



## AN AUDIT OF MORTALITY IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS RECEIVING NON INVASIVE VENTILATION (NIV) BETWEEN 2015-2016 IN A UK CENTRE

### BACKGROUND

Non-invasive ventilation (NIV) is a well-documented, effective treatment modality for patients presenting with acute hypercapnic respiratory failure (BTS, 2016). It is an especially well-recognised and evidenced treatment for patients with Chronic Obstructive Pulmonary Disease (COPD) presenting with acute hypercapnic respiratory failure during an acute exacerbation of COPD (AECOPD), and compares favourably in a number of outcomes to invasive mechanical ventilation in this patient group (BTS, 2016).

In 2001 Newcastle-Upon-Tyne Hospitals Trust, a large teaching hospital in the North of England launched a 24 hour physiotherapy-led NIV service. The service is provided by the medical respiratory physiotherapy team during working hours, and a cohort of senior respiratory physiotherapists out-of-hours and at weekends. A hospital protocol is in place to assist decision making regarding initiation of NIV and appropriate referral to Critical Care.

This audit presents data collected from October 2015 to October 2016 and aims to benchmark practice, namely mortality, against published national data.

### METHOD

Data was contemporaneously collected for all patients referred for and having NIV initiated in the time period of October 2015 to October 2016. Data was compared against British Thoracic Society NIV Audit 2013 results (BTS, 2013).

#### References

British Thoracic Society (2016) *BTS/ICS Guidelines for the ventilatory management of acute hypercapnic respiratory failure in adults*. Available at: <https://www.brit-thoracic.org.uk/document-library/clinical-information/acute-hypercapnic-respiratory-failure/bts-guidelines-for-ventilatory-management-of-ahrf/> (Accessed 20 Feb 2017).

British Thoracic Society (2013) *NIV Audit 2013 (national audit period 1 February- 31 March)*. Available at: <https://www.brit-thoracic.org.uk/document-library/audit-and-quality-improvement/audit-reports/bts-adult-niv-audit-report-2013/> (Accessed 20 Feb 2017).

### RESULTS

During this 12 month period, 256 patients had NIV treatment initiated for hypercapnic acidaemia (as determined by arterial blood gas sampling), of which 212 patients had a diagnosis of COPD (83%). The following results are with regard to the patients presenting with COPD only. 89% of COPD patients were managed in a ward environment, with 11% of patients being escalated to critical care environments. Only 3% went on to receive invasive mechanical ventilation.

Comparison of Starting pH Values for COPD Patients Initiated on NIV Between Studies

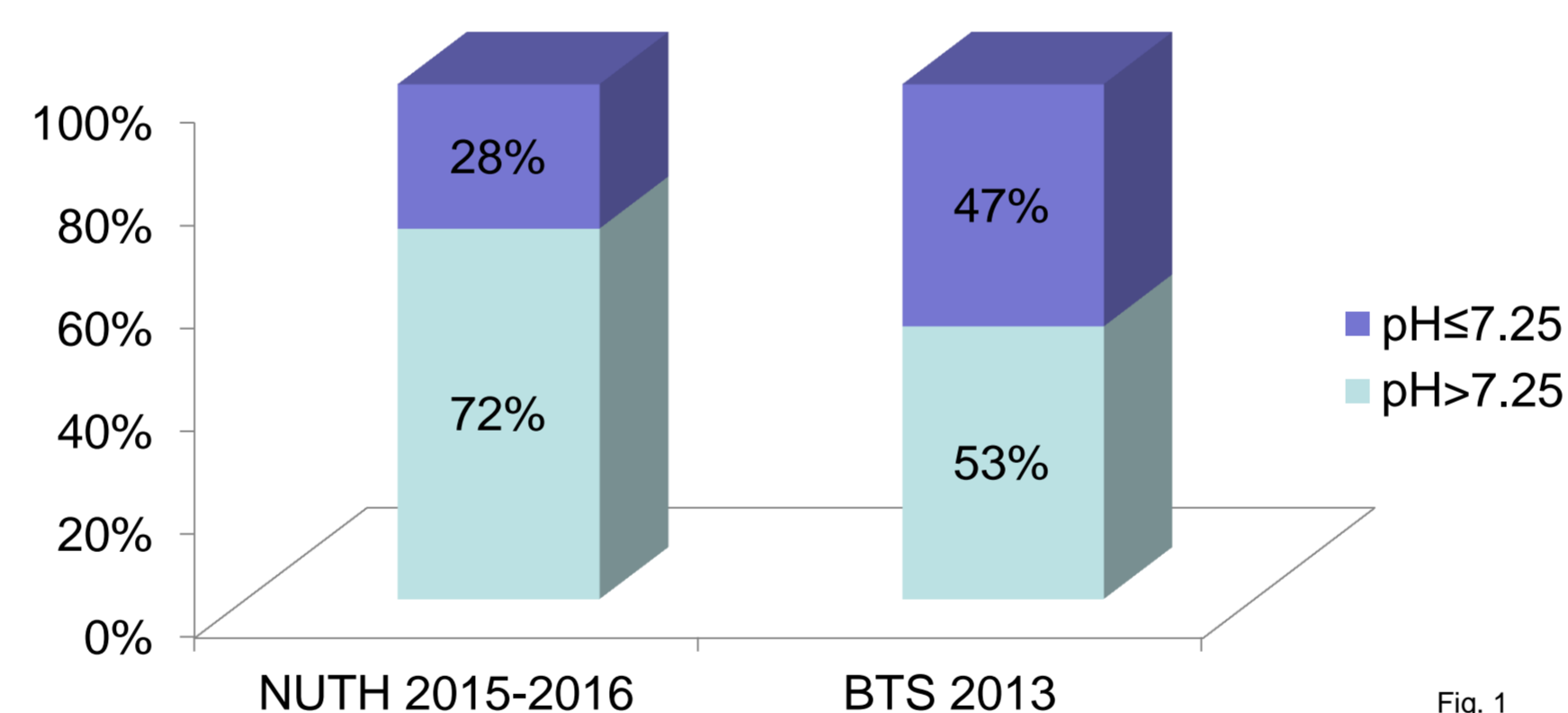


Fig. 1

At the time of initiation, 72% of COPD patients had a starting pH > 7.25, and 28% had a starting pH ≤ 7.25. This was compared to the BTS audit where at the time of initiation 53% of COPD patients has a starting pH > 7.25, and 47% had a starting pH ≤ 7.25. (Fig. 1)

