



Sotera Wireless

“The literature and each of our clinical experiences have examples of physicians on rounds, or nurses coming in to check on patients who have been dead for hours.”

“Healthcare game-changer.” This was Sotera’s waking dream in the spring of 2012. By the end of summer, the 67-employee firm was buzzing as the PR team finalized it’s much anticipated press release:

SAN DIEGO, Aug. 21, 2012 /PRNewswire via COMTEX/ -- Sotera Wireless, Inc. announced today that it has received 510(k) clearance from the United States Food and Drug Administration (FDA) for its full ViSi Mobile® System and is commencing sales to hospitals nationwide. The ViSi Mobile System, as approved, uses WiFi (802.11) wireless technology for transmission of patients' vital signs, keeping hospital clinicians connected to their patients, whether patients are in bed or up and moving around. Earlier this year, Sotera announced 510(k) clearance for its first generation ViSi Mobile Monitor, which encompasses the stand-alone device portion of the system that for the first time provides continuous monitoring of all the core vital signs on a patient worn platform.ⁱ

The ViSi Mobile platform allowed for continuous, non-invasive monitoring of a host of critical vital signs that could reduce patient length of stay, increase Intensive Care Unit (ICU) throughput, improve patient safety, and reduce frequency of uncompensated events like bed sores and pressure ulcers. “Continuous vital signs monitoring is crucial to detecting early deterioration in a patient’s condition and facilitating early intervention or rapid response,” said Tom Watlington, Sotera’s chief executive officer. “The ViSi Mobile System will stretch the boundaries of patient monitoring by enabling clinicians to receive this information without limiting a patient’s freedom to move about the hospital.”ⁱⁱ

While the FDA approval was a huge milestone, work to expand the usefulness of the platform was in full swing. The approval did not include the company’s patented cuffless non-invasive blood pressure sensor. Commenting on the cuffless monitor, Watlington noted, “That will be the last vital sign we’ll add. The holy grail of vital signs is continuously monitoring blood pressure without a cuff,” Sotera planned to submit the monitor for FDA approval in the fall.ⁱⁱⁱ

ViSi Mobile’s potential for value creation was clear to many and the complete system was now ready for sale. But success would require cooperation, investment, and operational changes across a range of actors in the healthcare ecosystem. Development was successfully

This case was written by Johnny Kaye T’12 and Professors Ron Adner and M. Eric Johnson of the Tuck School of Business at Dartmouth. It was written as a basis for class discussion and not to illustrate effective or ineffective management practices.

Version: September 4, 2012.

© 2012 Trustees of Dartmouth College. All rights reserved. For permission to reprint, contact the Center for Digital Strategies at 603-646-0899.

completed. The challenge now was to develop a deployment strategy that would safeguard long-term success in the market.

The Next Evolution in Patient Monitoring?

Joining Sotera as CEO in 2006, Watlington guided the fledgling start-up through several investment rounds raising a total of \$46 million while building a team of medical device engineers, venture capitalists, and S&P 500 strategic investors including Qualcomm, Intel, and Cerner.

Jim Moon, Sotera's CTO, who had been responsible for the last two major innovations in patient monitor design—the Alpha PC modular ICU monitor in 1985, and the ProPaq transport monitor in 1995—believed that the ViSi Mobile platform represented the next step in the evolution of patient monitoring. Sotera argued that single parameter devices (i.e., specialized equipment designed to monitor a single vital sign) were no longer sufficient solutions and that future success would be found in designing a platform that shifted the paradigm of patient care to the continuous monitoring of multiple parameters in real-time.

The ViSi Mobile platform was positioned to compete directly with existing hospital telemetry devices and a menagerie of small bedside monitoring devices. Furthermore, it would also enable providers to continuously monitor patients outside of the hospital. However, after eight years of perseverance, and millions of dollars in funding, the Sotera team still faced important challenges in making the ViSi Mobile wireless platform a commercial success.

Market Context: Upheaval in the Healthcare Industry

Healthcare spending in the U.S. had ballooned over the past decade—reaching \$2.7 trillion in 2011 and projected to consuming nearly 20% of GDP by 2021. Aging baby boomers and an increasing number of Americans diagnosed with obesity-related chronic conditions each year (e.g. diabetes, hypertension, and hyperlipidemia) contributed to this relentless growth. Much of the spending was highly concentrated among a small group of individuals (particularly patients in the last few months of life) with just 5% of patients responsible for nearly 50% of all U.S. healthcare spending.^{iv}

On the surface, increased spending might seem to be a net positive for hospitals and healthcare providers, but a complex set of dynamic industry fundamentals were making their jobs more difficult. Years of declining reimbursements, cost-shifting, stringent quality regulations, a push for increased coordination between providers, and newly minted regulations in the Affordable Care Act (ACA), had pushed many hospitals and healthcare providers to the breaking point. In 2009, nearly 30% of all U.S. hospitals had negative operating margins.^v Faced with this stark reality, nearly all institutions found themselves forced to investigate new solutions that facilitated more efficient operations across both the financial and clinical domains of the enterprise each year.

Additionally, with the passage of the ACA, the Centers for Medicare and Medicaid Services (CMS) hospitals and healthcare providers were required to do even more to “bend the cost curve.” Higher levels of coordination, quality metrics, and other measures were linked to ever-decreasing reimbursement levels. In essence, hospitals and healthcare providers would need to do more while utilizing fewer resources. Both the government and insurance companies were demanding better outcomes at lower cost.

