

June 8, 2017

The Honorable Ajit Pai
Chairman
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Dear Mr. Pai:

On behalf of the Healthcare Information and Management Systems Society ([HIMSS](#)) and the Personal Connected Health Alliance ([PCHAlliance](#)), we appreciate the opportunity to respond to the Federal Communication Commission's (FCC's) [Request for Comment on Actions to Accelerate Adoption and Accessibility of Broadband-Enabled Health Care Solutions and Advanced Technologies](#). We offer these comments and recommendations to help enable the adoption and accessibility of broadband-enabled health care solutions, especially in rural and underserved areas of the country.

HIMSS is a global, cause-based, not-for-profit organization focused on better health through IT. In North America, HIMSS focuses on health IT thought leadership, education, market research, and media services. Founded in 1961, HIMSS North America encompasses more than 65,000 individuals, of which more than two-thirds work in healthcare provider, governmental, and not-for-profit organizations, plus over 640 corporations and 450 not-for-profit partner organizations, that share this cause.

PCHAlliance aims to make health and wellness an effortless part of daily life. The PCHAlliance, a non-profit organization formed by HIMSS, believes that health is personal and extends beyond healthcare. The Alliance mobilizes a coalition of stakeholders to realize the full potential of personal connected health. PCHAlliance members are a vibrant ecosystem of technology and life sciences industry icons and innovative, early stage companies along with governments, academic institutions, and associations from around the world.

To support its vision, PCHAlliance convenes the global personal connected health community at the annual Connected Health Conference, the premier international event for the exchange of research, evidence, ideas, innovations and opportunities in personal connected health. The Alliance publishes and promotes adoption of the Continua Design Guidelines. Continua is recognized by the International Telecommunication Union (ITU) as the international standard for safe, secure, and reliable exchange of data to and from personal health devices. PCHAlliance accelerates technical, business, policy and social strategies necessary to advance personal connected health through its flagship Healthy Longevity Initiative to promote lifelong health and wellness.

HIMSS and PCHAlliance strongly support flexibility throughout the systems and regulations governing broadband access. Rural healthcare needs are as varied as the communities are and geographies where facilities are located, and the choice of technology to enhance the access to, and quality of care, must adapt to these local conditions. We strongly support clarity in funding opportunities, including the elimination of retrospective discounting in the Rural Health Care (RHC) Program. Our organizations

further support efforts to increase the availability of short-term access by individuals to broadband connections to facilitate the use of remote patient monitoring and other chronic disease management programs that require connectivity to patients' homes. Finally, HIMSS and PCHAlliance support efforts to allow reseller access to fixed and mobile broadband networks, as it currently exists for telephone networks, in order to foster a business environment that enables management of multiple contracts across large and diverse healthcare systems.

The following are detailed comments to a few of the questions from the request for comment. Given the comprehensiveness of the Request for Comment,

OBJECTIVE I: Promote effective policy and regulatory solutions that encourage broadband adoption and promote health IT.

- 1. We request suggestions regarding ways in which the FCC, based on its authority, can further accelerate broadband adoption in the health care context and promote broadband-enabled health IT solutions, either on its own or working in collaboration with other agencies, and, at the same time, ensure that such services and technologies are fully available and accessible to all Americans, including those living in rural and remote areas, low density populations, Tribal lands, and in underserved urban areas of our country. We also seek comment on what impediments to these efforts exist, and how the FCC can address them.*

HIMSS and PCHAlliance appreciate the question and offer the following observations:

- The FCC can open the market for local broadband services to competition and access by third-party resellers in order to facilitate easier contracting for healthcare organizations spread across multiple local jurisdictions. Currently, healthcare organizations that reach across state, county, or local jurisdictions may have to contract with dozens of different organizations to acquire broadband connections for multiple facilities. In most cases, each of these providers keeps their networks closed to outside access, requiring the management of many individual contracts. Requiring broadband providers to open their networks to reseller access would allow for new business models to manage this complexity on behalf of healthcare organizations as resellers could provide a single point of contract access for healthcare organizations, while maintaining multiple relationships with national, regional, and local broadband providers. Reducing the contracting burden will result in increasing broadband access for healthcare organizations.
- Adapt policies in all funds that can be used to improve and extend broadband to ensure flexibility for the locus of care, evidence-based practice of care, and appropriate technology for delivery of reliable broadband that is necessary for such services for proven applications like remote patient monitoring (RPM).
 - **Locus of care:** The rural health care fund faces a number of challenges associated with approaches and policies that have not adapted to new health care delivery models like RPM.
 - **Evidence-based practice of care:** Remote monitoring coupled with patient education and engagement strategies is best practice for those with chronic conditions.
 - **Appropriate technology for the most effective approach for broadband:** some locations may be able to operate with fixed wireless solutions, while others (due to geography or other conditions) may require wired solutions.

