

AUSTRALIAN RURAL BIRTHING INDEX TOOLKIT



ARBI TOOLKIT

A resource for planning maternity services in rural and remote Australia

2015

Jo Longman, Jennifer Pilcher, Geoff Morgan, Margaret Rolfe,
Deborah Donoghue, Sue Kildea, Sue Kruske, Stefan Grzybowski,
Jude Kornelsen, Jeremy Oats and Lesley Barclay

CONTENTS

BACKGROUND	1
AUSTRALIAN RURAL BIRTHING INDEX (ARBI)	1
HOW TO CALCULATE THE ARBI SCORE	2
HOW TO INTERPRET THE ARBI SCORE	3
USING THE ARBI IN THE PLANNING PROCESS	4
ARBI CHECKLIST FOR PLANNERS	5
REFERENCES	9
DEFINITIONS	10

AUSTRALIAN RURAL BIRTHING INDEX TOOLKIT

BACKGROUND

The **National Maternity Services Plan** provided a strategic national framework for maternity services for 2010-2015 and identified actions for improving access to maternity services:

Action 4.2:

Ensure maternity service planning, design and implementation is woman-centred

Action 4.2.1:

Develop a rigorous methodology to assist in woman-centred maternity service planning (1).

This toolkit provides maternity health service planners and health service executives with just such a rigorous methodology: a **tool** which estimates an appropriate level of maternity service for rural and remote populations between 1,000 and 25,000, and **guidance** on how to use the tool.

AUSTRALIAN RURAL BIRTHING INDEX (ARBI)

The Australian Rural Birthing Index (ARBI) is an index that can be used to contribute to planning the level of maternity service for a particular facility.

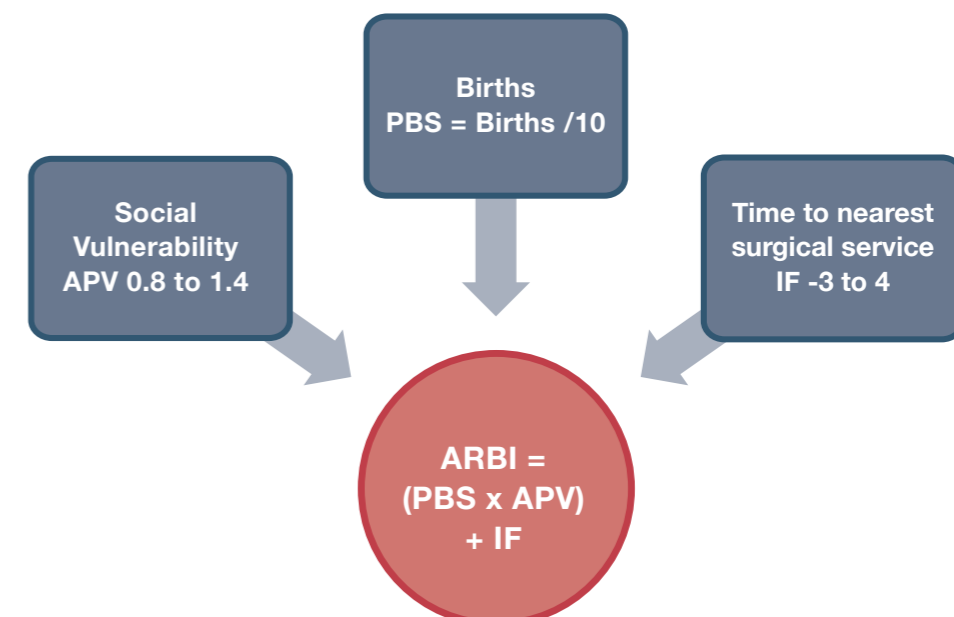
It has been developed from a similar Canadian index which was grounded in extensive fieldwork in British Columbia, followed by modelling (2). The Australian index has been based on Australian data for all maternity services in all states and territories, and on fieldwork in a small number of selected locations.

The ARBI applies to rural maternity services in facilities with catchment populations of 1,000 to 25,000. The term 'rural' is used inclusively here to denote locations with Australian Bureau of Statistics (ABS) remoteness area (RA) categories of Inner Regional, Outer Regional, Remote and Very Remote (RA categories 2 to 5) (3).

Calculation of the index is based on:

- The **Catchment Area** of the maternity service
- **Population Birth Score (PBS)**: the number of births in the catchment population (2).
- **Social Vulnerability (APV)**: the relative socio-economic disadvantage of the catchment population compared to the rest of the country (2).
- **Isolation Factor (IF)**: the geographic proximity of the facility to the nearest alternative surgical facility that can perform emergency caesarean section (2).

