Assessment of applicability and transferability of evidence-based antenatal interventions to the Australian indigenous setting†

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SUMMARY
There is a need for public health interventions to be based on the best available evidence. Unfortunately, well-conducted studies from settings similar to that in which an intervention is to be implemented are often not available. Therefore, health practitioners are forced to make judgments about proven effective interventions in one setting and their suitability to make a difference in their own setting. The framework of Wang et al. has been proposed to help with this process. This paper provides a case study on the application of the framework to a decision-making process regarding antenatal care in Aboriginal and Torres Strait Islander communities in Queensland. This method involved undertaking a systematic search of the current available evidence, then conducting a second literature search to determine factors that may affect the applicability and transferability of these interventions into these communities. Finally, in consideration of these factors, clinical judgement decisions on the applicability and transferability of these interventions were made. This method identified several interventions or strategies for which there was evidence of improving antenatal care or outcomes. By using the framework, we concluded that several of these effective interventions would be feasible in Aboriginal and Torres Strait Islander communities within Queensland.

Key words: aboriginal health; evidence-based health promotion; knowledge translation; maternal health

INTRODUCTION
Incorporating evidence into public health decision making can be a challenging process. Not only must public health practitioners grapple with the methodological issues which complicate much public health evidence but often the evidence that is available is from settings different to their own. Decision makers are therefore forced to make a judgement on the potential influence of context (e.g. social and cultural norms, political and organization
systems, etc.) on the effectiveness of an intervention (Frommer and Rychetnik, 2003).

One framework to help decision makers deal with this complex problem has been proposed by Wang et al. (Wang et al., 2006). This framework uses a series of questions to assess how applicable and transferable an intervention is to a particular setting (Wang et al., 2006). Applicability refers to the degree to which the intervention could be executed in a setting other than the one where it has been trialled (Wang et al., 2006). That is, is it feasible or able to be run in the local setting? Transferability refers to the degree to which the intervention could be expected to achieve the same results or effectiveness in another setting (Wang et al., 2006). Thus, it is suggested that the critical question for decision makers is whether the intervention will achieve the same effectiveness within their particular setting as has been previously demonstrated.

This paper describes a case study which sought to integrate multiple forms of evidence to operationalize this framework using a real public health example. That is, implementing antenatal care interventions with the aim of improving birth outcomes in an Aboriginal and Torres Strait Islander population in Central Queensland, Australia.

There is a great need for effective antenatal interventions targeted to this population. Aboriginal and Torres Strait Islander babies are at a higher risk of dying in their first year of life than their non-Indigenous counterparts (Australian Institute of Health and Welfare, 2005; Johnston and Coory, 2005). Most of this excess mortality, as well as many other short- and long-term adverse health outcomes, are due to unfavourable birth weight and gestational-age distribution (Panaretto et al., 2002; Australian Institute of Health and Welfare, 2005; Goldenburg and Culhane, 2007). Maternal smoking, a major risk factor contributing to these poor outcomes, is also higher in the Central Queensland Aboriginal and Torres Strait Islander population (56.6% 95% CI 49.4–63.7) compared to non-Aboriginal and Torres Strait Islander population (23.2% 95% CI 21.6–24.9) (Queensland Health et al., 2008). The improved delivery of effective antenatal care with appropriate screening and preventative treatment would aim to improve such risk profiles and maternal and child health outcomes (Humphrey and Keating, 2004). An initial literature search and a previous review found that evidence of effective antenatal interventions specific to Aboriginal populations is currently limited and there is a reliance on studies that have not been undertaken in Aboriginal settings (Rumbold and Cunningham, 2008). Given that the effectiveness of interventions differs for Aboriginal and non-Aboriginal populations (Ivers, 2003), it is critical that the applicability and transferability of intervention evidence from other population groups be considered in a systematic way prior to implementation. This makes this real public health example ideal for a case study in applying the Wang framework.

**OBJECTIVE**

To describe the application of a framework for assessing applicability and transferability of evidence to inform decision making within a real public health case study.