- Funding surety, i.e. no retrospective discounting, upon application acceptance is essential - retrospective reductions based on the number of applications jeopardizes rural health care facility projects, a retrospective reduction of funding for a facility with extremely thin margins means that they are likely to simply abandon the project.
 - Support of individual or family access to broadband services for short-duration healthcare needs. Currently, most broadband providers require long-term contracts (one year or more) for individuals installing or activating broadband connections, but many healthcare needs are episodic and require only a few months of access for programs to be effective. FCC could expand the Rural Health Care and other funding mechanisms to complete the last mile installations to patient homes needed in many rural areas and encourage contracting flexibility short-term for healthcare needs.
2. *We request information and data on the types, impact, scale, and benefits of broadband enabled services and technologies used for the delivery of health care. How is broadband currently being used to augment or transform existing health care delivery? What types of health care settings are using broadband-enabled services and technologies besides large medical hospitals? What variety of medical issues are they used for? Where are these health care settings located? What are some of the future plans for using broadband-enabled health services and technologies – not just by clinicians and hospitals but also by other participants in the broader health ecosystem?*
- Please see [Appendix](#) that consists of a compilation of case studies and clinical data compiled on remote patient monitoring.
3. *We are also interested in learning how health technologies and services can take advantage of new technological applications and emerging communications networks. For example, what impact will the Internet of Things (IoT) have on broadband-enabled health technologies and services such as telehealth and telemedicine? To what extent will pervasive connectivity and a fully connected environment around individuals (e.g., IoT) shift the point of care delivery? How might the demands on broadband networks evolve in this new environment? What, if any, changes are anticipated in existing broadband-enabled health services and technologies—operating over current mobile networks—when 5G (Fifth Generation Mobile and Wireless Networks) becomes available? To what extent might telehealth and telemedicine be impacted by the availability of 5G networks? What medical device innovations are anticipated to be developed using 5G networks?*
- Remote patient monitoring and home based primary care for those with chronic conditions is a prime example of how IoT and ubiquitous broadband can empower patients, improve health, and make care health care service delivery more efficient. See case studies and examples in the successful case study/pilot compilation that is in the [Appendix](#).

The locus of care has been steadily shifting from a centralized, general hospital type model to a more distributed specialty care model for decades. Access to technology and broadband connectivity enables smaller hospitals, ambulatory clinics, and even individual practices to deliver services in consultation with specialists located in population centers. The growth of broadband access, the mobile Internet, and soon a 5G-enabled IoT may lead healthcare to come full-circle to its early days where patients received most treatment at home and doctors and medical expertise travelled to them. In many ways, the growth of the general hospital was fueled

by the inability to effectively distribute information, diagnostic, and therapeutic power to where it was needed.

A 5G Internet is an important foundation allowing the locus of care to shift back towards the home.

The earliest promise of IoT for healthcare is a tremendous increase in the diagnostic ability of healthcare providers based on a flood of new data about patients and their conditions while they are outside of a traditional healthcare setting. Embedded sensors in common devices will add richness, context, and empirical evidence to what providers know about patients or what patients perceive about themselves. The defining characteristics of these data streams is that they will originate from widely disparate sources and likely have frequent low bandwidth transmissions. Simultaneously, the faster speeds of a 5G mobile network will allow for the migration of high bandwidth applications to new locations. This includes traditional telemedicine as well as ad hoc video consultations initiated by patients on demand.

We encourage the Commission to read the report from Darrell M. West at the Brookings Institution: "[How 5G Technology Enables the Health Internet of Things](#)" to understand some of the broader implications of a 5G Internet on health care delivery.

4. *What technical issues concerning the variety of broadband-enabled health care solutions and technologies are appropriate and necessary for the FCC to consider with respect to efforts to accelerate broadband adoption and promote health IT solutions? Are there issues of concern with respect to access, availability, interoperability, capacity, reliability, privacy, security, and speed? If so, please describe them. Does consideration of any of these issues vary depending on the technology platform—e.g., digital subscriber line (DSL), cable, fiber, wireless, or satellite?*
 - Geography can and must dictate technology options for delivery of reliable broadband for health care providers. Health care providers and the health care system must provide interoperable health record sharing and evidence-based best practice care delivery. To deliver this type of broadband enabled service, high speed broadband is generally necessary to ensure prompt delivery of information and to support the evidence-based audio-visual connections associated with the best care for those struggling to stabilize their condition.

