Improving the Health of South Dakotans through the Prevention and Management of Diabetes, Heart Disease, and Stroke

A Summative Report of a Five-year Project

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Executive Summary

In Spring 2018, the Centers for Disease Control (CDC) released a call to action to address health disparities among Americans with diabetes, heart disease, and stroke through CDC-1815. In response, faculty at the South Dakota State University (SDSU) College of Pharmacy and Allied Health Professions and the South Dakota Department of Health (DOH) collaborated to create a five-year plan to identify barriers and facilitators to care and develop viable solutions to improve care for South Dakotans with diabetes, heart disease, and stroke, as it relates to medication therapy management and pharmacy's role in patient care.

The objective of this project was to improve care for patients with diabetes, heart disease, and stroke across the state of South Dakota. Following the success of landmark projects like the Asheville Project, the Diabetes Ten City Challenge, the STOMPP Medication Non-Adherence program in Ohio, and others, the project team identified that increasing the accessibility and subsequent use of pharmacy services would be key to improving the state of care in South Dakota. Models which have been tested in other states were determined to be extremely beneficial to South Dakotans, including Adherence Pharmacy services, which includes medication therapy management (MTM), adherence packaging, medication synchronization, and delivering medications. However, little work had previously been done in the state, neither for patients with diabetes, heart disease, and stroke nor with community pharmacists. For this reason, the project team identified that a necessary first step would be to conduct a landscape analysis in Year 1 to assess exactly where resources and care for patients with diabetes, heart disease, and stroke stood in the state, as they relate to the role of the South Dakotan pharmacist. In Year 2, the project team developed programs and worked to educate and engage stakeholders. In Year 3, the team began to implement, market, and enroll patients in the developed programs, and continued into Year 4 with continuous evaluation and quality improvement of developed programs. In Year 5, implementation and CQI continued, along with work to evaluate sustainability and payment models for services. All work completed was designed to meet the needs of our three stakeholder groups: patients, practitioners, and payers. Project activities were reviewed and approved by the South Dakota State University International Review Board.

Results of the Year 1 landscape analysis, as well as follow up interviews with one additional payer group and practitioners serving South Dakota's American Indian population, informed the design of all project activities in Years 2-5. Activities included working with collaborators on the expansion of pharmacy services and customizing the adherence pharmacy model to meet the needs of the sites, enrolling patients in programs designed for each of the partner sites, conducting a statewide patient awareness campaign, facilitating American Pharmacist Association (APhA) certification trainings for Delivering MTM Services, Diabetes, and CVD to South Dakota pharmacists, developing and piloting a Patient Stories Reporting Tool, analyzing clinical data provided by collaborating sites, developing three publicly available webinars to increase knowledge around pharmacy services, conducting interviews with collaborating practitioners on the impact the integrated pharmacist has made at their sites, and collecting testimonials from patients and practitioners on the impact of the project work and newly expanded pharmacy services. All of these activities were completed in collaboration with one or more of our partner sites, including Haisch Pharmacy, the Community Health Center of the

Black Hills, Horizon Health Care, Lewis Drug, and Avera Health. The timing of the COVID-19 pandemic did present some obstacles to implementation as many pharmacists across the state were pulled away to serve patients with COVID-related conditions. However, the generalizability of this project allowed project work to not be greatly impacted given the strong methodology and rigor that was maintained.

Overall, for patients our goal was to impact awareness of these services, thereby impacting utilization and outcomes. The "Your Pharmacist Knows" campaign made approximately 340,000 impressions and reached at least 61 of 66 South Dakota counties and positively influenced health behavior regarding pharmacy services in South Dakota through knowledge, attitude, norms, and perceived control constructs. Several patients expressed interest and enrolled in programs at our partner sites. Ultimately, results indicated a statistically significant increase in the number of patients at or below the goal A1C (<9%) and at or below a blood pressure of 140/80 mmHg. Results also indicate that the expansion of MTM completed as a result of the project work led to an overall cost reduction for both types of patients. In total, for 26 patients with diabetes, $19,181 was saved over approximately 12 months, and for eight patients with hypertension, $20,250 was saved over the same period. Humanistic outcomes of the project were also positive. Surveys of patients already enrolled in expanded pharmacy services, like MTM, showed strong baseline scores regarding adherence satisfaction, and quality of life, and these scores were maintained with trends toward improvement.

For practitioners, the project team successfully completed 259 APhA certificate trainings over the project period. Results indicated there was an overall increase in the number of MTM interventions delivered for pharmacists who received the APhA training. Collaboration with our Lewis and Avera collaborators allowed for more pharmacist engagement in a clinical capacity, thereby expanding the role of the pharmacist. Likely resulting from this is the significant increase in SmartPack enrollment at both rural and urban sites with targeted approaches. Improved medication adherence was reported for several patients enrolling in Lewis's Smart Pack/Smart Sync with MTM components. Improvement was seen in patients feeling "much more confident" they are taking their medications correctly and more patients stating that using the Smartpack service was "very easy" compared to baseline. At Horizon, the addition of a Lewis pharmacist to the Horizon Health Home team resulted in improved workflows consequentially improving patient outcomes. Finally, a number of site-specific APhA MTM trainings were offered through Avera and Lewis and both Avera and Lewis are working with the project team to offer the APhA MTM trainings as part of their onboarding and expansion of services processes.

