Validation Study
of the Western Australian
Midwives' Notification System
1992

Vivien Gee BAppSc.(Nursing Admin), RN, RM, CHN
Vivienne Dawes MBChB, FAFPHM
Epidemiology and Health Statistics

Perth

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Health Department of Western Australia

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1. INTRODUCTION

The Western Australian Midwives' Notification System collects information about all births in the State. This surveillance system is a statutory requirement under the Health Act, and has been in operation since 1975. Under the legislation, the registered midwife in attendance is required to provide information in the prescribed form for all births. Changes are made to the form from time to time and a copy of the form in use in 1992 is given in Appendix 1. The form is to be completed for all births, liveborn or stillborn, of at least 20 weeks gestation or 400 grams birthweight. For multiple births, a separate form is required for each baby.

Guidelines[1] for completion of the form are provided to all hospital maternity units and to midwives in private practice. The Guidelines are designed to assist the midwives when filling in the form.

There are approximately 25,000 births annually at present in the State. For each birth, the Midwives' Notification System collects information on maternal demographics, previous and current pregnancies, medical and obstetric complications, labour and delivery and infant characteristics. All the forms received by the System are checked for omissions and possible errors. When it is considered necessary, the information is checked with the midwife provider prior to data entry. A number of checking procedures are also carried out during the establishment of the computerised data base. Despite all these checks in the System, it is still possible for errors to occur. In view of this, it is important that a validation study of the System is carried out periodically.

The purpose of the validation study was twofold. First, to provide information on the reliability of the data for the users of the System. Second, to indicate any area of the System where errors are occurring and where improvements can be made in the future. The data from the System are now used so widely and for so many purposes that it is essential for the data base to be as accurate as possible.

Two validation studies of the System had been carried out previously, in 1977[2] and in 1987[3]. The present study was carried out in 1993-94 and aimed to validate the 1992 data.

The study was carried out by comparing the data for a sample of cases with the information recorded in the hospital medical record. Thus, the hospital medical record was regarded as the gold standard for the purposes of this study.

2. METHODS

The validation study was undertaken by the Co-ordinator of the Midwives' Notification System. The Co-ordinator is an experienced registered midwife.

In 1992 there were 25,258 births to 24,918 mothers in Western Australia.. A 2% sample was selected, yielding a sample size of 508 births. The study was restricted to births in hospital, and thus planned homebirths (107 babies) and births before arrival at hospital (77 babies) were excluded from consideration.

2.1 Sample Selection

The method of sample selection was different for metropolitan and country hospitals. For metropolitan hospitals, the births were listed in order of date of birth and a systematic sample of every fiftieth birth was selected. This method was preferred to a random sampling method in order to allow for midwife staff turnover during the year. However, it should be noted that the method led to under-representation of multiple births as it was never possible for more than one birth among a set of multiple births to be selected into the sample.

The method of selection of cases for the country hospitals was different because it was not feasible to visit all country hospitals to collect the data for the validation study. It was decided to visit all seven country regional hospitals and both country private hospitals. Between them, these nine hospitals conducted 53% of births in the country. The remaining country births occurred in 62 different country hospitals, and in many of these hospitals there were less than 20 births in the year. Nine of the 62 small country hospitals were selected for inclusion in the study on the basis of accessibility, including proximity to the other country hospitals being visited. A 2% sample from the 62 small country hospitals would have yielded 59 births. Thus, 59 births were selected from the nine small country hospitals to maintain proportional representation by hospital category. Table 1 provides a listing of the study sample by hospital category. A total of 34 hospitals were included in the study sample.

2.2 Conduct of the Study

A letter was written to the Administrator of each of the 34 hospitals to inform them of the study and to request access to the medical records. All the hospitals agreed to participate in the study. The hospitals were visited during the last three months of 1993.

A blank Midwives' Form (Notification of Case Attended Form 2) was completed for each birth using information recorded in the mother's medical record. In the majority of hospitals, most of the information needed was found on the obstetric summary sheet (MR 71) or the neonatal history and assessment sheet (MR 75). Where information was not available in the medical record the item was marked as missing. When all the validation forms had been completed, they were coded by one of the coding clerks in the usual way and then entered onto a separate data base.

