



Identifying problems with data collection at a local level: survey of NHS maternity units in England

Natalie Kenney, Alison Macfarlane

Abstract

Objectives To document the extent to which maternity data are collected and how they are recorded, and to identify problems that may affect their availability throughout the NHS.

Methods Postal survey in September 1997 with structured questionnaires.

Setting 207 NHS trusts with maternity units in England.

Participants Heads of midwifery in maternity units.

Main outcome measures Extent to which maternity data were routinely recorded, how they were recorded and evaluated, and to whom they were made available.

Results 167 (81%) of questionnaires were returned, representing 166 trusts. Of these trusts, 165 collected ≥ 17 of the 19 data items in HES maternity tail, and 158 collected ≥ 40 of the 45 items selected from Körner dataset. Only 18 collected all five items selected from the "indicators of success," and 17 did not collect any. In 58 of trusts data were primarily recorded on paper. A computerised maternity information system was used by 106 (63%) of trusts, but many recorded data on paper first. Thirty four did not audit data for accuracy. Most trusts analysed data not routinely collected at national level, but 18 did not analyse HES maternity tail and 17 did not analyse Körner data.

Conclusions Improvement is needed in quality, completeness, and availability of maternity data at a national level, particularly if the NHS information strategy is to be successfully implemented. Although most of the data items in national datasets are recorded locally, variations in the way data are defined, recorded, and analysed and lack of linkage between computer systems restrict their access, availability, and use at local, district, and national levels.

Introduction

The NHS information strategy for England, described in *Information for Health*,¹ reiterated the need to improve the accuracy, completeness, and availability of NHS data.² Data about maternity care are needed at all levels of the NHS to monitor the health of women and their babies and the services provided.^{3,4} These data are also required to audit, monitor, and evaluate changes in the provision of care.⁵ Women need this information

to inform decisions about their care.^{1,6} It is widely acknowledged that national maternity data for England are incomplete and that some are inaccurate or unavailable⁷⁻⁹ and that they need to be improved.^{7,9,10}

At a national level, the Department of Health's hospital episode statistics (HES) system collects a core set of data about each episode of "admitted patient care." For episodes in which a baby is born, a supplementary set of data should be appended in the HES "maternity tail."¹¹ These data are lacking from about a third of delivery records.¹¹ The core HES record, the maternity tail, and additional maternity data are commonly referred to jointly as "Körner" datasets.¹²

To investigate the reasons for deficiencies in national maternity data, a project was commissioned to document the extent to which maternity data are recorded in NHS trusts and to identify problems that may affect the quality or availability of this information for use elsewhere in the NHS and to women using the maternity services. This paper reports, in brief, on the survey of NHS trusts with maternity units in England.

Methods

We designed a structured questionnaire that asked NHS trusts which maternity data items were routinely collected, how the data were recorded, whether they were audited for accuracy, the extent to which they were analysed, how accessible they were, how they were used, and to whom they were made available. The questionnaire was piloted in Northern Ireland.

In September 1997 we sent questionnaires to heads of midwifery in all 207 NHS trusts with maternity units in England. Reminder letters were sent to non-respondents three and six months later.

The replies were checked for anomalies and analysed with SPSS 7.5 for Windows.

Results

We received replies from 167 (81%) of maternity units, representing 166 NHS trusts. Some of the respondents did not answer all of the questions. Midwifery managers and midwives usually completed the questionnaires.

Extent of data collection

Of the 165 NHS trusts that replied to the question about data collection, all routinely collected ≥ 17 of the

National Perinatal Epidemiology Unit, Institute of Health Sciences, Oxford OX3 7LF

Natalie Kenney
survey researcher

Alison Macfarlane
reader in perinatal and public health statistics

Correspondence to:
A Macfarlane
alison.macfarlane@perinat.ox.ac.uk

BMJ 1999;319:619-22

website
extra

A longer version of this paper appears on the BMJ's website

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Table 1 Extent to which maternity units of 166 NHS trusts in England collected five "indicators of success" listed in *Changing Childbirth*⁶

Indicator	No of responses	No (%) of trusts collecting data
Women who have midwife as lead professional	145	51 (35)
Women who know the person who cares for them during their delivery	142	47 (33)
Women admitted under management of a midwife	143	55 (38)
Average No of antenatal visits for women with uncomplicated pregnancies	145	59 (41)
Women carrying their own case notes*	155	118 (76)

*Trusts may have responded positively if women usually carried their case notes, irrespective of whether the trust kept data about this practice.