For payers, the impact was multifold. Educating administrators and practitioners working with payer groups on setting up billing models for MTM and other pharmacy-based clinical services through webinars helped improve awareness. Payers require proof of impactful practice when making decisions on reimbursement for services on contracts. The project team's work to prove the viability and positive outcomes of expanded pharmacy services in South Dakota is a pertinent resource for partner sites to use in on-going and future contract conversations. Following the end of the project period the project team is optimistic that project work can be effectively utilized in working with payer groups to begin developing and implementing models for reimbursement of expanded pharmacy services. Lastly, while payment for services through various PartD payers

was available, due to a lack of training or resources, the services weren't being performed and reimbursed at the beginning of the project period. The project team's work resulted in more delivery of these services and thereby reimbursement for these MTM services through these Medicare PartD payers.

The adherence pharmacy model for providing services like MTM that was implemented has shown to be effective in a variety of settings. Integrating pharmacists into healthcare teams has been well-received and providers with pharmacists embedded on-site at ambulatory care sites continue to utilize their pharmacists as a resource they previously didn't have access to. Tools developed during the project were built into systems and processes throughout the project to help improve consistency and efficiency of pharmacist-provided services. Furthermore, multiple collaborators have expanded upon the project work to further facilitate growth of resources for expanded pharmacy services, resulting in success that stretched beyond project expectations. Overall, this five-year project was successful in its goals to increase awareness of, availability of, and access to expanded pharmacy services, particularly for patients with diabetes and CVD in South Dakota.

Introduction

In Spring 2018, the Centers for Disease Control (CDC) released a call to action to address health disparities among Americans with diabetes, heart disease, and stroke through CDC-1815. In response, faculty and staff at the South Dakota State University (SDSU) College of Pharmacy and Allied Health Professions and the South Dakota Department of Health (DOH) collaborated to create a five-year plan to identify barriers and facilitators to care and develop viable solutions to improve care for South Dakotans with diabetes, heart disease, and stroke, as it relates to medication therapy management (MTM) and pharmacy's role in patient care.

Every year, an estimated 5,000 people in SD are diagnosed with diabetes, and 21,000 more people have diabetes but are undiagnosed.[1] This accounts for 8% of SD adults diagnosed with diabetes, though this increases to 16% in the American Indian population.[2] Additionally, heart disease is the second leading cause of death in SD, while stroke is the sixth leading cause.[2,3] The prevalence of cardiovascular disease (CVD) not only affects overall health status but also impacts economic outcomes. In 2012, the estimated annual cost of CVD was $981 million in South Dakota. Also, the geographical layout of South Dakota contributes to the health disparities in the state. Thirty of SD's 66 counties (45%) are designated as rural (less than 36 people per square mile) and 34 (52%) are considered frontier (less than six people per square mile). In comparison, only 18% of the United States' total population lives in a rural area.[4]

To see a primary care provider (PCP), it is not uncommon for rural patients to travel more than 50 miles.[2] Given these challenges, community pharmacies represent an underutilized setting for patients to receive health services, especially in areas where traditional healthcare facilities are not available. It is estimated that 64% of SD residents live within a 15-minute drive to a pharmacy, and 81% are within a 30-minute drive.[5] Given their expertise in medication knowledge and appropriate use, pharmacists can improve patient access to healthcare through provision of clinical services such as immunization administration, MTM services, disease state management, diabetes education, and point-of-care testing.

Medication Therapy Management (MTM) services are structured in a variety of ways, but generally involve either targeted interventions or comprehensive review of all aspects of a patient's current medication use. Multiyear studies of MTM service models have shown positive impacts to patient health outcomes, reduced healthcare costs, increased medication adherence, and increased quality of life; thus, justifying further exploration into routine and widespread MTM implementation.[7-9] Notably, in cases where MTM has been implemented, A1c levels in patients with diabetes decreased along with reductions in systolic and diastolic blood pressures.[8]

Since MTM services can require a considerable amount of time to complete for both patients and pharmacists, MTM services were not routinely provided by pharmacies in a structured manner until the Centers for Medicare and Medicaid Services (CMS) enacted the Medicare Prescription Drug, Improvement, and Modernization Act in 2003, which required plan sponsors to offer MTM services to eligible beneficiaries. Following CMS' example, other private insurance providers, third party payers, and self-insured employers have also offered reimbursement to pharmacists for providing these MTM services to their beneficiaries. Empowering and educating patients on their medications helps decrease the issues associated with nonadherence, such as

increased healthcare costs, poor medical outcomes, higher hospitalization rates, and greater insurance premiums.[5,10,11]

There is precedent for implementing programs to increase the use of pharmacy services, like MTM, for patients with diabetes and CVD. The Asheville Project was a five-year program that took place in Asheville, NC beginning in 1997 that worked with employers to set up payment plans for their employees to receive coverage for pharmacy services. A significant decrease in A1C levels for patients at the 12 community pharmacies was seen over the course of the program, as was a significant cost savings for the employer health plan. The work was such a success that at the end of the program, the health plans elected to keep coverage of pharmacy services in the health plans.[12] Similar work was for the Diabetes Ten City Challenge and with the STOMPP Medication Non-Adherence program in Ohio.[8,9]