2.3 Analysis of the Study

For each of the cases, the information obtained from the medical record was compared with the information stored on the 1992 Midwives' Notification System data file. The number of variables compared for each case was 42. There were a few variables that were not included in the study and these were maiden name (which is an optional item), telephone number (which is

TABLE 1:
1992 VALIDATION STUDY: SELECTION OF STUDY SAMPLE

Hospital category	Number of births in 1992	Sample for validation
Metropolitan teaching (1 hospital)	4409	89
Metropolitan departmental (8 hospitals)	7557	153
Metropolitan private (7 hospitals)	6771	136
Country regional (7 hospitals)	2801	60
Country private (2 hospitals)	544	11
Country other (62 hospitals in total; 59 births selected from 1218 births in 9 hospitals)	2992	59
Homebirths BBA's	107 77	- -
TOTAL	25258	508

not computed), birth defects (which are not computed), adoption (which is not computed) and neonatal special care days (definitions not clear).

For each variable in the study the percentage correct was calculated, ie, the percentage of cases where the value of the variable on the data base was the same as the value derived from the medical record. For selected dichotomous variables the sensitivity, specificity, positive predictive value and negative predictive value were also calculated as follows:

Status from midwives' data file	Status from medical record		Total
	Positive	Negative	
Positive	a	b	a+b
Negative	c	d	c+d
Total	a+c	b+d	a+b+c+d

where a = true positives, ie, the number of cases with the characteristic that were correctly identified in the data base;

b = false positives, ie, the number of cases without the characteristic that were identified as having the condition in the data base;

c = false negatives, ie, the number of cases with the characteristic that were identified in the data base as not having the condition; and

d = true negatives, ie, the number of cases without the characteristic that were correctly identified in the data base.

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and   sensitivity $= \dfrac{a}{a+c}$

specificity $= \dfrac{d}{b+d}$

positive predictive value $= \dfrac{a}{a+b}$

negative predictive value $= \dfrac{d}{c+d}$

The sensitivity is the proportion of cases with a characteristic that are correctly classified as having it.

The specificity is the proportion of cases without the characteristic that are correctly classified as not having it.

The positive predictive value is the proportion of cases classified as having a characteristic that truly do have it.

The negative predictive value is the proportion of cases classified as not having a characteristic that truly do not have it.

3.   RESULTS

For all 508 births selected, the medical records were found to be available within the hospitals.

Selected characteristics of these 508 births (as recorded on the Midwives' data base) are given in Table 2, and compared with all births in the State. It can be seen that the sample is representative of the whole except with regard to multiple births. Multiple births are under represented in the validation study sample due to the method of sample selection.

TABLE 2:
1992 VALIDATION STUDY: SAMPLE PROFILE

Variable	Validation Study Sample (N=508) %	Western Australia (N=25,258) %
ONSET OF LABOUR:		
Spontaneous	40.4	36.8
Spontaneous and Augmented	22.4	25.2
Induced	25.2	26.2
No labour	12.0	11.8
TYPE OF DELIVERY:		
Normal	63.0	63.6
Vacuum	8.9	8.5
Forceps	8.7	7.4
Elective Caesarean	10.6	10.4
Emergency Caesarean	7.9	9.3
Breech	1.0	0.9
SEX:		
Male	52.8	51.6
Female	47.2	48.4
PLURALITY:		
Singleton	98.6	97.3
Multiple	1.4	2.7
CONDITION AT BIRTH:		
Liveborn	99.6	99.5
Stillborn	0.4	0.5

Table 3 presents the results of the validation of the mother's demographic information. On the whole these items were recorded well, with the percentage correct being in excess of 96% for all items.

Hospital
This item was correctly recorded in all cases.

Surname
This item was correctly recorded in all cases.

Forenames
Apart from minor differences in the spelling of a name in 17 cases (eg Sharron instead of Sharon), there were two cases where a different forename was given. In both these cases, however, the forename given was the second forename rather than the first forename.

Address
Apart from minor differences in spelling and punctuation, there were four cases where the address was different.

Postcode
There were four cases where the postcode was different although in two of these cases the postcode in the medical record was out of date and the postcode on the Midwives' System was correct.

Unit record number
In four cases this was wrongly recorded.

Mother's birth date
In two cases this was wrongly recorded, and in both of these cases just one digit of the birth date was wrong.

