RCPCH Audits



National Neonatal Audit Programme

A guide to the 2022 audit measures

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NNAP
National Neonatal Audit Programme

RCPCH
Royal College of Paediatrics and Child Health
Leading the way in Children's Health

HQIP
Healthcare Quality Improvement Partnership

National Neonatal Audit Programme (NNAP): A guide to the 2022 audit measures

The NNAP is run by the Royal College of Paediatrics and Child Health (RCPCH) and commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). More information about the Programme can be found at: www.rcpch.ac.uk/nnap

This document sets out the details of the 2022 NNAP audit measures and describes the following details for each measure:

- NNAP audit measure
- Changes to the audit measure for 2022 data
- NNAP standard and source of standard
- Inclusion criteria
- Attributing results
- Deriving outcomes
- Where the required data should be entered on BadgerNet

Cover photo by Ben Turner, father of baby Olive, who was born at 29 weeks 3 days by caesarean. This picture was taken post treatment when Olive came off low flow oxygen.

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1 About the NNAP dataset and methodology

The RCPCH receives the data contained in the NNAP dataset directly from Clevermed Ltd, provider of the BadgerNet clinical system. The NNAP team processes data that is required solely for care quality and service improvement in relation to the aims and scope of the NNAP. Neonatal unit staff enter data onto the BadgerNet platform as part of routine care whilst a baby is present on the neonatal unit, and that data is stored by Clevermed Ltd. Data items contained within the NNAP dataset are synchronised to an NNAP database hosted by the RCPCH. Patient identifiable data is pseudonymised before analysis is conducted by the NNAP team. The RCPCH has approval to receive patient identifiable data without consent for England and Wales under Section 251 support, and for Scotland under HSC-PBPP support.

NNAP data dictionary

The NNAP dataset is defined in the NNAP data dictionary, available at: https://www.rcpch.ac.uk/work-we-do/quality-improvement-patient-safety/national-neonatal-audit-programme-nnap/about

Inclusion criteria

The following inclusion criteria apply to all NNAP measures:

- Babies who were admitted to a neonatal unit for neonatal care (not including babies that only had transitional care, observational or postnatal ward care).
- Babies born at a gestational age of 22 weeks or more
- Babies who had care provided by an NNAP unit
- Babies whose parents or carers have not opted them out of secondary use of their data

Further criteria specific to each audit measure can be found in the measure descriptions.

Case ascertainment

In usual practice, every baby admitted to a participating neonatal unit is entered on the BadgerNet patient record system, and is eligible for inclusion in the NNAP; the audit therefore expects to achieve 100% case ascertainment in the participating organisations, excluding babies whose parents have chosen to opt them out of secondary use of their data. Babies receiving special care in transitional care areas or postnatal wards can also be entered, but it is known that some units do not enter data for such babies and for this reason measures do not concentrate on care outside neonatal units.

Data collection period

The cohort of babies included in the 2022 audit year are babies who either experience their first neonatal admission or final neonatal discharge in the calendar year 1 January 2022 to 31 December 2022, depending on the measure. The exceptions to this are the datasets used for Bronchopulmonary dysplasia, Two-year follow-up and Mortality until discharge for very preterm babies, the cohorts for which are set out in the measure description.

Describing gestational age

Gestation refers to "completed weeks" of gestation, based on the best available estimate recorded by clinical staff in BadgerNet. Gestation is typically described in bands – where we

refer to all babies born at less than 32 weeks, we mean all babies with a gestation at birth of up to 31 weeks and six days inclusive. Where we refer to 23-33 weeks inclusive, we mean to include all babies with a gestation at birth of 23 weeks and 0 days to babies with a gestation at birth of 33 weeks and 6 days.

Two measures of age are used within the NNAP audit, corrected age and post-menstrual age. When describing post-menstrual age of babies, we mean the chronological age of the baby plus gestation at birth. Corrected age of babies is defined as chronological age minus prematurity at birth. For example, a baby born at 32^{+0} weeks gestational age is 8 weeks premature, at 9 weeks of life, this baby would have a post-menstrual age of 41 weeks and a corrected age of 1 week post term.

2 Optimal perinatal care

2.1 Antenatal steroids

Does a mother who delivers a baby between 22 and 33 weeks' gestational age receive a full course of antenatal corticosteroids within 1 week prior to delivery?

Change to the audit measure for the 2022 data year: This measure now looks at whether a mother receives an appropriately timed full course of antenatal corticosteroids where previously it looked at whether a mother received at least one dose of corticosteroid before delivery. The cohort has been changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis. For continuity, both measures will be run for the first year. The lower gestational age cut-off has been extended to include babies born from 22 weeks gestational age, in line with the overall NNAP inclusion criteria. Please refer to the 2021 measures guide for a definition of the previous measure.

NNAP standard

Developmental standard: None, initially benchmarking only for the new measure looking at administration of a full course.

Comparison standard for outlier analysis: No outlier analysis.

Inclusion criteria

- Babies who experienced their first admission in the calendar year of analysis.
- Babies with gestational age at birth between 22 and 33 weeks' inclusive.
- Only data from the first known episode of care will be considered for analysis
- For multiple births, only one baby will be included so that each mother is only counted once per delivery.

Attribution

Results will be reported for each hospital of birth and network of birth. When 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 the hospital of their earliest neonatal episode. Babies whose place of birth is listed as *Home* or *Transit* will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

NNAP will use data from steroids last dose timing, steroids given and steroid courses to determine if the baby's mother received a full course of antenatal steroids within 1 week of birth (Table and Table 2). When multiple births present different data, data will be taken from the baby with "the most positive" outcome.

**Most to least positive: timely completion, incomplete, missing data.*

When the steroids last dose timing indicates that the last dose of steroids was given earlier than 7 days before birth, this will be categorised as incomplete.

When the steroids last dose timing indicates that the last dose of steroids was given after birth, this will be listed as incomplete.

When the steroids last dose timing has no data entered, Table 1 will be used to derive outcomes.

When the steroids last dose timing is within 7 days of birth, Table 2 will be used to derive outcomes.

Table 1. Categorising data for antenatal steroids from BadgerNet fields steroids given and steroids courses when steroids last dose is not entered.

Time of last steroid dose - Not entered			
Steroids given?	Course complete?		
	Yes	No	Unknown/Not entered
Yes	Missing	Incomplete	Missing
No	Missing	Incomplete	Incomplete
Unknown/Not entered	Missing	Incomplete	Missing

Table 2. Categorising data for antenatal steroids from BadgerNet fields steroids given and steroids courses when steroids last dose is within 7 days of birth.

Time of last steroid dose - Within 7 days of birth			
Steroids given?	Course complete?		
	Yes	No	Unknown/Not entered
Yes	Timely completion	Incomplete	Missing
No	Timely completion	Incomplete	Missing
Unknown/Not entered	Timely completion	Incomplete	Missing

BadgerNet data source

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

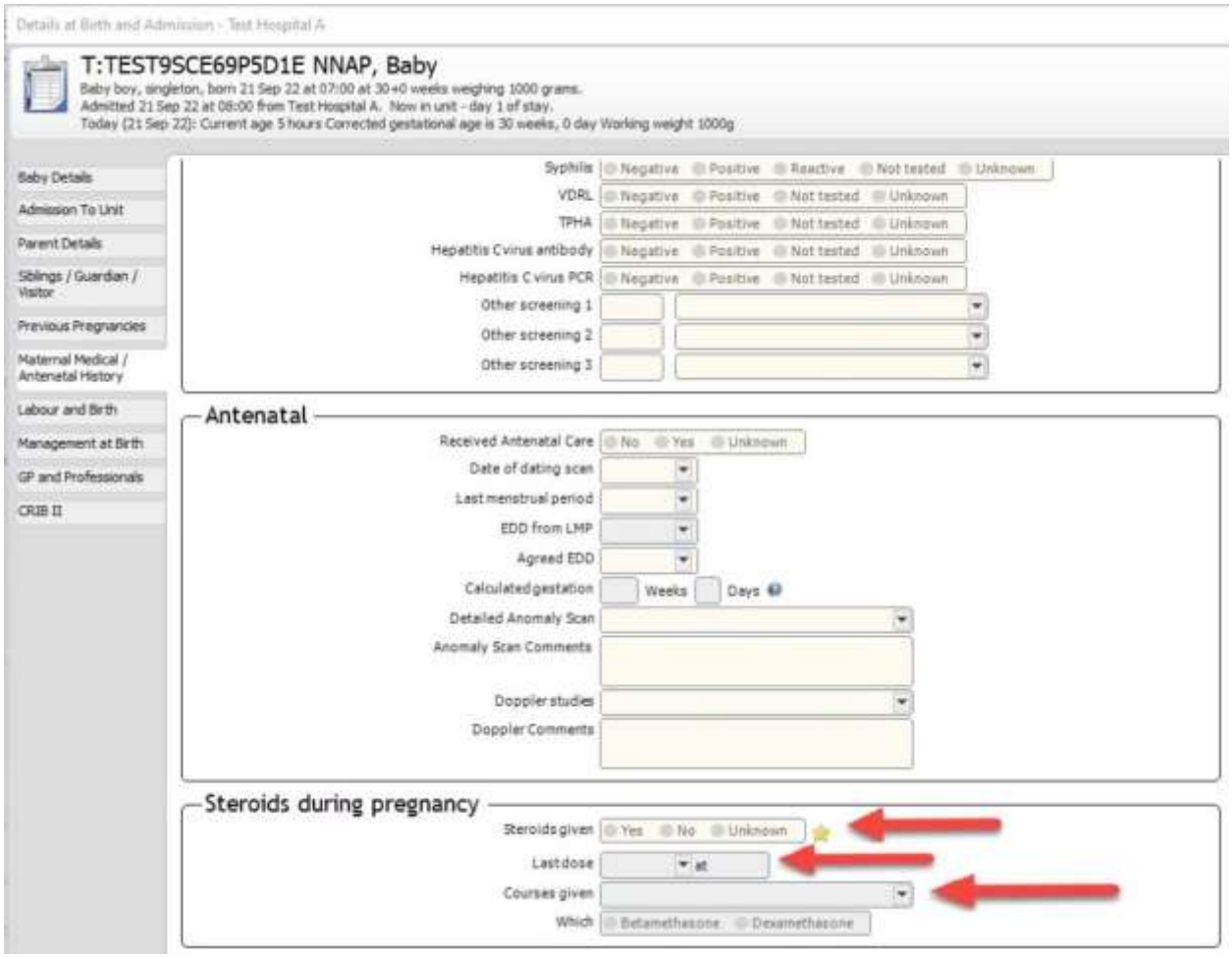


Figure 1: Pregnancy Details page, BadgerNet

2.2 Antenatal magnesium sulphate

Does a mother who delivers a baby below 30 weeks' gestational age receive magnesium sulphate in the 24 hours prior to delivery?

Change to audit measure for 2022 data year: The cohort has been changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: Ninety percent (90%) of eligible mothers should receive antenatal magnesium sulphate.

Source of standard: NNAP Project Board

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

- Babies who experienced their first admission in the calendar year of analysis.
- Babies with gestational age at birth less than 30 weeks.
- Only data from the first known episode of care will be considered for analysis.
- For multiple births, only one baby will be included so that each mother is only counted once per delivery.

Attribution

Results will be reported for each hospital of birth and network of birth. When 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 the hospital of their earliest neonatal episode. Babies whose place of birth is listed as *Home* or *Transit* will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

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

Table 2: Categorising antenatal magnesium sulphate from BadgerNet field Mother received magnesium sulphate in 24 hours prior to delivery

Q1: Mother received MgSO4 loading dose in 24 hours prior to delivery?	Q2: Was a minimum of 4 hours of antenatal magnesium sulphate given after a loading dose and completing within 4 hours of the birth?		
	Yes	No	Unknown / Not recorded
Yes	Given	Given	Given
No	Given	Not given	Not given
Unknown / Not recorded	Given	Not given	Missing

**Most to least positive: magnesium sulphate given, magnesium sulphate not given, missing / unknown data.*

BadgerNet data source

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

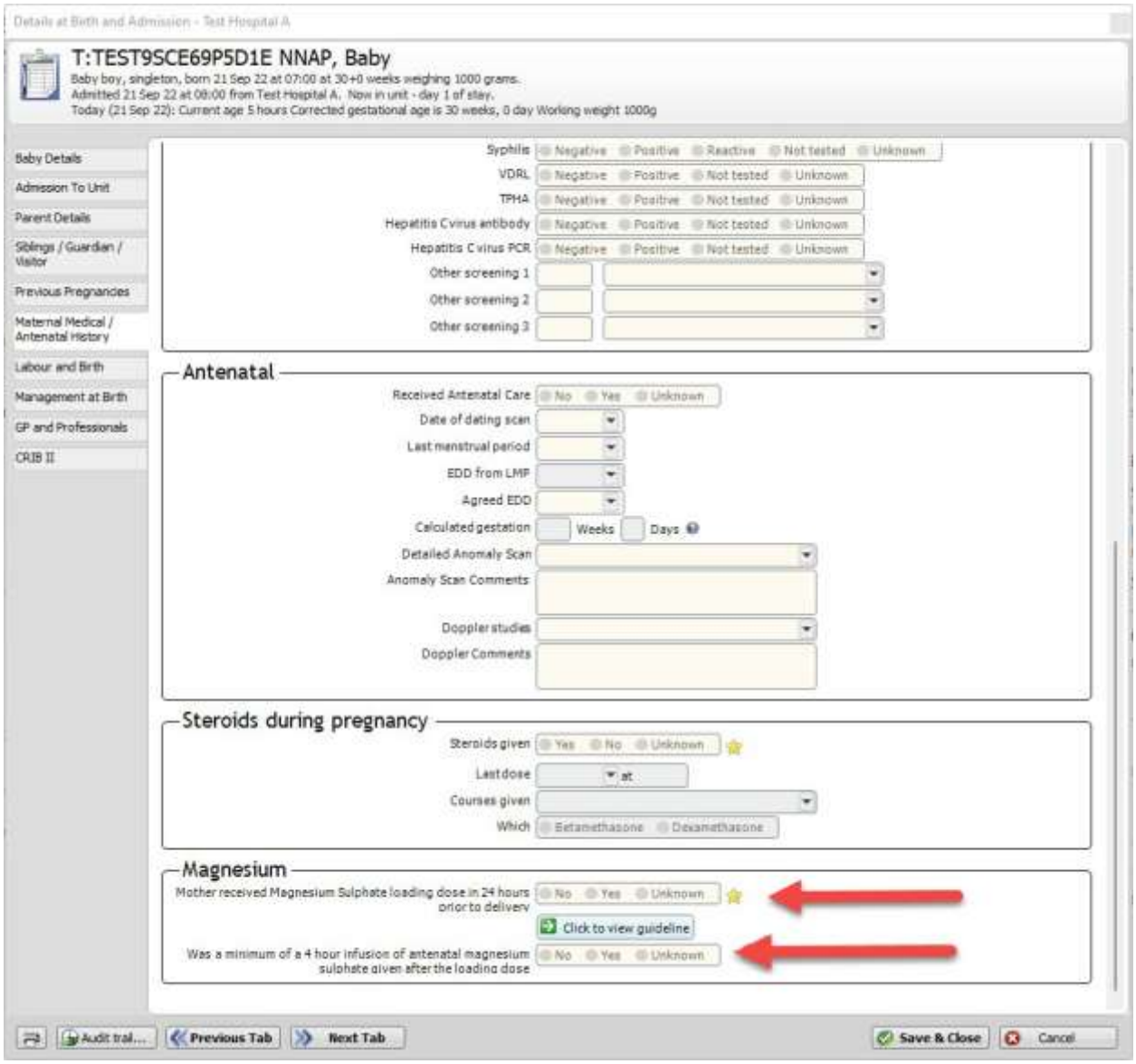


Figure 2: Labour and delivery page, BadgerNet

2.3 Birth in a centre with a neonatal intensive care unit (NICU)

Is a baby:

- *born at less than 27 weeks gestational age, or*
- *less than 800 grams at birth, or*
- *born as a multiple at less than 28 weeks gestational age*

delivered in a maternity service on the same site as a designated NICU?

