



Reconceptualising risk: Perceptions of risk in rural and remote maternity service planning

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ABSTRACT

Objective: to explore perceptions and examples of risk related to pregnancy and childbirth in rural and remote Australia and how these influence the planning of maternity services.

Design: data collection in this qualitative component of a mixed methods study included 88 semi-structured individual and group interviews ($n=102$), three focus groups ($n=22$) and one group information session ($n=17$). Researchers identified two categories of risk for exploration: health services risk (including clinical and corporate risks) and social risk (including cultural, emotional and financial risks). Data were aggregated and thematically analysed to identify perceptions and examples of risk related to each category.

Setting: fieldwork was conducted in four jurisdictions at nine sites in rural ($n=3$) and remote ($n=6$) Australia.

Participants: 117 health service employees and 24 consumers.

Measurements and findings: examples and perceptions relating to each category of risk were identified from the data. Most medical practitioners and health service managers perceived clinical risks related to rural birthing services without access to caesarean section. Consumer participants were more likely to emphasise social risks arising from a lack of local birthing services.

Key conclusions: our analysis demonstrated that the closure of services adds social risk, which exacerbates clinical risk. Analysis also highlighted that perceptions of clinical risk are privileged over social risk in decisions about rural and remote maternity service planning.

Implications for practice: a comprehensive analysis of risk that identifies how social and other forms of risk contribute to adverse clinical outcomes would benefit rural and remote people and their health

Abbreviations: PMUs, primary maternity units; GPs, general practitioners; CS, caesarean section

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services. Formal risk analyses should consider the risks associated with failure to provide birthing services in rural and remote communities as well as the risks of maintaining services.

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Introduction

Australia has seen the closure of 41% ($n=368$) of maternity units over the past 20 years, of which a large number were in rural and remote areas (Kildea et al., 2015). Rural and remote healthcare delivery in Australia involves many challenges including the distribution of services across large distances, low population density, staff recruitment and retention difficulties, lack of transport and high cost of service delivery (AHMAC, 2012). Approximately 86% of the Australian continent is classified as remote and only 2.3% of the population lives in these areas (Australian Bureau of Statistics, 2008). A further 29% of the Australian population live outside major cities referred to here as rural (Australian Bureau of Statistics, 2008). Closure of rural services reflects a global trend towards regionalisation in healthcare that is evident in numerous developed nations including Canada, France and the United States (Zhao, 2007; Pilkington et al., 2008; Grzybowski et al., 2011).

A growing body of evidence demonstrates negative health outcomes and social consequences resulting from the loss of rural and remote birthing services. Lack of maternity care close to home is associated with increased feelings of stress, distress and isolation (Chamberlain and Barclay, 2000; Kornelsen et al., 2001; Kornelsen and Grzybowski, 2005; Kornelsen and Grzybowski, 2006; Zelek et al., 2007; Arnold et al., 2009; Hoang et al., 2011); less favourable clinical outcomes for mothers and infants (Nesbitt et al., 1990; Allen and Kamradt, 1991; Klein et al., 2002; Dietsch et al., 2008; Grzybowski et al., 2011; Brown and Dietsch, 2013); and increased financial costs to families (Monk et al., 2013). These impacts are exacerbated for Aboriginal Australians for whom 'birthing on country' has important cultural and spiritual significance (Kruske et al., 2006; Ireland et al., 2011; Kildea et al., 2013). Closure of services has been significantly associated with an increase in infants being born before arrival to hospital (Kildea et al., 2015).

The Australian five year National Maternity Services Plan, endorsed in 2010, aims to increase quality maternity care for Australian women 'as close as possible to where they live' (Australian Health Ministers Advisory Council, 2011) and commitments have been made in the jurisdiction of Queensland to re-open at least three rural and remote maternity services (Fraser, 2012). However, despite a strong body of evidence and a supportive policy framework, the number of rural and remote birthing services across most Australian jurisdictions has continued to decline (Australian College of Midwives, 2015; Kildea et al., 2015).

