PICANet Key Metric Definitions

# Metric 1 Case ascertainment and timeliness of data submission

## CASE ASCERTAINMENT

**What does the metric measure?**

Case ascertainment is a measure of the proportion of total admissions to PICU that are reported to PICANet.

Each year case ascertainment is based on a subset of organisations for which validation visits were undertaken in the most recent year of the reporting period. This means the overall case ascertainment figure we present is an estimate of the case ascertainment across the whole audit.

**Inclusion/exclusion criteria for calculation**

This metric is based on validation visits conducted during the most recent year of the reporting period. For example, for the 2019 Annual Report, this metric is based on validation visits undertaken between 01/01/2018 and 31/12/2018.

Organisations where it was not possible to obtain a visit count are excluded when calculating this metric.

**How is the metric calculated?**

This metric is calculated using data presented in Table DQ5 and Table DQ1 of the Tables and Figures. We take the visit count (an independent count of the number of admissions to PICU as based on a unit’s admission book) and the number of admission events recorded on PICANet Web (as reviewed in the year of annual report production) from Table DQ5 for units where the validation visit was in the most recent year of the reporting period (as identified in Table DQ1).

For example, for the 2019 Annual Report, case ascertainment is based on the number of records on PICANet Web in May 2019 compared with admissions recorded during visit counts taken during validation visits in 2018.

To calculate the case ascertainment for each organisation, the number of records on PICANet Web is divided by the number of admissions according to the visit count to get the proportion of admission events reported to PICANet Web for each unit. Where it was not possible to obtain a visit count at a validation visit, we are unable to include a unit in the calculation.

If we imagine that a unit had 606 admissions in the admission book at the validation visit, with 600 of these on PICANet Web at the time of the validation visit, and 604 of these on PICANet Web at the time of review, then the case ascertainment rate for this unit would be 604/606=0.997 or equivalently 99.7%. If, however, it was not possible to undertake a visit count at the validation visit, but there were 103 events on PICANet Web at the time of the visit and 104 events on PICANet Web at the time of review, we are unable to use this unit’s data in the calculation of our case ascertainment metric.

To calculate an overall case ascertainment level, the number of admissions based on the visit count for each organisation is summed and divided by the summation of the number of records on PICANet Web (as at review following final data lock) to give an estimated case ascertainment level for the audit as a whole. Again, it is not possible for us to include any organisations where it was not possible to obtain a visit count.

For example, if there were two validation visits in the most recent year of the reporting visit with 340 and 160 admissions respectively at the visit count, and 320 and 159 records respectively on PICANet Web at the point of review, then the overall case ascertainment level would be calculated as (320+159)/(340+160)=479/500=0.958 or equivalently 95.8%.

## TIMELINESS OF DATA SUBMISSION

**What does the metric measure?**

Timeliness measures how many admissions events are completed on PICANet database within three months of discharge from PICU (the PICS standard for reporting).

**Inclusion/exclusion criteria for calculation**

This metric is based on all records for admissions for which:

* the admission was within the 10 years prior to the end of the reporting period; and
* the date of discharge was within the reporting period.

Data for patients still on PICU at the end of the reporting period are not included in this metric.

For example, the 2019 Annual Report, timeliness is presented for any admissions occurring between 01/01/2008 and 31/12/2018 which have a discharge date between 01/01/2016 and 31/12/2018.

**How is the metric calculated?**

A record is classed as complete when all information expected in relation to a given admission event has been completed, and there are no outstanding validation queries on the database for the record. No data on 30 day follow-up is required for a record to be defined as complete.

A record is classed as complete within three months of discharge if the above definition is met within three calendar months of the patient’s discharge date.

For example, for the 2019 Annual Report, where the reporting period is between 2016 and 2018, a patient admitted to PICU in December 2012 and discharged in March 2017 would be included in this metric. If the admission record for the patient had no outstanding validation queries (excluding those for 30 day follow up day) then the record would be classed as complete.

