


These issues present many challenges for the public health workforce in NSW.

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## QUALITY OF REPORTING OF ABORIGINALITY TO THE NSW MIDWIVES DATA COLLECTION

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This article describes a study that used capture–recapture methods to assess the quality of information on Aboriginality reported to the NSW Midwives Data Collection (MDC).

The NSW Aboriginal Health Strategic Plan states that: ‘In order to measure improvements and effectively target funding to programs which will improve the health of Aboriginal people, strategies are required to develop robust performance indicators, improve data collection and improve reporting processes’.<sup>1</sup> Aboriginality is known to be under-reported on Department of Health data collections in NSW, although it is not known to what extent. Improving the quality of information on Aboriginality in health data collections is an important part of improving the overall quality of information on Aboriginal health in NSW.

The MDC is a population-based surveillance system covering all births in NSW public and private hospitals, as well as homebirths. Births in NSW are required to be reported to the MDC under the NSW Public Health Act

1991. The data are used to monitor trends and variations in mortality and morbidity of mothers and newborns, quality of care and the major risk factors for adverse outcomes for mothers and babies. The MDC encompasses all live births and stillbirths of at least 20 weeks gestation or at least 400 grams birth-weight.

### METHODS

The Aboriginality of the mother, rather than the baby, is reported to the MDC, although mother’s Aboriginality is frequently used as a proxy measure for the baby’s Aboriginality. Consequently, maternal Aboriginality was used for this analysis.

Aboriginal or Torres Strait Islander mothers were counted as one group in the MDC up to 1997 and as two separate groups thereafter. We were therefore unable to examine trends in the quality of reporting for both these groups. For ease of reference, in this report ‘Aboriginal’ will be used to refer to both groups combined.

Records of births reported to the MDC were linked to birth registration records of the NSW Registry of Births, Deaths and Marriages for births occurring in the five-year period 1994–98. Records from the two files were matched using a probabilistic linkage software (Automatch). Prior

**TABLE 1****BIRTHS TO ABORIGINAL MOTHERS BY SOURCE OF BIRTH REPORT, YEAR OF BIRTH AND URBAN–RURAL HEALTH AREA OF HOSPITAL, NSW 1994–98**

Urban/Rural locality of hospital/ Year	MDC births No.	RBDM births No.	Births reported to both MDC/RBDM No.	Estimated Aboriginal births No.	Estimated Aboriginal births reported %	95% confidence interval of estimated births reported
<b>Urban</b>						
1994	553	665	268	1371	40.3	37.7–42.9
1995	642	742	345	1380	46.5	43.9–49.2
1996	593	794	338	1392	42.6	40.0–45.2
1997	658	1066	441	1590	41.4	39.0–43.8
1998	785	1053	495	1669	47.0	44.6–49.4
<b>Rural</b>						
1994	990	747	561	1318	75.1	72.8–77.4
1995	1117	887	689	1438	77.7	75.5–79.8
1996	1131	941	679	1567	72.2	70.0–74.4
1997	1196	1011	789	1532	78.0	76.0–80.1
1998	1280	901	771	1496	85.6	83.8–87.4
<b>NSW</b>						
1994	1543	1412	829	2628	58.7	56.8–60.6
1995	1759	1629	1034	2771	63.5	61.7–65.3
1996	1724	1735	1017	2941	58.6	56.8–60.4
1997	1854	2077	1230	3130	59.2	57.5–60.9
1998	2065	1954	1266	3187	64.8	63.1–66.5

Note: 'Urban' and 'Rural' refer to urban or rural Health Area of Hospital as reported to the MDC. Urban hospitals include those in the following health areas: Central Sydney, Northern Sydney, Western Sydney, Wentworth, South Western Sydney, South Eastern Sydney, Central Coast, Hunter and Illawarra. Home births are excluded.

Source: Linked NSW Midwives Data Collection and Registry of Births, Deaths and Marriages birth registration data.

to matching, residential address and mothers' name were standardised using a standardisation software (Autostan). The overall linkage rate was 96.6 per cent of MDC records (97.8 per cent of birth registration records).