The objective of this project was to improve care for patients with diabetes, heart disease, and stroke across the state of South Dakota. In the earliest stages of the project, members of the project team went on the road to meet patients, practitioners, and payer groups across the state, to informally assess the greatest needs for these three key interest groups.
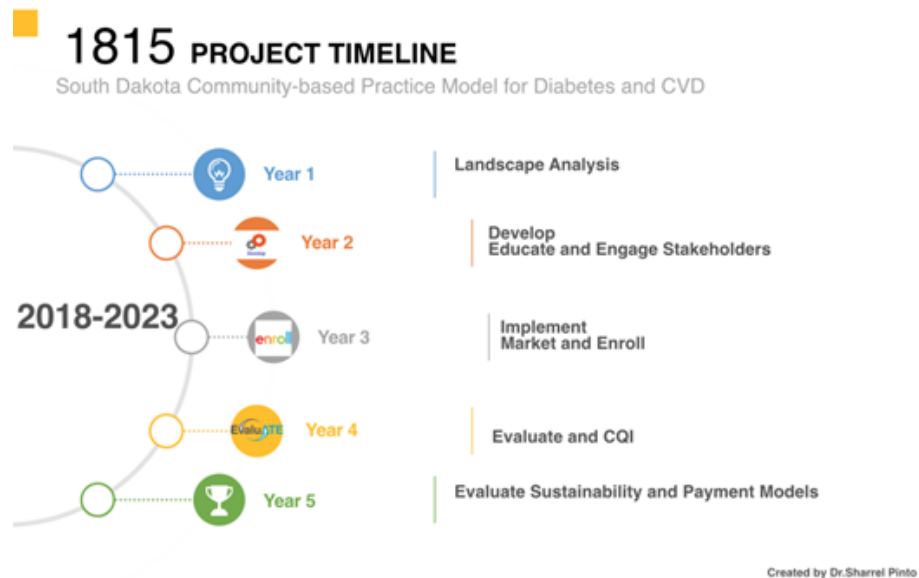
Figure 1. The 1815 Project Timeline

Following the success of first the Asheville Project a and by listening to patients, practitioners, and payers they met while on the road, the project team identified that increasing the accessibility and subsequent use of pharmacy services, like MTM, would be key to improving the state of care in South Dakota. However, little work had previously been done in the state, neither for patients with diabetes, heart disease, and stroke nor with community pharmacists. For this reason, the project team identified that a necessary first step would be to conduct a landscape analysis in Year 1 to assess exactly where resources and care for patients with diabetes, heart disease, and stroke stood in the state. In Year 2, the project team would continue to develop programs and work to educate and engage stakeholders. In Year 3, the team would begin to implement, market, and enroll patients in the developed programs, and continue into Year 4 with continuous evaluation and quality improvement. Year 5, implementation and CQI would continue, along with work to evaluate outcomes, sustainability, and payment models for services.

Problem

Landscape analysis

To begin the five-year project, the team from SDSU's Community Practice Innovation Center (CPIC) conducted a landscape analysis performed at three levels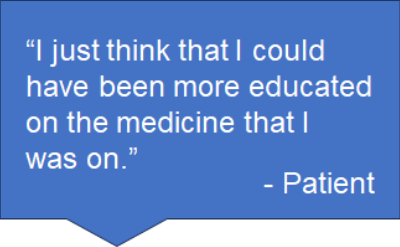: patient, payer, and practitioner. This included but was not limited to stakeholder identification, access pathways, current practices, roles, needs assessment, community asset mapping, and barriers and facilitators to care. Since little work had previously been done to assess the impact of pharmacy services in South Dakota, particularly in its rural communities, a landscape analysis was a valuable initial step as it provided the team an opportunity to understand the needs that existed in South Dakota. For the Year 1 landscape analysis, separate surveys were conducted with each of the three identified interest groups: the Patient Group, the Practitioner Group, and the Payer Group.

Recruitment for the project was done via newspaper, mailings, posters, social media, and word-of-mouth. In total, 50 patients, 69 practitioners, and 8 payer/others participated in this landscape analysis. These participants were either selected to speak one-on-one with the project team (referred to as elicitation interview) or in a focus group setting. There was a diverse representation within the three stakeholder groups; however, due to time constraints, the project team was unable to focus on recruiting American Indian participants, South Dakota's largest minority group which comprises approximately 9% of the state's population. A follow-up set of interviews were conducted with practitioners from Urban Indian Health Organization clinics in Year 2 to fill this gap (see page 33).

Patient Group

In the Patient Group, 50 participants were enrolled, 34 of which completed elicitation interviews. Participants represented many parts of the state, with more than half of the participants residing in rural communities (n=32). Health characteristics of the patient group were collected, indicating some of the history and experiences of the individuals surveyed.

Survey questions were organized into two primary categories. The first included questions pertaining to the patient's experience, from warning signs, to diagnosis, to treatment, to recovery or stabilization, and everything in between. Analysis of responses to these survey items enabled the project team to create a map of "The Patient Journey," with eight unique stages including Warning Signs/Symptoms, Care Seeking, Diagnosis, Treatment Plan, Initiate Treatment, Medication/Treatment Adherence, Behavior/Lifestyle Modification, and Recovery/Maintenance/Stabilized (see Figure 2). Following identification of this Patient Journey in Year 1, the project team made efforts to integrate this knowledge into all project planning the following four years. Potential applications of this Patient Journey are various.