Mother's current conjugal state
This was wrongly recorded in 17 cases. The most common error occurred in 10 cases and was a recording of single status in the medical record and married/defacto in the Midwives' System.

Mother's race
Seven cases had the race wrongly recorded.

Mother's height
In 37 cases the height was not recorded in the medical record and therefore could not be validated. In 17 cases, the height was recorded wrongly on the Midwives' System. Most of the heights were within a few centimetres of the correct value, the maximum difference being 10 cm.

TABLE 3:
1992 VALIDATION STUDY: DEMOGRAPHIC VARIABLES

Variable	Number of cases correct	Number of cases incorrect	Variable not recorded in hospital record	Percentage correct[1]
Hospital	508	-	-	100.0
Surname	508	-	-	100.0
Forenames	506	2	-	99.6
Address	504	4	-	99.2
Postcode	504	4	-	99.2
Unit record number	504	4	-	99.2
Mother's birth date	506	2	-	99.6
Current conjugal state	491	17	-	96.7
Mother's race	501	7	-	98.6
Mother's height	454	17	37	96.4

[1] Excludes cases which could not be validated because the variable was not recorded in the hospital medical record.

Tables 4.1 and 4.2 give the results for the pregnancy variables. Table 4.1 gives the percentages correct for these variables.

Number of previous pregnancies

This number was incorrect in 24 cases. In 20 of these cases, the number given in the Midwives' System was higher than that in the medical record. Most of these cases involved a difference of one pregnancy, and it appeared that the index pregnancy had been added to the previous pregnancies. In one case, a mother had five previous pregnancies recorded in the medical record and nine in the Midwives' System.

Number of previous children now living

This item was recorded incorrectly in three cases, each giving a difference of one or two.

Number of previous children born alive now dead

This item was recorded incorrectly in three cases, each giving a difference of one or two.

Number of previous children stillborn

This item was incorrectly recorded in two cases, and in both the mother was recorded as having had one stillbirth previously while the medical record showed no stillbirths.

Date of last menstrual period (LMP)

The usual practice in the Midwives' System to handle this item is as follows:
(i)   if a day, month and year are given for the LMP (eg 08/06/92) then these are entered into the System;
(ii)   if a month and a year are given but no day, eg ??/06/92, then the 15th of the month is inserted by the coding clerks, eg to give 15/06/92, and this is entered into the System:
(iii) if the day and month are unknown, then the LMP is entered as 'unknown'

The same procedure was followed for the data collected from the medical records for the validation study. The LMP was found to be correctly recorded in 476 (93.7%) cases. There were no cases with an unknown LMP. The LMP was recorded incorrectly in 32 cases. In one case the month and year were wrongly recorded, in the other cases the day and/or the month were wrongly recorded. In some cases it appeared that a clerical error had occurred, whilst in others this could not have explained the discrepancy. The discrepancies varied from one day to 86 days, with an average of 18 days.

Certainty of date of last menstrual period

This item was correctly recorded in 482 (94.9%) cases and incorrectly in 26 cases. In 16 of the incorrectly recorded cases, the date was recorded as certain when it was uncertain.

Expected due date

This date was incorrectly recorded in 10 cases, the discrepancies ranging from 1 to 83 days with an average of 19 days.

Complications of pregnancy

For this data item there are seven complications listed with corresponding tick boxes, and space for writing in any additional complications. These additional complications are coded according to ICD-9-CM codes. If no complications are present then this item should be left blank. If there are several complications of pregnancy, then these should all be noted in the appropriate places. The specified complications with tick boxes were recorded reasonably well, with the percentages correct being 96.1% or above and the sensitivities being 0.59 or above. In 88.6% of cases all seven specified complications (ie. A to G) were recorded completely correctly. It should be noted that the prevalence of all the complications is low, and thus the estimates of sensitivity and positive predictive value may be inaccurate. Among the 'other' complications, 452 (89.0%) of cases were recorded completely correctly: this number included 51 cases with one or more 'other' complications (true positives) and 401

