

## *Original Paper*

# Breast Screen Service Characteristics as a Measure of Accessibility

Deborah van Gaans<sup>1\*</sup>, Neil Coffee<sup>2</sup>, Mark Daniel<sup>2</sup> & David Roder<sup>3</sup>

<sup>1</sup> Australian Centre for Precision Health, South Australia Cancer Research Institute, University of South Australia, Adelaide, South Australia, Australia

<sup>2</sup> Centre for Research and Action in Public Health (CeRAPH), UC Health Research Institute, University of Canberra, Australia

<sup>3</sup> Cancer Epidemiology and Population Health, Australian Centre of Precision Health, School of Health Sciences, University of South Australia, Adelaide, South Australia, Australia

\* Deborah van Gaans, Australian Centre for Precision Health, South Australia Cancer Research Institute, GPO Box 2471, University of South Australia, Adelaide, South Australia, Australia

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### **Abstract**

*Breast Screen Australia is a national breast cancer screening program which aims to reduce illness and death from breast cancer through early detection using mammography. Through this program women aged 40 and over in Australia are eligible for a free mammogram every two years. Around 55% of the target population participate in the program. Understanding the accessibility of breast screen services has the potential to improve the uptake of screening services. Spatial analysis of individual breast screen services: opening hours, disability and accessibility infrastructure, parking and transport data can be used to describe the accessibility of breast screen services. Through highlighting regional accessibility to breast screen services it is possible to identify regions where accessibility to services could be increased to improved equity in health service provision.*

### **Keywords**

*Accessibility, breast screening, health services, equity*

### **1. Introduction**

Breast cancer was the sixth leading cause of death for females, accounting for 2,814 deaths in 2014 in Australia (ABS, 2016). In Australia, free biennial population-based screening is available for women in the target age group of 50 to 69 years, although women aged 40-49 years and over 70 years are also

able to take part (Youl et al., 2011). Roder et al. (2008) found that participation in screening was associated with a breast-cancer mortality reduction of between 30 and 41%, depending on assumptions about screening self-selection bias.

Access to care is often viewed simplistically as distance and availability, however, access masks quality of care, cultural security and the appropriateness of the model of care, type of service and needs of the local community (Bourke et al., n.d.). Focusing solely on ‘area-based’ explanations and responses to rural health problems runs the risk of diverting attention from more fundamental social and structural processes operating in the broader context and misdirecting policy formulation and remedial effort (Smith et al., 2008). In reality, people trade off geographical and nongeographical factors in making decisions about health service use (Cromley & McLafferty, 2002).

## 2. Method

Information on individual breast screen services in New South Wales, Australia was obtained from the Breast Screen New South Wales website (<https://www.breastscreen.nsw.gov.au/>) from 1/2/2017 to 20/2/2017. The location of the service, type of service, opening hours, disability and accessibility, parking and transport data were recorded for each site in an Excel spreadsheet. The address for each service was geolocated using <https://www.gps-coordinates.net/> and the longitude and latitude were recorded in decimal degrees.

Due to the inconsistency in the data under each of the data headings on the internet page, the data was consolidated to make it easier to use. Similar data was grouped under a new category (see Tables 1 to 4) and the new categories were mapped using ESRI ArcMap version 10.5.

**Table 1. Relationship between the Original Disability and Accessibility Data from the New South Wales Breast Screen Website and New Categories**

<b>Original Data</b>	<b>Adjusted to</b>
Assistance necessary to facilitate access	Assistance necessary to facilitate access
Assistance necessary to facilitate access (small single step or similar)	Assistance necessary to facilitate access
Fully accessible	Fully accessible
Fully accessible premises	Fully accessible
Fully accessible premises - lift access only	Fully accessible
Premises are not easily accessible	Premises are not easily accessible
Premises are not easily accessible (lots of stairs)	Premises are not easily accessible
Unknown	Unknown
Wheel chair accessible	Wheel chair accessible

**Table 2. The Relationship between the Original Transport Data from the New South Wales Breast Screen Website and New Categories**