> "I just think that I could have been more educated on the medicine that I was on."
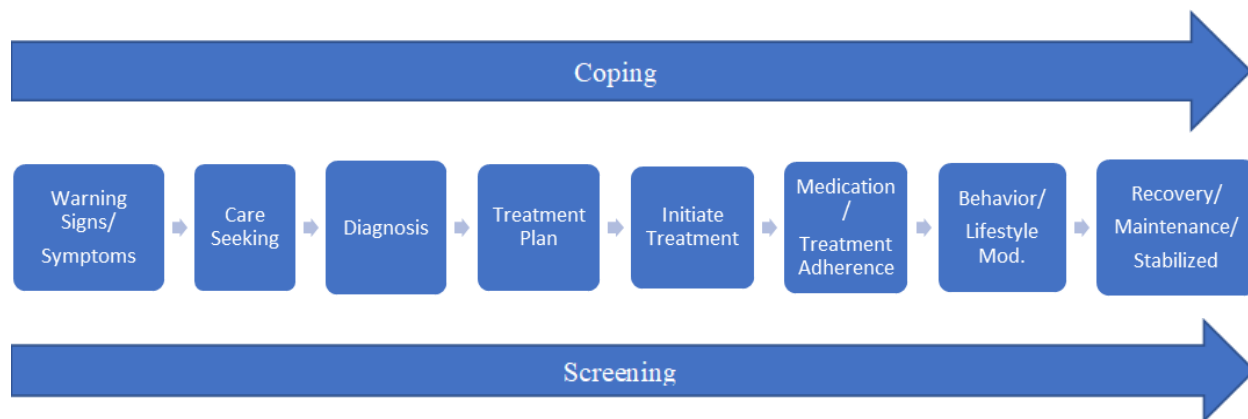>
> - Patient

Figure 2. The Patient Journey

The second category of questions the Patient Group was surveyed on were those pertaining to barriers and facilitators to receiving the care that they need. From responses, six barriers and three facilitators were identified. Barriers included 1. Time to diagnosis – many patients indicated that provider hesitance to provide a formal diagnosis may contribute to delayed treatment; 2. Difficulty obtaining medications – many patients expressed difficulties with medications throughout their diagnosis, such as cost of medication, obtaining medication, and finding the right dose and/or medication; 3. Lifestyle changes – many patients reported experiencing exhaustion and social or financial strains as a result of their diagnosis; 4. Adherence - Patients expressed that adhering to treatment plans can be difficult, but many also noted adherence techniques they'd been recommended or developed; 5. Non-individualized health care – When reflecting on the care they have received, many patients noted feeling as though their care had not been personalized to them; and 6. Inadequate education regarding disease state –

"My pharmacist… I love him. He knows me by name."
— Patient

Many patients expressed a lack of education on their disease state, leaving them questioning how to make improvements. Facilitators identified included 1. Pharmacist-patient relationship – Many patients noted the positive interactions they have had with their pharmacists and the positive impact pharmacists have had in their healthcare journey; 2. Willingness to learn and participate in enhanced pharmacy

"My pharmacist, he's the one I see all the time, for years, and I know him. That's the kind of relationship I want. He's always going to be there for me."   — Patient

services – despite many patients being unfamiliar with MTM, they expressed interest in the service and recognized the positive impact it may have in their healthcare journey; and 3. Social support system – Many patients noted the importance of their social support system in nearly every stage of their healthcare journey.

From these barriers and facilitators, the project team identified three needs that should be addressed and four goals to address those needs, in order to best fill the gaps in care for patients (see Table 1). Needs included a need to increase awareness and education of pharmacy services

and MTM, a need to increase access to medication and pharmacy services, and a need to improve medication adherence. Goals included conducting a statewide patient awareness campaign, completing work to increase availability of pharmacy services, facilitating patient education on pharmacy-based services, and measuring economic, clinical, and humanistic outcomes of patients receiving MTM.

Table 1. Identified Needs and Goals for Patient Group	
Identified Needs	**Goals**
• Need to increase awareness and education of pharmacy services and MTM	**1a.** Conduct a statewide patient awareness campaign
	1b. Work to increase availability of pharmacy services
• Need to increase access to medication and pharmacy services	**1c.** Facilitate patient education on pharmacy-based services
• Need to improve medication adherence	**1d.** Measure economic, clinical, and humanistic outcomes of patients receiving MTM

Practitioner Group

There were a total of 69 participants in the Practitioner Group. Participants in this group represented a variety of roles, including pharmacists (n=35), dietitians (n=11), diabetes educators (n=5), advanced practice providers (APPs), which includes physician assistants, nurse practitioners, and nurses, (n=4), and physicians (n=1). More than half of those in the practitioner group practiced in urban settings (n=39), with the rest practicing in rural areas throughout the state.

"My challenge is making sure that everyone knows I'm there. Many providers in rural communities aren't quite sure what all a pharmacist can do for them and their patients."
— Community Pharmacist

A combined 459-page transcript of provider interviews and focus groups offered an insider view into practice sites across the state and perceptions of barriers and facilitators to patient care for diabetes, heart disease, and related conditions. A number of providers identified the challenge of making healthcare and preventive services affordable to patients and working to find creative strategies to minimize out-of-pocket costs. In that regard, providers have a singular goal of minimizing the stress to the patient that may negatively influence disease status. The use of e-technologies has become an effective tool for managing patients' health status, facilitating communication among care providers, therefore promoting interprofessional, patient-centered team care. Participants in this group also discussed the various interactions they have during a patient's healthcare journey.

