When accuracy isn’t optional: The era of ventilator integration to the patient record



Background

Sheffield Teaching Hospitals NHS Foundation Trust is one of the UK's biggest providers of integrated hospital and community-based healthcare, offering a comprehensive range of local and tertiary services. Within the organization, the Neonatal Intensive Care Unit (NICU) plays a critical role in caring for the most vulnerable patients—newborns requiring advanced medical support due to prematurity, congenital conditions, or severe illness.

The NICU serves as a regional referral center and is equipped with advanced clinical technology, supported by a multidisciplinary team committed to high-quality, family-centered care. The Trust's Digital Strategy (2023–2028) and broader innovation agenda guide the adoption of digital solutions across clinical services, including neonatal care.

As part of this strategy, the Trust engaged Ascom as a vendor-neutral Medical Device Integration (MDI) partner to enable connectivity between neonatal ventilators and the NICU's Clinical Information System (CIS).

Clinical and operational challenges

Ventilator record keeping and compliance

Ventilator settings and patient physiological measurements that are documented in patient notes are not just a clinical necessity—they also form part of the legal medical record. Inaccurate or incomplete documentation can carry regulatory, professional, and legal implications.

Under the UK's GDPR and the Data Protection Act 2018, health data—especially ventilator parameters—must be accurately recorded and securely stored, and accessible only to authorized clinicians. Clinical standards (such as guidelines from National Respiratory Therapy Colleges) also require clear documentation of ventilator mode, input settings, and measured patient values to support handovers, audits, and, when necessary, mortality and adverse events reviews.

A missed or delayed update following a change in ventilator mode or settings can introduce risk during shift transitions or clinical reviews. During patient mortality reviews, recorded ventilator data is reviewed to ascertain if the correct clinical decisions were made and implemented in line with clinical guidelines. This task currently involves reviewing manually entered information in the CIS, extracting raw data from medical devices (if available), and interviewing staff.

In the NICU environment, timely and accurate documentation of ventilator data is essential for clinical decision-making, continuity of care and accuracy of the patient record, leading to the following areas of focus and measurement.



Risk of human error

Pre-state:
Data is manually transcribed from the medical device screen to the patient record, manual transcription of data introduces the risk of transcription errors, omissions, and inconsistencies.

Selected KPI:
To quantify the risk of human error we counted the defect opportunities, defined as the number of characters manually entered into the Clinical Information System (CIS). Each character typed represents a potential opportunity for error. For example, entering the value "50%" constitutes three defect opportunities, corresponding to the three manually entered characters. Each character entered into the CIS represents a potential defect opportunity, and even minor transcription inaccuracies can compromise patient safety and the quality of the patient record.

Workflow inefficiency

Pre-state:
Hourly manual documentation consumes valuable nursing time, diverting attention from direct patient care.

Selected KPI:
A time-and-motion study will be completed to understand the time required to complete this task and how much time can be reallocated to patient care from administrative tasks.