The Australian Rural Birthing Index (ARBI) project has developed an evidence-based tool to assist in planning an appropriate level of maternity services for rural communities (Longman et al., 2015). The study involved mapping Australian maternity services delivering care to populations of 1000–25,000 (Longman et al., 2014); spatial analyses and mathematical modelling of these services. We also undertook collaborative group consultation involving expert advisors and key stakeholders ($n=23$) who validated and critiqued our findings across the project and at its completion; and qualitative fieldwork to investigate maternity services that had been closed, that appeared vulnerable or that seemed to be sustainable. It became clear that concepts of risk and their application are crucial to understanding the sustainability or closure of rural maternity services. The aim of this paper, therefore, is to

describe fieldwork participants' perceptions of risk and how these influence the planning of rural and remote maternity services.

Methods

Design

This paper reports the analysis of exploratory qualitative data from fieldwork undertaken as part of the Australian Rural Birthing Index project.

Participants

A purposive sample of clinicians (doctors, midwives, nurses, Aboriginal health workers) and managers were selected with the aim to maximise variability in role, seniority, location and experience ($n=117$). Participants were identified through professional networks or nominated by people in leadership positions at jurisdictional or national level. Consumers were identified through consumer organisations, clinicians and managers and with the guidance of local Aboriginal elders where appropriate ($n=24$).

Setting

Fieldwork was conducted in four jurisdictions at nine sites in rural ($n=3$) and remote ($n=6$) Australia (see Table 1). We selected fieldwork sites that were identified in our quantitative work as having an inappropriate level of service for their population or identified by our nationally derived, multidisciplinary Expert Advisory Panel ($n=11$) as vulnerable, sustainable or recently closed. A matrix was developed to identify a sample of sites across a range of jurisdictions, sizes and service levels and sites were then selected in consultation with our Expert Advisory Panel and managers in the jurisdictions. In 4 fieldwork sites, data were also collected at the associated regional centre.

Ethics

Multisite ethics approval was obtained from Hunter New England Human Research Ethics Committee (12/06/20/4.08). Ethics and governance approval was also obtained for each jurisdiction. All research participants received a participant information sheet and signed a consent form.

Data collection

Data collection methods included 88 semi-structured individual and group interviews ($n=102$), 3 focus groups ($n=21$) and one group information session ($n=17$) over a twelve-month period in 2014. Two researchers conducted fieldwork at each site, collected informed consent for all interviews and prepared joint reports from each setting. The researchers included 3 midwifery researchers with experience in rural and remote settings (authors 1, 5 and 6), a rural GP researcher (author 10) and two social scientists (authors 2 and 3). An interview schedule guided data collection. Data included field notes, interview transcripts, meeting notes and reports. This constituted the 'corpus of texts' (Lincoln

Table 1
Fieldwork sites.

| Site | Site description |
|------|---|
| 1 | Small regional hospital with closed birthing service . Located in very remote centre with almost 50% Indigenous population and a large catchment of remote Aboriginal communities. Regional referral hospital 5.5 hours travel time by car. |
| 2 | Small district hospital with birthing service and caesarean section (CS) . Located in very remote centre with majority Indigenous population and large catchment of very remote Aboriginal communities. Regional referral hospital 1-hour travel time by plane. Interviews also conducted at regional referral hospital. |
| 3 | District hospital with no birthing service . Located in remote town with large Aboriginal population. Regional referral hospital 3–4 hours travel time by car and airport for emergencies. |
| 4 | Two district hospitals in close proximity with birthing services and CS . Located in adjacent rural towns with population catchment approximately 20,000. Regional referral hospital 1.5-hour travel time by car. |
| 5 | Small district hospital with birthing service no CS . Located in socio-economically disadvantaged rural town. Regional referral hospital around 30 minutes < 1 hour travel time by car. Key informant interviews were also conducted at the regional hospital. |
| 6 | Regional hospital with birthing services and CS . Located in high growth remote centre 25% Indigenous and large catchment of very remote Aboriginal communities. Data also collected with regional staff on-sight. |
| 7 | District hospital with recently closed birthing service . Located in a small rural town. Regional referral hospital with obstetric service 1-hour travel time by car. Key informant interviews also conducted at regional hospital. |
| 8 | Small health service with no birthing . Located in very remote town with small population and large catchment of very remote Aboriginal communities. Regional referral hospital full day travel time by car or 2 hours plane. |
| 9 | Small health service with recently re-opened birthing service and CS . Located in very remote town with small population and a broader catchment of remote Aboriginal communities. Regional referral hospital 3 hours travel time by car. |

