

From the Emergency Room to the Living Room: Management of Patients with Congestive Heart Failure

A White Paper on Innovation and Integration

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Introduction

The combination of financial challenges, an increased number of congestive heart failure (CHF) patients, and a deficit in cardiovascular care providers¹ has led to a gap in CHF patient care. Healthcare providers must take a fresh look at how we manage this chronic disease – a look that considers the whole picture and applies innovative thinking, advanced technologies and treatments, and an integrated care approach.

Rapidly grabbing hold of people globally, CHF already afflicts roughly 4.5 million Americans and another 550,000 new patients are diagnosed annually. Although the rates of other cardiovascular diseases have stabilized or even decreased over the last few years, CHF cases continue to climb. It can be costly and potentially fatal unless managed appropriately.

Fortunately, there are new approaches to the management of CHF patients, which can offer a diagnosis that does not automatically mean a death sentence. The focus of diagnosis and treatment is shifting from the emergency room (ER) to ambulatory settings. This entails leveraging new diagnostic tools and implementing patient monitoring systems that support CHF treatment plans and programs in the inpatient as well as outpatient settings.

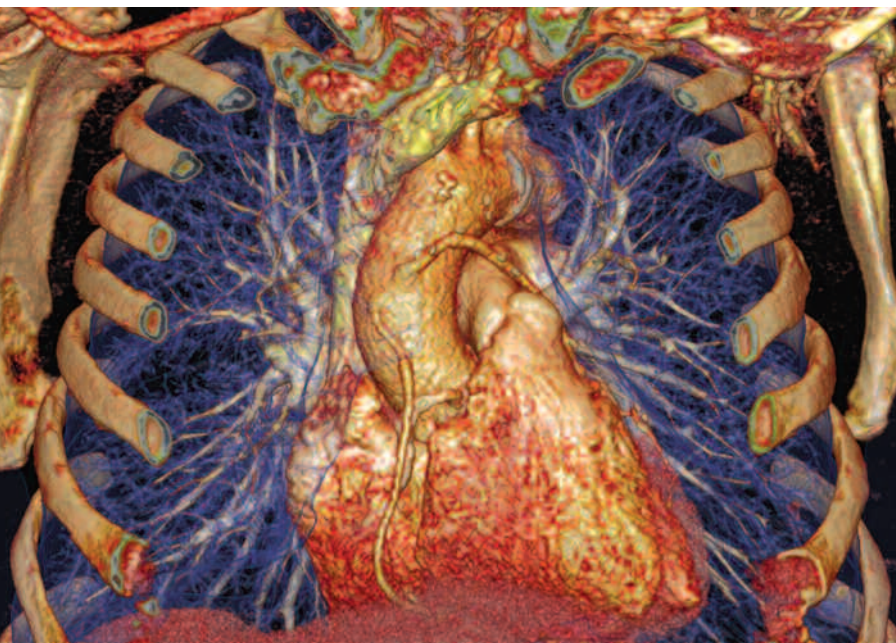
Process and workflow improvements, asset management, advanced therapies, and cutting-edge diagnostic technologies all lead to the integration of patient care – care that follows the patient from anticipating the onset of CHF and actually seeing symptoms, through diagnosis and therapeutic outcome.

This paper looks closely at the opportunities presented by new diagnostic tools, advanced treatments and therapies, and innovative information systems to monitor patients and improve workflow efficiencies. Beyond just considering how to leverage these advancements, most importantly, we will examine how to integrate these solutions in an approach that considers the care cycle over a patient's lifetime.

Lives and Dollars: The Need for Better CHF Management

Ninety million Americans in the US are living with some form of chronic disease. It is projected that by the year 2020, 25 percent of the American population will be living with multiple chronic conditions, and costs for managing these conditions are estimated to reach \$1.07 trillion.² A good majority of this chronic population will have CHF.

