

Case Study: Using New Heart Failure Measure, Home Care Providers Reduce Rehospitalizations

by Carolyn Humphrey, RN, MS, FAAN

If yours is a typical home care agency, patients with chronic conditions such as heart failure have the strongest negative impact on your rehospitalization rate. One would think that, with all the advanced technology available to healthcare providers today, there would be a tool able to detect an imminent heart exacerbation before the patient reaches the stage where hospitalization is the only course of action.

Today, finally, there is such a technology. What's more, it now comes in a package small enough and light enough to be carried from home to home by a nurse. This is its story. *(Click on numbers in parentheses to read author's footnotes.)*

U.S. health realities create the need

As indicated in the American Heart Association's 2008 statistics, the number of patients with Heart Failure (HF) promises to increase, which means it will remain the #1 diagnosis seen in home care and providers will continue to be pressed by *all payers* to find cost effective clinical care that results in great outcomes for the least amount of money!

The reality is HF is a chronic disease that is difficult to keep under control since its symptoms are linked to the heart's ability to efficiently pump fluid through the body. Without the correct combination of fluid management, medications, and symptom monitoring, HF can rapidly get out of control.

Caring for HF patients in home care means the nurse must first expertly assess the patient's co-morbidities, symptoms and the effects of medications to develop a picture of each person's unique disease path. Then, the nurse must teach every patient how to identify their own path and how to care for themselves.

This may not be so hard if you have the right tools. However, even though health care has become high tech, we are still assessing whether HF patients are collecting fluid, i.e. getting into problems, in the same, low-tech ways, looking for:

- weight gain
- swelling of feet, ankles, abdomen or legs
- shortness of breath, frequent coughing, or frequent coughs.

Unfortunately, by the time these symptoms occur, fluid has already built up to a level where effective treatment cannot be provided at home and away to the emergency room they go. Usually, they need to be admitted and the home care agency is charged with a rehospitalization on its Home Health Compare scores.

Stating the need

Wouldn't it be great if nurses had a way to detect a patient's HF problems before these traditional indicators even show up?

OR

Wouldn't it be great if nurses could detect an imminent weight gain, swelling or shortness of breath several days before it occurred and could intervene early enough to avoid a trip to the hospital?

Addressing the need

We do. The method is to measure Zo, shorthand for "Thoracic Base Impedance." This measure has been used by physicians for over twenty years as a quick and easy way to determine whether patients are experiencing fluid congestion or dehydration. They use the *ZOE® Fluid Status Monitor*,⁽³⁾ made by Noninvasive Medical Technologies, which provides objective data to guide early intervention of heart failure, end stage renal disease, hypertension exacerbation as well as other critical events related to hemodynamic status disruption.

Previously available only as part of a multi-function monitor, wheeled from hospital room to room on a cart, the portable ZOE® Monitor now fits in a small carrying case.

Research⁽⁴⁾ indicates that measuring Zo can predict congestion in heart failure cases as early as two weeks prior to weight gain and other symptoms such as edema or shortness of breath. Nurses then have more time to assess reasons behind the changes and work with patients to change behaviors or improve medication adherence. Often, they also consult with the patient's physician, *before* having to resort to disruptive and costly emergent care or rehospitalization, to determine whether adjustments in the patient's treatment plan are indicated.

The ZOE® Monitor is FDA approved and intended for use by qualified healthcare practitioners, under the direction of a physician, for monitoring:

- Patients living with fluid management problems
- Patients taking diuretic medication
- Patients living with Heart Failure
- Patients living with End-Stage Renal Disease
- Patients recovering from a coronary artery disease related event
- Patients suffering from recurrent dehydration

Contraindications:

- Patients with allergies to electrode hydrogel
- Patients with skin sensitivities to electrode hydrogel
- Patients with skin breakdown in areas on the chest where ZOE® Monitor electrode placement is required.

Measuring outcomes

One patient's ZOE® experience

Mrs. S is a 71-year-old woman with a primary diagnosis of HF and secondary diagnosis of insulin dependent diabetes. I interviewed Katherine, a home care nurse, after she had been monitoring Mrs. S with the ZOE® *Fluid Status Monitor* for six months.

Mrs. S's medications are the expected ones for someone with her diagnoses: insulin, a diuretic (lasix), potassium to counteract fluid loss from the diuretic, and a beta blocker. She has a very attentive husband who, though she playfully describes him as a man "any woman would die for," needs a lot of direction, education, and support when it comes to his caregiver duties.

Mrs. S was referred for in-home monitoring after having been hospitalized several times for being "extremely wet" (fluid overload) and occasionally for being "dry" (dehydrated). Her home care provider knew she needed more ongoing monitoring than they could provide so they supplemented in-person visits with services through their contract with Baseline Telehealth, Inc., the disease management company that employs Katherine.