<b>Original data</b>	<b>Adjusted to</b>
Close to bus stop	Close to bus stop
Close to bus stop (10 minute walk)	Close to bus stop
Public trains and buses close by	Close to bus stop
Close to train station	Close to train station
Close to train station (light rail station)	Close to train station
Close to train station. Courtesy bus available from Gosford train station, ask driver for closest stop for BreastScreen NSW	Close to train station
Engadine train station close by (10 mins walk)	Close to train station
Public trains and buses close by	Close to train station
No public transport available	No public transport available
Phone available to call taxi.	Phone to call taxi
Phone to call taxi	Phone to call taxi
Service by community mini-bus or other community transport service	Serviced by community mini-bus or other community transport
Serviced by community mini-bus or other community transport	Serviced by community mini-bus or other community transport
Serviced by community mini-bus or other community transport service (1 day a week)	Serviced by community mini-bus or other community transport
Taxi rank in site or close by	Taxi rank in site or close by
Unknown	Unknown

**Table 3. The Relationship between the Original Parking Data from the New South Wales Breast Screen Website and New Categories**

<b>Original data</b>	<b>Adjusted to</b>
Disability parking available on site	Disability parking available on site
Car park Offsite - no charges apply	Free offsite parking
Carpark offsite - no charges apply	Free offsite parking
General car parking on street - free and timed	Free offsite parking
General parking available on street - free	Free offsite parking
General parking available on street - metered and unmetered	Free offsite parking
Limited free parking available adjacent to the Centre. Enter through the boom gates.	Free offsite parking
All day parking for staff and clients on-site	Free onsite parking

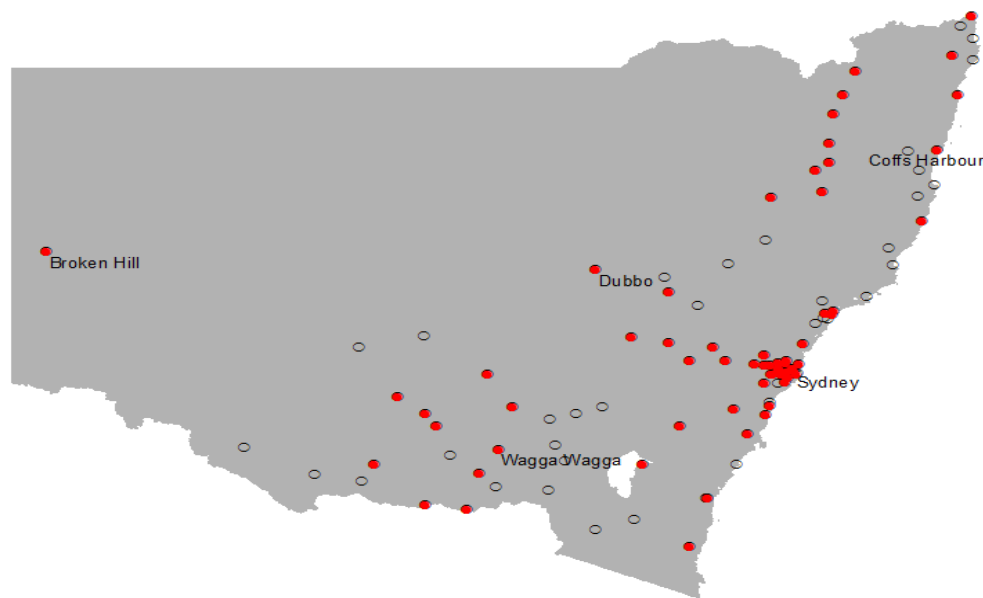
Car park onsite - charges apply (first three hours free)	Free onsite parking
Free parking for clients and staff	Free onsite parking
Free parking via the boom gate, collect token from the Reception to exit	Free onsite parking
General car parking available on site and on street - free	Free onsite parking
General parking available - free	Free onsite parking
General parking available on site - first 3 hours free	Free onsite parking
General parking available on site - free	Free onsite parking
Limited general parking available on site for free	Free onsite parking
No general parking available on site	No general parking available on site
General parking available on street - metered and unmetered	Paid parking offsite
Carpark offsite – charges apply	Paid parking offsite
General parking available on street - metered	Paid parking offsite
General parking available on street - timed	Paid parking offsite
General parking available on site - charges apply	Paid parking onsite
Carpark access via Collins Street	Parking nearby
General parking available on street	Parking nearby
Henty Field Days have zoned parking areas depending on entry access and entrances are accessible by foot only.	Parking nearby
If you park in multi-storey carpark off Racecourse Road take lift to level 5, follow link-way and signs to BreastScreen NSW	Parking nearby
Located next to the Sydney Adventist Hospital.	Parking nearby
Unknown	Unknown

