MARYLAND HEALTH CARE COMMISSION

Advancing Population Health and Primary Care Transformation via Telehealth

A Compilation of 2015 & 2016 Telehealth Grant Final Reports

March 2018

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Associated Black Charities of Dorchester County

Gerald Family Care

Gilchrist Greater Living

MedPeds, LLC

Union Hospital of Cecil County

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Introduction

In the fall of 2015, the Maryland Health Care Commission (MHCC) awarded telehealth grants (herein referred to as "telehealth projects" or "projects") to three organizations to assess the use of telehealth in improving the health of the population being served and the patient experience. Subsequently, in the summer of 2016, MHCC awarded two organizations telehealth grants to support value-based care delivery and expand access to health services tailored to the needs of different communities and patient populations. The five organizations that were the recipients of these grants ("grantees") implemented telehealth projects with goals of reducing unnecessary hospital utilization, increasing access to timely and appropriate care, and improving patient satisfaction. Telehealth services were provided to patients in a variety of settings, including primary care practices, patient homes, and community centers. This report provides information on the results of grantees' telehealth projects.

Background

Today, providers and organizations that use telehealth are still considered pioneers, maximizing use of technology to improve health outcomes and generate efficiencies in health care delivery. Since 2014, MHCC has awarded over $550,000 in grants to 12 provider organizations to demonstrate the impact of using telehealth.[1] These grants have helped inform: 1) better practices; 2) industry implementation and expansion efforts; 3) policies to support advancement of telehealth; and 4) the design of telehealth programs across the State. The grants have also complemented efforts to advance a strong, flexible health information technology (health IT) ecosystem in Maryland, the foundation of advance care delivery and payment models.

About This Compilation

This compilation includes an abstract of each of the five telehealth projects for which MHCC awarded telehealth grants in the fall of 2015 and summer of 2016 and the grantees' final reports (reports).[2] The reports demonstrate the promise of telehealth to address challenges in care delivery pertaining to access, quality, and cost. Accomplishments and lessons learned from the telehealth projects serve as beacons to guide other telehealth initiatives in the State. Generalizations of findings to other telehealth initiatives have limitations due to variation in clinical workflows and patient population demographics. Findings were self-reported by the grantees and were not validated through an independent review.

Common Themes

The MHCC's telehealth grants enable project testing through hands-on experience of providers, patients, and caregivers in diverse care delivery environments. The telehealth projects contributed to knowledge building that benefits ongoing efforts to increase diffusion of

[1] See Appendix A for a list of all grantees and a brief description of the telehealth projects funded by MHCC.
[2] Grantee reports are organized in alphabetical order.

telehealth. Consistent takeaways reported, include 1) patients and caregivers were satisfied in the ability to access their provider more quickly or efficiently; and 2) implementing the technology and incorporating it into provider workflows was, at times, more difficult than anticipated. Telehealth encounters required providers to manually enter the visit into the electronic health record (EHR). Provider, patient, and caregiver enthusiasm for telehealth was not necessarily indicative of their understanding or willingness to meaningfully take advantage of telehealth. In addition, grantees' tended to underestimate the difficulty of securing funds to sustain and expand their projects.

About the Telehealth Projects

Associated Black Charities of Dorchester County

About the Project

Associated Black Charities of Dorchester County (ABC) was awarded $30,000 to implement their telehealth project between December 2015 and May 2017.[3] Dorchester County is rural with high rates of chronic illness among its' low income population.[4] Patients often face challenges with access to health care, including limited public transportation and a health care workforce shortage.[5] Additionally, Dorchester County ranks in the bottom quartile on 11 out of 16 of prevention quality indicators such as diabetes, hypertension and heart failure.[6] As a Community-Based Organization (CBO), ABC assists minority and rural communities with navigating the health care system by utilizing community health workers (CHWs).[7] CHWs meet with patients in their homes and at locations in the community (e.g., churches, community centers, libraries, etc.,) to promote healthier, more active lifestyle choices and assist patients to proactively manage their chronic illnesses. During client encounters, CHWs often require clinical support to provide more effective care coordination.

ABC partnered with Choptank Community Health System (CCHS), a local Federally Qualified Health Center,[8] and used mobile tablets with Microsoft Skype® for Business to facilitate primary care video clinical presence with a Licensed Practical Nurse (LPN) from CCHS.[9] A

[3] ABC matched its award at 2:1.
[4] Primary Care Office, Office of Primary Care Access, Maryland Department of Health. 2016 Primary Care Needs Assessment. March 31, 2016. Available at: https://pophealth.health.maryland.gov/Documents/Primary%20care/2016%20Maryland%20Needs%20Assessment.pdf.
[5] Dorchester County's primary care provider to population ratio is 1:3,358, the highest of any Maryland county.
[6] See n. 4, *Supra*.
[7] CHWs are non-clinical specialists who are trusted members of the community in which they work. CHWs serve as a link between health care providers. For more information visit: https://www.apha.org/apha-communities/member-sections/community-health-workers.
[8] FQHCs are community-based health care providers funded by the federal government to provide low-cost care to underserved populations.
[9] Microsoft Skype® for Business was selected as it provided a low cost, HIPAA compliant platform which was easy to use by CHWs in the field.

"virtual" telehealth presence extended the LPN's coordination efforts by reaching directly into a CHW site visit.[10] The LPN was able to answer clinical questions and communicate the patient's health care plan, when appropriate. The virtual encounter also facilitated the transmission of diagnostic tests performed in the field, such as blood pressure and blood glucose level monitoring, to be instantly reviewed by a CHW and LPN. The project aimed to improve the effectiveness of CHWs through access to clinical support in a real-time. Project goals were to improve patients' self-management of chronic diseases, including diabetes and hypertension, and health outcomes through care coordination using telehealth.

Data Collection

- Data was collected on the following measures after each patient encounter: 1) patient adherence to a scheduled medical follow-up or primary care visit; 2) patients with three or more emergency department (ED) visits within 30-days; 3) implementation of self-management behaviors among diabetic and hypertensive patients; 4) A1C levels[11] among diabetic patients; and 5) blood pressure readings among hypertensive patients
- Baseline data on all measures over three months (prior to implementing telehealth) was collected for patients seen by an ABC CHW
- The above data was analyzed for patients seen only by a CHW and compared to those who were seen by a CHW and received a telehealth intervention

Outcomes

- A total of 380 patients received telehealth, while 1,107 received only a CHW intervention; among those receiving telehealth, 139 were uncontrolled diabetic patients and 172 were hypertensive[12]
- Patients receiving telehealth fared better than those receiving only a CHW intervention on all measures except for patient adherence to a scheduled follow-up medical or primary care visit; about 63 percent of telehealth patients experienced adherence as compared to 90 percent of CHW-only patients
- Nearly 93 percent of telehealth patients implemented a self-management behavior after a telehealth intervention compared to about 73 percent of CHW-only patients
- Only one of the 380 patients receiving telehealth (0.3 percent) experienced three or more ED visits within 30-days of a telehealth intervention; baseline data indicated that 22 percent of CHW-only patients experienced similar ED outcomes[13]

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[10] ABC held two "mini-clinics" every week in the community as part of the project.
[11] Hemoglobin A1C is used to measure blood glucose concentration. More information available at: https://www.medicalnewstoday.com/articles/265443.php.
[12] The remaining patients did not have either diabetes or hypertension.
[13] Sixteen out of 1,206 CHW-only patients experienced three or more ED visits within 30-days of the CHW encounter.

Challenges

- ABC and CCHS used separate EHR systems, which did not allow for efficient electronic sharing of patient information and required both CHWs and LPNs to document encounters separately
- ABC's EHR, Cyfluent, did not allow CHWs to easily capture information relevant to their work, particularly encounter information that was non-medical, such as social service referrals
- Two months prior to the end of the project, ABC no longer had access to their EHR given ending of other grant funds[14]; ABC needed to transition to a new EHR platform with limited funds

Solutions

- After exploring several options, ABC transitioned from Cyfluent to Mirth Care[15] prior to the end of their contract with Cyfluent; information made available to the Chesapeake Regional Information System for Our Patients (CRISP) is also available through Mirth Care[16, 17]
- Mirth Care allowed CHWs to: 1) streamline documentation processes; 2) access additional information about patients' health care encounters (e.g., hospital admissions, ED visits, etc.); and 3) share electronic information about a CHW encounter with other providers part of the patients' health care team (e.g., primary care provider, specialists, etc.)

Project Observations

- ABC's project was successful in optimizing care management among high-risk hypertensive and diabetic patients from high-need communities, utilizing CHWs supported by clinical expertise provided via telehealth
- CHWs were leveraged as trusted community members to engage patients in their care, encourage use of preventative services, and improve management of chronic conditions; telehealth provided a way to support and enhance CHWs efforts by bringing virtual clinical expertise to their encounters when and where it is needed most

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[14] ABC's funding under the Health Enterprise Zone grant ended.
[15] Mirth Care is an online solution that allows the user to track and manage their patients, particularly those who have a chronic disease.
[16] CRISP is Maryland's State designated health information exchange. Health care organizations, such as hospitals, ambulatory providers, laboratories, radiology centers, long term care facilities, connect to CRISP to make available health care information through various CRISP services. More information is available at: www.crisphealth.org.
[17] ABC was able to obtain access to Mirth Care at no cost.

Lessons Learned

- ***Selection of cost-effective, goal oriented, and sustainable technology solutions is crucial***. In evaluating telehealth technology, organizations should assess the solutions' efficiencies in terms of data tracking, collection, aggregation, and sharing that are comprehensive and integral to a successful telehealth program.
- ***Patient acceptance of telehealth must be garnered through relationship building and maintenance.*** In bringing telehealth to places where community members are, ABC was able to build trust within the community and provide services enhanced by telehealth.[18]

Sustainability

- As a small CBO, ABC relies significantly on grant funds to support its services[19] and has applied for several grant opportunities at the local and national level to continue offering telehealth services
- ABC was able to acquire additional grant funds through the Quality Health Foundation for a 12-month period due to the success of the telehealth project
- ABC understands that solely relying on grants is not a sufficient sustainability model; ABC has appropriated a percentage of the fiscal year 2019 discretionary funds toward telehealth services and continues to explore all avenues to achieve full sustainability

Gerald Family Care

About the Project

Gerald Family Care (GFC) was awarded $30,000 to implement their telehealth project between December 2015 and May 2017 to serve Prince George's County.[20] GFC is a patient-centered medical home (PCMH) practice[21] with over four decades of experience in family practice, providing services to residents of Prince George's County. Prince George's County experiences a number of socioeconomic disadvantages, and related barriers to health care. According to a 2016 needs assessment, Prince George's County has a higher unemployment rate, more residents aged 25 or older with only a high school degree, lower median income, poor public transportation, and higher rental costs than the Maryland average.[22] Individuals experiencing social, economic, or environmental disadvantages are likely to face obstacles in accessing quality specialty care, including longer wait times, which can result in loss of productivity,

[18] ABC experienced returning patients who sought out additional counsel.
[19] CHW services are not reimbursable under traditional health insurance benefit plans.
[20] GFC matched its award at 2:1.
[21] GFC received PCMH recognition from the National Committee for Quality Assurance. More information is available at: http://www.ncqa.org/programs/recognition/practices/patient-centered-medical-home-pcmh.
[22] Prince George's County Health Department. 2016 Prince George's Community Health Needs Assessment. June 2016. Available at: http://www.dchweb.org/sites/doctors-community-hospital/files/Documents/Health_Wellness/2016%20PGCCHNA%20Report.pdf.

economic strain, and declining health.[23] In addition, the social stigma, distrust, and misinformation associated with behavioral health services prevent many from seeking and accessing these services.[24]

GFC partnered with University of Maryland Capital Regional Health (UM Capital)[25] and Zane Networks, LLC to provide specialty consultations via telehealth within three GFC primary care practice sites.[26] GFC primary care providers (physician, nurse practitioner or physician assistant) made referrals (written or verbal order) for patients to have a virtual telehealth consultation with a UM Capital specialist. The project aimed to increase access to specialty care for GFC patients with gastroenterologic, neurologic, dermatologic, cardiac, pulmonary related, and/or behavioral health conditions through using telehealth.[27]

Data Collection

- Data was collected on the following measures: 1) wait time for specialty appointments[28], 2) access to behavioral health services[29], 3) ED use[30], and 4) 30-day readmission rate[31]
- Baseline data on all four measures over 12 months, prior to implementing telehealth, were collected among GFC patients

Outcomes

- A total of 48 unique GFC patients received a telehealth consultation; ages ranged from 19 to 34, roughly two thirds (66 percent) were female, and virtually all (95 percent) were African American patients
- The project did not meet its goal of reducing the wait time for specialty appointments[32], which was due, in part, to: 1) scheduling challenges due to provider workflow issues, 2) a

[23] N. Arpey, A. Gaglioti, M. Rosenbaum. How Socioeconomic Status Affects Patient Perceptions of Health Care: A Qualitative Study. Journal of Primary Care & Community Health. March 8, 2017. Available at: http://journals.sagepub.com/doi/full/10.1177/2150131917697439.
[24] Mental Health America. Black & African American Communities and Mental Health. Available at: http://www.mentalhealthamerica.net/african-american-mental-health.
[25] Formerly Dimensions Health System.
[26] Site locations included: Bowie, Capitol Heights and Glenarden.
[27] After reviewing historical practice referral data, patients with these conditions were selected by GFC as targeted patients for the telehealth project due to the prevalence of: 1) referrals to specialists and 2) hospital encounters among GFC patients with these conditions.
[28] Defined as percent of patients receiving a specialty appointment within three to four days.
[29] Defined as percent patients who screened positive for depression and completed a behavioral health appointment.
[30] Defined as the percent of GFC patients with gastroenterologic, neurologic, dermatologic, cardiac, pulmonary or behavioral health conditions who had an ED visit.
[31] Defined as the percent of GFC patients discharged from a hospital that were readmitted to a hospital within 30-days of discharge date.
[32] GFC's baseline was 10 percent for wait-times for specialty appointments; GFC's goal was to achieve a 25 percent reduction; however, they achieved six percent reduction over the course of the project.

high rate of missed appointments[33], and 3) a specialty provider shortage due to specialist limited intake capacity[34]

- Changes in three of the four measures were positive:
  - Approximately 61 percent of telehealth patients accessed behavioral health services as compared to a 34 percent at baseline
  - The ED visit and 30-day readmission rate among telehealth patients was nine percent and 13 percent respectively, which was moderately lower than 12 percent and 14 percent at baseline
- The project received positive feedback from patients regarding improvements in accessibility of specialty services; as access improved, demand for specialty services increased

Challenges

- UM Capital specialists were solo private practice physicians with limited experience in telehealth; office staff did not have scheduling processes for telehealth visits as they did for in-person visits, resulting in workflow challenges and cancelled or rescheduled telehealth visits
- UM Capital specialists experienced a learning curve in adopting the telehealth service delivery model and needed additional technical support, particularly around identifying the optimal location within each specialist practice to conduct the telehealth visit
- The need for behavioral health providers proved to be greater than projected, due to patient requests for initial and follow-up behavioral health services; in early phases, the project was not able to accommodate the requests with only two UM Capital behavioral health providers available to provide telehealth consultations

Solutions

- GFC worked with specialty practices to integrate the telehealth visit scheduling into their workflows and streamline the scheduling process
- UM Capital assigned dedicated telehealth rooms at its' facilities so that specialists, who lacked adequate space or the necessary in-house IT support, could use these spaces to conduct telehealth visits
- To meet demand for behavioral health services, UM Capital recruited private, specialist consultants outside of the UM Capital network

[33] A high rate of missed appointments is generally typical in a high risk, vulnerable population.
[34] The project attempted to recruit additional specialists, but was unable to do so in a timely manner given the highly competitive hiring environment that prevails in the Washington, DC metropolitan area.

Project Observations

- The project helped address socio-economic challenges impacting the health care of patients (e.g., lack of transportation, social stigmas, etc.) by bringing specialty services to primary care sites via telehealth
- The project was successful in expanding access to behavioral health services and reducing ED visits for ambulatory sensitive conditions[35] and hospital readmissions
- Initial scheduling challenges were alleviated as telehealth technology and procedures were more fully integrated into providers' workflow and as patients became more accustomed to telehealth

Lessons Learned

- ***Integration of the telehealth system with the practice's electronic scheduling system will improve workflow.***
    - Telehealth software typically includes a scheduling feature that does not connect with the practice management component of an EHR[36] used to schedule in-person visits
    - Integration enables front-office staff to schedule telehealth visits within their EHR and have the visit automatically scheduled in the telehealth system
- ***There is a unique opportunity to meet patient demand for behavioral health services provided via telehealth in high-need and medically underserved communities.*** In offering behavioral health services via telehealth, GFC was able to increase access to these services and counteract the societal stigma attached to seeking behavioral health care

Sustainability

- GFC and UM Capital plan to sustain the project; they have a strong financial incentive due to the shift from fee for service payment to reimbursement for high quality, cost-efficient care that promotes innovation and alternative approaches to patient engagement
- GFC and UM Capital specialists are seeking reimbursement from private insurance and Medicaid for telehealth services

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[35] Ambulatory sensitive conditions are conditions that effective community care and case management can help prevent the need for a hospital encounter, these include: influenza, pneumonia, asthma, diabetes complications, hypertension, gastroenteritis, dental conditions, etc. More information available at: http://www.nhis.com/editorial/ambulatory-care-sensitive-conditions.

[36] Practices typically utilized a practice management component of an EHR to facilitate the day-to-day operations of a medical practice, such as scheduling appointments, performing billing tasks, generating reports, etc.

Gilchrist Greater Living

About the Project

In June 2016, MHCC awarded $56,000 for an 18-month period to Gilchrist Greater Living (Gilchrist) to implement their telehealth project between June 2016 and December 2017.[37] Gilchrist used telehealth to support case management and early intervention for patients enrolled in the Gilchrist Support our Elders (SOE) program.[38] SOE patients are typically home-bound, chronically ill seniors with multiple health conditions, who are high-utilizers of health care services, with frequent hospital ED visits and inpatient stays. At the conclusion of the grant, Gilchrist saw a reduction in hospital admissions, readmissions, and ED visits among SOE patients receiving telehealth services.

Gilchrist partnered with Lorien at Home[39] to increase access to care for about 20 participating SOE patients by providing remote monitoring services and prioritizing patients needing immediate care. The project utilized the Lorien Link telehealth system, a remote monitoring system to collect patient physiological data in real-time.[40] This information was monitored by a Registered Nurse (RN) Case Manager and used to facilitate home visits by a Nurse Practitioner (NP). When patients' clinical values were outside pre-established parameters[41], Lorien Link triggered an alert to the RN Case Manager who reviewed the clinical data and determined appropriate follow-up care. This included consulting with patients directly or their physician, and as needed, arranging video calls between providers and patients.

Data Collection

- Information was collected during the grant period on the following: 1) ED visits; 2) hospital admissions; 3) hospital readmissions; 4) urgent home visits by NPs; 5) unscheduled patient call volume; and 6) patient satisfaction with the telehealth project[42]

[37] A 2:1 financial match was required.
[38] The SOE program was established in November 2014 with the aim of improving care for older adults with advanced illness by providing home-based primary care delivered by a Nurse Practitioner through comprehensive health assessments, health care management, and coordination of care to reduce avoidable emergency department visits and hospitalizations.
[39] Lorien at Home is a home care services organization part of Lorien Health Services, a skilled nursing facility and residential service agency whose goal is to provide patient-centered care utilizing the latest in healthcare technology that results in the finest outcomes for our residents. More information is available at: www.lorienhealth.com/maryland-senior-care/about-us/.
[40] The Lorien Link utilizes a tablet and peripherals (i.e., blood pressure cuff, pulse oximeter, glucometer, scale and thermometer) to collect physiological data (e.g., blood pressure, pulse oximetry, blood sugar, weight, and temperature).
[41] Clinical parameters for each patient were programmed into the telehealth system by a Registered Nurse Case Manager for each patient based on the information provided on the patient's telehealth monitoring request form.
[42] Information on the number of urgent home visits for the entire SOE patient population was reported throughout the grant to assess the impact of telehealth versus SOE alone.

- Information was collected for 12-months prior to the grant period, which was used to establish a baseline for the project: 1) ED visits; 2) hospital admissions; 3) hospital readmissions[43]; and 4) patient call volume[44]

Outcomes

- Approximate reductions in ED visits by 69 percent; hospital admissions by 40 percent; and readmissions by 45 percent[45]
- Fewer urgent home visits were reported (about 1.9 percent less) as compared to all SOE patients[46]
- High patient satisfaction was reported throughout the grant period and near 95 percent[47] at conclusion[48]
- Unscheduled patient call volume decreased by about 18 percent
- Preliminary cost savings (about $9,978) for telehealth patients from baseline[49]

Challenges

- Developing protocols to ensure harmonization and consistency in care delivery and clinical handoffs between clinicians
- Enhancing enrollment criteria to factor in acuity and social determinants of health to better assess patients who might benefit more from telehealth[50]

Solutions

- Identified a primary point person to lead care coordination efforts and project communications

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[43] Baseline data on readmissions was not available for telehealth patients. Gilchrist used readmission data for the entire SOE patient population for its baseline.
[44] Data was collected for the period of July 1, 2015 to June 30, 2016.
[45] ED visits and admissions were compared to telehealth patients at baseline. Readmissions were compared to all SOE patients since this information was not tracked prior to the grant.
[46] Rate for telehealth patients was 7.72 percent as compared to 9.63 percent for all SOE patients.
[47] Based on aggregated data for SOE patients participating in telehealth.
[48] Conclusion results are based on surveys conducted when a patient was dis-enrolled from telehealth or once the grant period for the project ended. Due to differing enrollment and dis-enrollment dates, duration of time for telehealth participants varies.
[49] Reduction in cost savings was calculated using the CRISP pre/post analysis, which utilizes the Health Services Cost and Review Commission Case Mix data to calculate each patient's clinical utilization 12 months prior to and 12 months after enrolling in the telehealth program. Information on the total SOE population is presented in the Gilchrist report; however, the entire SOE population does not serve as a comparison group due to differences between the two groups, including the size (20 telehealth vs, >200 SOE), risk scores, acuity, geography, etc.
[50] Initially, selection criteria only included patient's mental status, psychosocial needs, willingness to participate, and Internet access.

