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National Neonatal Audit Programme 2016 and 2017 Audit Measures
Overview of data derivation, data entry and outputs

Royal College of Paediatrics and Child Health,
National Neonatal Audit Programme

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National Neonatal Audit Programme (NNAP)
2016 and 2017 Audit Measures
Overview of data derivation, data entry and outputs

This document sets out the details of the 2016 and 2017 NNAP audit measures and describes, for each of the measures, the following details:

- The eligibility for the inclusion of a baby
- Where the required data should be entered on BadgerNet
- How the results will be attributed
- The related data reporting outputs that the NNAP will produce

The audit measures are numbered in this document for identification purposes. The 5 new NNAP Audit Measures that were introduced for 2017 data are listed first for ease of reference.

	NNAP Audit Measure	Page
1)	**Were liveborn and admitted babies born at less than 27 weeks gestation delivered in maternity services on the same site as designated NICUs?**	3
2)	**For babies with a birth gestation of 34-36 weeks completed inclusive, who did not have any surgery or a transfer during any admission:** **How many "Special Care[a]" or "Normal care[b]" days were provided when oxygen was not administered?** (a= HRG 3 or b= HRG 5, as defined by the NHS England neonatal critical care service specification)	5
3)	**For babies with a birth gestation of ≥ 37 weeks, who did not have any surgery or a transfer during any admission:** **How many "Special Care[a]" or "Normal care[b]" days were provided when oxygen was not administered?** (a= HRG 3 or b= HRG 5, as defined by the NHS England neonatal critical care service specification)	7
4)	**What proportion of liveborn babies born at less than 32 weeks gestation who were admitted to a neonatal unit met the NNAP surveillance definition for Necrotising entercolitis (NEC) on one or more occasion?**	9
5)	**For all parents of babies with admissions of greater than 24 hours, did at least one parent attend a consultant ward round?**	11
6)	**Are all mothers who deliver babies between 24 and 34 weeks gestation inclusive given any dose of antenatal steroids?**	13
7)	**Are mothers who deliver babies below 30 weeks gestation given Magnesium Sulphate in the 24 hours prior to delivery?**	15
8)	**Do all babies of less than 32 weeks gestation have their temperature taken within an hour after birth?**	17

	and **What proportion of these admission temperatures recorded within one hour are within the recommended range of 36.5˚C to 37.5˚C?**	
9)	**Is there a documented consultation with parents by a senior member of the neonatal team within 24 hours of admission?**	19
10)	**Do all babies born weighing less than 1501g, or at gestational age of less than 32 weeks, undergo the first Retinopathy of Prematurity (ROP) screening in accordance with the current guideline recommendations?**	21
11)	**What proportion of babies born at greater than 34 weeks gestation have an encephalopathy within the first three full calendar days after birth?**	24
12)	**Ι2ǿ ΥΙ·ƴè ōΙ·ōλŜǎ ΚΙ·ǾŜ Ι· LJ2ǎλǘλǾŜ ōƒ22Ř ŎdzƭǘdzNJŜ óΙ·ƴè ƎNJ2ǿǘΚύ ǿλǘΚ Ι· ŎŜƴǘNJΙ·ƒ ƭλƴŜ LJNJŜǎŜƴǘΣ Ι·ŦǘŜNJ ǘΚŜ ŦλNJǎǘ тн Κ2dzNJǎ 2Ŧ ƭλŦŜ LJŜNJ мллл ƭλƴŜ ŘΙ·èǎΚ**	25
13)	**Recording of Blood stream and cerebrospinal fluid (CSF) cultures** **What percentage of babies admitted to a neonatal unit have:** (a) one or more episodes of a pure growth of a pathogen from blood; (b) one or more episode of a pure growth of a pathogen from CSF; (c) either a pure growth of a skin commensal or a mixed growth with ≥3 clinical signs at the time of blood sampling?	27
14)	**How many blood stream infections are there on a NNU per 1000 days of central line care?** a) The growth of a recognised pathogen in pure culture, or in the case of a mixed growth, or growth of skin commensal, the added requirement for 3 or more of 10 predefined clinical signs b) Central line= UAC, UVC, percutaneous long line or surgically inserted longline.	29
15)	**What proportion of babies born at less than 32 weeks developed Bronchopulmonary Dysplasia?**	31
16)	**What proportion of babies born at less than 33 weeks gestation were receiving any of their own mother's milk at discharge to home from a neonatal unit?**	33
17)	**Are rates of normal survival at two years comparable in similar babies from similar neonatal units?**	35

1) **<u>NNAP audit measure</u>: Were liveborn and admitted babies born at less than 27 weeks gestation delivered in maternity services on the same site as designated NICUs?**

Eligible babies and mothers

- Babies will be included for the analysis if their gestation at birth was less than 27 weeks and they were admitted to a neonatal unit.
- Only data from the first known episode of care will be considered for analysis.
- In the case of multiple births, only one baby will be included so that each mother is only counted once per delivery

Attribution

Attribution will be to the neonatal ODN of birth. In cases where mothers deliver in a location not associated with a neonatal ODN (home, in transit, unknown, etc.) they will be assigned to a neonatal ODN based on the hospital of first admission.

Categorising appropriately designated units

NNAP will use data from the place of birth to determine the level of neonatal unit within the hospital where babies were delivered.
Places of birth will be classified as follows:

Place of birth	NNAP Category
Hospital with a designated NICU	Delivered in appropriately designated location (NICU)
Hospital with a designated LNU/SCU	Delivered in inappropriately designated location (LNU/SCU)
Hospital with no designated neonatal unit/ Non-Hospital location	Delivered in location without neonatal facilities

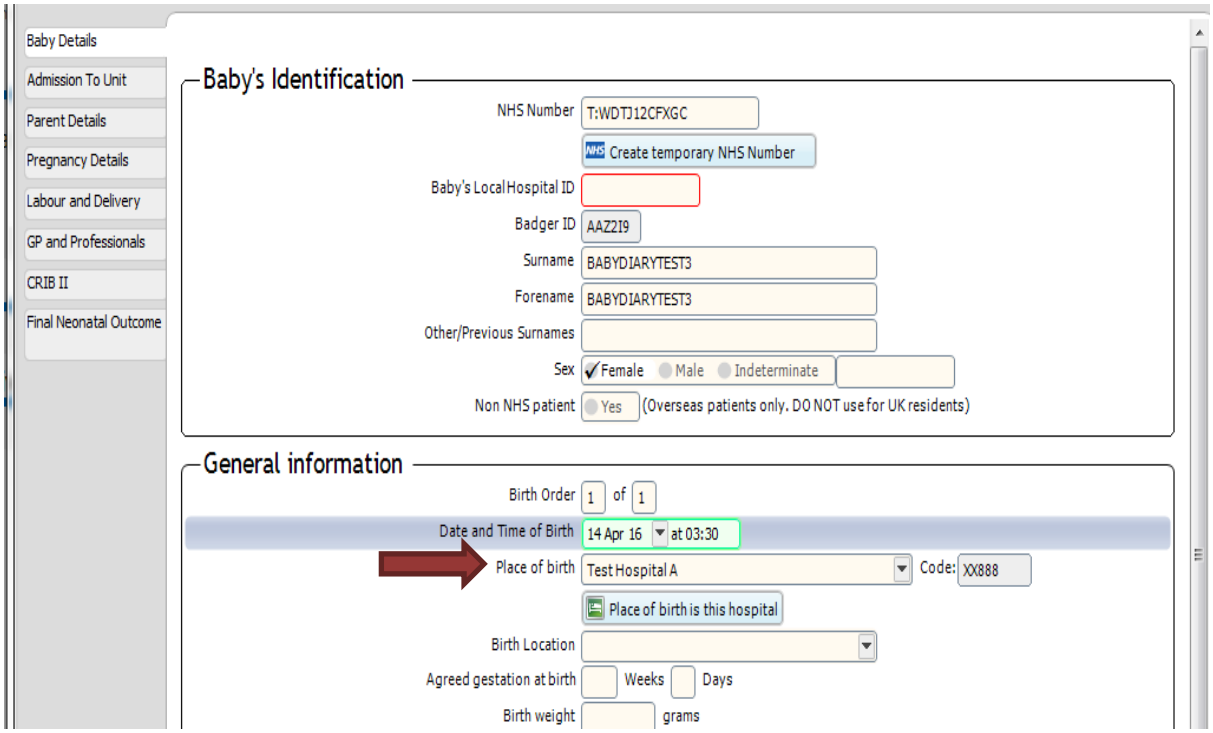
Outputs Tables

- Preterm infants delivered at < 27 weeks gestation: By ODN

Data Sources for the babies < 27 weeks born in appropriate units audit measure

Data on place of birth are captured on BadgerNet on the "Details at Birth and Admission" page. Values from the "Place of birth" field are used by NNAP for analysis (indicated below).

Related areas of data entry within BadgerNet:



2) **<u>NNAP audit measure</u>: For babies with a birth gestation of 34-36 weeks completed inclusive, who did not have any surgery or a transfer during any admission: How many "Special Care[a]" or "Normal care[b]" days were provided when oxygen was not administered?**

(a= HRG 3 or b= HRG 5, as defined by the NHS England neonatal critical care service specification)

Eligible babies

Babies will be included for the analysis of care days if they meet the following criteria:

- The baby was born between 34 and 36 weeks gestational age
- The baby received all their neonatal care in one neonatal unit, and were admitted for at least 12 hours.
- The baby did not have major surgery on any day of their neonatal care.
- Babies will be included annually based on their year of birth

  A second denominator of all live births within the gestational age range in the hospital (34-36 weeks) will be used when available.

Attribution

Attribution will be to the neonatal unit of admission.

Categorising care days

NNAP will use the pre-calculated care levels from BadgerNet to determine care days that are classified as HRG 3 or HRG 5 with "no added oxygen" and no other form of non-invasive respiratory support provided.

Days of care will be defined as having missing data if there is no data available to determine respiratory support.

Outputs Tables

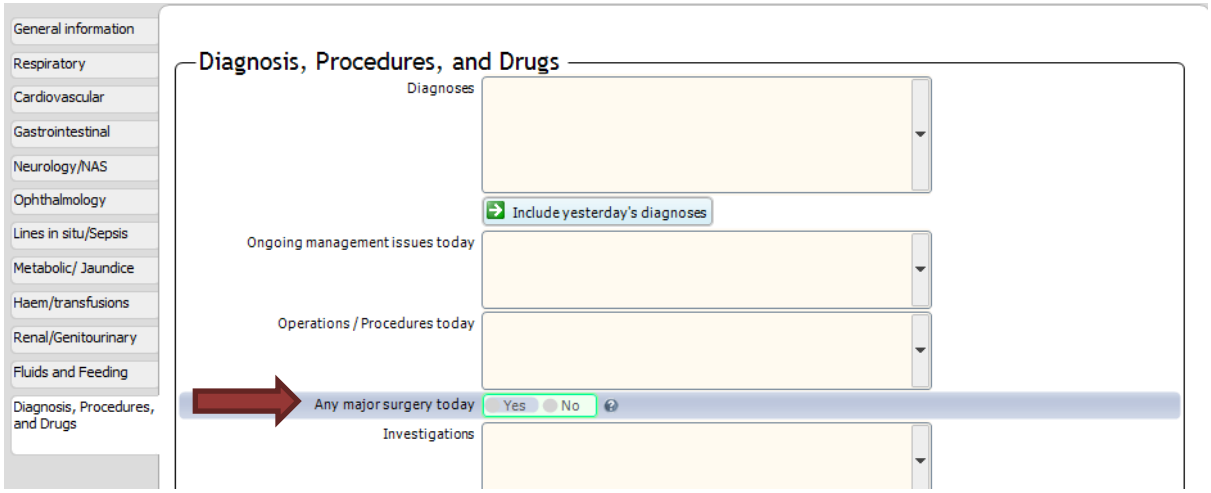
- Special care and normal care provision for infants born 34-36 weeks gestational age: By Unit designation (SCU/LNU/NICU)
- Special care and normal care provision for infants born 34-36 weeks gestational age: By ODN
- *Special care and normal care provision for infants born 34-36 weeks gestational age: By Unit (Online only)*