CMS had further been pushing the idea that general hospitals should be the hub of coordinated care for its community. Implicit was the idea that better coordination between providers (i.e. hospitals, community physicians, free-standing centers, etc.) would lead to improved outcomes for patients and lower system-wide costs. A core tenant of the ACA was that when groups of providers were compensated through “bundled payments” for treating an individual patient, increased cooperation among providers would result. Under a “bundled payment” scenario, all providers who were currently compensated individually by CMS and other private payers would be forced to coordinate a patient’s care with each other in order to get a “slice” of a fixed reimbursement centered on the treatment of that specific patient. This scenario was a far cry from the fee-for-service or separate professional (physician) and provider (hospital) billing models where specific clinical interventions were billed independently, thereby creating little incentive for controlling costs or coordination and a large incentive to provide more (possibly unnecessary) care. Recent comments by a leading CMS administrator highlighted the organization’s intent to radically change these incentives:

“The incentives we’re putting into place have created a whole new way to think about hospital care.” – Jonathan Blum, Deputy Administrator for CMS

Changing the incentive paradigm would be challenging, but through new regulations and payment incentives set forth by CMS such as the establishment of Accountable Care Organizations (ACOs) and the Medicare Hospital Readmissions Reduction Program (HRRP), providers could feel that change was in the air. Traditionally a hospital’s responsibility remained within its four walls, but as a result of these new regulations and incentive realignments—hospitals were quickly finding themselves as the guarantor of care quality both within the hospital and long after a patient had been discharged. This represented a monumental step in healthcare service and one that would require changes in care delivery, information technology, coordination among providers, communication, and patient monitoring in order for general hospitals to survive as coordinated care hubs.

Accountable Care Organizations

An accountable care organization is a network of physicians and providers that share the responsibility for providing patient care while at the same time sharing potential financial incentives when specific cost and quality thresholds are met. ACOs combine all relevant parties in a patient’s healthcare ecosystem—primary care physicians, specialists, hospitals, home health, and more—in order to facilitate a more integrated system of care benefitting the individual patient.^{vi}

ACOs were born out of desire to reduce the perverse incentives of fee-for-service payment models where providers are paid more when patients receive more tests and procedures with little or no connection to the outcome of these interventions. Studies like the *Dartmouth Atlas Project* showed that more healthcare was not necessarily better care and that the unwarranted variation in utilization of healthcare services was a significant and unnecessary cost burden on the U.S. healthcare system. ACOs would not do away with the fee-for-service model, but would instead offer additional and substantial bonus payments when providers showed an ability to keep costs down while meeting quality benchmarks. The hope was that health care providers would have incentives to keep patients “well” by focusing on prevention, better management of chronic conditions, improved coordination among a patient’s extended care team, and keeping patients out of the hospital. In essence, providers could financially benefit by keeping patients healthy and reducing unnecessary utilization—a novel idea but one fraught with risks for providers.^{vii}

For ACOs, success hinged on saving money. If an ACO wasn’t able to save money—or meet the potentially fluid CMS metrics—the ACO would be forced to absorb the costs it incurred. CMS had also indicated that it was open to the idea of experimenting with capitated payment models (i.e. a flat rate per patient) for ACOs in the future—representing a very different reimbursement and risk management environment for providers.

Medicare Hospital Readmission Reduction Program

Beginning on October 1, 2012 CMS planned to reduce inpatient payments to hospitals with higher than expected risk-adjusted 30-day readmission rates (via the Medicare Hospital Readmission Reduction Program (HRRP)) for acute myocardial infarction, heart failure, and pneumonia. Using three years of historical data—July 1, 2008 through June 30, 2011—CMS planned to develop an index measurement to determine whether or not a facility had abnormally high rates of readmission across the three categories.

Medicare’s penalties could be severe and impact several hundred hospitals at the outset. Nearly 7 percent of acute-care hospitals (307 out of 4,498) had higher than expected readmission rates for at least one of the three disease categories.^{viii} Under the proposal as it was written, these institutions would subject up to a 1% reduction in total Medicare payments in 2013 and could eventually rise to 3% of total Medicare payments in future years.

The ViSi Mobile platform

ViSi Mobile was a novel platform designed to continuously monitor a patient’s vital signs through a wrist-worn device and two thin cables—one connecting to a sensor worn on the base of the thumb and the other connecting to electrocardiogram (ECG) leads placed on the chest. Sotera designed ViSi Mobile to accommodate new accessories and algorithms that would expand its capabilities in the future, enabling clinicians to monitor an even broader set of vital signs and data. At its planned launch, ViSi Mobile would measure: continuous non-invasive blood pressure (cNIBP), respiratory rate, pulse oximeter oxygen saturation (SpO₂), heart rate/pulse rate (HR/PR), ECG, temperature, and motion. This data could be

continuously transmitted via 802.11 WiFi to a hospital's network and Electronic Medical Record (EMR) and made available to clinicians via any mobile or stationary computing device in the hospital. In addition, customizable alerts and push notifications could be sent to specific clinicians to provide real-time notifications when patient deterioration or emergencies were detected.

After years of R&D, Sotera had effectively converted an ICU-level monitor setup into a package small enough that patients wouldn't mind wearing and was specifically designed to accommodate (and monitor) a patient's mobility—an important but sometimes overlooked measure of a patient's recovery. Traditionally, continuous patient monitoring outside of the ICU (or trauma patients in the Emergency Department) had been viewed as neither feasible nor cost effective.

