

Fact Sheet

August, 2009

Page 1 / 4

Non-invasive ventilation

- Non-invasive ventilation reduces costs.
 - ¹The costs for a pneumonia patient using non-invasive ventilation in Europe are 10,300 Euros, while an intubated patient incurs costs of 25,000 Euros. (Schönhofer 2006)
 - Non-invasive ventilation can take place away from the intensive care ward, on special ventilation wards, which reduces costs. (Bülow 2007)
 - ²Invasive ventilation often brings with it the risk of hospital-acquired infections - particularly ventilator-associated pneumonia - resulting in considerable extra costs. (Schönhofer 2008)
 - Ventilator-associated pneumonia causes 12,000 dollars of extra cost per patient (Warren 2003).
 - ³According to a US study published in 2000, hospital-acquired infections cause annual costs of 29 billion dollars in American hospitals. (Institute of Medicine 2000, see also Robert Koch Institute 2002)

- Non-invasive ventilation reduces the risk of hospital-acquired infections.
 - Invasive ventilation involves risk of infection, as the windpipe acts as a highway for germs. (Schönhofer 2008)
 - Invasive ventilation brings with it the risk of hospital-acquired infection. (Schönhofer 2008)
 - ⁴In the case of non-invasive ventilation, the lack of tube means that fewer germs make it into the respiratory system, resulting in fewer hospital-acquired infections. (Kuhlen 2008)
 - Patients using non-invasive ventilation can be prevented from further invasive intervention, such as catheters, which are necessary for invasive ventilation due to the sedation.

Fact Sheet

August, 2009

Page 2 / 4

- Non-invasive ventilation can reduce the length of stays in hospital.
 - ⁵Non-invasive ventilation reduces the length of stays in hospital by an average of three days. (Ram 2004)
 - The length of the weaning phase from the ventilation device is about 40 percent of the ventilation time (Esteban 1995)
 - ⁶Non-invasive ventilation reduces this weaning phase, which results in shorter stays for patients on the intensive care ward and in the hospital. (Ferrer 2003)
 - In the case of invasive ventilation, weaning and possible infections prolong the stay on the intensive care ward, which in turn increases costs and occupies valuable intensive care beds. (Nava 2006)
-
- Non-invasive ventilation increases the quality of life for the patients.
 - Non-invasive ventilation avoids pain, as no medical instrument must be inserted into the body.
 - ⁷Non-invasive ventilation does not require the patient to be sedated. (Kuhlen 2008)
 - Invasive ventilation requires anaesthetisation. (Schönhofer 2008)
 - ⁸Patients using non-invasive ventilation can do without masks for varying phases, which allows them to communicate with doctors regarding their condition, and also to talk to visitors or drink something. (Nava 2006, Bülow 2007)
-
- ⁹Non-invasive ventilation can reduce complications.
 - ¹¹With non-invasive ventilation, the number of possible complications is reduced by 62 percent. (Ram 2004)
 - Non-invasive ventilation avoids internal injuries, such as those caused to the trachea. (Ram 2004)
 - The risk of intubation-related pneumonia increases by one percent every day the tube is used. (Nava 2006, Elliott 2004)

Fact Sheet

August, 2009

Page 3 / 4

-
- Invasive ventilation brings with it the risk of hospital-acquired infections - particularly ventilator-associated pneumonia - resulting in higher mortality rates and considerable extra costs. (Schönhofer 2008)
 - Early non-invasive ventilation reduces the need for intubation (Elliot 2004) by 59 percent (Ram 2004).
 - Ventilator-associated pneumonia represents one of the most common hospital-acquired infections in the USA and Europe (Robert Koch Institute 2000).
 - Because the patient need not be sedated during non-invasive ventilation, no after effects are caused by the anaesthetisation required for invasive ventilation.
 - If used for long periods, invasive ventilation can result in the decomposition of the musculature (Schönhofer 2008).
 - Non-invasive ventilation of patients reduces the risk of treatment errors by over 50 percent (Ram 2004).
-
- Non-invasive ventilation reduces mortality rates.
 - ¹¹The mortality rate for COPD patients using non-invasive falls by 48 percent (Ram 2004) or from 20 to 10 percent (Plant 2000).
 - Invasive ventilation brings with it the risk of hospital-acquired infections - particularly ventilator-associated pneumonia - resulting in higher mortality rates. (Schönhofer 2008)
 - Ventilator-associated pneumonia increases the mortality rate to 50 percent. (Warren 2003)
 - In the long term, patients using non-invasive ventilation have higher life spans than those using a tube. (Conti 2002)
 - In the case of patients using non-invasive ventilation, the risk of treatment errors falls from 27 to 15 percent (Plant 2000). According to another study, this figure can even be reduced by over 50 percent (Ram 2004).