- A patient screening tool was implemented (i.e., General Adult Risk Score or GARS[51]) as part of the enrollment process to incorporate an assessment of both clinical and social determinants of health

Project Observations

- Additional support provided to SOE patients through telehealth interventions increased patient engagement and enhanced care management
- Elderly patients were receptive to using telehealth technology and were highly satisfied with the telehealth services they received

Lessons Learned

- ***Implement telehealth in a practice setting using a phased in approach to support process improvements.*** Enroll a few patients initially and gradually increase enrollment to ensure project experience appropriately guides program modifications.
- ***Telehealth can be used as a means to foster elderly patient engagement with their provider.*** Elderly patients were active users of the technology to review their health information and expressed satisfaction with 24/7 access to their provider.
- ***Assess the telehealth intervention efficacy based on desired improvements in health outcomes as compared to investment costs***. Conduct an assessment that measures project performance compared to goals, considering project costs at least quarterly.

Sustainability

- Gilchrist secured funding to continue offering telehealth for six months beyond the grant period (through June 2018)
- The project team is continuing to gather and analyze data to assess outcomes and cost savings specifically attributed to telehealth interventions in the SOE program

MedPeds, LLC

About the Project

In June 2016, the MHCC awarded $61,154 for an 18-month period to MedPeds, LLC (MedPeds) to implement their telehealth project from June 2016 to December 2017.[52] MedPeds is a primary care practice serving patients in Laurel, Maryland and specializes in internal medicine, family practice, and pediatrics. The project goal was to expand access to primary care services using a mobile application for patients with uncontrolled diabetes[53], which included offering

[51] The GARS, available through Epic, in addition to the factors utilized by the LACE incorporates information on the social determinants of health to assess a patient's risk for readmission.
[52] A 2:1 financial match was required.
[53] These patients had a hemoglobin A1C above nine.

telehealth at times outside of standard business hours. By improving access to care, MedPeds aimed to reduce patients' hemoglobin A1C levels and associated ED visits and hospitalizations.

The project utilized Healow, a patient engagement platform available through the eClinical Works (eCW) patient portal. Healow was already in use by the practice and was developing a new telehealth feature offering virtual video visits; this feature was available via a desktop computer or mobile application.[54] Patients were identified as potential candidates for a telehealth visit through a patient registry that monitored and flagged hemoglobin A1C test results greater than nine.[55] The practice used intake questionnaires[56] to assess patient interest in telehealth.[57]

eCW was unable to meet its established timeframe to rollout the Healow mobile telehealth application.[58] MedPeds decision to pivot to the desktop version created patient engagement issues (e.g. hardware requirements of end users). MedPeds was not able to get patients to schedule a telehealth visit despite patients reported interest in telehealth from the intake questionnaire.[59] MedPeds concluded that technology challenges compounded by lack of patient engagement were too great to resolve and abandoned the grant project after 10 months.

Project Observations

- Unfulfilled commitments by the technology vendor created cascading challenges that adversely impacted the project timeline and end-users of the technology, including providers and patients
- Patient expressed interest in telehealth did not translate into their decision to seek care remotely
- Resource availability to dedicate to the project was challenging given the high volume of work that existed in the practice

Lessons Learned

- ***Selection of telehealth technology should include an assessment of existing use cases and end-users of the technology.*** Implementing new technology can provide opportunities for practices, patients, and vendors. On the other hand, risks of disruption can outweigh potential benefits of becoming an early innovator of the technology.

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[54] Other Healow features were already in use by the practice.
[55] The project targeted 177 patients at the practice.
[56] Patient intake questionnaires collect information on reason for visit, family history, insurance, etc. MedPeds included telehealth questions to assess patients' interest in telehealth.
[57] A total of 50 uncontrolled diabetics reported interest in telehealth.
[58] The project was initially scheduled to go live in September 2016 but was deferred until November 2016 given delays with eCW's release of the Healow telehealth feature. Though originally projected for release in July 2016, the desktop version did not become available until November 2016 and the mobile application in February 2017.
[59] One patient with uncontrolled diabetes completed a televisit.

- ***Training patients on how to use telehealth technology through simulation is essential for program success.*** Establishing understanding and a comfort level in using telehealth technology through hands-on learning is necessary before the hardware and software is used in care delivery. This provides assurances for patients who may overstate their ability to use the technology as a means to help manage their chronic medical condition.
- ***A dedicated full-time resource is needed for a minimum of six to nine months to deploy telehealth in a practice setting.*** Distributing the workload across individuals can lead to communication and coordination challenges. Practices are typically time constrained and often do not have staff to adequately dedicate to a technology implementation project of this magnitude. Resource availability and commitments should be factored into the adoption decision-making process.

Union Hospital of Cecil County

About the Project

Union Hospital of Cecil County (UHCC) was awarded $30,000 to implement their telehealth project between December 2015 and May 2017.[60] UHCC utilized telehealth to maximize population health through remote patient monitoring (RPM).[61] Targeted patients included those discharged from the hospital that were high-risk for readmission.[62] Patients participating in the project had certain biometric data (body temperature, blood pressure, heart rate, weight, blood glucose levels, and pulse oximetry) monitored by UHCC's care management team using in-home electronic, touch-screen tablets. UHCC worked with its RPM software vendor, Vivify Health (Vivify), and EHR system vendor, Meditech, to develop a system interface. As part of the project, UHCC tested single sign-on (SSO) capabilities[63], where the provider could click a button within the RPM system and securely access the patient's EHR. Ultimately, UHCC abandoned the SSO capabilities, concluding that it was cost prohibitive to maintain the interface.

UHCC is a 122-bed private not-for-profit acute care hospital whose mission is to enhance the health and well-being of residents in Cecil County and neighboring communities. Under

[60] UHCC matched its award at 2:1.
[61] RPM is considered to be the use of digital technologies that collect health information from a patient in one location and electronically transmit that information to a health care provider in a different location for assessment and recommendations. More information is available at: www.cchpca.org/remote-patient-monitoring.
[62] Patients at high-risk were those who met certain clinical and utilization indicators. Clinical indicators included chronic conditions, such as congestive heart failure, chronic obstructive pulmonary disease, hypertension, and/or diabetes mellitus. Utilization indicators were frequent emergent care as demonstrated by emergency department usage; unscheduled physician office visits; three or more hospitalizations/year; recent stay(s) at a comprehensive care facility; and/or complicated medication regimen/schedule.
[63] SSO allows a user to use one set of login credentials to access multiple applications.

Maryland's hospital payment reform model[64], all Maryland hospitals are required to reduce unnecessary hospital care and decrease hospital cost per capita growth. UHCC is focused on deploying innovations that support patient self-management of complex chronic conditions and enable early intervention by providers.

Data Collection

- Information was collected on the following measures: (1) congestive heart failure (CHF) and chronic obstructive pulmonary disease (COPD) Prevention Quality Indicators (PQIs)[65]; (2) Potentially Avoidable Utilization (PAU)-associated costs[66]; and (3) 30-day hospital readmissions
- Comparison data on all measures over 12 months was collected for the overall hospital population

Outcomes

- About 150 unique patients received RPM services of which 64 patients were diagnosed with CHF and 86 with COPD
- CHF PQI[67] decreased from 141 to 111 and COPD PQI[68] decreased from 205 to 177
- Forty-eight 30-day readmissions were avoided for an estimated cost savings[69] of $336,000

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[64] Maryland's All-Payer Model contract with the Centers for Medicare and Medicaid Services went into effect January 1, 2014. More information is available at: https://innovation.cms.gov/initiatives/Maryland-All-Payer-Model/.

[65] PQIs are a set of measures that can be used with hospital inpatient discharge data to identify quality of care for "ambulatory care sensitive conditions." These are conditions for which good outpatient care can potentially prevent the need for hospitalization or for which early intervention can prevent complications or more severe disease. Examples include diabetes long-term complications, bacterial pneumonia, heart failure, and hypertension. More information is available at: www.qualityindicators.ahrq.gov/modules/pqi_resources.aspx.

[66] PAU is hospital care that is unplanned and can be prevented; components include readmissions, potentially avoidable admissions, and hospital acquired conditions. PAU-associated costs calculated under this project include average hospital inpatient admission charge among patients discharged with CHF and COPD PQI. More information is available at: http://hfmamd.org/downloads/HSCRC_Workshop_2015/schuster_haile_hfma_presentation.pdf.

[67] CHF PQI includes admissions with a principle diagnosis of heart failure per 100,000 population, ages 18 years and older and excludes cardiac procedure admissions, obstetric admissions, and transfers from other institutions. Specifications are available at: http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V60-ICD09/TechSpecs/PQI_08_Heart_Failure_Admission_Rate.pdf.

[68] COPD PQI includes admissions with a principle diagnosis of COPD or asthma per 100,000 population, ages 40 years and older and excludes obstetric admissions, and transfers from other institutions. Specifications are available at: http://www.qualityindicators.ahrq.gov/Downloads/Modules/PQI/V60-ICD09/TechSpecs/PQI_05_Chronic_Obstructive_Pulmonary_Disease_(COPD)_or_Asthma_in_Older_Adults_Admission_Rate.pdf.

[69] Average PAU cost per case was $7,000.

Challenges

- SSO functionality was haulted following a software update of Meditech and Vivify; UHCC determined that restoring SSO functionality with the vendors was cost prohibitive[70]
- RPM kit[71] management proved to be challenging, especially as it related to kit return; UHCC had to make several follow-up calls to patients and oftentimes, had to retrieve the kit from patients' homes

Solutions

- Budgetary options were explored to fund Meditech and Vivify SSO development that would allow: (1) admission, discharge, transfer information to be available in a structured field within Vivify; and (2) vital sign feeds and health assessment survey results from Vivify to be available in an unstructured note within Meditech
- UHCC is contemplating investing in kit management services offered by Vivify in order to save on valuable staff time

Project Observations

- RPM provided an innovative opportunity to support patient engagement in managing their complex chronic conditions
- Providers' ability to proactively intervene in patient care was enhanced through RPM, and oftentimes prevented avoidable utilization of hospital services
- Project outcomes indicated improvements in PQIs and re-admission rates

Lessons Learned

- ***Establishing bi-directional connections between a telehealth system and EHR system creates efficiencies.*** Telehealth software typically does not interface with EHRs; bi-directional connections allow for seamless sharing of patient information between the two systems, eliminating duplicate documentation of a telehealth encounter and allowing a provider to access information about patient or the telehealth encounter that may be within the EHR.
- ***Investing in third party telehealth services minimizes staff resources.*** In situations where a provider makes RPM devices (e.g., tablets and peripheral components) available to patients; utilizing a third party for device setup and recovery reduces cost.

Sustainability

- UHCC is continuing to use RPM to manage transitions of care; the cost of kits and data usage are included in UHCC's operational budget

[70] The SSO functionality was a custom build that did not come as part of the update.
[71] The RPM kit includes a tablet and connected devices, such as a blood pressure cuff, weight scale, etc.

- UHCC plans to expand and fund telehealth RPM services in their palliative care program, ED, regional skilled nursing facilities, behavioral health programs, and the Health Services Cost Review Commission (HSCRC) Regional Transformational Grant program[72]

[72] The HSCRC Regional Transformation Grants were awarded to acute care hospitals that partnered with other hospitals and/or regional community-based organization. UHCC is partnered with the University of Maryland Upper Chesapeake Health on the grant. The grants aim to support the implementation of plans to improve care coordination and population health through a coordinated regional effort in support of Maryland's All-Payer Model. More information is available at: http://hscrc.maryland.gov/Pages/rfp-implement.aspx.

Final Reports Prepared by Telehealth Grantees

The following section includes the final reports of the five grantees: (1) Associated Black Charities of Dorchester County; (2) Gerald Family Care; (3) Gilchrist Greater Living; (4) MedPeds, LLC; and (5) Union Hospital of Cecil County. The reports detail the project and findings unique to each grantee.

Telehealth Project

Final Report

Table of Contents

Project Description

Associated Black Charities (ABC) of Dorchester County utilized telehealth technology to facilitate remote video consultations with patients in real-time. The project aimed to demonstrate the impact of using the telehealth platform to improve:

- The overall health of the minority and rural communities with hypertension and diabetes;
- The patient health care experience when managing a chronic condition; and
- Linking patients to the best care possible while lowering costs of care through the reduction of Emergency Department visits.

ABC is a community based organization that assists minority and rural communities. ABC identified that within Dorchester County there was a large population that required access to health care; however, for a variety of reasons including, but not limited to inadequate transportation systems, health care service availability during non-traditional hours, the high rates of chronic illness among low income populations, the low health care workforce available within the county along with the proximity to health care providers, could not access needed health care services. ABC had for many years provided health related community outreach to these individuals through education, no-cost health screening clinics, and community engagement activities.

ABC assists the community to navigate the health care system by deploying Community Health Workers (CHWs) to meet with patients both in their homes and at locations in the community, such as churches, community centers, libraries, etc., to promote healthier, more active lifestyle choices. CHWs also assisted community members to become more aware and proactive regarding their chronic illnesses. CHWs are non-clinical specialists and often require clinical supports to provide more effective care coordination when in the presence of their clients. Prior to the project, ABC would contact the patients' primary care physician within 48 hours to initiate a visit under the telehealth pilot. ABC discovered that the 48 hour gap, did not reduce wait times, and could potentially endanger the life and well-being of the patient. ABC identified real-time connection to the patient's provider as a solution to this issue.

The project utilized mobile tablets and devices, such as a scale and blood pressure cuff, to connect patients with a Licensed Practical Nurse (LPN). A "virtual" telehealth presence extended the LPN's coordination efforts and reach directly into CHW site visits. The LPN was able to answer clinical questions and to communicate the patient's medical care plan if appropriate, resulting in timely and appropriate health care management and reduction in costs by preventing costly crisis intervention. The virtual encounter also facilitated the transmission of diagnostic tests performed in the field, such as blood pressure and blood glucose level monitoring, to be instantly reviewed by a health care worker and LPN. In some cases, the LPN partner would provide clinical interpretations of the medical findings and counsel patients on specific next steps in the care and follow-up.

ABC collaborated with Choptank Community Health System, Inc. (CCHS) to be the remote telehealth provider. CCHS is a local Federally Qualified Health Center (FQHC) and provided medical counsel and oversight to the patients as needed through education from the LPN and the Certified Registered Nurse Practitioner, Ms. Mary Elliott who stepped in as a secondary clinical advisor. The primary medical professional from CCHS was Sherry Perkins, an LPN, who provided remote clinical presence, which included primary care recommendations and behavioral health support. ABC also partnered with Legal Technology Solutions, LLC (LTS) to provide the secure technology platform to connect ABC staff, teleworkers, and medical provider. LTS also provided:

- Project management services
- Technical services to configure the telehealth laptops, video cameras, and mobile devices
- Onsite and remote technology support
- Consultation on the data collection model for the project
- Staff training on the use of the telehealth equipment and technology.

The primary goal of the project was to increase patient engagement in order to reduce the health care disparities among low income populations and improve patient health outcomes through the inclusion of self-management practices with the patients. The project aimed to improve effectiveness of CHWs through access to clinical support in a real-time. An additional goal was to improve patients' self-management of chronic disease through care coordination using telehealth. The project aimed to demonstrate that patients receiving instant medical attention could facilitate an adjustment in their behavior between clinic visits, when necessary, and patients could receive immediate medical attention, as needed.

Technology Infrastructure

The project was initiated using the following technology components:

- Paper files in conjunction with Cyfluent, an Electronic Health Record (EHR) platform, used by ABC for documentation during the initial implementation stages of the project
- Mirth Care – Population health and care management platform, which later replaced the Cyfluent EHR.
- CRISP – Chesapeake Regional Information System for our Patients is a regional health information exchange (HIE)[73] serving Maryland, DC, Delaware, Virginia and West Virginia.
- Microsoft Skype® for Business – Video conferencing used to communicate between patient and CHW with the primary care physician/nurse

[73] HIE is a way of sharing patients' information among participating doctors' offices, hospitals, care coordinators, labs, radiology centers, and other health care providers through secure, electronic means.

The project relied on the technology consultant to select the most appropriate hardware. The project requirements were that the equipment be easily portable, secure, reliable, and well supported. Based on these requirements, the consultant selected Dell and Lenovo. Microsoft Skype® for Business was selected by the project staff as the communication vendor.

ABC selected Cyfluent as the EHR primarily because it was familiar with Cyfluent prior to the grant. Since this system was already implemented and the patient data collected, it was initially believed that it would be most cost and time efficient for ABC to continue using this EHR system. During the initial implementation, Cyfluent was used by ABC's CHWs in the field, while the CCHS provider used an alternative EHR, Wellcentive.[74] This required both ABC and CCHS to enter the same information into two different systems. Additionally, it was discovered that one of the limitations with Cyfluent was its inability to directly connect to CRISP or have a patient portal for patients to access their own health data. To implement a direct connection with CRISP would have taken additional time and financial resources that were not available to ABC. This forced ABC to consider moving to a system that would allow for better information sharing between the CHW team, the CCHS provider, and would include directly connecting to the information available through CRISP. The project team met and attended an in-depth demonstration of Mirth Care. Mirth Care provided ABC with a three-month trial of the platform for use during the course of the project.

Mirth Care allowed CHWs to streamline the documentation process and allow additional information about patients' health care encounters to be shared with other providers (e.g., hospital admissions, emergency department (ED) visits, etc.). Once Mirth Care was implemented, double entry was eliminated due to the secure and compliant data sharing between ABC, CCHS, CRISP, and the patient. Patients were able to, through real time telehealth interventions, receive health education from the LPN, confirm primary care and schedule follow-up appointments with providers, as well as have a health care professional provide them with one on one information where they live, pray, or visit. Additionally, patients, through satisfaction surveys, expressed that by having all of their health care team members informed about of their conditions and care efforts, they were more apt to modify behaviors conducive to improving health outcomes. Patient's expressed this was a result of having the CHW, the LPN, and the primary care provider following up, confirming and reaffirming care strategies along with monitoring their individual accountability.

Deployment of the technology during this project proved to be quite integrated. The patient information entered by the CHW into Mirth Care flowed efficiently through the HIE to CCHS and the patient. Moreover, a patient could both see and talk to a health care provider immediately during their telehealth visit. In the case of program participants that were home with extremely limited transportation or chronic medical conditions, a CHW could visit the patient in their

[74] Cyfluent was the limited interval EHR provided to partners under the Health Enterprise Zone program; and with CCHS being an intricate FQHC, that has existed in this community for decades – their system of medical records keeping and data tracking pre-existed this partnership and included the Wellcentive Care Management solution.

home. Microsoft Skype® for Business, the video communication platform, facilitated both the collection of patient data in the field and allowed the patient a virtual face-to-face communication with the CCHS health care provider. Microsoft Skype® for Business was selected as it provided a low cost, HIPAA compliant platform, which was easy to use by CHWs in the field.

Project Implementation

Clinical protocol development

The ABC team in partnership with CCHS developed the clinical practice parameters (i.e. if the blood pressure reading is 145 over 95 then we provide a telehealth intervention with the LPN). The protocol involved targeting patients diagnosed with or at risk for diabetes or hypertension. Those patients with A1C < 9 were considered to have poorly controlled diabetes. For hypertensive patients, the blood pressure must be less than 140 over 90. If the patient exceeded these numbers, then the CHW would immediately start the intervention procedures to connect them with a health care provider for a telehealth contact. If the patient's blood pressure was within the parameters, ABC would continue to monitor them weekly, connect them with telehealth as a part of the routine maintenance participation monitoring program component, and then follow-up with providers to re-affirm multi-level accountability.

The clinical protocol was developed based on the following:

- Baseline data collected by CCHS
    - Aggregate data was collected based on patient demographics, specific to either hypertension or diabetes. This data further demonstrated generalized follow-up appointment compliance, insurance statistics, recidivism rates for hospital ED visits for preventable chronic conditions related to the hypertension or diabetes
- Community health care needs regarding chronic disease through surveys
    - Community based survey data was collected from populations within the CHW and CCHS care network demographic area, primarily Hurlock and Cambridge, Dorchester County. The survey collected and summarized information on transportation, access to greens space, fresh produce, and clean air, along with health equity issues, such as availability of health care services including service hours and locations, providers and services in the area, fairness in treatment, and quality of care along with health care and insurance costs. The community survey questions aimed to gain information regarding social barriers including housing, employment, social injustices and safety.
- Hospital encounter rates for patients with preventable chronic disease

Once this data was reviewed, it was determined that the focus for the telehealth project would center around reducing elevated hypertension and A1C readings for common CCHS and ABC patients. This would include both a review of the patient's treatment plan for non-traditional

strategies, on the part of the provider, as well as behavioral skills training and education from the CHW team, again based on the participant care plan.

Workflow integration, provider training, and patient and family education

ABC implemented the project in four (4) phases as detailed below.

Phase I – Planning and Developing

ABC completed interviews and focus groups, hosted by the CHWs, which affirmed community interest and substantiated the visions of success through the project. Additionally, there were benefits to both the patient who witnessed unity between health care providers, patients, and CHWs as the project was initiated, which complimented the Patient Centered Medical Home Care Model for the patients of Dorchester County.

Phase II - Model Testing

Under the initial model using Cyfluent, ABC was unable to electronically share patient data; however, once Mirth Care began to be utilized, this was no longer an issue and unilateral patient data sharing between ABC and CCHS, through Mirth Care, which allowed a real-time patient care analysis to be provided to each partner. Furthermore, participants in the CHW Program who were also being treated by CCHS were included in this project in order to more accurately assess the intervention and to adequately measure the goals of the telehealth program components.

Phase III - Staff Training and Development

CHWs were trained on the use of telehealth for the project with a focus on accurately documenting the encounter. Training on access, scheduling, and use of the actual video streaming was provided in a group setting.

Phase IV – Program Implementation and Go Live

This phase involved software coding intended to automate the outcomes reporting process based on the electronic encounter records and surveys. ABC was able to use the electronic intake features of Mirth Care to create electronic surveys that were used to aggregate data associated with this project. One of the most intricate processes for this project was the inclusion of patient education. CHW's, in partnership with CCHS, provided health education to program participants weekly, prior to each telehealth community clinic visit. Community clinics were scheduled weekly to:

- Provide county-wide, no cost locations for education and telehealth interventions
- Effectively and efficiently market the project
- Proficiently and resourcefully make the best use of the nurse's services

Phase IV not only afforded the CHWs the feedback necessary to enhance the connectivity issues, but it simultaneously allowed the team members from CCHS and ABC to target some "out-of-the-box" strategies including supplementary phone calls and the creation of additional hot spots.

