STAFFORDSHIRE, SHROPSHIRE & BLACK COUNTRY NEWBORN NETWORK

DATA QUALITY PROJECT

DEVELOPING HIGH QUALITY DATA FOR A MODERN NEONATAL SERVICE

Report compiled by Karen Anderson, Russells Hall Hospital, Dudley on behalf of Staffordshire, Shropshire and Black Country Newborn Network

DECEMBER 2009
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Introduction

The Staffordshire, Shropshire and Black Country (SSBCNN) comprises of six neonatal units:

- New Cross Hospital, Wolverhampton
- Royal Shrewsbury Hospital
- Staffordshire General
- Manor Hospital, Walsall
- Russells Hall, Dudley
- University Hospital of North Staffs, Stoke on Trent

Currently data collection is undertaken in an ad hoc fashion within these units with 5 submitting data to the Perinatal Institute for submission utilising the Maternal and NeoNatal Electronic Recording System (MANNERS) and one utilising a maternity information system to provide data.

SSBCNN is supporting the neonatal units to move towards a standardised neonatal data system (BADGER) to provide contemporaneous data to enable audit and benchmarking of clinical activity as well as informed commissioning of services. This system is currently utilised by a high proportion of neonatal units across the country and is the solution recommended for use by the National Neonatal Audit Programme. Whilst utilising the BADGER platform will has been successful in promoting a co-ordinated approach to data collection in areas such as the London Perinatal Networks there still needs to be work done to ensure that the data is of good quality, reliable, accurate and fit for purpose.

In July 2009, SSBCN commissioned a project to review the current problems and areas of good practice. The project involved a number of steps:

1. Undertake a literature review on the collection of high quality clinical data
2. Identify units out of the network reported to collect high quality clinical data, so called ‘gold standard’ units
3. Design a proforma to survey data collection processes
4. Survey the ‘gold standard’ units
5. Review existing processes and resources in the SSBCNN neonatal units
6. Analyse findings and draw conclusions with recommendations for changes to ensure collection of high quality neonatal data in the SSBCNN

This report documents the findings of the project.
Review of the Literature

Neonatal services have an ever increasing need to measure high quality data to provide accurate information to clinicians, researchers and patients. There is a requirement to submit data to the Neonatal Critical Care Minimum Data set, the National Neonatal Audit Programme as well as the British Association of Perinatal Medicine data set and other national enquiries.

For a considerable period of time there has been discussion regarding the limitations of data collection and how poor quality data could be detrimental to the service. Potentially it may be used as a reason to remove resources from a service. A great deal of time and money is spent on activities and systems involved in collecting and analysing data and yet there is still a lack of confidence in some information. There is an increasing reliance by commissioners of services on performance information and the need to demonstrate robust, reliable data is vital with the risk that poor quality data may lead to flawed decision making and wasted resources.

A review of maternity services, July 2005 in NW London hospitals found that poor data provided to the PCT probably inhibited monitoring and planning of the service.

A recent analysis of data from the Payment by Results (PbR) clinical coding audit programme showed coding errors of 9.4%, with a range across Trusts of 0.3 per cent to 52 per cent. These errors contributed to a gross financial error of approximately £3.5 million, equating to 5 percent of the price of the sample reviewed. Clearly this margin of error could have a significant impact on the budgets available for services. The issue of poor quality data is not one just for the NHS but also plays a huge part in business where data can be described as critical a resource as a company’s assets and money. Firms are recommended to manage data quality with commitment from the top, ensuring that experienced data professionals are employed to oversee the process.

Commonly the issues affecting the accuracy of the NHS data are the quality of the source documentation, the level of clinical involvement and training and development of clinical coders. The Department of Health is taking steps to improve the quality and quantity of data received but do not support large scale checking as the best way to ascertain data quality. PbR depends heavily on accurate data that originates from the patient notes, patient administration systems (PAS) and hence this is where the clinicians role in the process becomes critical. The Audit Commission has said that one of the reasons for poor quality data was that few clinicians involved themselves in the collation process.

Corporate leadership on data quality is vital but this also has to be carried through to the everyday staff at all levels. Lack of understanding of the relevance and the benefits of the data to the service will result in poor quality data. It is unfortunate that the weakest link in the data collection process is the day to day practice of data entry, where too few doctors and nurses understand why collecting information and monitoring the performance of their service matters. It has been suggested that NHS Trusts can do a great deal to improve the quality of their data by conducting regular audits of data, informing clinicians of the need for accurate and complete data, and feeding back data to those collecting them.

Hospitals should routinely share clinically relevant analyses of local activity data with consultants in order to increase their involvement in the collection, validation and use of the data. However medics are much more likely to be engaged in the data collection process if they are collecting data to learn from than to be punished by it. Consultants who are supported in the retrieval and interpretation of their data are likely to demonstrate a greater likelihood of monitoring the quality of data held in their name and a greater willingness to contribute to the data collection and validation process.

Clinical networks which exist outside the organisational structure of the Trusts are increasingly important but have their own data needs. The NIC Services Review of 2003 recommended that newborn networks should facilitate research into aspects of care and develop IT infrastructures to support activity and outcomes. The development of
the Standardised Electronic Neonatal Database (SEND) in the London Perinatal Network allows the widespread audit of neonatal standards aiming, through clear definition and standardised annual reporting, to improve quality of care and outcomes.\textsuperscript{20} This collaborative data collection is becoming more widespread across the country but issues regarding data quality persist.

Projects such as the International Vermont-Oxford Neonatal Network (VON) have developed a collaborative organisation of neonatal units that work to improve quality of care through the integrating research and clinical practice. The anonymous database provides confidential instantaneous reports on performance with trends and benchmarking\textsuperscript{21}. However this method of data collection can be fraught with issues such as incomplete data and limited data checking. In the UK, the Confidential Enquiry into Maternal and Child Health (CEMACH) carries out perinatal mortality surveillance, publishing reports for use at a national level as well as for neonatal networks, strategic health authorities and Trusts. CEMACH has a strong national data collection process making use of a network of local health professionals who submit data. CEMACH utilises multiple source reporting, tapping into child health systems and congenital anomaly registers, to a high level of data ascertainment.\textsuperscript{22}

The Audit Commission identifies six key characteristics of good quality data (Table 1). It may be acceptable to accept some inaccuracy if timeliness of the submission is the primary driving force, however the limitations of the accuracy should always be made evident to the users of the data.

\textbf{Table 1 - Characteristics of good quality data}

<table>
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<tr>
<th>Characteristics</th>
<th>Definition</th>
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<tr>
<td><strong>Accuracy</strong></td>
<td>Should provide a fair picture of performance and enable informed decision making</td>
</tr>
<tr>
<td><strong>Validity</strong></td>
<td>Correct use of definitions, measuring what is intended to be measured</td>
</tr>
<tr>
<td><strong>Reliability</strong></td>
<td>Data should be stable and consistent processes across collection points and over time</td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td>Data should be captured as quickly as possible after an event or activity and available for the intended use within a reasonable period of time.</td>
</tr>
<tr>
<td><strong>Relevance</strong></td>
<td>Data captured should be relevant to the purpose for which they are used. This entails periodic review of requirements to reflect changing needs</td>
</tr>
<tr>
<td><strong>Completeness</strong></td>
<td>Data requirements should be clearly specified based on the information needs of the body and data collection processes matched to these requirements</td>
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Data should be sufficiently accurate that it can be utilised for its intended purpose and captured only once as close to the point of activity as possible.\textsuperscript{23} Trusts have been advised that training and development of staff and keeping IT systems up to date are important actions required to ensure quality data.\textsuperscript{24} Poor information quality may be due to errors in systems designs and data processing. Systems should be designed in a user friendly way with warnings and flags apparent if the user makes any errors.\textsuperscript{25} There is considerable evidence that allowing patients to review the information recorded about them can have a rapid and positive impact on information quality\textsuperscript{26} so in the case of neonatal care, providing parents with a summary of their baby’s care is likely to have similar effects. Many problems with the accuracy of data can be rectified by looking at analyses.\textsuperscript{27}

Improving data quality is more about encouraging positive attitudes than installing the best IT systems.
Methodology

Utilising the literature reviewed a proforma was developed to identify different issues relating to achieving high quality data (Appendix 1)

Broadly the areas of surveyed involve:
- An overview of the use made of the data which is collected
- The data collection process utilised
- Personnel involved in the data collection and training received
- How data completeness is measured and validation processes
- Data analysis undertaken

‘Gold Standard’ Units /Projects

These so called ‘gold standard’ units were identified through feedback from data analysts and Information Managers who were able to identify units which consistently reported good quality, accurate data with a well motivated team involved in the collection. Additionally long standing projects were visited to investigate their approach to achieving good quality data. Those identified as being of interest were:

Birmingham Women’s Hospital
Jessop Wing, Sheffield Teaching Hospital NHS Foundation Trust
St Michaels Hospital, Bristol
St Thomas’ Hospital, London
London Perinatal Networks
Perinatal Institute
The Neonatal Survey

These units and projects were visited and the process of data collection reviewed utilising the proforma to identify where the areas of good practice were and to allow comparison to the SSBCNN units.

