

Improving NIV care



Measurement Strategy

Project background

The British Thoracic Society (BTS) has conducted regular audits of acute non-invasive ventilation (NIV) for over 10 years, which have sadly demonstrated worsening patient outcomes. These results prompted a National Confidential Enquiry into the care of patients treated with NIV (NCEPOD 2017) which subsequently identified many areas for improvement. As a result of this enquiry, the BTS developed quality standards for acute NIV (2018). Since their introduction, there has been a slight improvement in mortality rates as identified in the 2019 BTS NIV audit. However, mortality rates remain higher than in other comparable countries at 26%.

Improving the outcomes of patients with COPD is a key priority within the NHSE Southwest Respiratory Network. The delivery of this Quality Improvement project will work to support this priority given that NIV is a core treatment in patients with COPD admitted with acute hypercapnic respiratory failure. It has been demonstrated that using NIV appropriately in this patient group improves mortality rates.

Data collection components

There are three components to the measurement, each of which are described below.

The three strands to the data collection are:

- i. Baseline mortality rate
- ii. Demographics of patients receiving NIV care
- iii. Project quality improvement data

Baseline mortality rate

Rationale:

Local audit results from the 2019 BTS NIV audit, demonstrate mortality rates of between 16-35% in the acute hospitals in the West of England. One site had a mortality rate of 0%, however it is acknowledged that this is unlikely to be representative of the usual overall NIV Mortality for that individual trust.

It is recognised that this data is not sufficient for an up-to-date baseline measure of local mortality rate. The impact of the Covid-19 pandemic has been far reaching and most respiratory services have undergone service changes and transformation to their pathways, workforce and resources. A more recent baseline figure is therefore required.

Intended use:

The mortality rate for each site will be used as a local baseline measure ahead of the quality improvement project. Each trusts data will also be combined with the other trusts for combine figures. The data will also be included in the project evaluation.

Process:

A request will be put into each of the trust Business Intelligence teams to determine the mortality rate of patients who have received acute NIV. The number of patients who have received NIV and the number of patients who died within that hospital admission following NIV will be requested. These will be requested as one report with data broken down by month with data being back dated to January 2022.

Demographics and medical conditions requiring NIV care

Rationale:

Demographic data of patients requiring NIV care have been captured in previous reports and reviews. However clinical teams report that following the Covid-19 pandemic, the demographics of patients that require acute NIV have changed along with the distribution of conditions that are being treated. For example, anecdotally many individuals have gained weight during the pandemic leading to an increased BMI. As a result, trusts have identified an increased number of individuals presenting with Obesity Hypoventilation Syndrome.

Capturing more recent data about patients receiving acute NIV will ensure we are using an accurate baseline at the start of our project, taking into consideration current case mix and morbidity. This will allow a true comparison between mortality outcomes in the recent past and post introduction of the NIV QI bundle.

Intended use:

The data collected will be analysed and will be included in the project evaluation. These results will be crucial in informing whether introduction of the QI bundle has been associated with a change in patient outcomes.

Process:

A request will be put into the Business Intelligence team in each trust to gather demographic and condition data. This will be a standalone request and will relate to every patient who has received NIV in the last 12 months.

The below data is to be collected:

- Age
- Gender
- Ethnicity
- Social deprivation score, classified using postcode
- Condition for which being treated
- Hospital outcome (discharged or deceased)

Project quality improvement data

Rationale:

The Improving NIV Care project is a quality improvement project that aims to implement the NIV care bundle. 'Live' outcome and process measures are therefore required to understand whether the bundle is being fully utilised and the impact.

Intended use:

The data collected will be used to inform the project delivery and will be included in the evaluation of the project.

Process:

The data collection strategy outlined on page 3 breaks down the data that will be gathered throughout the project, detailing the location of the data points and frequency of the collection. This data will be collected by each trust and will be provided monthly. No personal identification details will be shared during the data collection process.

A sample of patients of two patients will be used per week (8-10 per month). The Business Intelligence teams will identify random patients who have *received* NIV in the preceding month to allow for coding to be inputted. For example, for the month of March, a report will be produced for patients who received NIV in February.

The ICD-10 code for identifying patients is: E85.2 Non-invasive ventilation NEC (this includes Intermittent positive pressure ventilation NEC, Negative pressure ventilation, BIPAP).

Paediatrics will be excluded.

The analytical tools that will be used and the types of tables and charts will be considered following the first data trial.

Type of Measure	Measure	Operational definition	Source	Frequency / Duration	Collector	Reporting location
Outcome Measure	Mortality Rate	The percentage of patients who receive acute NIV and die during the hospital admission.	Patient notes	Monthly	Data collector	WEAHSN
Secondary Measures	Percentage of patients receiving the NIV care bundle	Percentage of patients receiving the NIV care bundle	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	Percentage of patients receiving all four elements of the bundle	Percentage of patients receiving all four elements of the bundle	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	Length of stay	Number of days of hospital admission from date first reviewed in the ED to date of death / discharge	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
Process	Reliable case selection	Percentage of patients who are receiving NIV who have Type 2 Respiratory Failure and a diagnosis where NIV is proven to be effective. Data to be captured includes: Diagnosis for which the patient is being treated with NIV CO2 and pH from first ABG reading	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	Treatment Escalation Plan	The percentage of patients who had a Treatment Escalation in place prior to commencing treatment	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	NIV 'decision to mask time'	Percentage of patients who received NIV within 60 minutes from the point of decision to treat	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	Inspiratory pressure at one hour	Percentage of patients who receive an inspiratory pressure of >20cmH2O within the hour. Where this is not achieved with good reason, the reason will be articulated.	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	ABG/CBG to be repeated within 2 hours of starting NIV	Percentage of patients who receive an arterial or capillary blood gas within 2 hours of starting NIV	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	Staff training	Number of staff trained on NIV care bundle	Training records	Monthly	Trainer / clinician	Spreadsheet / WEAHSN
	Reason why 20cmH2O wasn't achieved	A written reason why 20cmH2O wasn't achieved and the pH and CO2 measurement in the repeat ABG	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN

	Time NIV was initiated	The time that the NIV was initiated	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	The day that the NIV was commenced	The day that the NIV was commenced	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN
	Role of the clinician responsible for initiating NIV	The role of the clinician that started the NIV	Patient notes	Monthly	Data collector	Spreadsheet / WEAHSN