Change to audit measure for 2022 data year: Changed inclusion criteria to additionally include babies born at less than 800 grams, and babies born as a multiple at less than 28 weeks gestational age, in line with current guidance[1,2].

NNAP standard

Developmental standard: Eighty-five (85%) of babies born at less than 27 weeks gestational age should be delivered in a maternity service on the same site as a NICU.

Source of standard: Neonatal Critical Care Clinical Reference Group, NHS England.

Comparison standard for outlier analysis: No outlier analysis at neonatal unit level.

Inclusion criteria

- Babies who experienced their first admission in the calendar year of analysis.
- Babies with gestational age at birth of less than 27 weeks, born at less than 800 grams, or born as a multiple at less than 28 weeks.
- Only data from the first known episode of care will be considered for analysis.
- For 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 network of birth. Outcomes will be reported by neonatal network of birth. Babies whose place of birth is listed as *Other* will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

NNAP will use data from the place of birth to determine the level of neonatal unit within the hospital where babies were delivered (Table 2).

Table 2: Categorising birth in a centre with a NICU from BadgerNet field Place of birth

Place of birth	NNAP category
Hospital with a designated NICU	Delivered in appropriately designated location (NICU)
Hospital with a designated local neonatal unit (LNU) / special care unit (SCU)	Delivered in inappropriately designated location (LNU / SCU)
Hospital with no designated neonatal unit/ non-hospital location	Delivered in location without neonatal facilities

BadgerNet data source

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 (Figure 3).

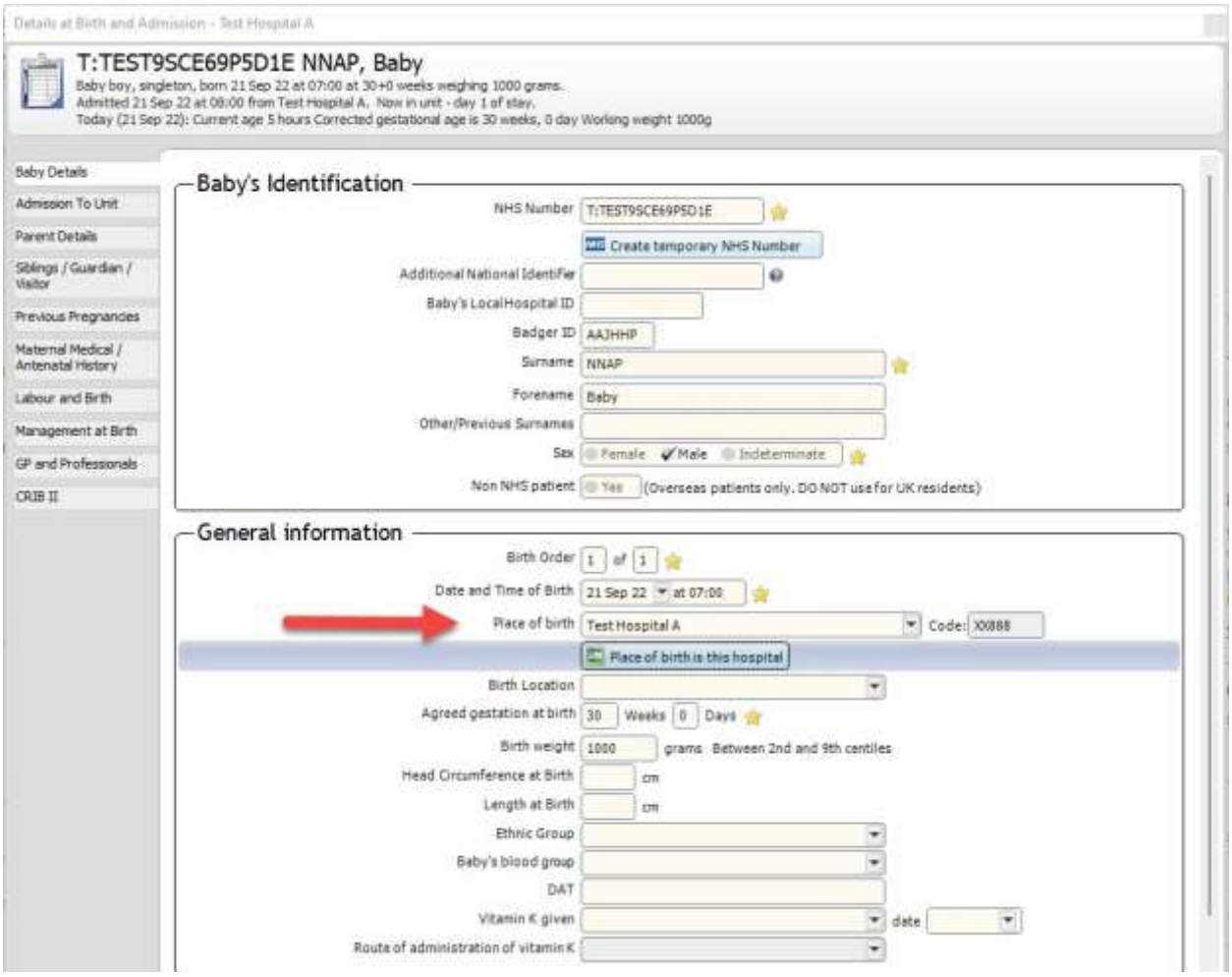


Figure 3: Details at birth and admission page, BadgerNet

2.4 Deferred cord clamping for very preterm babies

Does a baby born at less than 34 weeks' gestational age have their cord clamped at or after one minute?

Change to audit measure for 2022 data year: The upper gestational age cut off has been changed from less than 32 weeks to less than 34 weeks, in line with MatNeoSIP measurement. The cohort has been changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: Sixty percent (60%) of babies born at less than 34 weeks' gestational age should have deferred cord clamping.

Source of standard: By consensus of the NNAP Methodology & Dataset Group

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

- Babies who experienced their first admission in the calendar year of analysis.
- Babies with gestational age at birth of less than 34 weeks.
- Only the first known episode of care will be considered for analysis.

Attribution

Results will be reported for each hospital of birth and network of birth. When 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 the hospital of their earliest neonatal episode. Babies whose place of birth is listed as *Home* or *Transit* will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

NNAP will use data from the *Time of Cord Clamping* to determine whether cord clamping was deferred for 1 minute or more (Table 3).

Table 3: Categorising time of cord clamping in the NNAP

Time of cord clamping*				
Missing	< 0 minutes	Less than a minute after birth	1 – 2 minutes after birth	More than 2 minutes after birth
Time of cord clamping missing	Time of cord clamping missing	Less than 1 minute after birth	Deferred cord clamping (≥ 1 minute)	Deferred cord clamping (≥ 1 minute)

*Time of cord clamping is calculated by combining the *time of cord clamp minutes* and *time of cord clamp seconds* fields. If one of the two fields is not recorded, the not recorded field will be counted as 0, if both fields are not recorded, time of cord clamping will be counted as *missing*.

BadgerNet data source

Data on time of cord clamping are taken from the field *Time from birth to clamp* on the *Labour and Birth* page.

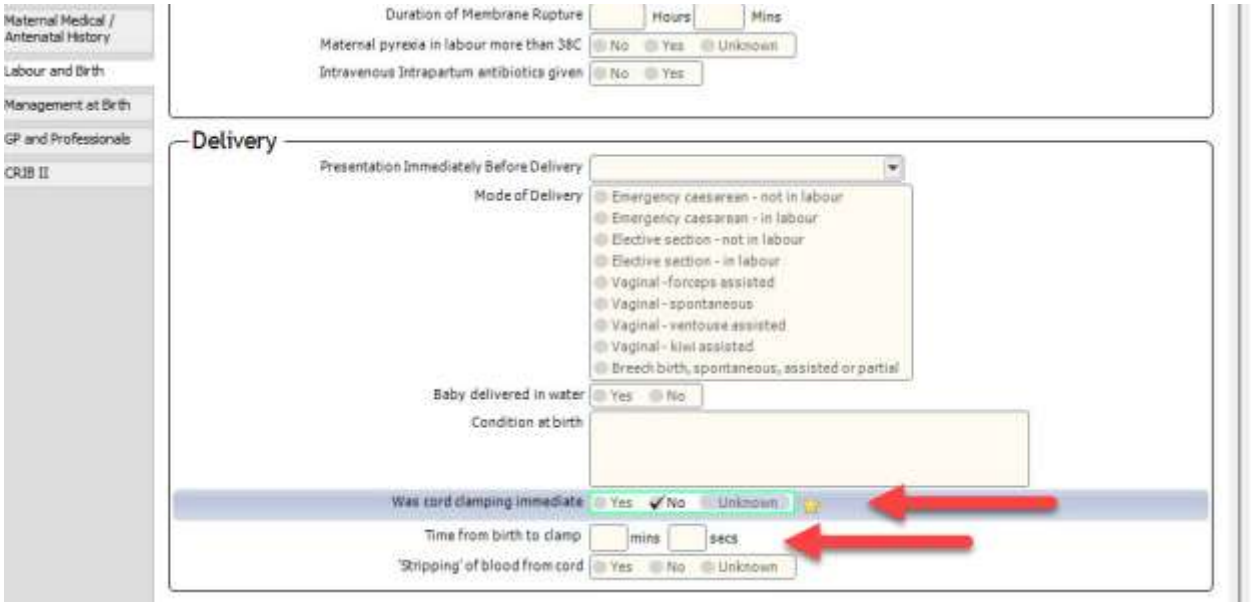


Figure 4: Delivery section, Labour and birth page, BadgerNet

2.5 Promoting normal temperature on admission for very preterm babies

Does a baby born at less than 32 weeks' gestational age have a first temperature on admission which is both between 36.5–37.5°C and measured within one hour of birth?[2,3]

Change to audit measure for 2022 data year: The cohort has been changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: First temperature on admission should be taken within an hour of birth for all eligible babies.

The composite measure of timeliness and normal temperature should be met for at least ninety percent (90%) of babies.

Source of standard: NNAP Project Board

Comparative standard for outlier analysis: National proportion.

Inclusion criteria

- Babies with gestational age at birth of less than 32 weeks.
- Babies who were admitted to a neonatal unit within an hour of birth.
- Babies who experienced their first admission in the calendar year of analysis.
- Only the first known episode of care will be considered for analysis.

Attribution

Results will be reported for each hospital of birth and network of birth. When 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 the hospital of their earliest neonatal episode. Babies whose place of birth is listed as *Home* or *Transit* will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

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 (Table 4).

Table 4: Categorising temperature measurement from BadgerNet fields Temperature measured after admission, Temperature value and Temperature not recordable

Time of first temperature measurement (minutes from birth)	Value of first temperature measurement				
	Temp. not taken	< 35.9	36-36.4	36.5-37.5	>37.5
Temperature not taken after admission	Not taken	Not taken	Not taken	Not taken	Not taken

Within an hour (≤ 60 minutes from birth)	Not taken	Within an hour	Within an hour	Within an hour and between 36.5-37.5	Within an hour and >37.5
After an hour (> 60 minutes from birth)	Not taken	Late	Late	Late	Late

Categorising temperature values

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

- Less than 32.0°C
- 32.0°C-35.9°C
- 36.0°C-36.4°C
- 36.5°C-37.5°C (normothermic)
- Greater than 37.5 °C

When the temperature value was not recordable, babies will be assigned to the 32.0°C-35.9°C group.

BadgerNet data source

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).

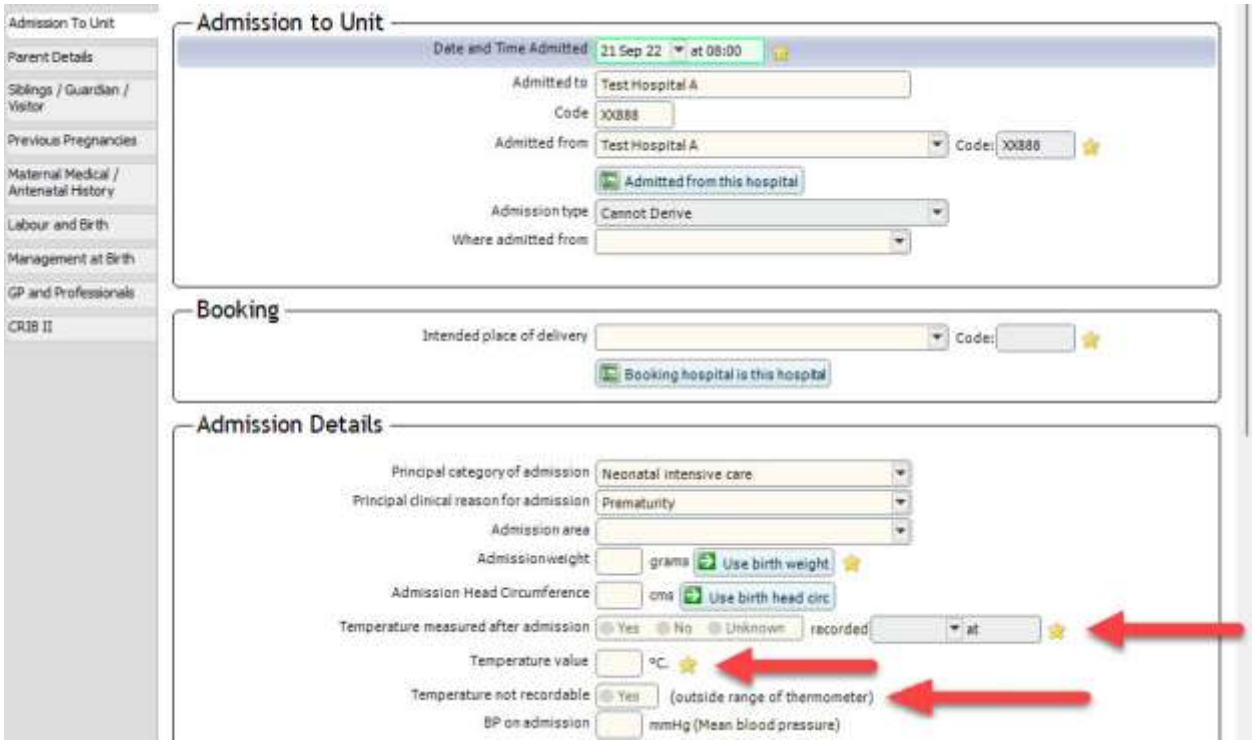


Figure 5: Details at birth and admission page, BadgerNet

2.6 Type and duration of respiratory support

What proportion of babies born at less than 32 weeks' gestation only receive non-invasive respiratory support during the first week of life?*

**Invasive respiratory support is defined as that delivered through an endotracheal tube.*

Change to audit measure for 2022 data year: New measure.