Heart disease is one of the most deadly and expensive maladies in the US, costing a staggering \$394 billion in 2005



Cardiovascular CT

ECG gated examination of the thorax to evaluate chest pain. A physician can diagnose the underlying causes of chest pain such as aortic dissection, coronary artery disease and pulmonary embolism with the help of a 15s scan. Image acquired from the SOMATOM® Sensation with z-Sharp.

¹Kereiakes, Dean J., MD et al. The United States Cardiovascular Care Deficit, *Circulation* 2004.

²Partnership for Solutions. Robert Wood Johnson Foundation and Johns Hopkins University. www.partnershipforsolutions.org

expenditures and lost productivity from death and disability.³ Hospital visits, administrative fees, treatments, and prescriptions are just some of the costs associated with managing heart disease and CHF. A recent report issued by the Agency for Healthcare Research and Quality named CHF as one of five conditions accounting for one-fifth of the nation's hospital bill.⁴

In addition, it also is one of the conditions attributing to half of the \$300 billion Medicare spends yearly to take care of 42 million elderly and disabled patients.⁵ Since 1979, hospital discharge from heart failure, a generic term used to describe the heart's inability to pump with sufficient strength and a precursor to CHF, has increased nearly 174 percent, and roughly 3.4 million visits were related to CHF cases.⁶

Government agencies are starting to recognize that the goal of cost-effective, quality patient care can be realized not just through advanced technologies and treatment, but also through disease management programs. CHF is the most common reason for hospital admission of Medicare patients and is the most expensive healthcare item for Medicare, which may have contributed to the recent changes to Medicare reimbursement requirements and the national efforts to attach performance measures to reimbursement. In fact, more Medicare monies are directed to the treatment of CHF than any other diagnosis.⁷ In 2001, \$4.0 billion were paid to Medicare beneficiaries for CHF alone, which is about \$5,912 per discharge.⁸ Public pressure on healthcare providers to deliver positive patient outcomes underscores the need to implement effective CHF plans.

Breaking the Cycle

Research shows that 47 percent of heart failure patients are re-admitted to the hospital within six months of treatment. Hospitals could save an average of \$3,884 per patient, and produce an average return on investment of \$2.78 for every dollar spent with disease management solutions for heart failure.¹⁸

Based on the prevalence of treatable, slow onset diseases such as CHF, it is estimated that by 2030, as many as 50 million Americans with chronic disease will meet the criteria for disease management. As a result, managing the growing chronic care population is increasingly a topic of national focus.

Step 1: Leveraging New Diagnostic Tools for Effective CHF Management

Regardless of the disease, the goal remains the same: more effective and cost-efficient treatment. CHF is no different. Early diagnosis is key to successful treatment because the disease is often most treatable in its earliest stages. If CHF is caught early and kept under control, it could result in fewer ER visits – with a positive impact on both lives and dollars.

Early diagnosis is finally being made possible through new technologies that allow clinicians to make a more definitive diagnosis of the body and piece together the causal factors affecting the heart. In fact, as more information is revealed about this complex muscle, the medical world is moving from simply diagnosing the disease to treating it before obtrusive symptoms occur.

³Centers for Disease Control and Prevention

⁴www.seniorjournal.com/NEWS/Medicare/6-09-23-Governmentpaying.htm

⁵www.courant.com/news/health/hc-docpay0925.artsep25,0,3939181.story?coll=hc-headlines-health

⁶Heart Disease and Stroke Statistics – 2006 Update, American Heart Association

⁷Lee, Won Chan et al. Economic burden of heart failure: a summary of recent literature, *Heart and Lung*, November/December 2004.

⁸Heart Disease and Stroke Statistics – 2006 Update, American Heart Association

¹⁸Goetzel, RZ. Return on Investment in Disease Management: A Review. Healthcare Financial.

“The paradigm has now moved to predicting disease,” said Mani A. Vannan, director, echocardiography lab, University of California, Irvine. “If you think about that for a moment, that is a very exciting concept for us as imagers. We are used to diagnosing disease, to move that into an arena where we should be able to tell someone, you’re going to have a healthy life, or you’re going to have a problem, or you’re beginning to have a problem, let’s take care of that now is very important.”

