Next-Generation Pulse Oximetry. Focusing on Masimo's Signal Extraction Technology.
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Pulse oximeters are used to determine trends in patients' blood oxygen saturation and to warn of dangerous saturation levels. But conventional pulse oximetry has some inherent limitations. For example, it has difficulty monitoring patients who are moving or who have poor perfusion; it is also subject to interference from certain visible and infrared light sources. Over the past several years, a number of companies have developed advanced signal-processing techniques that allow pulse oximeters to overcome many of these limitations. We refer to such new technologies as next-generation pulse oximetry. In this Evaluation, we focus on the first next-generation technology to have reached the market: Masimo Corporation's Signal Extraction Technology (SET).

We designed our study of Masimo SET to address the main question that needs to be asked of any next-generation technology: How well does it compare to conventional pulse oximetry? Specifically, how well does it perform when a patient is moving or being moved, when a patient is poorly perfused, or when certain types of light strike the sensor while it is attached to or detached from the patient? We also examined one type of sensor used with this product, comparing it to conventional tape-on sensors for comfort and durability. Several other next-generation pulse-oximeter products have become available since we began this study. We are currently evaluating these products and will publish our findings in the near future. A list of the products, including a brief description of each, is included in this article. Pulse oximeters are used to determine trends in patients' blood oxygen saturation and to warn against dangerous saturation levels. These monitors are often vital in helping to ensure patient safety, especially for critically ill patients, pediatric patients, and neonates. But conventional pulse oximetry has some inherent limitations--most significantly, it has difficulty monitoring patients who are moving or who have poor perfusion. Although gradual improvements have been made to the technology, only recently has it advanced to the point where it has really begun to overcome these limitations.

A number of manufacturers have developed advanced signal-processing algorithms that allow pulse oximeters to "read through" motion and conditions of poor perfusion. The first of these "next-generation" pulse-oximeter technologies that reached the market was Masimo Corporation's Signal Extraction Technology (SET). We tested that product in this Evaluation. In this Overview, we'll tell you about conventional pulse oximetry and its shortfalls, next-generation technology and how it's designed to improve on the old methods, and how we approached our Evaluation of Masimo SET.