TABLE 4.1:
1992 VALIDATION STUDY: PREGNANCY VARIABLES

Variable	Number of cases correct	Number of cases incorrect	Variable not recorded in hospital record	Percentage correct
No. of previous pregnancies	484	24	-	95.3
No. of previous children now living	505	3	-	99.4
No. of previous children born alive now dead	505	3	-	99.4
No. of previous children stillborn	506	2	-	99.6
Date of LMP	476	32	-	93.7
Certainty of LMP	482	26	-	94.9
Expected due date	498	10	-	98.0
Complications of pregnancy				
A-G all correct	450	58	-	88.6
A Threatened abortion	492	16	-	96.9
B Urinary tract infection	500	8	-	98.4
C Pre-eclampsia	488	20	-	96.1
D APH - placenta praevia	506	2	-	99.6
E APH - abruptio	506	2	-	99.6
F APH - other	503	5	-	99.0
G Premature rupture of membranes	497	11	-	97.8
H Other				
- all correct	452[1]	56	-	89.0
- all hypertension	491	17	-	96.7
- gestational diabetes	504	4	-	99.2
A-H all correct	416	92	-	81.9
Medical conditions				
- completely correct	464[2]	44	-	91.3
- asthma	502	6	-	98.8

[1] Includes 51 cases with complication(s) correctly recorded (ie. 51 true positive cases)

[2] Includes 77 cases with medical condition(s) correctly recorded (ie. 77 true positive cases).

1992 VALIDATION STUDY: SENSITIVITY AND SPECIFICITY OF COMPLICATIONS OF PREGNANCY AND MEDICAL CONDITIONS

Variable	True positives	True negatives	False positives	False negatives	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Complications of pregnancy:								
A Threatened abortion	16	476	5	11	0.59	0.98	0.76	0.97
B Urinary tract infection	20	480	2	6	0.76	0.99	0.91	0.98
C Pre-eclampsia	21	467	9	11	0.65	0.98	0.70	0.97
D APH - placenta praevia	2	504	1	1	0.66	0.99	0.67	0.99
E APH - abruptio	4	502	-	2	0.66	1.00	1.00	0.99
F APH - other	12	491	3	2	0.85	0.99	0.80	0.99
G Prem rupture membranes	12	485	7	4	0.75	0.98	0.63	0.99
H Other								
- all hypertension	8	483	15	2	0.80	0.96	0.34	0.99
- gestational diabetes	9	495	4	-	1.00	0.99	0.69	1.00
Medical conditions								
Asthma	38	464	-	6	0.86	1.00	1.00	0.98

cases with no complications (true negatives). There were 56 cases in which an error was made in this field. The 'other' complications field contains a large number of conditions, all of which are of low prevalence and some of which are extremely rare. As it was not feasible to present data for all these conditions separately in this Report, two of the more prevalent were chosen. The first was hypertension other than pre-eclampsia (pre-eclampsia has a separate tick box). For hypertension, there were eight true positive cases and 15 false positives; the sensitivity was 0.80 and the positive predictive value was 0.34. An examination of the 15 false positive cases indicated that in the medical record nine were noted as having pre-eclampsia rather than 'other' hypertension. The second 'other' complication chosen was gestational diabetes: there were nine true positives and four false positives, a sensitivity of 1.00 and a positive predictive value of 0.69. The whole complications of pregnancy item was completely correct in 81.9% of cases.

Medical conditions

This item consists of a space for writing in any pre-existing medical conditions relevant to the pregnancy. These conditions are coded according to ICD-9-CM codes and there is room for two such codes to be entered into the data base. This item was recorded completely correctly in 452 (89.0%) cases, including 77 true positive cases. Asthma is the most common medical condition. In the validation study there were 38 true positive cases of asthma, no false positives and 6 false negatives giving a sensitivity of 0.86 and a positive predictive value of 1.00.