A weighting is applied to each of the above factors to produce a score that estimates the appropriate level of maternity service for its particular location based on population need. The ARBI calculation is:



CALCULATION EXAMPLE: ESTIMATING POPULATION FOR A CATCHMENT AREA

1. Calculate the proportion of the ABS geographic area (e.g. LGA) covered by the catchment area;
2. For each of these LGAs multiply this proportion by the LGA population to estimate the population of the LGA who live within the catchment area;
3. Sum the estimated population of the LGA/s who live within the catchment area.

EXAMPLE 1:

Population (1hr):	11,000
Remoteness:	Inner Regional
Births: 159	PBS = 15.9
IRSD decile: 4	APV = 1.2
Time to CS: 1.4hrs	IF = 1
ARBI = (PBS 15.9 x APV 1.2) + IF 1	
ARBI = 20.1	

EXAMPLE 2:

Population (1hr):	4,000
Remoteness:	Remote
Births: 59	PBS = 5.9
IRSD decile: 3	APV = 1.27
Time to CS: 3.6 hrs	IF = 3
ARBI = (PBS 5.9 x APV 1.2) + IF 3	
ARBI = 10.1	

HOW TO CALCULATE THE ARBI SCORE

The ARBI is a simple calculation that does not require access to high level data management or analysis skills and uses national, freely available data from the Australian Bureau of Statistics (ABS).

Step 1: Define the catchment area

The **catchment area** for a maternity service is defined as the area bounded by a 1 hour road travel time in any direction from the facility where the service is provided. Where overlap occurs between the catchment areas of adjacent facilities, the overlap is split evenly between the facilities. Road travel times for a maternity service may be estimated using internet based road maps such as Google Maps (www.googlemaps.com) or others.

Step 2: Estimate the catchment area population

ABS census population data (www.abs.gov.au/census) may be used to estimate the **catchment area population**. Maternity service catchment areas do not usually coincide with standard ABS geographic areas. If this occurs, the catchment area population can be estimated as per the example (left).

Step 3: Estimate the catchment births

Catchment births are estimated as the annual number of births within the catchment population averaged over a 5 year period. Historical birth numbers by ABS geographic areas are available from the ABS (4). The annual number of births in a catchment area can be estimated as per the calculation example (left).

Step 4: Calculate the Population Birth Score (PBS)

PBS = Catchment birth numbers divided by 10

Step 5: Estimate the social vulnerability (APV)

To estimate **social vulnerability**, the ARBI uses the ABS Index of Relative Socio-economic Disadvantage (IRSD) (5). The IRSD score can be calculated for standard ABS geographic areas as per the calculation example (left). The score corresponds with an ABS Australia-wide decile category which is weighted to produce an Adjustment for Population Vulnerability (APV) score using the following table:

DECILE	1	2	3	4	5	6	7	8	9	10
APV	1.4	1.33	1.27	1.2	1.13	1.07	1.0	0.93	0.87	0.8

Step 6: Calculate the isolation factor (IF)

The **isolation factor** is the road travel time to the nearest facility that is capable of performing an emergency caesarean section. This can be estimated using internet based road maps such as Google Maps. The road travel time is converted to the appropriate isolation factor (IF) category using the following table:

TRAVEL TIME	<30 minutes	31-45 minutes	45-60 minutes	60-90 minutes	90-120 minutes	2-4 hours	≥4 hours
Isolation Factor	-3	-2	-1	1	2	3	4

If the main form of transport is by air or boat then automatically select 4.

Step 7: Calculate the ARBI

ARBI score = (PBS x APV) + IF

HOW TO INTERPRET THE ARBI SCORE

The ARBI score recommends the appropriate level of maternity service for a given rural community compared to other rural Australian services based on population need.

The ARBI currently only applies to catchment populations of 1,000 – 25,000.

The ARBI uses weightings based on rigorous qualitative and quantitative research and extensive fieldwork undertaken for the original Rural Birth Index in British Columbia, Canada. Additional analyses and fieldwork undertaken at nine sites in rural Australia suggest these weightings are appropriate for the Australian context.

ARBI SCORE	SUGGESTED MATERNITY SERVICE LEVEL
Less than 6	Unlikely to have local birthing. May have antenatal and/or postnatal care only.
6-10	Possible to have local birthing but probably without emergency caesarean section capability.
10-18	Likely to have local birthing possibly without emergency caesarean section capability.
Over 18	Generally will have local birthing probably with emergency caesarean section capability.

