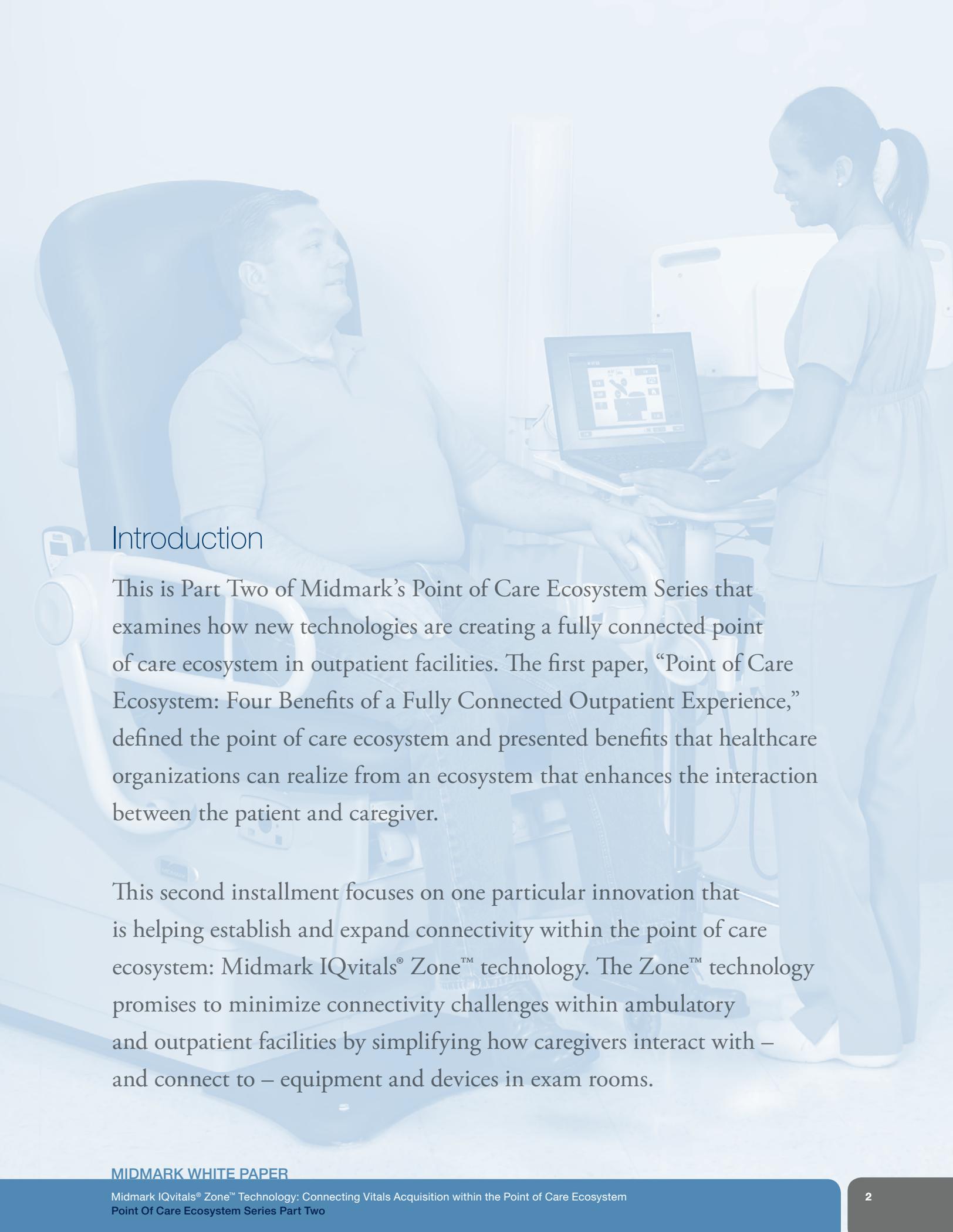


Midmark White Paper

Midmark IQvitals® Zone™ Technology:
Connecting Vitals Acquisition within
the Point of Care Ecosystem

Point of Care Ecosystem Series Part Two





Introduction

This is Part Two of Midmark's Point of Care Ecosystem Series that examines how new technologies are creating a fully connected point of care ecosystem in outpatient facilities. The first paper, "Point of Care Ecosystem: Four Benefits of a Fully Connected Outpatient Experience," defined the point of care ecosystem and presented benefits that healthcare organizations can realize from an ecosystem that enhances the interaction between the patient and caregiver.

