White Paper

Telemedicine Interventions

MANAGEMENT OF CHRONIC CARE

Introduction

Telemedicine Interventions and Management in Chronic Care

Change in the world of medicine is inevitable. We see this in legislative changes threatening to decrease the reimbursement of physicians and increase in the patient share costs. Innovation is key to delivering the necessary services to those at risk of losing coverage. This is especially notable with those with two or more chronic conditions.

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In 2014, with the advent of MyCare Ohio, our practice experienced a surge in patients with multiple co-morbidities. MyCare Ohio is in the state's Dual Demonstration, a system of managed care plans selected to coordinate the physical, behavioral and long term care services for individuals over the age of 18 who are dually eligible for both Medicaid and Medicare. These patients had never seen a physician nor been diagnosed and were now dealing with life limiting events such as stroke, diabetic neuropathy, limb loss, kidney failure, and morbid obesity. With their new health plan, patients not only sought out the care of a primary care practice, but also took advantage of hospital services and reduced cost medications. They had no understanding of newly diagnosed diseases and even less understanding of what life changes were required to maintain their current independence.

Long term chronic illness without treatment leads to permanent damage to vital organs and systems. The continual cycle of noncompliance to life style changes (Plans of Care) leads to a declining condition, and fight for stabilization. All of which creates a perfect storm rapidly driving up costs of treatment for these individuals.

With the reform of healthcare, physicians are now measured by the success of outcomes of treatment demonstrated by the reduction in hospitalization rates. This new measuring stick caused physicians to micro manage patients or stop treating these patient types all together. At Home Medical Professionals (AHMP) opted to continue to treat these patients by utilizing innovative tools.

Objectives of Chronic Care Patients

The following objective goals were determined for the pilot:

- **Reducing** Emergency and Hospital visits by 90% in the first 90 days.
- **Reducing** Emergency and Hospital visits by 77% after the first 90 days.
- **Enhance compliance** within patient Plan of Care.
- **Increase patient understanding** of Conditions and Management.
- **Reduce management** cost in the homebound population.

"In order for this Telehealth pilot to be successful, we must be able to dynamically detect changes in patient conditions without increasing the frequency of visits to a hospital or primary care."

Gwynne Ingram
Managing Partner, CEO
AHMP

Pilot Introduction

Twelve patients with the highest rate of hospitalization and after hours call frequency were selected. The telemedicine program ENGAGE was designed to remote monitor these patients and engage them in their plan of care. ENGAGE demonstrated the ability of technology to not only remote monitor patient changes but to change their perspective of the role in their plan of care.

Patient Selection Criteria

Patients chosen to participate in the pilot had to meet the following criteria:

- Three or more chronic diagnoses with the potential to create instability with the risk for return to hospital
- Target diagnosis included Diabetes, Congestive Heart Failure, Chronic Obstructive Pulmonary Disease, Primary Hypertension, Obesity and Anxiety *(Acute psychiatric diagnosis were not included in this pilot)*
- Three or more hospital visits in the 6 months prior to pilot or homebound without the ability to leave the home in case of medical emergency *(i.e. morbid obesity greater than 400 pounds)*
- Ability to follow multi-step directions, see a television screen and answer a phone. *(Anyone residing in the home with these abilities were also allowed)*

GTS Virtual Health (GTS)

