

## Topic Proposal Form

Guidance on completing each section of this form is provided in the form of prompt questions. *These are not intended to be comprehensive* but to allow an opportunity to provide the supplier with an overview of the rationale supporting the proposal. Completed forms should be submitted electronically to [mmason@ncepod.org.uk](mailto:mmason@ncepod.org.uk) by **September 26th 2014**. An electronic form is available at [www.ncepod.org.uk/events](http://www.ncepod.org.uk/events). The maximum number of words for each response is indicated, where applicable.

<b>Topic title</b>	<b>Improving standards of care for patient who require non-invasive ventilation (NIV)</b>
<b>Proposal Lead</b>	
<b>Clinical Leads</b>	
<b>Organisation</b>	
<b>Partner organisations</b>	
<b>Potential joint commissioners or funding partners</b>	

<b>1. OVERVIEW OF THE PROJECT</b>
<p>Provide a summary of the essential features of the proposed topic including aims, objectives, and opportunities for quality improvement.</p> <p><i>Maximum response 200 words</i></p> <p><b>Aims</b> To identify and explore remediable factors in the care of patients treated with acute non-invasive ventilation (NIV).</p> <p><b>Objectives</b></p> <ul style="list-style-type: none"> <li>• To identify a cohort of patients treated with acute NIV and characterise the care delivered from admission through to discharge or death</li> <li>• To identify remediable factors in the quality of care received and produce recommendations for improvement.</li> <li>• To identify whether NIV was an appropriate treatment intervention and whether it was used in the most appropriate location.</li> <li>• To identify whether NIV was initiated at an appropriate time and whether any factors compromise the timing of care.</li> <li>• To examine organisational aspects of care including local and national guidelines and protocols, staff training and delivery of NIV in hospitals.</li> </ul> <p><b>Opportunities for improvement</b></p> <ul style="list-style-type: none"> <li>• To recommend clearer organisation of services, specifically defining those patients who should benefit from a ward based approach and those who require an escalation</li> </ul>

of care.

- Publicise best practice guidelines for adjusting ventilator settings.
- Make recommendations on competencies required to deliver effective NIV treatment.
- Assessment of whether there is a group of patients who fail to receive an appropriate escalation of care and monitoring.
- Identifying a group of patients where NIV was not likely to be effective and high quality end of life care would be more appropriate.

## 2. BACKGROUND INFORMATION

**2.1 Background and clinical context of the proposed topic.** Include incidence / prevalence of the condition(s), its impact on the patient and family / carers, and its impact on the NHS and / or social care organisations.

*Maximum response 250 words*

Chronic obstructive pulmonary disease (COPD) is the fifth biggest killer disease in the UK. In England, it accounts for the loss of 24 million working days per year and £3.8 billion in lost productivity. Unfortunately, premature mortality from COPD in the UK was almost twice as high as the European average in 2008.

COPD is the second most common reason for hospital admission and, of these, 20% present in acidotic hypercapnic respiratory failure. A key UK study (Plant; Lancet 2000) showed that the use of acute non-invasive ventilation (NIV) in this patient group led to a significant reduction in hospital mortality from 20% to 10% when compared to standard care, and a 3-day reduction in length of stay. Rapid access to NIV is essential, since mortality increases with worsening respiratory acidosis. Delivering successful NIV is a specialist procedure and there are clear national guidelines regarding its use.

Proactive acute management improves outcomes. The NHS Atlas of variability for Respiratory disease (September 2012) shows an association between NIV provision and a reduction in 30-day readmission rates. However, it also demonstrates concerning evidence of unwarranted variation.

The British Thoracic Society (BTS) has conducted an annual NIV audit since 2010. Patients with COPD account for more than 2/3 patients treated with NIV. Overall mortality rates have increased rather than improved in the last three audit periods. As below, the audit data and other studies raise a number of important questions about both the care delivered and the organisation of NIV services.

HES data for 2012-13 gives 101,773 procedures listed as non-invasive ventilation for that year (this includes CPAP as well as NIV). This was the main procedure in 70,608 cases and it was used in 61,012 cases over the age of 50. If the overall mortality rate of 34% found in the BTS audit applies, NIV could be involved the care of up to 20,744 patients (over 50) who died that year.

**2.2 Relevant data:** Are you aware of any other work on this topic? How will this study enhance or add to the body of work that has already been completed?

*Maximum response 250 words*

The BTS National NIV audit (<https://www.brit-thoracic.org.uk/publication-library/bts-reports/>) has identified a number of outcomes that appear to be suboptimal. Data of particular concern from the 2013 audit (2693 patients, 148 UK hospitals) include;

**1. Inappropriate patient selection**

Ward-based NIV is not recommended for patients with pneumonia. Despite this, consolidation was present in 40%; if present, mortality was higher (35% vs 22%).

**2. Starting NIV too late**

The median pH has fallen in each audit and was 7.24 in 2013. This is typically due to treatment delay and results in worse outcomes. This was also clearly demonstrated in a separate study (Roberts CM et al, Thorax 2011) which identified significant deficiencies in the delivery of acute NIV.

**3. Variation in mortality according to location of care**

Mortality is highest in general medical wards (59%) and lowest if started in the ED (26%). Institutional factors appear to be very important.

**4. Unacceptably high rates of mortality (34%)**

This UK data compares very unfavourably with trial evidence (10%) and recent Spanish audit data (18% in a sicker patient group) (Carrillo et al, AJRCCM 2012). In the UK, NIV failure occurs in 34% (11% in the Spanish audit) and intubation was rarely considered (3%).

