Ventilator-associated pneumonia (VAP) is the most frequent life-threatening HAI in intensive care units.4

**THE PROBLEM**
Ventilator-associated pneumonia (VAP) results from the microbial invasion of the normally sterile lower respiratory tract, which subsequently can overwhelm the host’s defense and establish infection.4

**THE CAUSES**
The key risk factor to the development of VAP is a cuffed endotracheal tube or tracheostomy, both of which interfere with the normal anatomy and physiology of the respiratory tract.5

VAP leads to an attributable mortality rate of up to 71%.4

VAP increases the duration of hospitalization by 7 days and health-care costs by approximately up to $40,000 USD.4

**HAI INFECTION RATE**
- EU: 7.1%
- Low-income countries: ≈15.5%
- ICU: 30.0%

**THE CAUSES**
The most frequent route of transmission is indirect contact. The infected patient touches and contaminates an object, an instrument, or a surface. Subsequent contact between that item and another patient is likely to contaminate the second individual who may then develop an infection.9

In the clinical environment where patient safety is your first priority, breathing filter can support the airway management in the prevention of potential cross contamination.

**ELECTROSTATIC AND MECHANICAL FILTER**
- SafeStar® Plus
- CareStar® Plus

Humidification only by additional active humidifier or HME on the patient side. Filter shall be used on the device side.

**COMBINATION OF ELECTROSTATIC OR MECHANICAL FILTER AND HME**
- TwinStar® HEPA Plus
- TwinStar® Plus

Placed on the patient side. No further humidification needed.

**HEAT-AND-MOISTURE-EXCHANGER (HME)**
- HumidStar® Plus

Placed on the patient side for passive humidification. For bacterial filtration, a filter must be used on the device side.

**VAP Impact on Healthcare Costs and Resource Utilization**

<table>
<thead>
<tr>
<th>Duration of Mechanical Ventilation</th>
<th>4.7 days</th>
<th>14.3 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of ICU Stay</td>
<td>5.6 days</td>
<td>11.7 days</td>
</tr>
<tr>
<td>Length of Hospital Stay</td>
<td>14.0 days</td>
<td>25.5 days</td>
</tr>
<tr>
<td>Mean Hospital Charges</td>
<td>63,689 USD</td>
<td>104,983 USD</td>
</tr>
</tbody>
</table>

Based on therapy, Filters can protect patients according to hospital guideline by being a barrier for airborne bacteria and therefore avoid cross contamination either on patient and device side. In addition, HME can support the humidification of breathing gas by absorption of the patient’s humidified expiratory air in the foam and moistening of the air during the next inspirations. For additional information, please do not hesitate to contact us.