**Table 4. The Relationship between the Original Opening Hours from the New South Wales Breast Screen Website and New Categories**

Category	Definition
No Data	No hours of operation stated on the internet.
Regular	Open week days normal business hours.
Limited	Open limited days or hours week days.
Out of hours	Open outside of normal business hours (9am - 5pm) and / or open on weekends.
Hours of operation vary	No defined hours.
Regular	Open during normal working hours (9am - 5pm) week days.

### 3. Results

Mapping the disability and accessibility categories for each of the breast screen services has highlighted that most services across New South Wales are fully accessible with only the regions around Coffs Harbour, Leichardt and Parramatta revealing that they are not fully accessible (Figure 1) and that the services at Lismore, Coffs Harbour and Leichardt are services where assistance is necessary to facilitate access. Services around Hay and Forster were the only services which were identified as not accessible. The mapping has also identified that no services in the Sydney area were classified as not accessible. However, there is extremely limited wheel chair access across the state with only 2 services stating that they had wheel chair access.



**Figure 1. New South Wales Breast Screen Services which Are Fully Accessible**

Many of the breast screen services stated several transport options on the New South Wales Breast Screen Website (Table 5). The Sydney region is well serviced by transport options as none of the services stated that they did not have public transport available, however the more remote towns of Hay and Coffs Harbour had no public transport. The Sydney region is well serviced by train with many services stating that they are close to a train station. There is good taxi service coverage with a taxi rank in site or close by, and most of the Sydney region had services close to a bus stop. Outside of the Sydney region only a very small number of services stated that they had a taxi rank in site or close by. Outside of the Sydney region very few regional services had a taxi rank in site or close by, or access to train stations or bus stops. However, outside of the Sydney region many of the regional services are serviced by a community mini-bus or other community transport.

**Table 5. New South Wales Breast Screen Services Transport Options**

<b>Name</b>	<b>Close to bus stop</b>	<b>Close to train station</b>	<b>Serviced by community or other transport</b>	<b>mini-bus community</b>	<b>Phone to call taxi</b>	<b>Taxi rank in site or close by</b>	<b>No public transport available</b>	<b>Unknown</b>
Albury	x		x		x			
Argenton	x				x			
Armidale					x			
Auburn	x					x		
Ballina	x				x	x		
Bankstown	x				x	x		
Bathurst	x		x		x			
Bega	x				x	x		
Belmont	x		x		x	x		
Blacktown	x	x				x		
Bondi Junction								x
Boorowa								x
Bowral	x				x			
Bowraville					x		x	
Broken Hill					x			
Campbelltown	x	x			x	x		
Camperdown	x				x	x		
Campsie	x	x			x	x		
Castle Hill	x					x		
Coffs Harbour	x		x		x			
Concord								x
Cooma	x		x		x	x		
Cootamundra	x				x			
Corowra			x		x			
Corrimal	x	x			x			
Croydon	x	x			x			
Dee Why	x				x			
Deepwater					x			
Deniliquin	x				x			
Dorrigo					x		x	
Dubbo			x		x			
East Maitland	x	x	x		x			
Engadine		x						
Finley								