Capture–recapture methods are used to adjust estimates of counts to reflect ascertainment level or undercounting. Capture–recapture was carried out using the method described by McCarty et al.<sup>2</sup> Analysis was carried out using SAS version 6.12. Analyses concerning geographic location were based on health area of hospital of birth as reported to the MDC. Home births were excluded from the analysis.

## RESULTS

The estimated percentage of births to Aboriginal mothers in NSW, which were reported as Aboriginal in the MDC, rose from 58.7 to 64.8 per cent over the five-year period 1994–98 (Table 1, Figure 1). Reporting was better in rural hospitals than urban hospitals: in 1998 47.0 per cent of births to Aboriginal mothers in urban hospitals were reported compared to 85.6 per cent in rural hospitals, though there was a trend towards improved reporting in both urban and rural hospitals.

In 1998, the highest ascertainment rate was in hospitals in the New England Area (93.3 per cent) and the lowest in hospitals in the Northern Sydney Area (15.8 per cent) (Table 2). The number of reported births to Aboriginal mothers in Northern Sydney Area hospitals was small for both the MDC and the Registry of Births, Deaths and Marriages and the estimate of total births for this Area is not very reliable, as indicated by the wide confidence intervals (8.7–23.0 per cent).

Of the nine urban health areas, only three (Central Sydney, Wentworth, and Illawarra) had ascertainment rates of maternal Aboriginality of more than 50 per cent in 1998. All rural areas had ascertainment rates of more than 70 per cent.

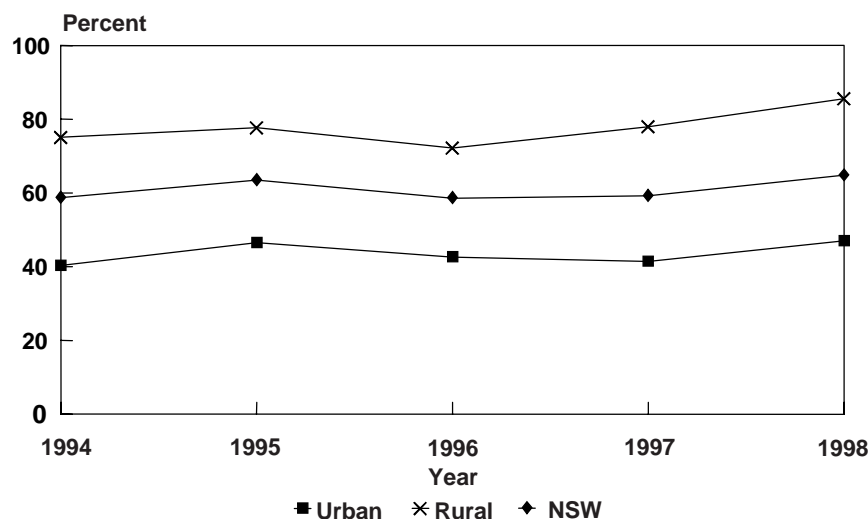
## DISCUSSION

In using capture–recapture methods, three conditions need to be met:

- the two systems should be independent;
- all true matches and only matches should be identified;
- all cases identified by the two or more surveillance systems should be true cases that occurred in the

**FIGURE 1**

**BIRTHS TO ABORIGINAL MOTHERS BY YEAR OF BIRTH AND URBAN-RURAL HEALTH AREA OF HOSPITAL, NSW 1994-98**



Note: Home births excluded.

Source: Linked NSW Midwives Data Collection and Registry of Births, Deaths and Marriages birth registration data.

population under investigation and within the appropriate time period.<sup>3</sup>

These three conditions are reasonably well met in this study. First, the two sources of data are independent. Second, the data linkage was carried out in such a way that the likelihood of obtaining true matches was maximised. For the third criteria, it is not known how many mothers in each data collection were incorrectly identified as Aboriginal. It is more likely that mothers would be incorrectly identified as non-Aboriginal than Aboriginal in NSW. If some mothers were incorrectly reported as Aboriginal in either data collection, this study would result in a larger estimate of total births to Aboriginal mothers than is actually the case.