Exhibit 1: ViSi Mobile Hardware



- Continuous vital signs +
 - *Continuous non-invasive blood pressure (cNIBP)*
 - Respiration
 - SpO₂
 - HR/PR
 - 3/5 lead ECG
 - Temp (skin)
- Motion (3 accelerometers)

Exhibit 2: ViSi Mobile Wireless Connectivity

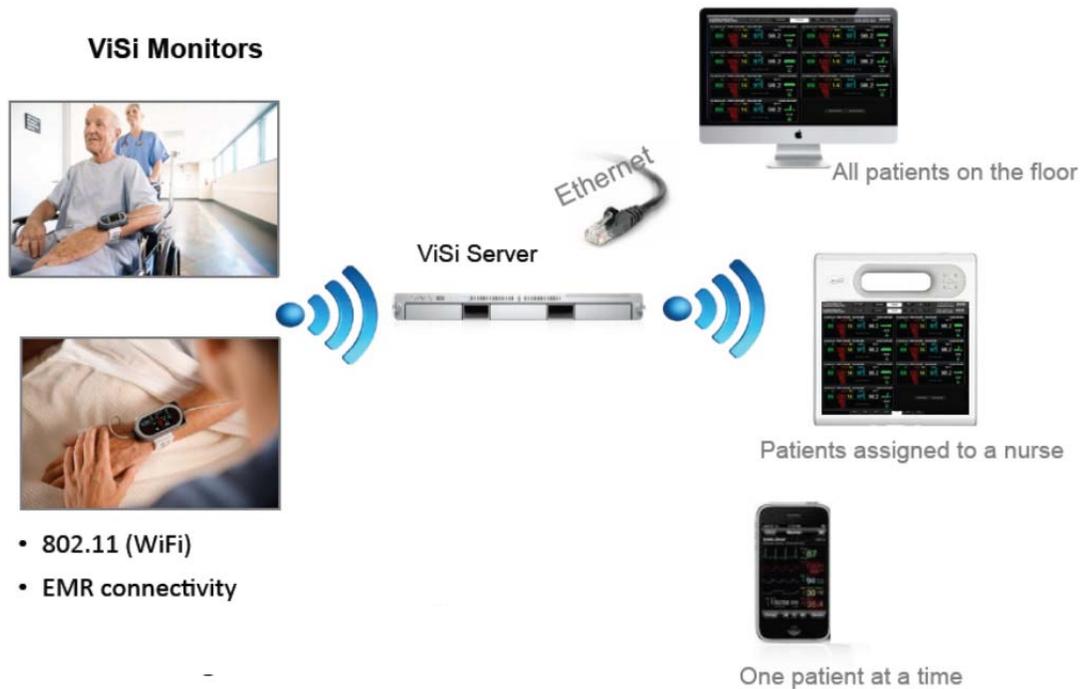
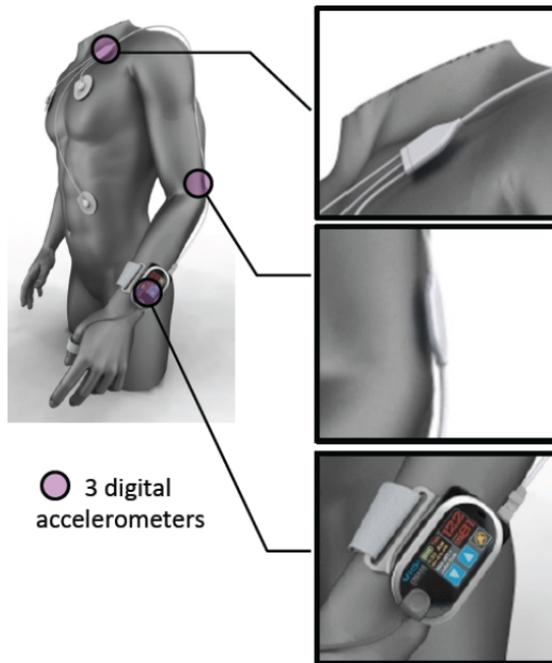


Exhibit 3: ViSi Mobile Patient Motion Monitoring



- Motion artifact rejection
- Detect adverse events
 - patient fall 
- Patient Activity
 - walking 
- Arm Posture
 - BP correction 
- Torso Posture
 - lying down 