Baseline provides telemonitoring in patients' homes, including ZOE® monitoring, and supplements nurses making in-person visits with office-based critical care nurses, who provide additional patient support, education, and intervention as needed.

Six months after Katherine began to see Mrs. S, she told me, "I am happy to inform you that Mrs. S has not been hospitalized since being with us and that the ZOE® Monitor is very helpful in letting me know when Mrs. S. needs to be careful with her diet or drink more or less. The majority of the time she showed no symptoms but her Zo readings indicated problems were present. She would start to get compliant and her numbers would go up and then she would start to get dehydrated but her weight did not change to reflect these events.

"When I realized that the ZOE® Monitor was giving me advance warnings, I started to rely on it all the time. Now, she gets a ZOE® Monitor reading every other day and I review it. I have been able to call Mrs. S when she is either too wet or dry and simply instruct her and her husband over the phone to drink more or to restrict her fluid intake."

One home health agency's ZOE® experience

Trinity Home Health Services, with corporate offices in Novi, Michigan, initiated a HF program a year ago called *Hearts at Home*. They purchased ZOE® Monitors for each of their seven offices and integrated them into their comprehensive disease management approach, which includes patients conducting daily monitoring of their ZOE® readings and other data and reporting them through the *Pharos Tel-Assurance* daily phone survey program. Visits focus on patient education, covering disease management, exercise and diet instructions for improved post-discharge self care.

Suzanne Omtvedt, RN, CRNI, Infusion Clinical Specialist and Coordinator of the *Hearts at Home* Program, "just loves" the ZOE® Monitor. "When I observe a patient's Zo readings fluctuate from baseline normal," she explains, "I ask more questions about what the patient has eaten and whether he has taken his medications correctly, searching for information to provide clues to reasons behind the changes." When necessary, she contacts his doctor.

"Our nurses have had several patients who have needed nothing more than medication changes," Omtvedt continued. "A few days after their physicians ordered the appropriate adjustments, their Zo readings returned to their normal ranges. This meant they did not have to go through the old patterns, waiting to develop breathing trouble and ankle swelling before we adjusted their medicines."

| Table 1 | | |
|--|----------------------|-----|
| Trinity office A: ZOE monitored CHF patients compared to Medicare Home Health Compare state and national averages | | |
| Percent of patients admitted to hospital (lower scores better): | 1st Quarter | 15% |
| | 2nd Quarter | 14% |
| | 3rd Quarter | 16% |
| | HHC State Average | 27% |
| | HHC National Average | 28% |

The data presented in Table 1 are outcome scores for the three quarters of Trinity's Home Care Compare data compared with state (Michigan) and national averages from March 2008 posted scores. The office shown has the largest number of HF patients, however, HF patient data from the other six offices trends the same way.

| Table 2 | | |
|--|----------------------|-----|
| Trinity office A: ZOE monitored CHF patients compared to Medicare Home Health Compare state and national averages | | |
| Percent of patients needing unplanned medical care (lower scores better): | 1st Quarter | 11% |
| | 2nd Quarter | 13% |
| | 3rd Quarter | 12% |
| | HHC State Average | 21% |
| | HHC National Average | 21% |

Although there are many factors that combine to affect overall agency scores for these patients, Suzanne Omtvedt states, "The ability to monitor patients' Zo readings has had a major impact on our ability to call patients to further assess what could be causing changes and then offer direct teaching or contact a physician for medication orders. There is no question that this early, direct communication with the patient has made a big difference in our Home Care

Compare outcomes and the cost savings we have experienced in the program.”

Trinity has begun measuring the financial impact of the *Hearts at Home* program (Table 3). Consideration of financial outcomes of such programs should be reviewed keeping in mind possible additional costs imposed by the program itself and potentially not calculated in published outcomes, as well as the variability of costs over time. It is evident, however, from this preliminary data that return on investment has been positive to the agency while the program provides high quality care and outcomes.

| Table 3 | | |
|---|----------------------------|--------------------|
| Trinity office A: Financial impact of <i>Hearts at Home</i> program | | |
| | Average visits per episode | Profit/Loss change |
| 1st Quarter - 25 patients | 14.0 | +\$8,220.00 |
| 2nd Quarter - 14 patients | 16.4 | +\$4,153.00 |
| 3rd Quarter - 25 patients | 18.8 | +\$7,830.00 |

Adoption of the ZOE® Monitor is on the rise, both by home health agencies and their telehealth vendors. As case studies and aggregate data such as presented in this article become increasingly available, monitoring Zo is perceived as a cutting edge technology that decreases costs, improves outcomes and increases patient satisfaction. Ongoing work on compiling data on case studies, programs and costs is a priority of the device's manufacturer (<http://www.nmtinc.org>) and distributor (www.omnimedicalsupply.com).

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