80% of COPD patients were discharged from hospital following treatment with NIV, reflecting an overall mortality rate of 20%. Mortality was higher for the patients with starting pH ≤ 7.25 (36%) than those with pH > 7.25 (14%). Mortality was higher in the 9% who had a mixed respiratory and metabolic acidosis than in the 91% with a respiratory acidosis (45% vs 18%).

Comparison in Mortality of Patients Treated with NIV Between Studies

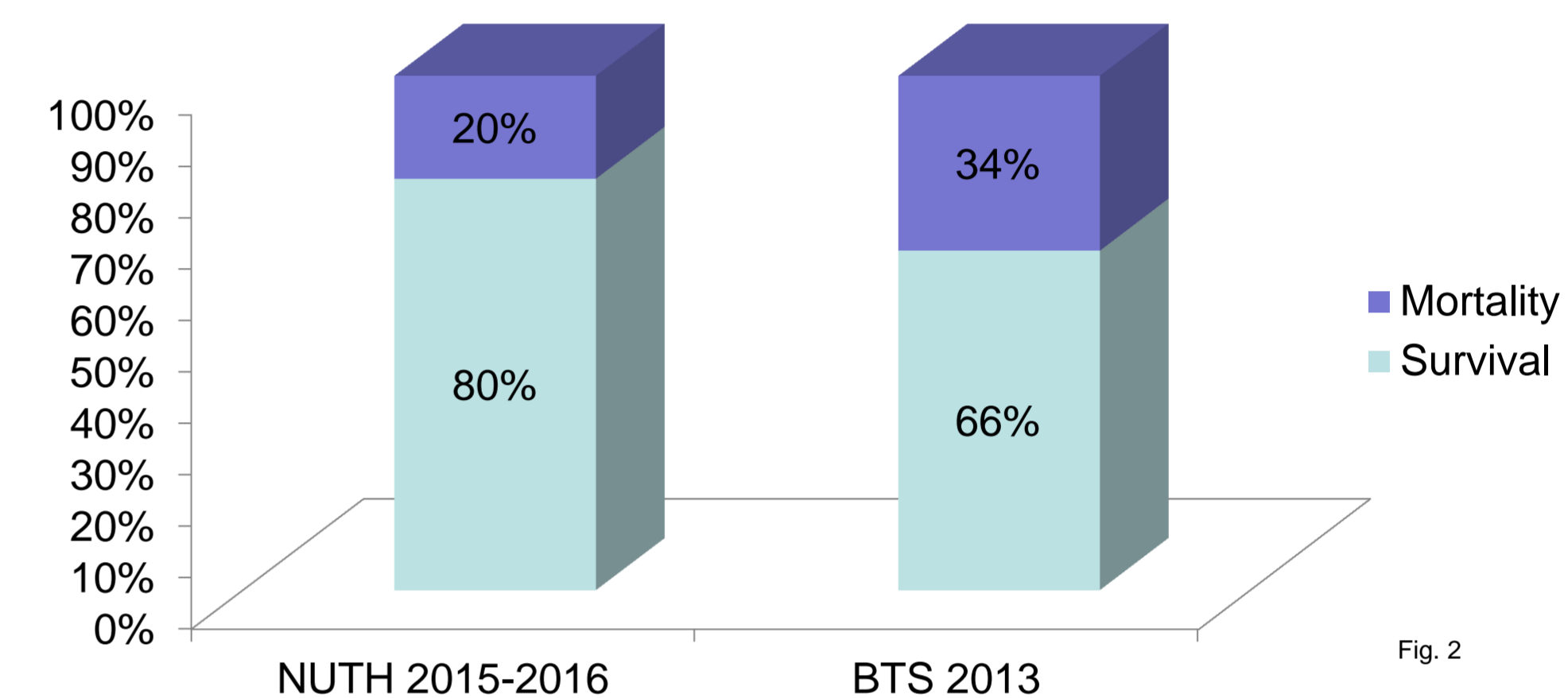


Fig. 2

### CONCLUSION

The overall mortality rate during this period was favourable in comparison with BTS data (20% vs 34%). (Fig. 2) Starting pH was predominately above the recommended 7.25 which may reflect timely initiation of NIV treatment and appropriate medical management leading to better outcome. Overall mortality is greater in patients with initial pH ≤ 7.25, in line with the BTS audit results. Patients with acute hypercapnic respiratory failure had a lower mortality rate than those with a mixed clinical presentation.

This physiotherapy-led NIV service has continued to provide an efficient and highly effective service and compares favourably to the most recent national audit data for mortality.

### LIMITATIONS AND RECOMMENDATIONS

The data collected was analysed retrospectively and therefore may be incomplete due to a potential for missing audit documentation at the time of NIV initiation. Data was not collected regarding the number of patient admissions for recurrent hypercapnic respiratory failure, and this may also affect mortality. There was no further analysis regarding the cause and timing of death in relation to management with NIV. The following data collection period will aim to address this with a change in data sheet format and an in-depth review of all mortality for patients undergoing NIV treatment.