

**Application of Telemedicine to Home-Managed Congestive
Heart Failure Patients in Rural Mississippi**

PROJECT SUMMARY REPORT

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Heart Failure Patients in Rural Mississippi

EXECUTIVE SUMMARY

Goals:

The goal of this project is to improve the home-based management of North Mississippi's rural region's congestive heart failure (CHF) patients.

Outcomes and Impact:

This project assessed 3 different outcomes: clinical - emergency department (ED) visits and hospitalizations; humanistic - patient quality of life and satisfaction; and financial - the efficiency of traditional home care compared to home care via telemedicine.

Summary of Procedure:

We procured 23 telemedicine (TM) units and 3 central units. We identified patients from our CHF home care population and placed a TM monitor in their homes. The homecare TM nurse taught the patients and their caregivers to use the monitor and assessment tools (telephonic stethoscope and sphygmomanometer). The nurse and patient set up a routine visit schedule and the patient contacted the TM nurse at the appointed time. The TM nurse conducted a routine home healthcare visit from her home healthcare (HHC) office performing both a cognitive and a physical assessment of the patient.

Evaluation:

This project was approved by the NMHS IRB and each patient signed an informed consent. The TM nurse maintained routine home healthcare nursing notes on each patient. The routine OASIS assessment was also performed on each patient at 3 and 6 months. The only additional information directly obtained from these patients was their satisfaction with the TM program. A retrospective analysis was performed on each patient to determine their hospitalizations and ED visits during their regular-HHC and TM-HHC courses. Each patient was compared to his/herself during these time frames. The lengths of stay and costs of these hospitalizations and ED visits were also recorded. A control population was randomly selected from the traditional HHC population and demographic information was collected. An evaluation of the efficiency of the TM-HHC vs. regular-HHC is performed using current labor, equipment, travel, time and transmission costs.

Results:

From July 2000 to March 2002, 44 home-bound CHF patients were managed via TM. Their average age was 75 years and 36% were Phase-IV (most serious). The analysis of hospital admissions, costs, lengths of stay, ED visits and ED costs favored TM, but a significant difference was only found with the frequency of ED visits (0.24 vs.0 ($P=0.03$)). The functional assessment (OASIS) found the majority of patients remaining stable (63%) or improved (27%) at the 3-month intervals. Eighty-six percent of patients or caregivers were "highly satisfied" with the TM program. The cost analysis identified the regular-HHC cost of care to be \$43.92 per visit and the HHC-TM to be \$33.23 per visit, with a net difference of \$10.69 per visit.

Conclusion: The TM program was successful in all 3 dimensions: clinical, humanistic and financial.

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Background

Patients with congestive heart failure (CHF) are unable to generate the cardiac output necessary to meet their body's demands. CHF patients experience shortness of breath, rales, edema, fatigue and poor exercise tolerance. The lifestyles of CHF patients are often restricted by these symptoms many of them are home bound. These patients are usually elderly and often live alone or with an aging caregiver. Even with optimal management, the progressive symptoms of CHF mandates the patient's isolation. This disease has considerable emotional impact on both patients and their families. It causes anxiety whenever the patient's symptoms worsen and on-going depression because of the patient's isolation and morbidity.

Life with CHF is a dismal picture. The patients are sick, isolated, depressed and then they die (the mortality rate of CHF is high, with more than 50% of patients dying within 5 years of diagnosis). [1] With close medical management, most CHF patients can be managed in their homes, however, it is not uncommon for these patients to get "out-of-control" and to cycle between home, hospital and emergency room. All of these problems are made worse for our community's patients for 4 reasons: Mississippi is a rural state, which means that patients are already geographically isolated; Mississippi is a poor state, with the lowest per capita income in the US, as well as low education levels; Mississippi is a medically under served state, with 141.8 physicians per 100,000 residents (compared to national ratios of 228.4 physicians per 100,000 residents), which means our patients have poor access to on-going medical management; and Mississippi is ranked 50th in the nation for inhabitants with heart disease and for deaths due to it.[2] In summary, our patients are more likely to develop and die from CHF, they are already geographically isolated, and they have poor access to primary care which makes home management more difficult and hospitalization more common.