NNAP standard

Developmental standard: None

Comparison standard for outlier analysis: No outlier analysis, benchmarking only.

Inclusion criteria

- Babies with gestational age at birth of less than 32 weeks.
- Babies who experienced their first admission in the calendar year of analysis.
- Babies that did not have surgery in the first week of life.
- Episodes in the first week of life will be considered for analysis.
- Babies who survived to day 8 of life on a neonatal unit.

Attribution

Results will be attributed to the hospital and network of birth. Babies whose place of birth is listed as Other will have their network of birth updated to the provider network of their earliest episode.

Deriving outcomes

Outcomes will be derived from the "respiratory support" field of the day summary forms from the first seven days of a baby's care. The numerator is babies who only receive non-invasive respiratory support ("*no ventilation/no CPAP"* or "*non-invasive support (inc. CPAP)"*) on all of the first seven days of life.

Babies born at or after 23:00 hours will have respiratory data from their first day of life imputed to match respiratory data from their second day of life, if data from their first day of life is missing. This is to account for babies born the day before their first admission to a neonatal unit.

Presenting the data

Data will be presented taking into account the gestational age mix at individual units.

BadgerNet data source

Details on type of respiratory support are captured on BadgerNet on the Day summary form, indicating type of respiratory support provided on the day.

3 Parent partnership

3.1 Parental consultation within 24 hours of every admission

Is there a documented consultation with parents by a senior member of the neonatal team, within 24 hours of admission?* [4,5,10]

**By senior member of the neonatal team, NNAP means a consultant or middle grade doctor, or a nurse practitioner acting in such a role.*

Change to audit measure for 2022 data year: The cohort has been changed from babies experiencing final discharge in the calendar year of analysis to babies first admitted in the calendar year of analysis.

NNAP standard

Developmental standard: A consultation should take place within 24 hours of admission for every baby (100%).

Source of standard: NNAP Project Board

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies who experienced an admission in the calendar year of analysis.
- Babies who were admitted to neonatal care for at least 12 hours for a given episode, receiving special care or a higher order of neonatal care.
- Babies receiving neonatal care in non-neonatal unit locations (postnatal ward, transitional care etc.) will not be included.

Attribution

Results will be attributed to the neonatal unit and network of admission.

Deriving outcomes

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 (Table 5).

Table 5: Categorising consultation with parents from BadgerNet fields Parents seen by senior staff and Time first seen

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
Consultation time not recorded	Missing

BadgerNet data source

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.

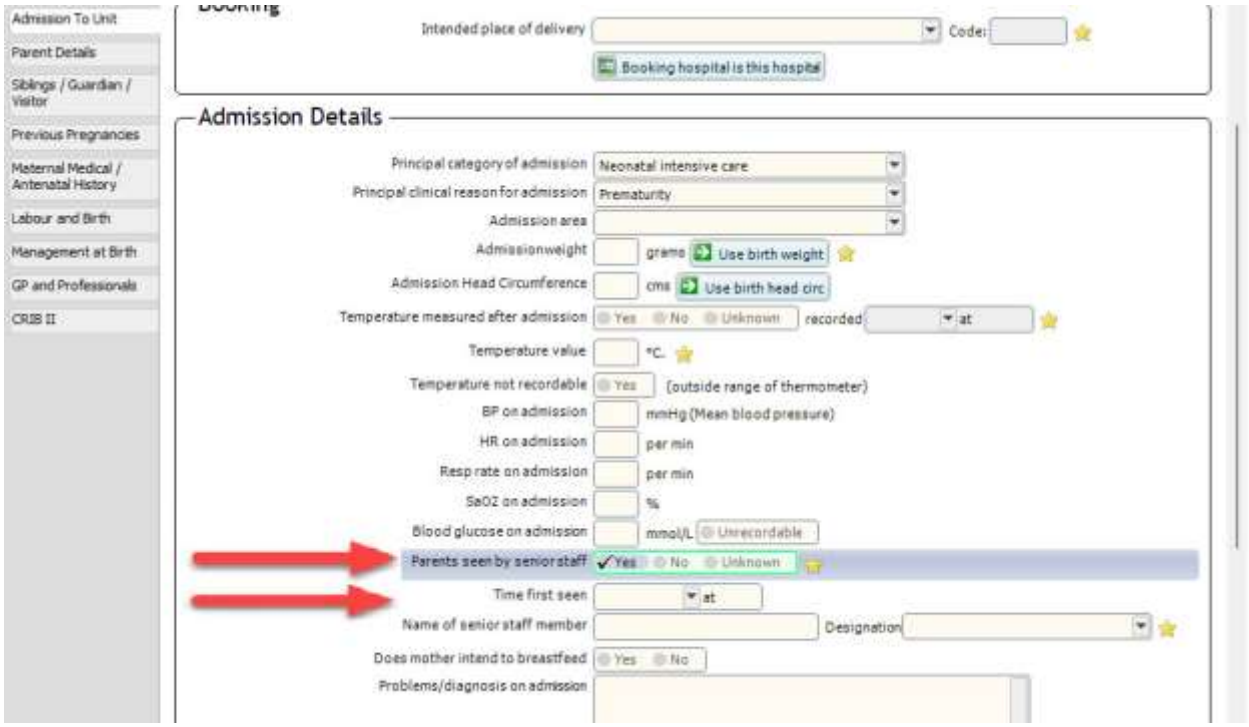


Figure 6: Details at birth and admission page, BadgerNet

3.2 Parental inclusion in consultant ward rounds

For a baby admitted for more than 24 hours, was at least one parent included a consultant ward round?* [4,5,6]

What proportion of consultant-led ward rounds had at least one parent included?*

**Consultant ward round refers to any ward round where a consultant is in attendance, at any time of the day.*

Change to audit measure for 2022 data year: Addition of question 'What proportion of consultant-led ward rounds had at least one parent present?' Change of wording from "attend" or "present" to "included".

NNAP standard

Developmental standard: Benchmarking only.

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies who experienced their final neonatal discharge in the calendar year of analysis.
- 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.
- All eligible admissions for a baby will be included.
- Babies receiving all neonatal care in non-neonatal unit locations (postnatal ward, transitional care etc.) will not be included.

Attribution

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

Deriving outcomes

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 (Table 6).

Table 6: Categorising parental presence at consultant ward rounds from BadgerNet field Parent present on consultant ward round today?

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.

BadgerNet data source

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.

Details on daily parental presence on ward rounds can also be captured in the BadgerNet EPR system under the clinical review section, where *Reason for Review* is listed as Ward Round and the *Consultant Ward Round* and *Parent Present at Review* fields are completed.

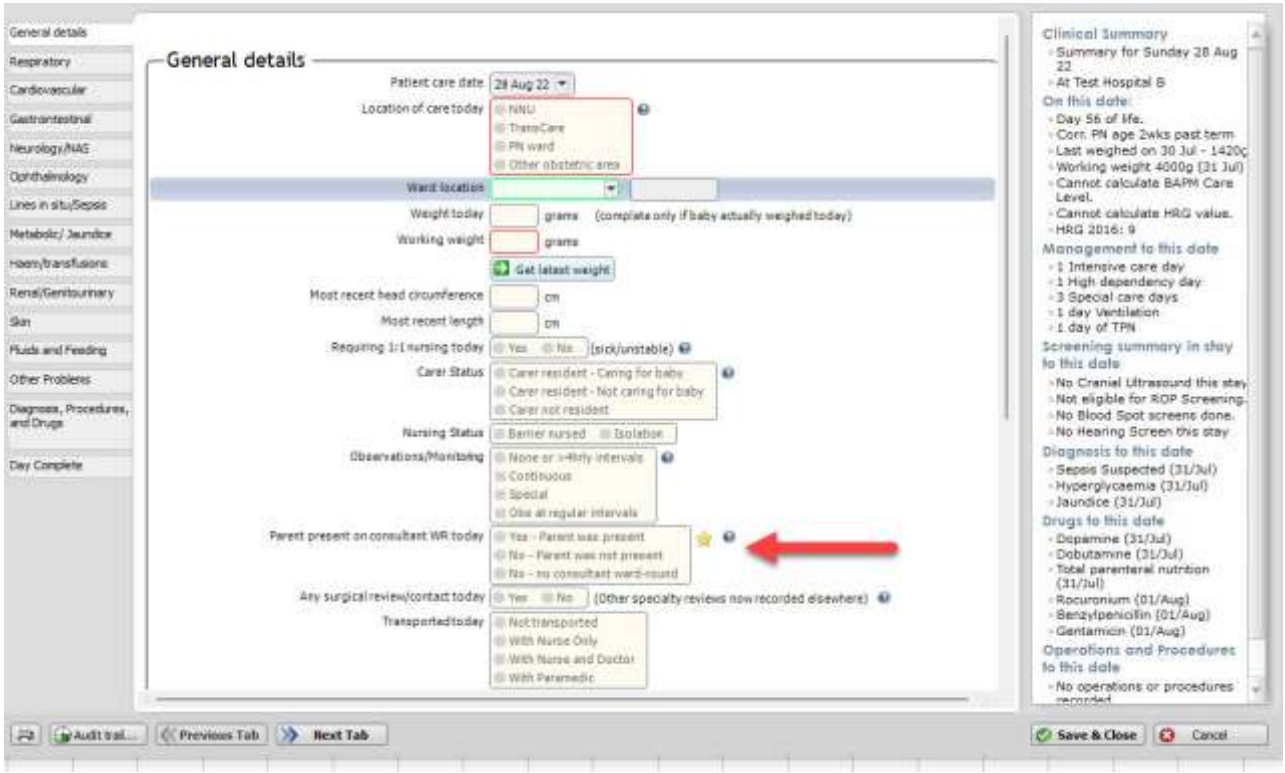


Figure 7: Daily summary, BadgerNet

4 Care processes

4.1 Breastmilk feeding in the first 2 days of life

Does a baby born at less than 34 weeks' gestational age receive any of their own mother's milk in the first 2 days of life?

Change to audit measure for 2022 data year: New measure, introduced to align with MatNeoSIP measurement.

NNAP standard

Developmental standard: Benchmarking only.

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies born at less than 34 weeks' gestational age who survive to 48 hours on a neonatal unit.
- Babies who experienced their first admission in the calendar year of analysis. *

**Note that the cohort of babies included in this measure is different to measures 4.2 and 4.3, which consider babies discharged in the calendar year of analysis.*

Attribution

- Babies will be attributed to their hospital and network of first admission.

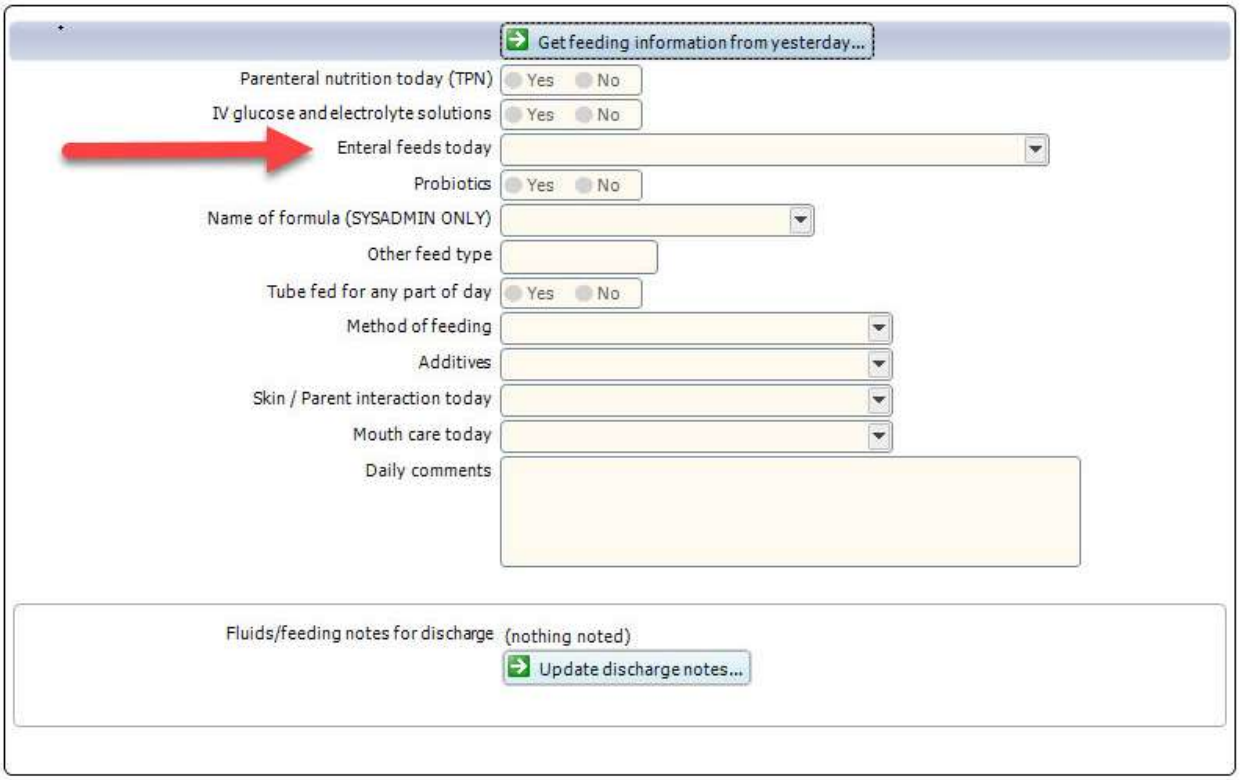
Deriving outcomes

Babies will be classified as meeting the NNAP standard if they are noted to have received any of the following types of enteral feed or mouth care on the day of birth or day after birth.

- Suckling at the breast
- Mother's fresh expressed breastmilk
- Mother's frozen expressed breastmilk
- Colostrum

BadgerNet data source

The primary source for information on feeding at discharge is daily summary data on enteral feeds for the day of birth or day after birth on the BadgerNet system.


Get feeding information from yesterday...
Parenteral nutrition today (TPN)
Yes
No
IV glucose and electrolyte solutions
Yes
No
Enteral feeds today
Probiotics
Yes
No
Name of formula (SYSADMIN ONLY)
Other feed type
Tube fed for any part of day
Yes
No
Method of feeding
Additives
Skin / Parent interaction today
Mouth care today
Daily comments
Fluids/feeding notes for discharge
(nothing noted)
Update discharge notes...