**METHODS**

The case study involved three steps. First, a literature search to identify systematic reviews of interventions effective at improving antenatal outcomes and quality assessment of reviews identified in this search was completed. Second, an additional literature search of primary studies was performed to identify factors which should be considered when making judgements regarding the applicability and transferability of the intervention evidence to Central Queensland Aboriginal and Torres Strait Islander populations. These factors were sourced from primary studies evaluating Aboriginal and Torres Strait Islander antenatal programs, but which by themselves may not be considered of sufficient quantity or quality of evidence to form the basis of a decision. They may, however, provide useful insights into important factors required for successful implementation into these communities. These factors, combined with personal experience, were then used to make judgements on the applicability and transferability of the identified interventions (Wang et al., 2006). Further details of the methodology are provided here.

**Literature search to identify systematic reviews**

The literature search was conducted to identify systematic reviews providing good available evidence relevant to the scope of this project.
Systematic reviews were included if they met the following inclusion criteria:

**Study designs:** systematic reviews of randomized control trials (RCTs), quasi-controlled trials and controlled cohort studies.

**Participants:** expectant mothers.

**Intervention type:** any antenatal intervention that had a public health focus for improving outcomes (excluded medical interventions and models of care).

**Outcomes:** access to antenatal care and outcomes associated with accessing antenatal care such as the number of antenatal care visits, preterm births (<37 weeks) and low birth weight babies (<2500 g).

**Search strategy**

Searches were initially conducted in May 2006, and for the systematic reviews, were later updated in September 2010. Four registries of systematic reviews were searched using search terms provided on the respective websites: The Cochrane Library (www.thecochranelibrary.com), DARE (www.york.ac.uk/inst/crd/), Health Evidence Canada (www.health-evidence.ca) and The Community Guide (www.thecommunityguide.org). The MEDLINE, CINAHL, AusHealth and PsycInfo databases were also searched between 1995 and April 2006 based on the following strategy:

1. prenatal;
2. antenatal;
3. pregnancy;
4. childbirth;
5. birth;
6. infants;
7. prenatal care;
8. pregnancy;
9. care;
10. classes;
11. home visit;
12. health education;
13. health promotion;
14. services;
15. midwives education;
16. or/1–16.

Reviews were obtained for consideration if screening of the title or abstract suggested they were within the scope of the research question.

**Quality assessment**

Reviews were classified as high, medium or low quality based upon a selection of 10 standard criteria for critically appraising reviews (Oxman et al., 1994). Systematic reviews were only included if they were of ‘high’ or ‘medium’ quality.

**Literature search of primary studies**

Primary papers that reported on evaluations of antenatal interventions for Aboriginal and Torres Strait Islander pregnant women were identified. Information relating to factors that may have been attributed to improvement in outcomes for Aboriginal and Torres Strait Islander women and children were extracted and grouped using the considerations of applicability and transferability of Wang.

**Inclusion criteria**

**Study design:** all designs that reported on interventions aimed at Aboriginal and Torres Strait Islander expectant mothers.

**Participants:** Aboriginal and Torres Strait Islander expectant mothers and/or mothers of newborn infants.

**Outcomes:** Attendance at antenatal classes, duration of breastfeeding, prevalence of low birth weight babies or prevalence of pre-term births was included.

**Search strategy**

The following databases were searched: Medline, CINAHL, Psych Info and AusHealth from 1995 to April 2006 using the same search terms as for the systematic review search. An additional filter to identify papers specific to Aboriginal and Torres Strait Islander peoples was used. In order to identify relevant grey literature, other websites were searched including the Commonwealth Department of Health and Ageing, Australian Institute of Health and Welfare (AIHW), State and Territory health department websites and a number of Aboriginal Community Controlled Health Service websites. Reference lists of papers were also searched to identify further articles.

**Translation of results**

Each of the interventions identified from the systematic reviews as effective was assessed for
their potential applicability and transferability to the Aboriginal and Torres Strait Islander context. In doing this, the assessment team integrated the factors identified from the primary papers with clinical judgement. This aligns with the fourth step of evidence-based practice (EBP), as defined by the Sicily statement (Dawes et al., 2005). The Sicily statement articulates the components of evidence informed decision making, and the fourth step requires utilization of ‘the tacit knowledge which comes from the wisdom of experience’ that is informed by both evidence and outcome (Dawes et al., 2005). The assessment team included one member (J.J.S.) who is Aboriginal Australian, and two members (P.R.A.B. and S.H.W.) possessing field experience in the Aboriginal and Torres Strait Islander context. These members also came from several different disciplines and included a nutritionist/dietician (S.H.W.), environmental health officer (J.J.S.) and epidemiologists (P.R.A.B. and J.J.S.). Our experience was more broadly from a public health promoting services context than from traditional clinical intervention.