Over time, technology solutions will provide unique opportunities for high-speed broadband for some health care facilities, as these come to market and demonstrate reliability, which should be among the options health care facilities can consider, but, there is currently no one single solution and the FCC policies and support of broadband as an essential health care infrastructure, must include the full array of technology available. For example, for facilities located in relatively flat areas with 'lines of sight', the newer fixed wireless technology can be a solution. However, for those located in other geographies, fixed wireless does not work and wired broadband may be the only means of reliable connection at any speed.

5. *We seek to better understand health care providers' connectivity requirements. What type of connectivity (e.g., wired or wireless; fixed or mobile) is necessary to support the deployment of health IT applications today and in the near future at the different types of health care delivery*

settings (e.g., tertiary care centers versus primary care physician practices, larger physician groups, clinics, hospitals, as well as "hospital in the home" settings).

e. What impediments, if any, exist in trying to retrofit existing and future health care facilities (e.g., hospitals and clinics) for broadband-enabled services and technologies, given current connectivity needs and the existence of varied spectrum environments? Do current designs take into consideration any potential interference concerns with projected wireless networks and devices that will be used in these facilities? Are there (or should there be) industry standards or best practices for ensuring that new health care facilities consider broadband in their design and account for any necessary conduits, wiring, building configuration, and materials (e.g., there may be a need to consider certain materials for internal or external walls to better enable wireless broadband within a facility or to limit RF into a building) at the design and construction phase?

- We encourage the Commission to maintain the greatest possible flexibility regarding rural access to broadband Internet. Healthcare applications range in bandwidth requirements just as they range in acuity. For individual emergency care, such as tele-stroke consultations, the combination of real-time video consultation, telemetry transmission, and image manipulation may require bandwidth greater than most mobile networks can now reliably provide. Conversely, chronic disease management programs, such as blood glucose monitoring for diabetes or home blood pressure monitoring, produce only tiny, sporadic transmissions that old 2G EDGE mobile technologies can easily accommodate. Yet these chronic disease management programs may greatly improve the health of thousands of people. We recommend an approach that encourages the maximum flexibility for patients and providers since healthcare needs can vary so significantly depending on diseases and acuity of a particular episode of care.

OBJECTIVE III: Strengthen the nation's telehealth infrastructure through the FCC's Rural Health Care Program and other initiatives.

17. We seek comment and suggestions on how the FCC can further promote and help enable the adoption and accessibility of broadband-enabled health technologies, like telehealth and telemedicine, in rural and other underserved areas. Are there other initiatives or actions beyond the RHC Program that the agency, or the Task Force on behalf of the agency, could pursue in order to promote and help enable the adoption and availability of broadband enabled health technologies in rural and underserved areas of the country?

- HIMSS and PCHAlliance strongly encourage the FCC to find ways to make the RHC program more flexible as noted above. This flexibility could be created by including other funds, when statutory authority is flexible, to help fund broadband infrastructure that will support health care, such that health care is considered along with other institutions when making priorities in general broadband fund programs.

OBJECTIVE IV: Raise consumer awareness about the value proposition of broadband in the health care sector and its potential for addressing health care disparities.

26. *We request information on any studies, pilots, research, or other data that quantifies the benefits of broadband-enabled health technologies in improving patient outcomes and in reducing costs. What kind of return on investment have pilot and demonstration projects experienced?*

- See the [Appendix](#) and the results in a number of the provided case studies.

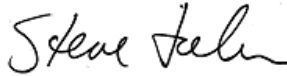
HIMSS and PCHAlliance are committed to being a valuable resource to FCC to help enable the adoption and accessibility of broadband-enabled health care solutions, especially in rural and underserved areas of the country. We welcome the opportunity to meet with you and your team to discuss our comments in more depth. Please do not hesitate to contact [Eli Fleet](#), HIMSS Director of Federal Affairs, at 703.562.8834, with questions or for more information.

Thank you for your consideration.