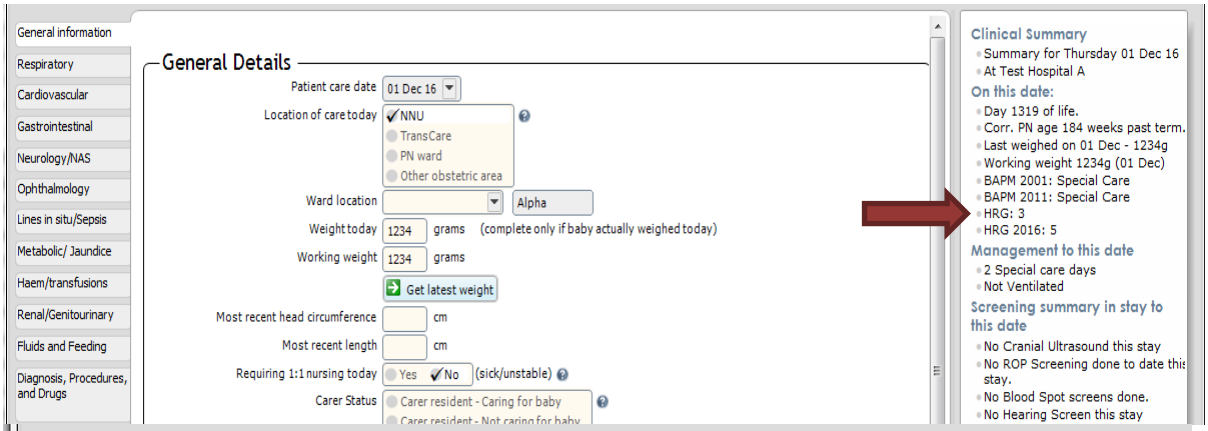
Data Sources

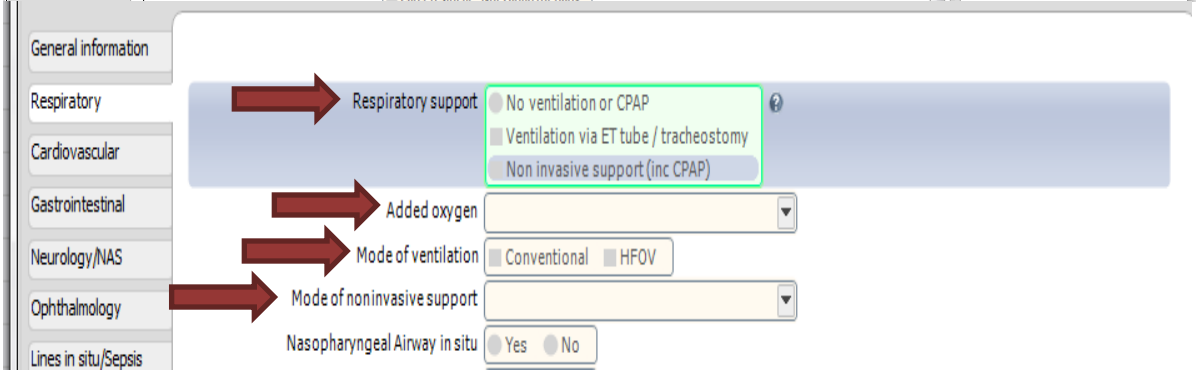
Details from the "Any major surgery today" field from daily data summaries will be used to determine and exclude babies who received surgery from the analysis.

Furthermore, the pre-calculated care level from each daily data summary, and the respiratory support details for that day, will be used to categorise care days.

Related areas of data entry within BadgerNet:







3) **<u>NNAP audit measure</u>: For babies with a birth gestation of ≥ 37 weeks, who did not have any surgery or a transfer during any admission: How many "Special Care[a]" or "Normal care[b]" days were provided when oxygen was not administered?**

(a= HRG 3 or b= HRG 5, as defined by the NHS England neonatal critical care service specification)

Eligible babies

Babies will be included for the analysis of care days if they meet the following criteria:

- The baby was born at ≥ 37 weeks gestational age
- The baby received all their neonatal care in one neonatal unit, and was admitted for at least 12 hours.
- The baby did not have major surgery on any day of their neonatal care, as recorded in daily data summaries.
- Babies will be included annually based on their year of birth

A second denominator of all live births within the gestational age range in the hospital (≥ 37 weeks) will be used when available.

Attribution

Attribution will be to the neonatal unit of admission.

Categorising care days

NNAP will use the pre-calculated care levels from BadgerNet to determine care days that are classified as HRG 3 or HRG 5 , with "no added oxygen" and no other form of non-invasive respiratory support provided.
Days of care will be defined as having missing data if there is no data available to determine respiratory support.

Outputs

Tables

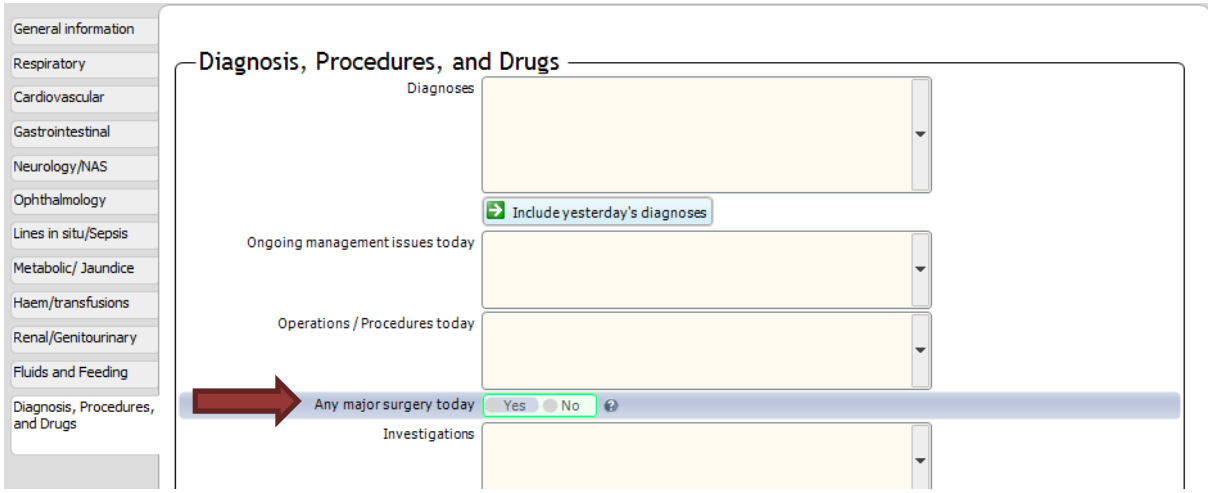
- Special care and normal care provision for infants born ≥ 37 weeks gestational age: By Unit designation (SCU/LNU/NICU)
- Special care and normal care provision for infants born ≥ 37 weeks gestational age: By ODN
- *Special care and normal care provision for infants born ≥ 37 weeks gestational age: By Unit (Online only)*

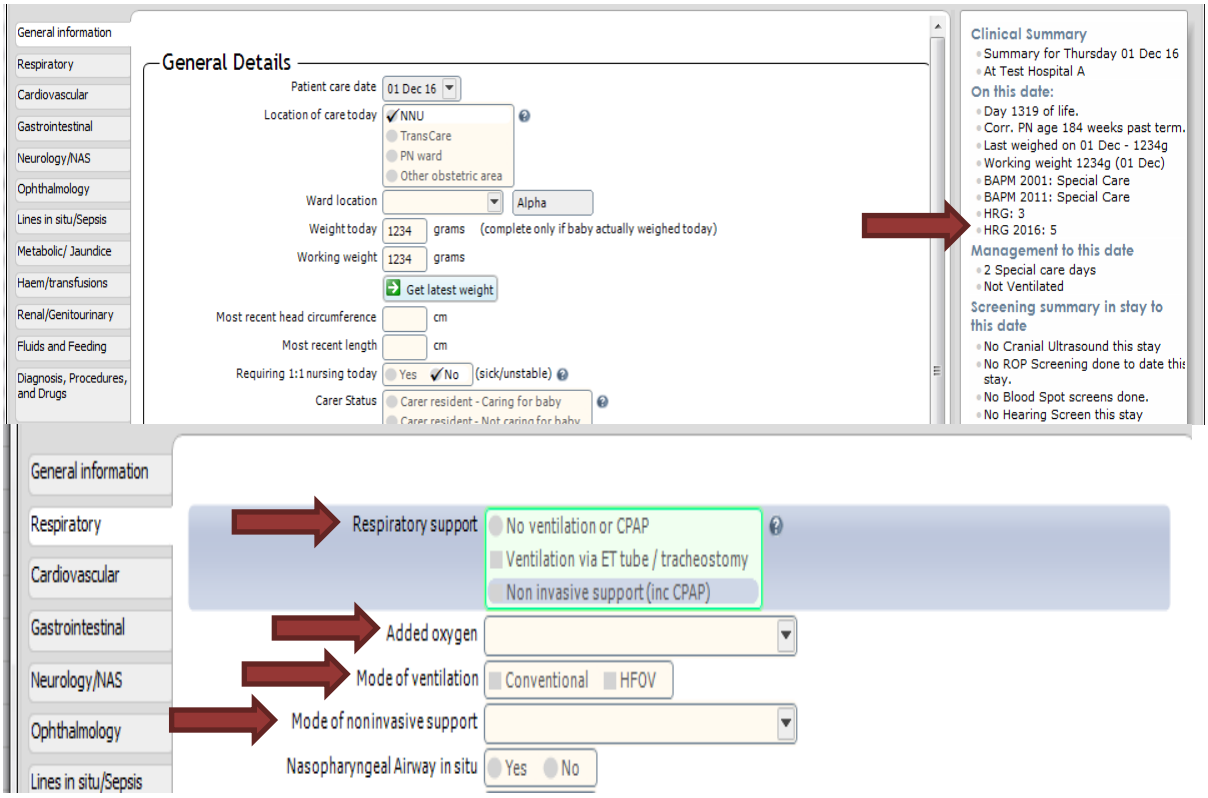
Data Sources

Details from the "Any major surgery today" field from daily data summaries will be used to determine and exclude babies who received surgery from the analysis.

Furthermore, the pre-calculated care level from each daily data summary, and the respiratory support details for that day, will be used to categorise care days.

Related areas of data entry within BadgerNet:





4) <u>NNAP audit measure</u>: What proportion of liveborn babies born at less than 32 weeks gestation who were admitted to a neonatal unit[a] met the NNAP surveillance definition[b] for Necrotising entercolitis (NEC) on one or more occasion?

(a) The analysis is based upon where the baby was resident at 48 hours of age.
(b) NEC may be diagnosed at surgery, post-mortem or on the basis of the following clinical and radiographic signs:

At least one clinical feature from:
(i) Bilious gastric aspirate or emesis
(ii) Abdominal distension
(iii) Occult or gross blood in stool (no fissure)

And at least one radiographic feature from:
(i) Pneumatosis
(ii) Hepato-biliary gas
(iii) Pneumoperitoneum

Eligible babies

Babies will be included for the analysis of NEC if they meet the following criteria:

- The baby was born at < 32 weeks gestation and survived to at least 48 hours after birth
- The baby was admitted for one or more episodes of care in a neonatal unit.

Attribution

Babies will be attributed to their location of care at 48 hours of life.

When a baby is in transit between units at 48 hours the baby will be assigned to the transferring hospital. When multiple admission locations exist at 48 hours of life, the baby will be attributed to the earliest associated admission time.

Categorising NEC

NNAP will use data from 'NEC diagnosed during this admission' and follow on questions to determine the presence of NEC. NEC will be categorised for NNAP when the diagnosis was based on:

- Surgical Confirmation
  OR
- Post mortem
  OR
- Clinical signs

At least one clinical feature from:
(i) Bilious gastric aspirate or emesis
(ii) Abdominal distension
(iii) Occult or gross blood in stool (no fissure)

And at least one radiographic feature from:

(i) Pneumatosis

(ii) Hepato-biliary gas

(iii) Pneumoperitoneum

Note: Infants clinically diagnosed as NEC using the clinical and radiographic criteria who are found at surgery or postmortem to have "Focal Intestinal Perforation" should not be recorded as having NEC.