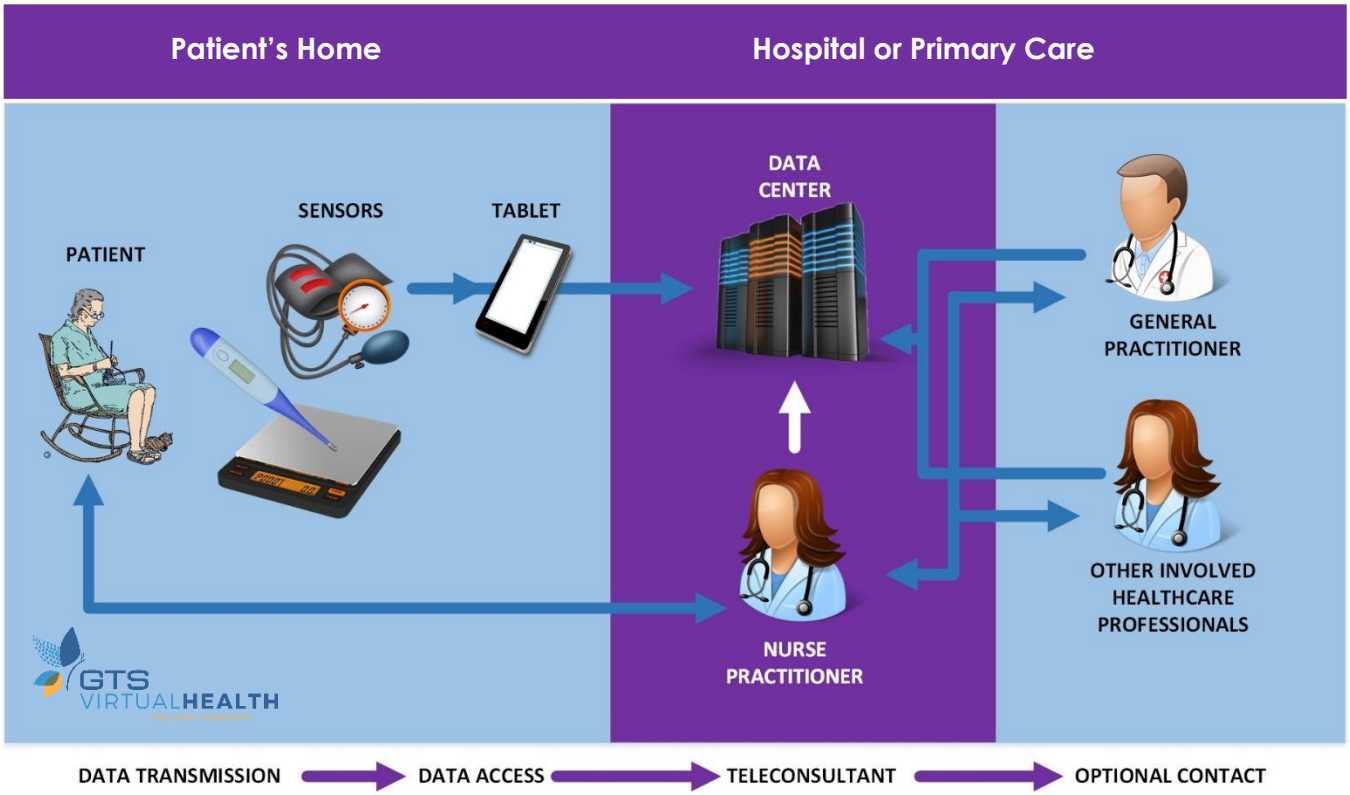
In order for a successful pilot, a dynamic and agile telehealth partner was required. AHMP, met with various telehealth providers. A common trait among many of the vendors was the need to be both a hardware and software company. Because of this, rather than focus on either hardware or software, the service offerings suffered across both. GTS is primarily a software company and their expertise in the user experience, back office infrastructure and agility to custom implement changes, made this company the clear choice for this project.

Innovative Technology

Leading edge technology was implemented that takes advantage of industry standard wireless communications and HIPAA compliant encryption standards. The assembled kits distributed to patients included:

- Android Tablet re-fitted with client interface
- Bluetooth wireless device nodes including: blood pressure cuff, wireless weight platform, pulse, heart rate and oxygen saturation finger cuff, wireless glucose meter

The right tools for the Right diagnosis
The configuration and layout of the equipment is specifically designed to be easy to use for all patients



Patient Case Studies

Basic parameters were established on patient baseline data within acceptable highs and lows. Any reading outside of the parameter created an alert sent to the on call provider. The provider would then determine if a phone call was needed to further assess the patient condition. This data was used to dynamically change patient care throughout the pilot.