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Glen Innes				X			
Gosford Hospital	X	X		X	X		
Goulburn			X	X			
Griffith			X	X		X	
Gulgong							X
Gundagai							X
Guyra				X			
Harden							X
Hawks Nest			X	X			
Henty							X
Hillston			X			X	
Holbrook							X
Hornsby	X	X					
Jerilderie	X		X	X			
Jindabyne							X
Kahibah	X			X			
Katoomba	X						
Kempsey	X			X			
Kogarah	X	X	X	X	X		
Lake Cargelligo			X			X	
Lakemba							X
Leeton							
Leichhardt	X			X	X		
Lismore	X		X	X	X		
Lithgow	X	X	X	X	X		
Liverpool (Assessment)							X
Liverpool (Screening)	X			X	X		
Lockhart							X
Marrickville	X			X	X		
Merriwa			X	X			
Miranda	X	X		X	X		
Morisset	X	X	X	X			
Moruya	X		X	X	X		
Moruya Mobile							X
Moulamein						X	
Mt Druitt	X						
Mudgee				X			
Murrurundi			X	X			
Murwillumbah	X			X			

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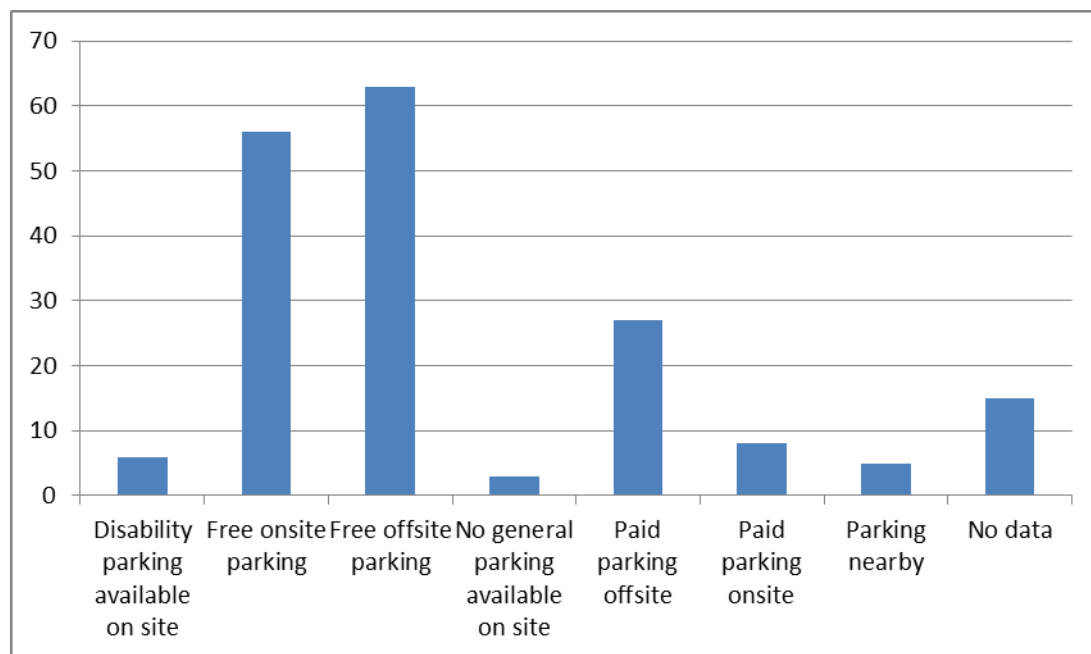
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Narrandera			x			x
Nowra					x	
Oberon			x		x	
Ocean Shores	x				x	
Orange	x		x		x	
Parramatta	x	x				x
Penrith	x	x				x
Port Macquarie	x		x		x	x
Pymont	x	x			x	x
Queanbeyan	x		x		x	
Randwick	x				x	x
Redfern						
Rhodes	x	x			x	x
Roselands						
Rylstone Showground						
Shellharbour	x				x	x
South West Rocks					x	
St Leonards	x	x	x		x	x
Strathfield						
Sydney	x	x			x	x
Tamworth	x				x	
Taree					x	
Temora			x		x	x
Tenterfield					x	
Toronto					x	
Tumbarumba						
Tumut						
Tuncurry			x		x	
Tweed Heads	x		x		x	
Ulladulla						
Uralla					x	
Wagga Wagga			x		x	
Wahroonga	x		x		x	x
Walcha					x	
Waratah	x				x	x
West Wyalong			x		x	x
Windsor	x	x	x		x	x
Wollongong	x	x			x	x
Yamba					x	