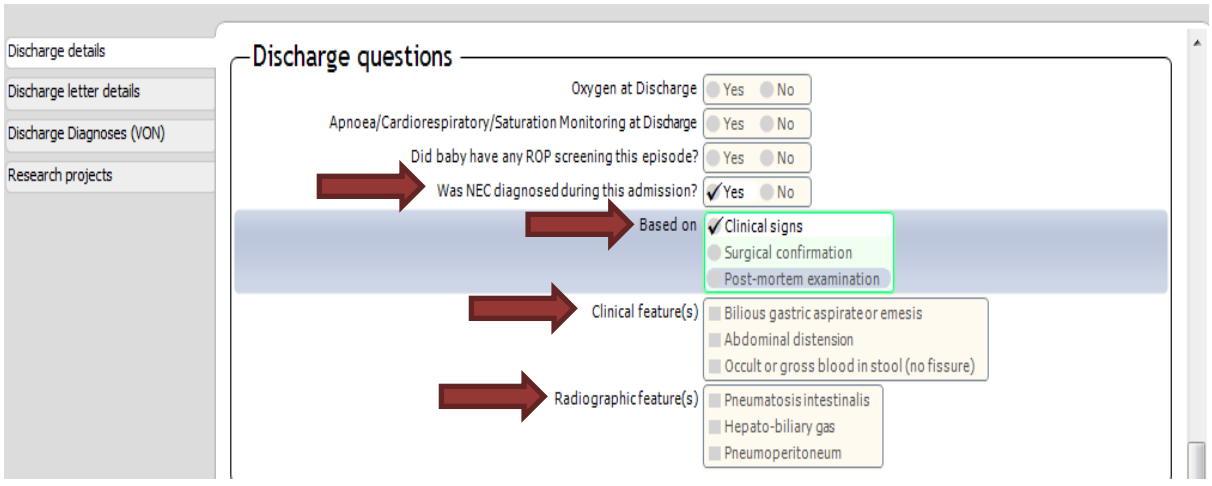
Outputs Tables

- Proportion of liveborn and admitted babies < 32 weeks at birth who met the NNAP case definition for NEC: By Unit designation (SCU/LNU/NICU)
- Proportion of liveborn and admitted babies < 32 weeks at birth who met the NNAP case definition for NEC: By ODN
- *Proportion of liveborn and admitted babies < 32 weeks at birth who met the NNAP case definition for NEC: By Unit (Online only)*

Data Sources for the NNAP NEC definition

For babies born at < 32 weeks, the field "Was NEC diagnosed during this admission?" will appear on the "Discharge details". Data from this field, and it's follow on question ("Based on", "Clinical feature(s)", "Radiographic Features"

Related areas of data entry within BadgerNet:



5) **<u>NNAP audit measure:</u> For all parents of babies with admissions of greater than 24 hours, did at least one parent attend a consultant ward round?**

For phase 1 the first year of data entry the NNAP will report the proportion of admissions where parents attended any consultant ward round, at any time, during the baby's stay (for admissions longer than 24 hours only).

Eligible admissions

- Admissions will be included if there is at least 24 hours (≥ 1440 minutes) between the admission time and discharge time for the episode of care.
- It is possible for one baby to have multiple eligible admissions for this analysis.

Attribution

Attribution will be to the neonatal unit providing care in each eligible admission.

Categorising parental presence on ward rounds

NNAP will use data captured as part of the daily summary of care to confirm parental presence on consultant led ward rounds, and admissions will be classified based on aggregated attendance data:

Number of days where a parent was present on consultant ward round	NNAP Category
None	Parent(s) not present for any ward rounds during admission
One or more	Parent(s) present for one or more ward rounds during admission

Days where no data is entered concerning parental presence on ward rounds, or where daily data is missing, will be considered as parental absence from the ward round.

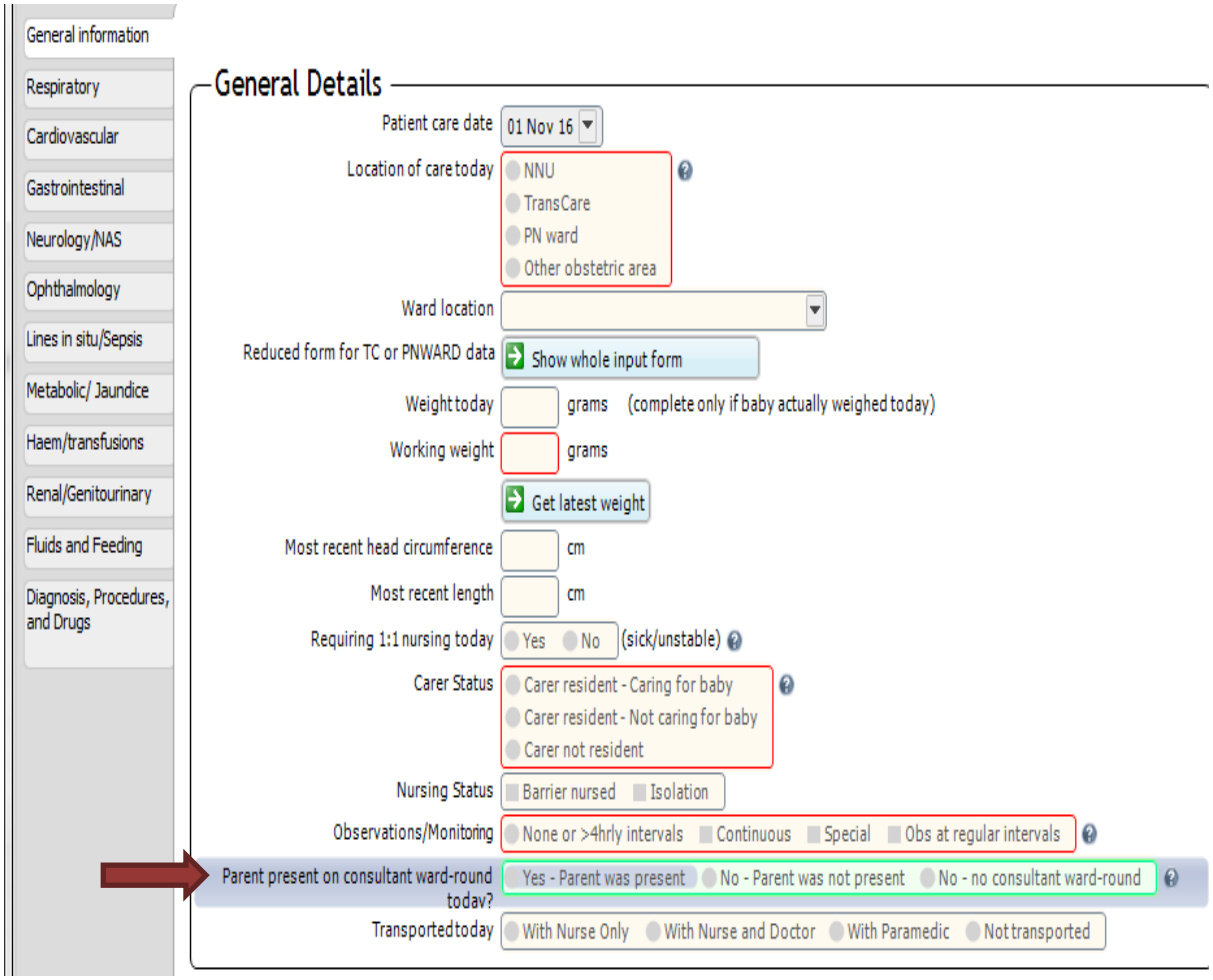
Outputs Tables

- Parental presence on consultant led ward rounds: By Unit Designation (SCU/LNU/NICU) and length of stay (≤ 7 days/ 8-14 days/ 15-21 days/22-28 days/ > 28 days)
- Parental presence on consultant led ward rounds: By ODN and length of stay (≤ 7 days/ 8-14 days/ 15-21 days/22-28 days/ > 28 days)
- *Parental presence on consultant led ward rounds: By Unit and length of stay (≤ 7 days/ 8-14 days/ 15-21 days/22-28 days/ > 28 days) (Online only)*

Data Sources

Details on daily parental presence on ward rounds are captured on BadgerNet in daily summary forms in the "Parent present on consultant ward-round today?" field. A form can be created for each baby for each calendar day where they are an inpatient, and NNAP will consider all of the forms created in relation to each eligible admission when determining parental presence.

Related areas of data entry within BadgerNet:



6) **<u>NNAP audit measure</u>: Are all mothers who deliver babies between 24 and 34 weeks gestation inclusive given any dose of antenatal steroids?**

NNAP Standard

85% of mothers should receive any dose of antenatal steroids

Eligible babies and mothers

- Babies will be included if their gestation at birth was between 24 and 34 weeks inclusive.
- Only data from the first known episode of care will be considered for analysis.
- In the case of multiple births, only one baby will be included so that each mother is only counted once per delivery

Attribution

Attribution will be to the neonatal unit of birth. Results will also be reported by network of birth. In cases where the place of birth is unknown, a non-hospital location, or a hospital without a neonatal unit, the place of birth will be assigned as "Other".

Categorising antenatal steroids

NNAP will use data from steroids given and steroid courses to determine if the baby's mother received any antenatal steroids. In cases where these two fields contain contradictory information then "the most positive"* data will be assumed correct (see table below). In cases where multiple births present different data, data will be taken from the baby with "the most positive" outcome will be considered for the audit.

Steroids given	Steroid Courses		
	Complete course	Incomplete course	Unknown / missing data
Yes	Steroids given	Steroids given	Steroids given
No	Steroids given	Steroids given	Steroids not given
Unknown/ missing data	Steroids given	Steroids not given	Missing/ unknown data

* Most to least positive: Steroids given, Steroids not given, Missing/ unknown Data

Outputs (Print version)
Tables

- Mothers receiving antenatal steroids: By Unit Designation (SCU/LNU/NICU)
- Mothers receiving antenatal steroids: By ODN
- *Mothers receiving antenatal steroids: By Unit (Online only)*
- Comparison to antenatal steroid audit results in previous NNAP reports

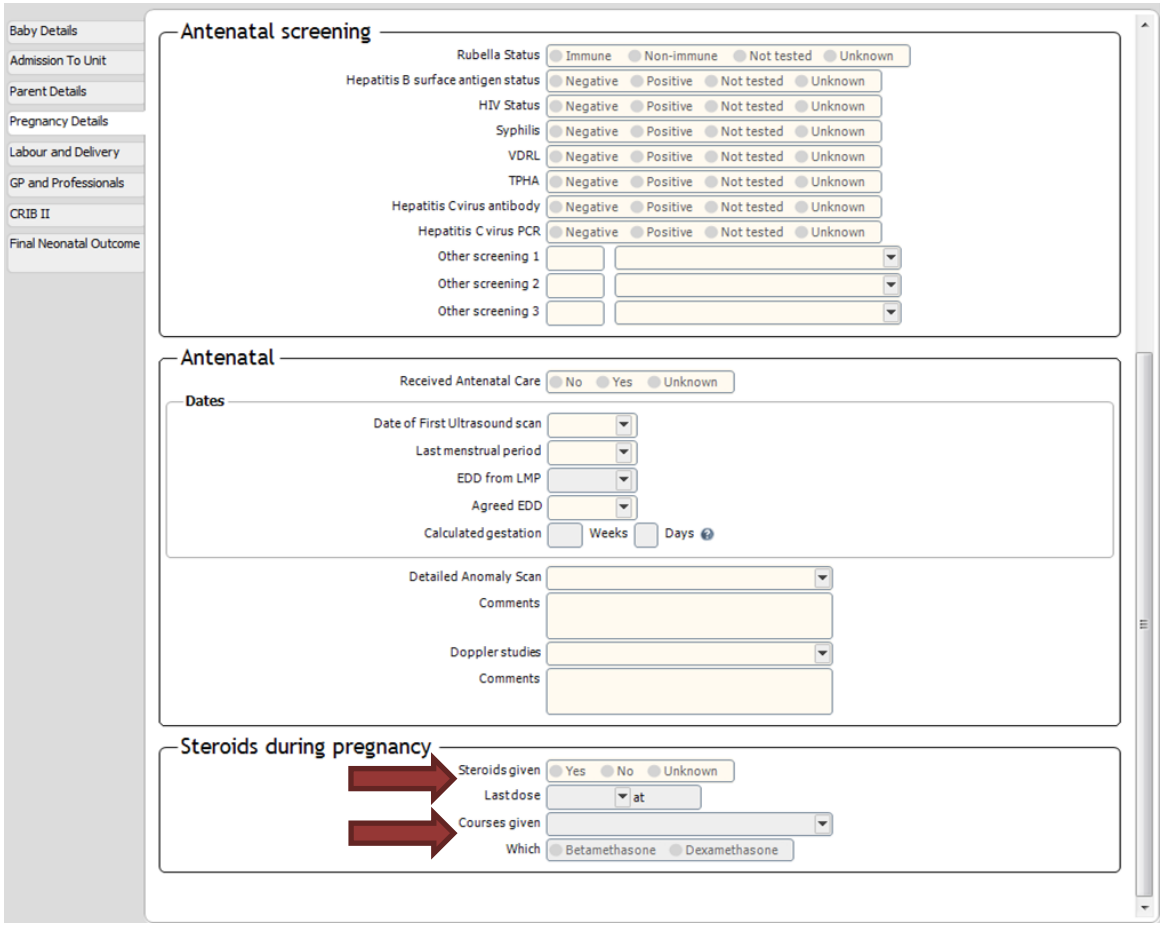
Figures

- Caterpillar plot for standard: By unit with 95% confidence intervals
- Caterpillar plot for standard: By ODN with positive imputations and 95% confidence intervals

Data Sources

Data from the Pregnancy Details page, for 'Steroids during pregnancy' will be used to determine if antenatal steroids were given.

