

# Nonin Onyx<sup>®</sup> Finger Pulse Oximeters

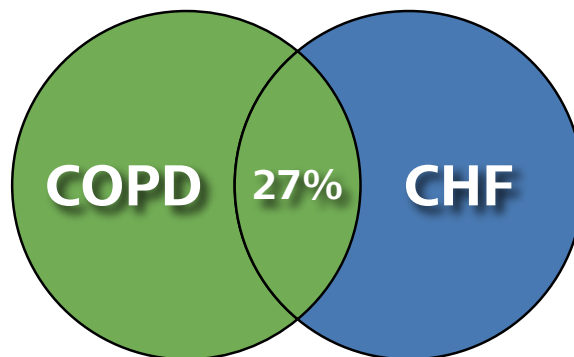
Superior Performance...For Challenging Patient Conditions



# COPD patients often present with **complex co-morbidities**

As a clinician who treats patients with Chronic Obstructive Pulmonary Disease (COPD), making the right decision is often dependent on getting an accurate oxygen saturation (SpO<sub>2</sub>) reading. Getting accurate readings can be more difficult in COPD patients with cardiovascular co-morbidities, such as congestive heart failure (CHF).

Up to 27% of COPD patients may also have congestive heart failure<sup>1</sup>



## COPD patients with CHF can challenge oximeter accuracy

### Poor blood circulation

- Poor blood circulation is a symptom of CHF<sup>2</sup> and can result in low pulse strength.
- Low pulse strength can cause inaccurate oximeter readings.

### Drops in oxygen levels (desaturation)

- COPD patients have little or no oxygen reserve capacity in their lungs and can be living on the edge of hypoxemia.<sup>3</sup>
- Many oximeters average measurements over numerous pulses, resulting in a delayed or inaccurate reading during desaturation events.

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Trust Nonin Medical's **Onyx® brand** of finger pulse oximeters  
for accurate results in challenging conditions.

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<sup>1</sup>PHC4-provided hospital discharges between Oct 1, 2007 and Sept 30, 2008. Pittsburgh Regional Health Initiative 2010.

<sup>2</sup>Mechanisms of Disease: Congestive Heart Failure. Loyola University Medical Education Network. <http://www.meddean.luc.edu/lumen/meded/mech/cases/case4/chf.htm>

<sup>3</sup>Wild Iris Medical Education, Case Manager CEU, [www.nursingCEU.com](http://www.nursingCEU.com) Chronic Obstructive Pulmonary

# Superior technology for challenging conditions...including rapid SpO<sub>2</sub>\* changes, poor peripheral blood circulation and motion

**The inventor** – Nonin developed finger pulse oximetry and has over 25 years of clinical experience.

**Peer-reviewed accuracy, FDA-cleared** – The accuracy and performance of the Onyx finger oximeter is supported by published, peer-reviewed clinical studies.

**U.S. military certified\*\*** – The only finger pulse oximeter that has airworthiness approval for use in military aircraft.

## PureSAT® SpO<sub>2</sub> technology

**The only oximeter with pulse-by-pulse filtering** – Nonin Medical's clinically proven PureSAT technology utilizes intelligent pulse-by-pulse filtering to provide fast, precise oximetry measurements — even in the presence of SpO<sub>2</sub> changes, poor peripheral blood circulation, motion and other challenging conditions.

## PureLight® sensor technology

**Only the purest red and infrared sensors** – Nonin's PureLight LEDs hold a steady calibration curve, even at SpO<sub>2</sub> levels below 80% where reliable information is even more critical.

## Superior accuracy during patient motion

In a study comparing accuracy in motion, Nonin and a competitor's finger pulse oximeter were tested during motion and compared to arterial blood gas samples.<sup>4</sup>

Control (Blood Gas)	Nonin	Competitor
97.3%	<b>99%</b>	90% (False Low)
92.8%	<b>93%</b>	No Value
86.2%	<b>89%</b>	99% (False High)
71.6%	<b>73%</b>	96% (False High)

Only Nonin's oximeter technology reads accurately during patient motion.

The competitor oximeter gave **false low** and **false high** SpO<sub>2</sub> readings and was unable to consistently read during patient movement (e.g., extend, flex, twitch, shake, clench, etc.).