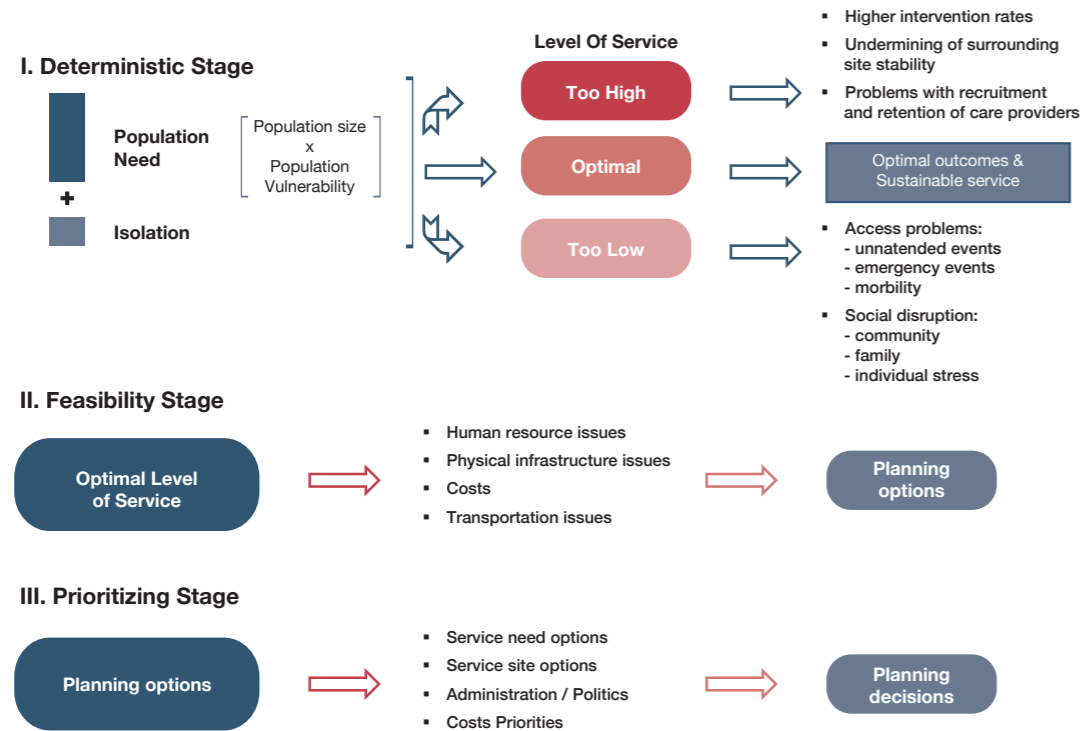
For detailed information regarding maternity service levels please refer to the **National Maternity Services Capability Framework** (6).

Please note: This ARBI Toolkit is intended for use at the level of individual services or communities. A more detailed guide to the ARBI for use by GIS planners at state or regional level is currently under development and will be published in late 2015.

The ARBI score estimates the recommended level of maternity service, based on catchment birth numbers (PBS), socio-economic status (APV) and isolation (IF). A range of other important factors also influence the level of maternity services provided. It is **essential** that these be considered in any planning decisions. The planning framework outlined below situates the ARBI calculation within the context of a planning process.

USING THE ARBI IN THE PLANNING PROCESS

The ARBI can assist planners at national, jurisdictional or health service executive level as part of a three-stage process for rural health service planning, depicted below.



A theoretical framework of planning and evaluating rural health services (2).

Deterministic Stage

Calculating the ARBI is the **deterministic stage** of the planning process. At this stage, population birth numbers, isolation and social vulnerability are objectively measured. These characteristics have been identified as the dominant characteristics predicting service level sustainability in rural maternity services and provide an indication of population **need** (2).

Feasibility Stage

The next stage of the planning process is the **feasibility stage**. This stage considers the pragmatic issues that impact the ability to deliver sustainable health services in a given rural community. These issues are contextual and need to be assessed for individual communities.

Prioritising Stage

The final stage of the planning process, the **prioritising stage**, involves making planning decisions within the context of competing service issues and priorities. Decisions at this stage will be strongly influenced by the deterministic and feasibility assessments.

ARBI CHECKLIST FOR PLANNERS

The checklist below provides a guide for planners using the ARBI to address the three stages of the planning framework outlined above. This process will provide a sound basis for decision-making in conjunction with the use of existing local planning guides.