Related areas of data entry within BadgerNet:



7) **<u>NNAP audit measure</u>: Are mothers who deliver babies below 30 weeks gestation given Magnesium Sulphate in the 24 hours prior to delivery?**

Eligible babies

- Babies will be included for the Magnesium Sulphate analysis if their gestation at birth was less than 30 weeks and they experienced their final neonatal discharge in the calendar year of analysis.
- Only the first known episode of care will be considered for analysis.
- In the case of multiple birth, only one baby will be included so that each mother is only counted once per delivery

Attribution

Attribution will be to the neonatal unit of birth. Results will also be reported by network of birth. In cases where the place of birth is unknown, a non-hospital location, or a hospital without a neonatal unit, the place of birth will be assigned as "Other".

Categorising Magnesium Sulphate Administration

NNAP will use data from Mother received Magnesium Sulphate in 24 hours prior to delivery to categorise the administration of magnesium sulphate. In cases where multiple births present different data, data will be taken from the baby with "the most positive"* for the audit.

Defining audit results for Magnesium Sulphate administration

Mother received Magnesium Sulphate in 24 hours prior to delivery	NNAP Category
Yes	Magnesium Sulphate given
No	Magnesium Sulphate not given
Missing/Unknown	Missing/Unknown data

* Most to least positive: Magnesium Sulphate given, Magnesium Sulphate not given, Missing/Unknown data

Outputs (Print version)

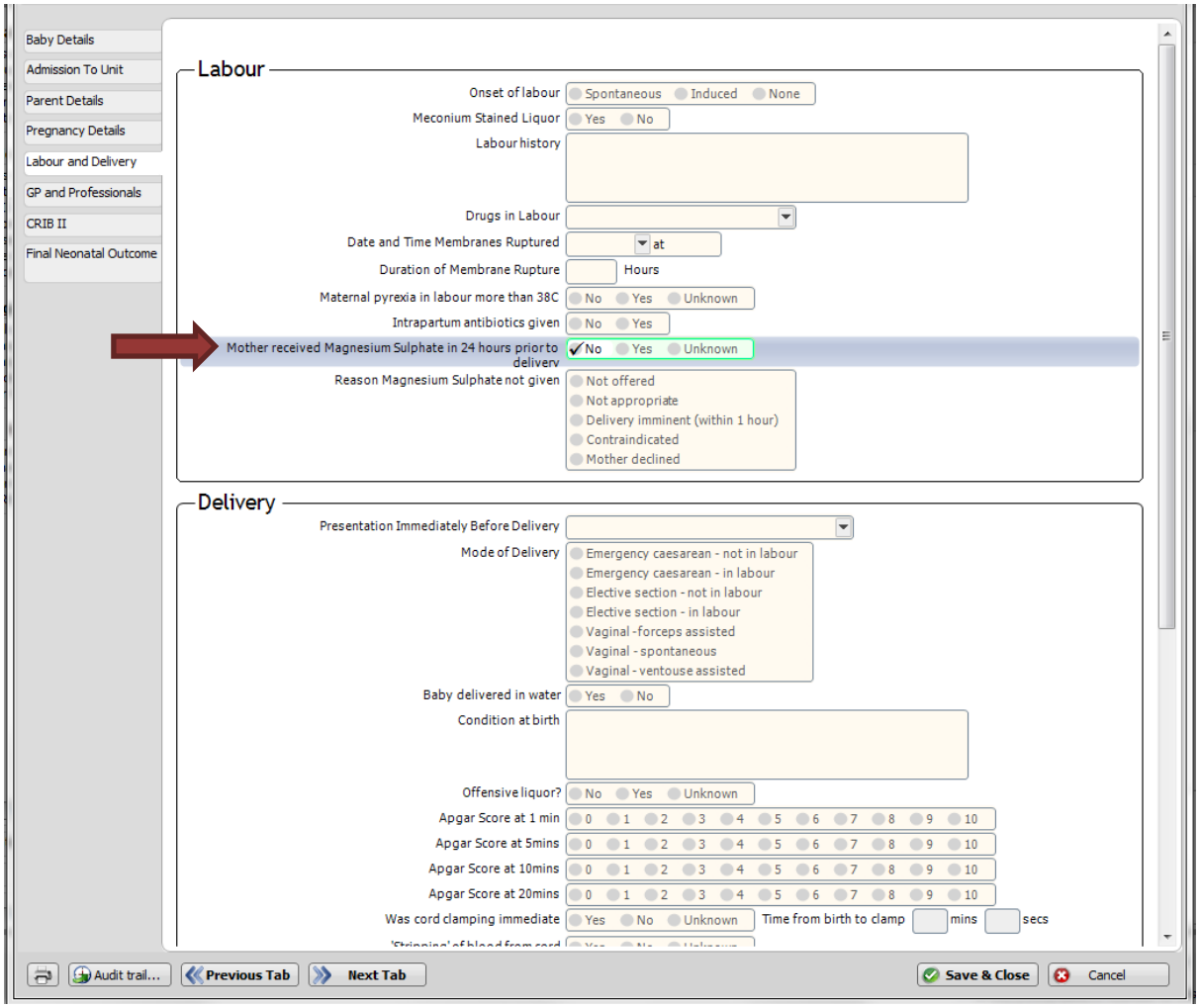
Tables

- Mothers receiving magnesium sulphate: By Unit Designation (SCU/LNU/NICU)
- Mothers receiving magnesium sulphate: By ODN
- Mothers receiving magnesium sulphate: By Unit (Online only)

Data Sources

Data from the Labour and Delivery Details page for 'Mother received Magnesium Sulphate in 24 hours prior to delivery' will be used to determine if magnesium sulphate was given.

Related areas of data entry within BadgerNet:



8) <u>NNAP audit measure</u>: Do all babies born at less than 32 weeks gestation have their temperature taken within an hour after birth?

NNAP Standards

98-100% of babies should have their temperature taken within an hour of birth.
For temperatures taken within an hour of birth: 90% at 36.5°C to 37.5°C (normothermic)

Eligible babies

- Babies will be included for the temperature analysis if their gestation at birth was less than 32 weeks and they were admitted to a neonatal unit within an hour of birth.
- Only the first known episode of care will be considered for analysis.

Attribution

Attribution will be to the neonatal unit of birth. Results will also be reported by network of birth. In cases where the place of birth is unknown, a non-hospital location, or a hospital without a neonatal unit, the place of birth will be assigned as "Other".

Categorising temperature measurements

NNAP will use data from the first temperature taken after admission to categorise when babies had their temperature taken, and the value of temperature measurement.

Defining audit results for the Temperature Measurement audit based on data related to the first temperature measurement after admission

Time of first temperature measurement (minutes from birth)	Value of first temperature measurement		
	Valid temperature (25.0-45.0)	Not Recordable	Invalid temperature or missing data
Temperature not taken after admission	Temperature not taken after admission	Temperature not taken after admission	Temperature not taken after admission
Within an hour (≤ 60 minutes from birth)	Within an hour	Within an hour	Missing/ unknown data
After an hour (> 60 minutes from birth)	After an hour	After an hour	Missing/ unknown data
Missing data	Missing/ unknown data	Missing/ unknown data	Missing/ unknown data

Categorising temperature values

Babies with a temperature measured "Within an hour" will be further categorised into the following groups based on their temperature values:

- < 32.0 °C
- 32.0 °C – 35.9 °C
- 36.0 °C – 36.4 °C
- 36.5 °C – 37.5 °C (normothermic)
- > 37.5 °C

In cases where the temperature value was not recordable, babies will be assigned to "32.0 °C –-35.9 °C" group.

Outputs Tables

- Temperature within the first hour after birth (composite standard): By Unit designation (SCU/LNU/NICU)
- Temperature within the first hour after birth (composite standard): By ODN
- *Temperature within the first hour after birth (composite standard): By Unit (Online only)*
- Temperature groups for babies who had their temperature taken within an hour of birth: By Unit designation (SCU/LNU/NICU)
- Temperature groups for babies who had their temperature taken within an hour of birth: By ODN
- *Temperature groups for babies who had their temperature taken within an hour of birth: By Unit (Online only)*
- Comparison to Temperature audit results (composite standard where applicable) in previous NNAP reports

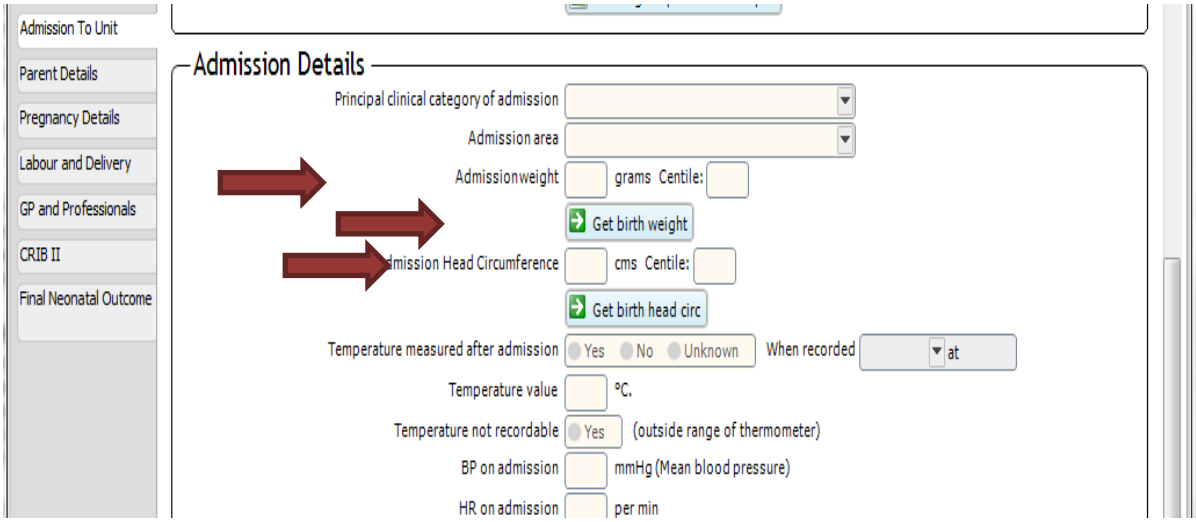
Figures

- Caterpillar plot for composite standard (babies measured within an hour and normothermic): By unit with 95% confidence intervals
- Caterpillar plot for composite standard (babies measured within an hour and normothermic): By ODN with positive imputations and 95% confidence intervals

Data Sources for the temperature measurement audit measure

Details on temperature measurement are captured on BadgerNet on the "Details at Birth and Admission" page. Values from the "Temperature measured after admission", "Temperature value" and "Temperature not recordable" fields are used by NNAP for analysis. (Indicated below)

Related areas of data entry within BadgerNet:



9) <u>NNAP audit measure</u>: Is there a documented consultation with parents by a senior member* of the neonatal team within 24 hours of admission?