"Pharmacists are left out of the discussion a lot of the times. Don't forget about us and bring us into the conversation and the patient healthcare journey."
— Ambulatory Care Pharmacist

When asked about working with other members of the healthcare team, practitioners generally reported a collegial relationship and a relative understanding of each other's roles and responsibilities. The majority suggest that they find each member of the care team essential and there was a strong desire to expand interdisciplinary collaboration among physicians, advanced practice providers (APPs), and pharmacists as well as a need to better understand the scope of practice and range of services offered by practitioners from various disciplines. The majority of practitioners expressed that they have positive relationships with APPs and pharmacists. One challenge that was

acknowledged regarding APPs, specifically nurses, was the occasional turnover in already staff-strapped facilities—requiring recruitment and training of new staff along with the learning curve that accompanies the new hire. Additionally, pharmacists respondents sought to demonstrate the expanded patient care role they could play.

Respondents were asked if medication therapy management services were offered in their practice sites. A number of providers acknowledged that elements of MTM exist within their sites, however a lack of understanding persists. The ability to provide MTM services is not consistent across practice sites throughout South Dakota with practitioners citing lack of space, lack of education and training, and time constraints as barriers to this service. A number of respondents were not aware of the various aspects of MTM based on pharmacist scope of practice. Several providers agreed that fully implementing MTM services into their practice would be beneficial and also add a needed efficiency to their patient care. Others expressed concerns that providers may believe their current service offerings are sufficient and MTM service implementation is unnecessary. Additionally, given the distance between practice sites, electronic medical record (EMR) interfacing was consistently mentioned as an important facilitator for team care, especially for smaller facilities that are not close in proximity to practice partners.

> "Traditionally, this has been the role of only the physician. This isn't working. Pharmacists could take the burden off of providers, allowing them more time to provide valuable patient visits."
> -Avera Health Plan Representative

From these responses, the project team identified nine needs and nine goals (see Table 2). Needs included a need to increase understanding of MTM, to increase facility space, to increase patient understanding of the value of MTM, to decrease staff turnover, to increase resources for patient transportation, to decrease financial barriers, to address lack of time, to address barriers regarding proximity to other providers, and to improve referrals to MTM pharmacy services. Goals included improving star ratings, increasing the ability to meet the needs of low income patients, expand programs and create new ones, create more square footage, increase use of diabetes education programs, increase medication adherence and completion of MTM, have A1c levels below 7, increase referrals to weight management, and work to increase communication and collaboration between pharmacists and other practitioners/providers.

Table 2. Identified Needs and Goals for Practitioner Group

Identified Needs	Goals
• Increased understanding of MTM	2a. Improve star ratings
• Increased facility space	2b. Increase ability to meet needs of low income patients
• Increase patient understanding of value of MTM	2c. Expand programs and create new ones
• Decrease staff turnover	2d. More square footage
• Patient transportation	2e. Increase use of diabetes education program
• Decrease financial barriers for patients	2f. Increase medication adherence and completion of MTM
• Address lack of time	2g. Have A1Cs less than 7
• Address barriers regarding proximity to other providers	2h. Increase referrals to weight management
• Improve referrals to MTM pharmacy services	2i. Work to increase communication and collaboration between pharmacists and other practitioners/providers

Payer Group

The payer group consisted of representatives of one health plan, which has approximately 180,000 covered members throughout South Dakota and Iowa. Also in this group were representatives of an organization through the South Dakota Department of Health that provides a centralized repository for automatic upload of electronic health record information from 63 hospitals and 375 primary care clinics in the region that providers within the network can access to facilitate patient care provision. This was a smaller group (n=8) than the others, but the data collected was no less robust.

Themes from the discussions in this group were education, communication, and holistic wellness. Almost every participant mentioned the need for education on various topics, including MTM, population health, coding/billing practices, roles of members of the healthcare team including pharmacists, and disease management. Communication was mentioned multiple times as causing challenges and barriers for patients, payers, and practitioners. Lapses in communication have resulted in inconsistency in how patients are treated, services that are offered to patients, and

> "I think if we're just starting an MTM process we need the policies around the MTMs to see exactly what the expectation is from the health insurance perspective."
> -Avera Health Plan Representative

> "We're also going to need to find a means of working with our retail pharmacies because some patients respond better to some of their pharmacists at their local pharmacy."
> -Avera Health Plan Representative

"turf wars." Regarding holistic wellness, stakeholders in this group mentioned numerous times that health systems around the nation are starting to look at patients more holistically, rather than one symptom or one disease. Some even pointed out that pharmacists are in a unique position to see patients this way, stating that pharmacists often have more contact with patients than others in the healthcare team due to more frequent visits or easier geographical accessibility, putting them in an ideal position to positively impact patients' disease management. Insurance providers realize that pharmacists with more of a presence in healthcare settings are needed.