Within SSBCNN key persons within the neonatal unit were visited. The proforma was completed identifying issues specific to that unit’s data collection process. The information was analysed and a flow chart developed to demonstrate the process currently undertaken.

Trends of good practice were identified and this information along with the literature reviewed was utilised to form recommendations for the development of process to ensure high quality data.
Embracing Data Collection
These are the units which were identified as having consistently reported good quality, accurate data with a well motivated team involved in the collection. These units were identified by analysts and managers involved in projects who are able to objectively comment based on data or practices reviewed. These units are not identified because they have a perfect process but because there is a real drive to improve data collection and a desire to improve the processes.

Birmingham Women’s’ Hospital
In the Southern West Midlands Newborn Network there is a desire to move towards a consistent approach to data collection and has begun with all units using the same software.

Birmingham Women’s’ Hospital has long collected neonatal data however the recent change in software to the BADGER platform has lead to a transformation in the approach and attitude. Initially the information department was sceptical that the new software could achieve the same data capture that the existing system did and in order to prove parity a 3 month comparative trial was undertaken whereby staff input data to the existing and the new system. This proved successful and hence from the 1st April the new software was adopted.

Use of the data
The data collected is now the single source of information for the NNU. Data is utilised for commissioning, NCCMDS, NNAP, network information as well as local audit.

Staff involvement
All staff is involved in the process of data collection including the medical staff, nursing staff and ward clerks. They are very strongly led by a consultant neonatologist who is also the network lead for audit. Training is undertaken by the lead consultant who managed to train all the unit staff in 3 weeks.

Process
The lead clinician at BWH has developed very clear guidance on who is responsible for what aspect of the data input (Appendix 2). Initial data entry to create a baby record or transfer a baby into the unit is undertaken by the medic / ANNP admitting the baby.

The software produces an admission summary derived from the data input and this is printed in place of a handwritten admission proforma.

The ward clerks are expected to check all the demographic details and amend errors if required. The daily updates are completed by the nursing staff and checked by the night sister. The doctor / ANNP must update any new diagnosis and results of screening.

Data completion
The data entry is completed on the day of discharge. The discharge letter is derived from the data input and therefore must input for the letter to be representative of the baby’s stay.
Validation and review of the data
There is frequent reviewing of the data collected. As already identified the daily sheets are reviewed by the
night shift lead. The data for the intensive care babies is reviewed daily on the ward round as well as on the
ground round each Monday and then each Friday afternoon. The lead consultant reviews the records of all
babies less than 28 weeks gestation to check for accuracy as well as completeness.

The ward clerks have a quality checking role rather than data entry reviewing specifically data items such as
GP details, NNAP, discharge summaries

Summary
The new process of collecting data has been enthusiastically received. There is acknowledgement that there is
still work to do with more emphasis being required on improving quality but the process that has been
implemented should support this improvement as, as the basics are gotten right so this will allow
improvement in other areas of the data collection. Areas of good practice are identified in table

The unit is already looking forward to implementing the use of mobile computer technology to allow data
entry at the cot side, allowing ease on the ward rounds and for easier access for the nurses who currently
have to leave the cot side to undertake data entry.

Table 2 - Areas of good practice

<table>
<thead>
<tr>
<th>• Enthusiastic leadership</th>
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<tr>
<td>• Clear guidance ensuring consistency and accountability</td>
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<tr>
<td>• Use of the software functionality reduces the need for duplication of tasks</td>
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<tr>
<td>• Timely completion of the discharge letter</td>
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<tr>
<td>• Frequent checking of the information to ensure quality and accuracy</td>
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Jessop Wing, Sheffield Teaching Hospitals NHS Foundation Trust
Jessop’s is a tertiary centre for neonatal care with 18 intensive care cots, 8 high dependency, 18 special care
and 6 transitional care. What is exceptional about Jessop’s is not that the data collection is completely perfect
but that with support and very evident champions the process has managed to become much more successful.
There has been considerable improvement in the success of data collection in recent years predominantly
because of the very strong clinical leadership supporting the process. Data is currently collected using the
MANNERS platform and is co-ordinated by a network appointed Information Manager.

Initially there was a feeling of doubt regarding the usefulness of the data however the importance is much
more readily accepted following comparison with PAS data and increased confidence in the accuracy.
Demonstrating the benefit of the data collection has resulted in better engagement of staff and improved
quality in the data.
Use of the data
The data collected is being utilised by the newborn network to produce annual activity and outcome reports. An extract of NCCMDS is sent to the information department, and the data is also being used to inform commissioning and local audits.

Staff Involvement
Jessop’s involve medical, nursing and data clerk staff in the data collection process. Training is provided to the staff by the network Information Manager. Whilst the majority of the data input is undertaken by band 3 the process is supervised by the lead clinician.

Process
The initial maternal and baby details are entered onto a proforma by the admitting medic / ANNP. A daily log is completed by the nursing staff, which is entered into the software by the data clerk when either the sheets are full (10 days data) or else if the baby’s stay is complete. Once the baby’s stay is complete the proforma is completed with additional information such as screening information and then these are input by the data clerks.

Data completion
There is an expectation that data entry will be complete by the day of discharge.

Validation and review
The unit receives monthly validation reports form the Perinatal Institute which identify missing data and these are actioned by the data clerk. Activity reports are sent to the medical lead allowing the data to be critically reviewed within context. Any discharge letters derived from the database are reviewed and countersigned by a consultant, again providing a checking process whereby the data is in its clinical context.

Summary
Jessop’s has made a concerted effort to improve the process for collecting data. The strong leadership has ensured that data quality is high on the agenda and is now becoming embedded in the process.

Table 3 – Areas of good practice

<table>
<thead>
<tr>
<th>Enthusiastic leadership</th>
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<tr>
<td>Use of the data has increased awareness for quality</td>
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<tr>
<td>Data collection is everyone’s responsibility</td>
</tr>
<tr>
<td>Frequent checking of the information to ensure quality and accuracy</td>
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St Michael’s Hospital Bristol

St Michael’s Hospital has undertaken data collection via the BADGER platform for approximately five years. Whilst data collection has been relatively successful it was identified that there was a need to improve the data quality and develop a mindset where data collection is high profile. Commitment to the drive to improve the data was supported by the appointment of an Information Manager for NICU. Initially a temporary intervention this role has proved to be pivotal in the improvement of data quality.

There is clear support for the software used specifically the reporting functionality and the ease of access to the data. This was identified as being very positive as allows the data to be constantly reviewed and issues identified.

Use of the data

The data is utilised to produce a monthly finance and activity report, NCCMDS, local clinical audit. The data is being used within the network to inform a ‘best practice’ group.

Staff involvement

Several staff groups are involved in the data collection process including the Information Manager, nursing staff, medical staff and ward clerks. The lead consultant is very positive and proactive with the data collection. Training is provided to staff through their induction programme, with regular training sessions held. There is a very visual presence of ‘BADGER champions’ who encourage accurate data collection. The ‘champions’ are facilitated by a ‘BADGER support group’ chaired by the Information Manager. The Information Manager role is 22 hours, with an additional 10 hours being funded for the collection of data from the Postnatal and Transitional Care areas.

Process

On admission to the NNU it is the responsibility of the ANNP / doctor to create a record in the software as part of the ‘clerking’ process. The unit no longer expects a written admission proforma to be completed but utilises the functionality of the software to produce the admission summary when the data has been input.