Quantitative Analysis

The telehealth patient interventions, which included health care provider treatment plans, CCHS virtual live streaming education and chronic condition reviews along with CHW screening, training and follow-up strategies, were compared to that of the standalone CHW education and training practices for patients seen in the same time frame. Baseline data collected reflected the pre-telehealth hypertension and diabetes populations having no telehealth intervention, which included the weekly CHW monitoring, and PCP follow-up and care coordination.

ABC compared program participants who received a telehealth consult ONLY with those program participants who just completed a CHW visit and weighed those program participants against those who received both intervention strategies over the course of the pilot and reviewed the impact on the patient populations. The interventions are triggered based on CHW blood pressure values transmitted via tele-monitoring consults. The tailored behavioral intervention involved promoting adherence to medical follow-up or primary care visits along with health behaviors. Patients who received the telehealth education and health care continuum or the combined arm had their hypertension regimen changed by the CHW team using a validated hypertension self-management or health education training series based on evidence-based hypertension treatment guidelines. The primary outcome is BP control: ≤130/90 mm Hg (nondiabetic) and ≤120/80 mm Hg (diabetics) measured at monthly intervals over 12 months.

Additionally, a sample of diabetic patients with poorly controlled diabetes at baseline of (N=53) were also randomized to one of three arms: (1) control group—a group of diabetic patients who receive care through the PCP only; (2) Community Health Workers tailored behavioral intervention; (3) nurse-administered education through telehealth with follow-up appointment scheduling and confirmation (accountability); and (4) a combination of the two interventions. Once again, just as with the hypertension patients, the interventions are triggered based on self-reported, weekly glucose reading values transmitted via tele-monitoring consults. The tailored behavioral intervention involves promoting adherence to medical follow-up or primary care visits along with health behaviors. This patient group, which were also randomized to the telehealth education, health care continuum or the combined arm had their blood glucose regimen changed by the CHW team using a validated diabetes self-management or health education training series based on evidence-based diabetes treatment guidelines. The primary outcome was A1C quarterly test scores: ≤ 7.2 with mean blood glucose averaging 177 over the course of 12 months.

Qualitative Outcomes

This project describes the formative process of a community-based participatory case review aimed at optimizing telehealth utilization among high risk hypertension and diabetic patients from high-need communities. Two major themes emerged from qualitative analyses. The first theme suggested changes in behaviors and self-management skills that would maximize accessibility of primary and follow-up services to improve health outcomes in the areas of

hypertension and diabetes through telehealth technology. Subthemes identified included issues that reflect connectivity issues for certain geographic locations. The second theme suggested that inclusion of telehealth maximized participant engagement. Subthemes also identified issues that reflect concerns of the patient populations, and that their involvement in telehealth would replace their clinic care.

In total, 164 community members were studied and analyzed. The results from the program involving patients with diabetes indicated a trend toward patients with telehealth achieving better glycemic control than those not participating in the overall intervention trials. Virtually all patients tracked with hypertension demonstrated the ability of telehealth to assist them in maintaining accountability, which ultimately resulted in reduced systolic and/or diastolic blood pressure. Both groups were paired with CHWs to further engage the patient participants in the telehealth monitoring process, which completed the continuum for this wrap around/follow-up service intervention.

Lastly, ED visits were reduced by 3% percent among patient who received a telehealth intervention with an estimated cost savings of $4,675.00 per patient (Average cost of ED visit for patient with diabetes or elevated hypertension based on the Maryland Health Services Cost Review Commission) or $201,025.

Lessons Learned

Being a community based organization, not linked to a health care facility, ABC required more time to research develop strategies prior to perfecting the actual project implementation than organizations already connected to a health care system or service provider. Consequently, ABC was required to extend the timeline for technology development, and research a care management model that would allow for proper interoperability between the telehealth system and the EHRs of the remote site provider at Choptank.

Patient engagement and responses to the introduction and implementation of the telehealth pilot study were garnered through relationship building and maintenance and resulted in continued interest from patients in the project.

Data tracking had to be modified to securely and accurately collect and report through the EHR for each patient participant in addition to systematically transmitting the exclusive data for dual patients that existed under this study in order to determine improvements, outcomes and the impacts on the patient participant's health.

Sustainability

ABC continues to seek and procure funding to support the telehealth component of the health education and training services provided to the rural patient populations. Due to the success of the telehealth project, additional funding through the Quality Health Foundation was generated.

Although there were no internal budget funds available to allocate to this project, 12 additional months of program services continue to benefit the families of this community. However, ABC is

working to support this programming through internal funds over the next 18 months, as we have intentionally appropriated a percentage of the fiscal year 2019 discretionary funds toward this health initiative.

Our goal is to help our participating patients achieve a more sustainable tomorrow by assisting them in making positive behavioral changes that promote individual accountability and self-management, which improve health outcomes. This approach is used by the CHW team to increase awareness among patients and the community while also creating buy-in from health partners, primary care providers, hospitals and the financial decision makers and partnering organizations, as they too benefit from the return-on-investment and impact of improved health outcomes for community members and disparate populations within this county.

Conclusion

Utilizing technology to facilitate remote video health education with patients in real-time has helped to demonstrate the impact of using the telehealth platform to: 1) improve the overall health of the minority and rural communities with hypertension and diabetes, 2) enhance the patient health care experience when managing a chronic condition; and 3) better link patients to the best care possible while lowering costs of care through the reduction of ED visits. Telehealth has proven beneficial to the community, the providers and the overall continuum of care for patients with hypertension and diabetes resulting in controlled BP and reduced A1C quarterly test scores among the participating patients.

Appendix A

Community Needs Survey

Please share your concerns and suggestions regarding the needs for your community. Associated Black Charities appreciates your honest opinions and thanks you for taking the time to complete this survey.

Please identify your community: ___ Cambridge ___ Hurlock ___Other _____

How long have you been in this community: ____Years ____ Months

Education Level:
- **Some high school___**
- **High School graduate___**
- **Some college/ tech school___**
- **Two-year degree___**
- **Four-year Degree___**
- **Graduate___**
- **NA___**

Age Range:
- **18 – 25___**
- **26 – 40 ___**
- **41 – 60 ___**
- **60 – 75___**
- **76 & up ___**

Which of the following best describes your occupation:

Business Owner ___	**Police/Fire Rep ___**	**Agency Staff ___**
Public Official ___	**Clergy/Minister ___**	**Homemaker ___**
Educator ___	**Volunteer ___**	**Health Professional ___**
Truck Driver___	**Hospitality Employee ___**	**Student ___**
Factory Employee ___	**Food Industry Employee ___**	**Construction Employee ___**

OTHER _____

Income Level:

Less than $25,000

$25,000 - $40,000
$40,001 -$55,000
$55,001 - $70,000
Over $70,000
Refused

HEALTH

Share your 3 Greatest Health Needs:

Please indicate if you use the Health Care system in your community: Yes ___ No___

If Yes, What is YOUR primary reason for choosing the physician or clinic you attend?

Location	**Insurance coverage**
Convenient hours	**Reputation**
Physician quality	**Other _____**

On a scale from 1 – 5 with 1 being not met at all and 5 being met exceptionally - How well were the following health issues in the area being met: (i.e. – DK = Don't Know)

Availability of Family Physicians	1	2	3	4	5	DK
Convenient hours—at clinics	1	2	3	4	5	DK
Availability of quality services	1	2	3	4	5	DK
Available transportation for health care needs	1	2	3	4	5	DK
Availability of Women's care	1	2	3	4	5	DK
Confidence in the provider	1	2	3	4	5	DK
Emergency medical care	1	2	3	4	5	DK

Ways you would like to see Improvements to Health Care in your area:

TRANSPORTATION

Share your 3 Greatest Transportation Needs:

Do you have your own source of transportation? Yes ___ No___

If, No – what sources of transportation do you use? _____

Please indicate if you use the public transportation system in your community: Yes ___No___

If Yes, What is YOUR primary reason for choosing to use the public transportation system?

Cost **Access to services**
Hours of Services **Other _____**

On a scale from 1 – 5 with 1 being not met at all and 5 being totally met - How well were the following transportation issues in the area being met: (i.e. – DK = Don't Know)

Availability of public transportation services	1	2	3	4	5	DK
Convenient hours	1	2	3	4	5	DK
Quality services	1	2	3	4	5	DK
Convenient pick-up & drop off locations	1	2	3	4	5	DK
Politeness of the drivers/schedulers	1	2	3	4	5	DK
Access to schedules and routes	1	2	3	4	5	DK

Ways you would like to see Improvements to TRANSPORTAION in your area:

EMPLOYMENT

Share your 3 Greatest EMPLOYMENT Needs:

Are you currently employed: Yes ___ No___

Are you employed within 10 miles of where you and your family live? Yes ___ No___

If NO, share your reason for working more than 10 miles outside of the area where you live?

What are the main employment opportunities where you and your family live?

On a scale from 1 – 5 with 1 being not met at all and 5 being totally met - How well were the following EMPLOYMENT needs in the area being met: (i.e. – DK = Don't Know)

Availability of Employment Opportunities in all fields	1	2	3	4	5	DK
Variety of Management positions available to local residents	1	2	3	4	5	DK
Quality Wages	1	2	3	4	5	DK
Bilingual Employers	1	2	3	4	5	DK
Benefits to employees	1	2	3	4	5	DK
Availability of Problem Resolution Services	1	2	3	4	5	DK

Ways you would like to see Improvements to EMPLOYMENT in your area:

THANK YOU!!!

This survey is brought to you through a grant from the Maryland Department of Health – Office of Minority Health and Health Disparities to Associated Black Charities.

Appendix B

EASTERN SHORE TELE-HEALTH

SATISFACTION SCALE & FOLLOW-UP SURVEY

Tele-Health Clinic Site: _____ Date: _____

Using the following scale (1 = Not Satisfied, 2 = Somewhat Satisfied, 3 = Very Satisfied)
How satisfied were you with:

Tele-Health Equipment & Use	Rating
The voice quality of the equipment	
The visual quality of the equipment	
The ease of getting connected to the telehealth nurse	
How well your privacy was respected	
Community Health Worker (CHW)	
The CHW Team Member answering your questions about the equipment	
The CHW Team Member explaining the consultation process	
The thoroughness, carefulness and skillfulness of the CHW Team Member	
The courtesy, respect, sensitivity, and friendliness of the CHW Team Member	
Consulting Nurse	
The ability of the Consulting Nurse in answering your questions	
The length of time with the tele-health nurse	
The thoroughness, carefulness and skillfulness of the Consulting Nurse	
The courtesy, respect, sensitivity, and friendliness of the Consulting Nurse	

Briefly share your personal **COMFORT LEVEL** in using the Tele-health?

_____

_____

_____

UNIVERSITY of MARYLAND
PRINCE GEORGE'S
HOSPITAL CENTER

Gerald Family Care

Telehealth Project

Final Report

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Project Description

The project aimed to increase access to specialty care for patients in Prince George's County, MD with gastroenterologic, neurologic, dermatologic, cardiac, pulmonary related and/or behavioral health conditions through the use of telehealth. Specifically, the project aimed to measure the impact of the telehealth solution on the following measures: 1) wait time for specialty appointments; 2) proportion of patients screening positive for depression who access behavioral health services; 3) patient satisfaction with the telehealth experience; 4) ED visits rates for patients with gastroenterologic, neurologic, dermatologic, cardiologic, pulmonary related and/or behavioral health conditions; and 5) 30-day readmission rates for all patients discharged from the hospital to GFC.

Partnering organizations

Gerald Family Care (GFC), a patient-centered medical home (PCMH) network providing primary care services to residents of Prince George's County, was the lead organization and the originating site for telehealth visits, connecting their primary care patients to specialists at the University of Maryland Capital Regional Health (UM Capital), formerly Dimensions Health System. GFC is a minority-owned organization with over four decades of experience in family practice and related medical services. GFC was a participant in the Maryland Health Care Commission (MHCC) - Maryland Multi-Payer Patient Centered Medical Home (MMPP) pilot[75] and has achieved Stage 2 Meaningful Use[76] and the National Committee for Quality Assurance (NCQA) Level 3 Recognition.[77] Paperless since 2010, GFC serves over 13,000 active patients at five locations in the Washington, D.C. metropolitan area, including three in Prince George's County. An Accountable Care Organization[78] member and an independent practice association[79] participant, GFC's interest in the present project was driven by its mission to improve the accessibility and quality of health care for the underserved.

UM Capital is part of the University of Maryland Medical System and is the largest not-for-profit provider of healthcare services in Prince George's County. The two UM Capital facilities that participated in this proposed project are Prince George's Health Center and Laurel Hospital. UM

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[75] The MMPP pilot was program testing the effectiveness of the PCMH model in 52 Maryland Primary Care practices. The program began in April of 2011 and ended in June of 2016. More information is available at: https://mhcc.maryland.gov/mhcc/pages/apc/apc/apc.aspx.

[76] Meaningful Use refers to the Centers for Medicaid and Medicare's electronic health records incentive program. More information is available at: https://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html.

[77] Level 3 Recognition refers to NCQA's PCMH Recognition program where practices meet certain criteria related to practice transformation performance and quality improvement. More information is available at: http://www.ncqa.org/programs/recognition/practices/patient-centered-medical-home-pcmh.

[78] An ACO is a group of health care providers, potentially including doctors, hospitals, health plans and other health care constituents, who voluntarily come together to provide coordinated high-quality care to populations of patients.

[79] According to the American Academy of Family Physicians, an IPA is a business entity organized and owned by a network of independent physician practices for the purpose of reducing overhead or pursuing business ventures such as contracts with employers, ACO and/or managed care organizations (MCOs). More information is available at: http://www.aafp.org/about/policies/all/independent-physicianassoc.html.

Capital has a track record of using telehealth. As an example, through its partnership with Children's National Medical Center in Washington, D.C., the Children's experts provided UM Capital pediatric patients with virtual consults for pediatric genetics, cardiology and neurology via a virtual private network configuration and secure encrypted telehealth processes.

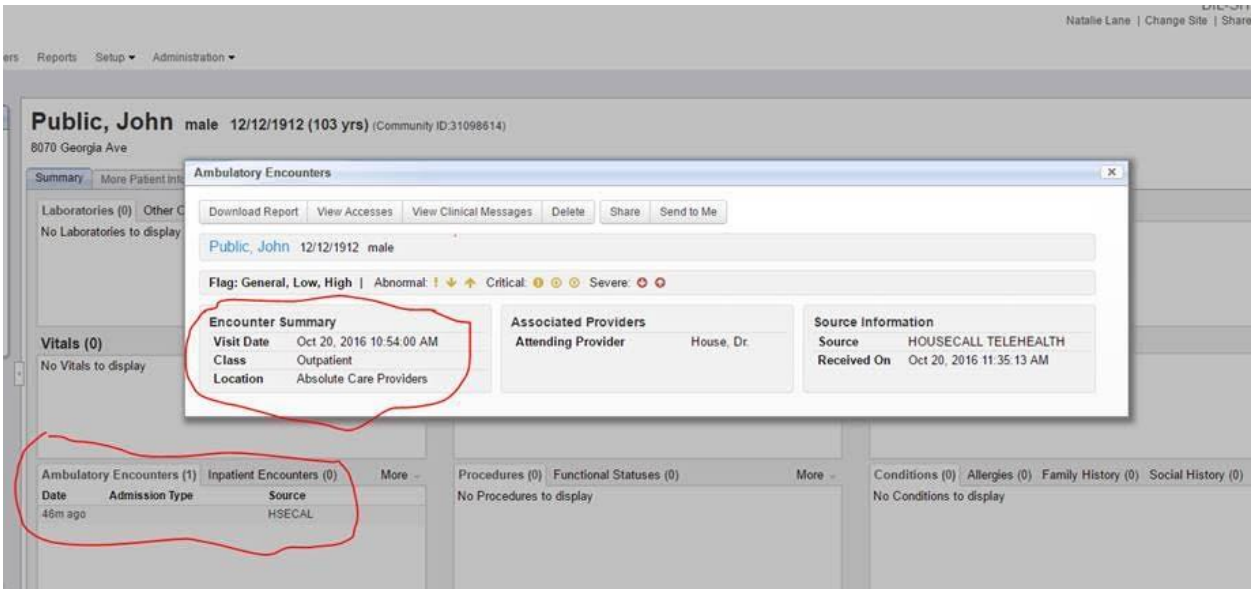
Zane Networks, LLC (ZaneNet), a Maryland MBE Certified, woman-owned business is among the first Managed Service Organizations certified by MHCC. ZaneNet has been instrumental in driving health information technology (health IT) adoption in the State of Maryland and was recently re-certified by the Electronic Healthcare Network Accreditation Commission (EHNAC). ZaneNet provided technical assistance to the project based on their experience managing and facilitating local and federal telehealth projects. ZaneNet also engaged the Chesapeake Regional Information System for our Patients (CRISP), the State-designated health information exchange (HIE) to facilitate information exchange between UM Capital acute care facilities and the practice sites. ZaneNet, the creator of the HouseCall telehealth software used in the project, provided ongoing technical customization of the tool to include connection to CRISP. By the end of the project, notifications regarding the e-visits were sent to CRISP as an ADT A04 message type (see figure x) to be made accessible to CRISP ENS subscribed providers participants via the CRISP ENS PROMPT.[80]

```
ADT^A04

MSH|^~\&|ADT|HOUSECALL^HOUSECALL||DIL-SITE|20161117132200||ADT^A04|331895|P|2.3
PID|7|31098614^^^CRISP^MR.ID|7||Public^John||19121212|male|||8070 Georgia Ave~^4th Floor~^^Silver Spring~^^^MD~^^^^20910||||Spanish|||||||
PV1||Outpatient|Absolute Care Providers||||12345^House^DR.^^^^^^^^^^NPI|||||||||||3760
```

While the interface has been built and is in production, GFC and a specialist with a treatment relationship to the patient has to request to receive the A04 ADT via ENS from CRISP in order to view the telehealth encounters via PROMPT. Furthermore, HL7 messages of telehealth encounters completed are made available via the CRISP query portal for additional review and more detailed clinical information, (see figure x).

[80] ENS PROMPT is a secure, web-bases tool that allows practices to manage their encounter notifications. CRISP provides secure alerts to providers when their patient has an encounter with any participating hospital in Maryland, Virginia, DC and Delaware. More information is available at: https://crisphealth.org/services/encounter-notification-services-ens/.



Description of the technology infrastructure

HouseCall had previously been licensed and used by UM Capital for a MHCC Round One telehealth grant that focused on the transition of care between its emergency department (ED) and post-acute facilities post discharge.[81] As such, UM Capital did not need to procure a new technology for the project, and its specialists could be on-boarded quickly onto the technology because it has already been authenticated and tested on the UM Capital health systems network. UM Capital had already identified key stakeholder champions that were experienced with the technology and could serve as a referral source for other specialists who may be reluctant to use the technology to deliver medical care. Additionally, by having an experienced and ready specialty network, the project team was able to focus on preparing the originating site for telehealth services.

Telehealth equipment, which included a medical cart, laptops, and peripheral such as dermascope, electronic stethoscope and sensor based vitals meter, pan/tilt/zoom camera with integrated audio, were all procured, delivered to three GFC facilities located in Prince George's County, and assembled by ZaneNet. Due to budget constraints and the need to provide access to telehealth from any of the GFC facilities, the team purchased equipment to support the consultative needs, which was able to seamlessly integrate with HouseCall while providing mobility and flexibility at GFC locations.

GFC utilizes the certified eClinicalWorks (eCW) EHR across all of its facilities. UM Capital, operating as an integrated health system, utilizes the Athena Health certified EHR. Since both practices participated in the Medicare Meaningful Use program, the providers were experienced at utilizing EHRs to identify the target population, generating the necessary reports, exporting patient panels, scheduling appointments, and related tasks.

[81] More information about MHCC's Round One grant is available at: http://mhcc.maryland.gov/mhcc/pages/hit/hit/documents/Telehealth_Brief_FINAL.pdf.

GFC scheduled and confirmed patient appointments in their EHR and in HouseCall. Specialists at UM Capital documented patient encounter visits in Athena Health and utilized HouseCall as the routing solution for sharing pre and post-consult notes and other necessary documentation needed. The implementation team worked on minimizing unnecessary and duplicative documentation by developing a workflow that supported the integration of telehealth visits as part of the practices' medical visit process. After an appointment was scheduled, GFC's front office staff followed up with the specialist to confirm the appointment. The specialist entered the appointment in Athena Health consistent with their current workflow. Documentation needed prior to the visit for authorization and for treatment purposes was uploaded into HouseCall by the GFC Care Coordinator and downloaded by the specialist personnel for review and insertion into their EHR.

Leveraging CRISP was key to helping the team identify the top four drivers of hospitalization and ED admissions for the GFC population served at UM Capital. The team worked with CRISP to obtain patient hospital utilization and discharge data for 2015 to serve as a baseline. The data provided by CRISP displayed beneficiary utilization by hospitals, service line, geography, and payer. The team assessed and analyzed clinical information, the service line data previously exported from GFC's eCW EHR, and selected the patients that would be consented for telehealth visits by conditions. Additionally, the team developed a workflow for analyzing data received through the CRISP encounter notification service (ENS) via secure email to GFC on a monthly basis. ENS documented hospitalization and ED events for enrolled beneficiaries and reported those as part of the monthly metrics requirement of the grant. This process was originally time consuming, however, once the team was oriented to the ENS PROMPT tool they could utilize the service to monitor and record GFC beneficiary hospitalization events adequately.

To more effectively identify enrolled beneficiaries through ENS PROMPT, ZaneNet worked with CRISP and built an interface from HouseCall to the CRISP enterprise, which was put into production towards the end of the grant cycle. This allowed for completed telehealth visits to be sent securely to CRISP in a structured format documenting the patient demographic, the encounter type, date of visit, and GFC facility, making it possible for the team to identify completed visits in ENS PROMPT. This continual interface provides a use case for demonstrating how telehealth visit events can now be shared with the HIE for care coordination and transition purposes.