Table 3. Identified Needs and Goals for Payer Group

Identified Needs	Goals
• Develop resources to facilitate education	**3a.** Continue to engage and work alongside payers
• Increase communication between payer groups, practitioners, and patients	**3b.** Determine resources and strategies needed to implement reimbursement models
	3c. Build relationships, engage, and continue to collaborate with payer groups
• Focus treatment to provide holistic care for patients	**3d**. Continue to interview payers on barriers and facilitators to implementing reimbursement models for pharmacy services

From these interviews, three needs and four goals were identified (see Table 3), aligning with the three themes from the payer interviews. Needs included developing resources to facilitate education on MTM and pharmacy services, increase communication between payer groups,

practitioners, and patients, and focusing treatment that cares for the patient holistically. Goals included continuing to engage and work alongside payers, determine resources and strategies needed to implement reimbursement models, build relationships and continue to collaborate with payer groups, and continue to interview payers on barriers and facilitators to implementing reimbursement models for pharmacy services.

Responses from the payer group were generally positive regarding desire to implement reimbursement models for these services, but the project team also recognized that much work would need to be done to successfully implement consistent reimbursement models for pharmacy services, like MTM, from payer groups in the state.

Key Findings of Landscape Analysis

In total, data was collected from 50 patients, 69 practitioners, and 8 representatives of payer groups in South Dakota. A set of 15 key needs and 17 key goals were identified (see Table 4).

Additional Needs Assessment

Following the Year 1 landscape analysis, interviews to assess needs were conducted with an additional practitioner group and an additional payer group.

In the Year 1 Landscape analysis, one major South Dakota population that was not targeted for recruitment in elicitation interviews was American Indians. American Indians/Alaska Natives (AI/AN) are South Dakota's largest minority group which comprises approximately 9% of the state's population. This population experience lower health status and disproportionate health burden due to social determinants of health including inadequate education, poverty, and other quality of life issues rooted in economic adversity and poor social conditions. Since these unique factors were not accounted for and this population was not surveyed during the Year 1 landscape, so the project team began work in Year 3 to identify and understand the perspectives of practitioners who serve specifically AI/AN populations.

Elicitation interviews were conducted with practitioners from two Urban Indian Health Organizations (UIHOs), which serve AI/AN populations in South Dakota. The objective of the project was to identify practitioner perceptions of facilitators and barriers to chronic care provision and management for American Indians in the state. Facilitators included existing resources, nutrition education opportunities, transportation services, and an integrated care model. Barriers included gaps in services, healthcare access, and challenges adhering to treatment plans. For more on these interviews and subsequent analysis, see page 33.

Table 4. Identified Need and Goals for Patient, Practitioner, and Payer Groups		
Patient	**Practitioner**	**Payer**
Needs		
• Need to increase awareness and education of pharmacy services and MTM • Need to increase access to medication and pharmacy services • Need to improve medication adherence	• Need to increase understanding of MTM • Need to increase facility space • Need to increase patient understanding of value of MTM • Need to decrease staff turnover • Need to address patient transportation • Need to decrease financial barriers for patients • Need to address lack of time • Need to address barriers regarding proximity to other providers • Improve referrals to MTM pharmacy services	• Develop resources to facilitate education • Increase communication between payer groups, practitioners, and patients • Focus treatment to provide holistic care for patients
Goals		
1a. Conduct a statewide patient awareness campaign **1b.** Work to increase availability of pharmacy services **1c.** Facilitate patient education on pharmacy-based services **1d.** Measure economic, clinical, and humanistic outcomes of patients receiving MTM	**2a**. Improve star ratings **2b.** Increase ability to meet needs of low income patients **2c**. Expand programs and create new ones **2d.** More square footage **2e.** Increase use of diabetes education program **2f.** Increase medication adherence and completion of MTM **2g.** Have A1Cs less than 7 **2h.** Increase referrals to weight management **2i.** Work to increase communication and collaboration between pharmacists and other practitioners/providers	**3a**. Continue to interview payers on barriers and facilitators to implementing reimbursement models for pharmacy services **3b.** Build relationships, engage, and continue to collaborate with payer groups **3c.** Determine resources and strategies needed to implement reimbursement models

An additional payer group was interviewed in Year 3. Following the success of the Year 1 landscape analysis, the project team continued to reach out to representatives from Sanford Health Plan, a payer group tied to the largest healthcare provider in the state. In Year 3, elicitation interviews with five representatives from Sanford Health Plan were conducted, analyzed, and a brief created. Interview responses were organized into Strengths, Challenges,

and Needs across three categories: Expansion of Pharmacist Services, Development of Reimbursement Policies, and Engagement of Beneficiaries. Needs identified included an assessment of current MTM programs, development of pilot programs, a need to credential pharmacists as providers, a need to tie reimbursement to clinical outcomes, a need to improve outreach, a need for education, and a need to include incentives for participation in programs. For more on these interviews and subsequent analysis, see page 32.

Intervention

Summary of Activities

Over the five years of the project, the project team completed a number of activities in response to the needs and goals identified through the Year 1 landscape analysis (see Table 5). In addition to the interviews with Sanford Health plan representatives and practitioners from UIHOs, the project team also completed activities in Years 2-4 including: conducting a state-wide patient awareness campaign, facilitating more than 250 APhA training certifications for South Dakota pharmacists, developing and piloting a Patient Stories Reporting Tool (PSRT), surveying patients enrolled in MTM services and conducting subsequent analysis, analyzing clinical data provided by three different collaborators, creating three webinars to facilitate education on MTM and expanded pharmacy services, conducting interviews with practitioners to assess impact of the program, and interviewing and creating testimonials of patients and practitioners impacted by MTM in the state.