The Technology: Unlocking the Mysteries of the Heart

As a muscle in motion, the heart can be difficult and sometimes even impossible to image. Recent advancements in computed tomography (CT) and magnetic resonance imaging (MRI) technologies have changed this, revolutionizing cardiac imaging to make disease diagnosis faster and easier.

“CT coronary angiography has changed the standard approach to a patient at risk of cardiovascular disease,” said Norman E. Lepor, M.D., director of coronary imaging, Westside Medical Imaging, Beverly Hills. “We’ve moved from the world of relative risk assessment to defining the risk of a patient suffering from coronary artery disease, allowing for earlier, and more targeted and aggressive treatment to prevent cardiac events.”

Traditionally, CT scanners were not considered to help diagnose and plan treatment of heart disease. However, innovations in the technology are leading to new and exciting clinical applications. The newest wave of CT scanners with dual source technology offer superb images of the heart and can accommodate patients with high or irregular heart rates without beta-blocker medications, which were previously needed. This is particularly important since many CHF patients have irregular heart rates and symptoms such as shortness of breath that would prevent them from being able to handle these types of medications.

Moving Beyond Slices

Early research conducted using the SOMATOM® Definition, the world’s first dual source CT system which shows increased visualization for cardiac applications, is validating the use of this solution. Research at the University of Erlangen-Nuremberg that recently appeared in the *European Journal of Radiology* indicated high and constant temporal resolution independent of heart rate permits imaging of coronary arteries with motion artifacts in a substantially increased number of patients, as compared to earlier generation scanners.

New MRI technologies also offer an effective option in the diagnosis of cardiovascular disease, especially for obese patients. Obesity is often a leading risk factor of heart disease.⁹ However, due to increased body mass and technology limitations, overweight patients can be a challenge to image. With newer high-field open-bore systems that offer more room than traditional MRI systems, larger patients can be imaged comfortably without sacrificing image quality.

Applications: A Closer Look Inside

In addition to technology advancements, new imaging applications are continually being developed to aid clinicians in the diagnosis of disease. For example, cardiac MRI had previously been stigmatized as complicated and time consuming. Now, a host of applications are coming along the pipeline to provide physicians with advanced tools to perform cardiac procedures almost as simple as the click of a mouse.

Simplifying Diagnosis

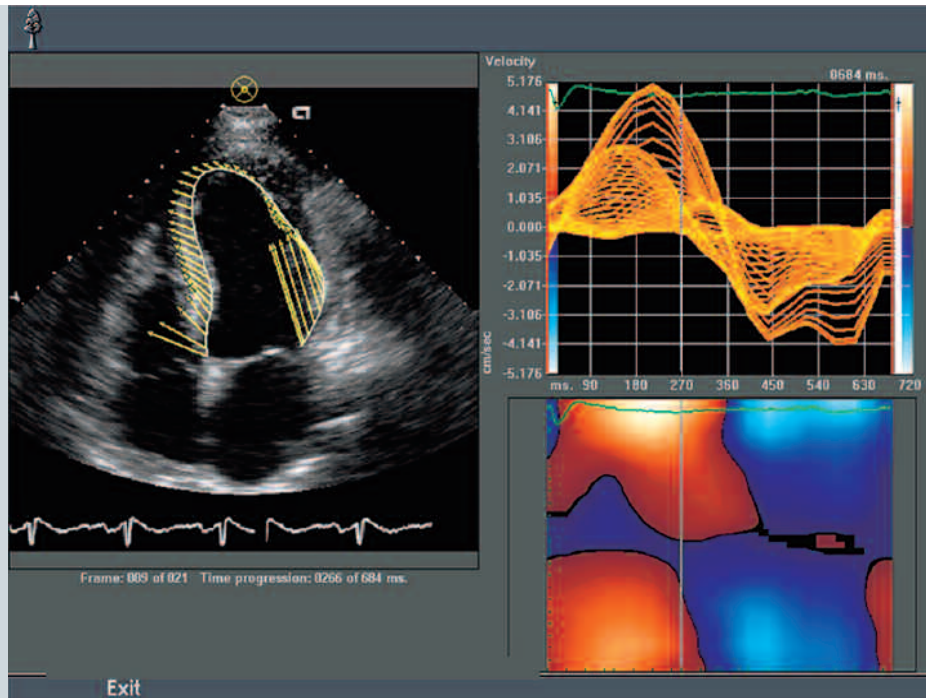
With *syngo*® Beat cardiac MRI application, patients with shortness of breath can be more easily diagnosed. The application provides high-resolution images and allows exams to be completed in just ten to thirty minutes. In addition, *syngo* CardioFusion, provides a familiar working environment for the end user. The technology allows for faster viewing of high-quality images of the heart. This unified platform for visualization of cardiac images from hybrid imaging technologies optimizes the cardiac clinical workflow to enable enhanced diagnostic capabilities.