To determine applicability, each element of evidence identified from systematic reviews was assessed by the collective to determine whether that element of evidence could potentially be feasible within the Aboriginal setting to which the team was familiar. The factors identified from primary papers were utilized in this consideration as they provided important contextual information as well as descriptions of the experiences of those who have previously conducted and evaluated antenatal services in Aboriginal populations. The factors enhanced clinical judgement, informing the decisions of applicability and transferability rather than requiring practitioners to rely solely on clinical judgement. For example, if a factor was identified as a relevant enabler to delivery of the strategy supported by systematic review evidence, it was then deemed as enhancing the applicability of the evidence.

The second step of the integration process required the assessment team to consider whether the elements could be transferred to this setting using their knowledge of the barriers which would reduce the success of the outcomes in an Aboriginal and Torres Strait Islander setting. Again the factors from the primary studies were used to inform the decision as to the likelihood of achieving the effects described in the systematic review. This process of assessing applicability and transferability of evidence of effectiveness using ‘clinical wisdom’ combined with information from primary studies was subsequent to the systematic and explicit identification of interventions found to be effective in other settings. In the case of this study, the ‘clinical wisdom’ came not from the specific in-clinic provision of antenatal medical services (which was not the purpose of translation), but rather from a broader population perspective and the contextual knowledge and experience of applied public health practice in Aboriginal communities.

RESULTS

Evidence-based interventions

The search initially yielded 31 studies investigating antenatal interventions. Twenty-two systematic reviews were excluded as they focused on medical interventions (e.g. corticosteroids), supplements or reported on outcomes not included in this project (e.g. breastfeeding). Nine systematic reviews met the inclusion criteria (Table 1). All of the reviews were of either medium or high quality. Some reviews incorporated studies of a variety of interventions and populations, while others were more specific. From the reviews, nine strategies were identified as being potentially effective. These strategies were:

(i) Delivery and characteristics of antenatal care
   (a) Reducing the number of antenatal visits (Villar and Khan-Neelofur, 2000);
   (b) Home-visiting as a delivery of public health nursing interventions to clients in the prenatal or postnatal period (Ciliska et al., 1999);
   (c) Giving women their own case notes to carry during pregnancy (Brown and Smith, 2004);
   (d) Traditional birth attendant training (Sibley et al., 2004);

(ii) Health education and supportive interventions
   (a) Additional social support for women with increased risk of low birth weight babies (Hodnett and Fredericks, 2003);
Table 1: Summary of systematic review results

