

HELPING PROTECT YOUR MOST VULNERABLE **NEWBORNS**

Puritan Bennett™ 980
Neonatal Ventilator System



Helping provide comfortable care

When a newborn's first weeks or months of life are spent in the NICU, it is emotionally challenging for the baby as well as the family. Everyone strives to keep these babies as comfortable as possible. However, routine care required for NICU patients can be a source of discomfort and stress.¹⁻³

The challenge of ventilatory support

One cause of patient discomfort can be the need for ventilatory support. The often weak respiratory drive and vulnerable lungs of babies can make effective ventilation difficult and can lead to a potentially uncomfortable patient-ventilator interaction.^{4,5} To confirm that sufficient gas exchange is taking place, ventilated newborns require significantly more procedures.²

Mechanically ventilated NICU patients are also unable to receive continual soothing parental contact, which can have a considerable impact on not only the baby's outcome, but also the parents' satisfaction and well-being.¹



Reducing the need for invasive ventilator support and improving mechanical ventilation when possible can help limit exposure to uncomfortable procedures and enable newborns to spend more time in the arms of their loved ones.^{1,2}

Managing ventilatory support

Significant air leaks are common in newborns intubated with uncuffed tubes and vary substantially over time because of changing patient conditions, sedation levels or muscle relaxation, patient position, and wakefulness.⁶

| YEAR | AUTHOR | KEY RESULTS |
|------|----------------------|---|
| 2010 | Mahmoud ⁷ | An air leak of 40% indicated the displayed Vt was underestimated by 1.2 mL/kg, thus by about 24% of target Vt (generally 5 mL/kg). |
| 2001 | Main ⁶ | Leaks larger than 20% resulted in inconsistent tidal volume delivery and gross overestimation of compliance (C) and resistance (R) regardless of ventilator mode. |

Noninvasive ventilation

Noninvasive ventilation is increasingly preferred to avoid the complications associated with intubation.⁸

A clinician's ability to continue providing noninvasive support and avoid intubation is related in part to how well the newborn is tolerating noninvasive ventilation.⁸ One factor contributing to a patient's tolerance of noninvasive ventilation is synchrony between the patient's spontaneous breathing efforts and the ventilator settings.⁸

Large airway leaks are common with noninvasive interfaces, for example nasal masks, and can result in a variety of trigger and cycle asynchronies.⁹ Trigger asynchrony can lead to an increase in work of breathing for the baby.⁸



Monitoring actual patient pressures

The NIV+ software option allows for calibration of the neonatal NIV interface, enabling the monitoring of two additional data values: end inspiratory pressure at the patient interface ($P_{I\text{ END IF}}$) and end expiratory pressure at the patient interface ($PEEP_{IF}$).

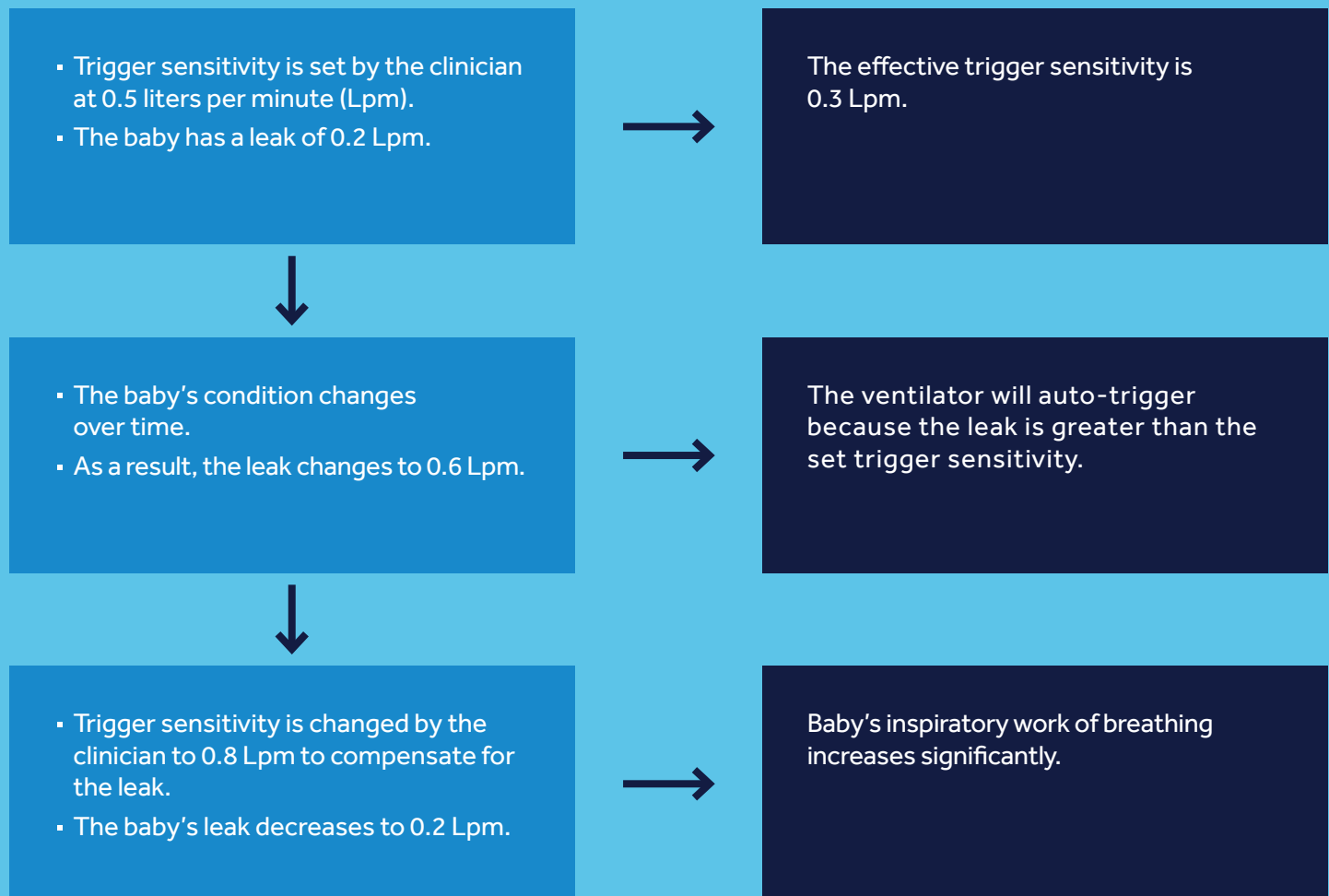
Due to NIV interface leaks and flow resistance added by the NIV interface, the set pressure on the ventilator does not always equal the pressure delivered to the patient. Knowing ventilating pressures proximal to and distal to the NIV interface helps the clinician make more informed ventilation-related decisions, such as pressure setting adjustments and the escalation or de-escalation of care.