Specifically, if the patient was discharged on 01/03/2017 and the record was classed as complete on 16/04/2017 then the record would be complete within 3 months. If, however, the record was classed as complete on the 01/08/2017 then the record would not be complete within 3 months.

# Metric 2 Retrieval mobilisation times

**What does the metric measure?**

This metric measures the time between the actual date and time at which clinicians agree that the child required paediatric intensive care (PIC) transport and the time the team departs base.

The Care Quality Commission has a target for specialist transport organisations to start their journey within one hour and the NHS England Quality Dashboard monitors the percentage of emergency transports undertaken where the team departs the transport base within 30 minutes from the time the referral is accepted.

**Inclusion/exclusion criteria for calculation**

This metric is based on all records for

* transports undertaken by PIC CTS teams
* reported in the previous three years
* the transport was recorded as non-elective, defined as a transport where the child cannot wait longer than six hours without adverse effects on their clinical condition

**How is the metric calculated?**

We measured the time from when the team agreed to the transport to the time they set off in the ambulance (or helicopter / plane) for what are called ‘non-elective’ or urgent transports.

The difference is calculated between the time the clinicians agree the child requires PIC transport and the time they depart the base. For example, if the clinicians agree that the child requires PIC transport at 9am on 01.01.2016, and then the team depart base at 9.23am on 01.01.2016 then they have mobilised in 23 minutes.

In this metric, we report mobilisation time groups for each PIC CTS for one year. We group mobilisation time into time bands of: 0 to 30 minutes; 31 to 60 minutes; 61 to 180 minutes and 181+ minutes.

Standards for mobilisation time are applied to PIC CTS teams in all countries although standards have not been defined for the devolved nations and ROI.

# Metric 3 Number of nurses providing clinical care per bed

**What does the metric measure?**

This metric measures the number of qualified nurses and nursing assistants/associates with appropriate competencies in critical care required to open the reported number of funded beds on a paediatric intensive care unit (PICU).

Each year PICANet carries out a staffing study to monitor staffing levels within PICUs and to audit the appropriate standards of the Paediatric Intensive Care Society: currently the PICS Quality Standards for the Care of Critically Ill Children (5th Edition, December 2015). The percentage of PICUs meeting the recommended level of nurse staffing per funded critical care bed is presented.

**Inclusion/exclusion criteria for calculation**

This metric is calculated from data collected from all PICUs in November each year related to the PICU’s nursing establishment. For example, for the 2019 Annual Report, this metric is based on data collected during the week commencing 19th November 2018. Information is collected about the funded nursing establishment and vacancies (Whole Time Equivalent, WTE).

**How is the metric calculated?**

The metric reports the number of nurses required (or nurse staffing establishment) to provide the appropriate levels of care for the number and given designation of the bed. This is calculated according to the PICS Standards for Intensive Care (one nurse to one bed) and high dependency care (one nurse for every two beds).

The appropriate staffing standards are the PICS Standard L3-207 and guidance from the PICS Nurse Workforce Planning document for Level 3 Paediatric Critical Care Units, October 2016 which states that ‘the minimum number of qualified nurses required to staff one level 3 critical care bed [intensive care] is a minimum of 7.01 WTE’. Non-registered staff (health care assistants) with appropriate competencies may be included in calculations of staffing levels per critical care bed so long as they are working under direct supervision of a registered nurse at all times. Previous PICS Standards (2010) endorsed the benchmark of 6.4 WTE qualified nurses to staff one level 3 critical care bed.

# Metric 4 Emergency readmissions within 48 hours

**What does the metric measure?**

This metric measures emergency readmission to the same PICU within 48 hours of discharge.

An emergency admission is defined as an unplanned admission (whether this is following surgery or for another reason). An unplanned admission following surgery is any admission where the unit was not aware of the admission before surgery began (e.g. bleeding tonsillectomy); an unplanned admission for other reason is any admission that the unit was not expecting (e.g. status epilepticus).

Within 48 hours of discharge is defined as a readmission within 48 hours of the discharge date and time. If no discharge time is provided (or an admission time is not provided for a readmission) then an admission which is within 2 calendar days of the discharge date is used to calculate the metric.