A limitation of this study is that it is restricted to an estimation of the number of births to Aboriginal mothers. Paternal Aboriginality also influences the baby's Aboriginality, and when this is not taken into account the number of Aboriginal babies born in NSW is further under-enumerated. For 1998, the linked data set created for this study showed a further 980 births where the father was reported as Aboriginal and the mother was reported as non-Aboriginal both on the MDC and on the birth registration record. Assuming the reporting of paternal Aboriginality on the birth registration record is correct, these 980 births could be added to the 3,187 births to Aboriginal mothers in 1998, estimated by this study, to

give an estimated total of 4,167 births of Aboriginal babies born in NSW in 1998. This is 4.8 per cent of all births in NSW in 1998 and double the 2.4 per cent of births to Aboriginal mothers reported to the MDC in 1998. As for maternal Aboriginality, it is likely that paternal Aboriginality is also under-reported and the true number of Aboriginal babies may be even higher.

In summary, while improvements have been made in the reporting of maternal Aboriginality to the MDC, resulting in a rise from 58.7 to 64.8 per cent of births to Aboriginal mothers being reported as Aboriginal over the five years 1994-98, there is still a need for substantial improvement in reporting of maternal Aboriginality, particularly in urban hospitals. Also, consideration could be given as to whether information on paternal Aboriginality should be obtained from birth registration records on a regular basis and included in reports of the numbers of Aboriginal babies.

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**TABLE 2****BIRTHS TO ABORIGINAL MOTHERS BY SOURCE OF BIRTH REPORT, YEAR AND HEALTH AREA OF BIRTH HOSPITAL, NSW 1994–98**

Health Area of hospital/ Year	MDC births  No.	RBDM births  No.	Births reported to both MDC/RBDM No.	Estimated Aboriginal births  No.	Estimated Aboriginal births reported %	95% confidence interval of estimated births reported
<b>Central Sydney</b>						
1994	123	84	65	159	77.5	71.0–84.0
1995	113	78	63	140	80.9	74.4–87.4
1996	84	70	51	115	73.0	64.9–81.1
1997	86	101	56	155	55.6	47.8–63.4
1998	73	90	51	129	56.8	48.2–65.4
<b>Northern Sydney</b>						
1994	19	23	11	39	48.7	33.0–64.4
1995	13	24	7	43	30.4	16.6–44.2
1996	13	27	8	43	30.5	16.7–44.4
1997	8	35	6	45	17.7	6.6–28.8
1998	16	29	4	101	15.8	8.7–23.0
<b>Western Sydney</b>						
1994	77	93	32	221	34.8	28.5–41.1
1995	85	102	36	238	35.7	29.6–41.7
1996	67	130	42	206	32.5	26.1–38.9
1997	76	144	48	227	33.5	27.4–39.6
1998	127	162	80	257	49.5	43.4–55.6
<b>Wentworth</b>						
1994	66	73	31	154	42.9	35.1–50.7
1995	82	88	44	163	50.3	42.6–57.9
1996	84	97	40	202	41.5	34.8–48.3
1997	88	140	55	223	39.4	33.0–45.9
1998	131	146	80	239	54.9	48.6–61.2
<b>South Western</b>						
1994	76	120	25	357	21.3	17.0–25.5
1995	88	141	52	237	37.1	30.9–43.2
1996	91	142	48	267	34.0	28.3–39.7
1997	84	181	47	321	26.1	21.3–30.9
1998	112	208	63	368	30.4	25.7–35.1
<b>Central Coast</b>						
1994	15	34	9	55	27.3	15.5–39.0
1995	20	36	12	59	34.0	21.9–46.1
1996	27	48	21	61	44.0	31.6–56.4
1997	36	58	24	86	41.7	31.3–52.1
1998	42	55	24	95	44.1	34.1–54.0
<b>Hunter</b>						
1994	67	101	32	209	32.0	25.7–38.4
1995	94	127	52	228	41.1	34.8–47.5
1996	101	132	56	237	42.6	36.3–48.9
1997	123	183	92	244	50.3	44.1–56.6
1998	111	162	78	230	48.2	41.8–54.7
<b>Illawarra</b>						
1994	81	78	45	140	57.9	49.7–66.1
1995	112	83	60	155	72.4	65.4–79.5
1996	101	86	59	147	68.8	61.3–76.2
1997	124	122	86	176	70.6	63.8–77.3
1998	113	109	80	154	73.5	66.5–80.4
<b>South Eastern Sydney</b>						
1994	29	59	18	94	30.9	21.6–40.3
1995	35	63	19	114	30.6	22.2–39.1
1996	25	62	13	116	21.6	14.1–29.0
1997	33	102	27	124	26.6	18.8–34.4
1998	60	92	35	157	38.3	30.7–45.9

