DOES MOVEMENT MATTER?

Exploring the Effect of Movement on Blood Pressure Readings with the **Welch Allyn SureBP** Algorithm

Acquiring an accurate blood pressure reading can be challenging, especially for pediatric and geriatric patients who may struggle to remain still throughout a reading. This patient population may be subject to moving during their blood pressure reading, so having a confident measurement with this consideration can ensure these vulnerable patients still have an accurate measurement.

UNDERSTANDING MOVEMENT'S IMPACT ON BLOOD PRESSURE READINGS

Patient-induced movement — both voluntary and accidental — can affect the acquisition and accuracy of blood pressure readings. That's why it's important to understand the impact of patient movements and explore solutions that can capture accurate blood pressure readings in the presence of motion.

RESEARCH OBJECTIVE

Researchers studied the **Welch Allyn SureBP** Algorithm — a unique, inflation-based blood pressure algorithm — in a vital signs device[2, 3] to determine if it could reliably provide precise and consistent blood pressure readings during patient-simulated movements.

STUDY PARAMETERS

Over a period of two months, 40 participants volunteered to take part in the study. Researchers collected data on readings taken while patients moved their arm, then compared those readings to blood pressure measurements taken without movement. Readings taken with patient-induced motion required study participants to simulate serial pronation and supination of the left arm every five seconds throughout the reading.

RESULTS

CAN'T STOP THE BEAT:
93% SUCCESS RATE WHEN OBTAINING A READING ON THE FIRST ATTEMPT

The **Welch Allyn** vital signs device with **SureBP** generated a blood pressure value for 93% of patients (37 volunteers) on the first measurement attempt.[1] When a second attempt was performed, the device recorded a value in 100% of patients (the remaining three volunteers).[1] The automated vital signs device with the **SureBP** algorithm required little to no repeat readings because it was able to capture measurements despite patient-induced movement. Reducing the number of repeat readings can help improve patient experiences — with fewer measurements to retake, clinicians can focus their time on important patient interactions.

PERFORMANCE UNDER PRESSURE:
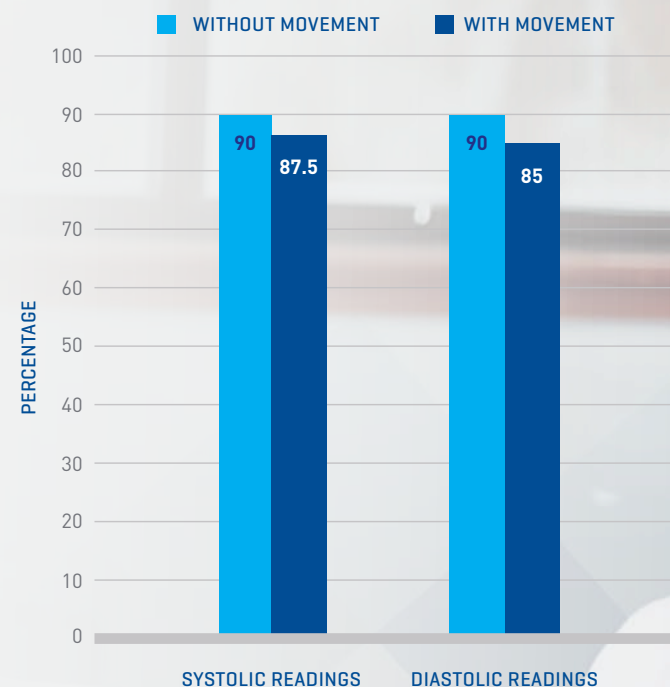### ACCURACY IN RELATION TO MOVEMENT

In addition to determining the percentage of successful blood pressure readings, researchers also analyzed the accuracy of those readings. During this study, the device's blood pressure algorithm demonstrated consistency between readings, even when movement was present, producing 85-87.5% of readings in a range of +/- 10 mmHg as compared to the manual device for the systolic and diastolic.

