90 kg

**Minor Substance Dependence**  
Drugs, alcohol, tobacco > 10 cigs  
**Previous Psychotic Illness**
Table 2 Service Cost Trends for Mode of Birth in Moderate Risk Groups for MGP and SHC 2004 - 2010

Based on hospital coded AR – DRG separation revenue / cost dataset
Roslyn Donnellan – Fernandez RM RN IBCLC MN BN (PhD Cand)
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