TABLE 5.1:
1992 VALIDATION STUDY: LABOUR AND DELIVERY VARIABLES

Variable	Number of cases correct	Number of cases incorrect	Variable not recorded in hospital record	Percentage correct
Onset of labour	504	4	-	99.2
Augmentation	490	18	-	96.5
Presentation of fetus	506	2	-	99.6
Type of delivery				
Completely correct	497	11	-	97.8
Normal	506	2	-	99.6
Vacuum - successful	505	3	-	99.4
Vacuum - failed	508	-	-	100.0
Forceps - successful	504	4	-	99.2
Forceps - failed	508	-	-	100.0
Breech manoeuvre	508	-	-	100.0
Caesarean - elective	502	6	-	98.8
Caesarean - emergency	502	6	-	98.8
Anaesthesia/analgesia				
Completely correct	487	21	-	95.9
None	500	8	-	98.4
General anaesthesia	505	3	-	99.4
Epidural/spinal	506	2	-	99.6
Other	491	17	-	96.7
Hours of labour	490	18	-	96.5
Complications of labour and delivery				
A-E all correct	447	61	-	88.0
A Precipitate delivery	499	9	-	98.2
B Fetal distress	472	36	-	92.9
C Prolapsed cord	507	1	-	99.8
D Cord tight around neck	496	12	-	97.6
E Cephalophelvic disproportion	498	10	-	98.0
F Other				
- all correct	369[1]	139	-	72.6
- Postpartum haemorrhage	499	9	-	98.2
- Previous uterine surgery	502	6	-	98.8
A-F all correct	329	179	-	64.8

[1] Includes 128 cases with complication(s) correctly recorded (ie 128 true positives).

TABLE 5.2:

1992 VALIDATION STUDY: SENSITIVITY AND SPECIFICITY OF TYPE OF DELIVERY, ANAESTHESIA/ANALGESIA AND COMPLICATIONS OF LABOUR AND DELIVERY

Variable	True positives	True negatives	False positives	False negatives	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Type of delivery								
Normal	319	187	1	1	0.99	0.99	0.99	0.99
Vacuum - successful	43	462	1	2	0.95	0.99	0.97	0.99
Vacuum - failed	-	508	-	-	-	1.00	-	1.00
Forceps - successful	44	460	3	1	0.97	0.99	0.93	0.99
Forceps - failed	-	508	-	-	-	1.00	-	1.00
Breech manoeuvre	-	508	-	-	-	1.00	-	1.00
Caesarean - elective	54	448	-	6	0.90	1.00	1.00	0.98
Caesarean - emergency	34	468	6	-	1.00	0.98	0.85	1.00
Anaesthesia/analgesia								
None	97	403	5	3	0.97	0.98	0.95	0.99
General	17	488	2	1	0.94	0.99	0.89	0.99
Epidural/spinal	170	336	2	-	1.00	0.99	0.98	1.00
Other	244	247	6	11	0.95	0.97	0.97	0.95
Complications of labour and delivery								
A Precipitate delivery	16	483	8	1	0.94	0.98	0.66	0.99
B Fetal distress	57	415	30	6	0.90	0.93	0.65	0.98
C Prolapsed cord	-	507	1	-	-	0.99	0.00	1.00
D Cord tight around neck	31	465	11	1	0.96	0.97	0.73	0.99
E Cephalopelvic disproportion	12	486	6	4	0.75	0.98	0.66	0.99
F Other								
- Postpartum haemorrhage	24	475	3	6	0.80	0.99	0.89	0.98
- Previous uterine surgery	37	465	1	5	0.88	0.99	0.97	0.98

Tables 5.1 and 5.2 provide the results for the labour and delivery variables.

Onset of labour
There were only four cases where this item was incorrectly recorded. Two of the cases had a spontaneous onset of labour that was recorded as induced and two did not have a spontaneous onset but were recorded as such.

Augmentation of labour
This item was correctly recorded in 96.5% of cases. In the 18 incorrectly recorded, nine were wrongly recorded as augmented and nine were wrongly recorded as not augmented.

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Presentation of fetus

In only two cases was this item incorrectly recorded: one case was recorded as a breech and was a vertex and the other was recorded as a vertex and was a breech.

Type of delivery

This item has eight options with tick boxes, and at least one option must be selected for each case. This item was recorded completely correctly for 497 cases. In the 11 cases where an error was made, the most common error was to record an elective caesarean section as an emergency caesarean section (6 cases).

Anaesthesia/analgesia

This item has four options with tick boxes, and at least one option needs to be selected for each case. There were 21 cases where this item was not recorded completely correctly. The most common error was omission of the recording of 'other' analgesia.

Hours of labour

The number of hours of labour was reported correctly for 96.5% of cases. In 18 cases the length of labour was incorrectly reported and in most of these the difference was one (15 cases) or two (two cases) hours. In one case, eight hours was recorded as the length of labour whilst the medical record indicated no labour.