A daily data form is completed by the nursing staff. The nurse caring for the baby is responsible for updating the form and this should be undertaken real time. The medical staff checks the forms during the morning ward round. Accountability is ensured by nurses, after completing their shift they are required to sign the form to confirm accuracy. This log is checked by the night shift lead nurse. The forms are collected and input to the software by the ward clerk. No specific ward clerk hours are identified for this - it is part of their role.

Data completion

The production of finance reports drives the timing for data completeness and input is expected to be complete by mid month after the month end. Clinical data entry should be achieved by discharge because parents are provided with a discharge letter before they leave the unit and the letter is derived from the data entered into the software, hence it has to be complete in order to obtain the letter.

Validation and review of the data

Reviewing the data is an ongoing process. The daily data form not only identifies the data required but also provides a clear definition of meaning, so reducing confusion. The Information Manager receives an error report on a weekly basis which is then acted upon.
The Information Manager frequently reviews the data by producing reports on information regarding admissions, discharges, deaths, care levels and episodic data summary. A monthly data quality report is produced and comment and suggestion on improvements is actively encouraged. The unit has a group where BADGER champions meet and discuss issues regarding the data collection and quality. Positive feedback is provided back to all staff to encourage improvement and engagement.

Additionally in order to monitor the quality of data a shadow process has been undertaken to compare the data collected via the hospital patient management system and that collected by the unit software. This process proved that that the quality of the data is now sufficiently good and comparable to the PAS and from the next financial year it will be used by the Information Department to support commissioning.

For the postnatal ward and transitional care areas an audit of 15 cases per month is undertaken by the lead clinicians to confirm that the correct data is being collected

Summary
Data collection is given a high profile at St Michael’s and now the process has been established the emphasis has changed to promote good quality, accurate data. The team are reactive to the changing data needs and are keen to measure their improvements.

Table 4 – Areas of good practice

<table>
<thead>
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<th>• Enthusiastic leadership</th>
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<td>• Use of the data has increased awareness for quality</td>
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<tr>
<td>• Frequent checking of the information to ensure quality and accuracy</td>
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<tr>
<td>• A reduced need for double data collection – the written proforma has been replaced with one generated from the data input</td>
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<tr>
<td>• Proactive review of the data to ensure quality</td>
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<tr>
<td>• Single data entry supports the multiple data needs</td>
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<tr>
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St Thomas’ Hospital
St Thomas’ have submitted data to the SEND project for 5 years via the BADGER platform and through the commitment of the senior neonatologist the data collection has become firmly established in the routine of the NNU. The BADGER platform is described as being very reliable with very occasional downtime. The confidence in the software encourages an interest in the data collection.
The unit has a 4 level agreement for the sharing of the data collected and this covers anonymous data for the network, the submission of data to the Neonatal Data Analysis Unit (NDAU), commissioning data and the NNAP.

**Uses of the data**
The data collected is used by the Trust and network to inform regarding neonatal activity. The data is also used to inform commissioning. The Unit has interfaced its patient management system with BADGER allowing transfer of information.

**Staff involvement**
The Consultant neonatologist takes an enthusiastic interest in the data collection. Data input is exclusively undertaken by the medical staff. However the ward clerks are involved in the checking process. The management and training of the users is undertaken by the Neonatal Consultants and takes about 20 minutes. Secretarial time is preserved as discharge letters are generated from the software reducing the need for dictation of lengthy letters.

**Process**
A record is created when the baby is admitted. The input of the admission and demographics takes approximately 15 minutes. The daily input sheets within the software are checked every day on the ward round, this is to ensure that the appropriate data has been entered and is accurate and includes data such as ROP screening, CUSS and any new problems. Following a successful trial of the use of mobile wireless laptops, investment has been made to ensure they are permanently available. This has allowed the data collection and input to be undertaken during the ward round and be reviewed at the cot side. It is felt that this process has reduced the mistakes in the data input and is a more efficient use of time.

**Data completion**
The data collection and input is a real time process so there is little backlog of data entry and therefore timely completion.

**Validation and review of the data**
Reviewing the data is an ongoing process as part of the daily routine and is undertaken during the ward round. Additionally, the record is reviewed as part of the grand round on a Monday morning. A weekly error report is responded to by the ward clerks. The Outreach Team review and monitor the quality of the discharge letter.

St Thomas’ are part of the Perinatal Network in London and as such their data is regularly reviewed by the senior analyst for the network. The role of the data manager is highly regarded and considered pivotal in the culture that now exists of constant review of the data and more importantly the use in benchmarking practice across the network. The network is taking the lead on analysis of the data and driving forward the agenda for review of practice and activity. This is perceived at St Thomas’ as being very valuable to the Unit.

**Summary**
This unit is a part of a large proactive network that is raising the profile of the importance of data collection through analysis and review of the data. The enthusiasm of the lead has ensured that the medical staff is aware of the importance of the data collection and the need for regular review.
Table 5 – Areas of good practice

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<th>Area of Good Practice</th>
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<td>Frequent checking of the information to ensure quality and accuracy</td>
</tr>
<tr>
<td>Use of modern technology to promote a more efficient process</td>
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London Perinatal Networks

The London Perinatal Networks consists of 9 networks, including 31 NNUs. The units submit data to the SEND project (Standardised Electronic Neonatal Database), utilising the BADGER platform. There is a senior information analyst responsible for liaising with all the hospitals in the network with regards to neonatal data. This is achieved by the negotiation of an honorary contract with each of the Trusts involved in the network and once obtained allows access to PAS and SEND data. The role is important in the monitoring of data quality and management of missing data involving cross validation against other existing held data. A significant aspect to the role is the production of operational reports as well as population based reports under the supervision of the London Perinatal Network Data and Analysis sub group.

Use of the data

The data is utilised for patient care, clinical and administrative surveys, national registers and service evaluation. The data is also used for NNAP, commissioning data and NCCMDS. The SEND project board has developed a Data Sharing Protocol/ Agreement which outlines how Calidicott Principles are met to allow the transfer of clinical data between units and Networks.

Staff Involvement

The data entry involves ward clerks, nursing and medical staff. Training for the software, data sets and processes is provided by local teams, with initial training being provided by the network Information Analyst. The network has acknowledged the need to ensure buy in to the concept of the neonatal data collection from the Trust IT departments. At each trust a ‘decision maker’ was identified to ensure engagement.
Process
A standardised approach to the data collection is promoted by the network and real time data entry is encouraged. A process has been developed which identifies which staff member group should be responsible for different aspects of the data collection, identifying specific data items. A data entry timescale is also specified to promote timely data entry.

Initial records are created by the ward clerk. Each NNU has a tick sheet for collecting the daily updates and this is completed by the nursing staff at 24.00. The ward clerk or in some cases a data clerk enters the data into the software and this is expected to be completed daily. The additional clinical data is entered daily and this includes information such as drug withdrawal, the cardiovascular system, infection, audiology and ophthalmology screening, surgery and so on. The specialist registrar / medic on duty on a Friday afternoon is expected to review each record to ensure the data is accurate.

The NW London network, covering 7 NNUs, has provided each of their units with the resources to purchase a laptop computer. This is to ensure easy access to the software and improve timely data input.

Data completion
Data collection has to be completed by discharge in order to produce a discharge letter. Frequent analysis encourages timely input else the records appear incomplete.

Validation and review of the data
Each unit receives a weekly error report. The network actively reviews the data regularly, producing reports that are reviewed at the network board. There is a feeling that the ‘naming and shaming’ of units who do not address the data quality has been beneficial in encouraging engagement in the improving of data quality. The Perinatal Network has a data user group which consists of Consultants and Data Managers, who meets quarterly to review all aspects of the data collection process.

Frequent reporting of the data promotes interest in the data. Reports always highlight the records that are not included in the analysis because it was incomplete. This allows a more reflective picture of the completeness of the data. Currently commissioning data received from the Trust from another data source is being compared to that collected through SEND. This is to review how robust the current data source is and the reliability of the SEND data.