4.2 Breastmilk feeding at day 14

Does a baby born at less than 34 weeks' gestational age receive any of their own mother's milk at day 14 of life?

Change to audit measure for 2022 data year: Upper gestational age cut-off increased from less than 32 weeks' to less than 34 weeks', in line with MatNeoSIP measurement.

NNAP standard

Developmental standard: Benchmarking only.

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies born at less than 34 weeks' gestational age who survive to their 14th day of life on a neonatal unit.
- Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

- Babies will be attributed to their location of care at 48 hours of life, which is intended as a proxy measure of the intention to provide ongoing care for a baby in a given neonatal unit.
- When a baby is in transit between units at 48 hours of life 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.

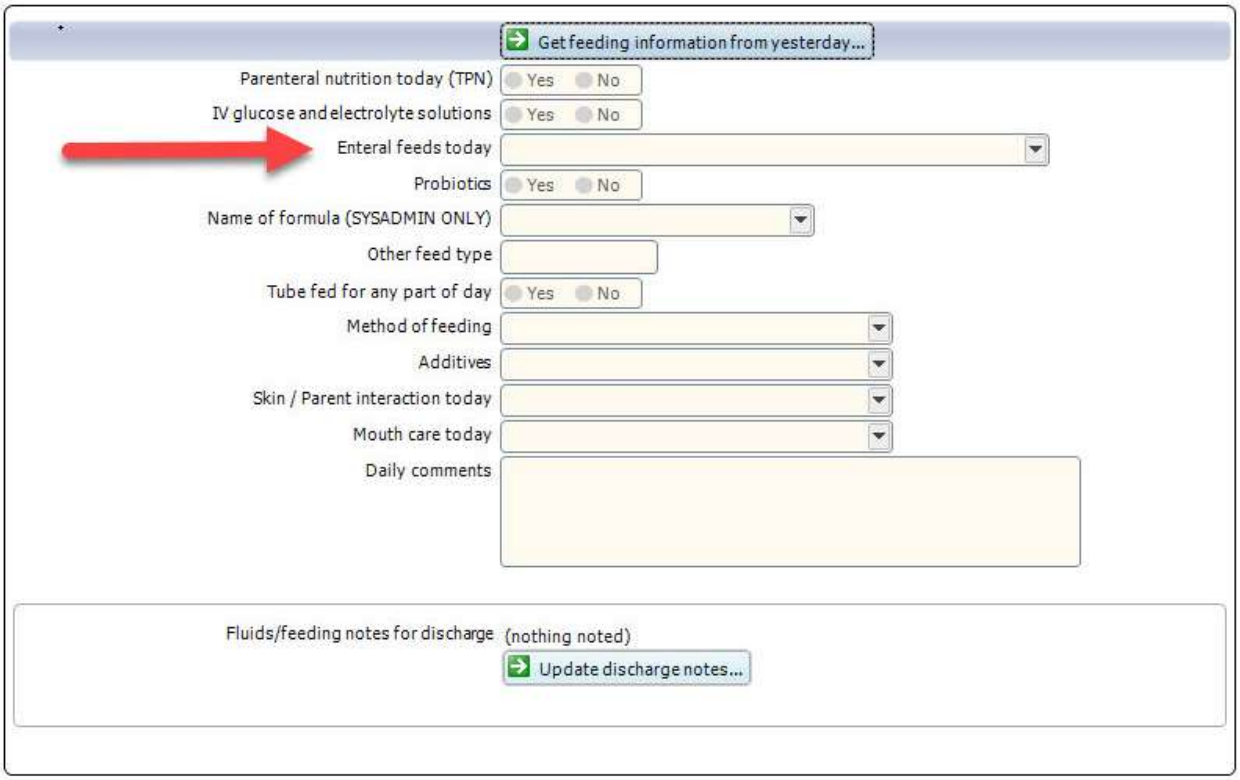
Deriving outcomes

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 14th day of life.

- Suckling at the breast
- Mother's fresh expressed breastmilk
- Mother's frozen expressed breastmilk

BadgerNet data source

The primary source for information on feeding at discharge is daily summary data on enteral feeds for the 14th day of neonatal care on the BadgerNet system. When enteral feeding data is missing for the 14th day, data from 13th or 15th day of care will be used instead (the most positive result will be used).


Get feeding information from yesterday...
Parenteral nutrition today (TPN)
Yes
No
IV glucose and electrolyte solutions
Yes
No
Enteral feeds today
Probiotics
Yes
No
Name of formula (SYSADMIN ONLY)
Other feed type
Tube fed for any part of day
Yes
No
Method of feeding
Additives
Skin / Parent interaction today
Mouth care today
Daily comments
Fluids/feeding notes for discharge
(nothing noted)
Update discharge notes...

4.3 Breastmilk feeding at discharge home

Does a baby born at less than 34 weeks' gestational age receive any of their own mother's milk at discharge to home from a neonatal unit?[6]

Change to audit measure for 2022 data year: Upper gestational age cut-off increased from less than 32 weeks' to less than 34 weeks', in line with MatNeoSIP measurement.

NNAP standard

Developmental standard: Eighty percent (80%) of babies born at less than 34 weeks' gestational age should receive at least some of their mother's milk at discharge home from the neonatal unit.

Source of standard: By consensus, in consultation with BAPM.

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies born at less than 34 weeks' gestational age.
- Babies who are discharged home alive.
- Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

Attribution will be to the neonatal unit of final discharge.

Deriving outcomes

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.

Data will be presented subdivided by rates of breastfeeding, and breastmilk feeding by bottle.

BadgerNet data source

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 BadgerNet system. When enteral feeding data is missing for the final day, data from the penultimate day of care will be used instead.

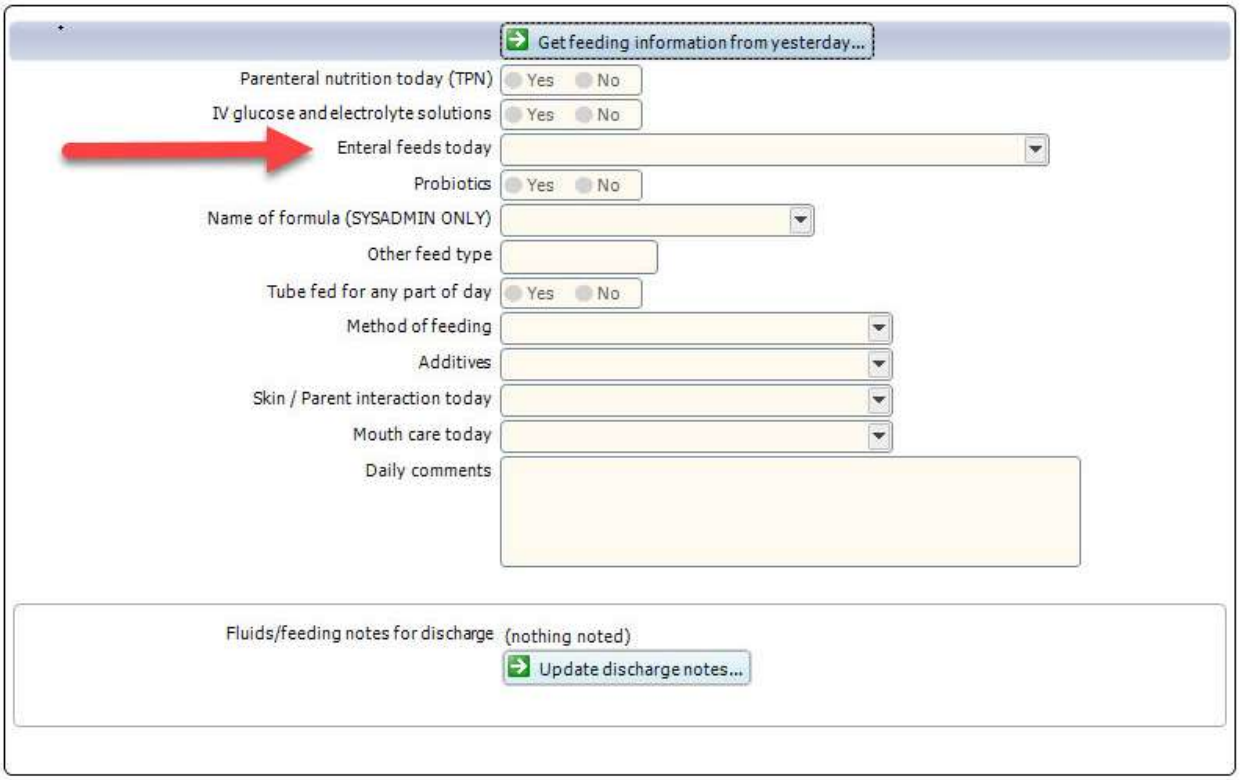


Figure 8: Daily summary form, BadgerNet

4.4 On-time screening for retinopathy of prematurity

Does a baby born at less than 31 weeks gestational age, or weighing less than 1501g at birth undergo the first ROP screening according to the guideline[7]?

Change to audit measure for 2022 data year: Measure amended in line with the latest ROP screening guideline[7]. For continuity, both measures will be run for the first year. Please refer to the 2021 measures guide for a definition of the previous measure.

NNAP standard

Developmental standard: All (100%) of eligible babies should receive ROP screening within the recommended time windows for first screening.

Source of standard: National standard (RCPCH, *UK Screening of Retinopathy of Prematurity Guideline, 2022*[7].

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Table 7: ROP screening window

Gestational age at birth (completed weeks)	National guideline ROP screening window[7]
Less than 31 weeks' gestational age	31+0 and 31+6 weeks' postmenstrual age, or at 4 completed weeks' postnatal age (28-34 days), whichever is later.
At or after 31 weeks' gestational age, with birthweight less than 1501g	36 weeks' postmenstrual age or 4 completed weeks' postnatal age (28–34 days), whichever is sooner.

Inclusion criteria

- Babies who experienced their final neonatal discharge in the calendar year of analysis
- The baby was alive at the beginning of the national guideline screening window

and

- The baby was born at less than 31 weeks gestational age and was admitted to a neonatal unit

or

- The baby's birth weight was less than 1501g.

Attribution

ROP screenings will be attributed to the unit completing earliest screening within the screening window.

If a baby is not screened within the window, they are assigned to the neonatal unit of care at the time that the screening window closed, or the neonatal unit of final discharge when the infant was discharged before the closure of the screening window.

Babies who died before the end of screening window, and who do not have a record of being "Screened on time" will not be attributed to a unit.

Deriving outcomes

ROP status will be derived from the ad–hoc and daily summary of care sections of BadgerNet to confirm if a screening took place and whether it took place during the NNAP ROP screening window (Table 8).

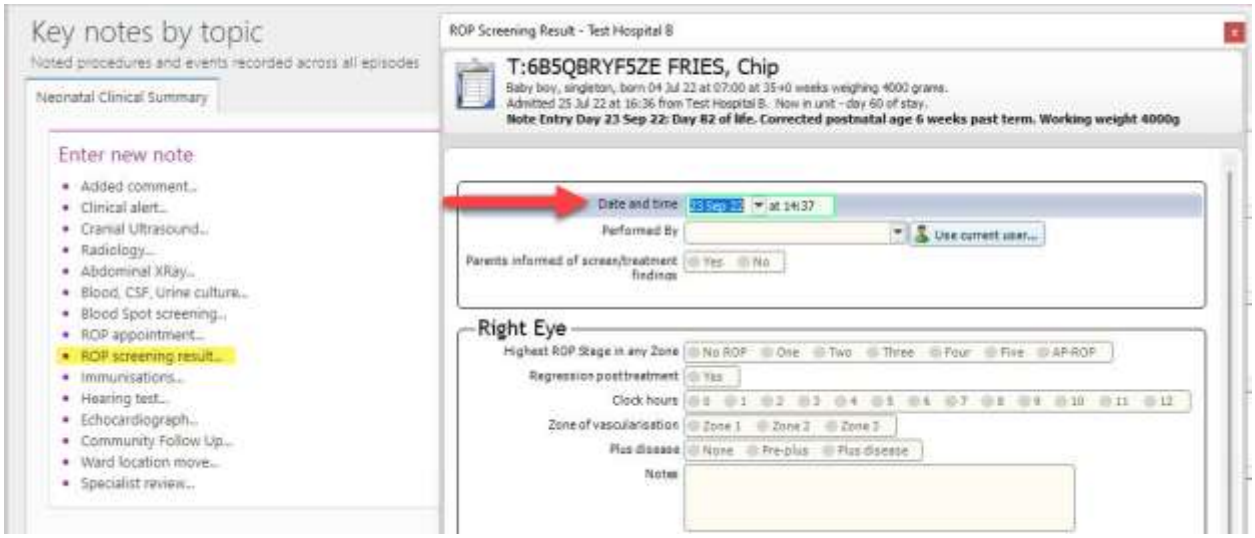
Table 8: ROP screening done categories

These categories are totalled to give 'Any screen':			No screening data
Within ROP screening window	Only before ROP screening window opened	Only after ROP screening window	No ad-hoc ROP form or ROP screen data on daily care summary
Screened on time	Screened early	Screened late	No screening data

BadgerNet data source

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).



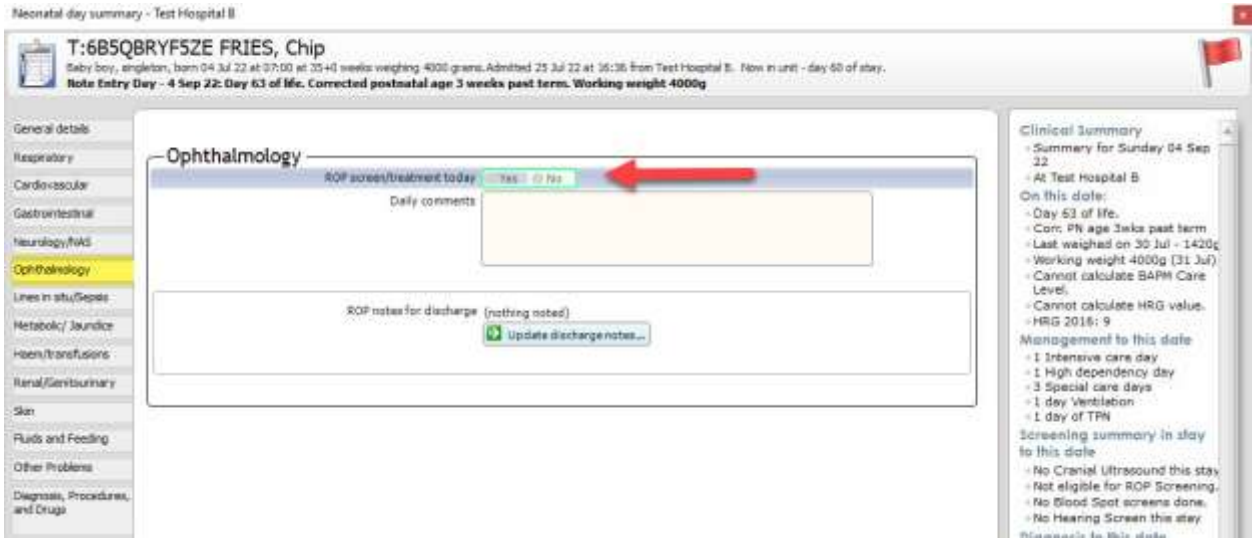


Figure 9: Ad-hoc form for ROP screening (top) and daily summary form (bottom), BadgerNet

4.5 Follow-up at two years

Does a baby born at less than 30 weeks gestational age receive medical follow-up at two years gestationally corrected age (18-30 months' gestationally corrected acceptable age range)?