**Inclusion/exclusion criteria for calculation**

All admissions, for children aged less than 16 years, to a UK or ROI in the reporting period are considered when calculating this metric. This means the child has to be aged less than 16 year at the time of both the original admission and the emergency readmission for their readmission to be counted in this metric.

For example, for the 2019 Annual Report, consider a child who was admitted to PICU XYZ on the 30/03/2016, was discharged on the 04/04/2016 at 08:00 and then was readmitted to PICU XYZ on 05/04/2016 at 18:00 as an emergency admission. The second admission would be classed as an emergency readmission within 48 hours and would be included in this metric.

If the same patient was readmitted as an emergency admission to PICU XYZ on 06/04/2016 at 09:00, however, this would not meet the metric definition as the readmission would not be within 48 hours.

If the same child was readmitted as an emergency admission on 05/04/2016 at 18:00 but was admitted to PICU ZYX rather than PICU XYZ, then this would not meet the metric definition as the readmission, although within 48 hours, was not to the same PICU.

If another child was admitted to PICU XYZ the day before their 16th birthday, discharge the day after their 16th birthday and then readmitted as an emergency to PICU XYZ within 48 hours, then their readmission would not be included the number of emergency readmissions within 48 hours as only admissions for children aged 0-15 years are considered in this metric.

If yet another child was admitted to PICU XYZ on the 31/12/2018 (the last day of the reporting period for the 2019 Annual Report), was discharged on the 01/01/2019 and was readmitted as an emergency to PICU XYZ on 02/01/2019, then, despite the readmission being within 48 hours, an emergency and to the same PICU, the readmission would not be counted in the metric as it occurred outside of the reporting period.

**How is the metric calculated?**

Admission events for children aged <16 within the reporting period are ordered chronologically within patient. For each patient and for each admission (excluding the first admission in the reporting period), the difference between the discharge date and time for the preceding admission and the admission date and time is calculated. If discharge time or admission time is not recorded then the difference between the preceding discharge date and admission date is calculated without taking into account time.

For each patient, any admissions within 48 hours of discharge are then identified. Any admissions meeting this criterion that are of an emergency admission type and are to the same PICU are classed as emergency readmissions within 48 hours to the same PICU. The proportion of admissions that are emergency readmissions is then calculated by dividing the number of events which meet the metric definition divided by the total number of admissions.

# Metric 5 Mortality in PICU

**What does the metric measure?**

This metric considers death of children whilst they are an inpatient on PICU. Specifically, we look at mortality rates using risk-adjusted standardised mortality ratios (SMR). This compares the number of deaths that have happened in a PICU and how many deaths we expected to happen given how poorly children were when they were admitted to PICU.

**Inclusion/exclusion criteria for calculation**

All admission within the reporting period are included in the calculation of this metric. Any planned admissions for the same patient to the same PICU which occur within 12 hour of discharge time are excluded as are children who were admitted to PICU following death. Children still on PICU at the point of final data lock are not included in calculations as their discharge outcome is not known.

**How is the metric calculated?**

We measure how poorly children were at the point when they were admitted to PICU using the Paediatric Index of Mortality 3 (PIM3) recalibrated based on data in the reporting period. PIM3 takes into account many factors such as whether the child was admitted as an emergency and whether they needed help breathing to estimate how likely each child is of dying.

The number of children who actually die (the ‘observed’ number) is compared to the number we predict to die (the ‘expected’) to derive the risk-adjusted Standardised Mortality Ratio (SMR). We compare at a unit level.

The observed number of deaths on a given PICU is calculated by summing the number of admissions to the PICU where the unit discharge status indicates that the patient died, for all admissions meeting the eligibility criteria to be included in this analysis.

The expected number of deaths for a given PICU is calculated by summing the PIM3 scores for all admissions meeting the eligibility criteria to be included in this analysis.

The Standardised Mortality Ratio (SMR) is then calculated by dividing the observed number of deaths by the expected number. This SMR is risk-adjusted as the denominator in the calculation takes into the risk of a patient dying as measured on admission through PIM3.