93%

SINGLE-READ SUCCESS RATE

100%

SECOND-READ SUCCESS RATE

■ WITHOUT MOVEMENT   ■ WITH MOVEMENT

Chart — PERCENTAGE (y-axis 0–100):
- SYSTOLIC READINGS: Without Movement 90, With Movement 87.5
- DIASTOLIC READINGS: Without Movement 90, With Movement 85

The **Welch Allyn Spot Vital Signs** 4400 Device is a simple, easy-to-use solution that offers an efficient way to capture, access and document vital signs so you can spend more time focused on your patients. It also includes the **SureBP** algorithm for consistent, accurate blood pressure readings — even in the presence of patient movement.
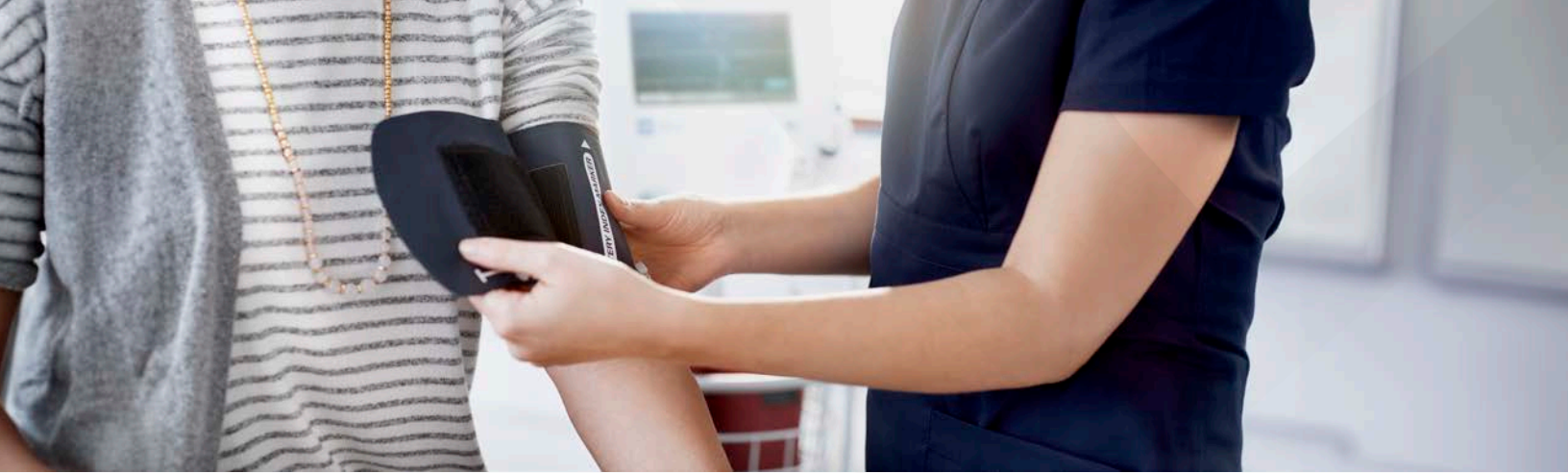
CONCLUSION

An automatic vital signs device that can consistently provide accurate blood pressure readings can help capture results in your movement-prone patients. Any motion during measurement can cause repeat readings and data inaccuracies, which consume precious time and may affect clinical decision-making. Therefore, standardizing your practice with automated vital signs devices — specifically with an algorithm shown to withstand the challenges of patient movement — can help provide efficiencies and improve the quality of patient data.

Regardless of a patient's ability to remain still, you should feel confident in the data you collect and the tools you use. That's why a robust, motion-tolerant vital signs solution is an important tool across care settings. Just because your patients move, does not mean they can't be measured.

Contact your Baxter representative to learn more about vital signs solutions featuring the SureBP algorithm.

References:

1.   Alpert, Bruce S., David Quinn, Matthew Kinsley, Tyson Whitaker, and Thomas T. John. "Accurate Blood Pressure During Patient Arm Movement." Blood Pressure Monitoring 24, no. 1 (February 2019): 42-44.
2.   Alpert BS. Validation of the Welch Allyn Pro BP 2000, a professional-grade inflation-based automated sphygmomanometer with arrhythmia detection in a combined pediatric and adult population by ANSI/AAMI/ISO standard testing. Blood Press Monit. 2018 Dec;23(6):315-317. doi: 10.1097/MBP.0000000000000350. PubMed PMID: 30312180; PubMed Central PMCID: PMC6250254
3.   Alpert BS. Validation of the Welch Allyn SureBP (inflation) and StepBP (deflation) algorithms by AAMI standard testing and BHS data analysis. Blood Press Monit. 2011 Apr;16(2):96-8. doi: 10.1097/MBP.0b013e328345232f. PubMed PMID: 21412074.