NNAP Standard: 100%
Source of Standard: NNAP Board

* The NNAP regards a senior member of the neonatal team as being a consultant or second tier medical trainee, or a nurse practitioner operating in such a role.

Eligible babies

- Babies who were admitted to neonatal care for at least 12 hours in their first episode, receiving special care or a higher order of neonatal care.
- Babies receiving neonatal care in non-NNU locations (Postnatal ward, Transitional Care, etc.) will not be included.

Attribution

Results will be attributed to the neonatal unit of admission. Results will also be report by ODN.

Categorising first consultation

The recorded time for first consultation with a senior member of staff is compared to the time of admission to determine when consultation takes place. The NNAP standard is aimed specifically at consultation at or after the time of admission, and so consultations prior to admission or birth cannot meet the NNAP standard.

Time of first consultation	NNAP Category
Before admission	Before admission
Time of admission – 24 hours after admission	Within 24 hours (NNAP Standard)
More than 24 hours after admission	After 24 hours
Confirmed "no consultation"	No Consultation
Confirmed "Unknown"	Missing/Unknown data
Missing Consultation Time	Missing/Unknown data

Outputs Tables

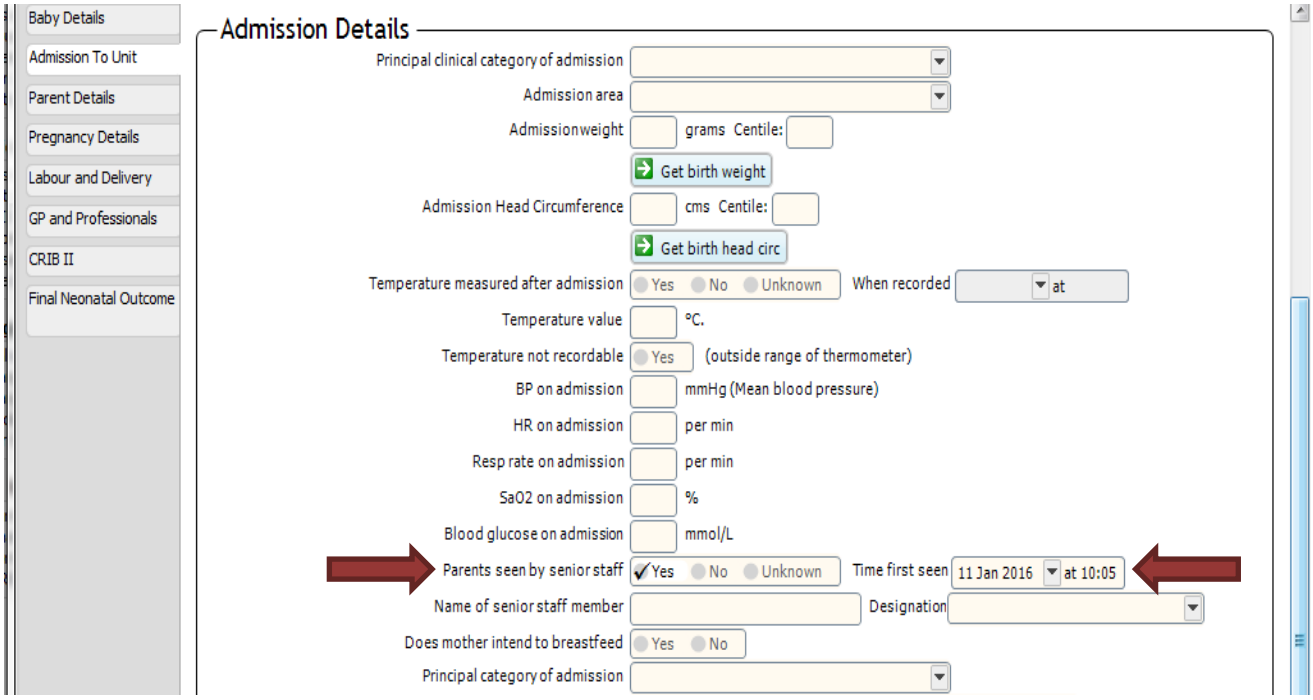
- First consultation within 24 hours of admission: By Unit designation (SCU/LNU/NICU)
- First consultation within 24 hours of admission: By ODN
- *First consultation within 24 hours of admission: By Unit (Online only)*
- Comparison to first consultation results in previous NNAP audits

Figures

- Caterpillar plot for standard (Within 24 hours): By unit with 95% confidence intervals
- Caterpillar plot for standard (Within 24 hours): By ODN with positive imputations and 95% confidence intervals

Data Sources in BadgerNet

Details on first consultation are captured on BadgerNet on the "Details at Birth and Admission" page. The answer to the question "Parents seen by senior staff" and the "Time first seen" are used by NNAP for analysis.



10) <u>NNAP audit measure</u>: Do all babies with a birth weight of less than 1501g, or a gestational age of less than 32 weeks, undergo the first Retinopathy of Prematurity (ROP) screening in accordance with the current guideline recommendations?

NNAP Standard: 100% of eligible babies should receive ROP screening within the time windows for first screening recommended in the guidelines:

- If the infant's gestational age at birth is < 27 weeks, the first screening should be between 30^{+0} and 30^{+6} weeks corrected gestation inclusive
- If the infant's gestational age at birth is ≥ 27 weeks, ROP screening should be at or after four weeks, and before five weeks of age
- All babies < 32 weeks gestational age or birth weight < 1501g should have their first ROP screening examination prior to discharge.

Source of Standard: National standard (RCPCH, RCOphth, BAPM and Bliss, *Guideline for the Screening and Treatment of Retinopathy of Prematurity*, 2008)

Note: In interpreting the national standards for this NNAP analysis, the Project Board has decided that a baby will be seen as having had ROP screening "on time" if:

- A baby who was discharged before the ROP screening window opened had their first screening conducted prior to discharge, or…
- A ROP screen takes place within the ROP screening window, before or after discharge

The NNAP Project Board has also agreed to allow an extra week either side of the ROP screening window as follows:

Gestational age at birth (completed weeks)	ROP screening windows	
	National Guideline ROP screening window	NNAP ROP screening window
< 27	30^{+0} to 30^{+6} weeks corrected gestational age inclusive	29 to 31 weeks corrected gestational age inclusive
≥ 27	4 to 5 weeks from birth (21-35 days)	3 to 6 weeks from birth (21-42 days)

Eligible babies

Babies will be included for the ROP analysis if they meet one of the following criteria:

- The baby was born at 31^{+6} weeks gestational age or earlier

or

- The baby's birth weight was 1,500g or less

and

- The baby was alive at the beginning of the National Guideline screening window

Attribution

- If a ROP screen is conducted in accordance with the NNAP standard this is assigned to the neonatal unit performing the first screen within the NNAP ROP screening window.
- If a baby is not screened in accordance with the NNAP standard this is assigned to the neonatal unit of care at the time that the National Guideline screening window (not the extended NNAP ROP screening window) closed, or the neonatal unit of final discharge when the infant was discharged before the closure of the National Guideline screening window.
- Babies who died before the end of screening window, and who do not have a record of being "Screened on time" will be not be attributed to a unit.

Categorising ROP Screening

The primary source of information for ROP screening is the ad-hoc ROP form in the Badger systems. Records of ROP screening from the daily summary forms in the Badger system will only be considered if no ad-hoc form has been completed for the day of that screening.
Each ROP screening examination will be assigned to one of six categories, based on the time of the screen and the baby's location

When did the screening occur?	Time of ROP screen in relation to the NNAP ROP screening window		
	Before the screening window opened	**During the screening window**	**After the screening window closed**
During neonatal in-patient stay	Screened early	Screened on time (met NNAP Standard)	Screened late
After neonatal discharge	Before screening window	Within screening window (met NNAP Standard)	After screening window

If there is a ROP screen within the NNAP ROP screening windows, regardless of whether this is during the in-patient stay or after discharge, this will be classified as "Screened on time (met NNAP Standard)".
If a baby's only known ROP screen is before discharge and the baby was discharged before the National Guideline screening window (not the extended NNAP ROP screening window) opened this will be classified as "Screened on time (met NNAP Standard)".

Once all the available screening data for a baby has been classified, ROP screening for the baby is categorised based on the earliest known "on time" screening. In cases where the baby had no screenings conducted "on time" screening status will be determined based on the earliest known screening for the baby.

Outputs Tables

- ROP screening for babies born <1501g or gestation at birth <32 weeks: By Unit designation (SCU/LNU/NICU)
- ROP screening for babies born <1501g or gestation at birth <32 weeks: By ODN
- ROP screening for babies born <1501g or gestation at birth <32 weeks: By Unit *(Online only)*
- Comparison to ROP audit results in previous NNAP audits

- ROP screening for babies born < 1501g or gestation at birth <32 weeks by NNU level. Adherence to standard by indication for screening, gestational age, and whether transfer had occurred before the end of the screening window

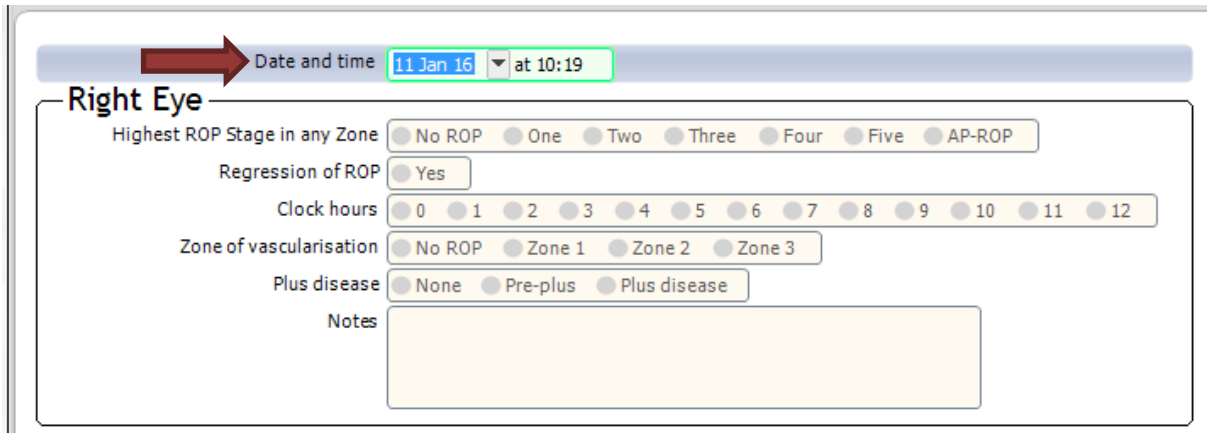
Figures

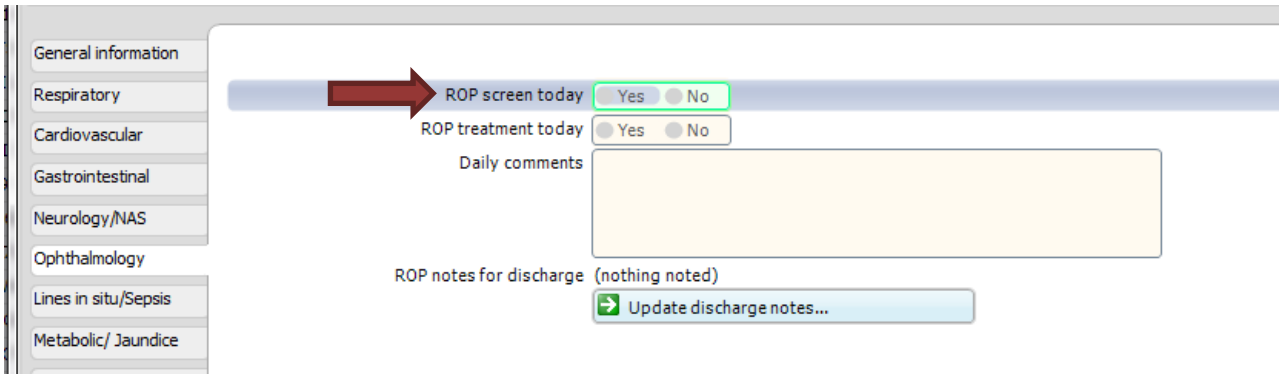
- Caterpillar plot for standard (babies screened on time): By unit with 95% confidence intervals
- Caterpillar plot for composite standard (babies screened on time): By ODN with positive imputations and 95% confidence intervals

Data Sources in BadgerNet

Details on ROP screenings are captured on BadgerNet via ad-hoc forms for ROP screening and from the daily summary form when "ROP screen today" is answered 'Yes'. Where evidence of ROP screening is available from both sources for the same day ad-hoc screening data will be used preferentially.