Summary
This is a large network which includes 31 neonatal units. The enthusiasm and commitment of the network and analytical team is paramount to ensuring a co-ordinated approach to the data collection. Data is reviewed regularly and used to proactively appraise practice.
Table 7 – Areas of good practice

- Standardised approach to data collection across the network
- Use of the data has increased awareness for quality
- Frequent checking of the information to ensure quality and accuracy
- Use of modern technology to promote a more efficient process
- Engagement of local IT teams

Perinatal Institute

Data collection is undertaken for several projects at the Perinatal Institute including the Reducing Perinatal Mortality / Investing for Health project. This project collects a maternity dataset from 19 units in the West Midlands and utilises a web based database for submission to a centrally held server.

Use of the data

The data collected is used to inform the project regarding health and social factors that may affect pregnancy outcomes. Analysis is undertaken by the Perinatal Institute team which is then reported to the Project Board.

Staff Involvement

The project is governed by a board and co-ordinated from the Perinatal Institute. The project has funded the employment of data clerks, at band 2, for each Trust. The data clerk hours are allocated on a pro rata basis with one whole time equivalent post being funded per 3000 deliveries in the Trust, a guesstimate based on previous experiences with data collection projects. The job description of the data clerk specifies a required level of IT skill required by the post holder.

The Perinatal Institute provides specialist training and support to the data clerks involved in the project to ensure that there is clear understanding of the data items being collected and the clinical terms. The data clerks are regularly contacted to inform them of updates and changes. Consistency of approach is considered to be very important.

Process

For the most part data collection is undertaken retrospectively from the pregnancy notes either straight to the software or, by completion of a proforma which the data clerk then inputs to the software. Availability of computers varies between Trusts with not all identifying a designated space for the project data clerk to work.
Data Completion
The data is reported every quarter and data input is expected to be complete by the 3rd week after the quarters end. It is estimated that each record takes between 15-30 minutes to input. A 100% completeness rate is expected. Data completeness is being measured and reported back to the users.

Validation and review of the data
The Perinatal Institute has a Service Level Agreement with each contributing Trust requesting a 90% submission rate for records. A traffic light system has been developed which summarises performance against this standard. The software has inbuilt validation of the data items but there are just 3 mandatory fields. Each Trust is expected to identify a lead to oversee the data collection however it was highlighted that it is not taken seriously enough by Trusts to warrant very senior supervision.

Feedback is provided to the clerks, managers, Heads of Midwifery, Clinical Directors and Medical Directors. The Local Implementation Group lead also receives performance information.

Currently data is extracted by project staff at the Perinatal Institute. Local review of the data is possible through the software reporting functionality in areas such as key performance indicators, demographics and outcomes including mode of delivery, rates of prematurity and inductions.

Table 6 – Areas of good practice

| • Standardised approach to data collection |
| • Consistency in training and use of definitions |
| • Frequent checking of the information to ensure quality and accuracy |
| • Feedback of data quality to the Trust to promote awareness |

The Neonatal Survey (TNS)
The survey has been collecting neonatal data for nearly 20 years. Coverage includes NNUs from Northamptonshire to Yorkshire. The database of preterm births is managed by the University of Leicester and currently covers babies born between 23 and 32 weeks gestation; data for babies greater than 32 weeks is collected if they receive respiratory support, are transferred, have a diagnosis of Hypoxic Ischaemic Encephalopathy, or die.

Use of the data
More than 50 published scientific papers have been derived from the preterm births database. The data is also used to underpin clinical governance issues in neonatal intensive care services, facilitation of the planning of future strategy and development of services. The Neonatal Survey data are used in clinical research projects as well as to explore variations in outcomes and practice between units and districts and to generate hypotheses for further research. More recently the data is being submitted to NNAP.
**Staff involvement**
The data is collected in a combination of real time (if babies are still resident when the data is collected) and retrospectively utilising a team of specialist nurses, each responsible for gathering data from between 2 to 5 units. The team received peer training regarding the dataset and definitions, as well as the software. The report is compiled by Professors David Field and Liz Draper supported by data analysts and statisticians.

**Process**
The specialist nurse visits the units for which she is responsible for collecting the data. Any admissions within the required cohort are identified by review of the admission register. The dataset input from the medical notes into a laptop which has the TNS database loaded onto it. Every fortnight the data is transferred encrypted to a memory stick which is then downloaded to the main project database.

**Data completion**
Data is reported annually, January to December. The data collection is expected to be complete for the annual period, by the end of March. The timescale allows the opportunity to identify and collect any missing information and allow completeness to be assured.

**Validation and review of the data**
The bespoke database has inbuilt validations for the data field. The software measures completeness of the record allowing missing details to be easily apparent. Periodically, the specialist nurses will peer audit the data to ensure that the definitions are being applied consistently. The project team meets to review data quality and local issues are fed back to the individual units to promote improvement, additionally each unit receives the complete report. From 2010 short reports will be published quarterly, the subject matter being identified by consensus requests from contributing units.

**Summary**
This is a well established, well respected project whereby the use of focused specialist nurses to collect the information allows reliable, good quality data to be reported. Because of the confidence in the data it is able to be used for a variety of different uses and is viewed very positively by the neonatal community.

**Table 6 – Areas of good practice**

- Standardised approach to data collection
- Consistency in training and use of definitions
- Frequent checking of the information to ensure quality and accuracy
- Feedback of data quality to the Trust to promote awareness
Promoting good quality data

Based on the good practice points identified from the units and projects undertaking successful data entry the following points are useful in promoting good quality data:

**Enthusiastic leadership** – This appears to be the key in motivating clinical staff to participate in data collection. If a lead consultant shows enthusiasm then this is cascaded through to the rest of the team. If the lead clinician reviews and questions the data it has a direct effect on not only the quality of data input into software but it is also reflected in the medical case notes which are so essential as source data. The lead clinician has the influence to ensure that data collection is given a high profile. The buy-in to data collection that is seen in a number of these units is also reflected in the appointment of Information Managers and Analysts that work together with the clinical staff to promote better data quality.

**Clear guidance** – this is essential to ensure a consistent approach. Well defined data items allow little margin for mis-interpretation and means that when analysed there is confidence that like data is being reviewed.

**Use of the software to promote more efficient process within the NNU** – there is no doubt that provision of incentives to clinicians will encourage data input. Functionality such as the production of admission and discharge summaries derived from data input will promote better quality data entry, reducing the administrative work that is required by nurses, medic and secretaries. With the BADGER platform, for example, if there is sufficient confidence in the data then it can be utilised as the single source for multiple needs such as NNAP, NCCMDS, specialised commissioning. The ability to undertake data entry to one application is a good incentive to ensure data quality and several of the units that are successful in data collection have undertaken ‘shadow’ data collection to prove that the clinical data collected via a specialist system is often far superior to that collected by their PAS.

**Review of data** – giving the data clinical context is a very positive way to encourage effort to maintain good quality. The senior analyst from the London Perinatal Networks described a situation whereby initially there was a great deal of mistrust of the data that was being presented, however constant review has encouraged units to take collection seriously. The projects that have established review of the data can demonstrate increased compliance with completeness and accuracy. Data projects which are co-ordinated at a national, regional or network level provide a forum to review data quality and more importantly report it.

**Utilise modern technology** – with the advent of wireless technology it is now easily possible to undertake data entry real time at the cot side. Where this is embraced it allows the data collection to be given context. Where wireless technology is available in the unit the provision of a laptop computer for data entry is a relatively small investment to ensure timely data collection – this monetary outlay could be quickly remunerated if the data collection identified just one additional intensive care day.
Summary of findings in Staffordshire, Shropshire and the Black Country

Overview of survey results

Five out of six of the units in SSBC are currently using web based software to collect the neonatal data. The software is provided by the Perinatal Institute and is managed by specific project staff. Newcross are the exception and currently utilise the neonatal component of the Euroking maternity information system. This is managed within the Trust.

The data collected via the different systems, informs different neonatal data needs and includes;

- National Neonatal Audit Programme
- Regional Neonatal Register (Perinatal Institute)
- Neonatal Critical Care Minimum Dataset
- Specialised commissioning
- Local audit

When considering the uses of the data collected, it would be expected that each Trust would ensure that data quality is of the greatest importance. Of the 6 units in the SSBC network none could identify if their Trust has a data quality policy. It may be that indeed each Trust has produced a policy however if so knowledge of the policy was not evident in the staff that were questioned with regards to the neonatal data.