<table>
<thead>
<tr>
<th>Review</th>
<th>Number of studies</th>
<th>Quality</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Villar and Khan-Neelofur, 2000</td>
<td>7 RCTs</td>
<td>Medium</td>
<td>Strategy: reduced number of antenatal sessions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Pooled results illustrated no differential effect in regard to low birth weight, preterm delivery or size for gestational age when reducing number of antenatal sessions by up to 2, as long as a minimum of four are maintained. More women in intervention groups would choose the same schedule of visits in the future compared to control groups</td>
</tr>
<tr>
<td>Ciliska et al., 1999</td>
<td>20 articles reporting on 12 studies (8 RCTs, 3 non-RCTs)</td>
<td>Medium</td>
<td>Strategy: home nursing interventions</td>
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<tr>
<td></td>
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<td>The review reported a significant ($p &lt; 0.05$) increase in awareness of community services and attendance at childbirth education classes, particularly on clients at higher risk, although there was no proven impact on low birth weight, gestational age or neonatal morbidity and mortality</td>
</tr>
<tr>
<td>Hodnett and Fredericks, 2010</td>
<td>17 RCTs</td>
<td>High</td>
<td>Strategy: provision of social support services for at risk pregnant women</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Meta-analysis showed that social support services have not been associated with reductions in the numbers of preterm babies or low birth weight babies. This intervention did, however, appear to result in a decreased likelihood of caesarean birth (RR 0.87, 95% CI 0.78 to 0.97) and antenatal hospital admission (RR 0.79, 95% CI 0.68 to 0.92)</td>
</tr>
<tr>
<td>Brunton and Thomas, 2001</td>
<td>Data were extracted on 13 studies (4 RCTs, 7 non-RCTs)</td>
<td>High</td>
<td>Strategy: support, health education and transport</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Five out of 13 studies showed significant improvement in birth weight. All five provided support and health education as intervention strategies. Transportation was provided in two of these studies</td>
</tr>
<tr>
<td>Brown and Smith, 2004</td>
<td>3 RCTs</td>
<td>High</td>
<td>Strategy: giving women their own case notes to carry during pregnancy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>There was no difference for health-related behaviours, analgesia needs during labour, miscarriage, stillbirth and neonatal deaths, although women carrying case notes were more likely to feel in control (RR 1.56, 95% CI 1.18 to 2.06) and more women in case notes group wanted to carry their notes in a subsequent pregnancy (RR 1.79, 95% CI 1.43 to 2.24)</td>
</tr>
<tr>
<td>Gagnon and Sandall, 2007</td>
<td>9 RCTs</td>
<td>High</td>
<td>Strategy: structured educational program offered to individuals or groups by an educator</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Authors concluded the effects of general antenatal education for childbirth or parenthood or both remain largely unknown</td>
</tr>
<tr>
<td>Dennis and Kingston, 2008</td>
<td>14 RCTs</td>
<td>High</td>
<td>Strategy: telephone based supportive interventions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No difference in pre-term birth, although proactive telephone support by health professionals as an adjunct to home visits suggested a possible risk reduction of low birth weight (RR 0.78, 95% CI 0.63 to 0.97)</td>
</tr>
<tr>
<td>Lumley et al., 2009</td>
<td>72 trials</td>
<td>High</td>
<td>Strategy: smoking cessation interventions</td>
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<td></td>
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<td>Smoking cessation interventions reduced low birth weight (RR 0.83, 95% CI 0.73 to 0.95), preterm birth (RR 0.86, 95% CI 0.74 to 0.98) and increased mean birth weight (53.91 g, 95% CI 10.44 to 95.38 g). There were no statistically significant differences in neonatal intensive care unit admissions, very low birth weight, stillbirths and perinatal or neonatal mortality</td>
</tr>
<tr>
<td>Sibley et al., 2004</td>
<td>10 trials</td>
<td>High</td>
<td>Strategy: traditional Birth Attendant Training</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Results suggest training may increase antenatal care attendance rates</td>
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</table>
Factors from primary evaluations

To aid in determining the applicability and transferability of the evidence-based interventions, nine primary evaluations were identified that met the inclusion criteria (Aspery et al., 1998; Nguntji Tjiti Pirni Aboriginal Corporation and TVW Telethon Institute for Child Health Research, 1998; Perkins, 1998; Smith et al., 2000; Office for Aboriginal and Torres Strait Islander Health, 2001; d’Espaignet et al., 2003; Nel and Pashen, 2003; Carter et al., 2004; Jan et al., 2004; Panaretto et al., 2005). These evaluations, presented in reports, journal articles or conference proceedings, generally described evaluations of interventions using less rigorous study designs than the studies generally used in the systematic reviews. Nonetheless, a number of key issues relevant to the applicability and transferability of the systematic review findings to Aboriginal and Torres Strait Islander women and communities were able to be derived from these evaluations.

A recent literature review commissioned by the Commonwealth Department of Health and Aging was also found in the search (Herceg, 2005). This report summarized nine operational antenatal care programs targeting Aboriginal and Torres Strait Islander expectant mothers. From this report, as well as considering the individual evaluations, and drawing upon the experience of the authors, 16 factors likely to influence the applicability and transferability of interventions to the Aboriginal and Torres Strait Islander population were identified. These factors were divided into those believed to influence whether an intervention would be able to be applied to a particular setting, and those which represent components of an intervention likely to effect the transferability of its effectiveness to this setting. These factors are presented in Table 2.

Judging the applicability and transferability of the interventions using the identified factors

The assessment of the potential applicability and transferability of the interventions from the integration of the factors identified from the primary papers combined with clinical judgement is described here.
Delivery and characteristics of antenatal care

Reduced number of antenatal visits

Applicability: applicability is not an issue as this intervention would involve a reduction of services.