Exhibit 4: ViSi Mobile Touch Screen Interface

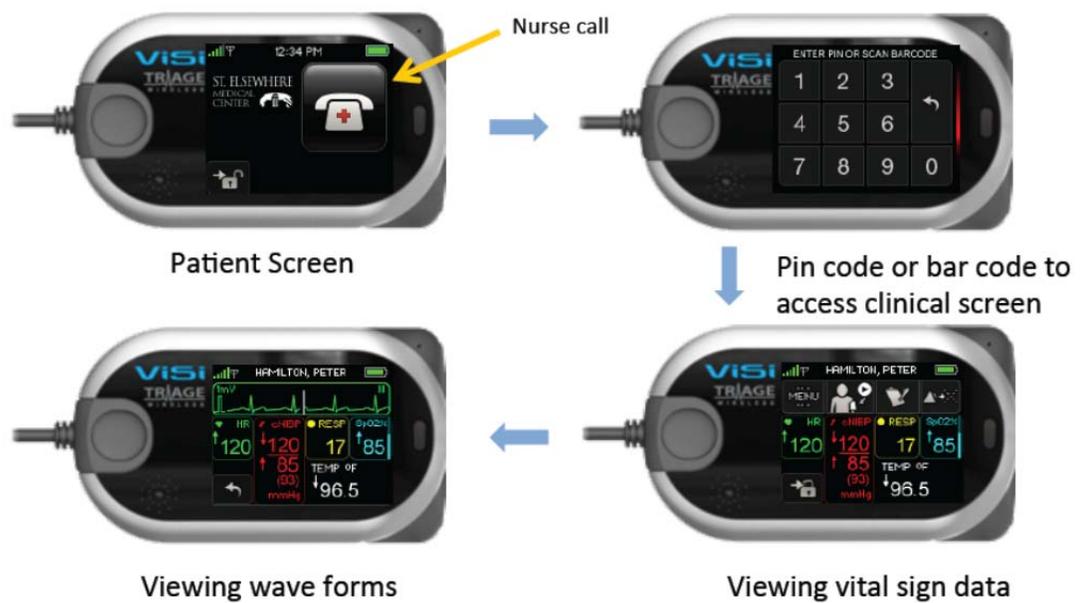
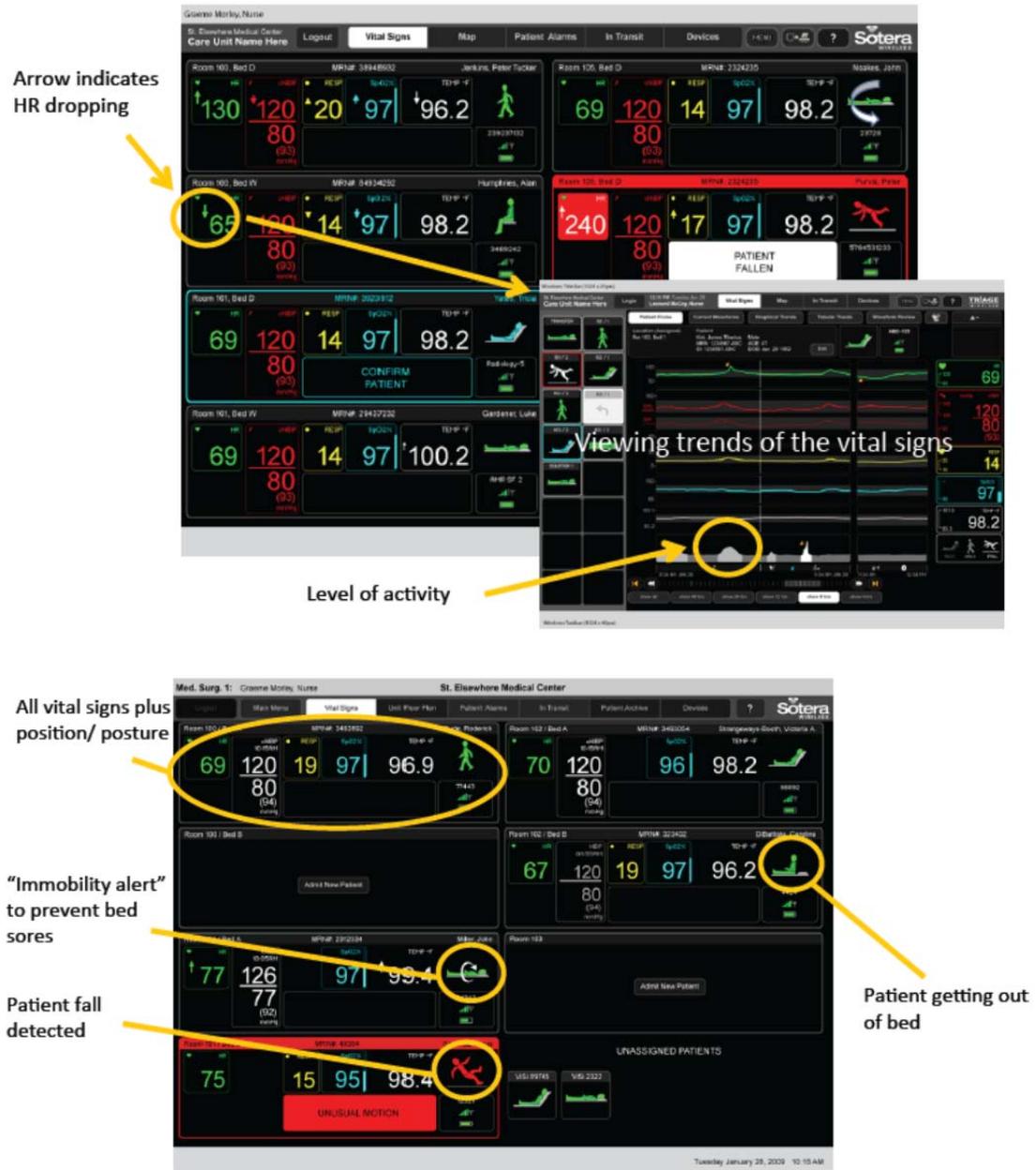


Exhibit 5: ViSi Mobile Software Screenshots (PC/Tablet)



In the ICU, a patient could be continuously monitored via a myriad of stationary single parameter devices and receive the highest level of monitoring in the hospital (in the most expensive location in the hospital as well). In contrast, monitoring that allowed for patient mobility on general inpatient floors or step-down units generally tracked only a subset of important parameters (e.g. cardiac telemetry monitors), relied on nurse “spot checks” at periodic intervals to supplement the dataset, and was susceptible to false alarms.

In-hospital monitoring had undergone incremental changes over the past 15 years, with spot check monitoring as the standard of care on low-acuity floors, telemetry monitoring as the standard following cardiac surgery, and invasive and stationary complete monitoring as the ICU standard. Monitoring outside of the hospital was rare and generally accomplished via a single-parameter measuring device that was periodically uploaded for review by a physician or caregiver.