The "Date and time" from the ad-hoc form is used to determine the time of screening, whilst daily summary is considered to have happened at the very beginning of the day (00:00).





11) <u>NNAP audit measure</u>: What proportion of babies born at more than 34 weeks gestation have an encephalopathy within the first three full calendar days after birth?

Eligible babies

All babies born at > 34 weeks gestation within the year of analysis, regardless of neonatal admission, will be included as the denominator for this question. Details on this denominator will be attained externally to the National Neonatal Research Database (NNRD), which typically forms the denominator for NNAP audit measure (see data sources for more details).

Attribution

Attribution will be to the neonatal unit of birth. In cases where the place of birth is unknown, a non-hospital location, or a hospital without a neonatal unit, the place of birth will be assigned as "Other", and will not be included in the final results of the analysis.

Categorising Encephalopathy and calculating encephalopathy rates

Encephalopathy will be categorised under the following circumstances:

- The baby was born in the year of analysis
- The baby was admitted to neonatal care for at least 72 hours
- Within the daily data summaries associated with the first 72 hours of life the baby shows two or more of the following neurological signs in the same daily data summary:
  - Tone: Abnormal
  - Consciousness: Lethargic or Comatose
  - Convulsions: Yes

Encephalopathy rates will then be calculated as a rate per 1,000 births:

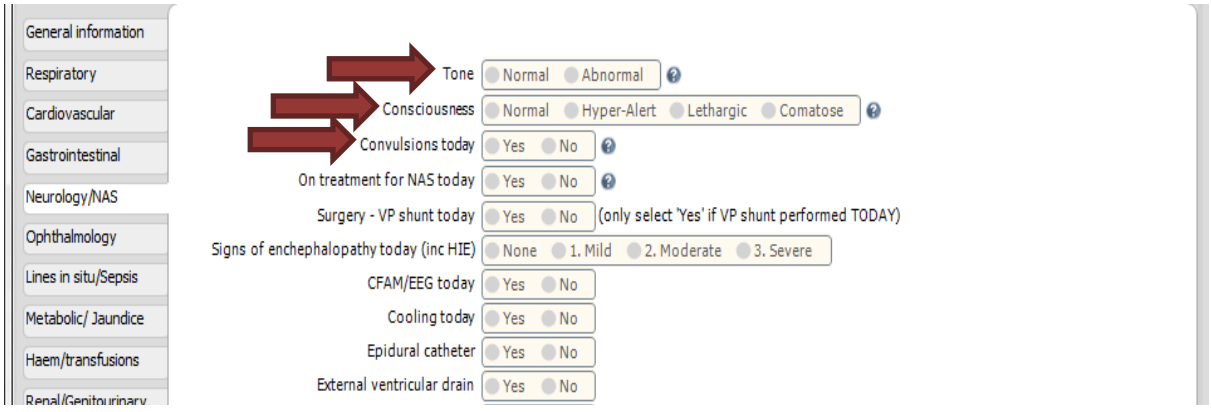
Outputs Tables

- Encephalopathy rates per 1,000 births: By Unit

Data Sources

Details on the neurological signs used to determine encephalopathy are captured on BadgerNet in daily summary forms. A form is created for each baby for each calendar day where they are an inpatient on a neonatal unit and the fields "Tone", "Consciousness" and "Convulsions today" will be used by the NNAP.

Related areas of Daily Summary – Lines in situ data entry within BadgerNet:



12) <u>NNAP audit measure</u>: How many babies have a positive blood culture (any growth) with a central line present after the first 72 hours of life per 1000 line days?

Eligible babies and line days

- All babies admitted to neonatal care
- All days where a central line (surgical venous line, UVC, UAC, PICC) was present will be included in the number of line days when calculating proportions per 1000 line days.

Attribution

Positive growths will be attributed to the NNU completing the culture form and babies will be counted as eligible once in each NNU they were admitted to.

Categorising positive blood cultures and central line presence

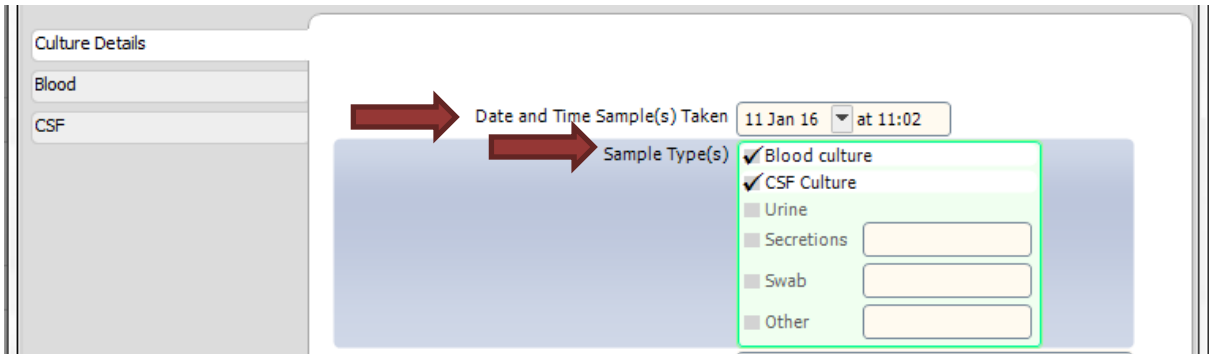
To ensure that early onset infections are not counted in error cultures from the first 72 hours of life will initially be included in the analysis. A blood culture that presents any growth will be considered positive, and recurring growths that are less than 72 hours apart will be removed so that only the earliest known instance of the growth remains in the data. Once this comparison has been complete, any remaining cultures from the first 72 hours of life will be removed from the analysis.
The time the culture was taken will then be used to map to daily data records to determine if a central line was present on the calendar day the culture was taken. If a daily record is not available for the day the culture was taken then it will be assumed that a central line was not present.

Outputs Tables

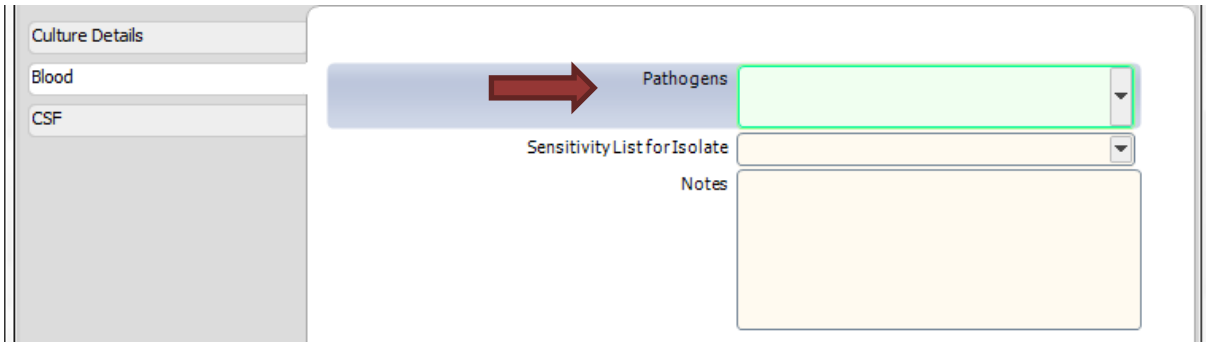
- Occurrence of central line associated bloodstream infection (any growth): By Unit designation (SCU/LNU/NICU) and gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)
- Occurrence of central line associated bloodstream infection (any growth): By ODN and gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)
- *Occurrence of central line associated bloodstream infection (any growth): By Unit* and gestational age (< 32 weeks/ >= 32 weeks) *(Online only)*

Data Sources for the Blood cultures and line days
Details for blood cultures and their results will be captured via ad-hoc forms for cultures on BadgerNet, whilst data on "Lines in situ today" from daily data summaries will be used to determine line days for the analysis.

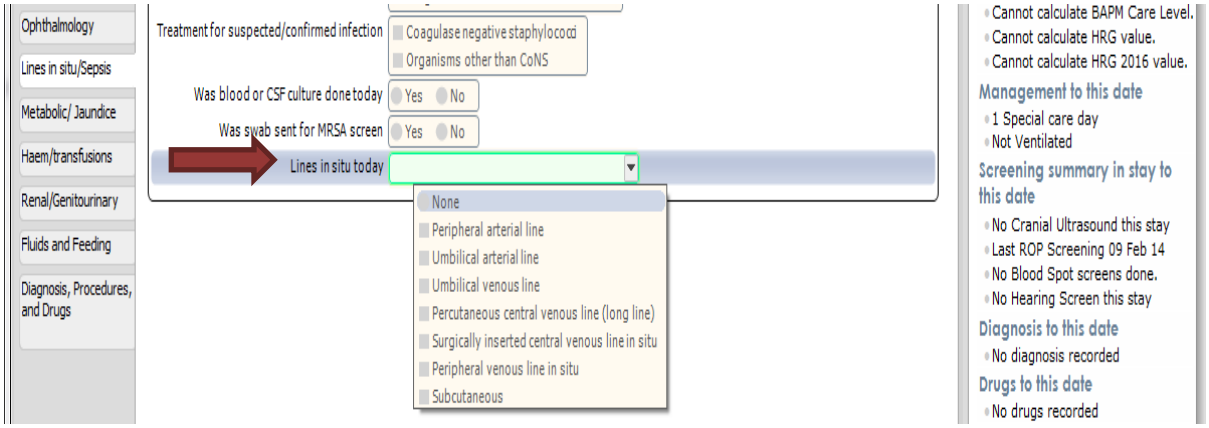
Related areas of culture details data entry within BadgerNet:



Related areas of culture results data entry within BadgerNet:



Related areas of Daily Summary – Lines in situ data entry within BadgerNet:



13) NNAP audit measure: Recording of Blood stream and cerebrospinal fluid (CSF) cultures

What percentage of babies admitted to a neonatal unit have:

(d) **one or more episodes of a pure growth of a pathogen from blood;**

(e) **one or more episode of a pure growth of a pathogen from CSF;**

(f) **either a pure growth of a skin commensal or a mixed growth with ≥3 clinical signs at the time of blood sampling?**

NNAP Standard: Benchmarking

Eligible babies

- All babies admitted to neonatal care

Attribution

Blood and CSF cultures will be attributed to the NNU completing the culture form and babies will be counted as eligible once in each NNU they were admitted to.

Categorising blood and CSF cultures

Culture records will be considered as complete if the pathogen results for the culture are entered including 'None' or 'No growth'.
Culture growths will be categorised as pure growths, mixed growths or skin commensals according to a predefined list of known pathogens. In the case of mixed growths and skin commensals, only those cultures with 3 or more clinical signs will be included.