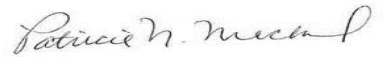
Sincerely,



Michael H. Zaroukian, MD, PhD,
MACP, FHIMSS
Vice President, Chief Medical
Information Officer & Chief
Transformation Officer
Sparrow Health System
Chair, HIMSS North America Board
of Directors



H. Stephen Lieber, CAE
President & CEO
HIMSS



Patricia N. Mechael, PhD MHS
Executive Vice President
Personal Connected Health
Alliance

APPENDIX

Overview of Evidence on Successful Remote Patient Monitoring Programs:

Review of the extensive literature on remote monitoring, including review of decades of research and publications by Department of Health and Human Services, has provided guidance on the use cases for which remote patient monitoring can improve care. This overview focuses on pilots, programs and translational research focused on the successful use cases – i.e. those that earlier research showed would and could provide improved health outcomes.

Consistently the data shows that using remote monitoring to enable care management demonstrates improved health, reduction in health care utilization, and lower costs of care, when targeted to patients with:

- ✓ Multiple chronic conditions, high utilizations/costs, risk factors for falls [Patients are identified through claims and EHR data]
- ✓ Hospitalization for Congestive Heart Failure
- ✓ Hospitalization for Congestive Obstructive Pulmonary Disease
- ✓ Diabetes

Services provided associated with the positive results are

- ✓ Remote monitoring of patient vital signs/biometric data in their home for a minimum of 90 days
- ✓ Nurse/care manager review of biometric data
- ✓ Self-management education
- ✓ Care plan modification and early intervention when adverse trends in biometric data are observed

Medicare Coverage Currently Does Not Cover Remote Monitoring, But Does Cover Care Management:

- ✓ Limited reimbursement is available, with strict rules, for a physician or the employed care manager to conduct care management
- ✓ Reimbursement does NOT cover investment or use of remote monitoring technology. Specifically, there is no capital adjustment made to accommodate remote monitoring technology that a provider must provide to enable remote monitoring enabled care management.

Savings reported for remote monitoring interventions, including care management and remote monitoring technologies:

- ✓ **University of Virginia:** \$500K savings for 426 patients monitoring post-discharge
- ✓ **Christus Health:** \$2.65 for every \$1 spent to conduct remote monitoring (includes equipment and labor costs)
- ✓ **Banner Health:** 34% cost reduction for patients monitored who have multiple chronic conditions and high cost profile
- ✓ **Danish Agency for Digitisation:** – Estimated annual net savings for remote monitoring COPD patients \$202M DKK

- ✓ **Medicare Health Buddy:** 7 to 13% lower costs per patient for remote monitored group compared to control group
- ✓ **PartnersHealth:** Estimated annual savings for remote monitoring of CHF patients \$10 million over 10 years for 3,000 patients
- ✓ **Care Beyond Walls:** Estimated total health charges reduced by 67%.
- ✓ **University of MS:** Estimated savings to Medicaid was \$339,184 for the 100 enrolled patients with diabetes
- ✓ **Presence Covenant Medical Center:** \$1 million savings for 665 hospitalized patients
- ✓ **Emory eICU:** \$1,486 average reduction in Medicare costs over a 60 day episode compared to control group

Recent and Focused Remote Monitoring Enabled Care Management for Patients with Chronic Conditions:

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
Remote Monitoring for Targeted Patients with Multiple Chronic Conditions		
<p><i>Veterans Health Administration Home Telehealth</i></p> <p>Analysis of 15,600 patients, FY2012</p> <p>Office of the Inspector General, “Veterans Health Administration: Audit of The Home Telehealth Program”, March 9, 2015</p> <p>https://www.va.gov/oig/pubs/VA_OIG-13-00716-101.pdf</p>	<p>Three types of patients qualify for home telehealth:</p> <ol style="list-style-type: none"> 1) <i>Non-institutional Care (NIC) Patients, one or more of the following:</i> <ul style="list-style-type: none"> ✓ One or more behavior or cognitive problems ✓ Life expectancy of 6 months or less ✓ Difficulty with three or more Activities of Daily Living, such as bathing, dressing, and eating ✓ Or a combination of two or more of the Activities of Daily Living dependencies. 2) <i>Chronic Care Management (CCM):</i> Patient does not meet NIC criteria but has one or more chronic diseases, such as diabetes, congestive heart failure, or chronic obstructive pulmonary disease that requires ongoing case management, monitoring, and interventions. 3) <i>Health Promotion/Disease Prevention (HPDP):</i> Patient must meet one or more of six conditions, which includes being at risk for developing a chronic care disease, or 	<p>Home telehealth (care management enabled by remote monitoring) lowered health care utilization.</p> <p>For all three groups:</p> <ul style="list-style-type: none"> ✓ Reduced Hospitalization rates. Average reduction across the groups was 5 per 100 patients ✓ Reduced Bed Days of Care (BDOC) by 1.4 to .3 days per hospitalization. <p>NIC patients had largest reductions in hospitalization and BDOC.</p> <p>“The program has proven to be a low cost alternative (at less than \$2,400 per patient annually) to providing home-based primary care, which includes case management and in-home nursing care (about \$22,200 annually), or placing a veteran in a contract nursing home facility (about \$92,300 annually).”</p>