The project demonstrated the interoperable integration of three technologies the telehealth system used by GFC—HouseCall, CRISP, and Sensogram, a wearable wireless device that captures and transfers vitals data via mobile networks—working seamlessly to support the delivery of telehealth services between the three GFC practices and, UM Capital, a multi-specialty health system outpatient practice. HouseCall and CRISP are now exchanging patient data unilaterally from HouseCall to CRISP to identify telehealth visits within CRISP ENS PROMPT. Furthermore, the development teams of both organizations are in the final stages of testing the delivery of summary note as a Consolidated Clinical Document Architecture (CCDA) structured document to CRISP for accessibility for other CRISP participants through its query portal.

ZaneNet has been working with Sensogram to finalize the integration of the Sensoscan® wearable device[82] for real-time display during a telehealth visit and for secure transfer of data collected from the Sensoscan® from the Sensogram data center to the ZaneNet EHNAC secured data center where HouseCall resides. Once this is interfaced and validated to ensure that the data from source to destination occurs securely, ZaneNet will include the patient vitals as part of the CCDA file sent to CRISP.

Description of how the project was implemented

The project was implemented from October 26, 2015 through April 28, 2017and served 48 unique GFC patients. They ranged in age from 19 to 34; roughly two thirds (66 percent) were female and 34 percent male and virtually all (95 percent) were African American. The patients were all managed by one of GFC's three practice sites—Bowie, Capitol Heights and Glenarden—in Prince George's County and patients were insured through Maryland Medicaid or a Maryland Managed Care Organization (MCO).[83] Specialty care was delivered by six UM Capital providers in areas of behavioral health, neurology, gastroenterology, dermatology, cardiology and pulmonary via the telehealth application.

GFC reviewed its EHR data for patients identified with the target conditions to identify and affiliate facilities with the most participants presenting with one of the targeted conditions. Based on the review, GFC primary care providers (physician, nurse practitioner or physician assistant) made referrals (a written or verbal order) for patients to have a virtual telehealth consult with a UM Capital specialist. Once the referral was received, the UM Capital Site Coordinator contacted the relevant specialist(s).

In the case of patients needing a behavioral consult, once the GFC provider discussed the need with the patient and prior to concluding the visit, the provider submitted the referral to the UM Capital Site Coordinator and used the telehealth connection to contact a UM Capital clinical social worker who is a member of a participating UM Capital behavioral health practice. To facilitate these contacts, UM Capital committed to having at least one clinical social worker available to participate in the initial telehealth visit for all GFC patients requiring a behavioral health consult during regular clinic hours.

The virtual consultations were provider-to-provider (with or without the patient present) or provider-to-patient. Providers practiced telemedicine within the boundaries of their licenses, credentials, privileges, keeping in mind that the technology is only a tool assisting in the provision of care at a distance and not a substitute for appropriate, responsible decision making. During the virtual visit the specialist reviewed the patient's EHR (i.e., problem lists, discharge summaries, labs, radiology reports, clinical summaries, and medications lists); and if necessary, contacted and followed up with the primary care provider. If during the visit either the GFC

[82] Sensoscan is a blue tooth wearable device, created by Sensogram Technologies, Inc., that measures blood pressure, heart rate, blood oxygen saturation and respiration rate.
[83] MCOs are health care organizations that provide services to Medicaid recipients in Maryland. More information is available at: mmcp.health.maryland.gov/healthchoice/pages/home.aspx.

referring provider or the UM Capital specialist found that the transmitted images were insufficient for diagnosis or treatment, the patient was referred for a face-to-face visit with a UM Capital specialist.

Integrating the project into the existing workflows of GFC and UM Capital providers involved the following steps:

- Establish guidelines for patients eligibility for the intervention
- Review literature on specialty-specific telehealth workflow redesign recommendations
- Assess the sites' telehealth capacity and designate a telehealth point person for each site
- Create specific telehealth workflow recommendations for each specialty site
- Create a scheduling process checklist and practice availability schedule
- Create a written clinical protocol for each specialty
- Create telehealth policies and procedures for each practice site
- Order, procure and customize project hardware, such as computers and peripherals
- Complete software integration with CRISP's HIE
- Obtain provider feedback on customizing the technology to address specific needs, maximize the utility of telehealth and minimize impact on workflow
- Set up and test hardware and devices at assigned sites and connect computers to existing IT infrastructure

In line with the above mentioned steps, GFC coordinated with specialists to schedule telehealth sessions. GFC providers could choose to participate in the initial specialty consult/e-visit to ensure appropriate hand-off and facilitate patient compliance. Subsequent visits were scheduled directly with the specialists. This redesigned workflow ensured that GFC providers were notified about scheduled appointments. Notification was also facilitated by the automated notices, calls, and reminders issued by the EHRs to patients. UM Capital facilitated coordination by designing an expedited scheduling process to ensure timely scheduling of e-visit consults with non-UM Capital providers.

UM Capital extended its call center for UM Capital providers and the One-call centralized scheduling process for this project. The call center entered the scheduled appointments into the providers' schedule and called the specialists at the time of the consult if they had not already joined the visit, thereby increasing the telehealth visit completion rates. GFC integrated two Care Coordinators into this model to increase originating site provider and patient compliance with scheduled telehealth consults. Onsite Care Coordinators ensured that scheduled visits were entered in both the GFC eCW EHR and in HouseCall. Site coordinators also prepared the participant in the telehealth equipped exam room for the consult and ready them for the specialists. This process was well documented and integrated into the clinical workflow for both originating and specialty providers.

ZaneNet developed and delivered hardware and software initial and refresher training to all participating providers. Written training materials were supplemented by videos that were uploaded to HouseCall and can be opened in an internet browser. The project team developed a

training methodology for GFC's medical staff to ensure that workflows were customized to support telehealth delivery. Originating site and remote consulting providers conducted several test consults to familiarize themselves with the technology and affiliated peripherals prior to scheduling real-time consultation of GFC patients. The GFC Care Coordinator worked with the specialist front desk personnel to schedule consults in the system, upload necessary documentation, perform technology tests and prepare the patient during the visit, thereby making the encounter time with the provider efficient while minimizing technical challenges that may occur.

The GFC health education staff developed culturally appropriate brochures at the fifth and eighth grade literacy level to introduce patients and their families to the project. The brochures presented the benefits of telehealth, the voluntary nature of project participation, and how a typical telehealth visit would be conducted. The GFC Care Coordinator followed up with interested parties to further explain how to use the telehealth equipment and how patient care would be coordinated, and to address any questions and concerns of patients and their family members. Once the project was implemented, a GFC staff member was always made available to assist any patient that had questions or encountered problems while scheduling a telehealth consultation and/or during and after the consultation.

Quantitative Analysis

After reviewing patient data from GFC and CRISP and consulting with MHCC staff, the project team identified the quantitative measures below.

Table 1: Project Measures

Measure	Rationale for Selection
Wait time for specialty appointments	Research indicates that clinical outcomes (ED use and ambulatory sensitive hospitalizations) and patient satisfaction are negatively impacted by long wait time for specialty consults. Average waiting time for GFC patients to receive a specialty consultation is seven days. "Murray M Reducing Waits and Delays in the Referral Process Fam Pract Manag. 2002,9(3):39-42."
Access to behavioral health services	Data shows that 13 percent of the patients aged 12 years and older screened for clinical depression screened positive and have a follow-up plan but have not necessarily received follow-up behavioral health consultation. "DHMH 2013 Maryland BRFSS Data for Prince George's County. The rate of depression among GFC patients is higher than the County rate of nine percent indicating a real need for behavioral health intervention among this sub-population
ED use	Required by MHCC as a cross cutting measures aligned with the Maryland All-Payer Model pay for performance program initiative.[84]
30-day readmission rate	

Baseline data were collected through a review of the GFC EHR (appointment wait time and access to behavioral health) and CRISP data (ED Use and 30-day readmission rate). GFC submitted its patient panel to CRISP and received baseline data on readmission and inpatient hospitalization. Additionally, the team reviewed encounter notification data from the CRISP ENS PROMPT tool for all GFC patients monthly to record patient hospitalization and ED utilization by month. For each measure, the baseline value was the average of the value for the 12 months preceding the start of the project.

The project measurement goals were developed based on observations made by GFC and UM Capital providers respectively that indicated that their patients were experiencing delays accessing specialty care; a review of the literature on increasing access to care via telehealth; and advice from MHCC staff during the planning phase of the project.

The patient satisfaction survey was originally developed by UMC Capital from its previously awarded MHCC Round One telehealth grant focused on transition of care from the ED to post-acute care facilities with a relationship to the health system. The project team reviewed the existing survey and determined it to be relevant for this project as well. In addition, a provider satisfaction survey administered during the previous DHS grant was used in the present project

[84] Maryland, under agreement with the Centers for Medicare & Medicaid Services, launched Maryland's All-Payer Model in 2014 to transform the health care delivery system. More information about Maryland's All-Payor Model is available at: http://hscrc.maryland.gov/Pages/progression.aspx.

to assess remote specialist consultants' satisfaction with the telehealth experience. Copies of these surveys are included in the appendix to this report.

Limitations of the Quantitative Analysis

Since the project was implemented primarily to assess the viability of telehealth to improve access to specialty care in specific instances, the evaluation design did not include a control group. This is a limitation of the quantitative analysis. The absence of a control group precluded the consideration of covariates that could explain the observed results. The relatively small sample size of 48 patients limits the generalizability of the study's outcomes to the wider patient and provider population. Additionally, because of the project timeframe, it was not possible to assess the long-term impacts of the project on access to and utilization of health services.

Quantitative Patient Outcomes

Table 1 presents a comparison (baseline versus average follow-up) for the key project outcomes.

Table 1: Quantitative Patient Outcomes

Measure	Baseline (%)	Follow-Up (%)
"Wait time for specialty appointments" defined as percent of patients receiving a specialty appointment within three to four days	10	6
"Access to behavioral health services" defined as percent of patients who screened positive for depression and completed a behavioral health appointment	34	61
"ED use" defined as the percent of GFC patients with gastroenterologic, neurologic, dermatologic, cardiac, pulmonary or behavioral health conditions who had an ED visit	12	9
"30-day readmission rate" defined as the percent of GFC patients discharged from a hospital that were readmitted to the hospital within 30 days of discharge date	14	13

The project did not meet its goal of reducing the wait time for specialty appointments for various reasons including the following: some visits had to be rescheduled during the initial phases of the project due to the learning curve in adopting the telehealth technology and related technical difficulties at practice sites; a high rate of missed appointments, which is not atypical in a high risk, vulnerable population; and a specialty provider shortage that arose because the UM Capital providers had limited intake capacity. The project attempted to recruit additional specialists although was unable to do so in a timely manner given the highly competitive hiring environment that prevails in the Washington, DC metropolitan area.

With respect to all of the other outcome variables, the observed change was in the desired direction. This finding underscores that, while the project did not achieve the desired reduction in wait time for specialty appointments, it was successful in improving access to behavioral health specialists, keeping patients out of the ED, and reducing 30-day readmissions thereby

reducing costs and improving clinical outcomes. The project aimed to have at least 60 percent of all patients reporting "high" or "very high" levels of satisfaction with the project. At the conclusion of data collection, 81 percent achieved this goal.

Qualitative Outcomes

The project received considerable positive feedback from patients regarding the telehealth intervention. Specifically, patients expressed appreciation for how telehealth improves the accessibility of specialty services. Patients commented that they do not experience difficulty in visiting the GFC practices that are accessible by public transportation; having telehealth specialty services available at GFC sites was an incentive to seek care in a timely manner. As a result, several patients who previously declined specialty care for various reasons, including transportation challenges to reaching the specialists' office, were able to access these services via telehealth.

We also observed that, as specialty services became more accessible, the demand for these services increased. For example, patients who were previously scheduled to have monthly behavioral telehealth consults are now inquiring whether they could see the behavioral health provider more often. Additionally, patients have requested that telehealth be expanded to include more specialties than are currently offered by the project.

Providers at both GFC and UM Capital reported high levels of satisfaction with the project. Providers reported being pleased with the increase in compliance for the specialist visits, particularly among patients with multiple issues including behavioral health. They also noted that since GFC is a family medicine residence site for UM Capitol, many of the GFC providers are personally acquainted with UM Capitol specialists. The relationships that existed prior to the project were instrumental in allaying the concerns that some patients had about seeking care from a specialist that they did not know. This facilitated patients to access the needed services by the convenience of the telehealth intervention, and also the assurances of the GFC providers as to the quality of care that they could expect from the UM Capitol specialists.

Description of key challenges

The UM Capital specialists were solo private practice physicians with no experience in telehealth. As a result, they tended to favor the needs of their private practice patients over those of the project's patients. They also experienced a learning curve in adopting the telehealth service delivery model.

Despite quantifying the need for behavioral health services during the project planning phase, the actual need proved to be far greater than projected. This was possibly due to the competing interest presented by the specialists' private practice patient and those of the project. Consequently, the project experienced a shortage of UM Capital behavioral health providers who were available to provide telehealth consults. To address this, UM Capital recruited private, specialist consultants outside of the UM Capital network to meet the demand. Onboarding these recruits took time leading to scheduling delays. Additionally, we found that patients who

experienced a telehealth encounter, preferred to conduct follow-up scheduled visits via telehealth as well, which impacted the scheduling challenge.

Despite conducting a comprehensive assessment of each specialist's information technology capacity at the outset of the project, the project IT team found that it had to provide additional IT support to some of the specialists once the project was underway. A related challenge centered on identifying the optimal location for the telehealth consultations at each specialist. Through the IT assessment process, the team identified the computer at each practice best suited for the telehealth visits; and it became apparent that the practices needed to dedicate specific space to the project as well. As a result, UMC Capitol assigned dedicated telehealth rooms at its facilities and coordinated with specialists so that the latter could use these spaces to conduct eVisits. This adjustment in the workflow increased the percentage of completed visits and decreased the need for technical support.

Finally, there were challenges with the scheduling process, which differed from the existing specialty referral workflow. Initially, GFC front office staff had to call the specialty consultant to schedule the telehealth visit, then follow-up with a call to the specialty practice to confirm the visit and have it entered into the practice's EHR. There were instances where specialty practices, which are all small in size, lacked the manpower necessary to follow-up on all scheduled calls in a timely manner. As a result, in some cases, scheduled telehealth visits had to be cancelled and rescheduled, causing frustration for patients and providers alike. The GFC Process Team recognized that the time involved in scheduling could negatively impact the productivity and hence revenue of the small practices; thus, over the course of the project, GFC worked with the practices to improve scheduling workflows and streamline the scheduling process.

Lessons Learned

The most critical lesson learned was the need to improve the overall provider experience during a telehealth consult and to optimize the workflow by having HouseCall integrated with the practice management component of the EHR. This enhancement would allow the practice front office staff to schedule the eVisit within their EHR and automatically have the telehealth scheduled visit established in HouseCall and prepared for the originating site practice. Currently, utilizing HouseCall leads to documentation duplication by practice staff, since it is not integrated with the practices' EHR for registration, scheduling and ultimately billing. Future telehealth interventions must therefore make provision for this integration.

The scheduling challenges posed by using solo private practice specialists leads us to propose partnering with one or more specialist groups in the future. Doing so should build in more scheduling flexibility, as well as increased support for the telehealth effort. Additional support should be provided by increasing the amount of telehealth training that participating providers receive.

Another lesson learned is that CRISP's current ENS system needs some refinement to enhance its ability to support population health programs. Specifically, we found that the current ENS

system is unable to provide notifications on panels or subsets of patients; it is only able to provide these alerts for a provider's entire patient population. As a result, staff had to be assigned to review notifications and identify any GFC patients that were enrolled in the present study. This necessity somewhat hampered the ability to track and report on the service utilization of patients enrolled in the project.

Finally, the project underscored the importance of telehealth in providing timely access to behavioral health in highly vulnerable, medically underserved communities. Untreated subclinical depression has serious consequences in the quality of life and poses a higher risk of developing major depressive disorders. This can be prevented with timely intervention and follow-up care. This is often not achieved due to the long wait times in accessing specialty service and the societal stigma attached to seeking behavioral health care. Telehealth can bridge this gap by making the required specialty service available with a reduced wait time while the patient is at a family practice service center. Individuals experiencing social, economic, or environmental disadvantages are likely to face obstacles in accessing quality specialty care. This results in loss of productivity, economic strain, and dwindling health. Undiagnosed and untreated, depression oftentimes presents with atypical symptoms and contributes to avoidable inpatient admissions and ED visits. A major reform can be brought about in the health and wellbeing of high risk communities by providing the required behavioral health services through telemedicine.

Sustainability

The likelihood that the project can be sustained is heightened by several trends in the health care marketplace. Specifically, MCOs are now encouraging their credentialed providers to take advantage of value-based payment initiatives that shift the payment models away from fee for service to reimbursement for delivering high quality, cost efficient care. This development has led to an increased emphasis on promoting innovation and alternative approaches to patient engagement that align with quality measures. As a result, GFC and UM Capital have a strong financial incentive to continue and expand the project. GFC is able to bill payers directly for its telehealth services and payers are likely to reimburse the services as doing so improves MCO performance ratings. Similarly, the GFC and UM Capital partnership remains viable and healthy because telehealth is associated with improved care transitions and reductions in ambulatory sensitive hospitalizations and ED visits, as well as readmissions.

To this end, GFC took steps during the project to make certain that providers could be reimbursed appropriately for their services. At the outset of the grant, the project leadership from UM Capital and GFC wanted to ensure that the organizations could bill and receive reimbursement for telehealth services as a key component of the sustainability strategy. However, we realized as telehealth consultations began to occur, the UM Capital specialty practices were not documenting the telehealth encounter in order to bill. GFC began billing the

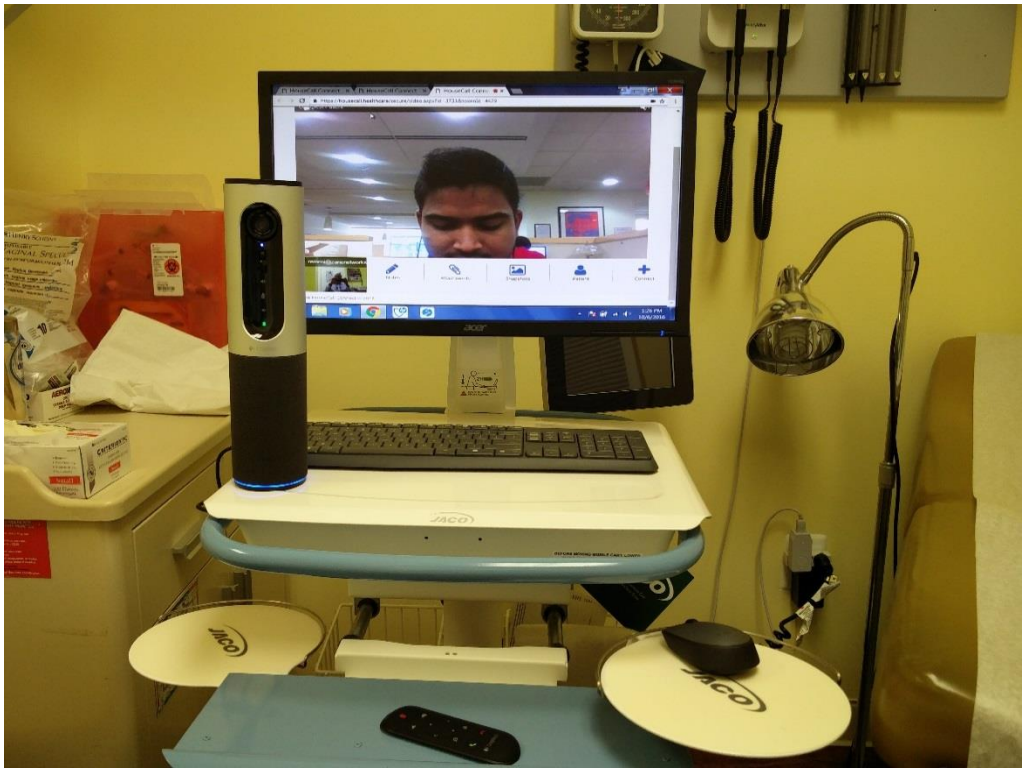
originating site fee[85] at the onset of the service delivery. However, upon reviewing the accounts receivables, GFC realized that the co-payments were being denied and reimbursed by Medicaid. The grant management team learned that telehealth reimbursement training needs to occur periodically to ensure that participating organizations integrate the process within their workflows and follow-up accordingly during their revenue cycle management process to ensure that telehealth payments are being paid by the health insurers. We anticipate that as specialist distant providers begin to receive telehealth reimbursement for services rendered, provider adoption will spread across participating organizations.

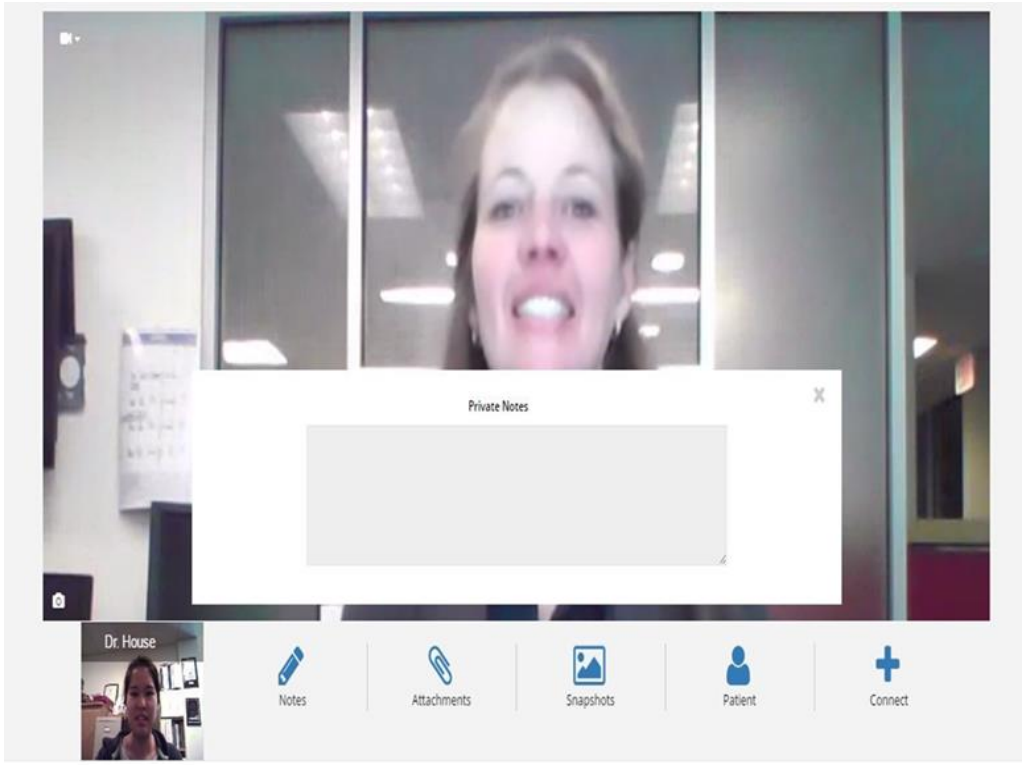
Conclusion

The project addressed a critical problem facing the patient population served by GFC and UM Capital, namely improving timely access to quality specialty care. Affording access using telehealth proved to be challenging although ultimately satisfactory to providers and patients alike. Reductions in patients' use of the ED and 30-day readmission rates and improved access to behavioral health specialists, as well as high levels of patient satisfaction with the telehealth service suggests that the model is viable and should be continued and even scaled up. We anticipate that as the telehealth technology and procedures are more fully integrated into providers' workflow and as patients become more accustomed to this treatment modality, the initial challenges encountered with scheduling will disappear. Also, the steps we have taken to ensure that providers are reimbursed for their services should attract more specialists and primary care providers to join the telehealth network.