Case Study **One**

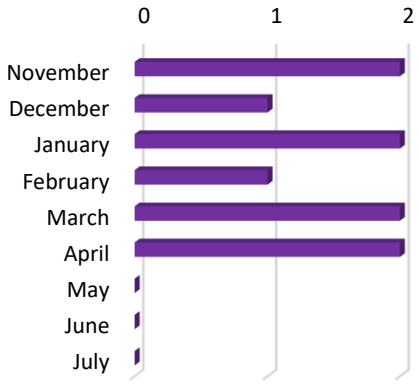
Patient: RJH *(76 year old female)*
Residence: Living at home without assistance
Diagnosis: Type 2 Diabetes, Morbid Obesity, Hypertension, Anxiety, Stage 3 Kidney Failure
Equipment: Blood pressure, weight, pulse, oxygen saturation, heart rate, and glucose
Readings: Three times per day *(additional readings were encouraged as needed)*

Because of her uncontrolled blood sugars, her default reaction to an anxious episode was to call 911 for a trip to the Hospital Emergency Room. This patient had a history of blaming high glucose readings on everything from faulty equipment to church friends pressuring her to eat cupcakes.

RJH demonstrated typical behavior of anyone living alone with multiple co-morbidities including anxiety. When RJH entered into ENGAGE she had just returned from her fourth hospital visit in two months. Because of her uncontrolled blood sugars, her default reaction to an anxious episode was to call 911 for a trip to the Emergency Room. This patient had a history of blaming high glucose readings on everything from faulty equipment to church friends pressuring her to eat cupcakes.

In the early days of RJH participation in the ENGAGE program the patient experienced an episode of anxiety which would have resulted in a 911 call by the patient. This incident began at 12:34 am 7 days into her program participation. The patient reported glucose reading of 86 which was outside the monitoring parameter. An alert was received by the on call provider who recognized this as acceptable given the time of day. Another identical reading was generated 11 minutes later at 12:45 am, and a third identical reading was generated 1:05 am. The on call provider called the patient to investigate the multiple readings. The patient answered the phone on the first ring and was obviously in a heightened state of anxiety. The patient told the provider she was awake and couldn't sleep so she decided to test for fun to see her reading. Upon receiving the unexpected low reading she worked herself into a panic

Hospitalization Stays



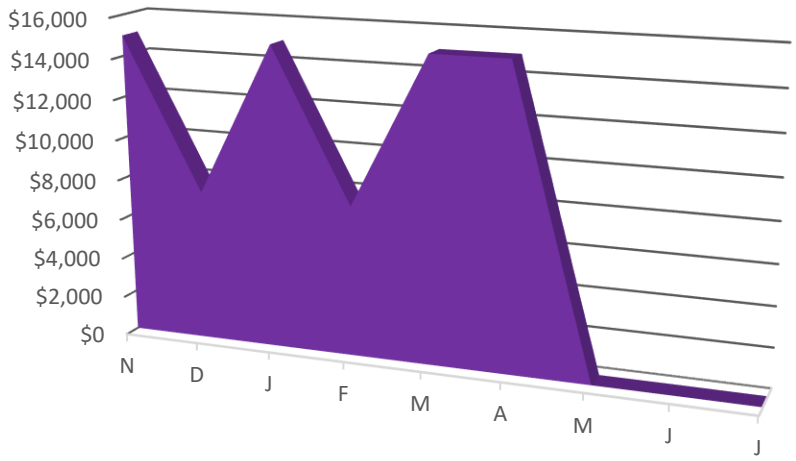
state and began to test and re-test fearing that if she went to sleep, she would never wake up. This incident allowed the provider to give the patient a rational explanation of the lower readings and walk her through all of the educational points in her plan of care. The patient quickly calmed down and finally was able to go to bed. This patient remained on the ENGAGE program a full year and never experienced another anxiety episode.

When later asked what changed, the patient said she realized that she was not alone. She also stated that she felt she was "smarter than she used to be about her diabetes and she knew what to expect." Where the patient previously deflected responsibility for high blood sugar readings to others and equipment, she began accepting responsibility for her food choices and the results they produced. In the months that followed, RJH would often contact the ENGAGE monitoring provider directly after a high blood sugar reading with just a simple phrase, *"CUPCAKES"* which of course was her biggest food nemesis.