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
	<p>needs assistance in choosing and maintaining healthy behaviors.</p> <p><u>Services Provided:</u> “The goal of the Home Telehealth Program is to improve veterans’ access to care while reducing patient treatment costs. The program does this by remotely monitoring patients’ vital signs in the home and intervening early when adverse trends are detected.” Page i</p>	
<p><i>Veterans Health Administration Care Coordination/Home Telehealth Program (CCHT)</i></p> <p>Analysis of 17,025 patients, FY 2003-2007</p> <p>http://www.health.gov.au/internet/mbsonline/publishing.nsf/Content/DD0F66183EDF57C6CA257CD20004A3A1/\$File/CHSWTFsub-HP-Attachment2.pdf</p>	<p><u>Non-institutional Care (NIC) Patients, one or more of the following:</u></p> <ul style="list-style-type: none"> ✓ One or more behavior or cognitive problems ✓ Life expectancy of 6 months or less ✓ Difficulty with three or more Activities of Daily Living, such as bathing, dressing, and eating ✓ Or a combination of two or more of the Activities of Daily Living dependencies. <p><u>Chronic Care Management (CCM):</u> Patient does not meet NIC criteria but has one or more chronic diseases, such as diabetes, congestive heart failure, or chronic obstructive pulmonary disease that requires ongoing case management, monitoring, and interventions.</p> <p>CCHT included: remote monitoring of vital signs of the patient in their home, nurse review of biometric data, and intervention/communication when adverse trends begin.</p>	<p>Home telehealth (care management enabled by remote monitoring) lowered health care utilization.</p> <p>CCHT prevented hospital admissions and reduced hospital length of stay. From a cohort of 17,025 CCHT patients:</p> <ul style="list-style-type: none"> ✓ 25% reduction in numbers of bed days of care, ✓ 19% reduction in numbers of hospital admissions, ✓ Mean satisfaction score rating of 86% after enrollment into the program
<p><i>University of Virginia Medical Center; C3 Program (Care Coordination Center)</i></p> <p>626 All Payer 313 Medicare</p>	<p><u>Hospitalized Patients Upon Discharge for:</u></p> <ul style="list-style-type: none"> • Congestive heart failure (CHF) • NSTEMI/STEMI(AMI) – All Payers • Chronic obstructive pulmonary disease (COPD) • Uncomplicated pneumonia 	<p>C3 Care Management enabled by remote monitoring led to reduced re-hospitalizations and estimated cost of care savings:</p> <p>Outcomes:</p> <ul style="list-style-type: none"> ✓ 16-37% reduction in readmissions