and Denzin, 2011), which were all read or checked by the first author. Field notes were checked for accuracy using audio recordings and manual cross-checking by two researchers at each field site. Written reports prepared by our field-work teams were also read by the first author, and provided to the leaders who assisted us and gave permission for the study at each site.

Data analysis

A predominant theme evident through our early analysis of interviews and subsequent texts was the notion of risk and how it dominated decisions about services. An early inductive interpretation of the data (Denzin and Lincoln, 2000) allowed researchers to develop a conceptual model identifying two categories of risk, health services risk and social risk, that together describe a comprehensive risk as presented in Fig. 1. This model represents the clear distinction in conceptions of risk described by women and those described by health service representatives and also reflects established categories for discussing risk in maternity care.

Data relating to health services risk were thematically analysed for sub-themes and then cross-checked and re-coded against the Australian Council on Healthcare Standards (2013). This

framework identifies two core domains of risk, clinical and corporate risk, expressed across four dimensions of financial, operation, political and legal risk (Australian Council on Healthcare Standards, 2013). Data relating to social risk were thematically analysed for sub-themes which included cultural, emotional and financial risks to women and families. These were cross-checked against literature examining risks associated with a lack of maternity services close to home (Kornelsen et al., 2001; Kornelsen and Grzybowski, 2006; Kruske et al., 2006; Kildea et al., 2013; Dietsch et al., 2008; Monk et al., 2013). Risk categories are defined in Table 2.

The project findings were regularly checked with a multi-disciplinary expert group of 11 established leaders. This was extended to 23 experts with key stakeholders in a consensus-building workshop held at the end of the study. Early findings on risk were reported to this group and supported by consensus at this meeting.

Findings

Clinical risk

Clinical risks related to local birthing services in rural and remote Australia

Most medical practitioners and health service managers we interviewed expressed concern that providing local birthing services in small rural and remote towns, especially where emergency surgical services are not available, would increase clinical risk for mothers and infants. For example, a medical practitioner in a remote town expressed the view that for birth services to exist it is essential to have caesarean section and anaesthetics (Field Site 3). A health service leader at a regional centre expressed the idea that mothers from small rural towns would be safer giving birth at the regional hospital than at their small local hospital (Field Site 7). Concern was also expressed about the clinical risk status of Aboriginal women in general. For example, a medical practitioner at Site 3 suggested that because of the high Aboriginal population in the town, many pregnant women would require referral to a regional centre to give birth because of their high clinical risk status (Field Site 3). A consumer participant expressed the same view, stating that all Aboriginal women would be high clinical risk and would therefore be unable to use local birthing services if these were available (Field Site 3).

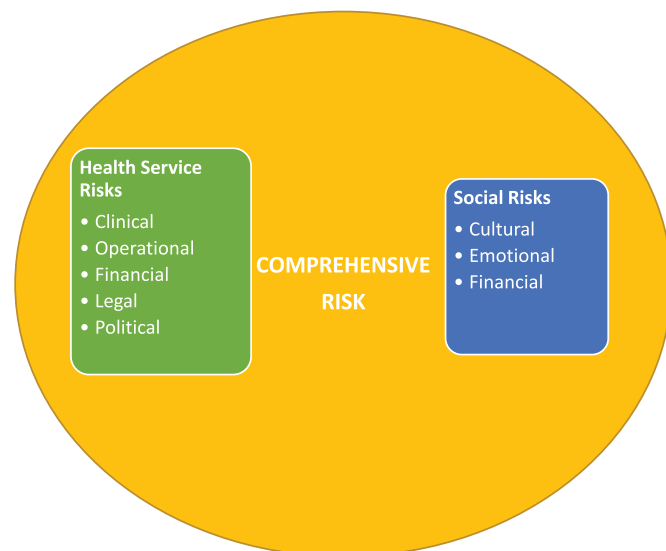


Fig. 1. Comprehensive Risk.