RJH baseline data: BP 148/74, A1C 9.6, weight 345 BMI 63.1

RJH 90-day data: BP 122/54, A1C 9.1, weight 339 BMI 62.0

Hospitalization Costs



Significant decreases in medical costs after GTS Telehealth introduction

Average monthly costs over 6 months of **$12,500** drops to **$0.**

Medical Professionals

Case Study **Two**

Patient: JH *(70 year old female)*
Resident: Living at home alone with occasional home care aides
Diagnosis: Anxiety, Congestive Heart Failure, Primary Hypertension, Chronic Kidney Disease, Chronic Edema
Equipment: Blood pressure, pulse, oxygen saturation, heart rate, and weight
Readings: Two times per day *(additional readings were encouraged as needed)*

Prior to ENGAGE, these levels would have gone unchecked in between provider visits and consistently resulted in emergency room visits. Now with the ENGAGE toolset, the provider was able to bring in home health care and give specific education targets to the home health care nursing and dietician.

JH demonstrated a general lack knowledge of nutrition as it directly related to her multiple diagnosis. She averaged One visit to either the Emergency Room or hospitalization every month for the last 18 months prior to participating in the ENGAGE program. The most frequent reasons for hospital intervention were edema and shortness of breath.

As with all patients, the more often the patient reported the more accurate picture we were able to ascertain. Specific areas of the Plan of care to be adjusted included diet education. Reporting from this patient indicated weight fluctuations in a single day of more than 6 pounds. When paired with food intake reporting *(also on the telemonitoring unit)* the provider was able to discover that the patient was eating a steady diet of pre-prepared foods. These foods including canned soup, frozen dinners, beer, and soda Increased the patient's fluid retention to critical levels. Prior to ENGAGE, these levels would have gone unchecked in between provider visits and consistently resulted in emergency room visits. Now with the ENGAGE toolset, the provider was able to bring in home health care and give specific education targets to the home health care nursing and dietician. ENGAGE monitoring data allowed patient diuresis at home rather than sending her to the Emergency Room for assessment and intervention.

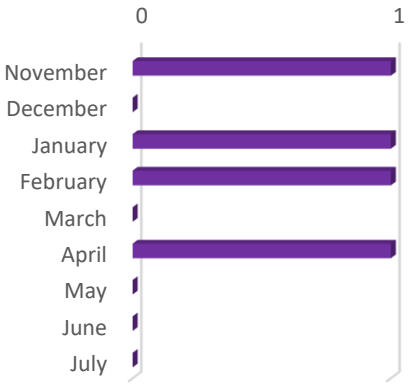
One specific outcome that must be heralded is drastic increase in the patient's' quality of life. Through a team approach in interventions with home health care, dieticians, nurse practitioners, nephrologists, this patient has better control of her diagnosis and has achieved stabilization. By learning to become engaged in her plan of care, she is able to enjoy the

foods she loves, but also knows what difficulties and symptoms to watch and how to treat in order to avoid emergency room visits.

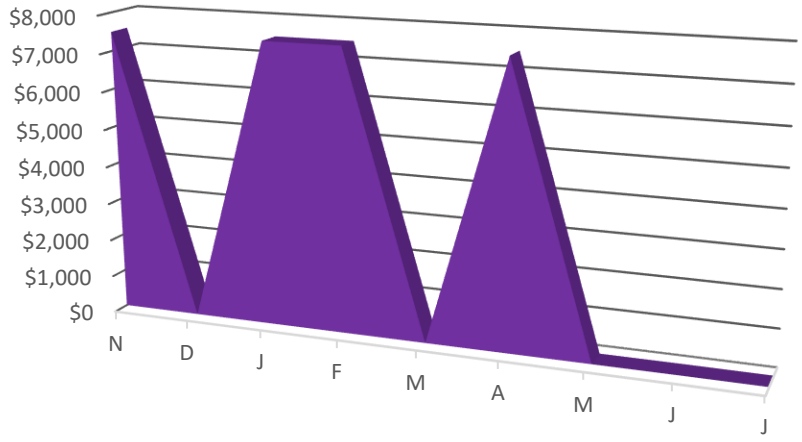
Baseline data: BP 166/90 HR 81 bpm, Pulse Oxygen Saturation 89%, weight 282.8 BMI 50.1