A landmark study published in 2008 showed that over a three year period (2005-2007) nearly 237,420 preventable deaths occurred in U.S. hospitals.^{ix} Additionally, nearly 50% of hospitals deaths each year occurred on general floors where patients weren’t thought to be at high risk. However, hidden risks often occurred for patients who slowly degraded over time—especially in cases where their worsening condition went unrecognized for several hours or days. On general floors, spot checks were sometimes unable to capture the subtleties of the decline. The case for more careful monitoring of patients was also highlighted in a study examining clinical antecedents of in-hospital cardiac arrest. The results of the study indicated that most patients who deteriorate, do so gradually and exhibit signs of degradation anywhere from 24-72 hours before a major cardiac event and could potentially be saved if the deterioration was discovered in time.^x

The ViSi Mobile platform allowed for continuous monitoring of patients in non-ICU areas of the hospital. It represented a transformation in clinical care and advancement in patient monitoring that was different from the current slate of competitive monitoring technologies through its ability to more closely monitor a broad spectrum of patients in disparate settings—many of whom didn’t realize they could be at risk.

Competitive Landscape

ViSi Mobile competed with a series of devices and solutions both inside and outside of the hospital. Sotera hoped to position it at the forefront of a potential shift in patient care where continuous monitoring would become the standard across the enterprise and beyond. Initially, ViSi Mobile was positioned as a hospital-wide solution –with the basic ViSi Mobile platform sold for general purpose use in low acuity rooms and an upgraded ViSi Mobile platform with additional accessories, third party sensors, and software geared towards specific service areas within a facility (e.g. cardiology, ED, etc.). Sotera competed against a diverse set of competitors with substantial footprints and specializations in each of these distinct areas of the hospital.

Telemetry Monitors

Telemetry monitoring was most commonly used for cardiac hospital patients post-operatively. Through a series of ECG leads placed on the patient's chest and a small box (generally clipped to a patient's gown) that wirelessly connected to a server in the hospital, data about a patient's cardiac activity could be monitored without confining a patient to his/her bed during physical rehabilitation. This type of non-invasive monitoring was generally regarded as safe and provided a continuous stream of data to clinical staff that allowed them the ability to intervene—for example, if a patient's heart rhythm changed as a result of changes in medication, activity level, or movement. Solutions typically involved a significant investment including: IT infrastructure, wireless sensors, and physical telemetry hardware. Leading competitors included: Philips MX40, Draeger M300, Nihon Kohden Prefense

Spot Check Monitors

Checking patient vital signs via spot check monitors was the standard of care in nearly all low-acuity U.S. hospital beds. Generally a nurse or nursing assistant would check in on a patient to take vital signs every 4-8 hours and either document the results in the patient's chart or enter them into the Electronic Medical Record (EMR). Most spot check monitors were mounted on wheeled carts—traveling between rooms to collect patient data at regular intervals and requiring clinicians to administer the vital sign tests and document the data (although some newer systems had ability to wirelessly transmit data to the EMR directly). In addition to the documentation burden that spot checks placed on the nursing staff, spot checks could also be an annoyance to patients and interfere with rest and recovery as patients were jostled awake to have a temperature or blood pressure reading at times that were anything but convenient. Leading competitors included: Welch Allyn VSM, Philips MP5SC

Masimo Patient Safety Net

The Masimo Patient Safety Net system allowed for in-hospital remote monitoring of a patient's pulse oximetry and respiratory rate, wireless notification of abnormal readings, and a customized dashboard to view specific patient alarms and trends on a PC. The system included a bedside monitoring device and multiple leads that attached to a patient's neck and finger. The system was geared toward post-operative patients on general floors recovering from routine procedures to avoid adverse events and/or emergent transfers to the ICU. The Masimo system measured a subset of the vital signs possible through ICU-level sensors and had a neck-mounted sensor and large hardware box that confined a patient's mobility to the hospital bed.

Bed Mattress Monitors

Mattress-based monitoring systems generally included a zip-on mattress cover with an embedded sensor array connected to a display that continuously monitored a patient's heart rate, respiratory rate, and movement to gauge the risk of developing pressure ulcers. Unlike conventional monitoring systems, these systems did not require any physical connection to the patient (i.e. electrodes, cuffs, sensors, etc.) other than the patient being physically present on the bed. Alarms were triggered to nursing staff when: heart rate or respiratory rate

showed signs of deterioration; when a patient attempted to get out of bed while unsupervised; or if the patient hadn't moved or been repositioned in several hours. However, because mattress-based monitors only measured a subset of the required vital signs, periodic spot checks were still required to assess a patient's condition and record additional measures. Leading competitors included: Hoana LifeBed, Earlysense, Sensiotec

Three Distinct Market Opportunities

With favorable industry dynamics, a novel technology platform, and an opportunity to enhance the clinical outcomes of thousands of patients each year, Sotera executives and investors were very bullish on the commercial opportunities on the horizon. In assessing the market for the ViSi Mobile platform, the team identified three primary markets for ViSi across the next 3-5 years: hospital in-patient, hospital recently discharged, and the chronic home market. All three markets were very attractive in their own right but questions remained as to how Sotera should prioritize the three opportunities and how they might proceed most effectively to ensure both the short and long-term success of the company and its platform.

Hospital Inpatient

In an inpatient setting, use of the ViSi Mobile platform represented a paradigm shift in the current “standard of care,” impacting both patients and clinicians. Outside of a few key areas with the hospital—such as cardiac telemetry, the ED, and the ICU—patients on general hospital floors were monitored solely via spot checks. Because this standard of care was so well established, any change to the status quo and clinical workflow would most likely require buy-in from an interdisciplinary team of stakeholders including: C-suite executives, physician leaders, nursing leaders, IT directors, patient safety and risk management administrators. In addition, the ViSi Mobile platform would require not only a capital purchase of the relevant devices, hardware, and software, but would also replace and/or make obsolete currently used monitoring devices and require retraining of staff, as well as integration with existing IT systems.