Table 2
Analytic framework and definitions.

| Health service risk | |
|---------------------|---|
| Code | Definitions |
| Clinical Risk | Risk to the mother or infant of an adverse biophysical event |
| Corporate risks | |
| Legal | Complaints, duty of care, legal and regulatory responsibilities, medico-legal |
| Political | Community, political and media expectations, relations with government, organisational culture. |
| Financial | Budget and resource allocation, contract management, risk management processes, fiduciary failures. |
| Operational | Service models and models of care, clinical and management policies and procedures, workforce management and clinical governance. |
| Social risk | |
| Code | Definitions |
| Cultural | Experiences of threats to traditional values and spirituality. |
| Emotional | Experience of system-initiated distress. |
| Financial | Compromised family budgets due to costs incurred in relocating for birth. |

Clinical risks related to lack of local birthing services in rural and remote Australia

No participants from rural birthing services without caesarean section capability reported the occurrence of adverse or catastrophic events. However, where no formal birthing services were available, all sites reported the occurrence of unplanned births, often without the presence of skilled staff. Health service participants at one site reported that in the last 12 months there had been six unplanned births at the local hospital that no longer provided staff skilled in maternity care (Field Site 7). One woman whose family circumstances made it undesirable to leave her town of residence to give birth avoided antenatal care and presented at term with a stillborn infant (Field Site 3). Another very young mother gave birth to her first infant on the airport tarmac while waiting for air evacuation after not accessing antenatal care and presenting at the local health service in advanced labour (Field Site 3). At another site it was reported that a 17 year old laboured at home alone for many hours before presenting to the local hospital in advanced labour (Field Site 1).

The absence of formal birthing services had led some women to avoid the health care system throughout the antenatal period, or close to the end of their pregnancies, to avoid the pressure to leave the community to give birth. One woman who had presented in labour with her third child having had no antenatal care told the medical practitioner we interviewed that she had avoided the local service because she knew that once she was in the system she would have to go to the regional centre to have her infant (Field Site 3).

Another clinical risk evident in our data was related to women's return to the community post-natally without medical records or hand over. In one rural town where midwives often needed to search for women in the community who had returned without hand over or records (Field Site 7).

Health service risks

Political risk

Political risks are those that challenge the health service. At a community where birthing services had closed, a number of women had presented at the health service in advanced stages of labour with the intent of avoiding transfer out of the community. One Aboriginal Elder described this as a 'forcing manoeuvre' that the community hoped would ultimately demonstrate to staff that local birthing services were essential (Field Site 3).

Other manifestations of political risk occurred through media attention to adverse outcomes, for example coverage of roadside births en route to a referral centre. In one remote site, Aboriginal women had threatened that if services were lost locally they would not travel to the regional centre but would remain in their home communities and birth 'on country' without midwives or doctors. Politically this situation was untenable and the Medical Director of the hospital was given funds to recruit locum obstetricians and anaesthetists in the short term and rebuild the services towards long-term sustainability (Field Site 2).

At a small rural site, community members were working with a local politician from the opposition against the health minister to try to reverse the decision to close services. One of the local community leaders very active in this political process described how their petition was signed by over 4500 women (Field Site 7).