Does a baby have complete results of a structured assessment recorded?[8]

Change to audit measure for 2022 data year: None.

NNAP standard

Developmental standard: Ninety percent (90%) of babies with two-year follow-up data entered.

Source of standard: NNAP Project Board

Comparison standard for outlier analysis: National proportion.

Inclusion criteria

- Babies born at less than 30 weeks who are not recorded as deceased within their episodic data (including final neonatal outcome).
- The eligible cohort runs for births from July to June each year, for babies who would have reached two years corrected age since the last annual report. Current and projected denominators are shown in Table 9.

Table 9: Categorising eligible babies for follow-up at two years of age

NNAP data year	Two-year assessment cohort: Time of birth (inclusive)
2021	July 2018 to June 2019
2022	July 2019 to June 2020
2023	July 2020 to June 2021
2024	July 2021 to June 2022
2025	July 2022 to June 2023

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.

Deriving outcomes

Assessment data will be considered for analysis if it took place between 18 and 30 months corrected age for the infant. This is calculated using assessment date, date of birth and gestational age at birth. If any of these fields are not recorded, the infant will be classified as *Outside of date range*. If the *Reason child not assessed* field is filled in, any data entered for this record will not count towards the analysis (Table 10).

Table 10: Categorising two-year follow-up data

Two-year follow-up outcome form	NNAP category
Any two-year follow-up health data entered	Health data entered
Lost to follow-up	No health data entered: Lost to follow-up
Died post discharge	Health data entered
Responsibility of another unit	No health data entered: Not assessed for other reason
Local decision not to follow-up	No health data entered: Not assessed for other reason.
Empty follow-up form / No follow up form	No health data entered: No health data entered at all
Assessment occurred outside 18-30 months corrected gestational age	No health data entered: No health data entered at all

BadgerNet data source

Data from the two-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:

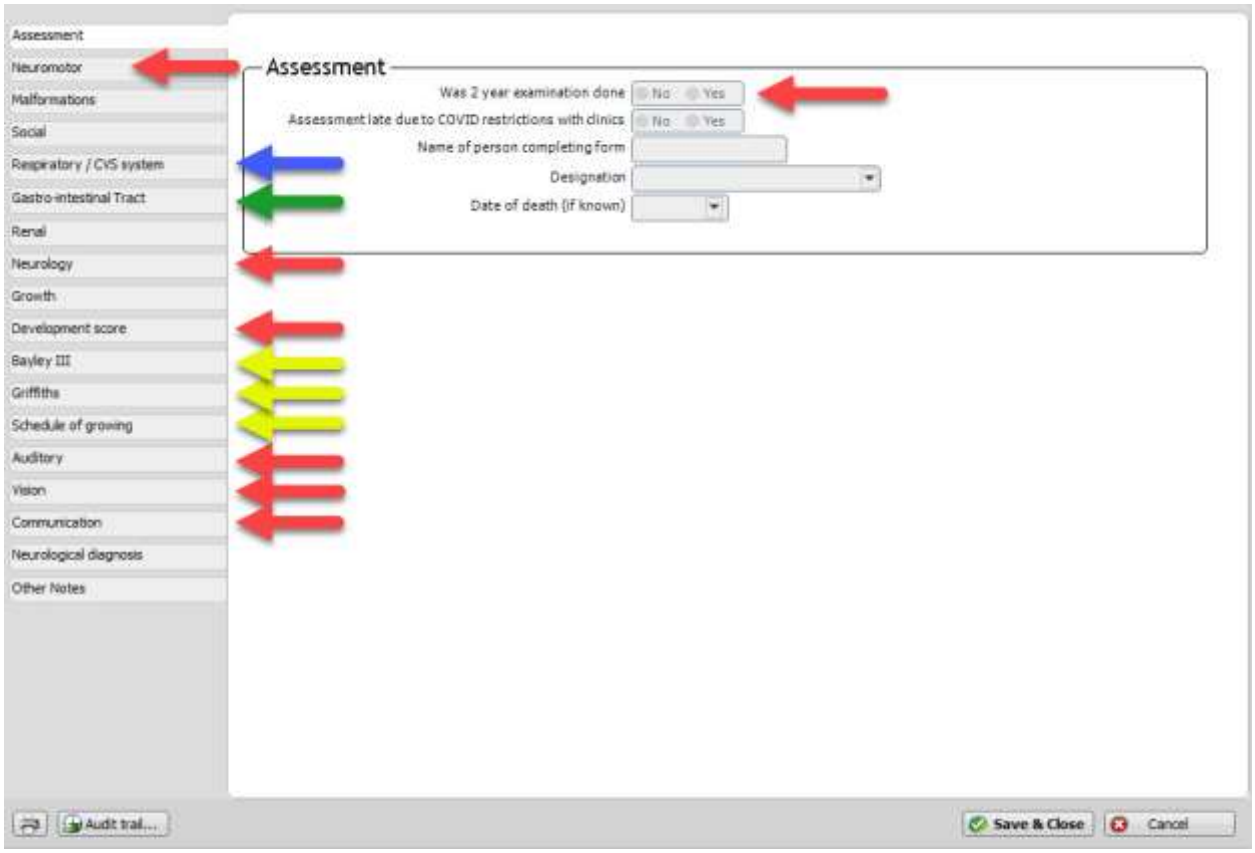


Figure 10: Two-year follow-up form, BadgerNet

Red: Assessment data and neurodevelopmental outcomes

Blue: Respiratory outcomes
Green: Gastrointestinal outcomes
Yellow: Standardised assessment data

4.6 Nurse staffing on neonatal units

What proportion of nursing shifts are numerically staffed according to guidelines and service specification?[2,10,9]

Note: Shifts are based on corresponding level of cot occupancy calculated by Badger system.

Numerator: Number of shifts where nurse staffing met or exceeded service specification rules (1:1 intensive care; 1:2 high dependency care; 1:4 special care; additional shift coordinator)[2,10].

Denominator: Number of shifts (data collection instrument and measure based on a two-shift model of each calendar day).

Change to audit measure for 2022 data year: Measures 2 and 3 have been removed, to focus solely on the proportion of shifts numerically staffed according to guidelines and service specification.

NNAP standard

Developmental standard: 100% of shifts staffed according to guidelines and service specification.

Comparison standard for outlier analysis: Not applicable, no outlier analysis. Inclusion criteria

A "nurse" is a member of non-medical staff with an allocated patient workload, or acting as a coordinator, with or without Nursing and Midwifery Council (NMC) registration, with or without a qualification in speciality. Staff members without allocated patients, such as housekeepers, research nurses, nurses in primarily educational roles are specifically excluded.

When entering data about partially worked day shifts, units should enter early or late shifts as follows: where a nurse is only present for an "early" or "late" part of a day shift, record as 0.5 shift.

Any shifts with no cot occupancy or nurse numbers data will be removed from the measure.

Additionally, any units with less than or equal to 50% data completeness across all their entered shifts will be removed from the measure. This completeness is assessed based on completion of the "Registered Nurses, qualified in specialty" field.

Use the guidance *Safe, sustainable and productive staffing: An improvement resource for neonatal care* to support data completion.

Attribution

Attribution will be to the neonatal unit.

BadgerNet data source

Data from the Nursing numbers update form (Figure 11) in BadgerNet will be used for this measure. The Nursing numbers update form is found within the Unit report section.

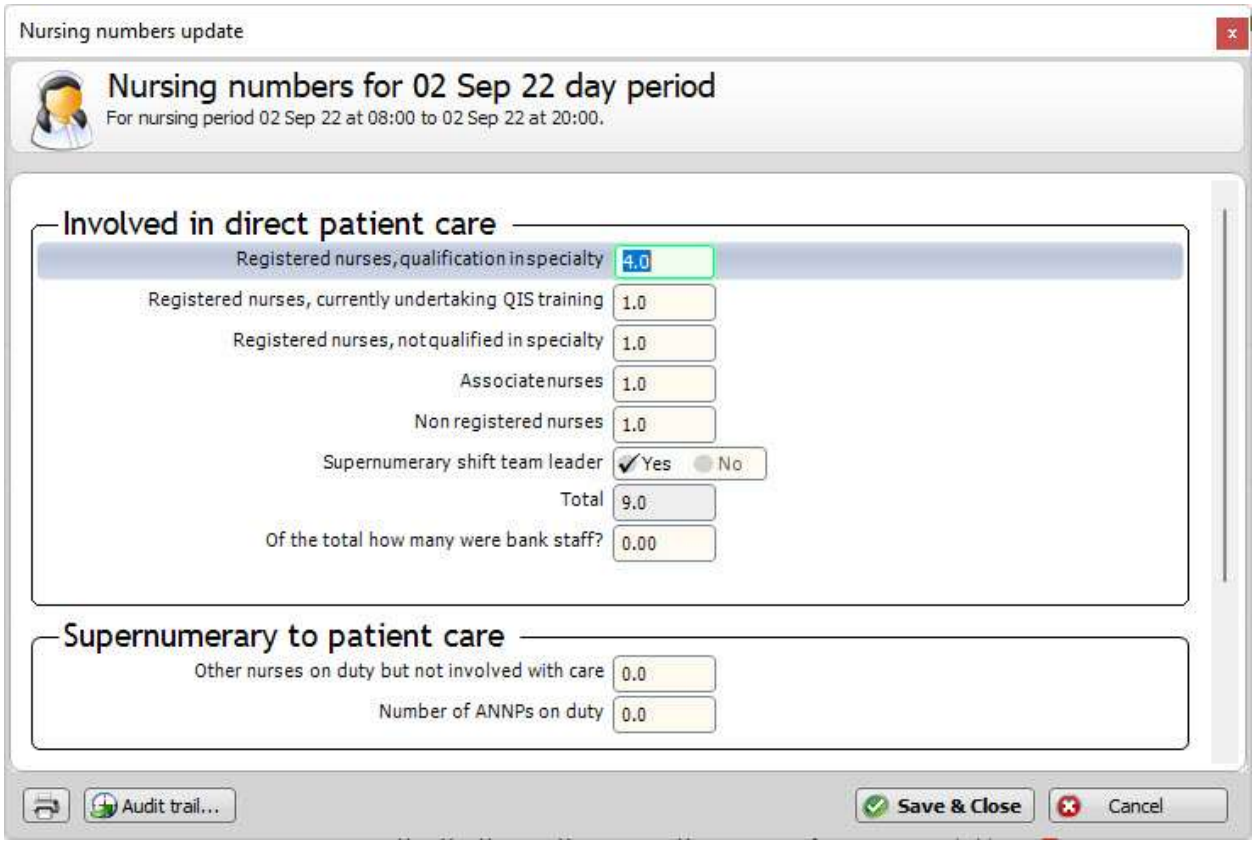


Figure 11: Nursing numbers update form, BadgerNet

Data entered into the form is summarised in the Neonatal Unit Nursing Numbers report (Figure 12).

Period	Nurses caring for patients							Cot occupancy					Nurses required			QIS Required (IC & HD)	
	With qual.	Assoc	Undertaking QIS	Without qual.	Not Reg.	Team Leader	Total	Bank Staff	IC	HD	SC	Admissions	Discharges	BAPM Recommends	Difference	Toolkit recommends	Difference
01 Sep 22 Day	8	1	1	1	1	1	13	3	0	0	0	0	0	1	12(0) (1,200%)	0	9
Night	8	1	1	1	1	1	13	3	0	0	0	0	0	1	12(0) (1,200%)	0	9
02 Sep 22 Day	4	1	1	1	1	1	9	0	0	0	0	0	0	1	8(0) (800%)	0	5
Night	Update...								0	0	0	0	0	1	-1(-1) (-100%)	0	0
03 Sep 22 Day	Update...								0	0	0	0	0	1	-1(-1) (-100%)	0	0
Night	Update...								0	0	0	0	0	1	-1(-1) (-100%)	0	0

Figure 12: Neonatal unit nursing numbers, BadgerNet

5 Clinical outcomes

5.1 Bloodstream infection

Does an admitted baby have one or more episodes of bloodstream infection, characterised by one or more positive blood cultures taken, after 72 hours of age?

Change to audit measure for 2022 data year: None.

NNAP standard

Developmental standard: Benchmarking only.

Comparison standard for outlier analysis: Treatment effect of 0%.

Inclusion criteria

- Babies who experienced their final neonatal discharge in the calendar year of analysis.
- Babies who were present on the neonatal unit at 72 hours of age.

Attribution

Blood cultures will be attributed to the neonatal unit of care when the culture was taken, or for units where there were two such units on a day of care, the unit completing the culture form. Babies will be counted as eligible once in each neonatal unit they were admitted to.

Deriving outcomes

Culture records will be considered as complete if the pathogen results for the culture are entered including 'None' or 'No growth'.

Fungal and bacterial culture growths will be categorised as pure growths of a clearly pathogenic organism, mixed growths or organisms of uncertain significance (including skin commensals) according to a predefined list of clearly pathogenic known pathogens (see Appendix 1 for the list used for 2017 data).

Data pertaining to late onset bloodstream infection will be presented in gestational age subgroups, and subdivided by positive cultures for "known pathogens" and "skin commensal" organisms (organisms which may represent "false positive" blood cultures).

Data viewing will be further enhanced by presentation of an indication that all positive blood cultures have been entered, for centres where this is the case.