Despite these challenges, ViSi Mobile presented a long-term value proposition to hospitals with the ability to improve patient safety, improve clinical workflow, and create better economics for the hospital. Patients would be safer with continuous uninterrupted monitoring that allowed for preemptive clinical responses at the first sign of trouble. At the same time, it relieved patients from burdensome routine spot checks, allowing for more restful sleep during recovery. Clinicians would have continuous vital sign information for all relevant patients at their fingertips—giving them the opportunity to attend to patients who were in the most need and reducing the amount of time spent manually documenting patient vital signs while increasing the amount of time spent on actual patient care. Hospitals could avoid expensive, preventable adverse events (e.g. falls, bed sores) while treating patients in lower cost beds (e.g. transfer out of the ICU, ED, or telemetry beds to general floors). They could also deploy clinicians more effectively with the time saved from previous manual measurement/documentation—thereby freeing frontline clinical staff to dedicate more time to patients most in need.

Hospital Recently Discharged

As compared to the in-patient monitoring, recently discharged patients presented many of the same challenges and opportunities, but this segment also introduced interesting dynamics that were unique and evolving. Hospitals were well-equipped to care for patients within the hospital, but hospital leaders were quickly realizing that recent industry trends such as the establishments of ACOs and Medicare's HRRP were creating new incentives and reimbursement realities that would require hospitals to invest in technologies, service offerings, and partnerships that allowed them to more closely monitor patients post-discharge.

The ViSi Mobile platform was positioned to potentially play a role in facilitating closer monitoring of patients who have been recently discharged from the hospital—especially patients who were at risk for 30-day readmission under the HRRP rules covering heart attack, heart failure, and pneumonia. Hospitals and/or ACOs would be the most likely customers of the ViSi Mobile platform and hardware, but hospitals and ACOs would also need to create or purchase a service offering that allowed for 24-hour monitoring of patients outside of the hospital—a competency that was well beyond the domain of most general hospitals. One potential service offering was back office nursing and medical professional service organizations with the ability to analyze the real-time data being generated by the ViSi Mobile devices, intervene as required based upon an established set of care plans, and escalate a specific patient's care to primary care physicians or specialists when appropriate. As with any evolving model however, questions remained concerning the liability/responsibility for individual patients, reimbursement, data privacy, appropriate care plans and protocols, and physician receptiveness to such a model.

Chronic Home

Technology enabling the chronic care of chronically ill patients in the home also offered the potential to “bend the cost curve” of U.S. healthcare by better controlling healthcare spending (Exhibit 3). The increased prevalence of chronic diseases and the skewed distribution of U.S. healthcare spending (where 5% of patients—many of them chronically ill—account for nearly 50% of total spending, see Exhibit 5) created an enormous untapped market opportunity to treat the chronically ill in a more cost effective manner. Keeping a watchful eye over recently discharged patients was one thing. But actively leveraging technologies like ViSi Mobile with back office nursing and professional service organizations specializing in chronic disease created the possibility to avoid hospitalizations or preempt expensive emergency care. Such integrated services represented a tangible value proposition to CMS, private insurance companies, and ACOs. However, payers wanted data that demonstrated patient compliance and the overall effectiveness of any such solution before approving reimbursement.

In years past, healthcare leaders focused on technology limitations as the primary hindrance to the proliferation of monitoring that enabled care for the chronically ill in a residential setting. However, with rapid advances in information technology, 3G/4G telephony, cloud computing, smart phone proliferation, broadband internet service, and device miniaturization, the technological barriers were falling away. The challenges of

reimbursement, regulation, proven service delivery models, and liability all dwarfed the technology challenges facing firms like Sotera.

A Pivotal Decision

With three attractive commercial market opportunities in front of them and favorable demographic and industry trends burgeoning the potential demand for the ViSi Mobile platform, the Sotera team faced an interesting set of questions as it finalized its go-to-market strategy. Which market should Sotera pursue? Where should Sotera focus its resources in the short, medium, and long-term? Which ecosystem partnerships should be prioritized to ensure a more effective commercial launch and long-term sustainability?

Exhibit 7: Sotera Wireless Management Team



Tom Watlington: CEO

- 28 years experience
- COO of Biosite Inc. (\$27M to \$300M), acquired in '07 for \$1.6B
- Launched first biomarker for heart failure - BNP



Brandon Poe: VP Finance/ Admin

- VP of Finance for Inverness Medical (formerly Biosite)
- 15 years experience medical, high-tech and airline industries



Matt Banet: CSO and Founder

- Successfully started and sold two technology companies
- Ph.D. in Physical Chemistry from MIT
- U.S. Patent Agent



Gunnar Trommer: VP Marketing

- Global Marketing VP of Patient Monitoring for Drager Medical
- Boston Consulting Group
- PhD Mechanical Engineering



Jim Moon: CTO

- Developer of 1st modern critical care patient monitor (Spacelabs)
- CEO/Founder of Protocol Systems - first portable vital signs monitor the Propaq (later sold company to Welch Allyn)