We suggest that a number of people assist or are consulted as this exercise is conducted. They include representatives from the Department of Obstetrics, Midwifery and Neonatology at the regional hospital, the Clinical Midwifery Consultant, Aboriginal Liaison Services, Aboriginal Community Controlled Health Organisations, Consumer Representative Groups, Ambulance or Air Retrieval Services and other stakeholders.

1. DETERMINISTIC STAGE - CALCULATING THE ARBI

CATCHMENT AREA AND POPULATION

ACTION	CONSIDERED?
--------	-------------

The ARBI score for a maternity service is based on a theoretical 1 hour road travel catchment area. Does the 1 hour catchment area reasonably estimate the actual catchment area for that facility given patient flows? If not, then the catchment area should be adjusted before calculating the ARBI score. In remote areas, expanding the catchment area may not necessarily increase the catchment population or number of births due to the low population density.

Does the catchment area need to be increased to include other communities who may not have been included in the catchment calculation? This may be especially important for Aboriginal communities whose traditional links make it more likely that they travel in a favoured direction for birth. Road access and transport links may also influence the potential catchment area.

CATCHMENT POPULATION BIRTHS (PBS)

ACTION	CONSIDERED?
--------	-------------

For existing maternity services with birthing, compare the actual number of births at the facility (averaged over the previous 5 years) with the estimated births from the catchment population calculation. If there is a difference, then the ARBI score should be interpreted with this in mind. Where a birthing service is being considered, assess whether the number of births suggested by the PBS score accords with the proportion of women from the catchment likely to give birth locally.

Does the proximity of the facility to a similar or higher level maternity service influence the potential number of women using a local service for birth? If it does, then the ARBI score should be interpreted with this in mind.

Consider the impact of the catchment area's physical geography on where people go to access services. For example, are women avoiding travel for antenatal care because the facility is too far, and/or delaying or rejecting being transported to another facility for birthing? Is there evidence of this occurring? Is this a cultural, economic and/or social issue? How is this likely to influence birth numbers?

Consider the private insurance rate. For example, high rates of private insurance in mining or other industries may change patterns of service utilisation and impact birth numbers.

SOCIAL VULNERABILITY (APV)

ACTION	CONSIDERED?
--------	-------------

Profile the relative socio-economic status of the catchment population – does the APV component of the ARBI score adequately reflect this? If it does not, then the ARBI score should be interpreted with this in mind.

Profile the risk status (burden of disease, obstetric and 'social' risk) of the birthing women in the catchment population including quantifying the proportion who are high risk. Consider how this will impact on the level of birthing service required and clinical governance and networking required.

In areas with significant Aboriginal and/or Torres Strait Islander populations the importance of connection to country should be recognised and incorporated into health planning. There is evidence that the current policy of relocation for many Aboriginal and Torres Strait Islander women for birth causes significant distress for women and their families that is in addition to the upheaval and problems experienced by non-Indigenous women (5).

ISOLATION FACTOR (IF)

ACTION	CONSIDERED?
--------	-------------

Consider if the proximity of the maternity service to the nearest alternative surgical facility adequately captures the degree of isolation. If it does not, then the ARBI score should be interpreted with this in mind.

2. FEASIBILITY AND PRIORITISING STAGES – PLANNING HEALTH SERVICES

This section provides guidelines to consider the pragmatic issues that impact the ability to deliver sustainable health services in a given rural community. These issues are contextual and need to be assessed on an individual community basis. The information generated will provide an evidence-base on which to assess the feasibility of service provision in a given community and assist with prioritising and planning sustainable health services.

POPULATION TRENDS

ACTION	CONSIDERED?
--------	-------------

Consider the catchment population trend – is it growing or declining? How might this impact on the future sustainability (sufficient birth numbers) of the service?

SERVICE NETWORKS, CLINICAL GOVERNANCE AND RISK

ACTION	CONSIDERED?
--------	-------------

Review the network/interconnectedness of the services in this region. If there are changes to one service what will the implications be for any connected / referral in / referral out services? Review the nearest / other / similar or higher level birthing service facilities - are these facilities currently satisfying demand?

Are there current defined referral policies, guidelines, support and clinical governance processes integrated with higher level services? Is there an integrated review process to manage the service, including requirements for escalation of care and emergency retrieval within a defined maternity service network?