**5. Significant deviation from guidelines**

National guidelines recommend HDU/ICU management in those with severe acidosis (pH < 7.26), but this is rarely adhered to (9%). Of concern, signs of pneumonia are more likely to be evident in those treated in the ward, rather than ICU.

These data (and more) demonstrate poor outcomes in UK clinical practice and, unfortunately, a trend towards worsening outcomes with successive audits. To improve UK services, we need to disentangle the factors involved in poorer outcomes and champion areas of good practice. There are many opportunities for improvement and an NCEPOD study is the ideal mechanism to identify the key underlying factors associated with poorer outcomes and to provide robust recommendations for future NIV services.

**2.3 Standards and guidelines:** Are there any current standards relating to this topic. Please give details of any such measures existing for the care areas to be covered in this audit. These might include: QoFs, CQUINS, NICE Quality Standards, QIPP activities etc.

*Maximum response 250 words*

Noninvasive ventilation in chronic obstructive pulmonary disease: management of acute type 2 respiratory failure.

National Guidelines:

Clinical Standards department Royal College of Physicians, British Thoracic Society and Intensive Care Society: October 2008. Provides guidance on protocols and standards for treatment with NIV.

NICE Quality Standard 10: Chronic Obstructive Pulmonary Disease. Quality statement 11: Non-invasive ventilation in hospital. Defines structure, process and expected outcomes for hospital services providing NIV.

NICE guideline: Management of COPD in adults in primary and secondary care; 2010 update.

Recommends NIV as treatment of choice for acute hypercapnic ventilatory failure (R171) as a result of COPD and recommends delivery in dedicated setting by staff trained in its application (R172). This guideline also makes a recommendation that patients with exacerbations of COPD should receive treatment including invasive ventilation in ITU when this is thought to be necessary (R174).

**2.5 Alignment with health policy direction:** How does the project sit with current policies and political direction? How does it relate to current topics in the public arena? Is public interest formalised within recognised organisations?

*Maximum response 250 words*

Mortality is currently well above that reported in original publications on NIV. Reduction in avoidable mortality is a key priority of the Department of Health - NHS Outcomes Framework Domain 1 .

The Department of Health published “*An Outcomes Strategy for Chronic Obstructive Pulmonary Disease (COPD) and Asthma*” in 2011. It set out 6 main objectives. The need for this NCEPOD study is demonstrated in Objective 3;

“Objective 3: To reduce the number of people with COPD who die prematurely through a proactive approach to early identification, diagnosis and intervention, and proactive care and management at all stages of the disease, with a particular focus on the disadvantaged groups and areas with high prevalence.” The document specifically states that “*When non-invasive ventilation (NIV) is used in appropriate people, survival is almost doubled*” .

NHS England published “Our Ambition to Reduce Premature Mortality:

A resource to support commissioners in setting a level of ambition” in 2013.

Section 6.3 refers specifically to Non-invasive ventilation (NIV):

**Issue:** *A Cochrane systematic review found that NIV reduces mortality in people with COPD who develop type 2 respiratory failure with a 1 in 8 life saved. This is reflected in NICE Quality Standard and the Outcomes Strategy for COPD and Asthma recommendations<sup>1112</sup>. Despite this there is substantial geographical variation in provision of NIV to eligible patients. The COPD Strategy Consultation Impact Assessment found that NIV is a cost-saving intervention.*

**Suggested Action:** *Commissioners to consider using contracting mechanisms to promote greater provision of NIV in line with NICE guidelines.*

**2.6 Key stakeholders:** Which groups are the key stakeholders for this project? **Please append letters of ‘in principle’ support from potential key stakeholders such as the relevant Royal College, specialist professional society and patient organisation(s).** How have stakeholders been involved in the development of this proposal? How much support is there for this project from relevant clinical professionals?

Letters of support have been received from the following organisations which confirm strong support for this proposal:

Intensive Care Society –letter attached

College of Emergency Medicine – letter attached

Society for Acute Medicine – letter attached

Faculty of Intensive Care medicine – letter attached

The following organisations have also confirmed support:

Royal College of Physicians of London

British Lung Foundation  
 Professor Mike Morgan, NHSE National Clinical Director, Respiratory has confirmed his support for this project.

### 3. RISKS

Please identify the potential risks associated with this proposal?

*Maximum response 250 words*

**Case ascertainment:**

Failure to code non-invasive ventilation might mean that some cases missed during study period. This has not been a problem in the hospitals providing data for the BTS audit.

**Variation in local protocols and provision of NIV**

Arrangements for NIV are difficult to standardise. NIV is often delivered in more than one location within a hospital and may fall within the remit of multiple specialists. This will increase the complexity of data collection (care may be transferred between generalist to respiratory specialist and potentially the ICU physician). Improving the delivery of this care will require a complete dataset throughout the hospital admission to discharge or death.

**Variation in case-mix**

Approximately 60% of cases have COPD as primary diagnosis. Other diagnoses are quite limited (Obesity-related, Cardiogenic Pulmonary oedema, and Neuromuscular Disorders). There may be some key issues related to other diagnostic groups in describing improvements needed in NIV treatment. The study would need sufficient number of cases to make sure messages are not diluted. The BTS data collection period was 2 months and included the following case-mix from 146 hospitals (COPD 1894, Obesity-related 232, Cardiogenic pulmonary oedema 258, Neuromuscular 128). However, general principles in the delivery of NIV are similar across diagnostic groups.



The Clinical Outcome and Review Programme into Medical and Surgical Care is commissioned by the Healthcare Quality Improvement Partnership on behalf of the funding bodies of the Department of Health and devolved nations of Wales, Northern Ireland, the Channel Islands and Isle of Man.