North Mississippi Medical Center (NMMC) is a 650-bed tertiary care center in Tupelo Mississippi and it provides acute, subacute, long-term and home care management of CHF patients. The NMMC Home Healthcare Agency collaborated with the Biomedical Department to provide telemedicine units to patients in their homes. In October 1999, the Technology Opportunity Program (TOP) provided a grant to fund the purchase of 23 home telemedicine units and 3 central units. The goal of this project is to improve the home-based management of NMMC's rural region's congestive heart failure (CHF) patients. This "improvement" was assessed through 3 different outcomes: clinical - emergency department (ED) visits and hospitalizations; humanistic - patient quality of life and satisfaction; and financial - the efficiency of traditional home care compared to home care via telemedicine.

Project Development

Once funding for the telemedicine units was secured from TOP, the CHF-TM team worked to procure the units and implement the program. The project's time line is described in Appendix 1. A site visit was made to a HHC with a well-established TM program, The University of North Carolina Home Health Telemedicine Program, and this provided us with good practice examples and TM data management forms. A RFP was prepared and 3 vendors demonstrated their equipment. The CHF-TM team selected the Kodak product and developed the necessary technical policies and procedures. The HHC-TM case manager, a nurse, developed a protocol for TM patient selection and management that was consistent with current home care management standards. The project's evaluator developed a project outline, data collection plan, and an informed consent document. The project was approved by the NMHS IRB and the first home healthcare patient was started on TM July 2000. In December 2000, Kodak decided to

discontinue their TM line of products. They provided us with the funding to purchase new equipment and maintained their equipment in patients homes until we could comfortably make the switch in products. The CHF TM team reviewed their initial product evaluation and selected American Telecare. Eight patients were enrolled in the program at this time and we did not enroll new patients until the new equipment was fully installed and functional (March 2001). From this time to the present, the HHC-TM nurse has continually enrolled new patients and managed them until their death or discharge.

TM Patient Management

The original proposal planned for patient access to HHC nurses 24/7 via the TM units. Through the site visit, research on existing programs and our own logistics we found that 24/7 availability was not essential and very difficult to implement. Our program was set up like other HHC-TM programs, providing patients with access to the HHC-TM nurse, Monday through Friday, from 7:30 A.M. to 5:00 P.M. During the evening and on weekends, the TM patients would have routine access to HHC nurses via conventional phone.

We identified patients from our CHF home care population who required intensive management. All of the patients were NYHA stage III or IV of heart failure and many of them were routinely hospitalized for heart failure. (Appendix 2 - Inclusion/Exclusion Criteria) We explained the TM program to the patients and asked if they wanted to participate in the program. If they consented, we placed a TM monitor in their homes. The HHC-TM nurse taught the patients and their caregivers to use the monitor and assessment tools (telephonic stethoscope and sphygmomanometer). (Appendix 3 - Patient Admission Process)

The case manager and patient set up a routine visit schedule (2-3 times per week) and the TM case manager called the patient at the appointed time. The HHC-TM nurse conducted a routine home healthcare visit from her home healthcare (HHC) office performing both a cognitive and a physical assessment of the patient. Patients described how they were feeling and any problems they've had. Patients or the caregivers placed the stethoscope on the patient's chest and the nurse is able to listen to the patient's heart and lungs. The nurse is also able to take the patient's blood pressure and pulse via the sphygmomanometer. This information along with the patient's daily weights are used by the nurse in her assessment of the patient's condition and are incorporated into the patient's medical record.

