

## Advances and Benefits of Medical Monitoring

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As the size of the elderly population grows in most developed countries and our collective health status evolves with changing lifestyles, there is an increased demand on healthcare and thus increased pressure for medical efficiency. As a consequence, home healthcare is fast growing<sup>1</sup> and confers several advantages to patients, as well as to the population.<sup>1</sup> Technology that allows patients to be medically monitored from home reduces the burden of traveling to physicians' offices and waiting for physician availability. Such technology therefore provides flexibility in health management.<sup>2</sup> Medical monitoring also has several specific health benefits. For example, its use improves diagnostics and treatments and lowers costs associated with medical care.<sup>3,4</sup> The financial advantages of medical monitoring are likely to grow as the relevant capabilities of mobile technology flourish.<sup>5</sup> It has been estimated that medical monitoring will save the United States about \$197 billion by preventing adverse effects of chronic disease over the next 25 years.<sup>6</sup>

Importantly, people who use medical monitoring tend to take on more responsibility for their own health. As patients are able to track their health metrics and self-manage conditions, they tend to comply more with their preventative health and treatment regimens, resulting in better health.<sup>7,8</sup> Self-monitoring is thus quite effective.<sup>9</sup> A recent meta-analysis demonstrated that medical monitoring improved therapeutic

compliance in patients with hypertension and significantly reduced systolic and diastolic blood pressure.<sup>8</sup> Medical monitoring has also been shown to be effective in blood glucose control in patients with diabetes<sup>10</sup> and to reduce embolism when combined with anticoagulants.<sup>9</sup> In addition to the benefits that result from added patient responsibility, medical monitoring may provide more accurate information related to patients' health than information collected from physician office visits. For example, remote monitoring may prevent effects such as the white coat effect, wherein patients demonstrate blood pressure measurements inconsistent with their average blood pressure because of the stress of the clinical environment.<sup>10</sup>

For effective medical monitoring, certain physiological metrics must be obtained. Unfortunately, many devices developed for this purpose have practical limitations, including high costs and low reliability. In addition, many devices are large and heavy, consume large amounts of energy, have sensors that are difficult to connect or implement, and have limited functions.<sup>11-13</sup> Some devices are designed to continuously monitor patients, and these devices have been claimed to be intrusive and to prevent privacy, as well as to raise ethical and legal concerns.<sup>13</sup> It has been argued that effective medical monitoring systems must be unobtrusive and efficient, incorporating multiple functions, and provide real-time feedback and wireless communication with data evaluation systems.<sup>14,15</sup>

Devices for monitoring blood pressure provide examples for non-ideal monitoring devices. One common technique for blood pressure monitoring is the oscillometric technique, which

involves inflating a cuff around the patient's wrist. Though this method avoids the white coat effect, it can cause skin irritations and interrupt blood flow. Continuous use of this type of device can also cause sleep disruptions and enhance stress levels.<sup>16</sup> Recently, cuff-less methods have been developed to determine blood pressure using sensors.<sup>16-19</sup> However, these methods are not particularly accurate because changing the position of the hand relative to the heart destabilizes hydrostatic pressure.

The Dynosensor, or Dyno for short by DynoSense Corp provides a practical solution to medical monitoring, overcoming several of the practical limitations of other medical monitoring devices. The DynoSensor is a versatile device. It not only measures all fundamental vitals, including electrocardiogram, photoplethysmography, pulmonary plethysmography, temperature, and blood pressure in less than one minute, but it can also integrate other tests, such as those for hydration and influenza virus A/B, according to patients' specific needs. Unlike many other medical monitoring devices, the Dyno is a small, lightweight hand-held device that noninvasively measures vitals with the placement of a wand inside the patient's mouth. The system is intuitive, with all measurements taken simultaneously without the use of additional components. The system does not require high power and can be used when needed and automatically sanitizes between uses. The Dynosensor overcomes privacy concerns by securely capturing all data. However, the data is available for sharing and can thus provide physicians with information to monitor patients remotely. An additional benefit of the data storage and share system is the potential to combine the data with patient records and decision support systems to

optimize medical care. Such an integration of data has been highly recommended<sup>1,20-22</sup>

*About Sponsor: DynoSense Corp. is a medical device company and creator of world's first fully integrated multi-scan health scanner.*

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