[85] An originating site fee is a payment from Medicaid to the eligible practice where the patient is located during the telehealth encounter.

Appendix A

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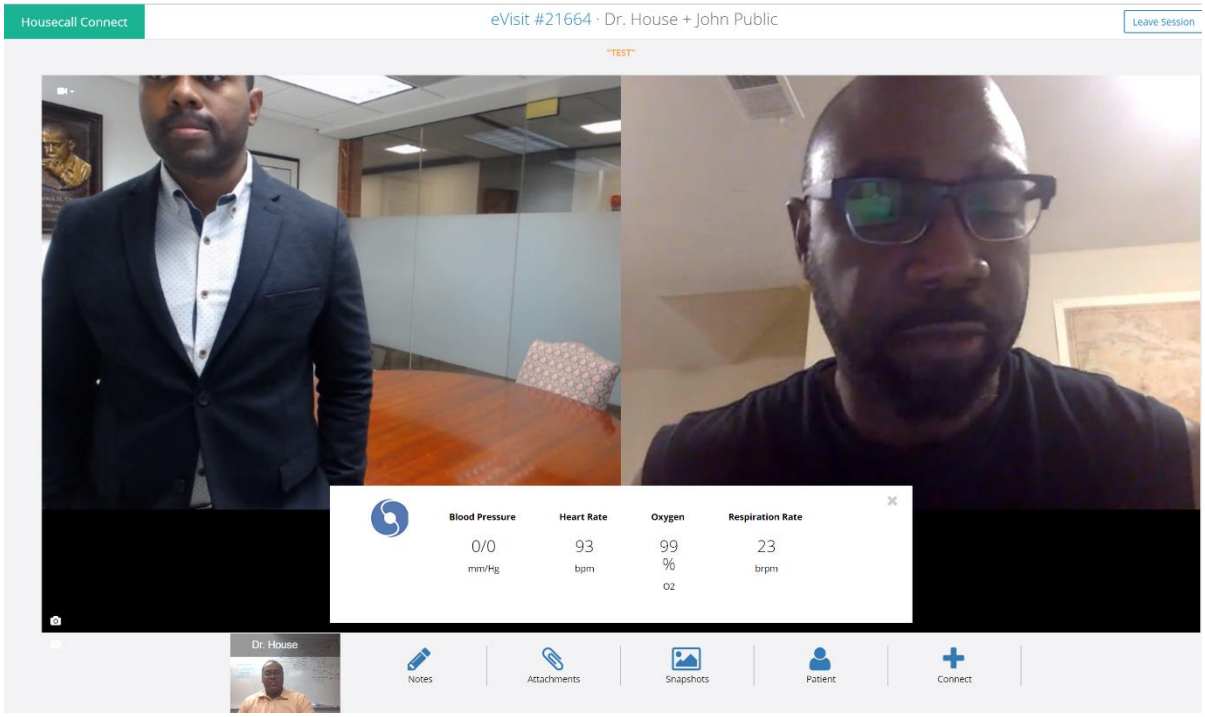
Dr. House
Notes
Attachments
Snapshots
Patient
Connect



Notes *

Reimbursement

Please choose a code (optional)

Feedback (Optional)

HOW WAS YOUR SESSION TODAY?

The quality of the video was great	Definitely	Somewhat	Disagree
The quality of the audio was great	Definitely	Somewhat	Disagree
Housecall easy/intuitive to use	Definitely	Somewhat	Disagree
I was able to successfully complete my goals	Definitely	Somewhat	Disagree

Close eVisit

(once closed, the session cannot be rejoined)

Appendix B

About Dimensions Healthcare System

Dimensions Healthcare System is an integrated, not-for-profit, community-owned organization providing comprehensive, quality healthcare services to the residents of Prince George's County, Maryland and surrounding areas. The facilities that comprise Dimensions Healthcare System include: Bowie Health Campus, Family Health and Wellness Center, Laurel Regional Hospital, Prince George's Hospital Center and the Rachel H. Pemberton Senior Health Center. Dimensions Healthcare System is the largest provider of healthcare services headquartered in Prince George's County, Maryland, caring for more than 150,000 patients each year.

Dimensions Healthcare System Specialty Centers are as follows:

Dimensions Surgery Center	**Domestic Violence & Sexual Assault Center**
Infusion Center	**Larkin Chase Care & Rehabilitation Center**
Physical Rehab Center	**Sleep Wellness Center**
The Diabetes Center	**Wound Care & Hyperbaric Medicine Center**

Dimensions Healthcare System services include, but are not limited to:

- Cardiac Rehabilitation
- Cardiopulmonary
- Emergency Services
- Maternal and Child Health
- Medical Imaging
- Midwifery
- Orthopedics
- Surgical Services
- Trauma Care
- And more!

Gerald Family Care Telemedicine Services participating locations:*

Gerald Family Care, P.C. – Bowie
2905 Mitchellville Rd, Ste. #102
Bowie, MD 20716 • 301.218.4101

Gerald Family Care, P.C. – Capitol Heights
4744 Marlboro Pike
Capitol Heights, MD 20743 • 240.670.1003

Gerald Family Care, P.C. – GlenArden
7940 Johnson Avenue
Glenarden, MD 20706-1772 • 301.364.3200
www.geraldfamilycare.com

**See, hear and talk to a Dimensions-affiliated physician or healthcare specialist, in real time, while visiting your neighborhood Gerald Family Practice location.*

For additional information about Dimensions Healthcare System and a complete list of services and programs, please visit **www.dimensionshealth.org.**

Telemedicine Services at Gerald Family Care

In partnership with:

Dimensions Healthcare System
www.DimensionsHealth.org

Gerald Family Care P.C.
Quality Healthcare since 1974

301.364.3200

Bringing Specialty Care To You

Gerald Family Care, in partnership with Dimensions Healthcare System, can now bring specialty care directly to you. The following Gerald Family Care locations now have telemedicine equipment and technology to allow patients to connect remotely with specialty care providers to receive needed services:

- Bowie
- Capitol Heights
- Glenarden

Now Gerald Family Care patients have direct access to the following specialty services:

- Behavioral Health Services
- Cardiology
- Dermatology
- Gastroenterology
- Neurology
- Pulmonology

QUESTIONS?
For help, contact Yolanda Henry, RN, at Gerald Family Care at **301.364.3261.**

HOW CAN I PARTICIPATE?

Participating in telemedicine services at Gerald Family Care is as easy as 1-2-3!

- Agree to be seen by a specialist using telecommunications technology.
- Sign a consent form provided by a Gerald Family Care staff member.
- Show up on time for your next appointment!

WHAT IS TELEMEDICINE?

Telemedicine is the delivery of healthcare services using video cameras and monitors to connect patients to healthcare providers reducing the need to travel to receive care.

WILL MY TELEMEDICINE VISIT BE PRIVATE AND SECURE?

Yes. Just like a regular doctor's appointment, your telemedicine visit will be private and confidential. The visit is conducted using a secure encrypted Internet connection, ensuring the same level of privacy as if you and the physician were in the same room. When the consultation is completed, information about the visit is stored in a secure electronic record system that allows future access, if necessary.

TELEMEDICINE BENEFITS

1

Easy and Efficient – Reduces the time, cost and risk of having to travel

Expanded Access – Specialized services are now available in your community

Enhanced Continuum of Care and strengthened relationships between primary and specialty care providers

Enhanced Communication between Gerald Family Care staff and Dimensions Healthcare System specialists

Faster and Convenient Treatment – Specialized care is delivered directly to patients in a familiar healthcare setting

Appendix C

Gerald Family Care, P.C.

Telemedicine Evaluation – PCP-Specialist/Consult

PATIENT/FAMILY Satisfaction Survey

Patient's: **Age:**
Sex: M / F
Race:

Date of Evaluation: _____/_____/_____

We would like to know how you feel about the services we provide so we can make sure we are meeting your needs. Your responses will be used to improve these services. All responses will be kept confidential and anonymous. Thank you for your time.

Please circle the numbered response that most accurately reflects how well you think we are doing in the following areas.	**Strongly Agree** **5**	**Agree** **4**	**Neither Agree or Disagree** **3**	**Disagree** **2**	**Strongly Disagree** **1**
Communication					
I feel the telemedicine audio-video conferencing is an effective tool for communication between my primary care provider and the specialist regarding my (***or*** family member's) care.	5	4	3	2	1
Through the use of telemedicine video conferencing, I feel my (***or*** family member's) medical condition was communicated thoroughly to the specialist physician.	5	4	3	2	1
Through the use of telemedicine video conferencing, I feel my questions and concerns about my (***or*** family member's) care were addressed.	5	4	3	2	1
Communication between my primary care provider and the specialist was improved by use of the telemedicine-enabled video conferencing when compared to telephone communication alone.	5	4	3	2	1
Overall, I was satisfied using telemedicine	5	4	3	2	1
Utility					
I feel telemedicine-enabled communication with video conferencing should be routinely used for assessment and communication about a patient's medical condition.	5	4	3	2	1
Logistics					
I could communicate easily with the physicians/providers using the telemedicine enabled video conferencing equipment/workstation.	5	4	3	2	1
The quality of the video was good.	5	4	3	2	1
The quality of the audio good.	5	4	3	2	1

Comments:

_____

_____

_____

_____

Gilchrist Support Our Elders

Telehealth Project

Final Report

Table of Contents

Introduction

When timely and objective clinical data is obtained from telehealth systems, it can enhance the capacity of health care providers to efficiently deploy medical services and appropriately care for patients in the home setting. Gilchrist Services (Gilchrist) and Lorien at Home, part of Lorien Health Services, LLC, (Lorien) deployed Lorien Link telehealth technology to better serve patients in the Gilchrist Support Our Elders (SOE) program. The technology, utilized by primary care providers, facilitated the implementation of clinical interventions earlier in the disease treatment process for chronically ill patients. This enabled ongoing stabilization of patients in their homes who could have otherwise returned to a hospital for further monitoring and clinical interventions.

The SOE program is a home-based medical care program that sends a nurse practitioner (NP) to a patient's home to provide medical care visits to older individuals with advanced illness. The SOE program is a part of a fully integrated health system affiliated with Greater Baltimore Health Alliance (GBHA) the accountable care organization of the Greater Baltimore Medical Center (GBMC). The SOE program patients receive home-based primary care services from the NP with 24/7 telephone access and visits within two business days for urgent needs.[86] The SOE program has an active caseload of approximately 200 home-bound patients at any given time. SOE patients are typically older with advanced debilitating chronic illnesses who often find themselves in an unending cycle of health crisis transitioning from home to the hospital to rehabilitation and back to home.

Lorien is a Maryland licensed Level 3 residential service agency (RSA)[87] providing an array of services from companion care to complex nursing care in the home. Included in the Lorien service offerings is the *TeleHealth Program*, which utilizes Lorien Link, a remote communication telehealth system offered through a partnership with Grand Care Systems. Gilchrist partnered with Lorien to provide telehealth monitoring to a subset of SOE patients identified as being good candidates for telehealth interventions. Lorien staff supplied operational support through its registered nurse (RN) care coach and additional administrative and clinical team members. In addition, Lorien assured proper installation and ongoing technical support in clinical care coaching throughout the project.

Outcomes from the project have shown reductions in hospitalizations by 40 percent and emergency department (ED) visits by 69 percent when compared to baseline data for telehealth patients prior to enrollment in the telehealth program. The 30-day all-cause readmission rate was reduced by 47 percent in comparison to baseline data for all SOE patients. Two objectives

[86] Urgent needs are synonymous with reasons a person would go to an urgent care clinic (fever, cold, respiratory infection).

[87] COMAR 10.17.05 defines a Level 3 RSA as a business that is engaged in employing or contracting with individuals to provide at least one home health care service for compensation to an unrelated sick or disabled individual in the residence of that individual, which provides complex care, such as large wounds, IV therapy, and ventilator care. More information is available at: www.dsd.state.md.us/comar/SubtitleSearch.aspx?search=10.07.05.*

were identified regarding transformation of the primary provider practice: reduce patient call volume and reduce urgent visits by the primary care provider to the patient's home. There were reductions in call volume by about 18 percent for the patients enrolled in the telehealth program when compared to baseline telehealth patients. There was an urgent, unplanned home visits reduction of 16 percent when comparing patients enrolled in the telehealth program to the overall SOE panel.

Technology Infrastructure

Lorien Link allowed clinicians to provide 24/7 in-home monitoring of patients vitals, provided medication reminders, and facilitated live video calling with on-call staff. A patient's plan of care was customizable through Lorien Link based on medical status, cognition, and physical environment, while the patient was in their home. Lorien Link was utilized to provide remote home monitoring for objective measurements based on the patient's individual condition and needs including: blood pressure, pulse oximetry, blood sugar, weight, and temperature. Direct communication between the patient and a Lorien or Gilchrist RN Care Manager was also supported via Lorien Link's secure video conferencing capabilities. All members of the patient's clinical care team worked with the patient and their families to establish effective plans of care in an effort to improve and maintain management of the patients' chronic condition(s) and allow patients to stay in their home.

The SOE program utilizes the Maryland State Designated Health Information Exchange, the Chesapeake Regional Information System for our Patients (CRISP)[88] and Epic, the Electronic Health Record (EHR) system for the SOE program, to communicate about their telehealth patients with other health care providers. CRISP Care Alerts[89] were updated to identify SOE patients as telehealth users and used to notify other providers internal to the GBMC system and across other Maryland health systems. The team also utilized CRISP to receive patient panel encounter notification services (ENS)[90] and pre/post analysis project implementation reports. The intent of obtaining CRISP pre/post analysis reports on a quarterly basis was to compare hospital utilization and cost between the SOE population as a whole and the subset population that utilized the telehealth interventions. Two primary metrics assessed were ED visits and inpatient hospitalizations. Pre/Post analysis reported 1, 3, 6, and 12-month snapshots pre and post program enrollment dates.[91]

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[88] CRISP is a regional health information exchange serving Maryland and the District of Columbia. CRISP has been formally designated as Maryland's statewide health information exchange by the Maryland Health Care Commission. The health information exchange allows clinical information to move electronically among disparate health information systems.

[89] CRISP Care Alerts are notifications to providers within the EHR workflow that alert the provider on the context of the patient's care. More information is available at: crisphealth.org/services/single-sign-on-sso/.

[90] ENS are real-time alerts to notify ambulatory providers when their patient has a hospital encounter. More information is available at: crisphealth.org/services/encounter-notification-services-ens/.

[91] Pre/Post analysis reports are based on hospital case mix data, which includes demographic, financial, and clinical information collected by the Health Services Cost and Review Commission by legislative mandate from all acute care hospitals and licensed specialty hospitals on all inpatient and outpatient hospital visits. More information is available at: www.hscrc.maryland.gov/Pages/data.aspx.

Project Implementation Process

Lorien Link was deployed to 20 SOE patients; these patients were selected based upon the results of an initial assessment and clinical indicators that suggested the patient would be a good candidate for the program and experience beneficial outcomes from remote telehealth monitoring. A preliminary SOE patient assessment process for enrollment in the telehealth program consisted of determining if the patient had clinical indicators that could be measured, was willing to participate in the telehealth program, and had Internet connectivity in their home. Lorien utilized information from the clinical assessments to set up Lorien Link with initial settings specific to each patient. An NP and RN Care Manager from the SOE program worked alongside Lorien. Upon admission to the SOE program, the Gilchrist RN Care Manager collected a patient's medical history in an effort to establish baseline measurements. A home safety and medical assessment was also completed to identify any additional patient needs and challenges. A NP then worked with Lorien to complete and initiate the individualized clinical care plan.

Lorien maintained direct contact with the patients at least weekly via video-call, phone call, and/or in-person home visits to review diagnostic trends that could impact the patient's health status and risk for hospitalization. The Gilchrist and Lorien RN Care Managers received real-time alerts for individual patients based upon the parameter settings of Lorien Link as determined by the NP upon initial clinical assessment. The Lorien or Gilchrist RN Care Manager accessed real-time physiological data from Lorien Link to address health parameters that were out of normal range. When an alert was triggered by a call for assistance from the patient, the Lorien or Gilchrist RN Care Manager served as the first point of contact to assess the plan of care quickly and effectively. If further assessment was deemed necessary, given the clinical data presented, the information was forwarded to a NP, who assisted the patient in receiving effective medical care in the most appropriate outpatient setting.

Protocol Development and Staff Orientation

Initial objectives of the project implementation consisted of establishing effective communication between Lorien and Gilchrist. A weekly telephone utilization review of the active caseload was implemented prior to go-live of the project. With two separate entities working together towards implementation of an individual patient care plan, a formal workflow protocol was needed to effectively provide for clinical handoffs of clients between SOE and Lorien clinicians. The protocol addressed both regular hours and after-hours processes and detailed how telehealth notifications would be handled. Establishing a downtime procedure using a fax machine as a default communication became relevant after a power outage was experienced for one business day due to a storm in the first quarter of the project.

The team developed a telehealth monitoring request form (see Appendix A) so that both entities would be aware of the clinical parameters needing to be captured. The form also assisted in identifying the type of telehealth equipment to be deployed based on initial clinical assessment of all new patients. It was determined that Lorien staff should have access to the SOE EHR in order to gain the most comprehensive insight about the patient's ongoing clinical care. Lorien

was oriented initially to eClinicalWorks, and two months later to Epic, after the SOE program transitioned to a new EHR system. In addition, both partners utilized CRISP services to support care management of SOE patients enrolled in the telehealth program.

The SOE office and field staff were oriented to Lorien Link and the referral process through an onsite demonstration by Lorien. The program was initiated with the enrollment of two patients in an effort to test established communication workflow and the structure of the weekly conference calls. Enrollment progressed, inclusive of the initial two patients, over the next three months to a total caseload of 20 patients.

Patient Enrollment and Care Delivery

Once staff protocols were established, the project plan addressed the patient enrollment process. The primary focus was on communication efforts to the patient population and the development of the program marketing materials. An ongoing SOE client log to identify and track the patients who were utilizing the telehealth technology was also established. These specific efforts were launched during the third month of the program, which had a caseload of 11 patients at that time. The clinical technology and protocols were implemented, patient satisfaction surveys were developed, and a timeline for distribution was established during launch. In a proactive effort, it was determined that Lorien would provide after-hours home visits, when necessary, based on the telehealth alerts, to prevent unnecessary transfers. The metric outcomes and clinical goals were also refined to establish a baseline for urgent care visits and patient call volume.

Another successful implementation aspect of the project was the ability to integrate pharmacy providers as members of the interdisciplinary care team. Pharmacists were able to utilize Lorien Link to provide care both while in the patients' homes, as well as remotely. Use of telehealth has transformed the way pharmacists are able to provide interventions. Based on historical clinical indicators, diagnosis, and the initial visit from the NP, an intervention from the pharmacist could be initiated for SOE patients. Lorien Link alerts assisted the pharmacists with monitoring patients who were having issues related to medication stabilization. This enabled the pharmacist to screen the patients that needed to be contacted regarding a medication management issue and provide pharmacological intervention, including medication changes and education. Clinical indicators that were effectively managed through telehealth include hypertension, diabetes, and pain control. In addition, as these indicators became more stable, patients reported experiencing a reduction in their anxiety. Pharmacists reported that Lorien Link has been a vital tool to gain more daily insight into patient's clinical data.

As the overall caseload continued to grow, refining the enrollment process, distributing marketing materials, and implementing a process to review unplanned transfers became areas of focus. The unplanned transfer tool (see Appendix B) was created by SOE clinicians to capture elements such as pharmacy involvement, the last time a visit was made, if the transfer to the hospital was an emergency, and the type of services provided by SOE prior to the transfer. The SOE medical director then reviewed the unplanned transfer tool to determine if the transfer could have been avoided. Development of processes and protocol for specific patients to receive

pharmacy visits was also established. Pharmacist defined standard activities to occur before, during, and after every visit (see Appendix C).

Assessment Approach

The project aimed to demonstrate transformation of practice by utilizing telehealth monitoring by assessing if there was a reduction/improvement in the following metrics: ED visits; hospital admissions; hospital readmissions; urgent, unplanned home visits by NPs; patient call volume to the SOE office during after-hours and regular business hours; and patient satisfaction with the telehealth program. Baseline data was obtained for the 12-month period prior to the project start (July 2015-June 2016) for the existing panel of SOE patients for the following metrics: ED visits, hospital admissions, readmissions, and phone call volume. The baseline information was utilized to establish the goals for these measures.

At baseline, all SOE patients had an ED visit rate of 0.844 visits per 1000 patient days, hospital admission rate of 1.798 per 1000 patient days, and 30-day all-cause hospital readmission rate of 0.220 per 1,000 patient days. The panel of 11 patients that participated in the launch of the telehealth program were also assessed for the following baseline information: ED visit rate of 2.640 per 1,000 patient days and hospital admission rate of 3.080 admissions per 1,000 patient days. Baseline data on re-admissions was only able to be captured if the patient was an established SOE patient. There were patients who were enrolled in SOE and were enrolled in the telehealth program simultaneously, thus baseline readmission data was unable to be calculated for the 11 baseline telehealth patients. In addition, historical data to serve as a baseline was not available for the practice transformation measures, (i.e., number of unplanned, urgent visits and call volume); therefore, ongoing data was collected throughout the project from the active SOE patient panel not enrolled in the telehealth program as a comparison for measuring the effect of telehealth in these two areas. The project team believed implementation of telehealth technology that facilitated the collection of objective clinical data from Lorien Link, as opposed to subjective reporting of symptoms by patients would result in an improvement in the project measures. The team set a target of 20 percent improvement in the metrics reflecting touch points with the health care system and a 10 percent improvement for measures relating to practice transformation.