Of the six units none are currently utilising wireless technology and laptops to enable real time data entry to take place at the cot side. Hardware is usually situated in shared offices or in clinical areas and the computers often have multi-purpose and pressure on the availability of the machine.

Data collection

Data collection is undertaken both in real time and retrospectively. At Newcross, RHH and Stafford a record is created for the baby immediately on admission to the NNU. At these 3 units medical or nursing staff is responsible for ensuring this is undertaken and forms part of the process of admission. For RSH, UHNS and Walsall records are created at the next available opportunity for the clerk involved in the data collection. Retrospective creation of a record can occur after some time lag and this is an issue when utilising a multi – unit shared software. Particularly when transferring babies to other NNUs, it is of great benefit if the record has been created and the clinical data entered that can then be shared with the receiving unit.

The clinical data set is collected in several different ways. Two units have the clinical data entered into the software real time by the nursing staff. Three units collect the daily clinical data by completing a clinical log. This is undertaken by the nursing staff caring for the individual babies. The log is completed either at a specified time (usually 24.00hrs) or as events occur. The logs are then entered retrospectively into the software, in all 3 cases by ward/ data clerk.
Whilst this should be an effective method of obtaining the clinical data the ward clerks report that consistently the logs are incomplete and inaccurate. Information has to be cross checked with the nursing and medical notes to identify missing information.

In one unit the data clerk undertakes the data entry retrospectively from the medical notes.

Units undertaking a process that relies on input directly from the medical notes consistently report that a backlog of data to be input often occurs. This is attributed to the case notes being removed from the NNU before data entry is complete either for clinical coding or for use in other clinical areas because of re-admissions and outpatient appointments.

Only one unit (RHH) specified that data input had to be complete and up to date by the 5th day after the month end.

At New Cross daily data entry is a requirement of the Euroking system there is an expectation that it is completed. This is monitored regularly by a ward sister, ANNP and specialist midwife. Additionally data entry has to be complete at the baby’s discharge. This is because production of the discharge / transfer letter is dependent on the data input being complete and a baby cannot leave until the parents are in receipt of a copy of the letter.

The 4 remaining units used notification provided by the Perinatal Instiute of the date of data extract ion for production of the regional annual report, as the date for completion of data input. This lack of a clearly defined date for submission of data can be obstructive in the collection and input process as there is no driving force to ensure that the input is complete in an appropriate time frame. Two units reported that on previous occasions they have had to commit resources to clearing the backlog of records to be entered.

The BAPM dataset, NNAP dataset and NCCMDS overlap in a number of ways and because of this it would make sense to utilise one data source to address all the data needs. Utilising one source would reduce the amount of double data entry required. Use by the Trust for HRG submission would also drive timely submission of the data.

In 4 out of the 5 units they were unable to quantify the duration of time that was spent collecting and inputting data. The complexity of the case and different durations of stay means that there is no standard record. RSH specified 40 minutes was spent inputting each record.

Four of the units identified designated time that was identified exclusively for data collection. This ranged from 5 hours at UHNS, 10 hours at RHH and 16 hours at RSH and Walsall. This does not include the time spent by medical and nursing staff, to complete proformas and daily logs which are then input by clerks. At Newcross the data collection is part of everyone’s role and therefore no specific time was identified, however there is a full time IM&T manager who monitors both maternity and neonatal data.

**Personnel and training**

The Units in SSBC show variance in the staffs who undertake the *majority* of the data collection (Table 7). At Russells Hall for example, whilst the medical staff create a record for a baby on admission and the nursing staff complete a daily log of events that have happened to a baby, it is the Band 2 data clerk who is responsible for inputting and cross checking the majority of the clinical data. The same scenario is seen at Walsall and UHNS.
In all cases the clerks reported that they did not feel that the data collection was given a particularly high profile within the NNU and was often de-prioritised because of the pressure of the clinical workload.

At RWH nursing and medical staff are equally responsible for doing their part in the process and at Stafford all of the nursing staff are involved. These 2 units did appear to have managed to embed the data collection within the day to day routine of the NNU.

At RSH the band 2 clerk is supported by ANNPs and medical staff to achieve the data entry. Whilst this should ensure high quality data the workload of the ANNPs and medics is obstructive to achieving timely input. It was identified that the staff often struggle to avoid a backlog.

In 3 units the staff had not received specific training regarding the data set being collected. This may lead to issues regarding the interpretation of the dataset. In order to ensure uniformity in the data collection the users should receive the same training and this should be supported by a manual which defines the dataset for reference.

Reassuringly 5 out of the 6 had received specific training on the use and functionality of the software. For the users of MANNERS 3 units received training from the project administrator, whilst in the other 2 units training was cascaded from peers. The training for all users took place in the work place.

Table 7 – staff undertaking the majority of data collection

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Data completeness and validation

Four units identified that there was no defined level of completeness for the data input and that the current software being used did not support identification of data incompleteness. For the MANNERS using units a report is provided on a monthly basis that identifies key missing data, the report is e-mailed to key users with an expectation that they action the report.
The MANNERS software has some inbuilt validation regarding the actual values entered however it provides limited validation of missing data items with regards to the different datasets collected. There are no mandatory fields (other than the NHS number) and whilst this does allow the input of any data at any time this is also a disadvantage because it allows users to input incomplete information.

RWH reports that there are a number of mandatory fields in the Euroking application and this promotes better data completeness.

No units identified have a documented pathway for when issues are encountered, however help desk advice is provided by the Perinatal Institute for the MANNERS using units. This allows a consistent approach to managing issues.

None of the MANNERS using units reported access to raw data for checking and that the data has to be reviewed through the user interface. Data is extracted from the MANNERS database via data requests to the Perinatal Institute however, 4 of the 5 MANNERS using units perceived that the process for obtaining a data request is hard, with data requests taking between 1-2 and > 2 weeks to be received. The Trusts are unable to extract any data locally however they are provided with an HRG extract. It is questionable whether this extract is actually being utilised at present as 4 out of the 5 MANNERS using units reported that only occasional adhoc analysis is undertaken on the data. Unfortunately this lack of accessibility to the data promotes a feeling of unreliability in the data. This in turn serves to affect the data quality as it limits the effort that users put in to collecting and inputting the information.

As RWH manages their own database there is instant access for the IM&T manager. Data is readily available for checking and this helps with the validation process of the data. Frequent analysis is undertaken on the data in response to clinical questions and local audit needs. This easy access to the data inspires interest in the data and allows the data to be reactive to validation processes. This can only improve data quality.

For several years all the NNUs in the West Midlands have contributed data to the Regional Report that has been produced by the Perinatal Institute. The MANNERS data has been extracted and combined with non-MANNERS data to provide an overview of activity in the region. Unfortunately, the lack of accessibility to the data has perpetuated a feeling that the data is inaccurate and of poor quality, this limits the perceived usefulness of the regional report.

All 6 units report that the software they use to collect the data has functionality that enables them to produce admission, discharge and transfer summaries as well as unit activity. However, 4 of the MANNERS using units reported that they do not utilise this functionality. This is unfortunate as these reports are generated from the data entered and using the reports would highlight areas where the data is inaccurate and incomplete.

In 5 units there is no individual designated to oversee the quality of the neonatal data. Only one unit reports that they have a group that meets to oversee data quality.

There appears to be little or no robust review of the neonatal data and this is essential to inspire confidence in it.
**New Cross Hospital**

**Use of the data**
The data collected is utilised for specialised commissioning, NNAP, NCCMDS, network requirements as well as local audits. Frequent analysis is undertaken of the data. Data collection is undertaken utilising the EUROKING patient management system and is linked to the Trust maternity system.

**Staff Involvement**
All staff are involved in the data collection. The Information Manager, who has a clinical background, ensures that the neonatal data collection is given a high profile. There is an attitude that the data collection is important.

**Process**
The data collection and input at New Cross is very well established and forms a part of the everyday care that a baby receives once admitted to the NNU (figure 1). There is a linked maternity and neonatal system which means that once the delivery details have been entered by the maternity ward clerk a record is then created for the baby. Initial demographics do not have to be input by the NNU team as they are imported from the hospital PAS system. The admitting ANNP / Medic are responsible for entering admission information onto the system with the subsequent clinical data being entered by nursing staff at 24.00 reflecting the previous 24 hours care. The data input has to be completed at discharge. The baby is not allowed to leave the unit until they have a discharge letter. The discharge letter cannot be produced until key pages in the software have been completed – hence this ensures that the data entry is completed in a timely manner. A copy of the discharge letter is provided to the parents and this also acts as a quality check as the parents will very quickly identify if any inaccurate data appears.