19 data items contained in the HES maternity tail¹¹ and 158 (96%) routinely collected ≥ 40 of the 45 data items selected from the Körner maternity dataset.¹² Most trusts also recorded a substantial number of other maternity data items. Of the 10 "indicators of success" listed in *Changing Childbirth*,⁶ five are easily quantified, but only 18 trusts routinely collected all five items, while 17 collected none (table 1).

How data were recorded

In 58 of the 166 trusts, data were primarily recorded on paper. Some data may have been recorded on the patient administration system, but we did not investigate the extent to which this was done. Of these trusts, 48 stated that they experienced problems recording data.

In 106 (63%) of the trusts data were recorded on a computerised maternity information system. In only 35 of all trusts did midwives enter data directly on computer systems. In 50 trusts data were entered separately on both the maternity information system and

the patient administration system, and only 17 trusts were able to transfer data from the maternity system to the patient administration system automatically.

Overall, 113 (68%) of the trusts used both paper and computerised recording methods, with many recording some data on paper and other data on computers. Two trusts did not indicate how data were recorded.

Audit of data

One hundred and twenty six (76%) of the trusts stated that data were routinely audited for accuracy, with 63 doing so monthly or more frequently. Resources did not allow us to check the extent or quality of these audits. Data were more likely to be audited if midwives collected data on paper and subsequently entered them onto computers.

Analysis of data

Data from the HES maternity tail and Körner dataset were analysed by 150 (90%) of the trusts, and most trusts produced at least some statistical analyses for the additional data that they collected. We did not ascertain the extent to which data were analysed. Most trusts analysed data with computer software, but 28% did so manually.

Access to data

We asked the trusts to provide aggregated figures for six data categories for the year 1996, including items in the HES maternity tail and Körner dataset (table 2). Only 15 trusts could provide figures for all the data items. Although a further 151 trusts were able to provide some of the data, many could not provide them in the form requested, either because aggregated statistics were not routinely produced for those items or there were difficulties accessing paper records. Some trusts provided aggregated statistics for the whole data category. Many NHS trusts could not provide the required figures because they used different definitions or groupings of data. Other researchers have encountered the same problem.¹³

Ninety six of the 151 trusts that could not provide some data claimed that the data could be accessed if required urgently. Of these trusts, 42 could access data in less than a day, but 11 stated that it would take two weeks or more to obtain the information.

Availability and use of data

Of those trusts that answered the question, 93% (141/152) presented maternity data at local clinical meetings. Only 66% (97/146) routinely provided data to all clinicians, 53% (57/108) provided data to general practitioners, and 27% (32/118) included data in information leaflets for women. The type of data made routinely available was not specified. Although 91% (128/140) of trusts provided data to their local health authority, our parallel survey of health authorities showed that these were more likely to relate to contracting than to clinical practice.¹⁴

Discussion

Problems in the collection of maternity data in English NHS trusts lead to inadequacies in the quality, completeness, and availability of the information.

Table 2 Maternity units' access to maternity data in 166 NHS trusts in England

Aggregated data item requested	No of responses	No (%) of trusts providing data
Total No of women delivering in trust	158	156 (99)
Onset of labour:		
Spontaneous	142	99 (70)
Elective caesarean section	153	143 (93)
Induction of labour*:		
Prostaglandins	150	86 (57)
Artificial rupture of membranes or amniotomy	145	73 (50)
Oxytocics	140	65 (46)
Oxytocics and artificial rupture of membranes	142	55 (39)
Method of delivery:		
Spontaneous vaginal	154	150 (97)
Ventouse	156	151 (97)
Forceps	156	150 (96)
Breech (vaginal)*	148	113 (76)
Breech (assisted)*	129	66 (51)
Caesarean section (elective)	156	147 (94)
Caesarean section (emergency)	156	147 (94)
State of perineum*:		
Episiotomy	154	134 (87)
1st degree tears	148	74 (50)
2nd degree tears	149	77 (52)
3rd degree tears	151	97 (64)
Perineum intact	134	79 (59)
Gestational age at delivery (weeks)*:		
<24	141	54 (38)
24-27	144	53 (37)
28-36	143	56 (39)
37-41	140	55 (39)
≥ 42	140	53 (38)

*Differences in data definitions were encountered.