Data was collected and reported monthly through a review of CRISP ENS data, internal EMR reports, Lorien Link reports, patient chart review, and provider-reported events that were reviewed minimally during weekly utilization review meeting and via daily clinical hand-offs. Satisfaction surveys were obtained at three points throughout the patients' enrollment in the program: one month, six months, and program completion. The project team anticipated that there would be increased satisfaction over the course of time as patients and their caregivers became more familiar with the telehealth monitoring systems.

Assessment Limitations

The following limitations were identified over the course of the project (18-months):

1. Patients with advanced debilitating illness that may have benefited from the program were excluded if they did not demonstrate a means of being literate in technology, which was a requirement for enrollment in the telehealth program;
2. The small sample size and targeted clinical indicators of advanced illness do not allow for a robust statistical analysis and prevent the results of the project from being generalized to other populations;
3. The CRISP pre/post analysis currently does not adjust for patients discharged from the program, including death of a patient, which results in skewing of data; and
4. Measures not tracked prior to the grant did not have historical baseline data available, which limited the ability to assess the effect of the telehealth on these measures.

Results of Telehealth Intervention

The clinical and volume metrics were tracked monthly to monitor progress throughout the duration of the program. Reducing urgent visits was targeted as a transformation of practice measure with anticipation that a reduction in unplanned visits would lead to less disruptions in the NP's daily visit schedule. Previous baseline data was not available for comparison as it had not historically been measured prior to the project launch; therefore, the team utilized the complete SOE panel as a means of comparison. Telehealth patients experienced unplanned, urgent visit rate that was under the pre-established goal of 10 percent. The patients with telehealth monitoring had an urgent unplanned visit rate of 7.72 percent compared to SOE patients, which had a rate of 9.63 percent, which is a 1.91 percent reduction in urgent visits compared to SOE patients.

Measure	Numerator/Denominator	Baseline: All SOE Patients	Baseline: Telehealth patients*	Goal	Total
		FY 2016	FY 2016		
Decrease the number of urgent, unplanned home visits for SOE patients with Telehealth versus patients without Telehealth	Numerator: # of urgent (unplanned) visits for Telehealth Patients	n/a	n/a		22
	Denominator: Total # of patient visits for Telehealth Patients	n/a	n/a		285
	Percent	n/a	n/a	10%	7.72%
	Numerator: # of urgent (unplanned) visits for all SOE Patients	Not tracked prior to grant	n/a		167
	Denominator: Total # of patient visits for all SOE Patients	603	n/a		1,734
	Percent	n/a	n/a	10%	9.63%

The second transformation of practice measure was to decrease the overall volume of calls to the support staff, including after-hours call volume, as compared to the SOE patients. The rate at baseline was 28.55 calls per 1,000 patient days for all SOE patients. The telehealth patients experienced an increase in overall call volume compared to all SOE patients with a total of 42.75 calls per 1,000 patient days. This can be attributed to continuous monitoring of the telehealth patients that resulted in real-time alerts triggered as a result of data that was outside pre-established parameters, which required telephone calls. Successful clinical interventions were then able to be implemented, enabling patients to receive care in the most appropriate setting. This was found to be correlated with the overall reduction of readmissions and ED visits for the patients with the telehealth monitoring system versus all SOE patients.

Measure	Numerator/Denominator	Baseline: All SOE Patients	Baseline: Telehealth patients*	Total
		FY 2016	FY 2016	
Decrease SOE patient call volume during business hours and after-hours	Numerator: Total # of calls that come into the practice for all SOE patients	778	264	352
	Denominator: Total # of SOE Patient Days	27,253	5,040	8,638
	Calls per 1,000 Patient Days	28.55	52.38	42.75

ED utilization at baseline rate was calculated to be 0.84 ED visits per 1,000 patient days for the overall SOE panel without telehealth monitoring in the prior year (June 2015-July 2016). The baseline ED utilization rate was 2.64 ED visits per 1,000 patient days for the 11 telehealth patients at baseline. During the program, the patients receiving telehealth monitoring experienced a 69.32 percent reduction in ED visits as compared to their rates at baseline. This exceeded the goal of 20 percent reduction defined at the initiation of the project. Furthermore, the performance of those patients with telehealth monitoring also demonstrated a 4 percent reduction in ED visits per 1,000 patient days compared to the overall SOE panel.

Measure	Numerator/Denominator	Baseline: All SOE Patients	Baseline: Telehealth patients*	Goal	Total
		FY 2016	FY 2016		
Reduce ED visits by SOE patients enrolled in the telehealth program.	Numerator: # of ED visits by enrolled SOE patients	23	6		7
	Denominator: Total # of SOE Patient Days	27,253	2,275	20% Reduction	8,638
	ED visit rate per 1,000 Patient Days	0.844	2.640	2.110	0.810

The next clinical measures identified were hospital admissions and hospital readmissions. The baseline rate for the overall SOE panel without telehealth monitoring in the prior year (June 2015-July 2016) was calculated to be 1.80 per 1,000 patient days for hospital admissions and 0.22 for readmissions per 1000 patient days. The baseline for the 11 telehealth patients enrolled at the program launch was 3.08 per 1,000 patient days for hospital admissions; the data for readmissions of this group was not available as it had not historically been measured prior to the grant launch. The patients with telehealth monitoring demonstrated 39.80 percent reduction in hospital admissions when compared to the telehealth patients at baseline and a 47.36 percent reduction in hospital readmissions compared to all SOE patients. For all clinical measures, there was a reduction that exceeded the goal of 20 percent defined at the initiation of the project.

Measure	Numerator/Denominator	Baseline: All SOE Patients	Baseline: Telehealth patients*	Goal	Total
		FY 2016	FY 2016		
Reduce hospital admission by SOE patients upon enrollment in the telehealth program.	Numerator: # of hospital admissions by enrolled SOE patients	49	7		16
	Denominator: Total # of SOE Patient Days	27,253	2,275	20% Reduction	8,629
	Hospital Admits per 1,000 Patient Days	1.80	3.08	2.460	1.854
Reduce hospital readmissions (30-day all-cause) by SOE patients upon enrollment in the telehealth program.	Numerator: # of hospital readmissions by enrolled SOE patients	6	n/a		1
	Denominator: Total # of SOE Patient Days	27,253	n/a	20% Reduction	8,629
	Hospital re-admits per 1,000 Patient Days	0.22	n/a	0.176	0.116

Another internal measure tracked was patient satisfaction with utilizing the telehealth equipment based on surveys administered via SurveyMonkey, and on paper when needed (see Appendix D). Patient satisfaction was anticipated to increase over the duration of the program as the patients and their caregivers became more familiar with utilization of the telehealth monitoring equipment. The patient satisfaction rate was 96 percent (n=24)[92] one month after installing telehealth equipment in the patient's home; 94 percent (n=17)[93] six months after

[92] The project only had 20 patients enrolled in the program at a given time. If it was determined that a patient was no longer able to continue on the program and discharged, the patient was replaced. This resulted in greater than 20 patients having satisfaction survey data collected throughout the duration of the program.
[93] Some patients were either cycled off the program prior to six months or were enrolled later to replace patients discharged from the program and did not reach six months during the course of the grant period.

installing telehealth equipment in the patient's home; and 95 percent (n=16) at program completion. There was an overall increase in satisfaction as the program continued. During the satisfaction survey collection, patients reported that they enjoyed being able to check their own readings at home with accurate equipment along with knowing that a provider would be checking on them. Utilization of the telehealth equipment provided a sense of security that is invaluable for both patients, their caregivers, and providers.

Measure	Numerator / Denominator	1 Month Survey (24 Responses)	6 Month Survey (17 responses)	Program Completion Survey (16)
Increase patient satisfaction rates (results provided after 1 month, 6 months, and at end of pilot)	Numerator: Total actual score of patients completing satisfaction survey	1,725	1,268	1,112
	Denominator: Highest score possible on satisfaction survey	1790	1350	1,170
	Percent	96%	94%	95%

The results obtained via the CRISP Pre/Post Analysis Reports (See Appendix H) demonstrated the following changes in total charges per patient before and after enrollment into the program via snapshots taken at 1, 3, 6, and 12 months. When looking at charges per patient for members who had a visit, the following was observed at respective pre and post monthly intervals: $5,391 increase at 1 month, $5,838 decrease at 3 months, $4,912 decrease at 6 months, and a $9,978 decrease at 12 months. Of note, when reviewing the favorable decrease in charges observed in both panels, the panel size should be an important consideration. The patients with telehealth had a total panel size captured of 19 patients compared to the patients with SOE only panel that captured 99 patients.

	Total change in charges per patient with a visit pre and post enrollment	
Timeframe	Patients with Telehealth and SOE	Patients with SOE only
1 month	$5,391	-$3,867
3 months	-$5,838	-$4,595
6 months	-$4,912	-$8,785
12 months	-$9,978	-$18,325

There was a notable decrease in the rate of visits per member for the subset population who utilized telehealth intervention based on available results (1, 3, and 6 month pre and post intervention).

	Visits rate change per patient pre and post enrollment	
Timeframe	**Patients with Telehealth and SOE**	**Patients with SOE only**
1 month	0	-3.4
3 months	-10.0	-6.6
6 months	-16.5	-9.1
12 months	unavailable	-12.8

Project Challenges

Establishing clear, timely, and efficient communication between two entities that would enable appropriate clinical interventions was a key challenge identified early in the project. There were many communication processes implemented as a means of addressing this challenge. Ongoing refinement of the content discussed during the weekly joint utilization phone calls, the process of clinical handoffs between clinicians, along with who and how telehealth notifications would be routed were identified. Consideration was also given regarding communication during both business hours and after-hours. To address this, a process was established in which Lorien would provide after-hours coverage from 5:30 pm to 8:30 am on weekdays and weekends from 5:30 p.m. on Friday to 8:30 a.m. on Monday. Daily e-mails were exchanged between SOE and Lorien along with weekend updates to further facilitate communication during after-hours. The need for a primary point person on behalf of SOE was also identified as a communication area for improvement, which became the SOE RN Care Manager. The SOE RN care manager also facilitated communication regarding enrollment and disenrollment of patients in the program among the SOE providers.

Responding to telehealth alert notifications also emerged as a challenge. Lorien Link has different types of telehealth alerts that could be received. There were two main alert types that were received by patients enrolled in the project. A "Needs Assistance Alert" is patient initiated and indicates they have a need of any type; the current response time is approximately 60 seconds with the expectation there is a response in a few minutes. Lorien assumed all responsibility in responding to the "Needs Assistance Alerts." The other type of alert was generated by the system when a clinical indicator for a patient was outside the parameters established. These alerts were received by the SOE RN Care Manager for clinical evaluation and then forwarded to the individual patient's NP if further intervention was needed.

Determining the most effective selection criteria for enrollees proved to be an ongoing challenge. Initially the following was taken into consideration: patient's mental status, psychosocial needs, caregiver willingness to participate, and Internet access (see Appendix E). However, it was determined that an assessment of the patient's risk for re-entry into the hospital system was needed to better identify patients that could benefit from using telehealth. To address this challenge the project considered an assessment of individual patient's acuity levels. The LACE index scoring tool (see Appendix F) was initially applied to all telehealth SOE patients in an effort

to provide an acuity assessment. The outcomes of the LACE tool[94] provided highly varied scores from low risk to high risk. With the launch of Epic, the General Adult Risk Score (GARS) (see Appendix G) is automatically populated in real time for all patients. A comparison between GARS and the LACE scores was completed, and the findings were that the GARS captures both clinical and social determinants of health, which provides a more comprehensive and accurate assessment of patient acuity and risk for potential re-entry into the hospital system. All SOE patients enrolled in the telehealth project had either a high or moderate risk score.

Lessons Learned

The project began with a small group of patients, which allowed for an individual provider and small, focused group during the beginning stages of a program to make necessary, rapid, and iterative improvements during the implementation processes. By minimizing variables to manage, the project team was able to develop and refine efficient protocols before scaling and adding more staff and a larger patient population.

The project determined that narrowing the targeted patient population would be beneficial during the implementation phase. As a result, the team identified opportunities for more focused patient recruitment to include specific clinical indicators, including uncontrolled blood pressure, pharmacy intervention (medication reconciliation adjustments), and social indicators such as isolation.

Interactions between staff members via telehealth alerts, phone calls, and/or home visits, contributed to favorable outcomes. Both provider and patient satisfaction were demonstrated throughout the program. In one provider testimony, Barbara McHenry, pharmacist, shared patient anecdotes of how much they enjoy being able to check their readings at home with accurate equipment and knowing that someone is checking in on them. Patients were given security through use of telehealth knowing that when an alert is triggered, a provider will initiate a video call and provide the clinically necessary follow-up care, including a home visit. Patients reported telehealth as an invaluable service that they do not want to be without. One patient commented that the telehealth system provided both social and clinical benefits. "The equipment allowed me to be active mentally, keep up with current events, learn new facts, and have health personnel know my general condition. I loved working with the system."

Suggestions for Using Telehealth to Support Value-Based Care Delivery

The project team believes there is an opportunity to assist providers with managing the care of patients who are in the home, experiencing uncontrolled diabetic management and hypertension. Implementation of telehealth units for this specific patient population would enable ongoing clinical supervision by NPs and/or RNs. In addition, telehealth can provide pharmacists with objective data to make pharmacological recommendations for improvement, such as medication reconciliations and adjustments based on telehealth parameter readings.

[94] LACE stands for length of hospital stay, acuity of the admission, co-morbidities, and ED visits. The LACE index provides a score from 1-19 in which scores above 10 indicate a high risk of readmission.

This enables patients to remain safely in their homes, while stabilization efforts are implemented during an exacerbation of their chronic illness.

Sustainability

In an ongoing effort to transform the delivery of primary care services, the partnership between Gilchrist SOE and Lorien will continue as follows:

- Continue with utilization of 12 units over the next six months;
- Incorporate more narrowed patient selection criteria, including use of the GARS to identify high risk patients, defined as having a score in the range of 6-15 points on the scale, for enrollment;
- A focused objective to increase the number of touchpoints by the Lorien RNs in-between NP visits in an effort to demonstrate if utilization of a primary care provider extender will enhance outcomes and increase operational capacities; and
- The cost saving contributions and reduction in rate of visits obtained from the telehealth patients are inclusive in the overall SOE panel outcomes which will be reviewed with Greater Baltimore Health Alliance, the GBMC Accountable Care Organization.

Closing

The program's success was highly dependent upon the design and redesign of communication workflows between Gilchrist SOE and Lorien. Ongoing cooperation between both entities was an indispensable resource. This enabled clinical information to be obtained by providers in both organizations from different technology sources, telehealth, EHRs, and Health Information Exchanges. The project team strongly believes that the positive impact in decreasing ED and hospital utilization, along with patient overall well being seen during the program is a result of utilizing telehealth to provide 24/7 access to quality care to patients in the program.

Appendices

Appendix A: Telehealth Monitoring Request Form

Appendix B: Unplanned Transfers and Management Evaluation Form

Appendix C: Pharmacist's Services Process

Appendix D: Patient Satisfaction Survey

Appendix E: Patient Selection Flow Chart

Appendix F: LACE Index Scoring Tool

Appendix G: General Adult Risk Score Example

Appendix H: CRISP Pre/Post Analysis Report for Patients who received MHCC telehealth intervention

Appendix A

Telehealth Monitoring Request Form

Support Our Elders

Telehealth Monitoring Request

Patient name: _____ DOB: _____

Responsible party: _____ Contact: _____

Interest in telehealth program: YES NO

Internet Access: YES NO Internet provider: _____

Passwords Available: YES NO

Diagnosis/Reason for Tele-Health Monitoring/participation:

_____

_____

_____

Circle the type of monitoring needed for patient: and indicate alert range:

Weight	Loss	Gain	Pounds _____
Systolic BP	< _____	> _____	
Diastolic BP	< _____	> _____	
Glucose	< _____	> _____	
Oxygen Saturation	< _____	> _____	
Thermometer	_____		
Motion Detector	Yes	No	Define: _____
Environmental Aids:	Yes	No	Define: _____

Additional information needed before set-up or in home visit:

_____

Call/Fax to: Lorien at Home: Tracy Carroll cell fax

Call/Fax/Note to: SOE RN Care Manager

CRNP/SOE RN Care Manager making request Date

Appendix B

Unplanned Transfers and Management Evaluation Form (cont.)

Unplanned Transfers and Management Evaluation Tool

Support Our Elders

Patient name: _____ **DOB:** _____ **MOLST:** _____

Zipcode: _____ **CRNP:** _____

Telehealth: yes no **Service Coordinator/MHCC:** yes no

Pharmacy involved: yes no

Date Transfer to Hospital: _____ **Time of day:** _____

Hospital: _____ **911 emergency:** yes no

ED visit, only: yes no **Hospital Admit:** yes no

What did SOE provide for patient prior to transfer? (Circle all that apply)

Phone call **In- person visit** **by provider:** yes no **MD** **CRNP**

labs **IVF** **med changes** **XRAY** **EKG** **DOPPLER**

What was not available in order to treat/care for patient/family? (list and explain) *ie equipment, meds, other*

_____

_____

Reason for transfer to ED/Hospital:

Family Issue: (insistence, conflict, unavailable, etc) yes no

Ethical Issue/Advanced Directive: (none, full code, incomplete, unclear) yes no

Unable to handle complexity of situation: yes no

Provider issue: (on call/covering MD, after hours, insistence) yes no

Other: _____ yes no

If admitted, list diagnosis and treatments performed:

DX: _____

Appendix C

Pharmacist's Services Process

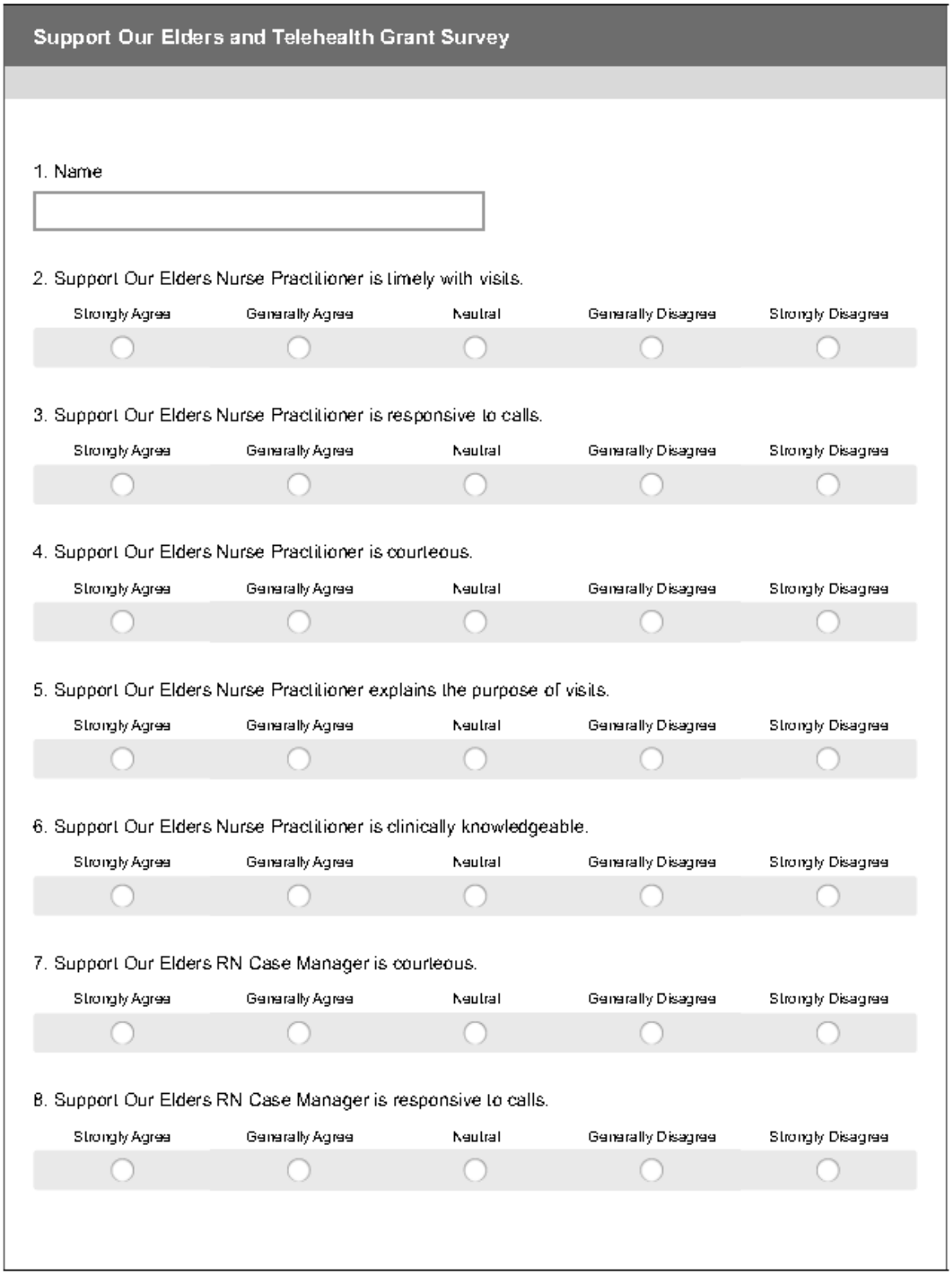
Implementing Pharmacist's Services in the SOE Program

Spring 2016 Semester:

- Before Patient Visit:
  - Students and faculty advisor collected patient information, assessed for potential disease state and medication related problems, and developed a potential plan based on disease state guidelines and goals of therapy
- During Patient Visit, Students Provided:
  - Medication Reconciliation
  - Patient Education
  - Comprehensive medication review
- After Patient Visit:
  - Their visits (interventions and recommendations) were documented via a SOAP note that was approved by NDMU faculty advisor
  - SOAP note was added to medical chart and shared with health care team
  - Faculty advisor followed up with CRNP and RN Care Manager at weekly rounds regarding recommendations

Appendix D

Patient Satisfaction Survey



Support Our Elders and Telehealth Grant Survey

1. Name

2. Support Our Elders Nurse Practitioner is timely with visits.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

3. Support Our Elders Nurse Practitioner is responsive to calls.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

4. Support Our Elders Nurse Practitioner is courteous.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

5. Support Our Elders Nurse Practitioner explains the purpose of visits.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

6. Support Our Elders Nurse Practitioner is clinically knowledgeable.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

7. Support Our Elders RN Case Manager is courteous.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

8. Support Our Elders RN Case Manager is responsive to calls.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

Patient Satisfaction Survey (cont.)