The patients weigh themselves daily and measure their blood pressures. This information is recorded in the patient's home telemedicine unit. The HHC-TM nurse collects this information when she contacts the patient during her regularly scheduled telemedicine visits. The patients are educated about weighing themselves and are asked to contact the nurse immediately if their weight is outside of their individualized "normal" range. If the patient calls because his or her weight is outside of the preset range or with any other new complaints, the HHC-TM nurse conducts an unscheduled telemedicine visit. The HHC-TM nurse notifies the patient's physician of any changes in the patient's condition or plan of care. The telemedicine units are available to the physicians for virtual visits with their CHF patients. And if a patient is unstable, the HHC-TM nurse encourages his or her physician to participate in a telemedicine visit. The patient's

regular home health care nurse is still providing actual visits, but on a reduced frequency, and these visits are coordinated with the HHC-TM nurse.

Patients are routinely discharged from this program and the criteria and procedures are outlined in Appendix 4.

TM Equipment

An automated video/voice communication device is placed in each patient's home. It consists of a two-way interactive H.324 compliant video and personal telemedicine module containing a camera, display speakerphone, a blood pressure and pulse meter and a telephonic stethoscope. It is capable of providing two-way video interaction as well as measuring heart rate, blood pressure and transmitting breath and heart sounds. The information is fed to a central unit via plain old telephone system (POTS) much like the way EKG, Holter "dumping" works.

The central stations are located in the HHC central nursing office, the Family Medicine Residency Center and the Internal Medicine Associates. These units include a receiver to identify incoming calls, a video screen for the health care staff, and the listening end of the electronic stethoscope. The central station also has a personal computer and a storage device for the patient's home-care records. The first unit was placed in the HHC central nursing office and has been in use throughout this project. The other two units were placed in the physician's offices in mid-2002, so their use is not included in this evaluation.

Data management

All patients who sign the informed consent, and are enrolled in the TM program, are included in the data analysis. The HHC-TM nurse develops a TM patient profile for each patient and records clinical data as necessary for optimal patient management. This clinical record is a source of process information and clinical outcomes for the study's data base.

This project assessed 3 different outcomes: clinical - emergency department (ED) visits and hospitalizations; humanistic - patient quality of life and satisfaction; and financial - the efficiency of traditional home care compared to home care via telemedicine. The following is a description of how the data were gathered for each of these outcomes.

Clinical: Each patient acts as his or her control during the study. Patient care is monitored for the time they were receiving regular home healthcare (r-HHC), prior to the implementation of TM, and for the time they receive home health care via telemedicine (HHC-TM). The frequency of hospitalization and ED visits during the r-HHC phase (at least 3 months) during the HHC-TM phase (at least 3 months) were collected by querying the health system's database using each patient's universal record number. Only hospitalizations that included a primary or secondary diagnosis code for CHG (4280) were recorded. The LOS of hospitalizations and the cost of hospitalizations and ED visits were recorded. The frequencies of hospitalizations and ED visits are annualized. If the length of stay (LOS) in either the R- HHC phase or the HHC-TM phase is less than 3 months, the patient's outcomes are not included in this section of the study's analysis

because we feel that at least 3 months of activity is necessary to assess the effects of the phase of care.

Statistics: A mixed model approach was followed, using the Mixed procedure of SAS. Patients were viewed as a random effect in the model and data from patients receiving both regimes, as well as those receiving only a single management regime, were included in the analysis. Least squares means, which adjust for treatment imbalance within patients, were used to estimate effects for the two regimes. Additionally, the analysis was done separately for each NYHA class (III and IV) in the study.

Humanistic: Patient functionality and satisfaction are both assessed through separate tools. The HHC-TM nurse collects patient functional information. All HHC patients are assessed using OASIS, a standardized, functional assessment tool. Patients are evaluated at the onset of their HHC course and at 3 month intervals. The HHC-TM patients are assessed at the onset of their TM care and at the 3-month intervals. Nine items from the OASIS assessment that reflect emotional status, physical condition and activities of daily living (ADLs) will be followed as part of the functional assessment for these patients. (Appendix 5) The patients' responses to each of the indicators is ranked as "improved," "stabilized" or "destabilized" from the baseline assessment.