Work with Collaborators

To maximize efforts, the project team collaborated with five different pharmacy and healthcare providing organizations and three health insurance providers in South Dakota to complete these activities. Key healthcare providing collaborators included Haisch Pharmacy in Canton, the Community Health Center of the Black Hills (CHCBH) in Rapid City, Horizon Health Care (the project team worked closely with the Horizon site in Huron and evaluated data from several other Horizon sites across the state), Lewis Drug which serves 26 different South Dakota communities, and Avera Health which serves patient across South Dakota. Key collaborating insurance providers included Avera Health Plans, DakotaCare, and Sanford Health Plan. Additionally, while the project team did not work directly with any Sanford health centers, we did work closely with several Lewis pharmacists who were working within Sanford outpatient clinic sites. Partnerships were established through project team outreach and through connections made during the Year 1 landscape analysis. Collaboration with these pharmacies and health care providers across South Dakota was key to reaching South Dakotans, and unique work was done with each of these partners to achieve project goals.

Table 5. Project Activities

Activity	Summary	More information
Landscape analysis	Elicitation interviews and focus groups conducted with 127 participants representing patients, payers, and practitioners.	See page 8
Work with collaborators, including, expansion of pharmacy services and MTM model at collaborating sites	Work completed alongside Haisch Pharmacy, Horizon Health Care, CHCBH, Lewis Drug, and Avera Healthon expansion of pharmacy services.	See page 15
Sanford Health Plan interviews	Interviews with representatives from Sanford Health Plan.	See page 32
UIHO practitioner interviews	Interviews with practitioners from two Urban Indian Health Organizations.	See page 33
Patient awareness campaign	Statewide campaign to increase awareness of expanded pharmacy services, including flyers, brochures, business cards, and newspaper and television advertisements.	See page 35
APhA trainings	American Pharmacist certification trainings in Delivery of MTM Services, Diabetes, and CVD.	See page 37
Patient Stories Reporting Tool development and pilot	Development and pilot test of a tool for pharmacists to share stories of patient interventions.	See page 38
Analysis of clinical data from collaborators	Data was provided by Avera, Horizon, and Lewis and analyzed by the project team. Results indicated trends in patient health indicators, cost savings, and impact of APhA pharmacist trainings.	See page 40
Enrolled patients survey and analysis	Data from patients enrolled in expanded pharmacy services comparing baseline and 6 months. Data analyzed and yielded key results.	See page 48
Development of three webinars	Three education webinars developed and shared. Made available for free on the SD DOH website.	See page 51
Year 4 practitioner interviews	Interviews with practitioners from collaborating sites in Year 4 of the project.	See page 52
Patient and Practitioner testimonials	Testimonials conducted and recorded. Preparations for formal dissemination are in progress	See page 53

Haisch Pharmacy: Haisch Pharmacy is a community pharmacy that serves Canton, South Dakota. Haisch pharmacists have been key in working with the project team on the implementation of the MTM model, including completing APhA training (see page 37). Over the project period, Haisch pharmacists have worked with the project team on strategies and practices for increasing patient enrollment in expanded pharmacy services, like MTM. Additionally, Haisch participated in offering patients the ability to enroll in a longitudinal project that collected important clinical data that can be used to increase understanding of disease states and improve provision of care (see page 57). Finally, the project team also worked with Haish Pharmacy to update many of their day-to-day processes and capabilities to help facilitate pharmacist provision of MTM and other expanded pharmacy services. This included implementing PioneerRx, a pharmacy management software, and SD Healthlink, into workflow to maximize the effectiveness of pharmacy workflow and services.

Community Health Center of the Black Hills: The Community Health Center of the Black Hills (CHCBH) is a healthcare provider based in Rapid City and serving the Black Hills region. It is a Federally Qualified Health Center serving uninsured or underinsured patients. The project team worked closely with the CHCBH on implementation of the MTM care model, including facilitating APhA certification training for all their onsite pharmacists (see page 37). Following training, these pharmacists began providing MTM services to patients. Factors including staffing changes and a high number of transient patients contributed to difficulties with patient enrollment in MTM programs, however the project team worked closely with the CHCBH on developing and implementing strategies to increase enrollment. Ultimately, by the end of the project period, the project team successfully helped CHCBH set up provision of MTM services, which were not previously available to patients receiving services and medications from this FQHC.