Complications of labour and delivery

For this data item there are six complications listed with corresponding tick boxes, and space for writing in additional complications. The additional complications are coded according to ICD-9-CM codes and there is capacity for up to three codes per case to be entered into the data base. The specified complications with the tick boxes were recorded reasonably well with sensitivities of 0.75 or above. All the fields had false positive cases, and for some fields the numbers of false positives were high. Among the 'other' complications, 369 (72.6%) cases were recorded completely correctly including 128 true positive cases. Two of the more prevalent 'other' complications were postpartum haemorrhage and previous uterine surgery, and both of these complications were recorded well.

Table 6 gives the results for the baby variables.

Baby's birth date

This was recorded correctly in all cases.

Baby's birth time

This was recorded correctly in 97.4% of cases. In the 13 incorrect cases the error was almost always in one digit only. The differences in times recorded ranged from 1 minute to 20 hours with eight cases being 10 minutes or less.

Plurality

This was recorded correctly in all cases.

Sex

This was recorded incorrectly in six cases, there being three girls recorded as boys and three boys recorded as girls.

Liveborn/stillborn

This was recorded correctly in all cases.

Birthweight

This was recorded correctly in all but three cases. In each of these three cases the difference was less than five grams and it appeared that a rounding error had occurred as the value should

1992 VALIDATION STUDY: BABY VARIABLES

Variable	Number of cases correct	Number of cases incorrect	Variable not recorded in hospital record	Percentage correct[1]
Baby's birth date	508	-	-	100.0
Baby's birth time	495	13	-	97.4
Plurality	508	-	-	100.0
Sex	502	6	-	98.8
Liveborn/stillborn	508	-	-	100.0
Birthweight	505	3	-	99.4
Length	472	36	-	92.9
Head circumference	458	50	-	90.2
TSR	495	13	1	97.4
Resuscitation	483	25	-	95.1
Apgar score - 1 min	500	8	-	98.4
Apgar score - 5 min	503	5	-	99.0
Estimated gestation	468	40	-	92.1
Date of separation	495	13	-	97.4
Type of separation	507	1	-	99.8

[1] Excludes cases which could not be validated because the variable was not recorded in the hospital medical record.

be rounded to the nearest five grams (eg. a birthweight of 2744g should be given as 2745g not 2740g).

Length
There were 36 cases in which this was recorded incorrectly. The difference was one centimetre in all cases except one where the difference was two centimetres.

Head circumference
In all 50 cases where this was recorded incorrectly the difference was one centimetre. It is likely that some of these errors are rounding errors.

Time to spontaneous respiration (TSR)
This item was incorrectly reported in 13 cases. In eight of these cases the time given was one minute when it was two minutes. The biggest discrepancy was a case reported as five minutes when it was one minute. One case was incorrectly reported as having been intubated and ventilated (and therefore not having a recordable TSR) when in fact the TSR was three minutes.

Resuscitation
This item was correctly recorded in 95.1% of cases. Amongst the 25 cases incorrectly recorded, intubation was correctly recorded except in one case. There were no particular patterns of incorrect recording evident.

Apgar score at one minute

This was recorded in error in eight cases. In seven of these cases the difference was one point and in one case it was two points. In six of the cases the score was overestimated eg. given as '9' instead of '8'.

Apgar score at five minutes

This was recorded in error in five cases. In all five the difference was one point.

Estimated gestation

This item is estimated at birth, when the expected gestation may be altered by clinical examination of the baby. This item was correctly recorded in 92.1% of cases. In the forty cases incorrectly recorded, 33 were ± one week, five were ± two weeks and two were ± three weeks. These errors would have resulted in two babies being allocated to the wrong preterm/term/post term category.

Birth trauma

This item was extremely poorly recorded in the medical record and therefore was excluded from the validation study. In the Midwives' System, 41 (8.1%) cases in the validation study sample were reported to have a chignon, but no other trauma was reported.

Date of separation

This item was recorded incorrectly in 13 cases. Most of the discrepancies were small, but there were three cases where the discrepancy was more then ten days including one of 62 days.

Type of separation

This was recorded correctly in all cases except one. In this one case, the baby was recorded as having been discharged to a country regional hospital when in fact it had been discharged home.