Gary Manning: VP Sales/ Bus Dev

- 20 years experience
- Datascope: International and US sales and marketing mngt

Exhibit 8: ViSi Mobile Business Model

Equipment/ algorithms



• Monitor



• Accessories



• Patient disposables



• New algorithms (cNIBP)
• 3d party sensors*

* Shown - smO2/ PH/ HCT sensor by Reflectance Medical

Remote Viewing Software



ViSi Server



- Services (deployment / after sales)
- Software licenses
- 3rd party hardware

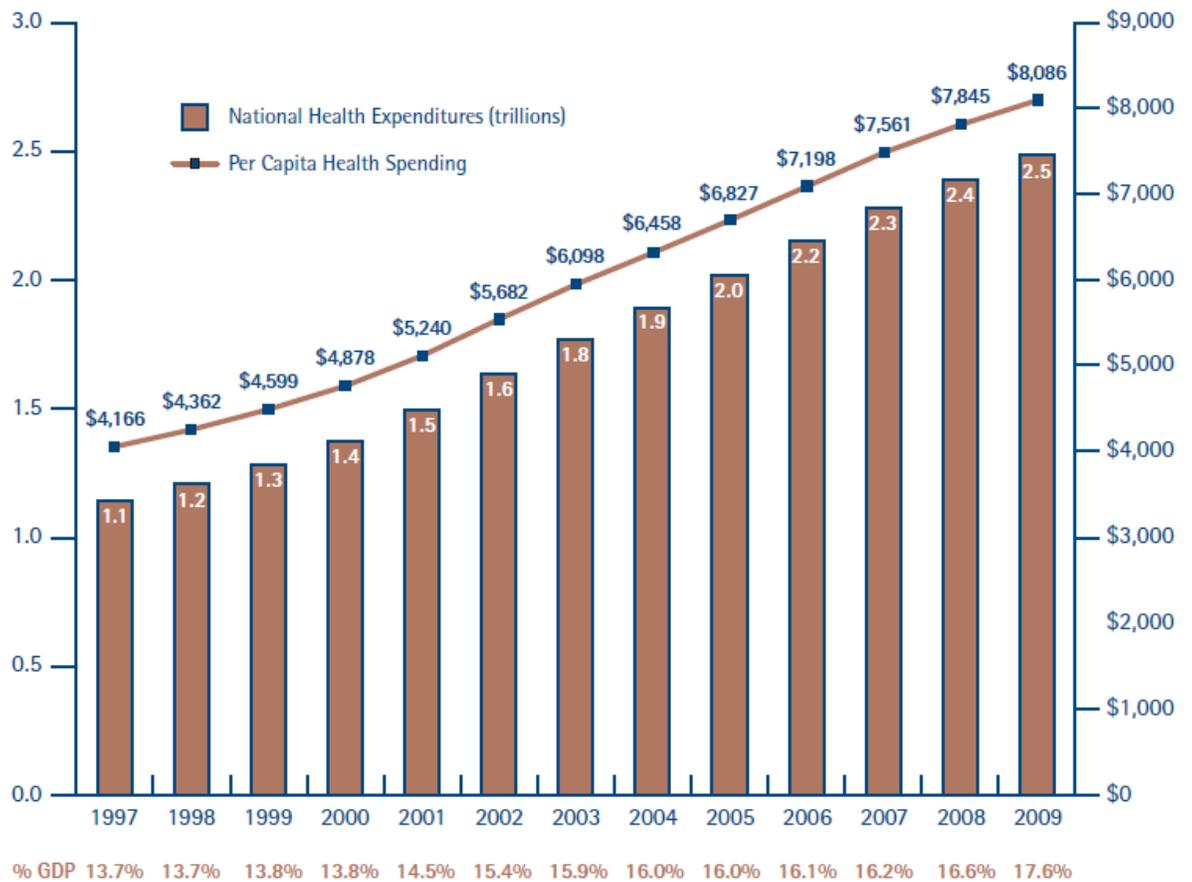


Exhibit 10: Daily Cost of Patient Care by Location

Exhibit 11: Potential Hospital Cost Savings

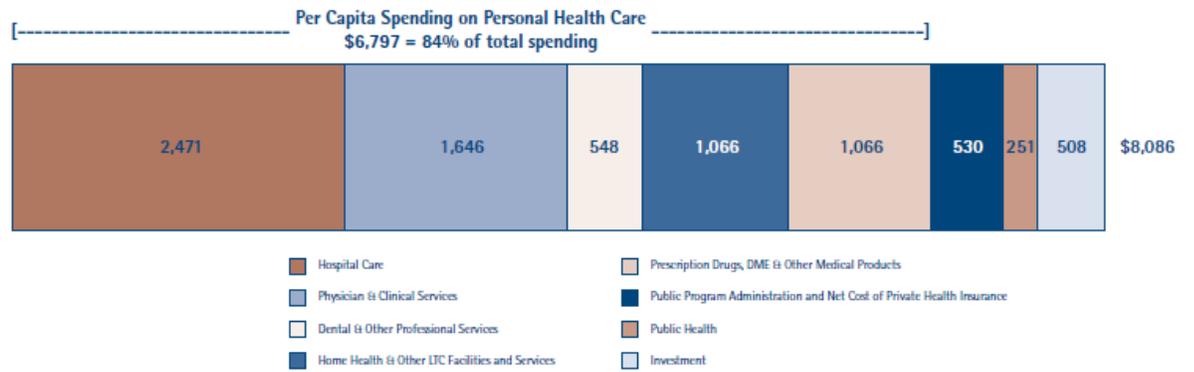
- Detecting and avoiding adverse events
 - Detect / avoid fall with injury – 7.5 extra days / \$6,437
 - Each cardiac arrest survivor costs ~\$42,000
- Keeping patients in lower cost beds
 - 1 day in an ICU = 3 to 5X more than for one day in a general care unit
- Increasing patient throughput in ED and ICU
 - Reduce time on ED divert (1hr / \$1400 loss)
- Improved workflow
 - 1/3 of nurses time spent in documentation
- Eventually replacing multiple systems (vital signs, nurse call, VoIP, location)