Corporate risk: legal

Fieldwork revealed a number of avoidable legal risks and confusion related to the issue of informed consent and duty of care. One participant care provider provided an example of police, sent by a local health service manager, attending a woman's home to tell her she must travel to the regional centre to give birth. This was described as the 'Pregnancy Gestapo' by an Aboriginal participant from the same community (Field Site 3). Another woman from the same town, it was reported to us, asked to delay her transfer from 36 to 37 weeks' gestation and was told that she would be reported to 'child safety' if she did not travel at 36 weeks (Field Site 3). A feeling of powerlessness in this community had precipitated discussions by Aboriginal leaders with a community legal service about challenging the right of the health service to make women comply with such an unacceptable system, and they were threatening court action (Field Site 3).

Although leaving the community to give birth may have been a foregone conclusion due to lack of local services, explicit discussion of options by professionals, preparatory planning and consent by the health service was absent for most women, but not in every case as the following vignette illustrates:

Vignette: Informed Consent – Field Site 1

A resident in a remote town with no local birthing service told her midwife she did not want to evacuate to the regional hospital for the birth of her child. The woman had an uncomplicated pregnancy and it was her second baby. The midwife discussed the options and asked her to see the visiting obstetrician when he was next in town. The obstetrician advised her of risks related to giving birth locally but agreed it was the woman's decision and they could not force her to leave. The Medical Director of the hospital was informed and agreed on the condition that the plane would be called when she presented in labour in case of complications requiring transport to a higher level of care. The woman presented in the first stage of labour and gave birth normally. The plane arrived, at considerable cost, and was not needed.

Another perceived legal issue related to primary maternity units. Medical staff praised and respected high quality midwifery care but questioned who was legally responsible for women in midwife-led birth services. 'If something happened and the doctor was not notified is the midwife responsible? You say the midwife but has this been tested? Who is the patient admitted under?' (Field Site 1).

Financial risk

There are significant costs to the health service associated with lack of local maternity services. In remote Australia, air and sometimes road travel is supported by the health system for those without private means of transport and travel allowance is paid to

some consumers who travel to give birth.

At two remote sites the current practice was to send a plane if birth was imminent or the woman was refusing transfer to the regional town, regardless of the reported \$10–12,000 expense (Field Sites 1 and 3). Staff believed that it was important to be seen to have done everything possible to prevent a bad outcome and that the service needed to 'guarantee safety or be held to account' (Field Site 1).

At another site, even if mother and infant were well after an unplanned local birth, they were still evacuated to the regional hospital. According to data supplied from this site, 4–5 hours driving time from the referral service, there were 21 'fly outs' in labour in the two years (2012–13) since the service was closed at a cost of around \$10,000 per trip (Field Site 3).

Our data also showed inefficiencies of staff time because clinicians were used to drive women from one small town to antenatal appointments and tests in the closest regional centre (Field Site 4). This resulted in lost clinical work time of 6–8 hours per trip. In this site participants also described six unplanned births in a small nearby non-birthing facility, in the year or so since the local birthing service closed (Field Site 4).

Operational risks

Operational risks identified related to workforce, clinical governance and service networks. Workforce risk was described primarily as the loss of procedural general practitioners (GPs) or problems in maintaining a midwifery workforce. Researchers observed that in all but two sites, GPs lacked support from regionally networked obstetric and registrar services; this raised serious issues of clinical governance (Sites 1,2,3,5,7,8 and 9).

Vignette: Lack of networking and staff support creates risk – Site 3

A small town with a closed birthing service used a local GP for emergency call outs. One health practitioner was concerned about the skill level of the GP, stating that he/she did not appear capable to deal with emergency callouts and was very nervous. An obstetrician at the regional hub confirmed the lack of qualifications and experience of this GP.

Recognition of the need for clinical networks and collegial inter-disciplinary relationships that include case conferences, monitoring and support and continued training, characteristic of a contemporary health system, were only evident at one remote regional hospital site, where clinicians were well supported by their regional referral centre and by a state-based continuing professional development team of midwife and obstetrician who helped up-skill local clinicians (Field Site 6).