Take echocardiograms or cardiac ultrasounds. These versatile diagnostic solutions can be performed conveniently right at a patient's bedside. They often help to distinguish which type of CHF a patient may have prior to starting a treatment regimen. The technology, however, can be limited when it comes to assessing the mechanics of the heart – an important aspect in evaluating heart failure.

Breakthrough ultrasound applications are on the horizon to provide clinicians with a holistic view of the heart. One such solution uses vectors to display direction and relative velocity of motion so that clinicians can see a graphical presentation of tissue motion. This can help to measure diastolic function, which is playing a greater role in evaluating CHF.

Echocardiography

Standard DICOM image with *syngo*® Velocity Vector Imaging analysis of myocardial mechanics and motion acquired from the ACUSON Sequoia™ C512 echocardiography system.



The Complete Heart

New ultrasound applications, such as *syngo*[®] Velocity Vector Imaging[™] (VVI), provide a holistic view of the flow and function of the heart. Clinicians can now see a graphical presentation of tissue motion. This is done using vectors to display direction and relative velocity of motion in the ventricular wall depicted in 2D echo in real-time.

A good analysis begins with a high quality image, and images from technically difficult exams can be analyzed with VVI. In fact, analysis can be performed from images on transducers, and data can be evaluated retrospectively or in real-time. For example, ACUSON AcuNav[™] offers practitioners the chance to analyze myocardial mechanics during a procedure, which could improve patient comfort, outcomes, and workflow.

“With ultrasound, we haven’t always been the best at evaluating the mechanics of the heart, simply because we didn’t have the tools,” said Dr. Mani Vannan, director of the echocardiography lab at the University of Irvine, Ca. “VVI very eloquently shows us what the heart is doing and its mechanics.”

At the University of Irvine, Dr. Vannan and his team are using VVI in conjunction with about one-third of its echocardiograms. While Dr. Vannan admits that the technology has yet to reach its full potential clinically, he predicts in the future it could be used as an effective tool to diagnose and assess not only the severity of existing CHF patients, but also those who are at high risk for developing the disease.

“So often our emphasis is on diagnosing and treating established CHF patients,” said Dr. Vannan. “To go to predicting the risk of developing CHF in patients and then treating it will be a huge shift in paradigm.”

Biomarkers: The Latest Advancements in CHF Diagnosis

Beyond traditional imaging technologies and applications, biomarkers are proving to be an effective tool for determining CHF on a molecular level – perhaps even before symptoms occur. In fact, diagnostic biomarkers are becoming accepted protocol for CHF testing in the acute care setting. The challenge is transitioning this solution into the ambulatory and outpatient setting.

A patient admitted to an ER with chest pain immediately triggers a set of procedures to eliminate the possibility of a heart attack. The European Society of Cardiology recommends three tests to evaluate the possibility of a heart attack or heart failure: an ECG, cardiac X-ray, and now the NT-proBNP biomarker, a hormone released with ventricular wall distress.¹⁰ In the first ten minutes, a determination of Troponin I or CK-MB levels might also be employed to assess if the patient has suffered myocardial damage. If the Troponin proteins are present, it is likely the patient is in an advanced state of CHF.