Consider the service's relationship to higher level services, and how those interface with other providers offering maternity services in the region e.g. Aboriginal Medical Service, community midwifery, general practitioners, Child and Family Health services or equivalent, visiting Royal Flying Doctors Services or outreach from higher level services. Coordinating service provision between providers can reduce duplication and fragmentation, improve communication and contribute to the sustainability of the service.

Is the town an 'infrastructure hub'? If so, is a birthing service a necessity for other smaller health services or communities who have nowhere else to go or for whom travel to another service is even further? Could these smaller services or communities be supported to provide services closer to home either locally or as an outreach service from the infrastructure hub? How could this subsequently be linked to a larger regional hub and specialist obstetric and paediatric services?

Are adequate and effective clinical governance processes currently established in the region? For example, is there an integrated clinical governance system across levels of service and maternity providers? Are community based GPs & GP obstetricians linked to a regional specialist team? Is there a senior regional midwifery position responsible for providing clinical governance for midwives? Are maternity services linked to regionally based Clinical Midwifery Consultants? How do/would local midwives link to GP and Specialist Obstetricians? How do service networks, including private service providers e.g. Aboriginal Medical Services, community based general practice shared care programmes, impact on clinical governance arrangements?

Consider how the health service is assessing risk and against which parameters. For example what are the risks associated with not having a maternity service with birthing at the facility? These risks may include unplanned births, and women presenting in labour with minimal or no antenatal care. How do these risks compare to the risks of having a service with birthing?

Will the regional or jurisdictional service network decide the level of maternity service being planned or does the local maternity service have capacity to decide?

COMMUNITY CONSULTATION AND SERVICE MODELS

ACTION	CONSIDERED?
Consider the service model and model of care. Is the service structured in accordance with contemporary, evidence-based best practice? Could the sustainability of the service be enhanced by implementing contemporary models such as Midwifery Group Practice models or collaborating with privately practicing midwives (8-10)?	
Is there local demand for a type of service or model of care? What does the community want? What input has the council had (local government, Aboriginal council etc.) into decision-making?	
Has there been community consultation? Is there a local reference group already in place that could be utilised to collect information/data?	
Consider the importance of birthing 'on country' for any Aboriginal populations included in the catchment area and if this is feasible given the number of births each year (7).	


TRANSPORT LOGISTICS

ACTION	CONSIDERED?
Understand patient flows and referral patterns - do they mirror transport routes? Does this change in relation to time of year? Consider how this will impact on service use.	
Consider how transport is affected by weather and whether there would be an impact on an all year round service e.g. flooding and cyclones.	
Transport and accommodation for accessing higher level services requires planning and support. Are women having difficulty accessing allowances? What low cost accommodation and support is available for women when required to be away from home/family and country? How is access to travel funds from the Commonwealth managed? Is the community aware to ask for Patient Assisted Travel funding? Are there locum staff who don't know? Do orientation programs for staff include information and responsibilities for managing travel funding?	
Consider the distance, travel time and availability of emergency retrieval services.	

WORKFORCE

ACTION	CONSIDERED?
Consider if the current/proposed model of service delivery requires changes in workforce numbers and/or up-skilling of the workforce.	
Does the service network have capacity for up-skilling and training and education within the sector?	
Consider ease/difficulty of recruitment and retention of staff, succession planning and sustainability into the future. Does there need to be a change in the way the service is delivered and organised/coordinated to attract and retain a workforce?	
Consider how training provided by universities for pre-service midwifery, medicine or registrar training could bring additional teaching and clinical supervision resources into the area.	
Consider if a Medicare rebate could be charged for midwifery services (eligible midwives, population <7,000, rural or remote).	
If considering changing the level of maternity service offered in a facility, consider the impact this may have on current service provision and workforce requirements. For example, GP Obstetricians or Visiting Medical Officers may be the mainstay of services other than birthing in the community and changes to services will impact on volume of work and GPs required.	

PHYSICAL INFRASTRUCTURE AND RESOURCES

ACTION	CONSIDERED?
What maternity service level is supported by the existing physical infrastructure? If this is insufficient to support the service level under consideration, what would be required to bring it up to standard and are these resources available?	
	