At other sites we observed that safety was potentially compromised by a lack of regional support or medical/midwifery oversight and no evidence of a clinical governance framework embedded in a networked model of care. This appeared to result in inappropriate hospital services and skill mix such as Directors of Nursing without midwifery qualifications and skills overseeing and managing out of date and less than optimal models of midwifery services (Field Sites 3, 5 and 7). This was compounded as expert medical or midwifery leaders, even at the regional referral level, did not have influence over decisions made at executive level of the health service.

Researchers also observed operational risk and workforce inefficiencies associated with midwifery which was frequently attached to out-dated nursing models of care rather than best use of skills e.g. recruiting qualified nurse midwives who were then rostered on 24 hour shifts, rather than a case load model of delivering care. This was compounded by reluctance by many nurse leaders to employ midwives who were not also registered nurses, a relatively new model of education in Australia.

Vignette: Ineffective Models of Care – Field Site 7

A birthing service in a rural town was closed following the resignation of a GP Obstetrician because the Health Department made the decision that the service could only remain open if 3 GP Obstetricians were available. This meant women needed to transfer to the regional centre, or another town a similar distance away offering caesarean birth. The closed service had well over 100 births a year with a high proportion of Aboriginal families and migrant workers. The town was approximately 100 km from a regional hub that had salaried staff specialists, a registrar and a midwife consultant. There was an ambulance base in town with qualified back up when the paramedic was off duty. The local hospital employed experienced midwives who worked on 24 nursing rosters. Interviews with staff showed nursing work took precedence when antenatal or postnatal visits were required. Outreach did not appear to have been considered as an option instead of closure; for example the registrar providing a monthly clinic for referrals or the midwife consultant helping the Director of Nursing understand better ways to organise services. A midwifery service backed by a regional obstetric service for low risk women was one answer to this dilemma, but due to a lack of understanding of these new models of care within the health service leadership, this did not appear to have been considered.

Social risk¹

Cultural risk

Cultural risk was a dominant theme for Aboriginal women. All Aboriginal participants emphasised the importance of their cultural links to the land and the role that 'country' played in their overall health and wellbeing. An Aboriginal participant and leader from one site explained that it is important that Aboriginal people are born on their own land (Field Site 3). This connection was not only related to the 'traditional' country that individuals were connected to but also to the country where they now lived and currently considered their home:

Because this is not my country – women [still] want to have their babies here but it is not their country – their country is, or, but they still want to have their baby here – better than [the regional town] (Field Site 1).

Relocation to give birth was seen by one Aboriginal participant as a political agenda at play: *'That link to country is robbed from them – [this is] another form of genocide'* (Field Site 2). Another said that *'many women think they stopped birthing here because of land rights. They think their birth certificates say so they then can't prove their country [is here]'* (Field Site 2).

Vignette: Cultural risks associated with birthing service closure - Field Site 2

A small regional hospital in a very remote area provides birthing services for up to seven remote communities in the region. Even though women would prefer to stay in their communities to give birth, they mostly comply with the transfer to this small regional community to await giving birth at the hospital.

When the birthing service at this regional hospital was threatened with closure, Aboriginal participants described that many women did not feel safe to travel a further two hours flying time to a larger tertiary facility. They believed it would be a cause of sickness, significantly increasing the

¹ We have begun with cultural risk due to our understanding of its importance to Aboriginal Australians.

degree of distress caused by threatened closure of the service.

Cultural risks were amplified when staff did not understand how to work with or value cultural imperatives. For example, in one site there was no discussion with the community about the appropriate location for a smoking ceremony site. The hospital staff chose an area on their land that was unacceptable and therefore smoking ceremony did not occur. Participants explained to us that using hospital grounds as an area to 'welcome' babies home is problematic as 'many Aboriginal people believe that people die in the hospital so lost spirits are walking around' (Field Site 3).