Exhibit 14: National Health Expenditures 1997-2009



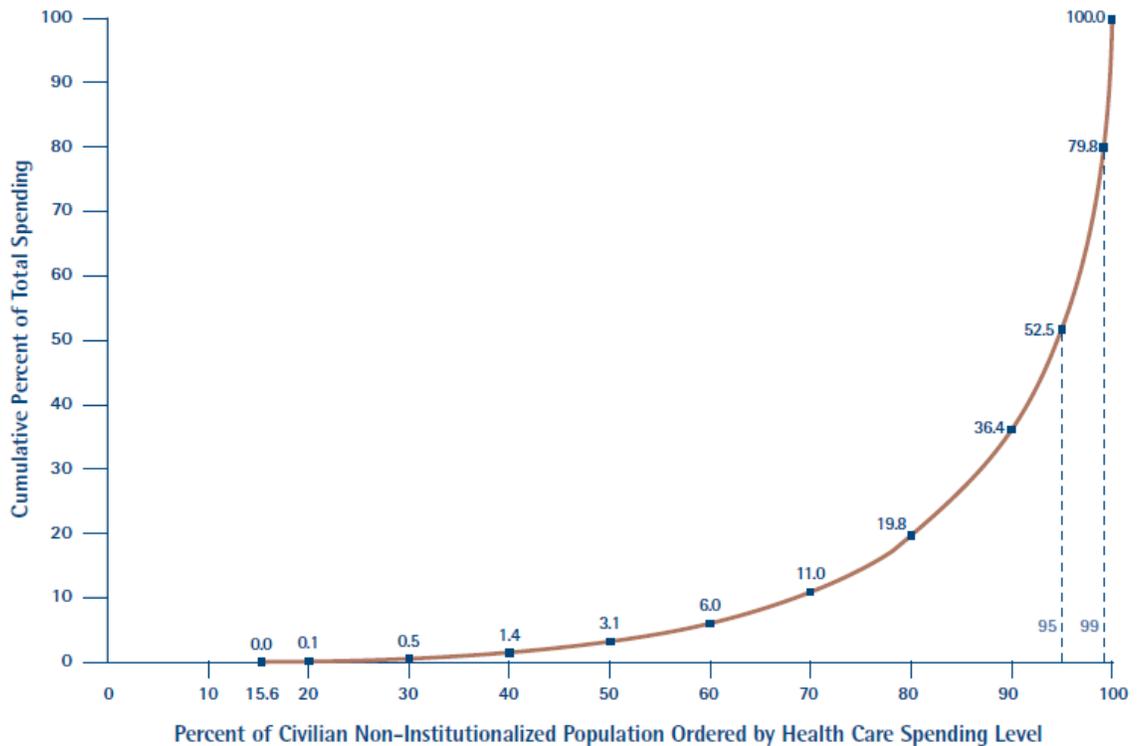
Source: NIHCM Foundation analysis of data from the National Health Expenditure Accounts, available at <https://www.cms.gov/NationalHealthExpendData/>.

Exhibit 15: Components of National Health Spending Per Capita 2009



Source: NIHCM Foundation analysis of data from the National Health Expenditure Accounts, available at <https://www.cms.gov/NationalHealthExpendData/>.

Exhibit 16: Distribution of Healthcare Spending 2008



Source: NIHCM Foundation analysis of data from the 2008 Medical Expenditure Panel Survey, available at http://www.meps.ahrq.gov/data_stats/meps_query.jsp

Exhibit 17: Selected Sotera Strategic Partnerships


Investor; integration with EMR; reseller in 800 Premier accounts in US



Investor – collaborating on technology for patient monitoring outside the hospital



BP cuff in ViSi patient kits; product integration with CONNEX; possible distributor in select markets



Partnership agreement with PPH for existing hospitals and new “Wireless Hospital of the Future”



ViSi being showcased as part of their “Concept Ambulance of the Future”

ⁱ <http://www.marketwatch.com/story/fda-clears-wireless-visi-mobile-patient-monitoring-system-aimed-at-enhancing-patient-safety-for-ambulatory-hospital-patients-2012-08-21>

ⁱⁱ Sotera Press Release, March 26, 2012.

<http://www.soterawireless.com/news-and-events/press-releases/>

ⁱⁱⁱ Nagappan, P, "Sotera's Visi mobile vital-sign tracker OK'd" U-T San Diego, Aug. 21, 2012.

<http://www.utsandiego.com/news/2012/aug/21/soteras-visi-mobile-vital-sign-tracker-okd/>

^{iv} Understanding U.S. Healthcare Spending, NIHCM Foundation Data Brief, July 2011

^v Avalere Health analysis of American Hospital Association Annual Survey data, 2009, for community hospitals

^{vi} <http://www.npr.org/2011/04/01/132937232/accountable-care-organizations-explained>

^{vii} <http://www.npr.org/2011/04/01/132937232/accountable-care-organizations-explained>

^{viii} <http://www.kaiserhealthnews.org/Stories/2011/July/30/medicare-and-hospital-readmissions.aspx?p=1>

^{ix} HealthGrades (2008, April 8). Medical Errors Cost U.S. \$8.8 Billion, Result in 237,420 Potentially Preventable Deaths, Study Shows. *ScienceDaily*.

^x RM Schein, N Hazday, M Pena, BH Ruben and CL Sprung; **Clinical antecedents to in-hospital cardiopulmonary arrest**, *Chest* 1990; 98; 1388-1392