Transferability: the review suggested that a minimum of four antenatal visits should be recommended and that the activities undertaken in antenatal care be proven to be effective. This population is not directly comparable to the populations in which the conclusions from the systematic review were made. Aboriginal women are less likely to access antenatal care in the first trimester of pregnancy, a time when many risk factors could be addressed (AHMAC, 2008). Further, a smaller proportion of Aboriginal women access five or more antenatal sessions compared with other mothers in Queensland (Australia’s mothers and babies, 2008).

Home-visiting to deliver public health nursing interventions

Applicability: these interventions could adopt some of the factors identified in Table 2 (i.e. factors 3, 4, 5, 6, 7) tailoring them to this population.

Transferability: interventions that are home based and which have an outreach component have been successful in this population, so it is not unreasonable that this intervention may increase attendance at education classes and improve awareness of community services (factors 13 and 14). For example, as part of the Closing the Gap Campaign, a home-visiting service in Central Australia funded through the Australian Nurse Family Partnership Program is being implemented to help mothers gain confidence and improve their parenting skills (Australian Government, 2010). The findings from the systematic review were also in high risk groups and therefore share some similarities with this population (factor 16).

Giving women their own case notes to carry during pregnancy

Applicability: this intervention requires little resources to be implemented so minimal issues with applicability would be anticipated.

Transferability: the systematic review found these interventions had no effect on important outcomes and only impacted upon the mothers feeling of being in-control. It is uncertain to what extent Aboriginal women in the target population would be prepared to carry the notes.

Table 2: Factors identified from primary evaluations that were important in assessing the applicability and transferability of interventions to the Aboriginal and Torres Strait Islander setting

<table>
<thead>
<tr>
<th>Applicability</th>
<th>Transferability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organizational structures</strong></td>
<td><strong>Components of an intervention which would facilitate transferability</strong></td>
</tr>
<tr>
<td>1. Intervention is integrated with other services (e.g. hospital liaison, shared care)</td>
<td>9. Intervention includes flexibility in service delivery and appointment times</td>
</tr>
<tr>
<td>2. Intervention is community based and/or community controlled services</td>
<td>10. Intervention has a specific service location intended for women and children</td>
</tr>
<tr>
<td><strong>Social norms/ ethics</strong></td>
<td>11. Intervention provides continuity of care and a broad spectrum of services</td>
</tr>
<tr>
<td>3. Intervention has a respect for Aboriginal and Torres Strait Islander people and their culture</td>
<td>12. Intervention includes outreach activities</td>
</tr>
<tr>
<td>4. Intervention has a focus on communication, relationship building and development of trust</td>
<td>13. Intervention includes home visiting</td>
</tr>
<tr>
<td>5. Intervention values Aboriginal and Torres Strait Islander staff and female staff</td>
<td>14. Intervention includes provision of transport</td>
</tr>
<tr>
<td>6. Intervention has a respect for family involvement in health issues and child care</td>
<td>15. Intervention includes provision of childcare or playgroups</td>
</tr>
<tr>
<td>7. Intervention provides a welcoming and safe service environment</td>
<td><strong>Characteristics of the target populations</strong></td>
</tr>
<tr>
<td>8. Setting has an appropriately trained workforce</td>
<td>16. Characteristics of target populations are comparable to those in studies</td>
</tr>
</tbody>
</table>
Traditional birth attendant training
Applicability: this intervention could be applied to this population. The Strong Women, Strong Babies, Strong Culture successfully trained community health workers so a logical extension of this to include birth attendant training seems applicable, assuming it was done in a culturally appropriate way (d'espaignet et al., 2003).

Transferability: the systematic review suggested that training may increase antenatal care attendance rates, results that are consistent with the The Strong Women, Strong Babies, Strong Culture program.

Health education and supportive interventions
Additional social support
Applicability: an intervention providing additional social support has been implemented in an Aboriginal population. The Strong Women, Strong Babies, Strong Culture program indicates that an appropriate social support intervention could be implemented, assuming a trained support base (factor 12).

Transferability: the systematic review found that these interventions did not result in reductions of low birth weight babies or preterm birth, although it did decrease caesarean birth and antenatal hospital admission. The Strong Women, Strong Babies, Strong Culture program included decreased prevalence of low birth weight and increased early attendance at antenatal care classed. This suggests that a culturally appropriate social support intervention would perhaps be more effective in this group than the at-risk mothers for whom the systematic review was investigating.