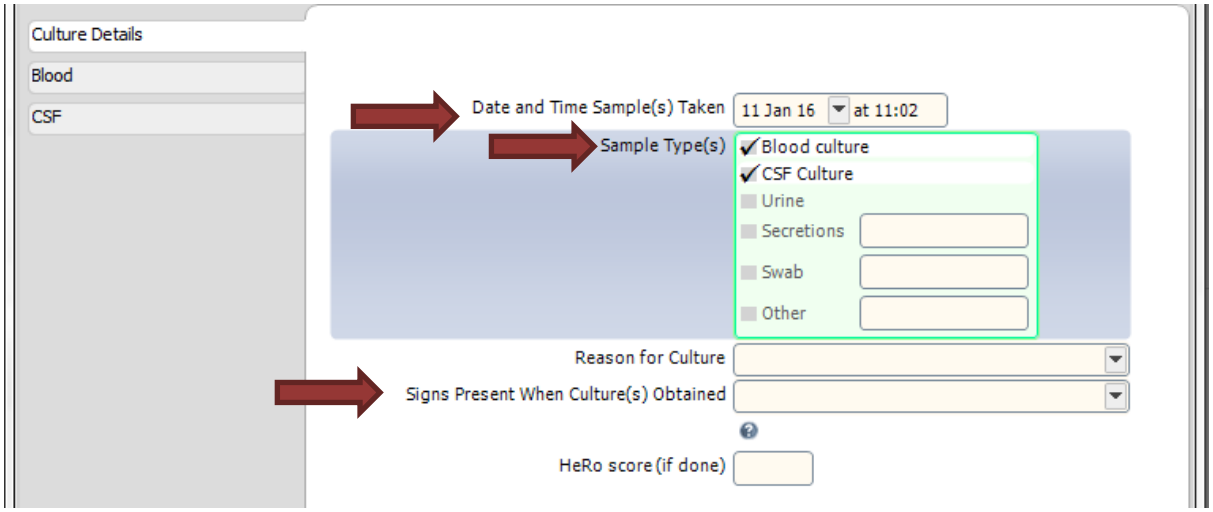
Outputs Tables

- Completeness and available culture data: By gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)
- Positive blood culture results: By NNU designation (NICU/LNU/SCU) and gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)
- Positive CSF culture results: By NNU designation (NICU/LNU/SCU) and gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)

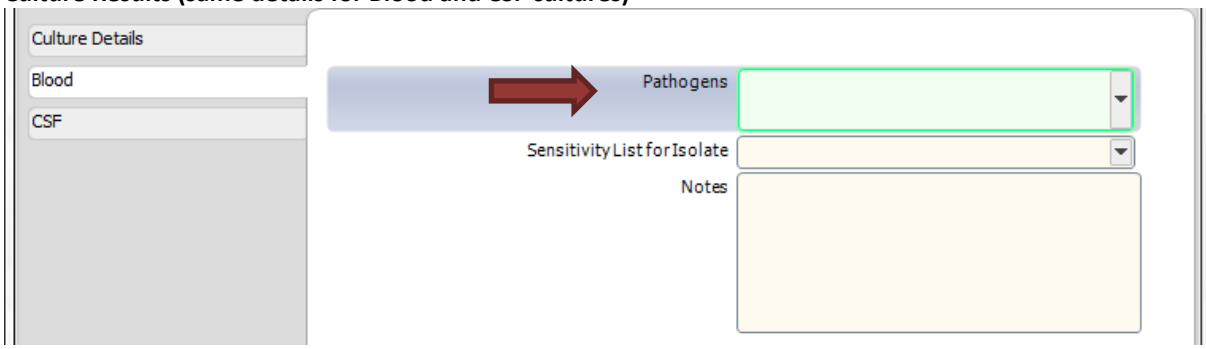
Data Sources for the cultures and line days

Details for blood cultures and their results will be captured via ad-hoc forms for cultures on BadgerNet.

Related areas of culture details data entry within BadgerNet:



Culture Results (same details for Blood and CSF cultures)



14) <u>NNAP audit measure:</u> How many blood stream infections[a] are there on a NNU per 1000 days of central line[b] care?

a) The growth of a recognised pathogen in pure culture, or in the case of a mixed growth, or growth of skin commensal, the added requirement for 3 or more of 10 predefined clinical signs
b) Central line= UAC, UVC, percutaneous long line or surgically inserted longline.

Eligible babies and line days

- All babies admitted to neonatal care
- All days where a central line (surgical venous line, UVC, UAC, PICC) was present will be included in the number of line days when calculating proportions per 1000 line days.

Attribution

Positive growths will be attributed to the NNU completing the culture form and babies will be counted as eligible once in each NNU they were admitted to.

Categorising blood cultures and central line presence

To ensure that early onset infections are not counted in error cultures from the first 72 hours of life will initially be included in the analysis. Recurring growths that are less than 72 hours apart will be removed so that only the earliest known instance of the growth remains in the data. Once this comparison has been complete, any remaining cultures from the first 72 hours of life will be removed from the analysis.

Culture growths will be categorised as pure growths, mixed growths or skin commensals according to a predefined list of known pathogens. In the case of mixed growths and skin commensals, only those cultures with 3 or more clinical signs will be included.
A culture result will be defined as a blood stream infection if there was central line present on the day the culture was taken, or on one of the two preceding calendar days. Cultures will be linked with daily line records via the recorded time the culture was taken, and if an associated daily record is not available then it will be assumed that a central line was not present on that day.

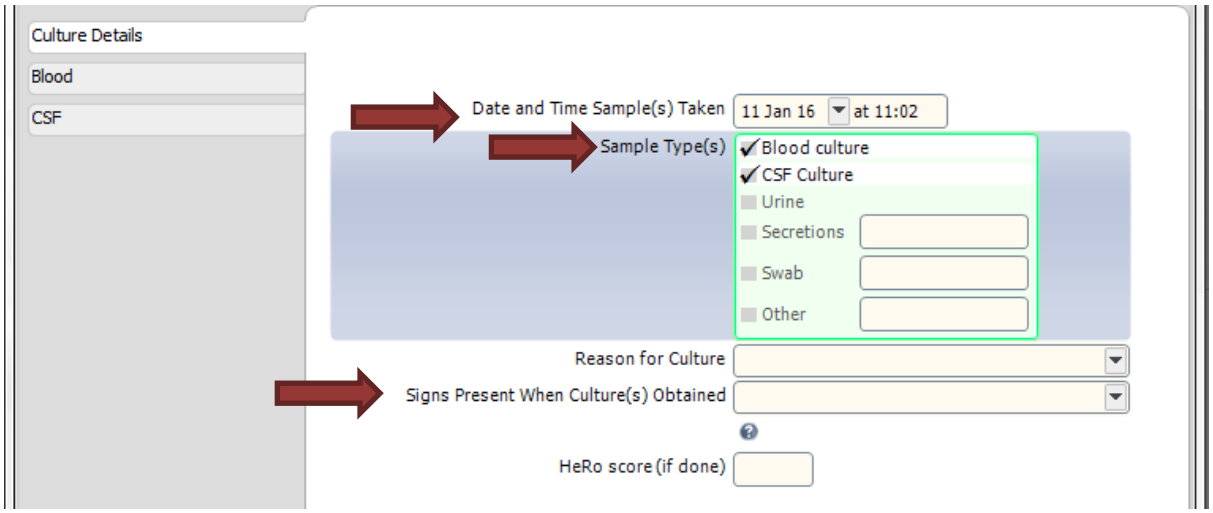
Outputs Tables

- Occurrence of central line associated bloodstream infection: By Unit designation (SCU/LNU/NICU) and gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)
- Occurrence of central line associated bloodstream infection: By ODN and gestational age (Missing/ <= 27 weeks/ 28-31 weeks/ 32-36 weeks/ >= 37weeks)
- *Occurrence of central line associated bloodstream infection: By Unit* and gestational age (< 32 weeks/ >= 32 weeks) *(Online only)*

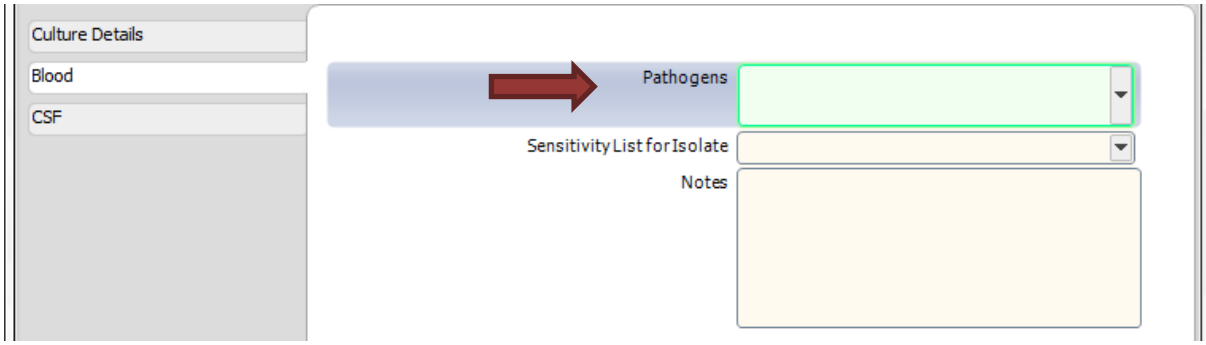
Data Sources for the Blood cultures and line days

Details for blood cultures and their results will be captured via ad-hoc forms for cultures on BadgerNet, whilst data on “Lines in situ today” from daily data summaries will be used to determine line days for the analysis.

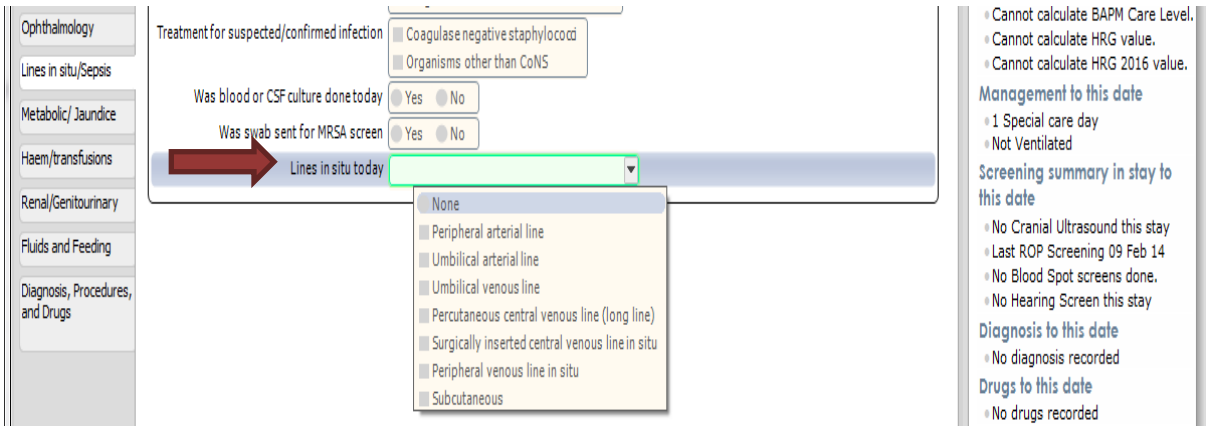
Related areas of culture details data entry within BadgerNet:



Related areas of culture results data entry within BadgerNet:



Related areas of Daily Summary – Lines in situ data entry within BadgerNet:



15) <u>NNAP Audit measure</u>: What proportion of babies born at less 32 weeks gestation developed Bronchopulmonary Dysplasia?

Eligible babies

Babies will be included for the BPD analysis if they meet one of the following criteria:

- The gestation at birth was less than 32 weeks

AND

- The baby was still an in-patient in a neonatal unit at 36^{+0} weeks postmenstrual age or had been discharged alive from neonatal care at <36 weeks postmenstrual age

BPD attribution

- Attribution will be to the neonatal unit of birth. Outcomes will also be reported by network of birth. In cases where the place of birth is unknown, a non-hospital location, or a hospital without a neonatal unit, the place of birth will be assigned as "Other".

Definition of Bronchopulmonary Dysplasia

BPD will be defined by the level of respiratory support received at 28 days postnatal age, and at 36 weeks postmenstrual age, as shown in Table 1.
When a baby was discharged from neonatal care before reaching 36 weeks corrected gestational age, data from the time of discharge will be used instead.