During the initiation visit the HHC-TM nurse provides the patient/caregiver with a satisfaction survey. At the time of discharge from the CHF TM project, the HHC-TM nurse asks the patient to complete and mail the satisfaction survey to the HHC-TM nurse. The respondents were given the following options: highly satisfied, somewhat satisfied, satisfied, somewhat not satisfied, and not satisfied.

Financial: The costs of providing regular HHC (nurses' time and travel) were compared to the costs of providing HHC-TM (nurses' time, equipment, transmission). These costs generate the estimated cost per visit per each mode which are then projected to an annual cost comparison.

Results

The first patient was enrolled in July 2000. This analysis followed patients who were enrolled through March 2002. The hospitalizations and ED visits of the patients who were enrolled in the program in March were monitored through September 2002. Patients enrolled after March 2002 were not included in this analysis. A control group was created via a random sample of patients receiving regular HHC. Basic demographic information was collected on these patients.

Forty-four CHF patients were entered in the TM program and information on 21 control patients was collected. (Table 1) Although the HHC-TM patients were younger than the r-HHC patients (mean years of 75.4 vs. 84.8), the HHC-TM patients were sicker. The New York Heart Association (NYHA) is standard assessment mechanism for CHF, with grades I through IV with IV being the worst. The r-HHC population has a much higher percentage of patients in grade III heart failure (83% vs. 64%), indicating that the HHC-TM patients were generally sicker than the regular HHC population.

Table 1: Patient Demographics

Variable	Regular Home Health Care		Home Health Care - TM	
	Mean/count	n/%	Mean/count	n/%
Age	84.8	21	75.4	44
r-HHC duration	5.8	23	7.6	42
HHC-TM duration	-	-	5.2	40
NYHA III	19	83%	28	64%
Female Gender	16	70%	29	66%

Data for 44 CHF patients who received both Home Care and Telemedicine care, for varying durations and in that order were analyzed for differences in annualized hospital admissions, cost, and LOS and for annualized ED admissions and cost. As seen in Table 2, the only significant difference between the two regimes is for ED admissions when analyzing all patients, with the HHC-TM phase having fewer admissions. Additionally, though not statistically significant, TM patients had fewer admissions and a lower cost of care for their hospital care. When the patients are analyzed by their NYHA class (III or IV), none of the parameters reach statistical significance.

While the analysis allows one to adjust somewhat for patient differences and for patients receiving only a single management regime, it is possible that the results are biased against TM because this regime is always applied after patients have already received HHC. Because the condition of CHF patients typically deteriorates with time, even patients who were exposed to each management regime were usually sicker when on TM.

Table 2: Hospital admissions and ED visits for all patients

Variable(/yr)	Regular Home Health Care		Home Health Care - TM		P value
	LS mean	SE	LS mean	SE	
Hosp. Admissions	1.49	.41	1.05	.35	.29
Hosp. Costs (\$)	14,025	3,860	11,664	4,606	.62
Hosp. LOS (days)	6.36	1.87	7.27	2.63	.77
ED Admissions	.24	.10	0	0	.03
ED Cost (\$)	181	107	0	0	.10

As noted, 44 patients were started on TM and baseline OASIS assessments were performed on all patients. Thirty-five patients were available for the first 3 month assessment. Five patients had expired and 4 other patients were off of the program for other reasons (improved, inconvenient, uncomfortable with technology). At the 6-month mark, 25 patients were assessed. Two patients expired and 8 patients were off of the program.

The majority of patients “stabilized” at both the 3-month and 6-month marks. (Table 4) The most noticeable “improvement” at the 3-month mark is in dyspnea with 63% of patients being assessed as improved over baseline. Improvements in pain management followed, with 43% of patients assessed as improved. Bathing was the biggest problem at the 3-months, with 14% of patients declining from baseline. The 6-month assessments also showed considerable improvement (28%- dyspnea and 36% - pain). More important, however, was the relatively little decline observed, with 0% in depression, behavior, bathing, and transferring.