Health education and support strategies based at the clinic or home
Applicability: these interventions could adopt some of the factors identified in Table 2 (i.e. factors 3, 4, 5, 6, 7) tailoring them this population.

Transferability: there was inconsistent evidence that a multi-component strategy of support, health education and transport can improve infant outcomes in teenage mothers.

Telephone supportive interventions
Applicability: these interventions could adopt some of the factors identified in Table 2 (i.e. factors 3, 4, 5, 6, 7) tailoring them this population. However, it is important to recognize that while the majority (98%) of Aboriginal and Torres Strait Islander households have telephone access, those in remote areas are less likely to have landlines (39.5 compared to 70.9% in non-remote areas), although many living remotely have access to mobile coverage (60.7% on pre-paid mobile and 19.4% on contract) (Australian Bureau of Statistics, 2010).

Transferability: the systematic review found a possible reduction in low birth weight babies with this intervention. The intervention is conducted in conjunction with home visits (factor 13), provides continuity of care (factor 11) and is a form of outreach service (factor 12). All of these components are consistent with those identified as important in transferability. There is, however, variability in telephone access, and that this application would need to be considered on a community by community basis.

Structured educational programs (group or individual) provided by an educator
Applicability: these interventions could adopt some of the factors identified in Table 2 (i.e. factors 3, 4, 5, 6, 7) tailoring them to this population.

Transferability: the systematic review concluded that the effects remain unknown.

Interventions targeted specific risk factors
Smoking cessation interventions
Applicability: if these interventions adopted factors which ensured the interventions were appropriately tailored to this population, then they should be applicable (factors 3, 4, 5, 6, 7). As with the other interventions here, successful interventions would require enough trained personnel to conduct these relatively intensive interventions.

Transferability: the rate of smoking in Aboriginal women (50.9%) during pregnancy was much higher then non-Aboriginal women (14.4%) in Australia in 2008. If the interventions were able to include some of the components noted in Table 2, then this should improve the likelihood of a successful transfer of the results of the systematic review. These results included decreased low birth weight and
DISCUSSION

The application of this decision-making process suggests that interventions based on improved continuity of care comprising of support, education and transport could effectively improve health outcomes. Other services undertaken in adjunct such as health education delivered at the home would increase participation and awareness of community services. Further, interventions such as smoking cessation have the potential to modify important determinants for health.

The search identified only limited research regarding the effectiveness of antenatal care interventions for Aboriginal and Torres Strait Islander women; however, numerous strategies with other population groups were identified from the systematic reviews. A large well-designed study to identify which of these strategies are applicable and effective for Aboriginal and Torres Strait Islander women would provide useful information for future policy planning and service provision. This could include a focus on the knowledge, attitudes and perceptions of Aboriginal and Torres Strait Islander women in regard to accessing antenatal services.

For the most part, the systematic review evidence identified in this case study should be applicable and transferable to the specific service delivery area of the Aboriginal and Torres Strait Islander population identified, particularly given high risk groups were often targeted in the reviewed interventions. The exception to this is the strategy involving a reduction in antenatal visits, which for reasons stated, would not be applicable to this context.

The most effective antenatal interventions identified from the systematic review literature were multifaceted and generally comprised of both emotional and tangible support. Tangible support comprised of transportation to and from clinic-based appointments or childcare services for other children within the family. Many of the interventions found to be successful at increasing access to antenatal care, decreasing the number of low birth weight babies and/or premature births could be adapted to suit the needs of Aboriginal and Torres Strait Islander women.

Should an intervention based on this evidence be implemented in a specified service delivery area identified, it should certainly involve partnering with Aboriginal and Torres Strait Islander communities. This will help establish mechanisms of social and peer support from within the community and ensure the intervention culturally acceptable. Ideally, peer support could be accompanied with health education, and potentially home visits to give this strategy the best chance to improve outcomes. Interventions need to include elements presented in Table 2 to improve the chances of successful translation into this setting. Our assessment was limited in that no member of the team has had direct clinical experience with pregnant Aboriginal women. However, several members of the team had significant experience in working with Aboriginal communities in the delivery of a range of public health and health promoting services.