Fact Sheet

August, 2009

Page 4 / 4

Bibliography

- Bülow 2007: Bülow HH, Thorsager B, Hoejberg JM. Experiences from introducing non-invasive ventilation in the intensive care unit: a 2-year prospective consecutive cohort study. *Acta Anaesthesiol Scand* 2007; 51: 165-170. (8)
- Conti 2002: Conti G, Antonelli M, Navalesi P et al. Noninvasive vs. conventional mechanical ventilation in patients with chronic obstructive pulmonary disease after failure of medical treatment in the ward: a randomized trial. *Intensive Care Med* 2002; 28: 1701–1707.
- Elliott 2004: Elliott MW. Non-invasive ventilation for acute respiratory disease. *British Medical Bulletin* 2004; 72: 83–97.
- Esteban 1995: Esteban A, Frutos F, Tobin MJ, Alia I, Solosona JF, Valverdu I, Fernandez R, dela CM, Benito S, Tomas R, et al. A comparison of four methods of weaning patients from mechanical ventilation. *Spanish Lung Failure*.
- Ferrer 2003: Ferrer et al. Non-invasive Ventilation during Persistent Weaning Failure. *Am. J. Respir. Crit. Care Med.* 2003; Vol. 168, No. 1: 70–76. (6)
- Institute of Medicine 2000: Institute of Medicine. *To Err is Human: Building a Safer Health System*. National Academy Press 2000. (3)
- Kuhlen 2008: Kuhlen R. „NIV erfordert ein anderes Patienten-Management“. *Drägerheft* 2008: 15. (4)(7)
- Nava 2006: Nava S. „Offen sein für nicht-invasive Beatmung“. *C.A.R.E.* 2006; 1. (8)
- Plant 2000: Plant PK, Owen JL, Elliott MW. Early use of non-invasive ventilation for acute exacerbations of chronic obstructive pulmonary disease on general respiratory wards: a multicentre randomised controlled trial. *Lancet* 2000; 355: 1931–5. (11)
- Ram 2004: Ram FSF, Picot J, Lightowler J, Wedzicha JA. Non-invasive positive pressure ventilation for treatment of respiratory failure due to exacerbations of chronic obstructive pulmonary disease. *The Cochrane Database of Systematic Reviews* 2004, Issue 3. (5) (10)
- Robert Koch-Institut 2000: Prävention der nosokomialen Pneumonie – Mitteilung der Kommission für Krankenhaushygiene und Infektionsprävention am Robert Koch-Institut. *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz* 2000; 43: 302-9.
- Robert Koch Institut 2002: Nosokomiale Infektionen Autoren: Dr. med. Christine Geffers, Prof. Dr. med. Petra Gastmeier, Prof. Dr. med. Henning Rüden, Heft 8 (3)
- Schönhofer 2006: Schönhofer, B.: *Nicht-invasive Beatmung - Grundlagen und moderne Praxis*, UNI-MED, Bremen, 2006
- Schönhofer 2008: Schönhofer B et al. Nicht-invasive Beatmung bei akuter respiratorischer Insuffizienz. *Deutsches Ärzteblatt* 2008; 105(24): 424-433. (2)
- Warren 2003: Warren DK et al. *Crit Care Med* 2003