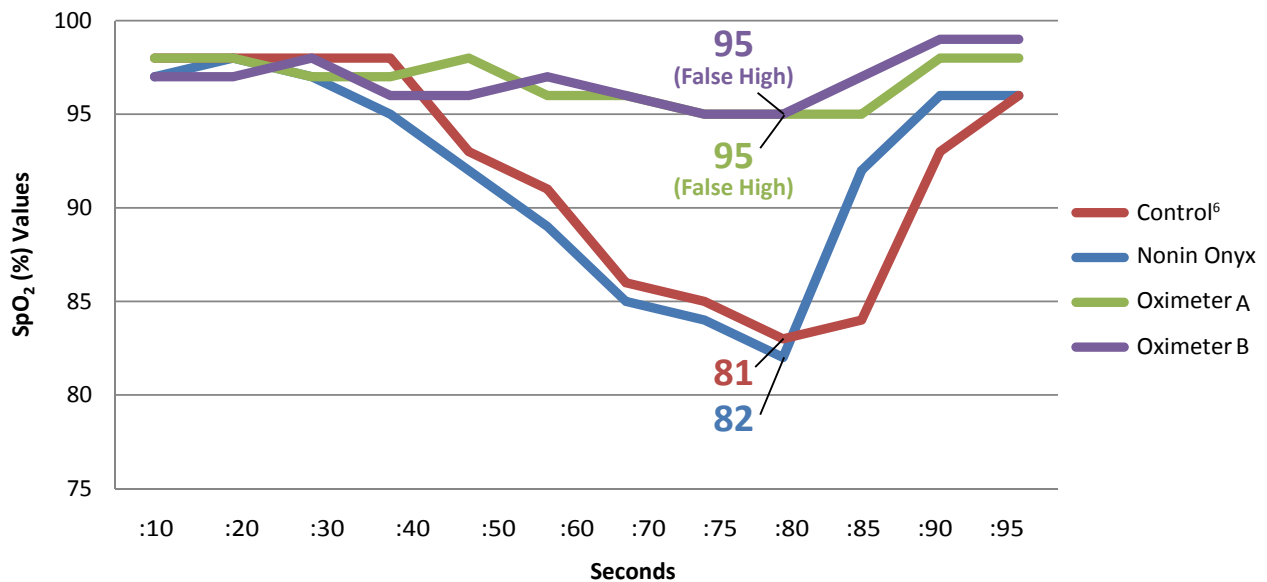
\*Blood oxygen saturation

\*\*Onyx 9500 and Onyx II 9550 finger pulse oximeters are approved for airworthiness in U.S. military aeromedical aircraft.

<sup>4</sup>Study conducted in a leading hypoxia research lab. Competitor finger pulse oximeter manufactured by Beijing Choice Electronic Technology Co., LTD. This test is a competitive comparison. There are currently no finger pulse oximeters with accuracy in motion claims cleared by the FDA. Nonin Medical, Inc. Data on file.

# Nonin Onyx<sup>®</sup> – accuracy and durability in

Only Nonin's finger oximeter was able to track the subject's desaturation<sup>5</sup>



## SpO<sub>2</sub> saturation values you can trust

- Nonin PureSAT technology uses pulse-by-pulse filtering to provide accurate SpO<sub>2</sub> measurements. The leading competitors use measurement averaging across numerous pulses which can result in delayed or inaccurate readings during saturation changes.
- In the above comparison, Nonin Onyx was the only finger pulse oximeter to accurately track the subject's desaturation down to 81-82% and back up to 96% SpO<sub>2</sub>. The two competitors registered changes of only 3% SpO<sub>2</sub>.

## Accurate readings in challenging patient conditions

- Onyx's sensor accuracy is not degraded due to dark skin pigmentation.
- Nonin sensors are accurate even in bright room lighting.
- With automatic adjustment for finger size, one oximeter accurately reads from pediatric to adults (8mm – 25.4mm, or .3" – 1" diameter).



<sup>5</sup>Nonin Medical, Inc. Data on file.