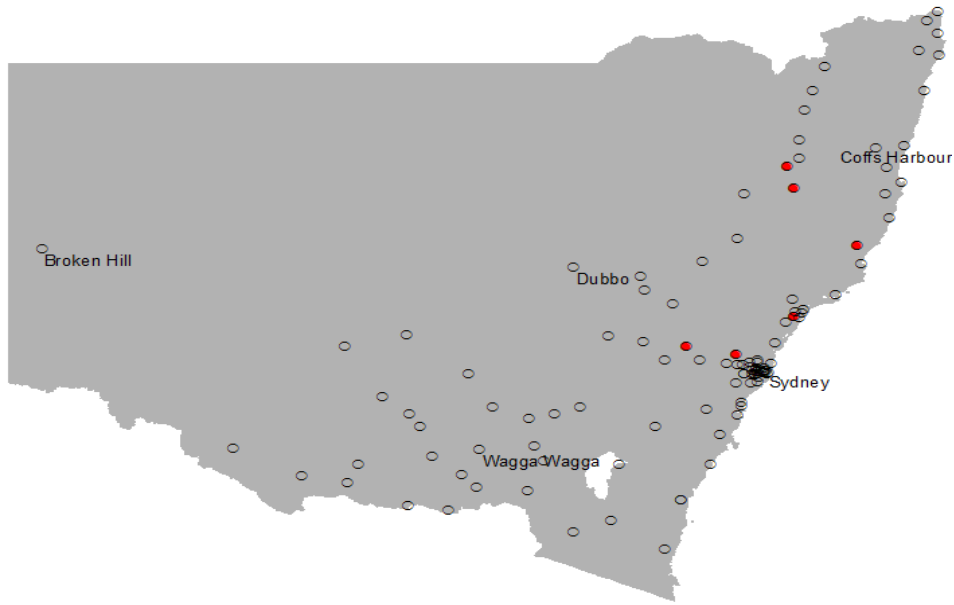
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Through analysing the breast screen services parking options, it was possible to identify that a large proportion of the breast screen services in New South Wales stated that they had free parking with 56 services stating that they had free onsite parking and 63 services stated that they had free offsite parking (Figure 2). There was a fairly evenly distributed number of services in rural New South Wales with free offsite parking. However, in the Sydney region there was no free offsite parking stated around Parramatta and inner Sydney. Breast services stating that they had parking nearby were very few in rural New South Wales, with only services around Wollongong and Newcastle having this type of parking and only one service in the Sydney region. Very few of the rural services stated that they had no general parking available onsite and only one service in the Sydney region. A few scattered rural services have stated that they have paid parking off site with these being located around Lismore, inner Sydney, and the south east of the state. Only a few breast screen services around the Sydney area have stated that they have paid parking onsite. The analysis also revealed that very few services in rural New South Wales stated that they had disability parking onsite and there were none in the Sydney area (Figure 3).