These problems restrict the use of the data by the NHS and may impede the implementation of the NHS information strategy.¹

We found that the NHS maternity units collected a substantial amount of data, but many trusts used different definitions for various data items. This limits their use throughout the NHS because of the difficulty in aggregating and comparing data that have been collected using different definitions.¹⁵

There may be justifiable reasons for not collecting data for the "indicators of success" listed in *Changing Childbirth*,¹⁶ but the lack of these data makes it difficult to assess the policy's overall impact. This information may be collected on a sample or ad hoc basis for health authorities, but our survey of health authorities found that only 58% monitored the implementation of the policy.¹⁴

The combination of computerised and paper methods commonly used by NHS trusts to record data can make linkage and management of data difficult, restrict their use, and affect the flow of data through the NHS and to the Department of Health. The duplication of data recording is wasteful of time and NHS resources.¹⁵ Improved linkage is needed between computerised maternity information systems and patient administration systems to ensure that data are recorded only once.

Although computerised maternity information systems are supposed to make it easier to record and use data,¹⁷ many problems persist.^{18, 19} Eleven of the trusts in our survey reported that it would take two or more weeks to obtain data that were not immediately accessible. Unless information is readily available it cannot be used effectively to inform NHS decision making.^{1, 6, 9}

It is of concern that 28% of the trusts analysed their data manually. This is laborious, time consuming, and limits the extent of analyses. This can impede the use of data locally and the forwarding of information to NHS systems. If the NHS information strategy is to be successfully implemented, these issues must be addressed.

Evaluating the quality of data will soon become mandatory in the NHS,¹ but 24% of the trusts did not routinely audit their maternity data for accuracy. Conducting regular audit of data and educating clinicians about how to audit their maternity records can improve data quality.^{10, 20} Feeding back data to those who collect them is also associated with improving data quality and clinical practice,^{20, 21} but 33% of the trusts did not routinely provide these data to clinicians.

Most trusts produced statistical analyses of data not routinely collected by the Department of Health. This suggests that there is a local need for these analyses, but their use is limited by a lack of comparable national data. Although maternity data were often made available within NHS trusts, the availability of data to others was limited. With the emphasis on sharing information in the NHS and the provision of information to users of the health services,^{1, 2} availability must be improved.

Conclusions

Most of the maternity data missing at a national level are widely collected at a local level. Variations in the ways data are recorded, and many other problems,

Key messages

- Most NHS maternity data missing at a national level are collected at a local level
- Variations in the way in which maternity data are defined, recorded, audited, and analysed can affect the quality, completeness, and availability of this information throughout the NHS
- Considerable work and investment will be required to implement the plans set out in the NHS information strategy *Information for Health*

contribute to inadequacies in the quality, completeness, and availability of this information. Lack of computer systems for recording data in some trusts and lack of linkage between "stand alone" computer systems and hospitals' patient administration systems in others are major problems. These problems restrict data use at all levels of the NHS¹⁵ and may impede the implementation of the NHS information strategy.¹

NHS trusts can do much to improve the quality of their maternity data by conducting regular audits of data, informing clinicians of the need for accurate and complete data, and feeding data back to those collecting them.^{10, 20, 21} Now that the Department of Health has started to publish comparative HES maternity data,¹¹ trusts will need to ensure that their data are accurate, complete, and up to date so that their services are accurately represented in comparisons with other trusts.

At a national level, the Department of Health has committed itself to a revised maternity dataset.^{1, 22} Once implemented, this should ensure that data are collected according to agreed definitions, making it easier to aggregate and use this information throughout the NHS. When the maternity dataset is agreed, the Department of Health should allocate resources to maternity units for computer systems that will enable them to collect data in a consistent way and which can be linked to other NHS computer systems.

It has been suggested that contributing maternity data to national systems has a low priority at a local level.⁸ Now that it has begun to publish maternity data,¹¹ the Department of Health should consider making it mandatory for maternity units to contribute data to national systems. When new policies are implemented it is essential that the relevant data are collected locally and aggregated nationally so that the impact of policies on the maternity services and their benefit to women and their babies can be assessed.

We thank all those who completed questionnaires for this project.