**Care categories**
Care Category data is input into the electronic system on a daily basis by the nurses caring for the baby.

**Validation and review of the data**
The data is checked daily by the Information Manager who is supported by an ANNP and a Neonatal Unit Sister. Queries are actioned in a timely fashion because the data is being reviewed frequently. The senior clinician for the unit checks the data monthly and prior to it’s submission to the Perinatal Institute.

**Data completion**
By virtue of the need to complete a discharge letter the data input is completed in a timely fashion.

**Issues identified**
1. The software was identified as being in need of updating
2. The increasing data requirement needs put strain on the existing personnel resource which is shared with Maternity

**Russells Hall Hospital**

**Use of the data**
The neonatal data collected is utilised for the report of the regional neonatal register, NNAP, submissions for specialised commissioning and network information. The data has also been utilised to supply information to the Neonatal Task Force and BLISS.
Staff involvement
Data collection at Russells Hall Hospital is reliant on the medical staff, nursing staff and all playing their part. There are approximately 12 hours of data clerk time dedicated to the collection of the neonatal data and activity data.

Process
The process begins with the admission of a baby to the NNU (figure 2). There is usually fairly rapid provision of the NHS number so there should not be a delay in creating a record for each baby. The initial record is created by the ward clerk or in their absence this should be undertaken by the medical staff / ANNP admitting the baby. The admission events should be input at the same time as the other clerking responsibilities. Thereafter daily support logs are completed by the nursing staff caring for the baby. These logs are kept with the nursing process and should be completed as the nurse updates the notes.

The data clerk is responsible for inputting the data from the daily logs and this is undertaken 2-3 times per week. At discharge additional information such as cranial ultrasound scans, screening and neonatal blood spot testing is entered, support for clinical terminology is provided by ANNPs and the lead nurses.

Discharge letters are generated from the software and are the responsibility of the medical staff who undertake the discharge examination however this is often not completed and results in a backlog of letters awaiting completion. The delay can often be in excess of 7 days between discharge and completion of the letter.

Care Categories
The level of care data is collected by the shift lead three times per day at 07.00, 17.00 and 24.00. This information is collated by the data clerk and reported to the Trust Information Department and the Perinatal Institute as a record of unit activity.

Validation and review of the data
A staff nurse is allocated approximately 12 hours per month non-clinical time to review the daily logs and check for completeness and accuracy.

The data clerk ensures the information is checked for missing items and inconsistencies and utilises the software functionality to check both the clinical data and the level of care category data. The data clerk is the recipient of validation reports from the Perinatal Institute which she acts upon.

Data Completion
The data clerk attempts to complete data entry on all discharged babies by the 5th day after the month end in line with the submission of the category of care data. This is to ensure that she has had the opportunity to cross check the category of care data with that calculated based on the clinical care entered into the software.

Issues identified
1. The data clerk identifies that the level of care data recorded by the shift lead often does not correlate the BAPM definitions but that she has implemented a process to review and adjust the level accordingly and this information is regularly fed back to the shift leads.
2. Medical staff will often not complete the admission events which results in this having to be undertaken by either the data clerk or at discharge.
3. Sometimes there is missing data where the nurse has failed to complete the daily log.
4. The nurse responsible for checking the logs often does not get the allocated non-clinical time due to workload pressures.
5. There is often a delay between the discharge of the baby and completion of the letter.
6. The data is not utilised to inform local audit topics.
7. There is no senior medical review of the data.

**Royal Shrewsbury Hospital**

**Use of the data**
The data input into MANNERS is utilised for inclusion in the regional annual report, NNAP and some local audits. There appears to be little confidence in the quality of the data collected using the software and this is attributed to what is perceived as cumbersome software.

**Staff involvement**
There are 16 hours used to facilitate the data collection however these are actually ward clerk hours that are re-directed to undertake the data input. There is some time identified on the registrar rota to undertake administrative duties but this is rarely able to be utilised due to the clinical workload. ANNPs and medics are required to contribute to the checking of the data that has been entered.

**Process**
A ward clerk will create a record for the baby on admission (figure 3). The (data) clerk undertakes retrospective data entry from the medical notes and inputs this information into the software. Once discharged the medical staff/ANNPs input additional clinical data and check the record for completeness and accuracy.

**Care categories**
The unit has a manual system for collection of the activity data and there is a solid confidence in this which is underpinned by audit work to review the accuracy. The dependency levels are identified by the shift lead.

**Validation and review of the data**
There is quite a struggle to get the data input into the software and the validation reports provided by the Perinatal Institute are not utilised. There lack of belief in the accuracy of the data collected through the software and hence a belief that the validation reports are not of use because of the amount of issues highlighted.

**Data completion**
There is often a backlog of records to be entered which is hindered by clinical workload. The quality of record keeping often makes the data collection difficult and time consuming. There is a problem with medical notes being removed for use in outpatient clinics making data completion difficult. In preparation for the extraction of the data for the regional annual report, two senior clinicians spent a considerable period of time undertaking data entry to ensure that all records were entered.

**Issues identified**
1. The software was identified as being cumbersome and not intuitive and therefore hindering data input.
2. A large amount of activity is undertaken on the postnatal ward and the current software does not support the collection. This is an issue for this unit that believes the work load contributes significantly to the activity.
3. There was concern that resources for the data collection are limited compared to the increasing data requirements.
4. Use of senior clinicians to actually undertake data entry is an expensive resource.

**Stafford Hospital**

**Use of the data**
The neonatal data collected is utilised for the report of the regional neonatal register, NNAP, submissions for specialised commissioning and network information. The data is currently input into the MANNERS software provided by the Perinatal Institute.

**Staff involvement**
Data input is undertaken by the nursing staff on the NNU. No additional resource is identified to undertake the data collection or checking, it is just undertaken as part of each nurses day to day work.

**Process**
The nurses create the records and input all the clinical data (figure 4). Each nurse is responsible for the input of daily data regarding the babies in their care. This is undertaken at the end of the shift with good availability of desktop computers. Data entry is completed on the day of discharge.

**Care Categories**
The level of care data is collected by the nursing staff on a daily basis.

**Validation and review of the data**
The data review is done entirely by a band 6 nurse who reviews the data with comparing it with the medical notes, including the accuracy of the clinical data and the categories of care. The band 6 nurse receives the data quality reports form the Perinatal Institute and is responsible for actioning these.

**Data Completion**
The data is completed at discharge so there do not appear to be any issues regarding back log of data entry.

**Issues identified**
1. The current software has limited inbuilt validation checks.
2. There is limited reporting of the data.

**University Hospital North Staffordshire**

**Use of the data**
The data collected is used submitted to NNAP, used to compile a local and regional annual report. The data is currently input into the MANNERS software provided by the Perinatal Institute.

**Staff involvement**
The data collection is undertaken by medical and nursing staff by completion of proformas. Input of the data at UHNS is primarily undertaken by a support worker and medical secretary.
Process
The process relies on medical staff completing a proforma at admission and the nursing staff maintaining a daily log from which the secretary can identify the daily clinical events that have occurred to each baby (figure 5). Twice weekly the secretary inputs the data from the daily log. Once the baby is discharged notes are retained until the medical staff has the opportunity to complete the proforma with additional data e.g. cranial ultrasound scans, sepsis and NEC. Once the proforma has been completed the secretary will input the outstanding data. The discharge letters generated by the software are not utilised.
The process at UHNS is dominated by retrospective data entry and there is often a delay in data input which has resulted in there being a current backlog of sixty babies where data entry has not been completed.

Care Categories
The care category data is entered into a book and also into a separate information system. It was identified that the levels of care recorded by the nurses do not always correlate with those defined (BAPM 2001). In particular babies may be identified as receiving intensive care on the day of admission irrespective of what their actual dependency was.