Emotional risk

All participants in this study, Aboriginal and non-Aboriginal, described the distress and loneliness experienced as a result of routine transfer to regional settings at 36–38 weeks gestation. Likewise, participants told us about the impact on families of having to leave young children and be away from home and family for weeks at a time. A community leader in a rural site described that there was still a strong memory of how good it was to give birth locally (Field Site 7). She had given birth in the community previously but for her last infant had to relocate to a regional hub and described that this had caused their family financial and emotional distress. These negative experiences were told in stark contrast to the positive benefits experienced by women who could have their infant locally. Descriptions by women of local births included 'empowering', 'feeling safe', 'having family', and 'being in a familiar place' (Field Sites 1, 3, 7). These or similar terms were used consistently to convey the benefits of giving birth close to home.

Financial risk

Participants described the shifting of costs from the health system to individual families when travel outside the local community to give birth was necessary. These included the costs of transport and accommodation, often for extended periods of time. It was reported to us in one site that a family spent \$250 dollars on taxi fares to get to a routine antenatal appointment in a regional town (Field Site 7). A woman in permanent employment from a remote site described that she used all the money she had saved for maternity leave to pay for motel accommodation for the three weeks before her infant was born (Field Site 3). When she went over her predicted due date she asked for an induction of labour to try to reduce time away from home as she could not afford to stay in the motel any longer.

Discussion

This paper used data from fieldwork to explore participants' perceptions and observations of risk relevant to the planning, sustainability or closure of rural maternity services. We identified two types of risk: health service risk (clinical, legal, political, financial and operational) and social risk (cultural, emotional and financial). These interrelated themes are mutually influential in an overarching category we labelled as comprehensive risk.

Clinical risk

Our findings demonstrated that perceptions of clinical risk were privileged in the planning of rural and remote maternity services. Many health services participants held a perception of biophysical risk or concern about negative clinical outcomes related to giving birth in rural communities not based on research evidence. All health services including large urban hospitals face a

small, unavoidable clinical risk as a result of biophysical abnormalities in the mother or infant. However, evidence shows that the occurrence of these risks in Australia is generally low. For example, in the period between 2006 and 2010 there were 99 direct and indirect maternal deaths, a rate of 6.8 per 100,000 (Johnson et al., 2014). Similarly, overall perinatal death rates in Australia are very low, averaging approximately 7.5 per 1000 (Australian Institute of Health and Welfare, 2008).

Risk and primary maternity units

There remains a widespread perception that birthing services without immediate access to caesarean section are unsafe (Kildea, 2006; Monk et al., 2013) and this was reflected in our findings. However, primary maternity units (PMUs), defined as a free-standing service that provides care to women with limited obstetric, anaesthetic, laboratory or paediatric support available on site (Monk et al., 2014) have demonstrated excellent clinical outcomes in numerous international (Van Wagner et al., 2007; Brocklehurst et al., 2011; Hunter et al., 2011; Overgaard et al., 2011; Dixon et al., 2012; Van Wagner et al., 2012; Grzybowski et al., 2011) and Australian (Monk et al., 2014; Kruske et al., 2015) and Australian (Tracy et al., 2007) studies. Kornelsen and McCartney (2014) completed a systematic realist review of the safety of such services and found good outcomes when services had good risk screening, access to emergency transport and provided system-level support to providers.

Women giving birth in PMUs or small rural or remote units are necessarily low risk. Women with complications or at clinical risk are evacuated out and give birth in regional settings with specialist and surgical services. Despite this, and evidence that with effective risk screening PMUs have maternal-newborn outcomes equivalent to those of higher service delivery levels, these low risk units continue to be closed. Perceptions of risk and safety held by medical and administrative participants in this study reflected an approach of birth being 'normal in retrospect'. From this perspective, the pursuit of safety requires the availability of caesarean section. However, Canadian research undertaken at two points of time and with large all risk rural populations found that those from communities with PMUs had better outcomes than those from communities without local services (Grzybowski et al. 2015). The study population included 150,797 women and excluded women with multiple pregnancies or very premature or infants and those with congenital abnormalities due to the lack of suitability for this population to deliver in a low-resource (rural) setting (Grzybowski et al. 2015).