This second installment focuses on one particular innovation that is helping establish and expand connectivity within the point of care ecosystem: Midmark IQvitals® Zone™ technology. The Zone™ technology promises to minimize connectivity challenges within ambulatory and outpatient facilities by simplifying how caregivers interact with – and connect to – equipment and devices in exam rooms.

Connected Point of Care Ecosystem

As defined in the [first paper in this series](#), a point of care ecosystem goes beyond the direct interaction between patients and caregivers to encompass everything that happens within the practice or clinic, as well as experiences that occur outside of this environment. For most healthcare organizations, the exam room is comprised of disconnected processes, devices and components that often prevent seamless, well-coordinated patient experiences. Additionally, isolated processes and disconnected data flows can create inefficiencies, communication breakdowns and human errors.

A fully connected point of care ecosystem is becoming more of a reality as new technologies with greater connectivity are introduced to the industry. A connected ecosystem integrates processes, equipment and caregivers at the point of care to significantly enhance the patient and caregiver experience and improve the quality of ambulatory care. It also ensures a more satisfying and seamless patient experience by providing a platform where organizations can leverage new technologies, incorporate best practices and employ greater standardization to improve care and outcomes.

The benefits resulting from a fully connected ecosystem include:

1. **GREATER VISIBILITY** into a patient's health history is gained through automating vital signs acquisition. Trends and fluctuations in health history are more easily identified when readings are acquired with the same method each visit, rather than reviewing charts that may contain variations in manual techniques.
2. A **STANDARDIZED APPROACH** enables organizations to develop clinical protocols that drive better outcomes. It helps eliminate human variables that often increase the likelihood of errors and contribute to inaccurate diagnoses. For instance, [manual transcription of data can produce a 6.5 percent rate of error on average¹](#).
3. **GREATER EFFICIENCY** is achieved by allowing healthcare organizations to identify opportunities to enhance and improve processes and workflows. Caregivers and practice administrators can better track the progress and success of initiatives designed to increase efficiencies and cost savings.
4. **ENHANCED PATIENT-CAREGIVER INTERACTION** is essential to improving outcomes. By understanding the time patients and staff spend on specific activities within the clinical space, as well as how rooms and equipment are utilized, healthcare organizations can make better decisions and deliver a patient-centered experience at every encounter.

¹ Wahi MW, Parks DV, Skeate RC, Goldin SB. Reducing errors from the electronic transcription of data collected on paper forms: a research data case study. JAMA 2008 May 1; 15(3): 386–389.

Midmark IQvitals® Zone™ Technology

Midmark IQvitals Zone (Figure 1) minimizes connectivity challenges within ambulatory settings as outpatient facilities begin to create a connected ecosystem. The vital signs monitor is the first diagnostic device to feature Zone Bluetooth® low energy technology that enables wireless auto-connecting. This allows caregivers to effortlessly and securely connect their tablet or laptop to the device when they place their tablet or laptop on or near the IQvitals Zone and initiate vitals acquisition.



FIGURE 1. Midmark IQvitals Zone allows caregivers to centralize vital signs acquisition at the point of care. In-room and mobile versions of the diagnostic device provide flexibility and multiple workflow options for caregivers.

IQvitals Zone changes the traditional workflow in vitals acquisition by establishing a direct wireless connection between the vitals device and the caregiver's tablet or laptop. It eliminates the need to manually connect and disconnect by auto-connecting when the caregiver places their laptop on the multi-use work surface or near the diagnostic device. It automatically disconnects when the tablet or laptop is moved away from the device.

When connected, caregivers can take vitals, review results and seamlessly import the information to an electronic medical records (EMR) system. Additionally, if the exam room includes a [Midmark 625 Barrier-Free® examination table with integrated IQscale®](#), caregivers can directly capture weight data from the table and send to the EMR. This can all be done through a "single pane of glass," where caregivers perform all device functions and transfer data to the EMR within one computer screen, as opposed to interacting with multiple device screens spread throughout the room.

Midmark IQvitals Zone Technology Benefits

Following is how Zone technology contributes to the four primary benefits of a connected ecosystem at the point of care.

GREATER VISIBILITY

IQvitals Zone provides caregivers greater visibility into a patient's health history by offering consistent and reliable measurement of patient vital signs. This allows caregivers and patients to more easily track important health status and trends of chronic disease conditions – which ultimately leads to better patient care and outcomes.