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
<p>Poster session found at: https://www.nationalreadmissionprevention.com/content/documents/case-studies/university-of-virginia-health-system.pdf</p>	<p>C3 Intervention: Care management delivery system that:</p> <ul style="list-style-type: none"> • Utilizes biometric monitoring and education coaching using current remote monitoring technology • Provides clinical oversight of biometric data by experienced Registered nurse 	<p>compared to benchmark rate(s) for Medicare patients</p> <ul style="list-style-type: none"> ✓ 27-36% reduction in readmissions compared to benchmark rate(s) for All Payers <p>Additional Study for Medicare Beneficiaries that included joint replacement surgeries:</p> <ul style="list-style-type: none"> ✓ Annual cost savings for Medicare estimated at \$500K
<p><i>Christus Health</i></p> <p>53 patients as of 9/30/14 115 patients as of 3/3/2015 Slides on RPM Program</p>	<p>Hospitalized patients upon discharge with: CHF, Heart Disease, COPD, Pneumonia, Diabetes, Sepsis</p> <p>Post discharge services: care management enabled by biometric monitoring.</p>	<p>RPM program associated with:</p> <ul style="list-style-type: none"> ✓ Reduced hospitalizations ✓ Lower costs per hospitalization ✓ High Satisfaction ✓ ROI calculated at \$2.65 saved per \$1 spent
<p><i>Banner Health</i></p> <p>128 patients, data for one year pre intervention and one year post intervention</p> <p>Press Release, Forbes Article: http://incenter.medical.philips.com/doclib/enc/12931987/Forbes_May_3_2015_Banner_Philips_eI_AC_program_lo_res.pdf%3ffunc%3ddoc.Fetch%26nodeid%3d12931987</p>	<p>Patients with 5 or more chronic conditions and high utilization.</p> <p>90% enrolled were Medicare beneficiaries</p> <p>Intervention: Intensive Ambulatory Care Program – provides coordinated care management enabled by remote monitoring technology.</p>	<p>Intensive Ambulatory Care program led to:</p> <ul style="list-style-type: none"> ✓ 34% reduction in overall health costs ✓ 50% reduction in hospitalization rate ✓ 50% reduction in hospital bed days ✓ 75% reduction in 30 day readmission rates
<p>Remote Monitoring for Targeted Patients with Specific Condition (COPD, Heart Failure, Diabetes)</p>		
<p><i>Danish Agency for Digitisation Ministry of Finance, Denmark</i></p> <p>TeleCare Nord Pilot</p> <p>Analysis of 1,225 patients with COPD, CY 2016</p> <p>https://www.digst.dk/Servicecenter/English/News/Telemedicine-</p>	<p>Patients with severe COPD (rated as GOLD 3 &4 on a severity of disease scale)</p> <p>Intervention group provided with telemedicine home monitoring which includes:</p> <ul style="list-style-type: none"> ✓ Remote monitoring of vital signs of the patient in their home, ✓ Local health department/clinic review of biometric data, 	<p>Telemedicine home monitoring for patients with severe COPD was found to:</p> <ul style="list-style-type: none"> ✓ Reduce health costs by an estimated \$202million Danish Krone (DKK) annually ✓ Reduce hospital use and costs ✓ Improve self-care ability and engagement in care ✓ Improve quality of life, comfort and satisfaction

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
<p>benefits-COPDpatients-and-health-expenditure</p>	<ul style="list-style-type: none"> ✓ Intervention/communications based on changes in condition, ✓ Care management 	
<p><i>Medicare Health Buddy Demonstration</i></p> <p>Baker, et. al., “Integrated Telehealth And Care Management Program For Medicare Beneficiaries With Chronic Disease Linked To Savings”, HEALTH AFFAIRS 30, NO. 9 (2011): 1689–1697</p> <p>http://content.healthaffairs.org/content/30/9/1689</p>	<p>Medicare patients with high costs and utilization and:</p> <ul style="list-style-type: none"> ✓ congestive heart failure, ✓ chronic obstructive pulmonary disease, or ✓ diabetes mellitus <p>Health Buddy Intervention: Care management enabled by remote monitoring.</p> <p>“a telehealth tool that gives providers an opportunity to communicate better with patients and thus improve the information available to care managers.....The application [telehealth tool] incorporated an exception based approach that aimed to identify the need for care management interventions based on deteriorating vital signs and symptoms and to identify gaps in patients’ behavior and knowledge. After reviewing patients’ information, care managers could contact patients who appeared to be at risk for deterioration or who required intervention to ensure that they received appropriate services.”</p>	<p>Lower health spending for intervention group that received care management enabled by remote monitoring compared to the control group.</p> <ul style="list-style-type: none"> ✓ Mean health spending in the intervention group decreased approximately 7.7–13.3% over two years, compared with a matched control group. ✓ “In the first year after the intervention was available, mean spending in the intervention group was \$3,608, compared with \$4,107 for the control group (p < 0:01).” ✓ “In the second year of the intervention period, mean quarterly spending in the intervention group was \$3,568, compared with \$4,051 for the control group (p < 0:01).”
<p><i>Partners Health Care Center for Connected Health</i></p> <p>Analysis of 3,000 patients</p> <p>http://content.healthaffairs.org/content/33/2/194.full.html</p> <p>Review of several types of telehealth interventions – Remote Monitoring intervention included was the Partners Congestive Heart Failure Home</p>	<p>Congestive Heart Failure Patients with recent hospitalization</p> <p>Upon discharge patient provided with: remote monitoring and care management for 120 days post discharge. Specifically, in-home monitoring of weight, blood pressure, heart rate, and pulse oximetry. These data were uploaded daily, and decision support software identified those patients who needed attention.</p>	<p>Lower health care costs for group receiving care management enabled by remote monitoring.</p> <p>RPM provided for 120 post discharge associated with:</p> <ul style="list-style-type: none"> ✓ 44% reduction in hospital readmissions compared to usual care ✓ Cost savings of more than \$10 million over a 10 year period compared to usual care.