Heart failure often progresses to CHF. NT-proBNP is a ‘cutting-edge’ tool best used to eliminate the chance of an acute coronary event, especially myocardial infarction, to predict short-and long-term mortality. A recent study concluded that NT-proBNP may be just as useful as other hormone predictors, such as BNP, in the diagnosis of CHF in patients who are experiencing shortness of breath in the ER setting.¹¹

This PRIDE study showed patients who were diagnosed as having acute CHF after complaining of shortness of breath had NT-proBNP levels of more than 4,000 pg/ml compared to those who did not have acute CHF whose NT-proBNP levels were 131 pg/ml.¹² It also found that under an receiver-operating characteristic analysis, NT-proBMP was

¹⁰Bettencourt, Paulo Ph.D., et al. N-Terminal-Pro-Brain Natriuretic Peptide Predicts Outcome After Hospital Discharge in Heart Failure Patients. *Circulation*. 2004: 110:2168-2174.

¹¹Mueller, T et al. Diagnostic accuracy of B type natriuretic peptide and amino terminal proBNP in the emergency diagnosis of heart failure. *Heart* 2005

¹²Januzzi, James L. The N-Terminal Pro-BNP Investigation of Dyspnea in the Emergency Department (PRIDE) Study. *The American Journal of Cardiology*: Vol. 95, April 15, 2005.

highly sensitive and specific for the diagnosis of acute CHF.¹³ Variations in NT-proBNP levels during hospitalization and predischarge NT-proBNP levels are predictors of readmission and death within six months of discharge for hospitalized CHF patients.¹⁴ Therefore, measuring NT-proBNP levels is a useful tool in making the decision to discharge patients. In addition, these markers can help establish guidelines for effective hospital discharge strategies.¹⁴

By the time patients are admitted to the ER, it is highly likely they are in the advanced stages of heart failure. With that in mind, the healthcare industry must move from administering diagnostic biomarkers such as NT-proBNP before CHF reaches this critical stage. If these tools were delivered in the ambulatory setting, physicians might be able to detect CHF even earlier, allowing them to administer a less aggressive CHF plan. This would be particularly useful for patients at high risk for developing CHF, such as those with diabetes or obesity.

Step 2: New Treatments in the Spectrum of CHF Care

While breakthrough diagnostic technologies and applications are being developed to provide new insight into the cardiovascular function and help catch disease in its earliest stages, they might also help to improve the delivery of treatment when used in conjunction with other pharmaceutical and device therapies.

Technology to Treatment

With the use of ultrasound applications such as VVI, clinicians can also effectively assess whether or not Cardiac Resynchronization Therapy (CRT), an emerging treatment for heart failure patients that involves the use of an implantable biventricular pacemaker, is necessary. Despite meeting all the criteria for CRT, about one-third of patients do not respond to it. In the past, Tissue Doppler was commonly used to assess patients for CRT. The problem herein was that this technology was not inherently developed for the heart muscle, but rather for blood flow. Since it was adapted, naturally it had certain technical limitations. For example, the Apex part of the heart is very important in understanding how the heart pumps. However, since the Apex is often perpendicular to the ultrasound, Tissue Doppler couldn't view this section. The first-of-its kind, VVI technology can move freely throughout the body and view the Apex as well as other mechanics of the heart necessary in determining CHF.

"VVI can help us understand, based on conventional treatment, who will respond as well as who will not," explains Dr. Vannan. "I think that's where the combination of CRT and VVI will be the most comprehensive evaluation of the heart muscle and its pumping ability."

An adjunctive method to VVI is Auto Ejection Fraction™ (EF) technology, a novel 2D echo image analysis system that calculates ejection fraction. EF enhances accuracy and workflow by automatically detecting and calculating the most common cardiac function parameters using pattern recognition technology. In addition, Auto EF can be used to evaluate patients before resynchronization therapy using biventricular pacing.

¹³Januzzi, James L. The N-Terminal Pro-BNP Investigation of Dyspnea in the Emergency Department (PRIDE) Study. *The American Journal of Cardiology*: Vol. 95, April 15, 2005.