For instance, the technology provides caregivers four different automated modes for blood pressure (BP) measurement to ensure more consistent and accurate readings. Spot mode takes a single noninvasive blood pressure (NIBP) reading. Interval mode acquires a series of NIBP readings at selected intervals until the user elects to finish the monitoring session. Continuous mode achieves continuous BP measurements for five minutes. Average mode automates a series of five readings, and via an algorithm that eliminates the first reading, displays the patient's average blood pressure.

Automated vital signs acquisition provides the consistency that is key to accuracy, especially for a measurement that is the foundation for so many decisions about a patient's health.

STANDARDIZED APPROACH

Currently, many healthcare organizations are working to implement a level of standardization into their processes and procedures. Zone technology introduces automation and connectivity that can ensure a level of standardization to minimize human variables while maximizing consistency and data accuracy.

The automation introduced by IQvitals Zone facilitates the repeatable adherence to a health system's clinical guidelines for proper BP measurement techniques to achieve more accurate, consistent and reliable BP measurement for all patients. This is especially evident when the device is used in conjunction with a connected exam table that automatically positions the patient in accordance with American Heart Association (AHA) and American Medical Association (AMA) guidelines for proper BP measurement. Caregivers who use that device are set-up to easily achieve a more accurate, consistent and comparable BP measurement.

It has also been proven that manual BP readings can have inconsistent results. One research study found that automated capture tends to produce numbers significantly lower than manually taken readings by as much as 10.8/-3.1 mmHg (systolic/diastolic error).² When the data collection process is automated and standardized, consistency and precision is achieved between care sites, equipment and providers. This means increased confidence in the data collected, which ultimately leads to better clinical decisions and patient care. This is especially important given the issues of inaccuracies with BP measurement, which we discuss later in this paper.

The new level of connectivity provided by Zone technology protects the quality of data by virtually eliminating the risk of human errors occurring at the keyboard. IQvitals Zone directly sends patient data into the EMR, eliminating transcription errors and providing greater confidence in data accuracy. Studies have shown that manual transcription of data produces a 6.5 percent rate of error on average.³ Assuming a practice sees 20 patients a day, that can equate to approximately eight avoidable errors each day.⁴

The standardization enabled by automation and connectivity also establishes a platform that reinforces workflows for existing protocols. Over time, the platform can serve as a mechanism to consider and implement new workflows that follow industry best practices.

GREATER EFFICIENCY

The vital signs acquisition process hasn't changed significantly in the last 30 years. Today's processes often include multiple stopping points in a facility to capture vital signs (height, weight, pulse, temperature and BP). Some locations are in semi-public spaces, which can lead to patient discomfort and privacy violations. By establishing a connected point of care ecosystem, IQvitals Zone allows caregivers to realize greater efficiencies with the vitals process.

Centralizing the vitals process at the point of care with Zone technology reduces the need to move patients through different stations to capture the needed vitals information. By automating the process, IQvitals Zone allows multiple vital signs acquisitions to occur in parallel. And by providing a direct, wireless connection between the vital signs device and the clinician tablet or laptop, the technology eliminates the need for – and accuracy risk of – manual data entry.

At a most basic level, Zone technology allows caregivers to easily move from room to room and be instantly connected to the vitals device. Traditionally, when caregivers enter a room they are required to manually connect their laptop or tablet to the vital signs device. This login can require as many as three to five clicks

² Wahi MW, Parks DV, Skeate RC, Goldin SB. Reducing errors from the electronic transcription of data collected on paper forms: a research data case study. JAMA 2008 May 1; 15(3): 386–389.

³ Wahi MW, Parks DV, Skeate RC, Goldin SB. Reducing errors from the electronic transcription of data collected on paper forms: a research data case study. JAMA 2008 May 1; 15(3): 386–389.

⁴ Error rate equation: (20 patients)(6 vital signs per patient)(6.5 percent errors)=8 errors per day

every time the caregiver enters the room. This also doesn't include any steps necessary to disconnect before leaving the room. This is valuable time that could be better spent focused on the patient.



FIGURE 2. Caregivers using IQvitals Zone can automatically connect the diagnostic device to vital signs equipment. With zero clicks and no cables to connect, the caregiver can better focus on the patient.

ENHANCED PATIENT-CAREGIVER INTERACTION

Patient-caregiver interaction in the exam space is a foundational element in the continuum of care. For that reason, every aspect of IQvitals Zone is designed to ensure that interaction at the point of care is improved. For instance, the diagnostic device features a built-in work surface where caregivers can place their laptops. This eliminates the need for a separate computer cart or mayo stand. With the laptop and vitals device located together, providers can more effectively maintain eye contact with their patient, improving interaction and intimacy during patient visits.