BadgerNet data source

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

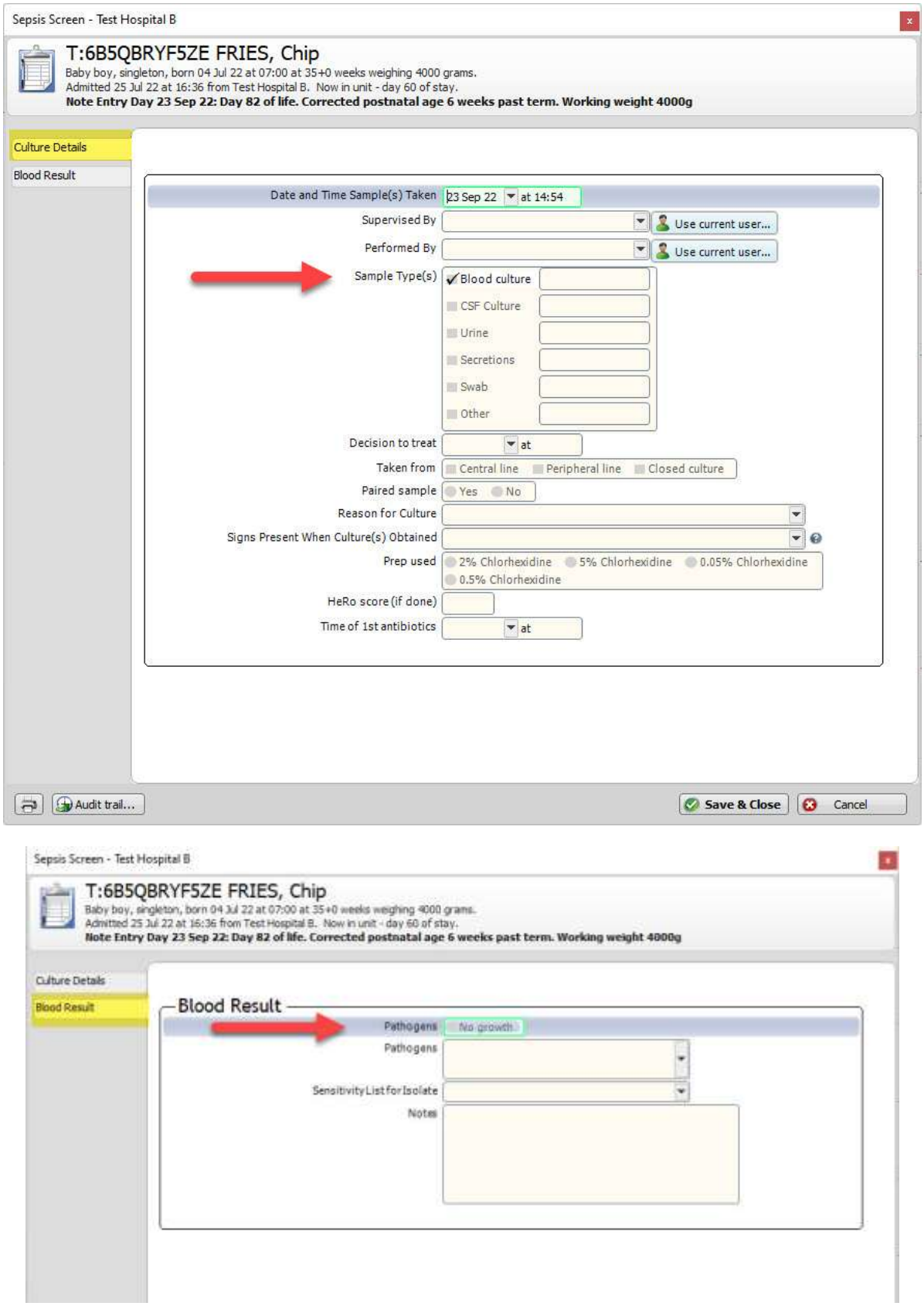


Figure 13: Ad-hoc form for blood culture taken (top), and ad-hoc form for blood culture results (bottom)

5.2 Bronchopulmonary dysplasia

Does an admitted baby born at less than 32 weeks' gestational age develop bronchopulmonary dysplasia (BPD) or die?

Change to audit measure for 2022 data year: None.

NNAP standard

Developmental standard: None, benchmarking only.

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies with a gestational age at birth of less than 32 weeks.
- Babies who experienced their final neonatal discharge in the calendar year of analysis.

AND

- Babies who were still an inpatient in a neonatal unit at 36 weeks' postmenstrual age, had been discharged alive from neonatal care at less than 36 weeks' postmenstrual age, or had died before 36 weeks postmenstrual age.

Attribution

Attribution will be to the hospital of birth. The NNAP will report BPD on three year rolling epochs. Outcomes will also be reported by network of birth. When 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*. Babies with a place of birth assigned as *Other* will be attributed to the network of their first episode of care.

Table 11: Categorising eligible babies for Bronchopulmonary dysplasia

NNAP data year	Cohort: Discharged from neonatal care
2020	1 January 2018 to 31 December 2020
2021	1 January 2019 to 31 December 2021
2022	1 January 2020 to 31 December 2022
2023	1 January 2021 to 31 December 2023
2024	1 January 2022 to 31 December 2024
2025	1 January 2023 to 31 December 2025

Deriving outcomes

BPD will be defined by the level of respiratory support received at 36 weeks' post-menstrual age (Table 12).

When a baby was discharged from neonatal care before reaching 36 weeks' post-menstrual age, data from the time of discharge will be used instead.

Table 12: Categorising BPD or death in NNAP based on daily respiratory support data

Survival at 36 weeks CGA	Respiratory data from 36 weeks post-menstrual age / final discharge		
	Not receiving respiratory support	Receiving respiratory support*	Missing required respiratory data**
Died before 36 weeks PMA	Died	Died	Died
Survived to 36 weeks PMA	No BPD	BPD	BPD not determinable

*'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. ≥ 2 lpm gas flow)*
- *Oxygen treatment*

** *In instances where respiratory data is not available for the specified day, data from the subsequent day of care (or penultimate day of care for babies discharged less than 36 weeks) will be sought instead. When respiratory data is also missing from this second source the baby will be classified as 'Missing required data' for that period.*

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

BadgerNet data source

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 non-invasive support* will be used to by the NNAP.

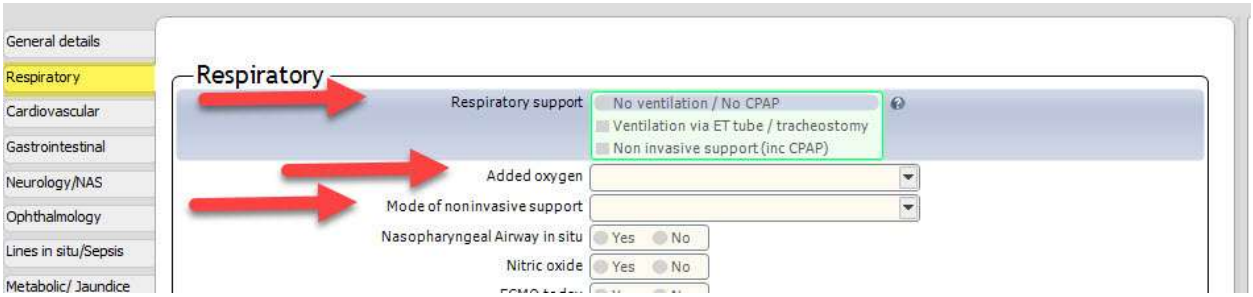


Figure 14: Daily summary form, BadgerNet

5.3 Necrotising enterocolitis

Does an admitted baby born at less than 32 weeks' gestational age meet the NNAP surveillance definition for necrotising enterocolitis (NEC) on one or more occasion?

Change to audit measure for 2022 data year: None.

NNAP standard

Developmental standard: Benchmarking

Comparison standard for outlier analysis: Treatment effect of 0%.

Inclusion criteria

- Babies who experienced their final neonatal discharge in the calendar year of analysis.
- Babies born at less than 32 weeks' gestational age and survived to at least 48 hours after birth.

Attribution

- Babies will be attributed to their location of care at 48 hours of life, which is intended as a proxy measure of the intention to provide ongoing care for a baby in a given neonatal unit.
- When a baby is in transit between units at 48 hours of life 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.

Deriving outcomes

The outcome is based on an analysis of all episodes of each eligible baby, using the following order of priority for the final outcome: Confirmed NEC > NEC status missing > No NEC.

NEC may be diagnosed at surgery, post-mortem or based on the following clinical and radiographic signs.

At least one clinical feature from:

- Bilious gastric aspirate or emesis
- Abdominal distension
- Occult or gross blood in stool (no fissure)

And at least one radiographic feature from:

- Pneumatosis
- Hepato-biliary gas
- Pneumoperitoneum

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

Table 13: Categorisation of NEC diagnosis

Survival to discharge home	Was NEC Diagnosed during this admission?					
	NEC diagnosis based on surgery	NEC diagnosis based on post-mortem	NEC diagnosis based on presence of clinical signs		NEC not diagnosed	NEC diagnosis data not recorded
			At least 1 radiographic and 1 clinical feature	Radiographic or clinical features missing		
Survived to discharge home	NEC	NEC	NEC	No NEC (Unconfirmed NEC)	No NEC	Missing data
Died prior to discharge home	NEC	NEC	NEC	No NEC (Unconfirmed NEC)	No NEC but died prior to discharge	Missing data

BadgerNet data source

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

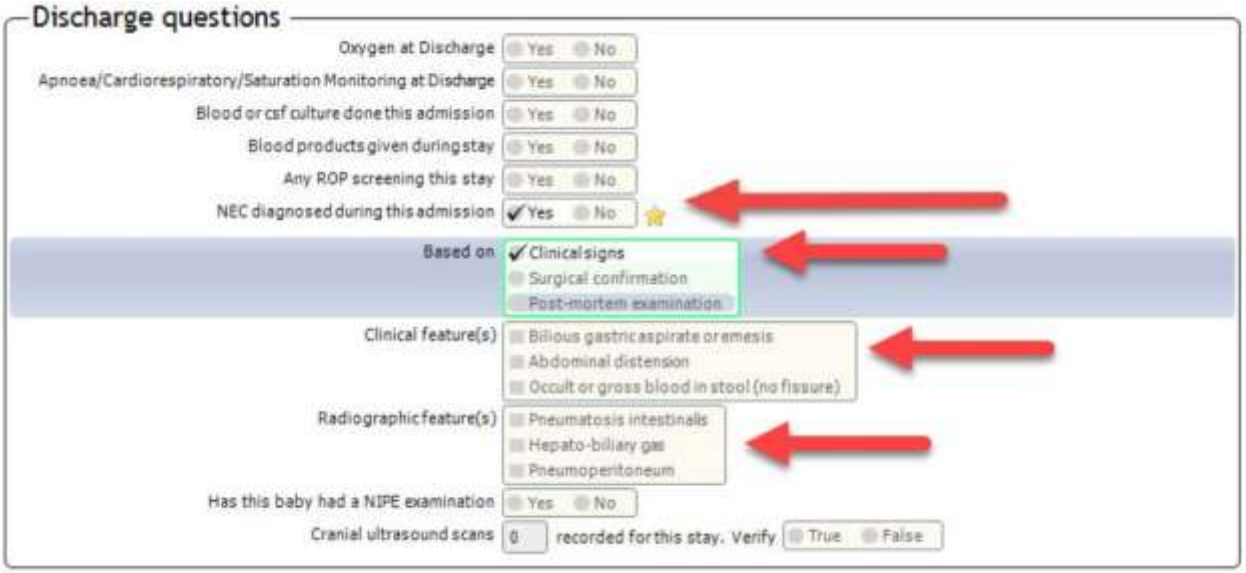


Figure 15: Discharge details page, BadgerNet

5.4 Neonatal preterm brain injury

Does a baby born at less than 32 weeks' gestational age experience any of the following forms of brain injury?

- *Germinal matrix/ intraventricular haemorrhage*
- *Post haemorrhagic ventricular dilatation*
- *Cystic periventricular leukomalacia*

Change to audit measures for 2022 data year: None.

NNAP standard

Developmental standard: None, benchmarking only.

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

- Babies born at less than 32 weeks' gestational age
- Babies who are admitted to a neonatal unit
- Babies who experienced their final neonatal discharge in the calendar year of analysis.

Attribution

Outcomes will be attributed to the unit and network of birth.

Deriving outcomes

The analysis will be based on data recorded on a daily basis relating to cranial ultrasound imaging. Where no imaging is recorded for a baby, this will be reported as "no imaging".

Where babies have scans on the system, but the scan contains no relevant data, they will be listed as Missing Data.

The outcomes will be reported according to the following definitions, which are also visible in the Badger system:

Germinal Matrix/ Intraventricular Haemorrhage and Haemorrhagic Parenchymal Infarction

Recording the worst grade of GMH-IVH interpreted by any cranial ultrasound or MRI, performed on or before day 28 after birth; or clarify that no imaging was performed in the first 28 days.

Grading is based on an ultrasound classification system and is recorded separately per side (i.e. left and/or right):[11]

- No germinal matrix or intraventricular haemorrhage
- Grade 1: Germinal matrix haemorrhage with no or minimal intraventricular haemorrhage (<10% of ventricular area on parasagittal view)
- Grade 2: Intraventricular haemorrhage (10-50% of ventricular area on parasagittal view)
- Grade 3: Intraventricular haemorrhage (>50% of ventricular area on parasagittal view; usually distends lateral ventricle).
- Grade 4: Haemorrhagic infarction in periventricular white matter (with or without IVH)

Post-haemorrhagic ventricular dilatation

On any ultrasound or MR imaging, performed at any time during the stay, was the following diagnosed:

- Intraventricular haemorrhage (past or residual) with enlarged ventricles: VI >97th centile +4mm.[12]

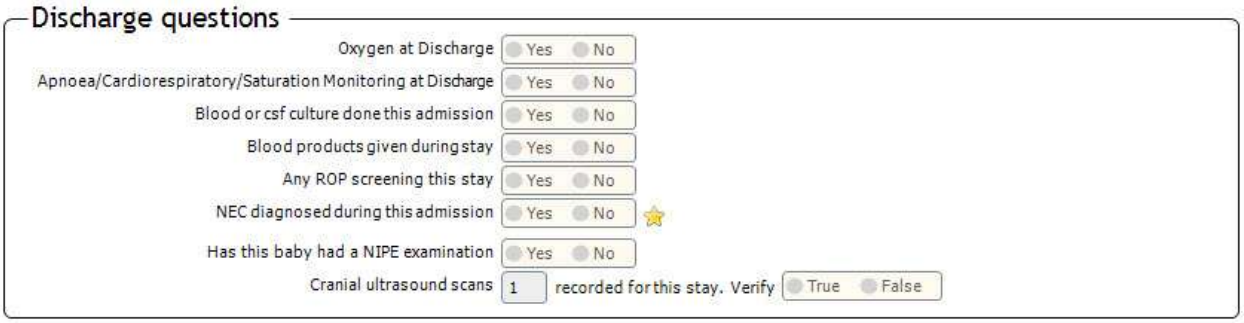
Cystic Periventricular Leukomalacia

At any time during the infant's stay:

- Evidence of cystic periventricular leukomalacia on a cranial ultrasound or MRI scan obtained at any time during admission or clarify that NO imaging was performed during the admission.
- To be considered cystic periventricular leukomalacia there must be multiple small periventricular cysts identified in the white matter.
- Connatal cysts should not be included. Connatal cysts are thin walled cysts in the lateral aspect of frontal horn of lateral ventricle and anterior to the foramen of Monro.

