



WHITE PAPER

The Modern Doppler Effect: How VascuChek Meets Today's OR Needs

Reengineering Intraoperative Blood Flow Assessment for Precision, Sterility, and Speed



The Doppler Effect: From Physics to the OR

In physics, the Doppler effect describes how sound waves change frequency as the source or observer moves—a principle that allows motion to be detected and measured. In medicine, this same phenomenon became the foundation of vascular and surgical imaging, enabling clinicians to hear and assess blood flow in real time.¹

But in today's operating rooms, the Doppler effect carries a new meaning. Just as a frequency shift reveals motion, the surgical field itself is shifting towards higher case volumes, leaner teams, budget-strapped hospitals and healthcare systems, and zero-tolerance infection standards.

For decades, Doppler technology has been an indispensable surgical tool for assessing blood flow. Yet despite advances in imaging, infection prevention, and OR automation, the handheld Doppler has remained largely unchanged in its design—corded, tethered, and time-consuming to clean after each use. The technology created to detect motion has, ironically, struggled to keep pace with the evolving needs of its users.

Mounting Pressures: Staffing, Safety, and Efficiency

Across surgical disciplines, teams face three interlocking challenges: staff shortages, stricter safety standards, and aging technology. Nursing shortages, particularly perioperative nurses, present a persistent challenge to hospitals and healthcare systems.

The World Health Organization estimates a global nursing shortage of 5.8% by 2030. This shortage is already being felt in the perioperative setting, where nursing vacancy rates have increased from 3.1% to 18% between 2013 and 2023, and up to 73% of managers reporting moderate to crisis-level staffing shortages.²



Fewer nurses makes meeting necessary patient safety protocols more complex, particularly regarding reusable Doppler probes. Doppler probes—classified by the CDC as semi-critical devices requiring high-level disinfection between patients³—require rigorous cleaning between patient uses, but many facilities miss or skip critical cleaning steps, relying on manual cleaning methods that increase the risk of contamination and the spread of hospital-acquired and surgical-site infections.⁴

A salient explanation for the continued reliance on manual processes is the time and cost burden associated with reprocessing. Reprocessing instruments for reuse in sterile settings follows a strict protocol, across pre-cleaning, cleaning, disinfection, removal of cleaning and disinfectant residues, and final sterilization. Machine disinfection can expedite each step, but many hospitals still use manual techniques like cleaning wipes, increasing the likelihood of contamination on probes as well as attached cables.⁵

With limited staff resources, legacy medical devices like tethered Dopplers that were built for slower, simpler ORs compound existing challenges. Unfortunately, while indispensable in the OR, handheld Dopplers have changed little since their introduction in the 1950s⁶; the device's physical design—corded, reusable, and labor-intensive to disinfect between each use—has remained despite advances in OR instrumentation.⁷

The need for Doppler device innovation to meet the needs of today's OR labor force could not be more clear.

Meeting Modern Demands with Smarter Design

The next advancement for Doppler technology isn't physics—it's reimagining how handheld vascular Doppler tools fit into modern workflows, especially when those workflows are challenged by staffing shortages and regulatory compliance.

Maintaining compliance with rigorous regulatory protocols regarding preventing the risk of infection, as mentioned previously, is a labor-intensive, costly, time-consuming process. Reprocessing instruments for use in sterile environments can take upwards of 60 minutes, costing anywhere from \$600 to \$1,000 per instrument.⁸

With so much time and money at stake, modern ORs have explored the use of single-use probes to increase efficiency and stay compliant with rigorous patient safety protocols. Replacing reusable probes with single-use ones can save over \$400 in labor and sterilization costs per case.⁸ Single-use, disposable probes further eliminate the risk of cross-contamination, as well as reprocessing delays.

Combined with cordless operation that removes clutter, keeping bulky cords out of a sterile environment while empowering single-operator use, a modern Doppler like VascuChek® brings motion and progress to the OR—bringing the Doppler effect back to its original purpose.



The VascuChek Advantage: Precision Without Compromise

The Doppler effect started as a measure of motion. With VascuChek, it's a way to define momentum where it matters most.

VascuChek is the first handheld cordless and rechargeable Doppler FDA-cleared for evaluating intraoperative and subcutaneous blood flow inside a sterile field. A cordless Doppler that provides real-time audio feedback eliminates the need for an awkward, tethered transceiver box and a second operator.

VascuChek utilizes removable and disposable probes to ensure reliability, sterility, and facilitate both clinical and surgical use cases. Disposable probes are equipped with a user-friendly sheath deployment system for surgical settings. And three speakers—two integrated, one new external Bluetooth®—empower loud and clear audio even in the busiest ORs.



With its sterile, disposable probes, the VascuChek Doppler is purpose-built for the everyday realities of cardiac, vascular, orthopedic, and ASC environments.

- **For surgeons,** cordless Dopplers empower freedom of movement and immediate vascular checks without cables crossing sterile zones or requiring a second operator during use.
- **For nurses,** disposable probes and sheaths reduce the need for costly and time-consuming reprocessing; an effortlessly portable Doppler design frees them up to focus more on patient care; three speakers ensure optimal audio quality where it matters most.
- **For service line directors,** predictable, per-case costs help reduce reprocessing overhead.





Staying in Motion with VascuChek

By removing cords, reducing cleaning cycles, and the risk of compliance gaps, the VascuChek Doppler helps move surgical teams forward at every use. Backed by over 30 years of industry leadership and designed with the input of over 100 leading clinicians, VascuChek is the modern solution ORs need to ensure and advance the quality of care.

Turn motion into momentum—schedule a consultation today!

vascuchek.com

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