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
Monitoring Program		
<p>Care Beyond Walls and Wires: Remote Heart Failure Monitoring and Healthcare Utilization Analysis in a Rural Regional Medical Center</p> <p>50 heart failure patients, Medicaid</p> <p>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4365431/</p>	<p>Medicaid patients with hospitalization and diagnosis of heart failure</p> <p>The intervention was to provide remote wireless monitoring via mobile broadband to facilitate patient and care team co-management of HF in a predominantly rural, disproportionately Native American patient population. It included:</p> <ul style="list-style-type: none"> ✓ Remote monitoring of vital signs of the patient in their home, ✓ Care manager review of biometric data, ✓ Intervention/communications based on changes in condition, ✓ Care management 	<p>Analysis of the 6 months prior to enrollment and the 6 months after enrollment in the remote monitoring intervention showed:</p> <ul style="list-style-type: none"> ✓ 42% decrease in the number of hospitalizations ✓ 64% decrease in hospital days ✓ 67% decrease in total health care charges
<p>University of Mississippi Medical Center</p> <p>Mississippi Telehealth Network</p> <p>100 Medicaid Patient Pilot</p> <p>Poster Presentation by K. Henderson, 2015 “How Mississippi is Leading the Way in Innovation”</p>	<p>Rural residents with type 2 diabetes (and on Medicaid), recruited to participate in University of Mississippi Telehealth Network remote patient monitoring project through rural health clinics.</p> <p>Intervention: care management and education enabled through remote monitoring technology</p>	<p>Improved health and reduced health care utilization for those who received care management through a remote monitoring.</p> <ul style="list-style-type: none"> ✓ Estimated savings to Medicaid was \$339,184 for the 100 enrolled patients. ✓ Reduced HbA1C by 1.7% ✓ No hospitalizations or emergency department visits for 12 months for the enrolled patients ✓ 71% of enrolled patients lost weight ✓ Medication compliance improved
<p>Medication Adherence and mHealth: The George Washington University and Wireless</p> <p>50 Patient Pilot</p>	<p>Medicaid patients with hypertension and prescribed 2 or more medications to control hypertension. 96% enrollees were African American.</p> <p>Intervention: Provided an automated</p>	<p>“Average blood pressure and level of control during study period improved significantly after initiation of the study and remained improved from baseline through the course of the study.”</p>

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
<p>https://www.ncbi.nlm.nih.gov/pubmed/?term=Mobilizing+Your+Medications%3A+An+Automated+Medication+Reminder+Application+for+Mobile+Phones+and+Hypertension+Medication+Adherence+in+a+High-Risk+Urban+Population</p>	<p>medication reminder on their mobile phone.</p>	
Remote Monitoring in Hospital Setting to Improve Care, Address Staffing Shortages, and Promote Efficiency		
<p><i>Presence Covenant Medical Center, Urbana, IL</i> <i>Remote Sitter</i></p>	<p>Pilot in October of 2014, monitored 665 elderly hospitalized patients for over 5,000 hours.</p>	<p>The remote sitter monitoring system prevents falls and fall-related injury among elderly hospitalized patients and led to a cost savings.</p>
<p>Monitored 665 elderly patients</p> <p>https://www.chausa.org/publications/catholic-health-world/archives/issues/september-15-2016/remote-sitter-aims-to-lower-fall-risks-while-improving-staffing-efficiency</p>	<p>Hospitalized elderly patients at risk of falling</p> <p>Service provided: Remote monitoring for danger and signs of patient fall</p> <ul style="list-style-type: none"> ✓ A certified nurse assistant at a remote location (140 miles away) watches the patient on a monitor ✓ Upon recognition of activity in which there is danger and/or risk of a fall, the assistant triggers a warning to attending staff ✓ At the facility, the attending nurse's phone sounds a special alarm. 	<ul style="list-style-type: none"> ✓ 665 patients were successfully monitored with no adverse events and no patient injury ✓ System identified and prevented 161 potential falls ✓ Of the 665 patients, 3 patients fell, but experience no injury and no adverse event ✓ Estimated Combined savings of \$1.1 million through reduced falls, claims and FTEs
	<p>Utilized 10 carts for observation of patients</p>	
	<p>Expanded across four sites in 2016 and logged 16,131 hours monitoring fall risk patients from the TeleHealth center</p>	
<p>Emory Rapid Development and Deployment of Non-Physician Providers in Critical Care</p>	<p>Train/deploy critical care NPs and PAs, supported by an eICU, to address intensivist shortage</p>	<p>The program reduced hospital utilization, reduced per episode Medicare costs, and was rated highly by patients. Evaluation of the program found it was associated with:</p>
<p>CMS, CMMI Health Care</p>	<p>The eICU program monitored critical</p>	