4.   DISCUSSION

The Midwives' Notification System consists of the collection of data about all births using a fairly comprehensive notification form, and the creation of a computerised data base. Ideally, the events of each pregnancy and birth will be accurately reflected in the medical record, on the Midwives' form and in the computerised data base. However, there are numerous points in the flow of data where errors may occur. Errors are possible, for example, in the observation of the events, in the recording of the events, in the reading of handwritten information, in coding and in data entry. In a data base that includes in excess of 50 variables for approximately 25,000 cases annually it is inevitable that some errors will be present. Thus, it is important to conduct a validation study from time to time, to assess accuracy and to indicate areas where the collection may be improved.

A validation study could be conducted prospectively, but this would be extremely labour-intensive and is not a practical proposition. To conduct a validation study retrospectively, possible sources of information that could be used include the mother herself, the service providers involved in the case and the medical record. Generally, the medical record alone is used, and this approach was used in this validation study. The medical record was regarded as the gold standard, and the analysis was conducted accordingly. It is recognised, however, that errors may be present in the medical record. It is also recognised that in certain situations the information on the Midwives' Notification System may be more accurate than that recorded in the medical record. For example, the demographic information on the mother may be recorded in the medical record at the time of booking for delivery. Some of these items, eg. address, marital status, may change by the time the birth occurs. The more up-to-date information may not be entered in the medical record but may be obtained by the midwife and provided on the Midwives' form. These difficulties should be borne in mind when interpreting the results of the validation study.

Another methodological consideration is the selection of the sample for the validation study. Whilst a systematic 2% sample may be adequate for the majority of births it is inadequate for the evaluation of rare events such as complications of pregnancy. A larger sample or a sample selected differently may help to provide better estimates, and may be justified at some stage in the future.

The results of the validation study are on the whole encouraging, although there are some areas where improvements could be made. The demographic items were recorded well. As explained above, some of the 'errors' in these items may reflect errors in the medical record rather than in the Midwives' System. Among the pregnancy variables the date of the LMP showed some errors, being 93.7% correct. The date of the LMP is one item where the data in the medical record bears a questionable relationship to the events in real life. The Midwives' System in 1992 recorded only 0.3% of births as having an unknown LMP. It would be expected that this percentage would be higher, and it may be that the LMP is at times estimated. It is also possible that the LMP may be estimated differently at different times eg. may be influenced by an ultrasound report. In the complications of pregnancy item, individual complications were on the whole recorded well, but the item was completely correct for only 81.9% of cases. The medical conditions item also included several errors, being completely correct in 91.3% of cases.

Most of the labour and delivery variables were recorded well, the most errors being made in the complications of labour and delivery field. Some of these errors may relate to definitions,

eg. for fetal distress. In the baby variables, most errors were made in the length, head circumference and estimated gestation fields. In the length and head circumference items rounding errors may be responsible for many of the discrepancies. The errors in estimated gestation probably relate to differing perceptions of different observers.

The results of this validation study were compared with the 1986 validation study. Overall, the results are very similar, and some improvements in accuracy are apparent.

Validation studies of the midwives' data collections in Victoria[4], South Australia[5] and New South Wales[6] have been published. There are differences between these States with regards to the data collection form, the sample selection for the validation study and the methods of data analysis. However, broadly speaking, the results are comparable and similar problem areas were identified.

The results of this validation study will be taken into consideration in the design of the Midwives' form in the future, in the instructions provided in the Guidelines[1] for completion of the form, feedback sessions to the hospital midwives and in discussions with the Midwives' System Advisory Committee. It is recommended that the National Perinatal Data Advisory Committee discusses the methodology for validation studies.

5.   REFERENCES

1.   Gee V. Guidelines for completion of the notification of case attended Midwives' Form 2. Perth: Health Department of Western Australia, 1990

2.   MacDonald WBG, Stanley FJ. Midwives' Validation Study. Perth: Community and Child Health Services, 1977.

3.   Hill C. Validation study of the Western Australian Midwives' Notification System 1986. Perth: Health Department of Western Australia, 1987

4.   Robertson H. A validation study of the Victorian perinatal data collection forms 1986. Melbourne: Consultative Council on Obstetric and Paediatric Mortality and Morbidity.