9. The community resources provided for you by Support Our Elders RN Case Manager are helpful.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

10. Using the telehealth equipment enhances my ability to take care of myself.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

11. Using the telehealth equipment enhances my ability to interact with others.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

12. I find the telehealth equipment easy to learn.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

13. I find the telehealth equipment easy to use.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

14. The quality of the information I get from the telehealth equipment is high.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

15. The benefits of using the telehealth equipment are apparent to me.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

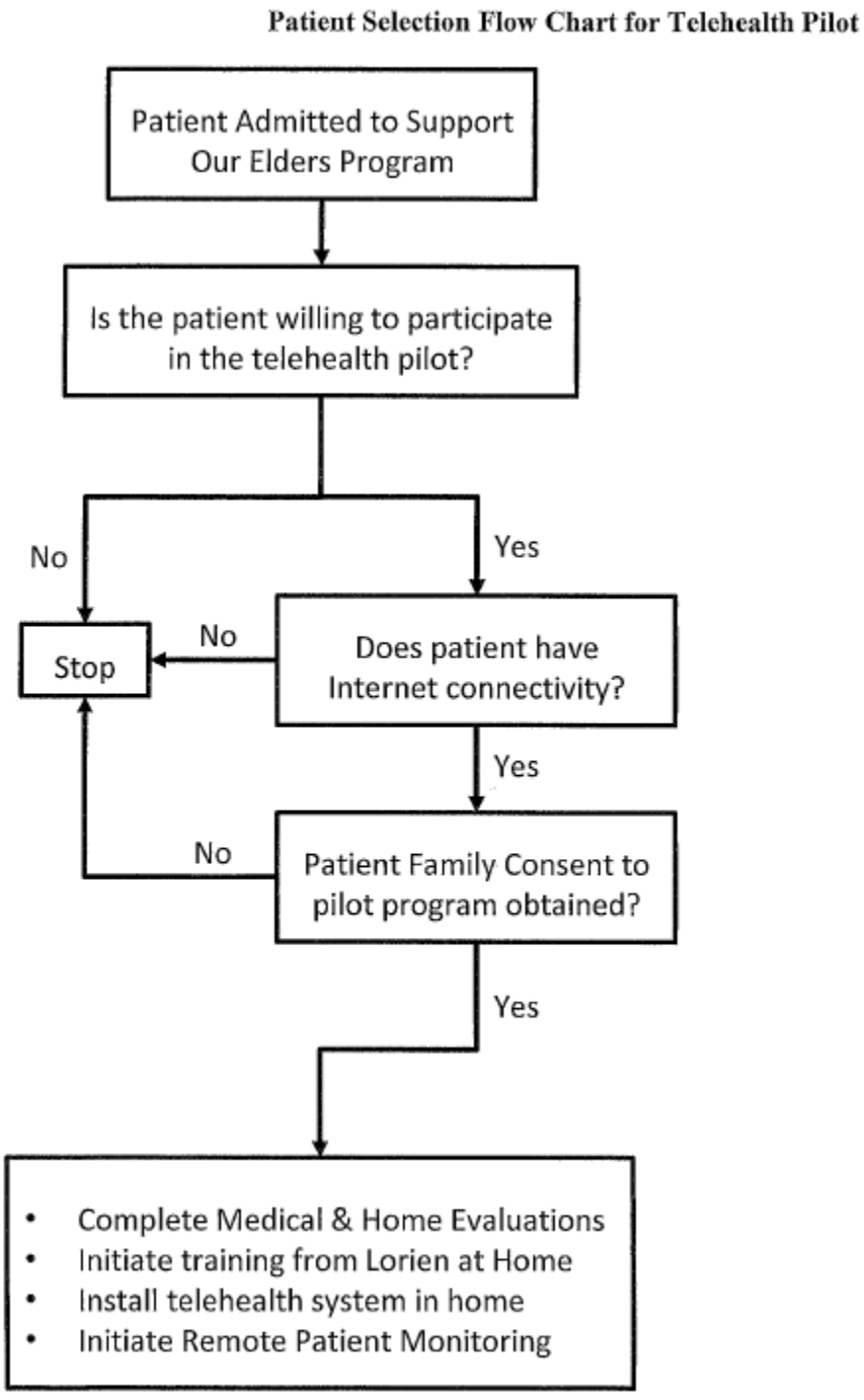
16. Overall, I am satisfied with the Support Our Elders telehealth program.

Strongly Agree	Generally Agree	Neutral	Generally Disagree	Strongly Disagree
○	○	○	○	○

17. Comments

Appendix E

Patient Selection Flow Chart



Appendix F

LACE index scoring tool (cont.)

MR#_____

UNIT_____
DOS_____

LACE index scoring tool

Step 1. Length of Stay
Length of stay (including day of admission and discharge): _____ days

Length of stay (days)	Score (circle as appropriate)
1	1
2	2
3	3
4-6	4
7-13	5
14 or more	7

Step 2. Acuity of Admission
Was the patient admitted to hospital via the emergency department?
If yes, enter "3" in Box A, otherwise enter "0" in Box A

Step 3. Comorbidities

Condition (definitions and notes on reverse)	Score (circle as appropriate)
Previous myocardial infarction	+1
Cerebrovascular disease	+1
Peripheral vascular disease	+1
Diabetes without complications	+1
Congestive heart failure	+2
Diabetes with end organ damage	+2
Chronic pulmonary disease	+2
Mild liver or renal disease	+2
Any tumor (including lymphoma or leukemia)	+2
Dementia	+3
Connective tissue disease	+3
AIDS	+4
Moderate or severe liver or renal disease	+4
Metastatic solid tumor	+6
TOTAL	

If the TOTAL score is between 0 and 3 enter the score into Box C. If the score is 4 or higher, enter 5 into Box C

Step 4. Emergency department visits
How many times has the patient visited an emergency department in the six months prior to admission (not including the emergency department visit immediately preceding the current admission)? _____
Enter this number or 4 (whichever is smaller) in Box E

Add numbers in Box L, Box A, Box C, Box E to generate LACE score and enter into box below. If the patient has a LACE score is greater than or equal to 10 the patient can be referred to the virtual ward

LACE Score Risk of Readmission: 0 - 4 Low, 5 - 9 Moderate, > 9 High Risk

LACE index scoring tool (cont.)

Condition	Definition and/or notes
Previous myocardial infarction	Any previous definite or probable myocardial infarction
Cerebrovascular disease	Any previous stroke or transient ischemic attack (TIA)
Peripheral vascular disease	Intermittent claudication, previous surgery or stenting, gangrene or acute ischemia, untreated abdominal or thoracic aortic aneurysm
Diabetes without microvascular complications	No retinopathy, nephropathy or neuropathy
Congestive heart failure	Any patient with symptomatic CHF whose symptoms have responded to appropriate medications
Diabetes with end organ damage	Diabetes with retinopathy, nephropathy or neuropathy
Chronic pulmonary disease	??
Mild liver or renal disease	Cirrhosis but no portal hypertension (i.e., no varices, no ascites) OR chronic hepatitis Chronic Renal Disease
Any tumor (including lymphoma or leukemia)	Solid tumors must have been treated within the last 5 years; Includes chronic lymphocytic leukemia (CLL) and polycythemia vera (PV)
Dementia	Any cognitive deficit??
Connective tissue disease	Systemic lupus erythematosus (SLE), polymyositis, mixed connective tissue disease, moderate to severe rheumatoid arthritis, and polymyalgia rheumatica
AIDS	AIDS-defining opportunistic infection or CD4 < 200
Moderate or severe liver or renal disease	Cirrhosis with portal hypertension (e.g., ascites or variceal bleeding) Endstage Renal Disease, Hemodialysis or Peritoneal Dialysis
Metastatic solid tumor	Any metastatic tumour

Appendix G

General Adult Risk Score Example

General Adult Risk Score

0 - 3 Points: Low Risk
4 - 5 Points: Medium Risk
6 - 15 Points: High Risk

Change:

This score indicates an adult patient's general health risk. Note: External data might be a factor in metrics not marked with points

Metrics

Age: 80
Patients age 18-64 get 0 points; age 65-84, 1 point; and age 85+, 2 points.

Hospital admissions: 0

Patients get 1 point for each hospital admission in the configured time period (default is past year), up to 3 points maximum.

ED visits: 1
Patients get 1 point for each ED visit in the configured time period (default is past year), up to 3 points maximum.

Has chronic obstructive pulmonary disease: No
Patients with COPD get 1 point.

Has diabetes: No
Patients with diabetes get 1 point.

Has congestive heart failure: No
Patients with CHF get 1 point.

Has liver disease: No
Patients with chronic liver disease get 1 point.

Current PCP: RUIZ, BEVERLY A
Patients without a current PCP get 1 point.

Has ERSD: No
Patients with ESRD get 3 points.

General Adult Risk Score Example (cont.)

Has asthma: No
Patients with asthma get 1 point.

Has hypertension: Yes
Patients with Hypertension get 1 point.

Has IVD: No
Patients with IVD get 1 point.

Has coronary artery disease: No
Patients with CAD get 1 point.

Has Mental Health Disorder: 1
This score takes gives 1 point for someone having a mental health disorder and 2 points for someone who has depression and a PHQ-9>9.

Has depression and PHQ-9>9: 2
This score is looking at patients who have depression and a PHQ9>9.

Is Self-Pay: 2
Patients who are self-pay get 1 point.

Has Medicare: Yes
Patients with an effective Medicare coverage and under age of 65 get 1 point.

Has Medicaid: Not on file
Patients with an effective Medicaid coverage get 1 point.

Outpatient Med Count: 12
Patients with outpatient medication point greater than 10 get 1 point.

Drug use: No
Patients with substance abuse get 1 point.

Falls in Past Year: 1

Appendix H

CRISP Pre/Post Analysis Report for Patients who received MHCC telehealth intervention

Pre/Post Analysis - Summary

The analysis is based on admissions before and after the enrollment date.

Program Name: MHCC Telehealth (210044)

Chronic Conditions: All Patients

Most Recent Payer: (All)

Visit Type: (All)

N/A

N/A

Chronic Condition Operator: (•) AND ( ) OR

Total Number of Members on Panel that could contribute to analysis

	1 Month	3 Months	6 Months	12 Months
Total Number of Patients in Pan..	19	18	17	-1

Percent of Members on the Panel with 1 or more Visits

Label	Total Number of Patients with a visit - Pre	Total Number of Patients with a visit - Post	Total Number of Patients with a visit - Pre %	Total Number of Patients with a visit - Post %	Change in Number of Patients
1 Month	<11	<11	<11	<11	0.00%
3 Months	<11	<11	<11	<11	0.00%
6 Months	15	<11	88%	<11	0.00%
12 Months	<11	<11	100%	100%	0.00%

Average Charge per Member

Label	Total Number of Patients with at least 1 visit pre or post	Pre – Total charges	Post – Total charges	Average Charge per patient - Pre	Average Charge per patient - Post	Total Charges per Patients change
1 Month	< 11	$46,592	$29,419	-	-	$5,391
3 Months	13	$161,706	$41,330	$16,170.64	$10,333	($5,838)
6 Months	17	$228,579	$92,939	$15,238.59	$10,327	($4,912)
12 Months	< 11	$169,026	$70,420	-	-	($9,978)

Rate of Visits per 10 Members

Label	Total Number of Visits - Pre	Total Number of Visits - Post	Rate of Visits per 10 patients - Pre	Rate of Visits per 10 patients - Post	Visits Rate change
1 Month	<11	<11	0.0	0.0	0.0
3 Months	18	<11	10.0	0.0	-10.0
6 Months	40	12	23.5	7.1	-16.5
12 Months	31	13	-310.0	-130.0	180.0

Average Charge per Visit

Label	Total Number of Visits - Pre	Total Number of Visits - Post	Pre – Total charges	Post – Total charges	Average Charge per visit - Pre	Average Charge per visit - Post	Total Charges per Visit change
1 Month	<11	<11	$46,592	$29,419	-	-	$8,054
3 Months	18	<11	$161,706	$41,330	$8,984	-	($718)
6 Months	40	12	$228,579	$92,939	$5,714	$7,745	$2,030
12 Months	31	13	$169,026	$70,420	$5,452	$5,417	($36)

MedPeds, LLC

Telehealth Project

Final Report

Table of Contents

Introduction

MedPeds is a tech-savvy eight-provider private primary care practice in Laurel, Maryland that has provided primary care services (Internal Medicine, Family Practice, and Pediatrics) since 1982. In the past two years MedPeds provided primary care to over 17,000 adult and pediatric patients at a single office in Laurel, Maryland. MedPeds is committed to providing our patients with the highest quality healthcare and compassion. MedPeds was an early adopter of electronic health records (EHRs), which were implemented in 2004. In 2013, MedPeds received the prestigious HIMSS-Davies Ambulatory Award for Healthcare IT. [95]

The MedPeds project aimed to determine if telehealth would improve access to care and hemoglobin A1C (HgA1C)[96] levels for poorly controlled diabetic patients defined as those having an HgA1C of greater than nine percent. The primary goals of this project included embracing technology to increase access to care during and after traditional office hours, as well as to ensure better continuity of care after emergency room visits, urgent care, and hospitalizations. MedPeds aimed to use telehealth to deliver health care in a manner that allowed patients, their families, and caregivers to be included in a way that is not feasible with strictly in-person visits. Finally, MedPeds aimed to transform the practice by integrating the technology into routine patient care, and to serve as a model for other primary care practices looking to integrate telehealth.

MedPeds used a smart device application (app) named "Healow" that directly interfaces with the practice's EHR, eClinicalWorks (eCW). The Healow app is a version of the eCW patient portal that works on a patient's smart device[97] with both iPhone and Android operating systems; it is available at no cost to patients. The Healow app was updated to include a telemedicine capability, which was released in early 2017. This enhanced the functionality of the Healow app by enabling a two-way video feature that allowed the provider to conduct a medical visit virtually.

Technology Infrastructure

MedPeds chose Healow to deliver telemedicine because it is a HIPAA compliant app that uses the patient's smart device and microphone to facilitate communication between patients and the provider. Healow also provides patients an alternative method to access and share their medical records with other providers. The telehealth visit is documented directly by the provider in real time in the progress note of the EHR, in the same manner as during a face-to-face visit. The

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[95] The HIMSS Davies Award is awarded to organizations who are recognized as outstanding in utilizing health IT to improve patient outcomes and value. More information is available at: www.himss.org/library/davies-awards.

[96] Hemoglobin A1C is the measurement glucose in the blood, averaged over the six to eight weeks prior to the test. It is used to measure how well blood glucose levels are controlled.

[97] A smart device is an interactive electronic gadget that is able to connect to a network and interact remotely with users through the processing of commands sent by the user. Some common examples of smart devices are: smartphones, tablets, phablets, smartwatches, smart glasses and other personal electronics. More information can be found at: www.techopedia.com/definition/31463/smart-device.

smart device app technology was chosen because MedPeds had unsatisfactory experience in the past with patients using two different PC-based technologies with camera and microphone. It was believed that using a smart device app would result in fewer audio and video glitches than through computer-based technology.

Upon release of the updated version of Healow with telemedicine capability, the initial cost was a monthly subscription fee which would result in over $25,000 annually for MedPeds to use the app for eight providers. Recently, the vendor reduced the cost of telemedicine, and is now event-based at $5.00 per telemedicine visit. Telemedicine through Healow requires patients access a previously established patient portal account using a username and password.

Patients with poorly controlled diabetes were chosen for this project to facilitate better care coordination. MedPeds had an infrastructure in place to conduct care coordination for this population prior to the beginning of the project. Timely access to care is important to address issues with transportation and to help increase a patient's engagement in the practice. The goal of introducing telemedicine was to increase access to care and to the provider, both during and after standard office hours, and provide more structured ways to engage patients in their care.

Project Implementation Process

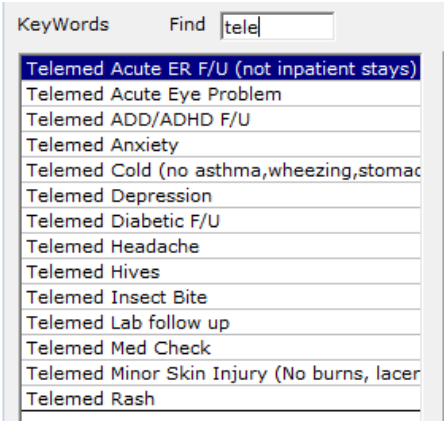
In order for patients to participate in the project, patients had to download and utilize Healow on their smart device. MedPeds initiated a robust workflow initiative to increase awareness, and encourage patient portal and Healow adoption. These efforts included a kiosk check-in questionnaire asking if patients used their portal account, needed a printout of their username and password, and if the patient would be interested in telemedicine as an option for a future patient visit. Answers to these questions were captured as structured data and automatically populated in the EHR. This information was used by the staff to assist the patient to download, and set up the app, manage their account, and schedule telemedicine visits for interested patients. MedPeds also provided business cards promoting the Healow app, the patient portal, and telemedicine which included the name and password for the free guest wireless network. Patients were encouraged to use the guest wireless network to download and configure Healow while waiting to be seen by the provider. Additional marketing campaigns to promote Healow and telemedicine in the office included: modifying the existing waiting room slide show; staff and providers wearing buttons inviting patients to "Ask me about Healow;" updates to the practice website and phone systems to include information about Healow and telemedicine; and signage in exam rooms and hallways promoting patient portal and Healow use.

Staff was trained by managers at regularly scheduled monthly staff meetings. Medical assistants were given financial incentive for promoting and successfully getting patients to download Healow. Medical assistants were also trained to review the kiosk-collected data about portal use, provide usernames and passwords to patients when requested, and assist patients in activating portal accounts and installing and configuring Healow for use. The providers were trained by the Medical Director and were encouraged to promote the use of the patient portal and counsel patients how they could access the office after hours.

A student from University of Texas was engaged to analyze MedPeds' structured data from the registry to determine differences in clinical outcomes by age, race, ethnicity, language, zip code, education level, gender, BMI, insurance groups, and the role of endocrinologists in the patients' care. The student made a site visit to MedPeds to become familiar with the project and to enable him to remotely access data for the project. An analysis of HgA1C levels prior to and during the telemedicine pilot was to be used to compare any differences between patients receiving telemedicine during the pilot, those who received only standard in-office care, and those who tried telemedicine and later reverted back to standard office-based care.

Patients with poorly controlled diabetes were identified through a registry built using the analytic capabilities of eCW as having HgA1c above nine at the most recent HgA1c test in the 12 months prior to the onset of the project. The identified patient's problem list was assigned and flagged within the EHR, so that targeted patients' charts were easily identified to providers at point of care and could be more easily accessed for registry searches. Each patient's chart was reviewed for hospitalizations in the 12 months prior to onset of the project to serve as the baseline data to assess the impact of telehealth on reducing non-surgical hospital and emergency department visits.

Two templates were designed in eCW for telemedicine visits: one for general telemedicine visits, and one specifically for the patients with poorly controlled diabetes being targeted as part of the project. These templates were designed to ensure providers could reliably document all required information during the visit, since telemedicine documentation and billing requirements are somewhat different than for face-to-face visits. A structured list of appropriate reasons for a telemedicine visit was created in the EHR to assist in scheduling telemedicine visits appropriately. The scheduling team was required to select one of the pre-established reasons for the telemedicine visit; if the patient needed to be seen for any other reason, a face-to-face visit was scheduled. Acceptable reasons for telemedicine visits were established by the Medical Director, since some clinical issues such as ear pain or chest pain are not appropriate for telemedicine. The template for the patients with poorly controlled diabetes contained additional structured fields to facilitate data collection for project goal reporting including interest in telemedicine, whether the patient had a Healow account set up, and number of hospitalizations in the past year.



Project Implementation Challenges

MedPeds telemedicine pilot was initially scheduled to begin in September 2016 and be completed by December 2017. Though the Healow app was already in use by the practice, this version did not include a telemedicine component, which was in development by eCW. Initially, the developers at eCW projected a release in July 2016; however, development of the telemedicine capability of Healow was delayed to November 2016 when eCW released a partially functioning computer-based version of Healow with the telemedicine component. Due to delays in the release of the updated version of the Healow app, recruitment of patients did not begin until November 2016, when the practice began to utilize the computer-based version of Healow. Due to technical requirements necessary to use the computer-based version, such as a camera and microphone, the patients being targeted for this project were unable to conduct visits with the computer-based version.

An Android operating system app became available in January 2017. Unfortunately, all the patients willing to schedule a telemedicine visit had an iPhone; the iPhone operating system version of the app did not become available until February 2017. Though work under the grant ended in March 2017, telemedicine visits have continued outside of the grant. Almost all of telemedicine appointments that were successfully completed have occurred using the computer-based version rather than the smart device.

While 28 percent of patients with poorly controlled diabetes indicated a high level of interest in telemedicine, only one patient scheduled a telemedicine visit. MedPeds expected greater acceptance of telemedicine given the high level of patients' interest in telemedicine and the convenience that telemedicine allows patients by avoiding additional travel time for office visits. When selecting the goals, MedPeds chose an average of one telemedicine visit per provider per month for 2017; however, acceptance of telemedicine was far below that goal and the grant was terminated early due to lack of patient recruitment.