¹⁴Bettencourt, Paulo Ph.D., et al. N-Terminal-Pro-Brain Natriuretic Peptide Predicts Outcome After Hospital Discharge in Heart Failure Patients. *Circulation*. 2004: 110:2168-2174.

Catheterization has been a mainstay in CHF treatment. In fact, since 1979, the number of cardiac catheterizations has increased by more than 373 percent.¹⁵ Current technological limitations, however, can make it difficult for physicians to manually navigate catheters through the heart, resulting in a strenuous, time-consuming, and even unsuccessful treatment.

Enter magnetic navigation.¹⁶ This technology is changing the face of cardiac care, making catheterizations easier to perform. The result – better outcomes for the patient and increased efficiency and workflow for medical facilities. A recent study demonstrated that magnetic navigation can be a better and more practical method for delivering ablation treatment in the heart of patients with atrial fibrillation. The study's researchers at San Raffaele University in Milan, Italy found magnetic navigation successfully guided catheter tips through 38 out of 40 study participants with no reported complications.¹⁷

Physicians at the Methodist DeBakey Heart Center at The Methodist Hospital in Houston, not affiliated with the study, believe magnetic navigation will one day replace manual conventional catheter technology. The benefits of magnetic navigation can be best summarized by looking at an automatic versus a manual transmission.

Imagine navigating a twisting and turning mountain road in a Model T with four-speed transmission, manual steering, and no seatbelts. Now, imagine navigating the same road in a sleek, race-inspired automatic Ferrari with a 400bhp engine. Given the choice, chances are that most people would select the Ferrari for their next mountain vacation.

In much the same way that a manual Model T takes extra effort and care to

navigate, so does a manual catheter. Physicians navigating the heart using manual methods during a catheter-based diagnostic or interventional procedure are forced to feel their way through a network of vessels and arterial tunnels. With magnetic navigation, clinicians can turn on the cruise control, remotely steering the catheter through a control panel. Navigation impulses are transmitted to two powerful magnets positioned on either side of the patient table that move the catheter, which has a magnetic tip. Using previously acquired angiographic images downloaded into the system, clinicians can view an actual three-dimensional model of a patient's coronary arteries.

"Unlike manual catheters, which rely on physician dexterity, a magnetic catheter can maneuver sharp angles and make 90 degree turns," said Dr. Albert Raizner, Center for Research in Cardiovascular Interventions, Methodist DeBakey Heart Center, Methodist Hospital Houston.

The added precision afforded by magnetic navigation provides a more successful treatment at a fraction of the time. Patients spend less time on the table, staff is protected from repeated exposure to radiation (work is completed in another room via remote control), and medical diagnosis is advanced for hard-to-treat patients.

"Magnetic technology can offer a new option for patients whose only other recourse was open heart surgery or not being treated at all," Dr. Raizner continues. "We cannot get a more precise road map."

In addition to making treatment more precise, it can also benefit facilities financially. "While the initial investment is considerable, potential economic savings can occur in a variety of ways," says Dr. Raizner. "For example, instead of having to use several devices for a procedure, we use just one with

¹⁵American Heart Association

¹⁶Along with its clinical partner Stereotaxis, Inc., Siemens pioneered the world's first magnetic navigation system.

¹⁷*Journal of the American College of Cardiology*, April 4, 2006.

magnetic navigation. More importantly, it shortens the time of procedures, particularly in complex cases. This reduces the chance of complications such as heart attack or stroke, which – besides the obvious health benefit – translates into tremendous economic savings.”

Step 3: Leveraging the IT Factor to Improve Workflow and Monitoring

CHF is a chronic condition and patient treatment does not stop at discharge nor is it limited to just one pill. A combination of diagnostic tools and new treatments are required to develop the correct CHF plan that will contribute to improved CHF management. In addition, implementing workflow tools that aid health professionals in the day-to-day management of lifestyle behaviors will not only reduce burdens placed on staff resources, but will improve care outcomes and best practices. New IT solutions can deliver these resources, further enhancing decision-making, which will result in better patient outcomes, and patient and healthcare staff satisfaction.