Contributors: AM initiated the research at the suggestion of Kate Jackson, director of the Changing Childbirth Implementation Team; cowrote the protocol; assisted with questionnaire design and data analysis; and participated in writing and editing the paper. NK cowrote the protocol, assisted with questionnaire design, and participated in data collection and analysis and writing and editing the paper. Pam Dobson (Kings College Healthcare NHS Trust), Cathy Winter (Southmead NHS Trust), Maggie Jeffries (Oxford Radcliffe NHS Trust), Fiona Alderdice (Queens University Belfast), Lesz Lancucki (Department of Health), Jane Cowl (Changing Childbirth Implementation Team), and Meg Goodman (Maternity Alliance) commented on and discussed

core ideas about the content and design of the questionnaire. Sarah Ayers (National Perinatal Epidemiology Unit) designed the computer databases and dealt with all computing issues. Jo Garcia, Rona McCandlish, Sally Marchant, Valerie King, and Kirstie McKenzie-McHarg commented on the questionnaire design and drafts of the paper. Suzanne Williams, Sarah Bowler, and Hedwig Van Asten entered the data. AM and NK are guarantors for the paper.

Funding: AM was funded through the Department of Health's policy research programme. NK was funded by the Changing Childbirth Implementation Team, Department of Health.

Competing interests: None declared.

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(Accepted 29 July 1999)

Claude Bernard on the action of curare

Claude Bernard (1813-78) was professor of experimental physiology in Paris. Among many original observations he was the first to elucidate the "fonction glycogénique" of the liver and invented the term "milieu intérieur."

The following is an abridged version, which I have translated, of "Physiological studies on certain American poisons," first published in *La revue des deux mondes* in 1864.

"Curare has been known since its discovery in Guyana by Walter Raleigh in 1595. Raleigh reported on this poison in Europe, used on poisoned arrows, under the name 'Curari.' The symptoms of death from curare, all observers agree, are quite characteristic.

"Watterton has described the death of a man poisoned by curare. Two Indians were hunting for game in the forest. One of them took a poisoned arrow and shot it at a red monkey which was above him in a tree. The direction of the arrow was almost perpendicular. The arrow missed the monkey and in falling hit the Indian on the arm just above the elbow. He was convinced that all was finished. 'Never,' he said to his companion in a broken voice, and looking at his bow while he spoke, 'will I bend this bow again.' Having spoken these words, he removed from his shoulder the small bamboo box which contained the poison, and having placed his bow and arrows on the ground, he lay down, said goodbye to his companion, and never spoke again. 'It will be a consolation for tender souls,' remarked Watterton, 'to know that the victim did not suffer, because 'wourali' takes life gently.

"In June 1844 I made my first experiment with curare: I inserted under the skin of the back of a frog a small piece of dry curare, and observed the animal. Initially, the frog moved and jumped around with great agility, then it became quiet, the body became flat and gradually subsided. After several minutes the frog was dead, that is to say, that it had become limp, and pinching the skin produced no reaction. I then proceeded with what I call a 'physiological autopsy' on the animal. Sensible regulations, widely approved, prevent one from doing an autopsy on the human until 24 hours have elapsed since death. These circumstances

detract considerably from the scientific importance of the 'cadaveric autopsy'...

"It is different, as one will see, when one does an autopsy physiologically, that is to say, by opening the body immediately after death. Man has the right to use animals for domestic purposes and for food, and has equally the right to use animals to inform himself scientifically in a manner useful to humanity.

"On opening the poisoned frog, I saw that its heart continued to beat. Its blood became red on exposure to the air and appeared physiologically normal. I then used electrical stimuli as the most convenient method of provoking a reaction in the nerves and muscles. Stimulating the muscle directly produced violent contractions in every part of the body, but on stimulating the nerves there was no reaction. The nerves, that is, the bundles of nervous tissue, were completely dead, while the other bodily components, the muscles, the blood, the mucous membranes, retained their physiological properties for a number of hours, as one sees in cold blooded animals. ...

"If the heart retains its power of movement, this proves, what one already knew, that it is not influenced by the nervous system as are the other muscles.

"That first analytical experiment on the frog was later repeated on a number of animals more closely related to man and belonging to the classes of birds and mammals. I have found identical results, and the 'physiological autopsy' showed me that, as in the frog, the motor nerves are the only tissues affected by curare, while the other components of the body retain their physiological properties."

Bernard was, of course, wrong in his interpretation; his pupil Vulpian suggested that curare acted on the motor endplate, whose morphology had been recently described by Kühne.

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John Black, retired consultant paediatrician, Framlingham, Suffolk