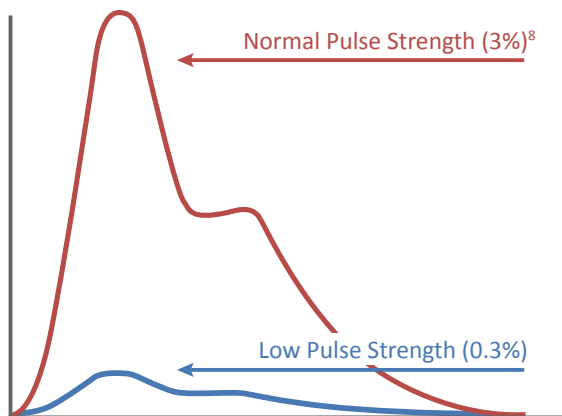
<sup>6</sup>Control is Nellcor Tabletop Oximeter



# challenging patient conditions

## Accuracy in poor peripheral (finger) blood circulation

**Figure 1:** Nonin Onyx Vantage is accurate in patients with as low as 0.3% pulse signal strength.<sup>7</sup>



A normal arterial pulse wave form showing the systolic peak (in red). Nonin Onyx Vantage can read pulse strength in patients with poor circulation (in blue) even when it is as low as 1/10th the strength of a normal wave form.

## Superior durability

**Drop durability** – After 50 drops from 1 meter onto a hard surface, Onyx® remained unbroken. Two leading competitors broke into pieces within 2–4 drops.<sup>7</sup>

**Moisture resistance** – Onyx passed a 10-minute test against ingress of water per IEC 60529 testing protocol.<sup>7</sup>

**Four-year warranty** – Onyx® has a four-year warranty.

## Made in America



Nonin Medical's finger oximeters are produced in the USA. We have **dedicated customer and technical service staff** to serve you globally from Minnesota and The Netherlands. Many other brands of finger oximeters are made by manufacturers in China.

**Figure 2:** Nonin Onyx versus Competitors after drops from the same height (1 meter).<sup>7</sup>



**Figure 3:** Nonin Onyx keeps reading while passing the 10 minute IPX2 moisture exposure test. Oximeter A stopped reading at 58 seconds.<sup>7</sup>



<sup>7</sup>Nonin Medical, Inc. Data on file.

<sup>8</sup>Pleth Variability Index. Cannesson, M., British Journal of Anaesthesia, June 2, 2008.

# Is your oximeter **professional-grade?**



	Onyx® Vantage 9590 Finger Pulse Oximeter	MD300C1 Finger Pulse Oximeter	CMS50DL Finger Pulse Oximeter
Manufacturer	Nonin Medical	Beijing Choice	Contec Medical
Manufacturing location	Plymouth, MN, USA	Beijing, China	Qinhuangdao, China
Warranty	<b>4-year warranty</b>	<b>1-year limited warranty</b>	<b>1-year limited warranty</b>
Latex-free*	<b>Yes</b>	<b>Unknown</b>	<b>Unknown</b>
Lead-free**	<b>Lead Free</b>	<b>Contains Lead-Rich Components</b>	<b>Contains Lead-Rich Components</b>
UL approved as medical device	<b>Yes</b>	<b>No</b>	<b>No</b>
RoHS*** compliant	<b>Yes</b>	<b>No</b>	<b>No</b>
Manufacturer provides published independent proof sources for claims	Yes	No	No
Tested in motion	Yes	No	No
Accuracy claims in dark skin pigmentation	Yes	No	No
Customer service and technical support	Plymouth, MN, USA or The Netherlands	Beijing, China or through internet distributors	Qinhuangdao, China or through internet distributors

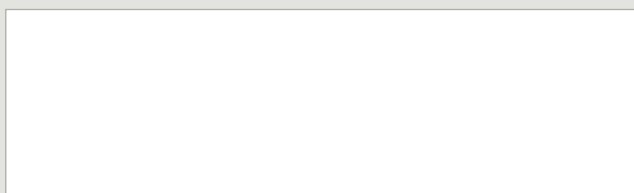
\* Does not contain latex or dry natural rubber in any patient contact part.

\*\* Nonin commissioned an independent test lab to analyze the lead content in several finger pulse oximeters. The results showed that imports from two leading Chinese manufacturers contained "lead-rich components." Nonin Medical's products were lead free.

\*\*\* Restriction of Hazardous Substances Directive (RoHS) is the restriction of the use of certain hazardous substances in electrical and electronic equipment regulation.

Learn more. Visit **OnyxVantage.com**.

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