

# Inconsistent occlusion results of dual bladder tourniquet inflation test on healthy subjects

## INTRODUCTION:

The purpose of this study is to formally investigate whether it is possible to consistently and repeatedly cause a pulse oximeter to discontinue reading—or “zero out”—by restricting blood flow to the fingers using a dual bladder tourniquet on a subject’s arm that is fully charged with blood.

## METHODS:

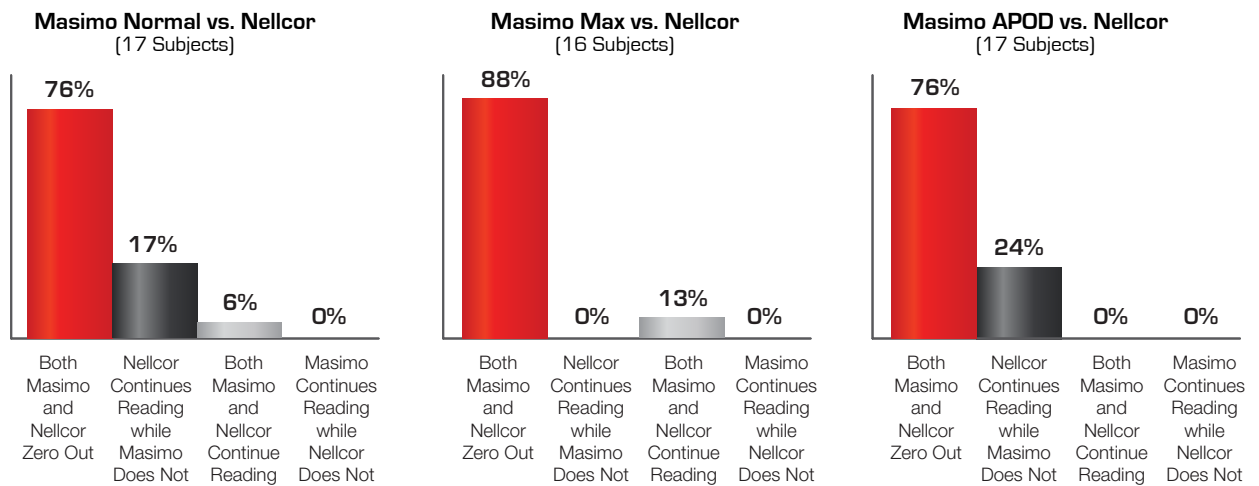
Oximeter performance was tested in 32 subjects, ages 21 to 60, during cuff inflation and for up to 4 minutes if a device did not zero out. For the study, sensors were placed on the index, middle, and ring fingers of the test hand according to a randomized schedule, and every subject was measured by three of four devices—a Nellcor N-600 and two Masimo Radical-7s set in a random combination of Normal, Adaptive Probe-Off Detection (APOD), or Max sensitivity settings. Accordingly, two thirds of the subjects were measured on each of the Masimo settings and compared to the Nellcor N-600, which only has one sensitivity setting.

After a stable baseline was achieved, the dual bladder tourniquet was inflated to 250 mm hg. The test was stopped if all three devices zeroed out but continued for four minutes if any device did not zero out.

## RESULTS:

As can be seen in the graph below, cuff inflation did occlude blood flow to the sensor site on more than 80% of subjects as measured by both Nellcor and Masimo oximeters. However it is also clear that both Nellcor and Masimo oximeters will continue to provide measurements in some instances during cuff inflation.

### Oximeter Behavior During Dual Bladder Tourniquet Inflation



## CONCLUSION:

The results of this study clearly show that in most cases, both Masimo and Nellcor oximeters will discontinue displaying measurements and zero out during cuff inflation. However, this study also shows that a complete occlusion of blood flow to the fingers using a dual bladder tourniquet on a subject’s arm that is fully charged with blood cannot be reliably or repeatedly obtained in all instances.