Validation and review of the data
The validation reports provided by the Perinatal Institute are acted on but this is not always in a timely fashion. The backlog of data awaiting input can be significant and by the time the staff is in a position to action the validations the notes may be unavailable as they are required for outpatient clinics.
A clinician does try to review the data but relies on a raw data file being produced from the Perinatal Institute.

Data completion
Data completion is often delayed. There is often a backlog of data entry which only catches up when a deadline is applied for data extraction – for example in the case of the provision of the regional annual report. The confused filing system for medical notes seems to exacerbate the difficulties in getting the medics to complete the proforma.
There is a medical lead identified for the data collection but his role seems to be predominantly to encourage the medics to complete the proformas.

Main issues identified
1. Data collection is not the only role of the staff involved and there are often conflicting needs that mean data collection may be de-prioritised
2. There are significant time lags between the admission of a baby and completion of data entry
3. Data entry is reliant on the use of a proforma that is completed by medical staff but this is often incomplete and inaccurate meaning that the secretary spends significant time seeking clarification from the medical case notes
4. Case notes may be removed from the unit as they are required for appointments or re-admissions to other wards and this causes additional delays.
5. Notes awaiting completion of the proforma are stored in a particular office along with the notes where the proforma has been completed. There is no clear system of identifying which notes have had the proforma completed and which haven’t. This causes confusion.
6. The staff that primarily undertake the data collection and input are keen to improve their process but there is a sense that that the data collection is perceived as being of little importance with no senior staff involvement that monitors the workload and reviews the efficiency of the process.

7. In the past the raw data was reviewed by a member of the medical team however this began to be more difficult when the database changed and the data file was no longer provided back to the Trust in the same format.

8. The lack of timeliness of the data collection and input hinders the ability to action the validations effectively

Manor Hospital, Walsall

Use of the data
The neonatal data collected is utilised for the report of the regional neonatal register, NNAP, submissions for specialised commissioning and network information. The data is input into the MANNERS software provided by the Perinatal Institute.

Staff involvement
There are 16 clerk hours, over two days per week, identified for the collection and input of the neonatal dataset and the activity data. The nursing staff are involved in the data collection as part of their role by assigning care categories and completing daily logs.

Process
On admission to the NNU a daily log is commenced for each baby (figure 6). The daily support log is then completed by the night staff for the previous 24 hour period. At the first opportunity after admission, the data clerk will create a record for the baby. Cross checks are made with the PAS system and admission register to ensure that all admissions are captured.

The data clerk has developed a systematic approach to capturing the neonatal dataset in response to the validation reports that are produced on a monthly basis by the Perinatal Institute. This has allowed identification of key data items that are required such as: maternal antenatal steroids, 1st blood pressure, 1st temperature, and 1st consultation. As far as possible the data clerk enters the daily logs whilst the baby is an inpatient on the NNU. At discharge the data clerk will review the medical notes for information such as cranial ultrasound scans and ROP screening.

Care Categories
The level of care is assigned to a baby by the nursing staff for a 24 hour period. The data clerk will cross check the assigned level of care with that calculated by the MANNERS software and look for inconsistencies. The data clerk seeks clarification from medical and nursing staff for issues identified.

Validation and review of the data
Use is made of the validation reports provided from the Perinatal Institute to support identification of incomplete data and where inconsistencies are evident. The data clerk makes use of the functionality within the software to check clinical data and the care category data. Whilst there is a senior medic identified as being responsible for the data there is no local review of the data which could identify issues of accuracy.
Issues identified

1. The data clerk identified that the level of care recorded by the nursing staff often does not correlate with the BAPM definitions and is inconsistent with that calculated by the software.
2. The daily logs are often incomplete or inaccurate and the data clerk spends considerable time clarifying data.
3. Despite there being a wealth of data available in the data base it is not utilised for local audit. The process for obtaining data requests is perceived as being cumbersome and requests for data have not been successful.
4. The lack of feedback regarding the usefulness of the data and its completeness and accuracy is a cause of concern for the data clerk, who is clearly very conscientious regarding the collection.
Process diagrams

Figure 1 – New Cross Hospital Process for Data Collection

- New Cross
- Baby admitted to NNJ
- Baby record created
- Demographic details imported from PAS
- Admission information entered by admitting doctor/ANNP
- Daily clinical data input at 24:00 for previous 24 hours
- Data is used to inform: NNAP, NCCMDBS, Network, Specialised commissioning, Local Audit
- The data is regularly checked by the IM&T manager, Ward Sister, ANNIP, Consultant lead
- Baby discharge/transferred from NNJ
- Any additional information is entered into the system in order to obtain the discharge letter
- The discharge letter must be generated before the baby leaves the unit. The letter cannot be generated unless the record is completed

Best practice—Data reviewed by senior clinicians for completeness and accuracy

Best practice—no double data entry
Figure 2 – Russells Hall Hospital Process for Data Collection

Russells Hall Hospital

- Ward clerk
- Nursing staff
- Medical Staff
- Data Clerk

Data is used to inform:
- NNAP Network
- Specialised commissioning

Baby admitted to NNU

Baby record created

Admission information entered by admitting doctor/ANNP

Daily clinical data entered onto a log - paper based

Logs are often incomplete or inaccurate

A nurse is allocated non-clinical time to check the logs for accuracy

Level of care for each baby collected by shift lead 3 times daily - paper based

Best practice - data entry completed by the 1st week after month end

Logs entered - inconsistencies and missing data checked with the medical notes

Levels of care collated and submitted to Trust Information Dept and PI

There is often a delay of >7 days awaiting completion of the discharge letter by the medical staff

Any additional information is entered into the software to obtain the discharge letter

Baby discharge/ transferred from NNU

Data entry completed
Figure 3 – Royal Shrewsbury Hospital Process for Data Collection

Royal Shrewsbury Hospital

Data is used to inform:
- NNAP
- Network
- Regional report
- Specialised commissioning

Ward clerk

Nursing staff

Medical Staff

Baby admitted to NNU

Baby record created – demographics entered

Retrospective data entry is completed from the medical notes

Level of care for each baby collected by shift lead x3 times daily – paper based

Activity data collated and informs specialised commissioning

Baby discharge / transferred from NNU

Additional information is entered into the software by medical staff / ANNPs

Often a large backlog of records to be entered due to clinical workload pressures

Medical notes often removed for use in OPA so data input not completed

Data entry checked and completed by medical staff and ANNPs
Figure 4 – Stafford Hospital Process for Data Collection

Stafford Hospital

Nursing staff

Data is used to inform:
Regional Neonatal Register
NNAP
Network
Specialised commissioning

Baby admitted to NNU

Baby record created

Daily clinical data entered into the software

Level of care for each baby collected by shift lead

Baby discharge/ transferred from NNU

Data checking undertaken and checked against medical notes

Data quality reports actioned
Figure 5 – UHNS Process for Data Collection

University Hospital North Staffs
- Secretary
- Nursing staff
- Medical Staff

Baby admitted to NNU

Baby record created

Demographics are completed on a proforma

Proforma is often incomplete and inaccurate

Clinical log completed daily at 24:00 (for previous 24 hours)

Logs often incomplete

Twice weekly the daily log is input into the database

The hours are not covered in the event of sickness/annual leave

Baby discharge/ transferred from NNU

Proforma completed with additional information e.g. screening, CUSS, infection

Proformas often incomplete

Data entry completed

The hours are not covered in the event of sickness/annual leave

No clear system for the notes – difficult for the medics to identify those that need completion and for the clerks to identify those where the proforma is complete

Notes may be removed for OPD appointments before proformas have been complete or data entry undertaken

All baby names are documented in a book by nursing staff and this book is used to identify which babies have had a record created on MANNERS. There may be a delay of > 2 days for the record to be created
Figure 6 – Manor Hospital Process for Data Collection

Manor Hospital, Walsall

- Nursing staff
- Data Clerk

Data is used to inform:
- Regional Neonatal Register
- NNAP Network
- Specialised commissioning

Baby admitted to NNU

Baby record created

- Daily clinical data entered onto a log – paper based
- Level of care for each baby collected by shift lead 3 times daily – paper based
- Level of care applied by shift lead is often incorrect based on the BAPM definitions

Logs are often incomplete or in accurate

Logs entered – inconsistencies and missing data checked with the medical notes

Baby discharge/ transferred from NNU

Additional information is entered into the software and validations actioned

Data entry completed
RECOMMENDATIONS TO ENSURE HIGH QUALITY DATA

Following review of the information available for achieving good quality data and the processes currently being undertaken in SSBCNN the following actions are recommended:

1. All Trusts adopt a standardised software solution which will allow for collection of the data requirements identified in Principle 8 of the toolkit for high quality neonatal service and this should include NCCMDS, NNAP and the results of practice throughout neonatal medicine and surgery.\(^{28}\)

2. There should be a regional / network lead for data responsible for co-ordination of data collection. The role should be utilised to promote the checking of data and provide analysis that would feed into the network board and sub groups to providing information to facilitate the development of a high class neonatal service.