<div style="background-color: #800000; color: white; padding: 10px; border: 1px solid white;"> EVIDENCE-BASED PLANNING DECISION </div>	

REFERENCES

1. Australian Health Ministers Advisory Council. National Maternity Services Plan. Canberra: Commonwealth of Australia; 2011
2. Grzybowski S, Kornelsen J, Schuurman N. Planning the optimal level of local maternity service for small rural communities: a systems study in British Columbia. Health Policy 2009;92(2-3):149-57.
3. Australian Bureau of Statistics. Remoteness Structure [Internet]. 2015 [cited 2015 27 March]. Available from: <http://www.abs.gov.au/websitedbs/D3310114.nsf/home/remoteness+structure>.
4. Australian Bureau of Statistics. 3301.0 - Births, Australia, 2013 [Internet]. 2015 [cited 2015 27 March]. Available from: <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3301.02013>.
5. Australian Bureau of Statistics. 2033.0.55.001 - Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA) Australia, 2011 [Internet]. 2015 [cited 2015 27 March]. Available from: <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/2033.0.55.001main+features1000520112011>.
6. Australian Health Ministers Advisory Council. National Maternity Services Capability Framework. Canberra: Commonwealth of Australia; 2012.
7. Kildea S, Van Wagner V. 'Birthing on Country,' Maternity Service Delivery Models: A review of the literature. An Evidence Check rapid review brokered by the Sax Institute. Sydney: Maternity Services Inter-Jurisdictional Committee for the Australian Health Minister's Advisory Council; 2012.
8. Gao Y, Gold L, Josif C, Bar-Zeev S, Steenkamp M, Barclay L, et al. A cost-consequences analysis of a Midwifery Group Practice for Aboriginal mothers and infants in the Top End of the Northern Territory, Australia. Midwifery. 2014;30(4):447-55.
9. Kruske S, Schultz T, Eales S, Kildea S. A retrospective, descriptive study of maternal and neonatal transfers, and clinical outcomes of a Primary Maternity Unit in rural Queensland, 2009-2011. Women and Birth. 2015;28(1):30-9.
10. Tracy SK, Hartz DL, Tracy MB, Allen J, Forti A, Hall B, et al. Caseload midwifery care versus standard maternity care for women of any risk: M@ NGO, a randomised controlled trial. The Lancet. 2013;382(9906):1723-32.
11. Queensland Health. Clinical Services Capability Framework Fact Sheet 1: Explanation of Service Levels. Brisbane: Queensland Government Department of Health; 2014.

DEFINITIONS

ABS GEOGRAPHIC AREAS

The Australian Bureau of Statistics presents data in accordance with the Australian Statistical Geography Standard 2011 which outlines standard 'structures' or 'geographic areas' such as Local Government Area (LGA), Statistical Local Area (SLA), Census Collector District (CCD), or Statistical Area Level 1-5. Planners using the ARBI may select the most appropriate ABS geographic area for their purposes.

FACILITY

Refers to the physical structure or organisation that operates a number of services of similar or differing capability levels (11).

SERVICE

Refers to clinical services e.g. surgical or maternity services, provided under the auspices of an organisation or facility (11).

MATERNITY SERVICE

A service that provides antenatal or intrapartum or postnatal care or a combination of these components for women and babies up to six weeks after birth. This care is provided in a variety of public and private settings and facilities and is supported by service capability frameworks, workforce, funding, information and data, and technological infrastructure (6).

MATERNITY SERVICE LEVEL

Maternity service level describes the level of complexity of care that can be planned for a maternity service. The National Maternity Service Capability Framework provides a detailed framework of service levels from Level 1, low complexity antenatal and postnatal primary care services, to Level 6, high complexity inpatient care (6).

CATCHMENT AREA

A defined geographic area within which a facility provides services to the population.

EMERGENCY CAESAREAN SECTION CAPABILITY

A facility with the workforce, equipment and physical capability to perform 24/7 onsite emergency caesarean section surgery.

COPYRIGHT INFORMATION

This document is intended for sharing. Users are free to copy and redistribute the material in any medium or format.

Suggested citation:

Longman J, Pilcher J, Morgan G, Rolfe M, Donoghue DA, Kildea S, Kruske S, Grzybowski S, Kornelsen J, Oats J, Barclay L. (2015) ARBI Toolkit: A resource for planning maternity services in rural and remote Australia. University Centre for Rural Health North Coast, Lismore.

Photographic image "Australia" by Alex Fan Moniz. Used with permission.

Health Service Planning Diagram reproduced with permission

© Health Policy 2009

Research funded by National Health and Medical Research Council

For further information please contact:

Professor Lesley Barclay AO

Chief Investigator, Australian Rural Birth Index Project

University Centre for Rural Health North Coast

Email: lesley.barclay@sydney.edu.au

Phone: 02 6620 7570

ISBN: 978-0-646-94331-2