Table 3: Patients Functional Assessment

	3-Month Assessment (35 patients)			6-Month Assessment (25 patients)		
	Improved	Stabilized	Declined	Improved	Stabilized	Declined
Pain	43%	54%	3%	36%	60%	4%
Dyspnea	63	28	8	28	64	82
Anxiety	31	63	6	32	68	4
Depression	23	71	6	28	72	0
Behavior	26	68	6	16	84	0
Bathing	23	63	14	28	72	0
Transferring	14	80	6	20	80	0
Ambulation	14	77	8	8	84	8
Oral Meds	8	86	6	12	84	4

All 44 patients and/or caregivers were asked to complete a satisfaction form at the time of the patient's discharge from the program or their death. The majority of respondent (86%) were highly satisfied and only 3 respondents were "somewhat not satisfied." (Table 4) In these cases, the patient's families expressed the following concerns: they found TM to be inconvenient; TM made them nervous; and in one case it was unnecessary because the HHC was visiting twice a week to administer Lasix, an injectable diuretic.

Table 4 - Patient and/or caregiver satisfaction with TM

Satisfaction Level	Respondents (44)	Percentage
Highly satisfied	38	86
Somewhat satisfied	2	5
Satisfied	1	2
Somewhat not satisfied	3	7
Not satisfied	0	0

The financial evaluation was performed by examining the costs incurred by employing each mode of care. To evaluate the TM it is important to capture the equipment costs and the costs of transmission (Table 5), whereas the transportation costs are more significant in the routine home care costs (Table 6). The difference in cost and the projected annual savings are presented in Table 7.

Table 5 - Cost of TM visit

Equipment Costs

Number of central stations	1*
Cost of central station	\$10,160
Number of patient stations	23
Cost of central stations divided by number of patient stations	\$441
Cost of patient station	\$4,908
Cost of patient station added to central station cost	\$5,349
Expected depreciable life of equipment (3 years) - annual cost	\$1,783
Calls/year per unit (2 calls/week in 19 of 23 units (82%) by 52 weeks)	85
Cost per call - annual cost divided by annual number of calls	\$20.98

Staffing Costs

Average hourly wage and fringe benefits	\$33.75
Cost per call - average length of telephone call - 20 min - 3 calls/hr	\$11.25

Telephone Costs

20 minutes per call at \$0.05 per minute	\$1.00
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Total Direct Costs of TM call

Equipment	\$20.98
Nursing	\$11.25
Telephone costs	\$ 1.00

Total Direct Costs of TM call **\$33.23**

*As noted earlier, although 3 central units were purchased, only one was in use for most of this project.

Table 6 - Direct Costs of an In-person Visit

Staffing Costs	
Average hourly wage and fringe benefits	\$28.81
Each visit plus travel time- 1.33 hrs (based on average # visits/day)	\$38.50
Mileage Costs	
Miles per visit (15.37) at \$.35 per mile	\$5.38
Total Direct Costs of an In-person visit	\$43.92

Table 7 - Net Difference and Projected Annual Savings

Net Savings per TM visit	
Inperson visit (\$43.92) - TM visit (\$33.23)	\$10.69
Projected Annual Savings	
Visits per year - 85 visits per year per unit (23 units)	1955
Visits per year by the savings per visit (\$10.69)	
Projected Annual Savings	\$20,902

Discussion

Home health care provided via telemedicine appears to be successful in all 3 of the outcomes we measured. When patients are used as their own controls we find that fewer patients are admitted to the hospital while on HHC-TM and the costs of these stays are less. Neither of these parameters were statistically significant, but the trend was strong and if the sample of patients was larger the difference may have been noted. The only statistically significant difference is the frequency of ED visits. This may be explained by the TM nurse being able to rapidly assess patients and provide reassurance, thereby keeping patients out of the ED.