Streamlining Data Across Healthcare Communities

CT and MRI technologies, and magnetic navigation and catheterization treatments – it all amounts to a lot of images and patient information. Not to mention all of the other records and administrative documents associated with hospital stays. Time is of the utmost importance for CHF patients and therefore patient information must be documented in an efficient manner. If a patient comes into the ER with chest pain, physicians need this information immediately in order to plan for the best course of treatment. Advancements in IT are making it possible to connect imaging systems and networks to a

central point of care, saving time and streamlining staff resources, resulting in better patient outcomes.

Across the Spectrum

Soarian® Cardiology is an IT solution that integrates image management and diagnostic measurement, and reporting tools with the powerful workflow designed applications in the solution. It interrupts the “silo effect” where information is stored in disparate systems. The solution is scalable, which enables the system to address each organization’s immediate needs. Because of its flexibility, it can be adapted to bring efficiency to the various workflows within each department. The solution covers the entire cardiology continuum of care from ordering, nursing, catheterization, echocardiography, nuclear medicine, EP, CT, MRI, rehabilitation, and surgery.

“In a clinical environment where images are critical to the care of a patient, physicians need all images and data integrated within one workstation and available via a single longitudinal clinical repository,” said Doug Colburn, CIO, Nebraska Heart Institute Heart Hospital.



Nebraska Heart Institute Heart Hospital front desk

Common Ground

Soarian Cardiology improves care outcomes by empowering healthcare professionals – nurses, physicians, and technicians – with vital, real-time information. With Soarian Cardiology, organizations have the chance to convert dozens of individual report templates, used across departments and among various physicians and healthcare staff, condensing them into one easy-to-read and -use report standard. This standardization reduces turn-around time, making them available in the same day, resulting in increased physician and general practitioner partner satisfaction. In addition, the standardization of reports has resulted in increased accuracy of the information collected and an improved use of staff time in creating the reports. Physicians can view the information online, anywhere at anytime, at the point of care. Finally, using this solution has enabled organizations to add additional cases to their caseload roster per day.

“South Carolina Heart Center has leveraged cutting-edge software and modalities to improve decision-making, which has enhanced our quality of care,” stated Sherry Shults, registered nurse and CIO of South Carolina Heart Center (SCHC), a physician-owned, outpatient cardiac care facility in Columbia, S.C. “In addition, this synthesis has resulted in increased efficiency and productivity of our staff and physicians, while reducing cardiovascular care costs.”

Managing CHF Treatment

The most advanced diagnostic tools and treatments can only take a patient so far. Self-management is the core to a successful CHF treatment regimen. A patient’s plan may be comprehensive, and include prescribed physical activity and a regulated diet to help strengthen the heart, as well as medications such as ACE inhibitors and diuretics to lower blood pressure. Daily monitoring of signs and symptoms is critical to developing and sustaining the behavioral changes necessary to keeping patients healthy.

Studies have shown that non-compliance with physicians’ medication and lifestyle guidelines results in 125,000 deaths annually in the US, leads to 10 to 25 percent of hospital and nursing home admissions, and is becoming an international epidemic. Old habits are hard to break, but these numbers could be significantly reduced if patients listened to their doctors’ orders and IT-based disease management may help patients comply with CHF plans.

Several recent studies suggest that patient compliance during the first month of treatment is the most powerful predictor of long-term compliance. Unfortunately, many studies also show a decrease in compliance over time. In a four-year study of an ambulatory care model, compliance with taking medication was improved with a regular telephone follow-up call from a nurse or pharmacy.



Maintaining a Balance

Soarian® Disease Management is a workflow-driven solution that supports the management of CHF patients by optimizing the care delivery process. It provides the necessary tools to proactively manage and monitor patients, ensuring that they are upholding their plans and/or in need of adjusting their regimens.