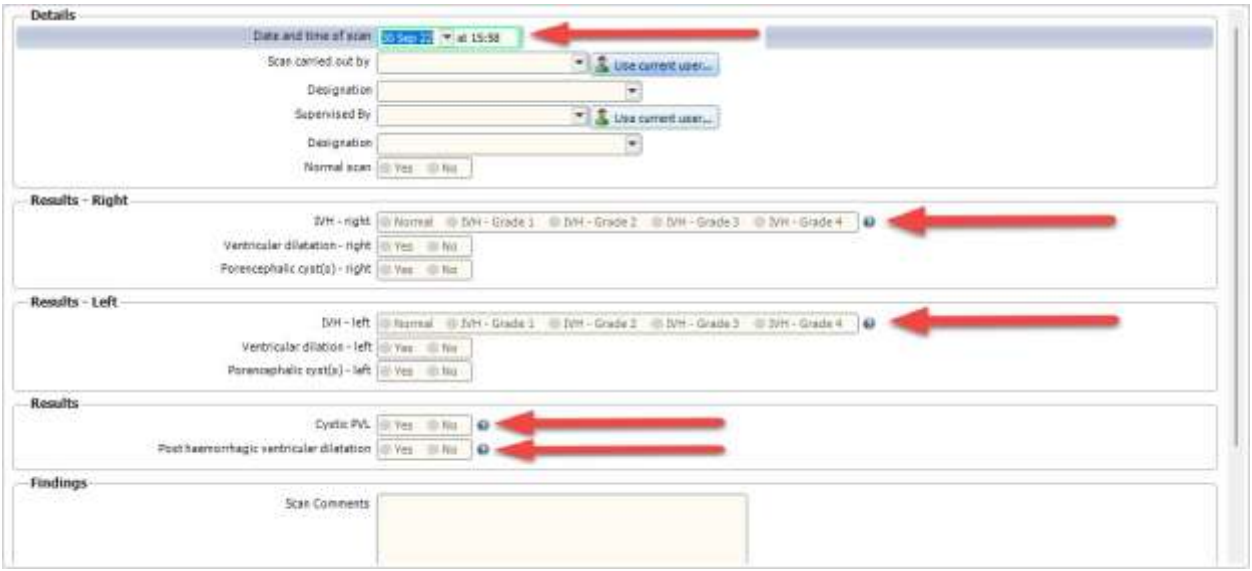
BadgerNet data source

In the discharge details section of badger, professionals discharging a baby are asked to complete the following:



Clinical staff are asked to ensure the scan data recorded adequately describes the scan findings, according to the classification system described above, for eligible babies.

Scan should be recorded using the cranial ultrasound section of the "Procedures/ events tab". Findings from the examination should be recorded as below:



Important note: Entering cranial ultrasound scans on BadgerNet

We are aware of an issue with BadgerNet which means that you can't add a cranial ultrasound scan record via the Procedures/events tab in the BadgerNet client if a baby cared for in your unit went on to have a subsequent episode in another unit. Clevermed are aware of this and are working on a fix, however in the meantime you can use the "smart search" function and search for "cranial" to add a new note to the desired episode of care. If you have any questions about how to do this, please do get in touch with Clevermed directly.

5.5 Mortality to discharge in very preterm babies

Does a baby born between 24 weeks' and 31 weeks' gestational age inclusive die before discharge home, or 44 weeks' post-menstrual age (whichever occurs sooner)?

Note: Babies discharged to a hospice for palliative care (such as for compassionate extubation) and who die prior to 44 weeks' postmenstrual age are counted in the numerator.

Change to audit measure for 2022 data year: None

NNAP standard

Developmental standard: None

Comparison standard for outlier analysis: Not applicable, no outlier analysis.

Inclusion criteria

Denominator: Number of babies admitted to a neonatal unit whose birth gestation was 24 to 31 weeks' inclusive.

Numerator: Deaths of babies 24 to 31 weeks' gestation inclusive, before discharge from hospital to home, or discharge for palliative care with agreed non-intervention plan in place followed by death prior to 44 weeks post-menstrual age (e.g. ventilated baby discharged to a hospice). In hospital deaths in units not submitting data to the NNAP will be included. Mortality at or after 44 weeks postmenstrual age will be excluded.

Table 14: Categorising eligible babies for Mortality until discharge or 44 weeks PMA

NNAP data year	Cohort: Date of birth
2020	1 July 2017 to 30 June 2020
2021	1 July 2018 to 30 June 2021
2022	1 July 2019 to 30 June 2022
2023	1 July 2020 to 30 June 2023
2024	1 July 2021 to 30 June 2024
2025	1 July 2022 to 30 June 2025

Attribution

The NNAP will report mortality on three year rolling epochs. Attribution will be to network of birth.

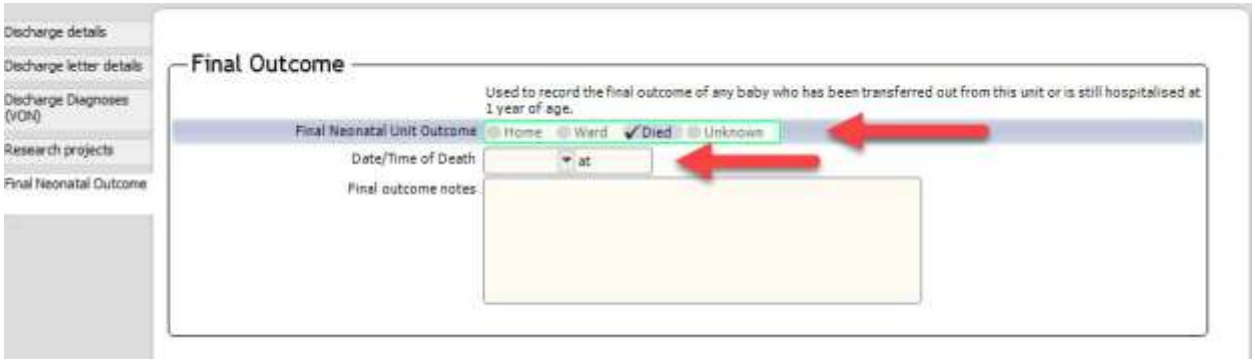
Deriving outcomes

Raw and matched mortality rates will be published for network and national data, but not for units.

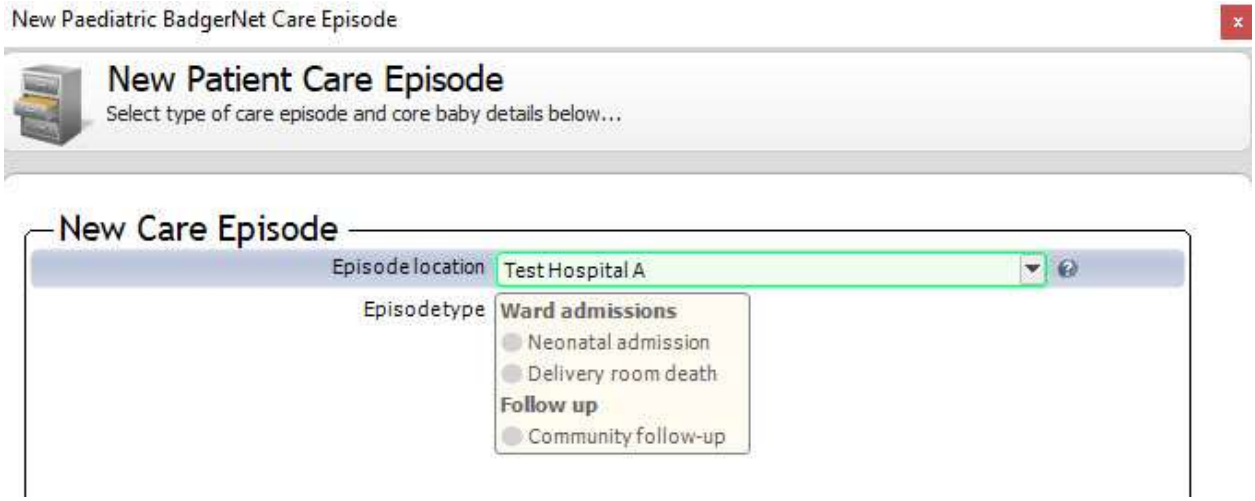
Case mix adjustment: For limited variables, including gestation, gender, multiplicity and ethnicity but neither antenatal steroid administration nor congenital anomalies.

BadgerNet data source

Use the *Final Neonatal Outcome* page to record deaths that occur at Non-NNAP units, along with the date and time of death. Please ensure that you click save and close to ensure that any outcomes recorded by another unit using BadgerNet but not participating in the NNAP are recorded.



The NNAP mortality analysis will only include babies admitted to neonatal units, in the first instance. However, we would like units to report liveborn but not admitted deaths using BadgerNet at gestations down to, and including, 23 weeks. Only the briefest of details are required to complete a "delivery room death" admission in place of a "neonatal unit admission".



Additional information

Rationale

Mortality is a vitally important outcome of neonatal care: reporting adds to the NNAP's perspective on neonatal services. The NNAP reports on mortality to discharge of admitted babies. This definition may facilitate quality improvement of care within the neonatal unit. One reason for omitting babies born at 23 weeks' gestation from the initial phase of reporting is that there are known important variations in rates of admission of babies at very low gestations. Low gestation babies have the highest mortality. Starting by reporting only on babies of 24-31 weeks' gestation inclusive will maximise the comparability of reported neonatal network mortality to discharge.

Future phases of mortality reporting

Once NNAP mortality reporting is established, it is anticipated that future phases of reporting will include numerators and denominators extending to 23 weeks' gestation, and the inclusion of liveborn, but not admitted cases of mortality.

What next?

Neonatal services should have systems for ensuring reporting to NNAP, via Badger, of any pre-44 week post-menstrual age mortality to babies born at 24 to 31 weeks' gestation who were discharged to non NNAP reporting units (surgical units, hospices, paediatric wards).

Neonatal should have systems to report to NNAP, via Badger, liveborn but not admitted babies at 23-31 weeks' gestation (inclusive) who later die. These will be small in number, but are significant to research projects, MBRRACE-UK and future NNAP mortality reporting.

6 Glossary of terms and abbreviations

BAPM	The British Association for Perinatal Medicine improves standards of perinatal care by supporting all those involved in perinatal care to optimise their skills and knowledge, promote high quality, safe and innovative practice, encourage research, and speak out for the needs of babies and their families. https://www.bapm.org/
BPD	Bronchopulmonary dysplasia
Bliss	Bliss is a national charity for babies born premature or sick. It exists to give every baby born premature or sick in the UK the best chance of survival and quality of life. Bliss supports families, campaigns for change and supports professionals, and enables life-changing research. https://www.bliss.org.uk
DCC	Deferred cord clamping
GIRFT	Getting It Right First Time (GIRFT) is a national programme designed to improve the treatment and care of patients through in-depth review of services, benchmarking, and presenting a data-driven evidence base to support change[13].
HQIP	The Healthcare Quality Improvement Partnership (HQIP) aims to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. https://www.hqip.org.uk/
HRG	Healthcare resource group: Standard groupings of clinically similar treatments which use common levels of healthcare resource.
Hyperthermia	A body temperature more than 37.5°C
Hypothermia	A body temperature less than 36.5°C
LNU	Local neonatal units (LNUs) provide neonatal care for their own catchment population, except for the sickest babies. They provide all categories of neonatal care, but they transfer babies who require complex or longer-term intensive care to a NICU, as they are not staffed to provide longer-term intensive care. Most babies over 27 weeks gestational age will usually receive their full care, including short periods of intensive care, within their LNU. Some networks have agreed variations on this policy, due to local requirements. Some LNUs provide high dependency care and short periods of intensive care for their network population. LNUs may receive transfers from other neonatal services in the network, if these fall within their agreed work pattern[14].
MatNeoSIP	The Maternity and Neonatal Safety Improvement Programme (MatNeoSIP), formerly known as the Maternal and Neonatal Health Safety Collaborative, is the programme supporting improvement in the quality and safety of maternity and neonatal units across England. https://www.england.nhs.uk/mat-transformation/maternal-and-neonatal-safety-collaborative/
MBRRACE-UK	Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK. https://www.npeu.ox.ac.uk/mbrrace-uk

NCAPOP	National Clinical Audit and Patient Outcomes Programme
NEC	Necrotising enterocolitis
NHSE	NHS England
NICE	National Institute for Health and Care Excellence
NICU	Neonatal intensive care units (NICUs) are sited alongside specialist obstetric and feto-maternal medicine services and provide the whole range of medical neonatal care for their local population, along with additional care for babies and their families referred from the neonatal network. Many NICUs are co-located with neonatal surgery services and other specialised services. Medical staff in a NICU should have no clinical responsibilities outside the neonatal and maternity services[14].
NMPA	The National Maternity and Perinatal Audit is a national clinical audit of NHS maternity services in England, Scotland and Wales. The audit, commissioned by HQIP, is led by the Royal College of Obstetricians and Gynaecologists in partnership with the Royal College of Midwives (RCM, the Royal College of Paediatrics and Child Health (RCPCH) and the London School of Hygiene and Tropical Medicine (LSHTM). www.maternityaudit.org.uk
NNAP	National Neonatal Audit Programme
Normothermia	A body temperature between 36.5°C and 37.5°C
ODN	Operational delivery network: In England, managed clinical networks for the coordination of neonatal critical care.
Outlier	A result that is statistically above or below expected performance. The NNAP defines outliers in four categories: • outstanding: three or more standard deviations above expected performance • excellent: between two and three standard deviations above expected performance • alert: between two and three standard deviations below expected performance • alarm: three or more standard deviations below expected performance.
PDSA	Plan, do, study, act
Perinatal	The period before and immediately after birth, here defined as the time from fetal viability up to 28 days after birth.
PERIPrem	Perinatal Excellence to Reduce Injury in Premature Birth https://www.weahsn.net/our-work/transforming-services-and-systems/periprem/
PReCePT	The Prevention of Cerebral Palsy in PreTerm Labour. https://www.weahsn.net/our-work/transforming-services-and-systems/precept/

Preterm	Preterm is defined by the World Health Organisation as a baby born alive before 37 weeks of pregnancy are completed. This definition is sub-categorised by gestational age: • extremely preterm (less than 28 weeks) • very preterm (28 to 32 weeks) • moderate to late preterm (32 to 37 weeks).
QI	Quality improvement
RCPCH	The Royal College of Paediatrics and Child Health (RCPCH) was founded in 1996 and now has over 17,000 members across the world. The RCPCH plays a major role in postgraduate medical education, professional standards, research and policy. https://www.rcpch.ac.uk
RCOphth	Royal College of Ophthalmologists
ROP	Retinopathy of prematurity
SCU	Special care units (SCUs) provide special care for their own local population. Depending on arrangements within their neonatal network, they may also provide some high dependency services. In addition, SCUs provide a stabilisation facility for babies who need to be transferred to a neonatal intensive care unit (NICU) for intensive or high dependency care, and they also receive transfers from other network units for continuing special care[14].

7 Appendix 1: "Pathogens" in the NNAP

Bacterial, fungal and yeast positive blood cultures reported to the NNAP in 2021 for the Bloodstream infection and Central line associated bloodstream infection measures have been classified as shown below into organisms whose growth would be regarded as indicative of a bloodstream infection without further confirmatory evidence, and into a list of other organisms. This list of organisms included for NNAP reporting is available below. The NNAP are grateful to Dr Jim Gray, Consultant Microbiologist at Birmingham Women's and Children's NHS Foundation Trust, who kindly reviewed organisms reportedly cultured in blood, and helped classify them into 'clearly pathogenic' and 'other' organisms.