Also, with vitals acquisition now streamlined and simplified through automated data transfer and a new level of connectivity, caregivers can spend more time with the patient. Less time clicking and more time listening and engaging the patient results in better care.

For patients, Zone technology helps ensure a consistent experience and alleviate any concerns they may have regarding potential errors resulting from inaccurate vitals acquisition or manual data entry. Patient peace of mind and comfort are important factors in driving high patient satisfaction, which is growing in importance in the healthcare industry. When patients and providers are comfortable in their environment and realizing gains in time and accuracy through efficiency and automation, better care and outcomes are possible.

MIDMARK WHITE PAPER

Midmark IQvitals Zone Technology and BP Measurement

As mentioned earlier in this paper, Zone technology helps eliminate human variables that increase the likelihood of errors that can contribute to inaccurate diagnoses. Of all the vital signs, BP measurement has perhaps the strongest connection to point of care diagnosis, patient risk stratification and medication dosing. These three critical factors of care management are essential to precise decision-making. Because of its centrality in care, it is essential that the BP assessment is accurate.

In order to properly diagnosis and treat hypertension – a major risk factor for coronary heart disease, stroke and renal failure – caregivers need accurate BP measurements, both current and trending. It is also becoming increasingly important to detect small differences in BP readings in the treatment of patients with diabetes and renal diseases, making accurate trending data and standardized protocols critical.

Unfortunately, BP measurement continues to be one of the most inconsistently performed tests in a clinical environment. According to the AHA, numerous surveys have shown that physicians and other healthcare providers rarely follow established AHA guidelines for BP measurement; however, when they do, the readings correlate more closely with objective measures of blood pressure than those readings taken not following the guidelines.⁵ As Chart 1 shows, there are a number of factors that can affect the accuracy of BP measurement.

FACTORS AFFECTING ACCURACY OF BLOOD PRESSURE MEASURE ^{6,7}		
Factor	Systolic BP discrepancy (mm Hg)*	Diastolic BP discrepancy (mm Hg)*
Patient talking or active listening	+10-15	+10
Arm is above heart level	+2 per inch	
Arm is below heart level	-2 per inch	
Patient's feet not flat on the floor	+5-15	
Patient's back not supported	+5-15	+6-10
Patient's legs crossed	+2-8	+2-8
Unsupported arm	+6-10	+5-11
Patient doesn't rest 3-5 minutes	+10-20	
White coat syndrome	+11-20	

*These error factors are not cumulative

CHART 1. A number of factors can cause discrepancy with systolic and diastolic blood pressure measurement.

⁵ T. Pickering, J. Hall, L. Appel, B. Falkner, J. Graves, M. Hill, D. Jones, T. Kurtz, S. Sheps, E. Roccella. Recommendations for blood pressure measurement in humans and experimental animals: Part 1: Blood pressure measurement in humans: A statement for professionals from the subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. Journal of Hypertension (2005) 45:142-161

⁶ E. O'Brien, R. Asmar, L. Beilin, Y Imai, J. Mallion, G. Mancia, T. Mengden, M. Myers, P. Padfield, P. Palatini, G. Parati, T. Pickering, J. Redon, J. Staessen, G. Stergiou, P. Verdecchia. European Society of Hypertension recommendations for conventional, ambulatory, and home blood pressure measurements. Journal of Hypertension (2003) 21: 821-848.

⁷ J. Long, J. Lynch, N. Machiran, S. Thomas, K. Malinow. The effects of status on blood pressure during verbal communication. Journal of Behavioral Medicine (1982) 5:165.

Research has shown that BP readings are often quite different among various members of a care team. Two different caregivers independently acquiring BP measurements using manual methods on the same patient can often get two different readings. With Zone technology, human variations are minimized by normalizing and automating the BP measurement process.

Because Zone technology automatically transmits its data directly to the EMR, errors in manual transcription are also eliminated. This added functionality allows the care team to use the tools within the Zone solution to standardize all portions of the vitals collection process. In the end, the patient and care team experience a streamlined and efficient interaction, which ultimately leads to improved satisfaction.



Conclusion

Midmark IQvitals Zone technology offers a major step forward in the effort to establish a fully connected point of care ecosystem. By further integrating vitals acquisition and caregiver mobile computing into the point of care, IQvitals Zone improves clinical workflow, EMR connectivity and patient care efficiency, while providing a platform for future capabilities to further advance quality of care and patient outcomes.