Categorising BPD in NNAP based on daily respiratory support data

Respiratory data from 28 days postnatal age	Respiratory data from 36 weeks corrected gestational age / final discharge		
	Not receiving respiratory support	Receiving respiratory support	Missing required data*
Not receiving respiratory support	No BPD	Significant BPD	BPD not determinable
Receiving respiratory support	Mild BPD	Significant BPD	BPD not determinable
Missing required data*	BPD not determinable	Significant BPD	BPD not determinable

* In instances where respiratory data is not available for the specified day, data from the subsequent day of care (or penultimate day of care in the case of babies discharged < 36 weeks) will be sought instead. In cases where respiratory data is also missing from this second source the baby will be classified as 'Missing required data' for that period.
'Respiratory Support' is defined as receiving any of the following at the specified time:

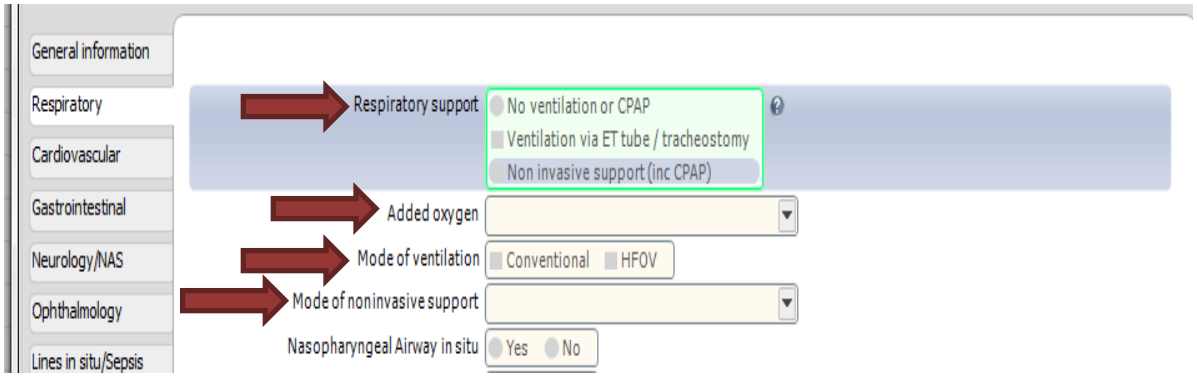
- Ventilation
- CPAP
- Non invasive ventilation (e.g. BiPAP)
- Hi flow nasal cannula therapy (i.e. ≥2lpm gas flow)
- Oxygen treatment

Babies will be defined as having missing data if there is no data available to determine respiratory support.

Data sources

Details on respiratory support used to calculate levels of BPD are captured on BadgerNet in daily summary forms. A form is created for each baby for each calendar day where they are an inpatient on a neonatal unit, and the fields “Respiratory Support”, “Added oxygen”, “Mode of ventilation” and “Mode of noninvasive support” will be used to by the NNAP.

Related areas of data entry within BadgerNet:



16) NNAP audit measure: What proportion of babies born at less than 33 weeks gestation were receiving any of their own mother's milk at discharge to home from a neonatal unit?

NNAP Standard: Benchmarking **Source of Standard:** NNAP Board

Eligible babies

Babies will be included for the mother's milk at discharge if they meet the following criteria:

- The baby was born at < 33 weeks gestation
- The baby received all of their neonatal care in one neonatal unit, and were discharged home at the end of their neonatal care

Attribution

- Data on feeding is assigned to the neonatal unit providing care to the baby.

Categorising feeding at discharge

Babies will be classified as meeting the NNAP standard if they are noted to have received any of the following types of enteral feed on their final day of care:
- Suckling at breast
-Mother's fresh expressed breast milk
-Mother's frozen expressed breast milk.

Outputs Tables

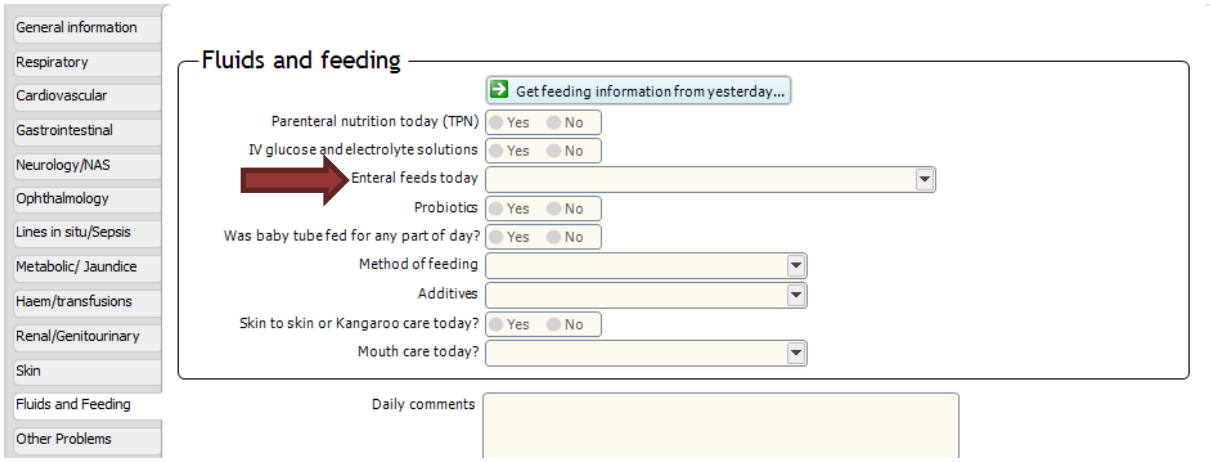
- Babies receiving mother's milk at discharge: By unit designation (SCU/LNU/NICU)
- Babies receiving mother's milk at discharge: By ODN
- *Babies receiving mother's milk at discharge: By Unit (Online only)*
- Comparison to mothers milk audit results in previous NNAP audits

Figures

- Caterpillar plot for standard (any mother's milk at discharge): By unit with 95% confidence intervals
- Caterpillar plot for composite standard (any mother's milk at discharge): By ODN with positive imputations and 95% confidence intervals

Data Sources in BadgerNet

The primary source for information on feeding at discharge is daily summary data on enteral feeds for the last day of neonatal care on the Badger system. In cases where enteral feeding data is missing for the final day, data from the penultimate day of care will be used instead.


General information
Respiratory
Cardiovascular
Gastrointestinal
Neurology/NAS
Ophthalmology
Lines in situ/Sepsis
Metabolic/ Jaundice
Haem/transfusions
Renal/Genitourinary
Skin
Fluids and Feeding
Other Problems
Fluids and feeding
Get feeding information from yesterday...
Parenteral nutrition today (TPN)
IV glucose and electrolyte solutions
Enteral feeds today
Probiotics
Was baby tube fed for any part of day?
Method of feeding
Additives
Skin to skin or Kangaroo care today?
Mouth care today?
Yes
No
Daily comments

17) NNAP audit measure: Are rates of normal survival at two years comparable in similar babies from similar neonatal units?

NNAP Standard

100% of babies with data entered

Eligible babies

- All babies born at less than 30 weeks who are not recorded as deceased within their episodic data (including final neonatal outcome) will be included.

- The eligible cohort runs for births from July-June each year, for babies who would have reached two years corrected age since the last annual report. Current and projected denominators are as follows:

NNAP Data Year	Two year assessment cohort: Time of Birth (inclusive)
2014	July 2011-June 2012
2015	July 2012-June 2013
2016	July 2013-June 2014
2017	July 2014-June 2015
2018	July 2015-June 2016

Attribution

Attribution will be to the neonatal unit of final discharge. When the unit of final neonatal discharge home cannot be ascertained, two year data is assigned to the last known episode of neonatal care.

Categorising Two year outcome data

1. **Categorising data from conducted assessments**

Assessment data will be considered for analysis if it took place between 18 and 30 months corrected age for the infant.

Assessment data is categorised based on questions from the TRPG/SEND/NNAP 2-Year Corrected Age Outcome Form. Questions are determined as being related to severe or mild/moderate impairment, and impairment for infants is classified based on the highest order of impairment they show within each NNAP impairment category.

Questions from the outcome form are associated with the following NNAP impairment categories:

NNAP impairment category	Domains used from TRPG/SEND/NNAP form	Questions related to mild/moderate impairment	Questions related to severe impairment
Neurodevelopmental	**1.Neuromotor**	a. Does the child have difficulty walking? b. Is the child's gait non-fluent or abnormal reducing mobility? d. Is this child unstable or needs to be supported when sitting? f. Does this child have any difficulty with the use of one hand? g. Does this child have difficulty with the use of both hands?	**c. Is this child unable to walk without assistance?** **e. Is this child unable to sit?** **h. Is this child unable to use hands (i.e. to feed)?**
	6.Neurology	a. Has this child had a fit or seizure in the past 12 months? b. Is this child on any anticonvulsants? d. Has this child ever had ventriculo-peritoneal shunt inserted?	**c. Has this child had more than 1 seizures a month despite treatment**
	8.Development	a. Is the child's development between 3-6 months behind corrected age? b. Is the child's development between 6-12 months behind corrected age?	**c. Is the child's development more than 12 months behind corrected age?**
	9.Neurosensory	a. Does this child have a hearing impairment? b. Does this child have hearing impairment corrected by aids? d. Does this child have any visual problems (including squint)? e. Does this child have visual defect that is not fully correctable?	**c. Does this child have hearing impairment not correctable with aids?** **f. Is this child blind or sees light only?**
	10.Communication	a. Does this child have any difficulty with communication? b. Does this child have difficulty with speech (< 10 words/signs)? d. Does this child have difficulty with understanding outside of familiar context?	**c. Does this child have < 5 meaningful words, vocalisations or signs?** **e. Is this child unable to understand words or signs?**
Respiratory	**3. Respiratory & CVS system**	a. Does this child have limited exercise tolerance with or without treatment?	**b. Does child require supplemental oxygen or other respiratory support?**
Gastro-intestinal	**4. Gastro-intestinal Tract**	a. Is this child on a special diet? b. Does this child have a stoma?	**c. Is this child having renal dialysis or awaiting renal transplant?**

2. **Categorising missing assessment data**

Missing data for individual assessment questions can lead to an infant's developmental outcome being classified as "not determinable". This occurs when the missing data still has the potential to change the impairment status of the infant. For instance, if an infant is classified as having "mild/moderate" impairment from their entered data there will be no consequence from missing data for other questions associated with mild/moderate impairment. If, however, the same infant was missing an answer to a severe impairment question the status of the infant would be "not determinable", as the missing data could still impact their impairment classification. Therefore, an infant must have complete data within an NNAP category in order to be classified as having "no impairment".

3. **Categorising infants without health assessments**

When no health data is entered within the window of 18-30 months corrected age, NNAP will categorise infants based on their reasons for not being assessed, if available. If no reason for missing assessment is provided the infant will be categorised as having "no data entered at all":

Reason not assessed	NNAP Category
Died post discharge	Died post discharge
Lost to follow up/ Declined appointment/ responsibility of another unit/ did not attend appointment/ moved out of area/ local decision not to follow up None given, and no health data entered	No health data entered at all

4. **Provision of standardised health assessments**

An additional analysis is conducted to determine how many infants with health data entered at 18-30 months corrected age were provided with a Schedule of growing, Bayley III or Griffiths assessment. Any data entered in relation to these standardised assessments will be considered as evidence of a standardised assessment being provided.

Outputs Tables

- Clinical follow up data and neurodevelopmental outcomes recorded at 18-30 months corrected age for babies < 30 weeks born between July [2013] and June [2014]: Overview
- Clinical follow up data and neurodevelopmental outcomes recorded at 18-30 months corrected age for babies < 30 weeks born between July [2013] and June [2014]: By ODN
- *Clinical follow up data recorded at 18-30 months corrected age for babies < 30 weeks born between July [2013] and June [2014]: By Unit (Online only)*
- Respiratory and gastro-intestinal outcomes recorded at 18-30 months corrected age for babies < 30 weeks born between July [2013] and June [2014]: By ODN
- *Respiratory and gastro-intestinal outcomes recorded at 18-30 months corrected age for babies < 30 weeks born between July [2013] and June [2014]: By Unit (Online only)*
- Comparison to clinical follow up audit results in previous NNAP reports
- Proportion of infants receiving standardised assessments recorded at 18-30 months corrected age to babies < 30 weeks born between July [2013] and June [2014] by ODN

Figures

- Caterpillar plot for standard: By unit with 95% confidence intervals
- Caterpillar plot for standard: By ODN with positive imputations and 95% confidence intervals

Data Sources

Data from the 2 Year follow-up form will be used to analyse assessment data. Which sections are used for each part of the analysis is indicated below by the coloured arrows:

Assessment data and neurodevelopmental outcomes

Respiratory outcomes

Gastro-intestinal outcomes

Standardised assessment data