5.   Jonas O, Scott J, Chan A, Macharper T, Lister J. A validation study of the 1986 South Australian perinatal data collection form. Adelaide: South Australian Health Commission, 1991.

6.   Pym M, Taylor L. Validation study of the New South Wales midwives' data collection 1990. New South Wales Public Health Bulletin Supplement 1993:8:1-6.

Appendix I

Health Act (Midwifery Nurses) Regulations Form 2

NOTIFICATION OF CASE ATTENDED

PARTICULARS RELATING TO MOTHER

Hospital ....

PRINT IN BLOCK LETTERS

SURNAME		UNIT RECORD No.
FORENAMES		BIRTH DATE
ADDRESS OF USUAL RESIDENCE		POSTCODE
MAIDEN NAME		TELEPHONE NUMBER

Current Conjugal State

single	( )	1
married (incl. de facto)	( )	2
other .... (please specify)		

Race:

Caucasian	( )	1
Aboriginal (full or part)	( )	2
Other .... (please specify)	( )	3

Height (cms)

PREGNANCY

PREVIOUS PREGNANCIES (excluding this pregnancy)

Total number of

Previous Pregnancies

Previous children now living

born alive, now dead

stillborn

THIS PREGNANCY

Date of LMP

This date · certain	( ) 1
not certain	( ) 2

Expected due date

Complications of Pregnancy:

Threatened abortion (under 20 weeks)	[ ] A
urinary tract infection	[ ] B
pre eclampsia	[ ] C
APH – placenta praevia	[ ] D
– abruptio	[ ] E
– other	[ ] F
prem. rupture of membranes	[ ] G

other ....H

....

Medical Conditions:

....

COMPLETE SECTION ON SEPARATION
Attach to Mother and Baby's Inpatient Summaries (HA22). Forward to Health Services Statistics and Epidemiology Branch, Health Dept of Western Australia P.O. Box 8172, Stirling Street, PERTH 6849 after discharge of mother and/or baby whichever is later. Guidelines for completion of this form available from above address.

MIDWIFE

Name ....

Signature ....

Reg. No. ....Date......../......../......

04091/10/91—32M SETS—S/7002

LABOUR AND DELIVERY

Onset of Labour:

spontaneous	[ ] A
induced	[ ] B
no labour	[ ] D

Augmentation of Labour

no	( ) 1
yes	( ) 2

Presentation:

vertex	( ) 1
breech	( ) 2
other	( ) 3

Type of Delivery:

normal	[ ] A
vacuum – successful	[ ] B
– failed	[ ] C
forceps – successful	[ ] D
– failed	[ ] E
breech manoeuvre	[ ] F
caesarean – elective	[ ] G
– emergency	[ ] H

Anaesthesia/Analgesia:

none	[ ] Z
general	[ ] A
epidural/spinal	[ ] B
other	[ ] C

Hours of established labour:

Complications of Labour, Delivery:
(Include reason for Caesarean)

precipitate delivery	[ ] A
fetal distress	[ ] B
prolapsed cord	[ ] C
cord tight around neck	[ ] D
cephalopelvic disproportion	[ ] E

other..F

....

....

BABY'S SEPARATION DETAILS

Date of Discharge Transfer or Death

Type of Separation:

Discharged home	( ) 1
Died	( ) 2
Transferred to	( ) 3

....

Special Care (wholedays only)

Separate HA22 for baby:

yes, attached	( ) 2

BABY

Separate Form for each Baby

Adoption   Yes ( )   No ( )

Birth Date:

Time (24 hr. clock)

Plurality:

single birth	( ) 1
first twin	( ) 2
second twin	( ) 3
other multiple birth:	( ) 4
(specify baby number___of___)	

Sex:

male	( ) 1
female	( ) 2

Condition:

liveborn	( ) 1
stillborn	( ) 2

Birthweight (grams)

Length (cms)

Head circumference (cms)

Time to establish unassisted regular breathing (mins)

Resuscitation:

none	[ ] 0
intubation	[ ] 3
oxygen only	[ ] 8

other..

Apgar Score

1 min

5 mins

Estimated Gestation (weeks)

Birth Defects..

....

Birth Trauma (Eg.cephalhaematoma)

....

HEALTH DEPARTMENT COPY

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