90 Day data: BP 137/72 HR 72bpm, weight 261.1 BMI 46.3, Pulse Oxygen Saturation 96%

Hospitalization Stays



Hospitalization Costs



Significant decreases in medical costs after GTS Telehealth introduction

Average monthly costs over 6 months of **$8,750** drops to $**0.**

Medical Professionals

Case Study **Three**

Patient: LP *(74 year old male)*
Resident: Living at home with disabled wife remote rural setting
Diagnosis: COPD, Primary Hypertension, Type 2 Diabetes, Diabetic Neuropathy, Chronic Edema, Chronic Pneumonia. Smoker, Continuous O2
Equipment: Blood pressure, pulse, oxygen saturation, heart rate, and weight
Readings: Two times per day *(additional readings were encouraged as needed)*

LP was referred to our practice through case management of CareSource. Patient truly homebound without means to get to his physician for routine follow up care, which led to instability of his diagnosis and frequent episodes of exacerbation. LP was just released from hospitalization when he began care with this practice and immediately was placed on to ENGAGE. LP was more than willing to participate in the program. He and his wife were both seeking a better quality of life.

Lack of compliance with usage of continuous O2 was quickly discovered upon reporting and follow up by on call providers. Diet intake and weight instability was also apparent and the tendency to remain lying flat for extended periods of time.

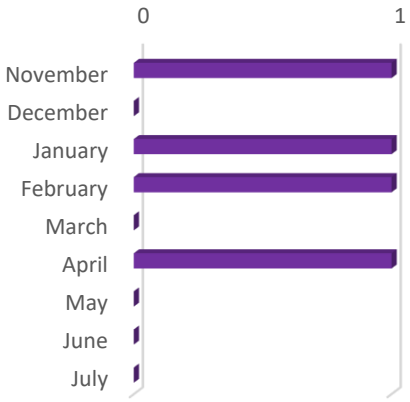
It was quickly discovered that the patient needed education on how noncompliance with the plan of care directly related to exacerbation in symptoms as well as the potential for threat to life. Lack of compliance with usage of continuous O2 was quickly discovered upon reporting and follow up by on call providers. Diet intake, weight instability and the tendency to remain lying flat for extended periods of time was apparent. Interventions were justified including Physical Therapy, Skilled Nursing and Respiratory Care. Each of these services provided directed education to allow the patient to fully understand the cause and effect relationships between his actions and his general quality of life.

The frequent alerts triggered by the patient's readings enabled the provider to use real life examples for demonstrating cause and effect relationship of the patient's actions to his state of being. Within the first 90 days, the triggered alerts dropped by 50%. The patient experienced no life threatening alerts and no hospitalizations.

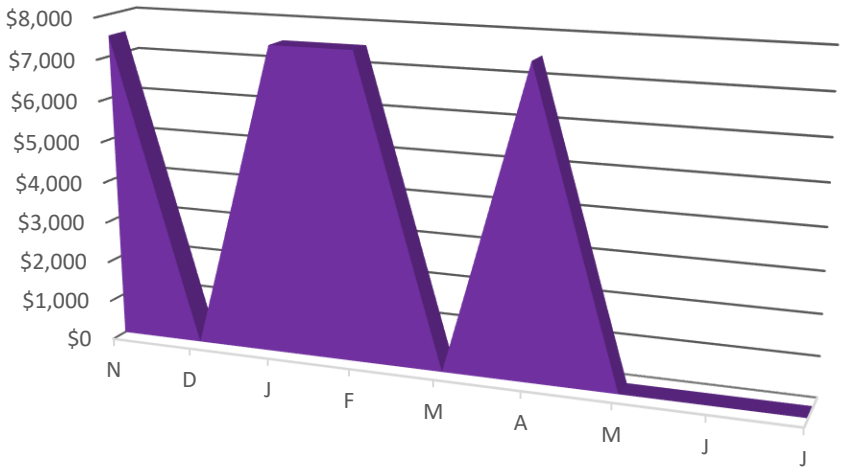
LP Baseline data: BP 165/84 HR 80 bpm, Pulse Oxygen Saturation 87%, weight 347.8 BMI 44.7 A1C 8.2

LP 90-day data: BP 128/70 HR 78bpm, Pulse Oxygen Saturation 96%, weight 325.8 BMI 41.8 A1C 7.7.