Table 1

MedPeds Telemedicine All Patients		
	#	%
Interest in telemedicine visit	2890	31.3
Healow installed on phone	290	3.1
Assistance provided for Healow download, account set up, and/or maintenance	2491	27.0
Number of completed telemedicine visits	19	0.21
Total patients seen during the grant period	9,235	

Table 2

MedPeds Telemedicine Poorly Controlled Diabetics		
	#	%
Number of poorly controlled diabetics interested in telemedicine	50	28
Number of telemedicine visits with uncontrolled diabetics	1	0.6
Total number of patients with uncontrolled diabetes	177	

Despite promotional efforts, the average number of appointments scheduled for all patients for telemedicine either during or after hours was one per week for all eight providers, which has remained unchanged since the conclusion of the grant. To increase access to telemedicine, MedPeds made telemedicine available during after-hours with the on-call provider. There were a total of 24 telemedicine visits scheduled for all providers, and 79 percent (19) were completed successfully, during and after office hours, although most were during office hours; however, only one visit was conducted with the target population during the telehealth grant period. The Clinical Data Manager (CDM) scheduled each telemedicine visit at a time that was mutually convenient for the patient and the provider. For the provider, this meant scheduling at the end of the day so that delays would not disrupt the rest of the schedule. Despite efforts to accommodate scheduling, 21 percent (5) of scheduled telemedicine visits did not occur, which was due to either the patients failing to connect to the telehealth visit at the appointment time, or due to some new technology glitch that occurred after the test visit was successfully conducted.

There was a profound lack of interest in telemedicine among the targeted patients with poorly controlled diabetes, despite provider and medical assistant encouragement. During the grant period only one patient with poorly controlled diabetes conducted a telemedicine visit, which was conducted after-hours; this patient missed two prior telemedicine appointments before a successful telemedicine visit was completed. Some of the lack of acceptance may be due to lack of familiarity with telemedicine in general. The Healow smart device now available may assist in providing a gradual increase in the use of telemedicine at MedPeds. Due to the low engagement with the target population during the grant, MedPeds chose to end the project early.

There were several technical challenges that occurred throughout the project implementation. During the grant period, there were three upgrades to the Healow software that required the provider to upgrade the Healow app. All upgrades were managed by the CDM, who had to initiate the upgrade with the provider. For two of the three upgrades, no notification was provided from the vendor of the required upgrade; the upgrade was discovered when a scheduled telemedicine visit was unable to be successfully initiated by the provider.

In the early phases of the project, several technical challenges occurred with installing and proper functioning of the patient's camera and microphone, which is necessary for the computer-based version. To ensure patients understood how to initiate their telemedicine visit and work out any and all possible impediments, MedPeds revised the workflow, so that every interested patient participated in a telemedicine "pre-visit" with the CDM. During the pre-visit, the CDM verified the appropriateness of the visit for telemedicine, ensured patients could access their patient portal accounts, and tested the functioning of the camera and microphone. Despite in-office patient education, patients would say they had a patient portal account when they did not, and many patients were confused about the difference between a Healow account and personal email. This would require the patient to return to the office prior to being able to participate in a telemedicine visit, since patient portal accounts are only activated during an office visit to ensure patient privacy. There were also several issues with patients being unable to access their portal account successfully, though they had previously set up an account.

Billing was successful, but required significant work to meet the requirements by payers for reimbursement of a telemedicine visit. From telemedicine visits conducted prior to the study, MedPeds learned that there were significant differences in billing for different payers. For example, different payers required different "place of service" codes. Also, some payers initially denied the claim, though it contained the appropriate 'GT' modifier, which required rebilling or an appeal. MedPeds agreed to provide telemedicine for Medicare patients without reimbursement; however, no Medicare patient was able to meet the technical requirements necessary to have a successful telemedicine visit.

Lessons Learned

Telemedicine in primary care requires more than enthusiastic practice-wide engagement to bring patient acceptance to the technology; it requires a cultural transformation where such services are considered normative for a primary care practice. At MedPeds, technical glitches and patient issues required that the workflow include completing a test pre-visit in advance of every scheduled telemedicine visit. The pre-visit aims to work out technical issues, and requires additional patient time that adds an additional barrier to technology acceptance. Sick, high-risk patients, who are not comfortable with technology, are notably uninterested in telemedicine visits and are more comfortable with office visits and telephone follow-up. For those patients who do utilize Healow, it is primarily utilized during normal business hours and is not widely utilized for after-hours visits.

The high rate of patients who do not complete a scheduled telemedicine visit is a barrier that will likely further delay adoption in busy primary care practices. At MedPeds, the high no-show rate during office hours discouraged using one of the four employed providers to conduct a telemedicine visit. The no-show rate for after-hours visits was so high that the primary telemedicine provider, the champion for this project, modified the available telemedicine appointments to earlier time slots. At MedPeds, future telemedicine visits will be considered on a patient by patient basis, with each patient who has had a successful visit more likely to seek another visit.

Healow, as a telemedicine platform, had many technical limitations and could benefit from improvements to better engage the provider within the EHR, as well as to promote continuity of care with the patient. Future development of Healow can enable the telemedicine visit to occur within the progress note screen, instead of conducting the visit on a separate screen, to allow the provider to document the visit in eCW during the telemedicine visit. Resolving technical glitches and eliminating the need for pre-visits would reduce the implementation challenges, reduce additional burden on patients and providers, and increase acceptance both among patients and providers.

Other technical features may also be improved to facilitate scheduling of telemedicine visits. For example, features that allow only active portal users to schedule appointments from predetermined slots and the ability to limit the reasons for a telemedicine visit to a structured list of appropriate conditions would reduce challenges with scheduling, as well as the number of telemedicine visits that need to be cancelled due to the visit reason not being appropriate for telemedicine. Another way to improve scheduling is to have a feature that enables an auto-scheduling, in which a patient is able to directly schedule an appointment for the next available telemedicine slot in the provider's schedule.

Suggestions for Using Telehealth to Support Value-Based Care Delivery

The key impediment to telemedicine in value-based care is patient acceptance of the technology. Telemedicine success in hospital-based settings or in situations where it provides expanded access to specialist services may not be readily available as an in-person visit. In primary care, a cultural shift is necessary for how primary care is delivered. Based upon MedPeds trajectory of patient engagement in telemedicine in 2017, MedPeds expects to have 50 patients engaged in this service; with a total of 17,000 patients seen in the last two years, this type of service barely adds value.

Integrating telemedicine into the patient portal can help reduce the complexity for patients in accessing telemedicine. In order to be HIPAA compliant, users must have a unique user name and password to access a telemedicine platform. For some patients, having to do this adds a level of confusion with keeping track of separate user names and passwords for the patient portal and the telemedicine platform. In addition, many patients require training to use the technology, which becomes more complicated when it differs for the patient portal and telemedicine. Integrating the technology into the patient portal would eliminate the need for the patient to remember multiple passwords and be trained on multiple technologies in order to access telemedicine.

One area that has the potential for telemedicine use in primary care is behavioral health. Currently, there are a number of behavioral health providers using telemedicine, which could be leveraged by primary care providers. During the course of the project, MedPeds provided a telemedicine visit to one 16 year-old adolescent whose parents were unable to bring the child to the office due to transportation issues. After taking a detailed medical history during the visit, the provider was able to newly diagnose schizophrenia in the young patient, which was

profoundly impacting the patient's life. By increasing access to care, the patient was able to be properly diagnosed and treated.

A shift in the payment structure for telemedicine visits would help to support providers with telemedicine implementation in their practice. One such shift may come if co-pays for urgent care and hospital emergency department services increased in comparison to primary care and urgent care center visits. Currently, many patients seek urgent care for issues that arise after hours, instead of calling their primary care office. If telemedicine is cheaper for the patient to access than an urgent care clinic, the service may be more widely utilized. Under new value-based payment models, telemedicine may emerge as a less expensive alternative to manage high-risk, high-cost patients in their homes. In value-based care, the return on investment for staff time required to coordinate telemedicine visits for these patients will be greater.

Sustainability

The cost for a primary care practice to offer telemedicine has come down significantly for practices using eCW, which is currently $5.00 per visit billed to the provider, and much more manageable for primary care practices. Patient interest in telemedicine, scheduling limitations, the usability and technical barriers with using the technology, reimbursement, and provider buy-in are still the primary barriers to telemedicine adoption.

Closing

Success of telemedicine in primary care requires a cultural shift in both the use of telemedicine and in acceptance in the broader culture. MedPeds is an award winning practice that was an early adopter of telemedicine. MedPeds had anticipated that an active program that engaged the entire practice would encourage more robust use of telemedicine by our patients. Unfortunately, the technology lacks many capabilities to improve the user experience in primary care settings, such as ease in scheduling appointments. Though patient interest in telemedicine during the grant lagged behind, patients have shared with the MedPeds that they have engaged with telemedicine services outside of the practice, not covered by insurance, and with a provider unknown to the patient. By re-educating these patients on the availability of telemedicine within the practice, telemedicine can begin to grow with patients who have already embraced this alternative form of care delivery.

Union Hospital of Cecil County

Telehealth Project

Final Report

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Project Description

Union Hospital of Cecil County (UHCC) continued its implementation of a telehealth program (program)[98] to assess the impact of telehealth on Prevention Quality Indicators (PQIs) and readmissions and maximize community/population health. UHCC tested integration of telehealth and other systems under this project and monitored utilization of the Chesapeake Regional Information System for our Patients (CRISP) Electronic Notification Services (ENS) and query and reporting service portals.[99, 100, 101]

Over the course of the grant, UHCC's care management team worked with AT&T and its remote patient monitoring (RPM) Software as a Service (SaaS) partner, Vivify, to enroll 150 patients in the program. Fifty-seven were enrolled during the second and third rounds of grant funding, while 36 were enrolled prior to receiving grant funding. Vivify provided initial and ongoing training to UHCC staff; assisted in the creation of reports; troubleshot and resolved technical issues; and provided guidance related to program optimization. AT&T hosted the RPM software in a compliant data center; served as the primary contact for program enhancements; procured additional kits and replacement parts as needed; directed development activities; managed data usage; coordinated software release updates; and facilitated kit logistics. Both vendors actively participated in MHCC grant program review activities.

Patients were selected based upon clinical and utilization indicators. The clinical indicators included chronic conditions such as congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), hypertension (HTN), and/or diabetes mellitus (DM). Other clinical indicators included the risk of poor medication compliance; and other conditions as determined by UHCC's care management team. The utilization indicators considered were frequent emergent care as demonstrated by emergency department (ED) usage; unscheduled physician office visits; three or more hospitalizations/year; recent stay(s) at a comprehensive care facility (CCF); and/or complicated medication regimen/schedule. Patients meeting such criteria who refused to participate were excluded from the program.

All 150 patients invited to participate in the program by UHCC's care management team met one or more clinical and utilization indicators. Among this patient population were 64 patients diagnosed with CHF and 86 with COPD. The patient diagnosis profile was consistent with that of

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[98] UHCC received a grant award June 2015 for an 18-month project from MHCC under its Round Two Telehealth Technology Pilot funding announcement to assess the impact of telehealth on Prevention Quality Indicators (PQIs) and readmissions. The final report for the project is available at: http://mhcc.maryland.gov/mhcc/pages/hit/hit_telemedicine/hit_telemedicine_grants.aspx.

[99] CRISP is Maryland's State designed health information exchange (HIE).

[100] CRISP's ENS provides secure alerts to providers when their patient has an encounter with any participating hospital in Maryland, Virginia, DC and Delaware. More information is available at: https://crisphealth.org/services/encounter-notification-services-ens/.

[101] The CRISP Query Portal is an Internet-based application that allows providers to view clinical information about their patient made available by participating organizations, such as lab results, discharge summaries, radiology reports, medications, etc. More information is available at: https://crisphealth.org/services/crisp-clinical-query-portal/.

UHCC's high-utilizer report. Patients with the most frequent hospitalizations, ED visits, and unscheduled physician office visits were those individuals with COPD and/or CHF.

UHCC worked with Vivify and Meditech to develop interface capabilities that would allow a health care provider, while in the Vivify caregiver portal, to more easily access patient information from Meditech. UHCC tested single sign-on (SSO) capabilities, where the provider could click a single button within Vivify and securely access the patient's record in Meditech. The goal was to enhance provider workflow, increase provider utilization of Vivify, and facilitate a more comprehensive view of the patient.

Quantitative Analysis

Quantitative data was generated from reports compiled from the Vivify RPM reporting system, and CRISP readmission and Potentially Avoidable Utilization (PAU) reports. The Vivify reports provided patient names, diagnosis, length of time on the program, program compliance, patient satisfaction scores, and physiological information. CRISP reports contained 30-day readmissions/medical record number, PQIs, and PAU-associated costs. Both repositories provided rich data. The challenge was that each did not use the same patient identifier. Vivify used patient names, while CRISP used medical record numbers. A separate UHCC data repository report was created and run to match patient last names to medical record numbers.

The telehealth patient 30-day readmission rates were compared to that of the total hospital readmission rate for the same data collection time frame. Pre-telehealth COPD and CHF PQIs were compared to post-implementation PQIs. PAU avoidance costs were calculated based upon the average CHF and COPD-related costs. The number of the "avoided" telehealth readmissions costs were derived from this average cost. There was no statistical analysis conducted on the data. The statistical significance of the results cannot be reported.

As demonstrated in round two, individuals participating in the telehealth program had fewer 30-day readmissions than overall organization readmission rates (CY17 YTD 10.25 vs. 0.27 percent). Heart failure PQIs decreased from 141 to 111; while COPD PQIs decreased from 205 to 177 during the time of the grant. Average PAU costs/case was $7,000. Forty-eight 30-day readmissions were avoided for a cost savings of $336,000.[102]

Qualitative Outcomes

As discovered in Round Two, patients began to understand how to minimize the impact of their medical condition through monitoring of their vital signs and weight; the caregiver portal provided the transition of care case managers with almost real-time information regarding the patients allowing them to contact the patient and primary care givers in a timely manner; and utilization of blue-tooth enabled kitted devices resulted in a more efficient on-boarding process. Successful administration of the program could have benefited with at least three full time staff, and managers needed to support staff in the administration and management of the telehealth program. Ongoing vendor support is critical to the success of the program; accurate and

[102] See Appendix A for more details.

complete data entry, especially patient status from program initiation, is important; ongoing staff training and reinforcement of learning is critical to the success of the program; investment in the kit logistics service could save valuable staff time; and dedicated focus and oversight of the program by management and the care management team is required to sustain use of telehealth and to demonstrate its impact. Patient referrals continued to originate from the inpatient setting, in spite of efforts to introduce the program in the ED.

Key challenges related to technology infrastructure and project implementation process centered on sustaining SSO between Vivify and Meditech. UHCC encountered a hurdle with the SSO capabilities after a software update of both Meditech and Vivify caused the SSO feature to be removed. UHCC worked with AT&T to re-install the SSO feature; however, re-installing the feature was cost prohibitive. As an alternative, UHCC explored options, as part of the hospitals FY18 capital budget, that would allow for a more valuable interface between Meditech and Vivify where admission, discharge, transfer (ADT) information is available in a structured field within Vivify and vital sign feeds, including health assessment survey results is available in unstructured PDF form within Meditech.

Other logistical and operational issues included: kit management, especially as it related to kit return; ongoing patient compliance with their care plan; intermittent engagement of medical stakeholders and case management staff; and the time to provide administrative oversight of the program was underestimated. No issues related to Internet connectivity, professional liability, or privacy/security were encountered. The need for a telehealth champion, and dedicated staff were once again apparent.

Lessons Learned

Key lessons learned related to technology infrastructure and project implementation process included: patients needed to be on the program for at least 60 days in order to more effectively incorporate the technology in their daily routines; patients on the program less than 30 days had a higher readmission incidence; patients began to understand how to minimize the impact of their disease through monitoring their vital signs and weights; the caregiver portal provided the transition of care case managers with almost “real-time” information about the patients allowing them to contact the patient and primary care givers in a timely manner; and the utilization of blue-tooth enabled “kitted” devices resulted in a more efficient on-boarding process.

During round three it became more apparent that a focused approach to a telehealth program was critical to success. With this in mind, UHCC’s comprehensive care nurse practitioner played a prominent role in referring patients, engaging providers, and refining the program. She visited patients at home and reinforced the program’s intent, assisted equipment set-up and use, and provided disease specific and healthy lifestyle education.

Sustainability

UHCC will continue to use telehealth as a transition of care tool. The cost of kits and data usage have been included in UHCC’s ongoing operational expenses. One full-time transition of care

manager has been assigned to onboard, monitor, and care for patients on the telehealth program. The use of telehealth will be expanded to the palliative care program, the ED, skilled nursing facilities, behavioral health, and the HSCRC's Regional Transformational Grant program. The use of Bring Your Own Device (BYOD) technology will also be explored to determine if individuals will benefit from receiving health promotion tips and/or disease management instructions on their smart phones. Program focus will be strengthened through leadership and involvement of an advanced nurse practitioner.

Conclusion

UHCC's experience with telehealth continues to be a positive one as evidenced by the achievement of its clinical and program goals. The lessons learned were valuable and will be incorporated in future program development. There is an organizational recognition of value of the program and a commitment to its sustainability. More focus will be placed upon engaging physicians as active program participants. Additional organizational structure and explicit accountability will be implemented to support the program staff, monitor progress, evaluate impact, and refine processes. Correlational data statistics and other analytics will be applied to gain insight into the effect of telehealth on specific patient populations and conditions. In addition to physiological and hospital data collection, health literacy will be assessed pre-, peri-, and post-program implementation. Such information will be used to inform the development of other community programs designed to address population health.

Appendix A

Days to readmission	*Number of patients*
Never readmitted	28
0-30	9
31-60	10
61-90	3
91-120	1
121-180	2
181+	4
Total	57

Telehealth Program Participant	*30-day readmission rate*
No	10.25
Yes	0.27

Diagnosis	*Number of Pre-telehealth PQIs*	*Number of Post-telehealth PQIs*
COPD	205	177
CHF	141	111

PAU cost savings:
Nine of 57 telehealth program patients were admitted within 30 days of discharge; 48 patients were not readmitted within 30 days. Average PAU cost/case was $7000.
$7000x48=$336,000 cost avoided.

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Appendix A: MHCC Funded Telehealth Projects

	Name	*Use Case*	*MHCC funding $*	*Match $*	*Start Date*	*End Date*
Nursing Home Transitions	Atlantic General Hospital (Worcester County)	Video consultations between the Emergency Department (ED) and Berlin Nursing and Rehabilitation Center (BNRC) to reduce ED visits and hospital admissions of patients residing in a long term care facility (LTC).	$30,000	$87,922	10/30/14	10/30/15
	Dimensions Healthcare System (Prince George's County)	Laurel Regional Hospital and Prince Georges Hospital used mobile tablets to conduct video consultations with patients residing at two LTCs, Sanctuary of Holy Cross and Patuxent River Health and Rehabilitation Center to reduce unnecessary hospital transfers.	$30,000	$42,316	10/30/14	10/30/15
	University of Maryland Upper Chesapeake Health (Harford County)	Remote telemedicine examinations and consultations between hospital and a fully equipped exam room and lab located at the Lorien, Bel Air facility. Technology provides EKG monitoring, sonogram and multiple cameras.	$27,888	$45,633	10/30/14	10/30/15
Remote Patient Monitoring	Crisfield Clinic, LLC (Somerset County)	Rural health clinic provides mobile devices for middle school and high school aged patients to assist children in managing chronic conditions including asthma, diabetes, childhood obesity, and behavioral health issues.	$20,000	$93,983	6/1/15	11/30/16
	Lorien Health Systems (Baltimore & Harford Counties)	Skilled nursing facility and residential service agency uses devices installed in patients' home to monitor chronic conditions including uncontrolled diabetes, congestive heart failure, and hypertension and providing clinical support to improve care and avoid hospital admissions.	$30,000	$63,600	6/1/15	11/30/16
	Union Hospital of Cecil County (Cecil County)	Hospital provides chronic care patients with mobile tablets and peripheral devices to capture blood pressure, pulse, and weight and provide patient education to facilitate patient monitoring.	$30,000	$60,000	6/1/15	11/30/16

	Name	*Use Case*	*MHCC funding $*	*Match $*	*Start Date*	*End Date*
Population Health	Associated Black Charities (Dorchester & Caroline Counties)	Community association that assists minority and rural communities with navigating the health care system will utilize mobile tablets to facilitate primary care and behavioral health video consultations with a licensed nurse care coordinator from Choptank Community Health System.	$30,000	$90,000	12/1/15	5/30/17
	Gerald Family Care, LLC (Prince George's County)	Patient Centered Medical Home practice will implement telehealth video consultations and image sharing services between patients at three family practice locations and Dimensions Health System specialists providing gastroenterology, neurology, orthopedics, and behavioral health services.	$30,000	$66,726	12/1/15	5/30/17
	Union Hospital of Cecil County (Cecil County)	Builds upon the original grant proving chronic care patients with mobile tablets and peripheral devices to capture blood pressure, pulse, weight, and glucose levels to facilitate patient monitoring will support data sharing with primary care and ED providers.	$30,000	$60,000	12/1/15	5/30/17
Primary Care Transformation	MedPeds, LLC (MedPeds) (Prince George's County)	MedPeds, a family medicine practice, will be using a mobile device application with patients to facilitate 24/7 video-based telemedicine with MedPeds providers, make appointments, and access EHRs with the goal of increasing patient access to primary care providers and improving outcomes for diabetic patients.	$61,154	$122,309	6/17/16	12/18/17
	Gilchrist Greater Living (Gilchrist) (Baltimore County)	Gilchrist, a comprehensive primary care geriatric medical practice, will be providing senior patients with in-home telehealth monitoring devices to support case management and early intervention for chronically ill patients with the goal of reducing hospital admissions.	$56,000	$112,289	6/17/16	12/18/17

	Name	*Use Case*	*MHCC funding $*	*Match $*	*Start Date*	*End Date*
Mobile Health	John Hopkins Pediatrics at Home (JH PAH) (Baltimore City)	JH PAH implemented mHealth to manage pediatric asthma in patients served by East Baltimore Medical Center. The project is for 18 months and will utilize a mobile application to conduct regular health assessments, track the patient's Asthma Action Plan, provide real time-time clinical and educational feedback, and facilitate secure communication between the patient and a JH PAH nurse.	100,000	200,793	12/16/16	6/15/18
Rural Health Care	University of Maryland Shore Regional Health (UMSRH) (Kent and Queen Anne's Counties)	UMSRH will implement telehealth to provide palliative care services to patients within University of Maryland Shore Medical Center at Chestertown (UMSMC-C) and Shore Nursing and Rehabilitation Center at Chestertown with the goal of increasing access to palliative care services and reducing hospital encounters. UMSRH will also implement telehealth to increase access to ED psychiatric services at both UMSMC-C and Shore Regional Emergency Center at Queen Anne's and inpatient psychiatric consultations at UMSMC-C.	$75,149	$150,303	1/31/17	7/31/18

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