3. Data review should be encouraged at a local and network level with frequent review of completeness. Clinical validation of the data collected should be encouraged at several levels including ongoing audit of the medical case notes to ensure accuracy and reflection of the patient journey, review of discharge summaries which are generated from software by a senior clinician. Each unit should review monthly activity data to identify discrepancies and inaccuracies and the data should be reviewed at the network level to allow meaningful comparisons and identify issues. This could be facilitated by the establishment of a quality meeting where data is reported in order to highlight issues.

4. Each unit should have a nominated clinical lead / champion with the authority to influence day to day practice in order to facilitate data collection. The lead should have designated time to review and validate data and provide feedback to the neonatal team. This champion should be participant in local and network data quality review meetings.

5. All medical and nursing staff should receive education and training in the data collection process and its importance. A documented pathway for the input of data should be adopted to ensure that all staff is aware of their responsibilities regarding the data collection. Examples of such pathways have been developed by Birmingham Women’s Hospital and could easily be adapted for use in the SSBCNN.

6. Units should be encouraged to utilise wireless technology to promote timely data collection that is reactive to changes in diagnosis and condition. A number of units are relatively newly built and so can access wireless technology. For these units provision of mobile computers would ensure that data reporting can be undertaken at the cot side. Older units may require investment in the IT infrastructure to support mobile technology.

7. The expertise of data clerks should be utilised to check the accuracy and completeness of data with the opportunity to feedback problems to the rest of the team.
**Purpose**

Increasing requirements for neonatal data has been identified however the quality of the data collected is often called into question. The purpose of this survey is to identify practice that may contribute or hinder the achievement of good quality neonatal data.

### Overview of data collection process

| What uses are made of the data collected? | ☐ National project (NNAP)  
☒ Network information  
☐ Trust NCCMDS  
☐ Specialised commissioning  
☐ Local Audit  
☐ Don’t know  
☐ Other – specify below |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Specify:</td>
<td></td>
</tr>
</tbody>
</table>
| Do the Trust / organisation have a data quality policy? | ☐ Yes  
☐ No  
☐ Don’t know |
| What is the availability of PC terminals? | ☐ At each cot side  
☐ Within each dependency area  
☐ In shared offices  
☐ Own office  
☐ Other – specify below |
| Specify:                                |                                                                  |
## Data Collection

| How is the demographic data collected? | □ Real time straight to input  
| | □ Real time to proforma  
| | □ Retrospective using medical notes  
| | □ Retrospective using a proforma  
| | □ Combination  
| Who inputs the demographic data? | □ Clerk  
| | □ Nurse  
| | □ Medic  
| | □ Combination  
| How is the clinical data collected? | □ Real time straight to input  
| | □ Real time to proforma  
| | □ Retrospective using medical notes  
| | □ Retrospective using a proforma  
| | □ Combination  
| Who inputs the clinical data? | □ Clerk  
| | □ Nurse  
| | □ Medic  
| | □ Combination  
| Is there a defined timetable for submission? | □ Yes – specify below  
| | □ No  
| Specify: |  
| What duration of time is spent collecting the data (per record)? |  
| What duration of time is spent inputting the data (per record)? |  
| How much time per week is identified exclusively for data collection (in hours)? |  

[40]
# Personnel and Training

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pay bad for the member of staff undertaking the majority of the data collection</td>
<td>☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ Medical scale</td>
</tr>
<tr>
<td>Is there a designated lead who oversees data collection?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Has the staff had specific training regarding the data set and definitions?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Has the staff had specific training regarding the software?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Has the staff had specific training regarding the IT skills?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Who undertakes the training?</td>
<td>☐ Peers ☐ Specialist trainers ☐ Other – specify below</td>
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<tr>
<td>Specify:</td>
<td></td>
</tr>
<tr>
<td>Where does the training take place?</td>
<td>☐ Work place ☐ Offsite ☐ Other – specify below</td>
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<td>Specify:</td>
<td></td>
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## Data completeness and Validation

<table>
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<tr>
<th>Question</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is there a defined level of completeness for data collection and input?</td>
<td>Yes</td>
<td>No</td>
<td>Don’t know</td>
</tr>
<tr>
<td>Is data completeness measured?</td>
<td>Yes</td>
<td>No</td>
<td>Don’t know</td>
</tr>
<tr>
<td>What is the feedback mechanism? Specify:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a documented pathway to follow for any issues encountered?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Is there access to ‘raw’ data for checking?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Does the software have inbuilt validation checks?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Are there any mandatory fields?</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
# Data Analysis

<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>How easy is the data extraction process?</td>
<td>Easy, Hard, Neither, Don’t know</td>
</tr>
<tr>
<td>How long does it take to obtain data extracts/requests?</td>
<td>1 day, 2-3 days, 4-5 days, 6-7 days, 1-2 weeks, &gt; 2 weeks</td>
</tr>
<tr>
<td>Who retrieves the data for analysis?</td>
<td>Information staff, Project staff, No designated individual, Don’t know</td>
</tr>
<tr>
<td>Does the Trust undertake any analysis locally?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>How frequently is analysis undertaken?</td>
<td>Weekly, Monthly, Annually, Ad hoc</td>
</tr>
<tr>
<td>Is there any central analysis that reports the data?</td>
<td>Yes, No, Don’t know</td>
</tr>
<tr>
<td>Is there any local analysis that reports the data?</td>
<td>Yes, No, Don’t know</td>
</tr>
<tr>
<td>Does the software have any reporting functionality?</td>
<td>Yes, No</td>
</tr>
<tr>
<td>Specify:</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Answer Options</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Which predetermined reports does the software produce?</td>
<td>☐ Admission summary ☐ Discharge summary ☐ Transfer summary ☐ Unit activity ☐ Others – specify below</td>
</tr>
<tr>
<td>Are the reports utilized?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>Is there a single individual held responsible for data quality?</td>
<td>☐ Yes ☐ No</td>
</tr>
<tr>
<td>What is the grade of the individual responsible for data quality?</td>
<td>☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ Medical scale</td>
</tr>
<tr>
<td>Is there a group that oversees data quality?</td>
<td>☐ Regionally led ☐ Network led ☐ Trust led ☐ Unit led ☐ None ☐ Other – specify below</td>
</tr>
<tr>
<td>Specify:</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2 – Example of BWH pathway

**Badger pathway for NICU admissions from other Badger Neonatal Units**

**NNAP Data**
Very important to ensure this data is accurate.
1. Admission Temperature
2. Admission BP
3. Time of Consultation
4. Time of Surfactant
This information should be known for all babies admitted to NICU
You should never tick ‘unknown’. If you are not sure, leave them blank. We can check them later on the rounds.

1. Doctor/ANNP to transfer baby’s details across
2. Transfer across the Badger details from other hospital
3. Complete Admissions details form
4. Routine examination of the newborn form
5. Assessment and plan of management (free text box)

Print out Admission Report
Admitting doctor to sign and date it
Copy to be filed in baby’s notes

Ward clerks to check following details are correct:
1. NHS Number (please enter later, if not immediately available)
2. Parents details form
3. GP details form

**Daily Updates / Level of Care**
Nurse looking after individual baby to complete
Extended daily summary form

**Clinical Summary of Stay Form**
Doctor/ANNP to update any new diagnosis
And results e.g. Cranial USS/ROP screening / AXR etc.

Night sister in charge to ensure
Daily Summary sheet is completed

General discharge details form
To be complete by discharging Doctor/ANNP

*House Keeping to ensure data complete and updated:*
1. Night Sister in-charge
2. Monday Grand Round
3. Friday Afternoon
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