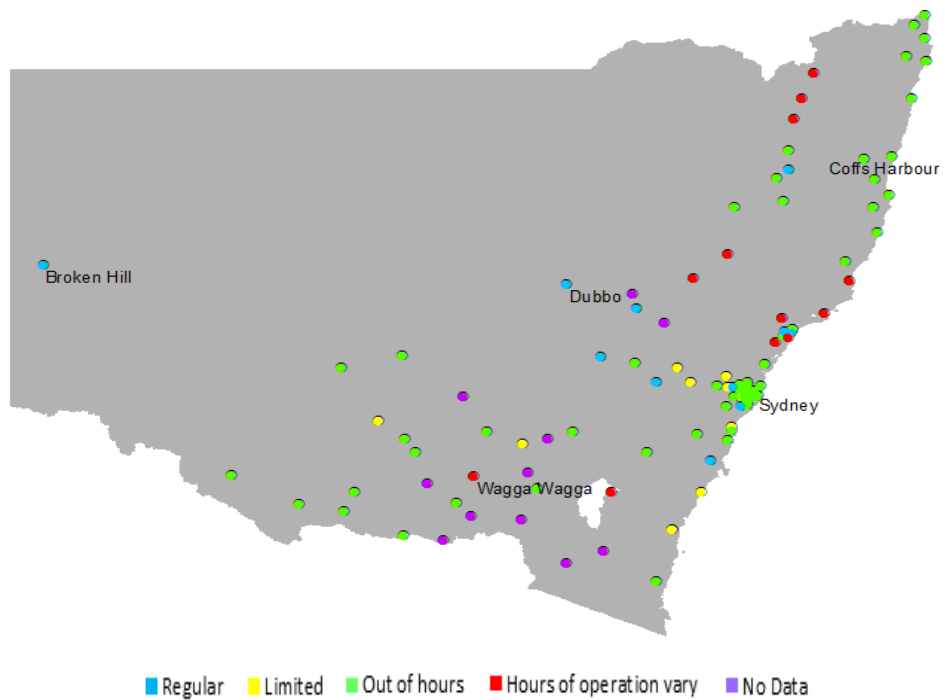


**Figure 2. The Number of New South Wales Breast Screen Services Per Parking Options.**



**Figure 3. New South Wales Breast Screen Services with Disability Parking Onsite**

Mapping the opening hours of each breast screen service revealed that most of services (58.5%) stated hours of operation that were categorised as out of hours (Figure 4). Breast screen services around Glen Innes, Newcastle had varying hours of operation. A few services in the South East of the State had limited operating hours.



**Figure 4. New South Wales Breast Screen Services Operating Hours**

#### **4. Conclusion**

While accessibility is often measured as space-time and is often measured as individuals' continuous trajectories or paths, in reality they are not random in space-time but are subject to a range of personal and social constraints, including the limits on mobility resulting from the available transport technology and the biological need for resting time (Kwan & Weber, 2003). Kwan and Weber (2003) noted that facility opening hours and variable travel speeds at different times of the day and parts of the city are important to individual accessibility. Forer and Huisman (2000) found that time is an integral element of individual accessibility, both in terms of the amount of time available to individuals for carrying out travel and activities, and also to the scheduling of activities throughout the day.

Extracting and spatially analysing the data from the New South Wales Breast Screen Website has highlighted that most services across New South Wales, state that they are fully accessible with only a few services in small regions around Hay and Forester being identified as not fully accessible. The number of services claiming to have wheel chair access is extremely limited and given Australia's ageing population this may need to increase in the future to improve the accessibility for older women. Most breast screen services stated several transport options and there is very good public transport coverage across the state. Where public transport is lacking a community mini-bus or other community transport was available. Most of the breast screen services also stated a variety of parking options. However very few services provided onsite disability parking. Parking definitions on the New South Wales Breast Screen Website are inconsistent which may make it difficult for women to compare services, to find one which would be more accessible for them.

Opening hours were clearly given for each of the breast screen services and after categorising them it can be clearly seen that across New South Wales a majority of services are open outside of normal business hours (9am - 5pm) on week days and / or are open on weekends making them very accessible to a range of women from working professionals to the elderly.

While potential access is a fundamental component of access to health services, it is only one factor that may lead to realized use of health services. Additional characteristics including age, ethnicity, socioeconomic status, beliefs about health and the actual need for care will also determine whether and where an individual seeks care (Bissonnette et al., 2012). Therefore, further analysis into the characteristics of breast screen services and their realized use would be beneficial to identify characteristics of the services which increase accessibility.

#### **5. Limitations**

Not all breast screen services in New South Wales had transport, parking, hours of operation or disability and accessibility information.

## Acknowledgements

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