Patients also appeared to do well while they were in the TM phase. The majority of their OASIS scores for the 9 indicators of mood, CHF symptoms, and functionality were considered “stable” at 3 and 6 months of TM. Relatively few patients declined during TM. It should be noted that HHC-TM always followed r-HHC, so the bias, if any, is against TM, since CHF is a progressive disease the TM patients would be sicker. It also appeared that most patients and care givers were pleased with TM.

The financial analysis used our actual costs, mileage and staff time, so they may not apply to others contemplating this service. Telemedicine appears to be more cost effective and projected a savings of more than \$20,000 per year. Two things may have affected this financial analysis: our HHC-TM nurse is an experienced nurse with advance training and her reimbursement is

higher than the average CHF nurse; Since we live in a rural area, our HHC nurses mileage may be higher than an urban or suburban HHC service.

Conclusion:

Telemedicine is a successful method of providing care to homebound patients with CHF. The HHC administrators are pleased with the program and plan to expand the use of TM to manage other chronic conditions. Now that HHC is receiving prospective payment, HHC administrators are looking for methods of improving efficiency without compromising patient care.

Telemedicine is a new technology that can provide good patient care as evidenced by fewer hospital and ED admissions and good functional assessments. It is also cost effective because the nurse is able to see more patients and the commuting costs are eliminated.

References:

1. AHCPR, *Heart failure: evaluation and care of patients with left-ventricular systolic dysfunction*. Clinical Practice Guideline. Vol. 11. 1994, Rockville, MD: U. S. Department of Health and Human Service.
2. Reliastar, *The Reliastar State Health Rankings*, . 1997, Reliastar Financial Corporation: St. Paul, MN.

Appendix 1 - Time line

Phase I: 0-9 Months (October 1999 - June 2000)

- The technical project manager and the clinical project manager visited, The University of North Carolina Home Health Telemedicine Program in Greenville, N.C., a facility with an existing TM program in February, 2000.
- The CHF Telemedicine Advisory Committee (TAC) reviewed available equipment and selected TM units that best fit patient, nurse, physician and biomedical technician needs.
- Three TM companies visited NMMC and demonstrated their products.
- The TAC developed an RFP
- The TAC bid for and purchased equipment.
- Acquire enclosed office space at the central home healthcare nursing office to set up the central unit such that patient privacy and confidentiality are ensured.
- Developed central unit computers' interface with hospital's mainframe computer.
- Developed TM nursing protocol and documentation that are consistent with standard HHC for CHF patients.
- Received approval from the NMHS IRB to implement the study (March 2000).
- Selected the Kodak line of TM equipment in May 2000.
- Kodak technicians trained our biomed technicians on the TM equipment.
- Trained multi disciplinary team on the use and care of TM equipment.
- Developed patient education packet that covers the following points: equipment care and use; disease management; medication instruction; and contacting of outpatient telemedicine team.

Phase II: 9-33 Months (July 2000 - July 2002)

- Selected CHF patients (using selection criteria), informed them about the study, and asked if they want to participate in the TM program. Procured informed consent.
- Entered first patient into TM program in July 2000.
- Instructed TM patients and caregivers on the equipment use.
- Performed baseline OASIS assessment on each new patient.
- Performed OASIS assessment at 3 month intervals.
- Developed and implemented patient/caregiver satisfaction survey at discharge from TM program (or the patient's death)
- Ceased enrolling patients in December 2000 when Kodak told us they were closing their TM business.
- TAC reconvened and reassessed the available TM equipment.
- Selected American Telecare and began the process of switching equipment from Kodak to American Telecare.
- Maintained existing TM patients during the product transition
- Enrolled new patients after transition complete (March 2001)
- Developed and presented interim project report to TOP Networks for People, Washington, D.C., December 2001).
- Implemented second and third central units in the Family Medicine Residency Center and the Internal Medicine Associates (August-September, 2002).

Phase III: 33-36 Months (July 2002 - September 2002)

- Evaluated Phase II by analyzing patient clinical and functional outcomes.
- Assessed the financial impact the TM program.

