

Pre-hospital non-invasive ventilation for acute respiratory failure: a systematic review and cost-effectiveness evaluation

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Plain English summary

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Acute respiratory failure occurs when heart or lung disease leads to the patient being unable to maintain oxygen levels in their blood. It can be treated with non-invasive ventilation (NIV), which involves delivering oxygen under increased pressure through a tight-fitting face mask. There are two types of NIV: continuous positive airway pressure (CPAP) provides constant pressure, while bilevel inspiratory positive airway pressure (BiPAP) increases pressure as the patient breathes in. NIV (usually CPAP) provided by paramedics in an ambulance on the way to hospital is known as pre-hospital NIV.

This study aimed to find out if pre-hospital NIV reduces the risk of a patient with acute respiratory failure dying or needing to be put on a ventilator, and if the costs required to set up and run pre-hospital NIV are justified by the improvements in patient health. We did this by collecting and analysing all the available research into pre-hospital NIV and by developing a cost-effectiveness model.

We found 10 studies that showed that pre-hospital CPAP appears to reduce the risk of dying or being put on a ventilator, while the effect of pre-hospital BiPAP is uncertain. The cost-effectiveness model showed that providing pre-hospital CPAP would cost an ambulance service an extra £235,683–582,300 per year. It was uncertain whether or not this represented value for money for the NHS. Cost-effectiveness depended on the number of people who could receive, and benefit from, pre-hospital NIV each year. More research is needed to find out how many people can receive pre-hospital NIV and how much they benefit from it.

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