Hospitalization Stays



Hospitalization Costs

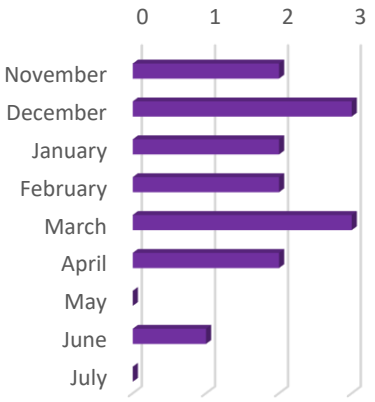


Significant decreases in medical costs after GTS Telehealth introduction

Average monthly costs over 6 months of **$5,000** drops to **$0.**

Medical Professionals

Hospitalization Stays

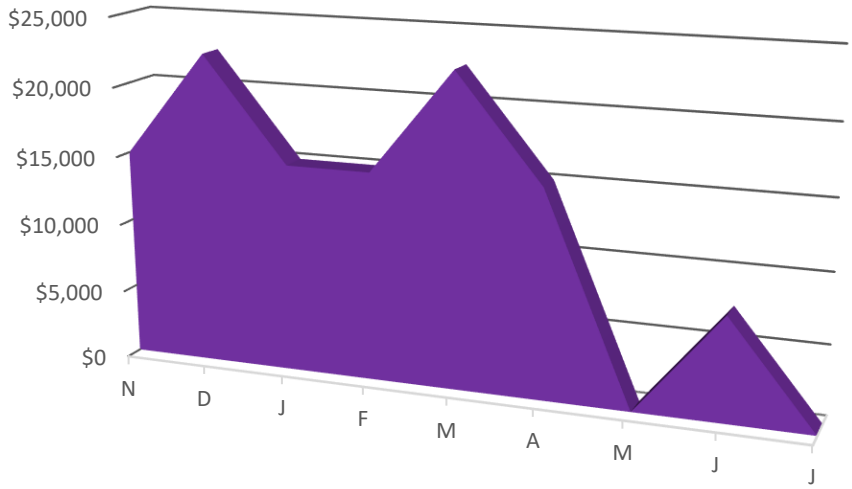


Patient Summary

During the GTS Telehealth pilot, a total of twelve patients participated in some capacity with service and data delivery. As shown earlier with the three case studies, similar results were evident across all participants. The make-up of patients remained consistent including those with morbid obesity, diabetes, hypertension, COPD and end stage congestive heart failure. As with our case studies, these patients had similar hospitalization cycles prior to the telehealth introduction and also the same drop in visits during the life cycle of the program.

An early discovery among these patients resulted in a correction on how future patients are selected for this service. Patients with end stage congestive heart failure need to be closely evaluated before telehealth deployment. Depending on the severity of the condition, hospitalizations may not be alleviated with telehealth tools. A single patient from the test group still required hospitalization within the first two months of the program. If this patient's statistics were removed from the project, the return to hospital decrease would be closer to 100%. These patient types will be vetted differently in the future due to the challenge in achieving disease stabilization.

Hospitalization Costs



Medical Professionals

General Findings

The greatest impact to patients was their ability to have concrete data as evidence of their own daily life styles. This program gave them the ability to feel levels of control for the first time in their many years of battling chronic long term illness. At a minimum, patients no longer had excuses to hide behind or deflect blame on circumstances that were out of their control.

From the provider point of view, the data painted a clear picture of the patient's life style *(away from the physician's office)* and hence the ability to make exact decisions on the plan of care, medications chosen, and resource interventions required to obtain stability. The more data was received, the clearer the picture became, the more directed the plan of care and the quicker the patient experienced medical stability.

From the provider point of view, the data painted a clear picture of the patient's life style and hence the ability to make exact decisions.