Appendix 2 - Inclusion and Exclusion Criteria

Inclusion Criteria

A candidate for the CHF Telemedicine project must meet **all** operational and at least one utilization indicator.

* Operational Indicators:

- dd. Requires 2 or more home care nursing visits per week
- b. Does not require “hands on” care with each visit
- c. Is reliable or has reliable caregiver(s)
- d. Has a history of poorly controlled disease process (stage III or IV CHF)

* Utilization Indicators:

- a. CHF-related emergency room visit within the last 2 months
- b. CHF-related hospitalization within the last 6 months
- c. Frequent (more than one per month) CHF-related clinic visits

Exclusion Criteria

A patient will not be considered a candidate for the CHF Telemedicine project if one of the following indicators is present:

- ee. Insufficient electrical or telephone service to support the system
- ff. Patient or caregiver’s inability to learn the telemedicine system
- gg. Unsafe home environment
- hh. Patient’s refusal to sign an informed consent form
- ii. Patient or caregiver(s) are uncooperative

Appendix 3 - Patient Admission Process

Patient admission process

1. The HHC-TM nurse visits each CHF TM Study patient in his or her home and perform a home admission assessment.
2. The HHC-TM nurse explains the study to the patient and/or caregivers. She will answer their questions and ask them to complete the informed consent.
3. The HHC-TM nurse works with the patient, primary staff nurse, and physician to develop the patient's plan of care. The plan includes treatment goals, frequency of tele-visits, nursing interventions, educational needs, and anticipated length of stay.
4. The HHC-TM nurse hooks up the telemed equipment. She explains and demonstrates its operation to the patient and/or caregiver(s). The HHC-TM nurse provides and discusses educational materials.
5. The HHC-TM nurse evaluates the patient and/or caregiver(s) abilities to perform the following tasks:
 - a. Make the initial connection
 - b. Position the camera for visualization
 - c. Use accessory devices appropriately
 - d. Place the stethoscope correctly
 - e. Position the blood pressure cuff correctly
 - f. Report digital findings for accessory devices.

Appendix 4 - Discharge Criteria and Procedures

1. The patient is discharged from the program upon patient request, physician order, death and/or determination by the HHC-TM nurse.
2. The physician is notified and updated on the patient prior to the patient's discharge.
3. The patient's discharge is determined based upon the following criteria:
 - a. The patient has met anticipated goals and his or her condition no longer requires maintenance activities or frequent monitoring.
 - b. The patient requires more care than NMMC's Home Health Agency can provide.
 - c. The patient is uncooperative or the patient's environment is assessed to be unsafe.
4. The HHC-TM nurse visits the patient at home to terminate his or her participation in the study. The HHC-TM nurse provides the patient and/or caregiver with discharge instructions, and assesses their understanding.
5. The HHC-TM nurse makes the final assessments for the study and asks the patient/caregiver to complete satisfaction and health perception surveys.
6. The HHC-TM nurse removes the telemedicine equipment from the patient's home and returns it to the Biomed Department, which cleans the equipment based upon the manufacturer's guidelines.

Appendix 5 - Selected OASIS Indicators

1. Frequency of pain interfering with patient's activity or movement (M0420)
2. When is the patient dyspneic or noticeably short of breath (M0490)
3. When anxious (reported or observed) (40580)
4. Depressive feelings reported or observed in patient (M0600)
5. Patient behaviors (reported or observed) (M0600)
6. Bathing: Ability to wash entire body. Excludes grooming (washing face and hands only) (M0670)
7. Transferring: Ability to move from bed to chair, on and off toilet or commode, into and out of tub or shower, and ability to turn and position self in bed if patient is bedfast (M0690)
8. Ambulation/Locomotion: Ability to safely walk, once in a standing position, or use a wheelchair, once in a seated position, on a variety of surfaces.
9. Management of Oral Medications: Patients ability to prepare and take all prescribed oral medications reliably and safely, including administration of the correct dosage at the appropriate times/intervals. (M0780)