Note: Home births excluded.

Source: Linked NSW Midwives Data Collection and Registry of Births, Deaths and Marriages birth registration data.

TABLE 2

**BIRTHS TO ABORIGINAL MOTHERS BY SOURCE OF BIRTH REPORT, YEAR AND HEALTH AREA OF BIRTH HOSPITAL, NSW 1994–98** *continued*

Health Area of hospital/ Year	MDC births	RBDM births	Births reported to both MDC/RBDM	Estimated Aboriginal births	Estimated Aboriginal births reported %	95% confidence interval of estimated births reported
No.	No.	No.	No.	No.		
<b>Northern Rivers</b>						
1994	122	111	74	183	66.8	60.0–73.6
1995	165	120	95	208	79.2	73.7–84.7
1996	143	104	76	195	73.2	67.0–79.4
1997	160	151	111	218	73.6	67.7–79.4
1998	180	131	102	231	77.9	72.6–83.3
<b>Mid North Coast</b>						
1994	141	108	77	197	71.4	65.1–77.7
1995	158	121	92	208	76.1	70.3–81.9
1996	159	135	94	228	69.7	63.8–75.7
1997	174	148	104	247	70.4	64.7–76.0
1998	168	99	82	203	82.9	77.7–88.1
<b>New England</b>						
1994	199	154	122	251	79.3	74.3–84.3
1995	212	163	144	240	88.4	84.3–92.4
1996	246	178	149	294	83.7	79.5–88.0
1997	267	227	197	308	86.8	83.0–90.6
1998	283	208	194	303	93.3	90.5–96.1
<b>Macquarie</b>						
1994	193	143	117	236	81.9	76.9–86.8
1995	185	159	114	258	71.8	66.3–77.3
1996	238	210	149	335	71.0	66.1–75.9
1997	261	184	157	306	85.4	81.4–89.3
1998	257	181	164	284	90.6	87.2–94.0
<b>Mid Western</b>						
1994	100	74	53	139	71.8	64.3–79.3
1995	102	90	64	143	71.2	63.8–78.6
1996	103	111	68	168	61.4	54.0–68.7
1997	93	93	66	131	71.1	63.3–78.8
1998	106	91	67	144	73.7	66.5–80.9
<b>Far West</b>						
1994	93	56	51	102	91.1	85.6–96.7
1995	122	77	73	129	94.8	91.0–98.7
1996	76	46	41	85	89.2	82.7–95.8
1997	77	47	39	93	83.2	75.5–90.8
1998	90	52	46	102	88.6	82.4–94.8
<b>Greater Murray</b>						
1994	101	72	46	157	64.2	56.7–71.6
1995	107	107	69	166	64.6	57.3–71.9
1996	128	121	83	186	68.7	62.0–75.3
1997	113	118	86	155	72.9	65.9–79.9
1998	132	101	86	155	85.2	79.6–90.8
<b>Southern</b>						
1994	41	29	21	56	72.9	61.2–84.5
1995	66	50	38	87	76.2	67.2–85.2
1996	38	36	19	71	53.4	41.8–65.0
1997	51	43	29	75	67.8	57.2–78.3
1998	64	38	30	81	79.2	70.4–88.1

Note: Home births excluded.

Source: Linked NSW Midwives Data Collection and Registry of Births, Deaths and Marriages birth registration data.