Adopting interventions identified through systematic review processes to a new context is complex. Adaptation is particularly challenging to indigenous settings where socio-economic disadvantage, poor health status and remoteness are potential modifiers of effectiveness. This exercise focused on the application of results into practice which is also described by a model known as the knowledge to action (KTA) process (Graham et al., 2006). The KTA phases of adapting knowledge to the local context and assessing the barriers of knowledge use is assisted by the processes described in the Wang framework.

During the design of this translational research, we also considered undertaking the formal critical appraisal of the primary studies; however, due to resource limitations, we were unable to do so. Although we assessed quality informally, we believe it is important to assess the validity of all information used in practice and policy development. We also recognized that this process is an early step. Many elements of decision making and consideration occur in a complex health needs setting which are highly subjective. We also recognize that our review question is narrow as we began with a public health nutrition question which we subsequently broadened.

In our experience, the listing of questions by Wang is at present a conceptual framework. We
found the applicability and transferability questions of the model to be useful to guide the consideration, but did not perceive the framework as a formal criteria or tool. For example, when considering the reduction in antenatal visits as an effective intervention, we considered the questions of acceptability, social norms and ethical acceptability. Guided by the questions, we determined that a reduction in antenatal services would go against local social norms (of ensuring women have adequate access to antenatal care) and would be ethically unacceptable. The decision on social norms and ethical issues is supported by reports of low attendance at antenatal clinics and priorities to increase care. Likewise, when considering the transferability of telephone supportive interventions, we considered the questions pertaining to the characteristics of the population, characteristics of the setting and the socio-economic status. We answered these questions using data of the profound social disadvantage and reduced levels of telephone service in many aboriginal communities which could potentially limit transferability. We found alignment between the factors from the primary studies in Table 2 (e.g. factors 5, 6 and 8) with the recommendations of home visiting. On the other hand, comparison of primary data and the antenatal reduction review findings demonstrate the importance of identifying discrepancies.

We found the Wang framework and questions posed very useful in this case study. The framework served as a guide to navigate the complexity of this setting that could be perhaps further developed for the translation of health promotion interventions to other disadvantaged settings. The process utilized in this research links knowledge synthesis with the context to make sense and use of all of the available knowledge. For the same reasons that the KTA process is advocated for policy development and program implementation, the methodology presented here offers a more transparent approach to increase the likelihood of selecting interventions that will result in an improvement. The approach of using factors identified from primary studies (Table 2) enhances the practice of sound clinical judgement in applying evidence from systematic reviews (Table 1). Furthermore, it fulfils the requirement of undertaking EBP by explicitly using the best available evidence as described by the Sicily statement, although an improvement to this method could be to critically appraise the primary studies where appropriate. This methodology offers practitioners greater confidence in their decision making by reducing the black-box component of the KTA process.

CONCLUSION

The evidence presented indicates that health promoting interventions that focus on providing health information combined with improved social support and transport are likely to be effective in improving attendance at antenatal clinics, as well as birth outcomes. This is consistent with systematic reviews from a variety of populations, but importantly, also in Aboriginal populations as shown in the ‘Strong Women, Strong Babies, Strong Culture Program’ (d’espaignet et al., 2003). However, the evidence from the review is unclear as to how much improvement in weight or reduction in low birth weight constitutes a clinically significant difference.

From the review process we recommend that:

- Interventions should consider a combination of strategies.
- Interventions that are home-based and have outreach components seem feasible and are likely to provide health improvements.
- Design, implementation and delivery of antenatal and breast-feeding interventions should include adequate input from members of the community.

This exercise demonstrated the application of the Wang framework for assessing applicability and transferability of evidence within a public health and health promotion scenario. Consideration of factors obtained from primary papers to determine the applicability and transferability of health promoting interventions identified from systematic reviews was a valuable addition to the Wang framework. This method is clearly superior to ad hoc methods, and is more appropriate than the mechanistic application of findings from systematic reviews. This methodology sits within the KTA process which provides an overall framework for translating available KTA and can potentially improve the antenatal outcomes for Aboriginal and Torres Strait Islander women. Through broader application of these principles, this approach offers a means of reducing health
inequalities of disadvantaged people groups through the considered application of health promoting interventions of demonstrated effectiveness.

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**REFERENCES**


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