

PICANet Key Metric Definitions

The following key metrics will be measured for data from 2021 onwards. The fifth metric will be applicable to data from 2021 onwards, however, the standard/ target will only be measured for data from 2022 onwards. The PICANet standard will be confirmed in 2023.

Metric 1

Case ascertainment and timeliness of data submission

What does the metric measure?

Case ascertainment is a measure of the proportion of total admissions to PICU that are reported to PICANet. A case ascertainment of 100% would mean that we received information for all admissions to paediatric intensive care units (PICU). High levels of case ascertainment ensure that we are confident our findings will be representative of the events and care processes that take place in PICUs.

We also measure the timeliness of data collection and present how many of the admission events are completed on the PICANet database within two months of discharge – a requirement of the Paediatric Critical Care Society (PCCS) Quality Standards (L3-702, 2021) [1].

How do we calculate case ascertainment?

In the past case ascertainment was calculated during validation visits from the number of admissions recorded locally compared to the number of admissions included on the PICANet web database (ascertainment check).

From June 2021, case ascertainment is obtained by asking each individual PICU to undertake a count of admissions for a two month period out of 12 months. These are then cross matched against the number of admissions entered on to the PICANet web database. This ascertainment check is carried out on a yearly basis. In addition, case ascertainment is a feature of the virtual validation meetings held with each organisation, scheduled to be undertaken every 12 – 18 months.

How do we calculate timeliness of data submission?

An admission record is defined as complete when all validation checks relating to PICU admission, discharge and care have been fulfilled (i.e. excluding any validation checks on 30 day follow-up).

Why is this metric important?

We want to base our analyses on all admissions to be sure that we can interpret our findings appropriately. If a significant proportion of admissions is missing we cannot be as confident about our conclusions.

As well as ensuring we collect data on as many admissions as possible, we also want to ensure that data are collected in a timely manner, that data are accurate and that all relevant data are available for analysis.

Metric 2

Retrieval mobilisation times

What does the metric measure?

Some children need to be transported to a PICU in a different hospital for urgent care (non-elective transports). PICANet have calculated how long it takes for a specialised paediatric transport service (SPTS) to mobilise and start their journey to retrieve a child needing urgent PIC admission once the decision has been made that PIC transport is required. The Care Quality Commission and the NHS England Quality Dashboard monitor the timeliness of emergency transports and mobilisation times.

How is the metric calculated?

We measure the time from the point at which the clinicians agree that the child requires PIC transport to the time the SPTS team set off in the ambulance (or helicopter / plane) for what are called 'non-elective' or urgent transports.

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

Why is this metric important?

Any delay in receiving intensive care could put the sick child at risk, as the referring hospital may not have the resources to look after a critically ill child. Delays in mobilisation may also serve to highlight pressures on transport organisations such as busy periods during the year, and also insufficient resources or organisational issues that need to be addressed.

Metric 3

Emergency readmissions within 48 hours

What does the metric measure?

For each PICU we record the frequency of emergency readmissions to the discharging PICU within 48 hours of discharge. An emergency admission is defined as an unplanned admission where the unit was not expecting or had planned for this admission.

How is the metric calculated?

Admission events are ordered chronologically for each patient. Therefore, using the admission and discharge dates and times, any admissions within 48 hours of discharge are considered emergency readmissions.

Why is this metric important?

Emergency readmission within 48 hours is an undesirable outcome. From an individual child's perspective, it suggests their health has deteriorated in a short space of time and that they require further intensive care treatment. This can cause stress to their child and their carers, and increases demand upon the PICU. This may not be a reflection of the care provided but it is monitored on a regular basis.

Metric 4

Mortality in PICU

What does the metric measure?

This metric considers death of children whilst they are an inpatient on PICU. Mortality (death) rates are assessed for every PICU based on a statistical approach that accounts for the child's severity of illness at the time of admission using a risk-adjusted standardised mortality ratio (SMR). This compares the number of deaths within a PICU compared to how many deaths were expected to happen given how poorly children were when they were admitted to PICU.

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). 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).

Why is this metric important?

Although death whilst receiving care on a PICU is extremely rare, it is important to assess whether more (or fewer) deaths than expected occur, as this can indicate that there is something different happening in a PICU. It only represents a statistical measure of mortality and it is very important to use this as an indicator that further investigation is required, not as a true measure of the quality of care delivered.

Metric 5

Unplanned extubation in PICU

What does the metric measure?

Some children in PICU are attached to a ventilator via an endotracheal tube (ETT). Removal of the ETT tube (extubation) is a planned clinical decision. An unplanned extubation is when any dislodgement or displacement of the ETT occurs at any other time than the planned extubation. The NHS England Quality Dashboard monitors the number of unplanned extubations per 1,000 ventilated days.

How is the metric calculated?

Unplanned pertains to a premature extubation without the intention to extubate, and without the presence of airway competent clinical staff in the bed space appropriately prepared for the procedure. Unplanned extubation includes those instances of self-extubation, accidental extubation due to other causes, and accidental extubation resulting in a reintubation. Each unit records the number of unplanned extubations for each child in a 24-hour period in the PCCMDS data. As we are comparing such events between PICUs, we need to calculate a rate of unplanned extubation, based on how many days of invasive ventilation are provided in each PICU, as the more patients that are ventilated on a PICU, the more likely an unplanned extubation will occur. To calculate the rate, we take the number of unplanned extubations for every 1,000 invasive ventilation days delivered. This makes comparisons between units with different volumes of invasive ventilation possible

Why is this metric important?

Although unplanned extubation is rare it is associated with complications such as hypoxaemia (low blood oxygen) and/or hypercarbia (high blood carbon dioxide), and these adverse events are associated with mortality, the need for emergency

reintubation, prolonged mechanical ventilation, longer length of stay and increased costs(2,3). Collection of this data allows units to review, implement and measure quality improvement initiatives to reduce their unplanned extubation rate in line with NHSE Service Specification Standards of <5 per 1,000 days (PICO8a)(4).

References

1. Paediatric Critical Care Society, *PCCS Quality Standards for the care of Critically Ill or Injured Children (6th Edition)*. 2021. Available from: <https://pccsociety.uk/wp-content/uploads/2021/10/PCCS-Standards-2021.pdf>
2. Kanthimathinathan, H.K., et al., Unplanned extubation in a paediatric intensive care unit: prospective cohort study. *Intensive Care Med*, 2015. 41(7): p. 1299-306.
3. da Silva, P.S.L., et al., Care bundles to reduce unplanned extubation in critically ill children: a systematic review, critical appraisal and meta-analysis. *Archives of disease in childhood*, 2021.
4. NHS England. Paediatric Intensive care (PICU) Quality Dashboard 2021/2022. 2021