In addition to taking the guesswork out of delivered pressure, the NIV+ software option also provides a robust means of determining patient disconnect, especially when leaks are present.

What leaks can mean for NICU patients

Leaks place ventilated patients at a higher risk of auto-triggering and can cause the ventilator to provide unwanted breaths.^{5,8} To mitigate auto-triggering, clinicians might react by increasing sensitivity settings on the ventilator, placing babies at risk of ineffective triggering, making it difficult for the baby to get a breath despite making an effort.^{5,8}

Both ineffective triggering and auto-triggering can cause an increased work of breathing, distress, and fatigue for the baby, as shown in the example below.^{5,7,8}



Engineered to help protect your most vulnerable patients from leak-related asynchrony

The Puritan Bennett™ 980 neonatal ventilator is designed to address the challenges of safe and effective neonatal ventilation. The Puritan Bennett™ Leak Sync software automatically detects and compensates for fluctuating leak sizes, resulting in a decreased risk of breath trigger and cycle asynchronies and helping clinicians keep babies at a more desirable work of breathing. It also results in more reliable displayed volume.



Leak Sync software



Providing safe and responsive care

The Leak Sync software can compensate for leaks up to 50 Lpm during inspiration and 15 Lpm during exhalation in neonatal applications, helping to ensure newborns receive the flow and volume selected by the clinician. This software works with multiple airway interfaces, helping provide peace of mind during both invasive and noninvasive neonatal ventilation.¹⁰

Puritan Bennett™ Leak Compensation Performance During Invasive Ventilation

Invasive ventilation

- The Puritan Bennett™ 980 ventilator is one of only two ventilators in a comparative study to acclimate to all leaks in invasive ventilation.¹¹
- Leak sync software now works with VC+ and VS modes.
- Volume targeted ventilation has been shown to be the most lung protective mode for babies.¹²

Puritan Bennett™ Leak Compensation Performance During Noninvasive Ventilation¹¹

Noninvasive mechanical ventilation

- The Puritan Bennett™ 980 ventilator was the only ventilator in a comparative study to acclimate to all leaks in NIV.¹¹

By effectively managing gas leaks during both invasive and noninvasive ventilation, the Puritan Bennett™ 980 ventilator can help clinicians provide the right ventilation, supporting the clinician's effort to keep babies safe and comfortable.

Advancing the legacy

The Puritan Bennett™ 980 ventilator was built on the reliability and sophisticated breath delivery technology clinicians have come to expect from Puritan Bennett™ ventilation.

Software you depend on

Innovative software features in the Puritan Bennett™ 980 ventilator include:

- **Proximal flow sensor** — Measures lower flows, pressures, and tidal volumes right at the patient wye for neonatal applications.
- **C20/C** — Helps ensure patients don't suffer from overdistension by monitoring compliance of the last 20% of each inspiration compared to the entire inspiration.
- **Configurable FiO₂ elevation** — Elevates FiO₂ for 2 minutes according to the configurable % set between 21% and 100%.
- **Trending** — Captures up to 72 hours and more than 57 parameters of patient data to help review the effectiveness of treatment over time.

Security for you and your patients

Our new ventilator assurance program includes:

- **Ventilator assurance feature** — The ventilator will continue to deliver ventilatory support in the event of certain system failures.
- **Status display** — There is an additional screen located on the breath delivery unit (BDU) with data display even if the graphic user interface (GUI) is unavailable.
- **Standby mode** — This feature pauses ventilation while the patient is disconnected from the ventilator and preserves settings; it auto-detects patient upon reconnection and resumes ventilation.





Service you can trust

The Medtronic service difference

- **Quality** — The Medtronic service team worked hand-in-hand with engineering during the development of the Puritan Bennett™ 980 ventilator to help ensure they are able to service the ventilator with the high level of quality that our customers have come to expect.
- **Consistency** — The Medtronic service team operates on a solid foundation of experience and expertise, with more than 50 years as a qualified provider of service for Puritan Bennett™ ventilators.
- **Responsiveness** — The Medtronic service team has more than 40 customer support engineers across the country. Our fully integrated sales, service, and clinical support team enables us to respond quickly to your service and account needs.
- **Integrity** — Strict compliance with industry standards for quality management systems and with our manufacturer recommended service maintenance schedule is a priority for our service team. Satisfying your needs with steadfast integrity enables us to build our relationship with you as a valued customer.

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