Hypertensive patients on the program saw a minimum of **20-point drops** in their average blood pressure readings within the first 90 days.

Contributing factors were as follows: medication reminders on the device resulted in increased compliance and nutrition and diet counseling become more directed.

Hemoglobin A1C results showed minimums of **.5 drop** in the first 90 days. More frequent daily glucose recordings produced better directed nutrition counseling.

Weight Control, average of **16-pound weight drops** with an average of 2.6 decrease in overall BMI in the initial 90 days.

Provider reimbursement

Telemedicine puts tools into the hands of providers and patients. These tools are desperately needed to bridge the gap in maintaining chronic conditions. Currently, CMS only allows for the billing of Chronic Care Management (CCM, CPT 99490) which encompasses up to 20 minutes of time spent managing patient care, care coordination and looking after patient concerns outside of the physician office. Although a big step in the right direction, it is only a step. A 20-minute billable window is far from adequate for patients who cannot routinely see a physician for adequate care and education.

The average patient with mid to end stage COPD must see their physician monthly for proper management of the disease. During this time, the physician must complete an entire review of systems, take vitals, review and adjust medications, make referrals for other resources such as physical therapy and respiratory therapy, engage the patient in honest discussion about their life-style choices, counsel the patient on diet, exercise, nutrition, and plan of care, educate on the symptoms to monitor, be on call for the patient 24/7 and fight insurance companies for appeals on proven medication therapies denied due to insurance formulary changes. All of this within a single visit.

To date, CMS will only cover telemedicine if the patient is classified in a remote location. Remote is a relative term when you live with several chronic conditions and depend on others to provide you transportation and supervision to go to a routine appointment.

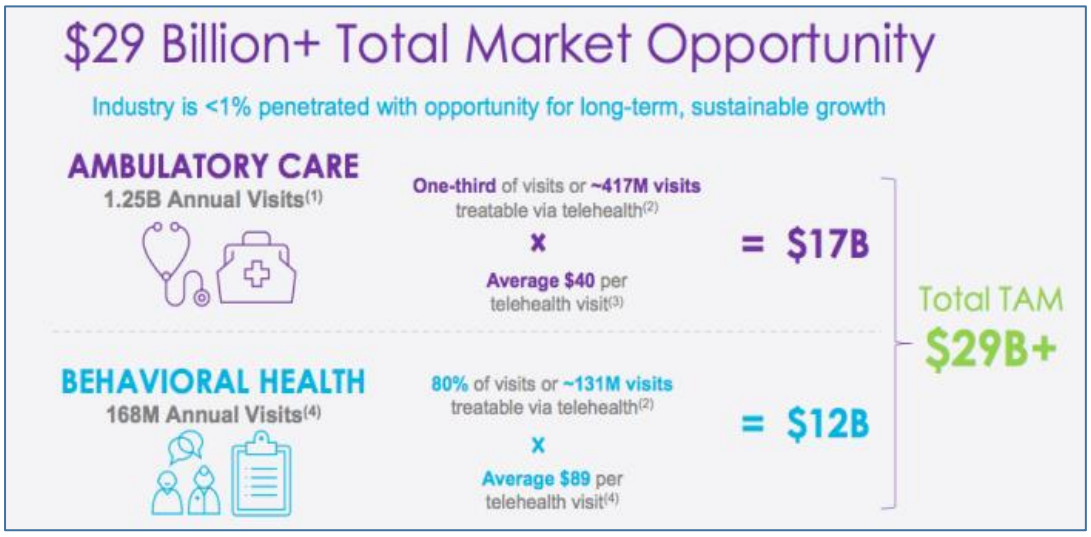
To date, CMS will only cover telemedicine if the patient is classified in a remote location. "Remote" is a relative term when you live with several chronic conditions and depend on others to provide you transportation and supervision to attend a routine appointment. In our practice we have patients who live within a two-minute ride to a hospital system, however with their immobility challenges, the distance is meaningless.

Telemedicine, when used in combination of medical house calls and in home diagnostics has the proven ability to reduce hospital stays, long term care stays and expensive trial-and-error medication therapies. Telemedicine offers the ability to directly engage and challenge the patient to be an active participant in their overall quality of life.