The system's workflow management capabilities help providers monitor chronically ill patients' adherence to care plans and provide a holistic picture of a patient's condition, pushing relevant information to clinicians. Tasks can be scheduled and tracked to support a patient's specific condition, including reminders for physicians to order tests or additional studies. The solution also pushes alerts to clinicians, enabling them to choose the correct intervention for a patient who does not report in as scheduled, or who reports vital statistics out of hospital-defined ranges.

Patient data from a call is displayed and color-coded so that nurses can spot potential problems early. For example, if a patient's weight were to go above or beyond a preset parameter, then the data would be flagged with an alert that the patient may need an adjustment to medication or diet. Most of the time, these changes can be handled over the phone, saving a trip to the doctor's office.

Overall, disease management solutions leave patients healthy, following physician guidelines, and problems are caught early before they reach a critical stage. The negative financial impacts associated with caring for the chronically ill are also significantly reduced.

Ultimately, these programs can improve any facility's bottom line in the following ways:

- Decrease ER visits and readmissions for the chronically ill
- Achieve shorter lengths of stay and fewer unscheduled office visits
- Optimize resources by freeing up specialists' time and keeping beds available for higher reimbursable procedures
- Improve patient affinity by providing higher quality of care and keeping patients tied to the organization
- Prepare for future revenue by anticipating pay for performance reimbursement for disease management services
- Remind clinicians to communicate with patients and physician about returning for follow-up tests/ procedures

Twenty percent of heart failure admissions are related to patient failure to seek attention for worsening symptoms. The program catches relatively small problems before they turn into major issues. In turn, patients are remaining healthy and their quality of life is significantly improved.

Shifting CHF Care to Ambulatory Setting

Through disease management solutions, the goal is to keep patients' CHF under control, shifting care from the ER to ambulatory setting. An integrated IT solution can help ease that transition. With the evolution of healthcare, organizations may be apprehensive about making the investment in an IT solution. It is important for these

organizations to select an IT solution that is flexible and adapts to their unique workflow. For this reason, the planning phase of an IT solution implementation is essential. It is important for healthcare organizations to knock down the silos and review their processes so that the result is the best patient care possible.

CHF Forecast

There is a clear need for reliable, economical solutions and approaches to diagnose and treat CHF at an early stage, and to track progression of the disease through a lifetime in order to allow for successful medical care. Advanced diagnostic technologies permit physicians to see the signs earlier, cutting-edge treatments are improving the effectiveness of therapy, and innovative IT solutions are streamlining workflow and enhancing decision-making. Shifting the focus from the ER to ambulatory setting is extending lives.

An integrated, holistic approach to CHF management ensures optimized outcomes in the areas of clinical, operational, and financial performance. With better CHF management, we not only can improve the quality of care, but we can do it more cost-effectively than ever before. Nowhere is this level of efficiency and quality of patient care more important than in the cardiac setting, where seconds count in patient health and survival.

Putting it All Together

With a broad array of technologies, treatments, and information systems available, determining the right mix of solutions to care for a CHF patient population can be a challenge for every facility, from acute to ambulatory. Siemens offers consulting services in the areas of business strategy and management, clinical and operational process optimization, technology and infrastructure planning and integration as well as a modality-focused Compass program. Through these services, consultants work intimately with each and every customer to identify the most effective, cost-efficient solution for their individual needs.

The future of CHF management continues to shape itself as developments in new diagnostic tools and treatments merge, and IT helps in the delivery of these advancements.

As the population grows older, the number of CHF patients will only continue to increase. This is a possible daunting thought to some, but through innovative treatments and disease management solutions, the healthcare industry is on its way to trendsetting patient care that's safer, more accurate, and cost-effective. And, the industry will only continue to make strides in these areas, not just for CHF, but well beyond it.

A true continuum of care results in empowering healthcare providers and patients with information. New diagnostic tools and technologies will help establish a manageable CHF plan and IT technologies can help ensure that these plans are met. With a complete clinical view of the patient's progression of disease over time, physicians are able to provide faster, more streamlined care.

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