For more information, see Fraser C, Muller-Pebody B, Blackburn R, Gray J, Oddie SJ, Gilbert RE, Harron K. Linking surveillance and clinical data for evaluating trends in bloodstream infection rates in neonatal units in England. PLoS One. 2019 Dec 12;14(12):e0226040. doi: 10.1371/journal.pone.0226040.eCollection 2019.

Clearly pathogenic organisms		
Acinetobacter Baumanii	Enterobacter Sakazakii	S. Aureus
Acinetobacter Baumannii	Enterobacter Sp	Salmonella Aba
Aeromonas Caviae	Enterobacter Sp.	Salmonella Agama
Aeromonas Hydrophila	Enterococcus Avium	Salmonella Ajiobo
Aeromonas Salmonicida	Enterococcus Casseliflavus	Salmonella Apapa
Aeromonas Sobria	Enterococcus Durans	Salmonella Arizonae
Aeromonas Sp	Enterococcus Faecalis	Salmonella Brandenburg
Anaerococcus Prevotii	Enterococcus Faecalis	Salmonella Colindale
Aspergillus	Enterococcus Faecium	Salmonella Cotham
Aspergillus Fumigatus	Enterococcus Gallinarum	Salmonella Cubana
Aspergillus Niger	Enterococcus Hirae	Salmonella Djugu
Aspergillus Sp	Enterococcus Raffinosus	Salmonella Dublin
B Haemolytic Streptococci	Enterococcus Sp	Salmonella Enteritidis
Bacteroides Capillosus	Enterococcus Sp.	Salmonella Gold-Coast
Bacteroides Distasonis	Escherichia	Salmonella Hadar
Bacteroides Fragilis	Escherichia Coli	Salmonella Heidelberg
Bacteroides Ovatus	Escherichia Hermannii	Salmonella Hofit
Bacteroides Sp	Escherichia Sp	Salmonella Hull
Bacteroides Uniformis	Escherichia Vulneris	Salmonella Infantis
Bacteroides Vulgatus	Fusobacterium Necrophorum	Salmonella Kedougou
C. Koseri	Fusobacterium Nucleatum	Salmonella Kiambu
Campylobacter Fetus	Fusobacterium Sp	Salmonella Kibusi
Campylobacter Jejuni	Gardnerella	Salmonella Kintambo
Campylobacter Sp	Gardnerella Vaginalis	Salmonella Kisarawe
Campylobacter Ureolyticus	GBS	Salmonella Matopeni
Candida	Group B Streptococcus	Salmonella Mississippi
Candida Albicans	Group G Streptococcus	Salmonella Monschaui
Candida Ciferrii	Haemophilus Influenzae	Salmonella Montevideo
Candida Dubliniensis	Hafnia Alvei	Salmonella Muenchen
Candida Fabianii	Hansenula Sp	Salmonella Muenster
Candida Famata	Klebsiella	Salmonella Newport
Candida Glabrata	Klebsiella Aerogenes	Salmonella Oranienburg

Candida Guilliermondii	Klebsiella Ornithnolytica	Salmonella Poona
Candida Haemulonis	Klebsiella Oxytoca	Salmonella Reading
Candida Krusei	Klebsiella Planticola	Salmonella Saphra
Candida Lusitaniae	Klebsiella Pneumoniae	Salmonella Senftenberg
Candida Parapsilosis	Klebsiella Pneumoniae Subsp Ozenae	Salmonella Sinstorf
Candida Sp	Klebsiella Sp	Salmonella Sp
Candida Sp.	Klebsiella Sp.	Salmonella Stanley
Candida Tropicalis	Kluyvera Sp	Salmonella Tel-El-Kebir
Cedecea Lapagei	Leclercia Adecarboxylata	Salmonella Typhi and Paratyphi
Citrobacter	Listeria Monocytogenes	Salmonella Typhimurium
Citrobacter Amalonaticus	Listeria Sp	Salmonella Unnamed
Citrobacter Braakii	Malassezia Furfur	Salmonella Virchow
Citrobacter Diversus	Malassezia Pachydermatis	Salmonella Vitkin
Citrobacter Farmeri	Malassezia Sp	Salmonella Wichita
Citrobacter Freundii	Morganella Morganii	Serratia Liquefaciens
Citrobacter Koseri	MRSA	Serratia Marcescens
Citrobacter Sp	Neisseria Meningitidis	Serratia Odorifera
Citrobacter Sp.	Pantoea Agglomerans	Serratia Plymuthica
Clostridium Beijerinckii	Pantoea Septica	Serratia Proteamaculas
Clostridium Bifermentans	Pantoea Sp	Serratia Rubidaea
Clostridium Butyricum	Pasteurella	Serratia Sp
Clostridium Paraputrificum	Pasteurella Haemolytica	Serratia Sp.
Clostridium Perfringens	Pasteurella Multocida	Shigella Flexneri
Clostridium Septicum	Pasteurella Pneumotropica	Shigella Sonnei
Clostridium Sordelli	Pasteurella Sp	Staphylococcus Aureus
Clostridium Sp	Pasteurella Sp.	Stellatoidea
Clostridium Sporogenes	Peptostreptococcus	Streptococcus Agalactiae
Clostridium Tertium	Peptostreptococcus Asaccharolyticus	Streptococcus Anaerobic
Coccidioides Sp	Peptostreptococcus Magnus	Streptococcus Anginosus
Coliform	Prevotella Bivia	Streptococcus Bovis
Cryptococcus Albidus	Prevotella Buccalis	Streptococcus Constellatus
Cryptococcus Sp	Prevotella Oralis	Streptococcus Faecalis
E.Coli	Proteus Mirabilis	Streptococcus Group A Stem
Enterobacter	Proteus Penneri	Streptococcus Group B Stem
Enterobacter Aerogenes	Proteus Sp	Streptococcus Group C Stem
Enterobacter Agglomerans	Proteus Vulgaris	Streptococcus Group D Stem
Enterobacter Agglomerans	Providencia Alcalifaciens	Streptococcus Group G Stem
Enterobacter Amnigenus	Providencia Stuartii	Streptococcus Milleri
Enterobacter Asburiae	Pseudomonas Aeruginosa	Streptococcus Milleri Group
Enterobacter Cloacae	Raoultella Planticola	Streptococcus Pneumoniae
Enterobacter Cloacae Complex	Raoultella Planticola	Streptococcus Pyogenes
Enterobacter Gergoviae	Raoultella Sp	Veillonella Atypica
Enterobacter Hormaechei	Raoultella Terrigena	Veillonella Named
Enterobacter Intermedium	Rhodotorula	Yeasts

Enterobacter Intermedius	Rhodotorula Rubra	Yeasts (Other)
Enterobacter Kobei	Rhodotorula Sp	Yersinia Enterocolitica

Other organisms		
Abiotrophia	Corynebacterium Striatum	Ochrobactrum Anthropi
Abiotrophia Adiacens	Corynebacterium Xerosis	Ochrobactrum Sp
Abiotrophia Adjacens	Coryneform Bacilli	Paenibacillus Amylolyticus
Abiotrophia Defectiva	Delftia Acidovorans	Paenibacillus Glucanolyticus
Achromobacter Sp	Dermabacter Hominis	Paenibacillus Pabuli
Achromobacter Xylosoxidans	Dermacoccus Sp	Paenibacillus Sp
Acidovorax Temperans	Diphtheroids	Parabacteroides Distasonis
Acinetobacter Anitratus	Eggerthella Lenta	Paracoccus Sp
Acinetobacter Calcoaceticus	Eikenella Corrodens	Paracoccus Yeeii
Acinetobacter Haemolyticus	Elizabethkingia Miricola	Pediococcus Acidilactici
Acinetobacter Johnsonii	Elizabethkingia Sp	Peptococcus Sp
Acinetobacter Junii	Eubacterium Lentum	Phialophora
Acinetobacter Lwoffii	Exophiala Sp.	Propionibacterium Acnes
Acinetobacter Parvus	Flavimonas Oryzihabitans	Propionibacterium Freudenreichii
Acinetobacter Radioresistens	Flavobacterium Sp.	Propionibacterium Sp
Acinetobacter Sp	Gemella Haemolysans	Proprionebacterium Acnes
Acinetobacter Sp.	Gemella Morbilarum	Pseudoclavibacter Sp
Acinetobacter Ursingii	Gemella Morbillorum	Pseudomonas Alcaligenes
Actinomyces	Geotrichum Sp	Pseudomonas Fluorescens
Actinomyces Bovis	Globicatella Sanguis	Pseudomonas Luteola
Actinomyces Cardiffensis	Gordonia Bronchialis	Pseudomonas Oleovorans
Actinomyces Naeslundii	Gordonia Sp	Pseudomonas Oryzihabitans
Actinomyces Neuii	Granulicatella Adiacens	Pseudomonas Paucimobilis
Actinomyces Odontolyticus	Granulicatella Elegans	Pseudomonas Putida
Actinomyces Oris	Haematobacter Sp	Pseudomonas Sp
Actinomyces Sp	Haemophilus	Pseudomonas Sp.
Actinomyces Sp.	Haemophilus Aphrophilus	Pseudomonas Stutzeri
Actinomyces Viscosus	Haemophilus Haemolyticus	Pseudoxanthomonas Kaohsiungensis
Aerococcus Sp	Haemophilus Parahaemolyticus	Psychrobacter Phenylpyruvicus
Aerococcus Urinae	Haemophilus Parainfluenzae	Rahnella Named
Aerococcus Viridans	Haemophilus Paraphrohaemolyticus	Rahnella Sp
Agrobacterium Tumefaciens	Haemophilus Sp	Ralstonia Pickettii
Alcaligenes Faecalis	Haemophilus Sp.	Ralstonia Sp.
Alcaligenes Sp	Kingella Denitrificans	Rhizobium Radiobacter
Alpha Haemolytic Streptococcus	Kingella Kingae	Rhodococcus
Anaerobes (Not Specified)	Kingella Sp	Rhodococcus Bronchialis
Anitratus	Kocuria Kristinae	Rhodococcus Sp
Arcanobacterium Haemolyticum	Kocuria Rhizophila	Roseomonas Gilardii
Arthrobacter Sp	Kocuria Rosea	Roseomonas Mucosa

Aurantimonas Altamirensis	Kocuria Sp	Roseomonas Sp
Bacillus	Kocuria Species	Rothia Aeria
Bacillus Cereus	Kocuria Varians	Rothia Dentocariosia
Bacillus Circulans	Kytococcus Schroeteri	Rothia Sp
Bacillus Licheniformis	Lactobacillus	Rothia Spp
Bacillus Pumilus	Lactobacillus Crispatus	Ruminococcus Gnavus
Bacillus Silvestris	Lactobacillus Fermentum	Scopulariopsis Brevicaulis
Bacillus Sp	Lactobacillus Gasseri	Sphingobacterium Multivorum
Bacillus Sp.	Lactobacillus Jensenii	Sphingomonas
Bacillus Subtilis	Lactobacillus Lactis	Sphingomonas Paucimobilis
Bifidobacterium	Lactobacillus Paracasei	Sphingomonas Sp
Bifidobacterium Adolescentis	Lactobacillus Rhamnosus	Staph Saprophyticus
Bifidobacterium Breve	Lactobacillus Sp	Staphylococcus Capitis
Bifidobacterium Catenulatum	Lactobacillus Sp.	Staphylococcus Coagulase Negative
Bifidobacterium Longum	Lactococcus Cremoris	Staphylococcus Epidermidis
Bifidobacterium Sp	Lactococcus Garvieae	Staphylococcus Haemolyticus
Brevibacillus Parabrevis	Lactococcus Lactis	Staphylococcus Hominis
Brevibacterium	Lactococcus Sp	Staphylococcus Lugdunensis
Brevibacterium Casei	Lactococcus Sp.	Staphylococcus Pettenkoferi
Brevibacterium Sp	Leuconostoc Sp	Staphylococcus Simulans
Brevundimonas Diminuta	Lysinibacillus Sp	Staphylococcus Sp
Brevundimonas Sp	Mallassezia Furfur	Staphylococcus Sp.
Brevundimonas Vesicularis	Massilia Timonae	Staphylococcus Vitulinus
Burkholderia Capecia	Methylobacterium Sp	Staphylococcus Warneri
Burkholderia Cepacia	Microbacterium Aurum	Stenotrophomonas Acidaminiphila
Burkholderia Gladioli	Microbacterium Paraoxydans	Stenotrophomonas Maltophilia
Capnocytophaga	Microbacterium Sp	Stenotrophomonas Sp
Chryseobacterium Indologenes	Micrococcus	Stephanoascus Ciferrii
Chryseobacterium Meningosepticum	Micrococcus Luteus	Stomatococcus Mucilaginosus
Chryseobacterium Sp	Micrococcus Lylae	Stomatococcus Sp
Chryseobacterium Sp.	Micrococcus Sp	Streptococcus Alactolyticus
Chryseomonas Indologenes	Micrococcus Sp.	Streptococcus Alpha And Non-Haemolytic
Collinsella Aerofaciens	Micrococcus Varians	Streptococcus Cristatus
Comamonas Acidovorans	Microsporum Sp	Streptococcus Gordonii
Comamonas Testosteroni	Mixed Growth	Streptococcus Infantarius Subsp Nov
Cons	Moraxella Catarrhalis	Streptococcus Infantis
Cons (Mixed)	Moraxella Lacunata	Streptococcus Intermedius Group
Corynebacterium	Moraxella Nonliquefaciens	Streptococcus Lutetiensis
Corynebacterium Afermentans	Moraxella Osloensis	Streptococcus Mitis
Corynebacterium Amycolatum	Moraxella Sp	Streptococcus Oralis
Corynebacterium Aurimucosum	Moraxella Sp.	Streptococcus Other Group
Corynebacterium Auris	Mycobacterium Sp.	Streptococcus Parasinguinis
Corynebacterium Coyleae	Neisseria Cinerea	Streptococcus Peroris

Corynebacterium Diphtheriae	Neisseria Flavescens	Streptococcus Pseudoporcinus
Corynebacterium Imitans	Neisseria Lactamica	Streptococcus Salivarius
Corynebacterium Jeikeium	Neisseria Mucosa	Streptococcus Sanguis
Corynebacterium Minutissimum	Neisseria Perflava	Streptococcus Sobrinus
Corynebacterium Mucifaciens	Neisseria Polysacchareae	Streptococcus Sp
Corynebacterium Propinquum	Neisseria Sicca	Streptococcus Sp.
Corynebacterium Pseudodiphtheriticum	Neisseria Sp	Streptococcus Thermophilus
Corynebacterium Simulans	Neisseria Subflava	Streptococcus Vestibularis
Corynebacterium Sp	NHS	Streptococcus Viridans
Corynebacterium Sp.	Oceanobacillus Profundus	

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