Ongoing Operations

The long term use of telemedicine in the management of the chronic unstable patient requires further review. Factors such as the potential for patient disengagement after long term use and increase in patient activity creating less data collection must also be examined. Achieving immediate stability in patient conditions and hence reducing hospitalizations continue to be largely successful. Additional benefits impacted the practice via provider and support staff work load.

- Out of acceptable parameter alerts **decreased by 30%** after seven days.
- Out of acceptable parameter alerts **decreased in severity** of the missed parameter by one – two points.
- **Workload for support staff decreased** by 21 minutes daily per FTE with the loss of excessive phone calls from patients and home health reporting issues and concerns of instability.
- **Provider visits decreased** from an average of 2.7 visits to 1 visit per month.
- **Provider calls decreased** on average of 3.4 calls from patient to provider to .4 calls weekly.



According to a CDC report of annual ambulatory care visits in the United States per year, including those at primary care offices. ER, outpatient clinics and other settings
Behavioral Health visits from Agency for Healthcare Research and Quality report including only outpatient provider offices

Conclusion

Increased attention to the patient condition may be obtained through more on site direct care provided by skilled nursing, home health, and even long term care facilities. While this is true, the cost to provide these services are prohibitive. Examine the following:

The cost of achieving stability in patients with multiple chronic conditions every year is staggering and climbing.

- COPD as a principal diagnosis were **$6.1 billion** with a 4.8-day mean length of hospitalization and an average cost per stay of **$7,500**. COPD stays with acute exacerbation accounted for 514,000 (62.5 percent) of all COPD stays and had comparable resource use to other COPD hospitalizations*
- 2017 costs of one-year skilled nursing stay **$87,600** with assisted living cost for one year of **$48,600****

The cost of achieving stability in patients with multiple chronic conditions every year is staggering and climbing. Although not a perfect solution to achieving these goals, the use of telemedicine has demonstrated great promise for the future of primary care. Continual innovations in video telemedicine, telemonitoring, optics, remote diagnostics, and remote lab testing will only improve upon the ease in managing patients with chronic conditions.

*Feb 14, 2011 hcup-us.ahrq.gov/reports/stat briefs/sb106.pdf
**aarp.org/relationship/caregiving-resource-center/ltcc

Participant Feedback

- *"For the first time, in a long time, I didn't feel I was completely alone." RJH, May 2017*
- *"This program is an extension of the good care we have received for a long time." "They (the monitoring provider) can be a real pain in the butt (because) they don't let you slide – However- I haven't been in the hospital in over a year now and I'm feelin' pretty good" LP, June 2017*
- *"ENGAGE didn't let me give excuses. I am responsible for my health and I am in control, something I have never felt before. I am healthy because I am in control." ML, May 2017*

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About At Home Medical Professionals

Headquartered in Wadsworth, Ohio, At Home Medical Professionals (AHMP) is the first Medical House Calls Practice founded by a Nurse Practitioner in the state of Ohio. In 2009, founder, Angela Schertz, recognized a lack of support with Chronic Care Needs and medical attention for those that found it difficult to venture out of their homes. We continue to innovate and grow from a single nurse practitioner at our founding to over 2400 patients with a team of Nurse Practitioners, Medical Directors, RN case managers, Social Workers, Medical Assistants and an entire in-house managed billing service. All of this is built around various service platforms to help reach our patients throughout the Health Care Continuum.

At Home Medical Professionals prides itself on our innovation, striving to think outside the box of Traditional Medicine. Putting Patients' goals first, we encourage all of our patients to identify what "Their Best Quality of Life" would be and strive to create and follow a plan to get them there. Using all of our internal and external resources, we do what is necessary to achieve this primary goal.

globaltelehealthservices.com

About GTS Virtual Health

GTS Virtual Health (GTS) is a global leader in software based remote healthcare solutions that enables healthcare providers to remotely monitor patients with chronic conditions.

Located in Hudson, Ohio, GTS has developed a SaaS based healthcare platform that reduces preventable hospitalization and manages the 20% of patients that represent 80% of the costs to the healthcare system to reduce costs and improve overall health outcomes.