The observed preoccupation with clinical risk in maternity care is therefore likely to reflect a broader cultural discourse that privileges biomedical knowledge over social and traditional forms of knowledge in modern maternity care (Oakley, 1984; DeVries, 1992; Downe, 2004, Monk et al., 2013). MacKenzie Bryers and Van Teijlingen theorise that risk is used as a mechanism to define childbirth as a medical event rather than a social experience because by doing so the intellectual and social capital, and therefore power, remains within the medical model (MacKenzie Bryers and van Teijlingen, 2010). The phenomenon of defining and managing risk is grounded in the concept of authoritative knowledge, based on perceived or claimed expertise (Jordan 1997) and assumes a relationship between specialised skills and technology and optimal health outcomes from low risk pregnancies that is not supported by evidence (Tracy et al., 2013; Monk et al., 2014).

Social risk exacerbates clinical risk

The closure of rural birthing services has created significant socio-cultural, emotional and financial risks for women and

families. Our fieldwork suggested that health service leaders believe that they avoid risk by closing services, however closed services produced other risks for the health service, and/or potentially transferred risk to the women. Our research suggested that women may avoid antenatal care and health professionals to prevent evacuation or transport away from families and therefore put themselves at higher clinical risk, a finding supported by other research studies in both British Columbia and Northern Territory (Ireland et al., 2011, Lawford and Giles, 2012). In some cases, clinical risk is exacerbated as women arrive in advanced stages of labour to give birth in a setting that is not prepared for birthing and without qualified staff to care for them. This has been described in work from Canada as the '10 cm strategy' (Grzybowski et al., 2009). In instances where women did leave prior to labour some reported coming back to the community before they had given birth but going underground to avoid being identified and evacuated again, a finding reflected in other research studies (Ireland et al., 2011; Lawford and Giles, 2012). Other Australian research related to remote maternity care has identified significant clinical risks related to lack of discharge planning, transportation and transfer of patient information for women returning to their remote communities after giving birth (Josif et al., 2012; Barclay et al., 2014). Relocating to give birth is expensive, distressing, and can lead to a cascade of events beginning with pressure applied to regional obstetricians to intervene to try to orchestrate a quick return home; this may itself increase clinical risk (Kornelsen et al., 2007).

Comprehensive risk

Our research demonstrates that social risks actually exacerbate clinical and other forms of risk and so compound risk overall. We therefore propose here an extended definition of risk for the health system that considers the full range of risks and their interactions (Fig. 1).

Proposed risk analysis

Our findings suggest that a range of risk factors need to be addressed when planning maternity services in rural and remote Australia. One way this could be undertaken is through a formal risk analysis when planning to open or close rural birthing services. The first step in this approach is to undertake a careful examination of context to evaluate the actual risk of adverse clinical events occurring using data and evidence of probability. The authors have developed a planning guide for rural and remote maternity services in Australia, the Australian Rural Birthing Index Toolkit, to support this process (Longman et al., 2015). The second step is to conduct risk analyses using a comprehensive definition of health services risk. This requires two analyses to be undertaken: risks to the health service and families associated with providing birthing services and risks to the health service and families associated with not providing birthing services.

A comparison of the two analyses could justify a decision that closure is appropriate or indicate re-opening of services. In both cases the evidence and arguments are identified for discussion with the community and the ramifications of either decision are better understood and can be dealt with proactively by the health system.

Conclusions

Our fieldwork demonstrated that perceptions of clinical risk were privileged among health providers, most medical leaders and policy makers in the planning of rural and remote maternity

services. However, these perceptions did not often correspond with evidence about actual risk and how it related to poor clinical outcomes. We also found that social risks, rather than influencing only women and families, actually increased health service and clinical risk and therefore contributed to overall risk.

We have proposed a definition of risk that incorporates social/cultural risk as a dimension of risk assessment and recommend that health services apply this definition to risk management processes. These findings have relevance to the planning of rural and remote maternity services and are likely to be applicable to other forms of rural health service delivery.

Conflict of interest

The authors confirm that they have no actual or potential conflicts of interest to declare.

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