



PATIENT SAFETY AT THE CORE OF VENTILATOR CARE IN THE ICU

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A stay in the ICU may have patients interfacing with life-supporting devices including a ventilator. We believe patient safety should be at the center of mechanical ventilation. Our experience with the legacy Puritan Bennett™ 840 (PB840) ventilator helped influence the innovative design of the Puritan Bennett™ 980 (PB980) ventilator, with several legacy features carrying over to the ventilator. In addition, our product engineers implemented improvements to maximize safety features based on feedback we received from clinicians. This article highlights several of those safety features available to you on your PB980 ventilator.

Refining standardization around back-up ventilation for improved patient outcomes

Knowing whether your ventilator has back-up ventilation safety components is important for your patient care. Some may consider backup ventilation a type of apnea ventilation, but in addition to this feature, the PB980 has another type of backup ventilation sometimes called ventilator assurance.

What occurs with ventilator assurance is that in the event certain critical components in the pneumatics (such as a pressure or flow sensor) fail, ventilation assurance provides continued ventilation support using one of three backup ventilation strategies, bypassing the fault to maintain the highest degree of ventilation that can be safely delivered.

Preventing adverse patient outcomes with automatic patient detection

Improving outcomes and delivering care is what healthcare providers strive for during a patient's stay. But, at times, devices may inhibit the workflow to result in unimaginable consequences. A common problem noted among clinicians is a ventilator not detecting and ventilating a patient after returning from transport. Stand-by mode is a commonly integrated feature used while the patient is away on temporary transport. If a patient, for example, requires transport for a computed tomography (CT) scan or for surgery and subsequently returns to their room following the transport, many ventilators don't recognize the patient has been reconnected to the ventilator, but it remains in stand-by mode unless the clinician manually presses a button.

The Emergency Care Research Institute (ECRI) released an alert detailing this reported issue of adverse patient outcomes caused by ventilators not automatically detecting a patient is connected and resuming ventilation.¹ With the design of the PB980 ventilator, an automatic patient detection feature is built into the ventilator that will automatically resume ventilation at the current settings without manual intervention. In a busy clinical setting, such as the ICU, this feature could make a critical difference between life and death with a patient, which is why it was an integral feature required in the build of the PB980 ventilator.

Protecting patients and healthcare providers with expiratory filtration

When it comes to providing protection, the PB980 ventilator also has the safety of clinicians in mind in addition to patient safety. With the PB980 ventilator, an additional element was integrated to prevent contagious respiratory pathogens from spreading out into the ICU room. The National Institute for Occupational Safety and Health (NIOSH) has three levels in ventilator filtration created around filter performance of most penetrating particle size (MPPS).^{2,3}

When SARS first became prevalent in North America in 2003, hospital facilities clamored for protection of their clinicians caused by the airborne particles expelled by patients on mechanical ventilators. The PB840 and PB980 incorporate the highest rated filtration — the N100 with 99.97 percent filtration — and because the expiratory filters are built in, they may potentially decrease the risk of contamination.

PB980 ventilator features for assurance of highest possible patient outcome

To further support both the patient and the clinician, the PB980 ventilator uses a lung protection patient strategy. By entering the patient's height and gender, the ventilator uses a predicted body weight to support the clinician in determining the appropriate tidal

volume for the patient. This feature is designed to reduce the likelihood of lung damage from overdistension based on the calculated size of their lungs.

Engineers also incorporated a 360-degree alarm indicator on the PB980 ventilator. This feature was designed with the clinician and patient in mind. No matter where the clinician is standing in the room, they have visibility of alarms that have been enunciated. A secondary display is also incorporated into the ventilator providing additional information such as gas source connections, battery time, and patient pressure — all to help navigate various scenarios.

Additionally, a secondary power off button is incorporated into the PB980 ventilator. If the power off button is accidentally initiated during ventilation, the ventilator doesn't turn off immediately. Instead, the PB980 ventilator requires a secondary on-screen power off button to be activated. This feature is, again, designed with patient safety in mind and to provide comfort for the clinician that an accidental shut down does not occur.

References:

1. Emergency Care Research Institute (ECRI). Leaving ventilators in standby mode with patient connected may cause patient harm or death. ECRI Exclusive Hazard Report. June 12, 2018.
2. Centers for Disease Control and Prevention. NIOSH guide to the selection and use of particulate respirators. <https://www.cdc.gov/niosh/docs/96-101/default.html>. Published Jan. 1996. Accessed Feb. 17, 2020.
3. Thiessen RJ. The impact of severe acute respiratory syndrome on the use of and requirements for filters in Canada. *Respir Care Clin N Am*. 2006;12(2):287–306.

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