Institution & Links to Findings	Attributes of RPM and RPM Patients	Key Findings
<p>Innovation Award Pilot Program</p> <p>Abt Associates, Evaluation of Hospital-Setting HCIA Awards, Submitted to CMS, November 1, 2016</p> <p>https://downloads.cms.gov/files/cmmi/hcia-hospitalsetting-thirdannualrpt.pdf</p>	<p>care patients 24/7 and provided intensivist physician oversight and support on the night and weekend shifts, when physicians are not consistently present in ICUs</p> <p>The eICU staff:</p> <ul style="list-style-type: none"> ✓ Remotely monitored patients in participating ICUs via telemetry ✓ Alerted clinicians at the bedside when they noticed any potentially problematic changes in patient vital signs that exceeded clinical guidelines 	<ul style="list-style-type: none"> ✓ a \$1,486 reduction in average Medicare spending per 60-day episode relative to the comparison group ✓ a 2.1 percentage point decrease in the rate of 60-day inpatient readmissions relative to the comparison group <p>“This monitoring was credited with numerous “saves” when problems were brought to the attention of bedside staff that might otherwise have gone undetected, endangering patient safety.” (Abt Associates Evaluation Report)</p>

Recent and Comprehensive Literature Reviews and Meta Analyses		
<p>AHRQ Evidence Review</p> <p>Technical Brief No. 26</p> <p>Telehealth: Mapping the Evidence for Patient Outcomes From Systematic Reviews</p> <p>June 2016</p> <p>www.effectivehealthcare.ahrq.gov/reports/final.cfm</p>	<p>Overview of the extensive body of evidence on telehealth for use by decision makers.</p> <p>1,494 citations about telehealth were identified, from which 58 systematic reviews met our inclusion criteria.</p>	<p>The evidence supports use of telehealth technologies as effective for:</p> <ul style="list-style-type: none"> • “Remote monitoring of patients with chronic conditions; • Communication and counseling for patients with chronic conditions; and • Psychotherapy as part of behavioral health.”
<p>Inglis, et. al.,</p> <p>“Structured telephone support or telemonitoring programmes for patients with chronic heart failure (Review)”</p> <p>Cochrane Library 2010, Issue 8</p> <p>http://www.thecochranelibrary.com</p>	<p>Review of randomized controlled trials (RCTs) of structured telephone support or telemonitoring compared to standard practice for patients with CHF in order to quantify the effects of these interventions over and above usual care for these patients</p> <p>Included 25 studies and 5 published abstracts</p>	<p>Consistent finding of reduced hospitalization rates.</p> <p>“This review demonstrates that CHF interventions utilising information technology can reduce the rates of death and hospitalisation and improve the quality of life.”</p>

Bashur et. al.,

**“Original Research
The Empirical Foundations of
Telemedicine Interventions
for Chronic Disease
Management”**

**Telemedicine and e-health, VOL.
20 NO. 9 SEPTEMBER 2014**

<https://www.ncbi.nlm.nih.gov/pubmed/24968105>

Comprehensive review of telehealth and telemedicine research.

Focus on remote monitoring and telemedicine for Congestive Heart Failure (CHF), Congestive Obstructive Pulmonary Disease (COPD), and Stroke.

Studies consistently found reduced hospital admissions, reduced length of stay, reduced emergency room use when remote monitoring was deployed for CHF, stroke and COPD.

Study provides detailed citations and listings of the findings of these studies.

“The preponderance of evidence from studies using rigorous research methods points to beneficial results from telemonitoring in its various manifestations, albeit with a few exceptions. Generally, the benefits include reductions in use of service: hospital admissions/re-admissions, length of hospital stay, and emergency department visits typically declined.”