

NONIN® Avant® 4000: Motion-Tolerance and Bluetooth® Wireless Technology Provide a Robust Monitoring Solution with Increased Safety and Clinical Efficiency in Exercising Patients

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With motion-tolerance and proven accuracy, the NONIN Avant 4000 provides a robust wireless monitoring solution for exercising patients without added infrastructure investments. Removing the cables from the patient's hands resulted in improved comfort and safety. The portable display with user-defined alarms allows the clinician to observe oxygen saturation values from almost anywhere in the room. By utilizing multiple Avant 4000 devices, more than one patient can be simultaneously monitored for increased clinical efficiency.



Clinical Setting/Problem

The Cardiac and Pulmonary Rehabilitation Center of Inova Loudoun Hospital provides outpatient services using state-of-the-art electronic exercise equipment in a pleasant environment. The rehabilitation facility is located in a small gym that holds approximately 13 pieces of exercise equipment and the space is shared with an outpatient Physical Therapy program. With as many as eight patients exercising and up to four clinicians assisting or monitoring patients at any one time, space is limited and the facility required an efficient monitoring solution.

Prior to 2005, patients were monitored while exercising with hand-held pulse oximeter devices. The patients either placed the device nearby or were required to hold the device while exercising. Holding the device was not only

cumbersome, but also restricted the exercise equipment options available due to the patient's hands being occupied. When the device was placed nearby, cables extending from the device to the exercising patient caused significant safety hazards. Assessment of oxygen saturation levels required the clinician to be next to the patient.

Given these limitations, a search for new monitoring technology was undertaken. Special attention was given to device accuracy, safety and logistical options related to monitoring patients.

Clinical Solution

The **NONIN Avant 4000 Bluetooth Wireless Pulse Oximeter** with motion tolerance is able to accurately monitor patients even during repetitive exercise, such as using a treadmill or stair machine.

The device consists of a small, compact patient module and a tabletop display. The patient module weighs 4.4 ounces and can be worn on the patient's wrist or arm or attached to a belt.

A full-range of pulse oximeter sensor probes is available for the Avant 4000, including traditional disposable and reusable finger sensors, ear clip sensor and forehead reflectance sensors.



The table top display is lightweight (2.2 pounds with batteries), portable and can operate from either line current or battery. The Avant 4000 can be connected to a nurse call system. In addition, it has audible alarms that allow user-defined defaults or can be silenced during monitoring.



Clinical Use/Implementation

For the exercising patients, a reflectance forehead sensor was chosen to remove all wires and cables from the patient's hands for improved comfort and safety. Furthermore, the patient module was placed in either a pocket or small pouch attached to the patient's waist during monitoring. This was easily accomplished with the use of one of the various length extension cables available for use in conjunction with the device.

The portability of the display unit allowed for increased clinical efficiency and was especially important in the decision process. With numeric display and user-defined alarms, the clinician was able to observe oxygen saturation values from almost anywhere in the room. The monitor could be placed at a nearby clinician workstation or, when appropriate, such that both the clinician and patient could view the display. By utilizing multiple Avant 4000 devices, more than one patient could be simultaneously monitored for increased clinical efficiency.

The Bluetooth technology allowed for simple implementation without the added investment of infrastructure changes such as hidden wiring as required for telemetry systems. Upon receipt of the devices, the

patient-worn module and monitor were easily synchronized for transmission and monitoring. There has been no interference in communications between monitor and patient modules during monitoring.

Clinic Staff and Patient Acceptance

The staff and clients have been very satisfied with the performance of the Avant 4000. Clinic staff found the Avant 4000 easy to understand and quickly learned how to use the device. There were no barriers in learning how to monitor patients, which made for a smooth transition to the new device. The Avant 4000 is easy to use from changing batteries in the patient module to setting functions on the display monitor.

"The Avant 4000 meets our needs in every way especially the accuracy of SpO₂, pulse rate and transmission."

Being wireless and free from cables and attachments provides a comfortable and safe atmosphere while working in a gym. Patients that come to the program after attending other facilities are complimentary about the method of monitoring. They feel well-cared for and are confident that they are receiving high quality care with the best technology.

Summary

The staff and patients at Cardiac and Pulmonary Rehabilitation of Inova Loudoun Hospital are pleased with the Avant 4000 performance and service provided. With motion-tolerance and proven accuracy, the Avant 4000 provides a robust wireless monitoring solution for exercising patients without added infrastructure investments. Removing the cables from the patient's hands resulted in improved comfort and safety. The portable display with user-defined alarms allows the clinician to observe oxygen saturation values from almost anywhere in the room. By utilizing multiple Avant 4000 devices, more than one patient can be simultaneously monitored for increased clinical efficiency.