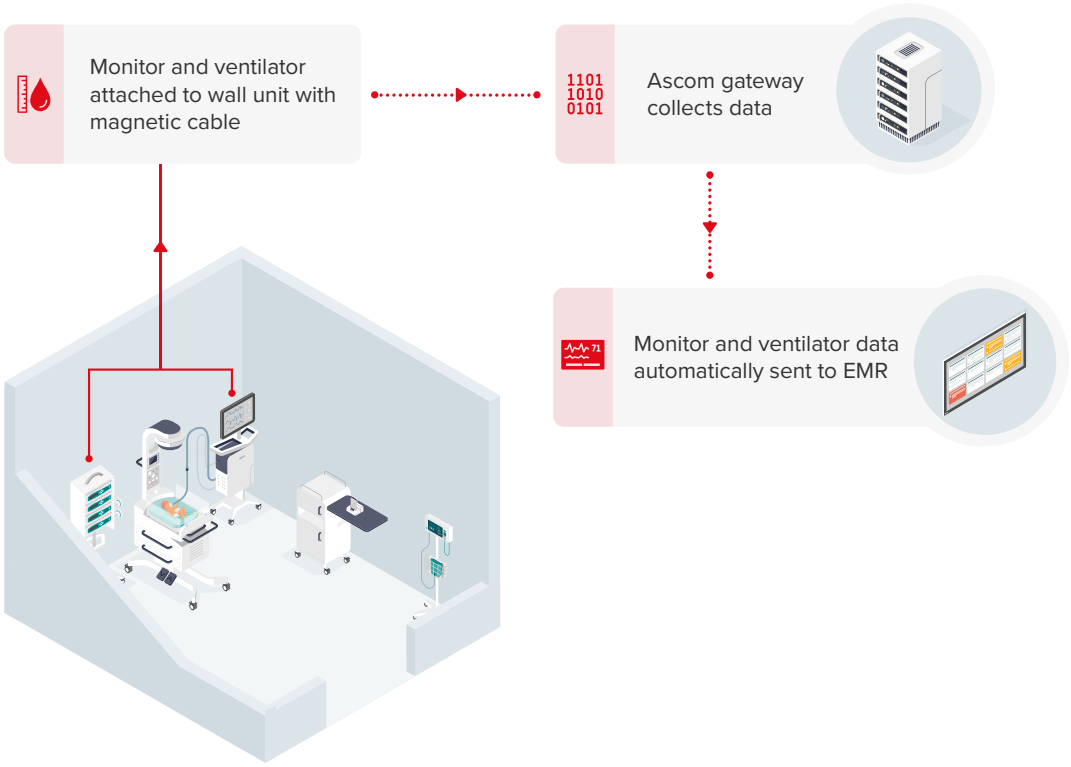
The Ascom MDI solution

Ascom implemented a vendor-neutral MDI solution to automatically transfer ventilator data from the Dräger VN500 ventilator into the BadgerNet, System C, CIS.

Using serial RS-232 connectivity and a magnetic Ascom cabling, the solution enables secure, continuous data transmission directly into the patient record. The magnetic connection supports ease of use at the bedside and provides alerts for unintentional disconnection, while allowing intentional disconnection when devices are moved between patients—an important consideration in the NICU workflow.

The Ascom MDI solution extracts ventilator data and stores it in a database. The CIS retrieves data from this database based on the patient record settings—either continuously or at selected time intervals (e.g. once an hour).

Ventilator data will be available and complete in the patient record, moving from a minimum of 24 data points per day to an enabled continuous 1,440 data points per day.



Results and impact

Risk of human error - With automated data capture, nurses no longer manually transcribe ventilator settings and physiological readings into the CIS hourly. This change eliminated an average of **28.5 defect opportunities per patient per hour**.

Sheffield Teaching Hospitals NHS Foundation Trust has 24 NICU bed spaces operating at 70% occupancy, this equates to approximately **3.86 million defect opportunities eliminated annually**. While individual transcription errors may appear minor or trivial their cumulative effect increases the likelihood of multiple contributing factors aligning and leading to patient harm.

The improved accuracy of the patient records means clinical reviews can take place away from the patient family anywhere the patients record can be viewed. It also means that any required mortality review can be completed efficiently and much more effectively than previously.

Workflow efficiency

Prior to integration, approximately 1% of a nurse's working day was taken transcribing ventilator data, with a median task duration of 36 seconds per hour per patient. Eliminating this task saves an average of 14.4 minutes per patient per day.

This time saving reflects not only data entry, but also navigation between screens, physical movement, and interruptions—time that will now be reinvested in direct patient care.

Estimated time:

Duration	Per nurse / patient	Unit total (24 beds) @70% occupancy
Day	14.4 minutes	3.46 hours
Week	1.7 hours	1 day
Month	7.2 hours	4.3 days
Year	3.65 days	52.6 days
Contract (5 years)	18.25 days	262.8 days

Cost avoidance

Based on NHS Agenda for Change Band 5 nursing costs (2025 rates), the time savings achieved through automation represent an estimated **£121,098 in cost avoidance over five years**, based solely on nursing efficiency gains alone.

According to the NHS, documented clinical decisions and outcomes are admissible as evidence in court. Such documentary evidence can contribute to reducing the cost of lawsuits incurred by the NHS, which in **2025 totalled £92.8m**. Automated, accurate and admissible records are estimated to save **£1.7m per case**.

Looking ahead

Beyond documentation accuracy and nursing efficiency the MDI solution is a foundation for Medical Device Clinical Alarm Management, which in the NICU creates opportunities to deliver contextual, actionable information directly to caregivers. Distributing device data and alarm notifications to mobile devices can not only contribute to better care and outcomes—it can help reduce workloads and the risk of alarm fatigue for busy frontline clinicians.

Time saving and defect opportunity mapping and analysis was conducted by Ascom Evidence Generation team, and all enquires should be directed towards Ascom.

To discover more, contact Ascom.

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About Ascom

Our vision is a world where the right information moves people forward. Our mission is to put the right information in the right hands at the right time so that people can make the best possible decisions.

We are a global provider of communication and collaboration solutions for the acute care, long-term care and enterprise sectors. Our solutions are based on intelligent integrations with software and hardware that are open source and compatible with third party solutions. Every single second, our systems generate large amounts of data, which we then turn into useful and actionable information. This helps us to bring data to life for people in the toughest operational environments, ensuring smooth, complete, and efficient workflows.

Ascom is headquartered in Baar (Switzerland), has operating businesses in 19 countries and employs around 1,400 people worldwide. Ascom registered shares (ASCN) are listed on the SIX Swiss Exchange in Zurich.

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