Horizon Health Care: Horizon Health Care is a federally qualified health center that provides healthcare services to patients across 22 South Dakota communities. Initially, the project team worked closely with the Horizon executive teams on education regarding the role of the pharmacist and how pharmacists can improve workflow and health outcomes for patients. This foundational work was key to future successes with Horizon through the project period, including working with Horizon Health Care and Lewis Drug to integrate a Lewis pharmacist into the healthcare team at a Horizon clinic in Huron, South Dakota, partially facilitated through grant funds. This pharmacist worked closely with the project team on providing performance data. Through this work, Horizon was key in the implementation of the MTM model and patient enrollment in MTM services, which was based on the Medicaid Health Home program in place at the site. Horizon pharmacists participated in APhA certification training sessions facilitated by the project team (see page 37). Horizon also participated in offering patients the ability to enroll in a longitudinal project that collected important clinical knowledge which can be used to increase understanding of disease states and improve provision of care (see page 47). Additionally, Horizon provided the project team with three years' worth of data related to diabetes and hypertension trends, which the team analyzed to increase knowledge and facilitate the growth of care surrounding diabetes, CVD, and services including MTM (see page 42). Practitioners from Horizon also participated in focus group

sessions in Year 4, enabling the team to qualitatively assess the impact of the programs from the practitioner perspective (see page 52). Finally, Horizon pharmacists also participated in the pilot test of the Patient Stories Reporting Tool (see page 38). Ultimately, by the end of the project period, Horizon providers had learned to integrate a pharmacist into workflow and leverage medication expertise of their pharmacist. As a result, for patients with diabetes, there was an increase in the number of patients at goal A1C levels, and for patients with CVD, there was an increased number of patients with maintained blood pressure control.

Lewis Drug: Lewis Drug is a regional chain pharmacy in South Dakota with 59 stores and has been a key partner throughout the 1815 project, including in the increasing implementation of the MTM model over five years. Several Lewis pharmacists participated in the APhA certification trainings facilitated by the project team and subsequently began providing increased MTM services (see page 37). Lewis pharmacists also worked with the team in providing data to measure the impact of expanded pharmacy service delivery as a result of receiving the APhA training (see page 44). Throughout the project period, the project team worked closely with Lewis on continuous quality improvement throughout implementation of the MTM model. This included during the COVID-19 pandemic, which threatened to severely disrupt the growth of services as all healthcare professionals felt the strain of the pandemic. To ensure project progression, Lewis developed an "Operations Center" managed by one full-time pharmacist with dedicated time to broad oversight related to MTM enrollment and service delivery, as well as facilitating rollout of new clinical programs and dispensing related changes, data collection and analysis, and assisting with large patient care events across all locations. This individual, along with other participating Lewis pharmacists and Lewis leadership, worked with the project team to develop or implement strategies to continue growth of enrollment numbers. Lewis also has a close working relationship with Sanford, with multiple Lewis pharmacists engaged in Sanford outpatient clinic facilities, so communications and work completed with many Lewis pharmacists helped to strengthen relationships with Sanford, including Sanford Health Plans. Lewis was also key to providing the project team with data which was then analyzed to increase knowledge and inform future work. This included data from patients who were provided the opportunity to enroll in a longitudinal project that collected specific clinical markers, (see page 47), data from MTM enrollment through the MTM programs DocStation and OutcomesMTM platforms (see page 44), data related to work completed through Lewis's medication synchronization (Smart Sync) and medication packaging (SmartPack) programs (see page 44). Ultimately, by the end of the project period, project efforts increased patient adherence, increased the confidence of patients correctly utilizing their medications, and increased the ease of use with SmartPack services.

Avera Health: Avera Health is an integrated Health System with locations across South Dakota. Avera's innovative efforts toward integrating pharmacists in healthcare teams and help developing sustainable MTM models for both patients and health systems are key to this project. Avera is also a leader in Telehealth. Avera has been a key partner in a number of capacities. First, Avera pharmacists completed the APhA certification training facilitated by the project team (see page 37). Second, following the Year 1 landscape analysis, the project team interviewed Avera practitioners to identify specific barriers and facilitators to provision of care at those sites. Third, Avera provided the project team with data which was utilized to increase knowledge and inform

future work, including a dataset of individuals who had receive MTM and were eligible for enrollment and offered Avera patients the opportunity to enroll in a longitudinal project that collected specific clinical markers (see page 48). Finally, the project team also interviewed individuals from the Avera Health Plans and DakotaCare, which has since merged with Avera Health Plans, on barriers and facilitators to setting up a reimbursement model for pharmacy services. By the end of the project period, there was an organizational desire from Avera to add clinical pharmacists to new locations and to normalize the integration of pharmacists into the clinic team.

Avera Health Plans and DakotaCare: Avera Health Plans and DakotaCare are two healthcare payer groups serving South Dakota. Avera Health Plans now serves more than 88,000 members through its health plans and DakotaCare has served the Dakota region for more than 30 years. In 2015, Avera Health Plan purchased DakotaCare. Representatives from Avera Health Plans and DakotaCare participated in the Year 1 landscape analysis. Relevant results from the landscape analysis were consolidated into a Brief, which was provided to Avera Health Plans. The project team also developed three educational webinars on expanded pharmacy services, which were made available to representatives from Avera Health Plans and DakotaCare. Throughout the project period, the project team continued to engage with these payer groups to collaboratively establish effective reimbursement models.

Sanford Health Plan: Sanford Health Plan is a health insurance provider tied to the largest healthcare provider in South Dakota. Following the Year 1 landscape analysis, the project team continued to engage payers by conducting elicitation interviews with representatives from Sanford Health Plan. Results from these interviews were compiled into a brief. Three educational webinars that address many of the themes from the elicitation interviews, regarding wanting more education on expanded pharmacy services, were developed and made available to representatives from Sanford Health Plan. The project team continued to engage with Sanford, including through the close collaborative work with Lewis pharmacists engaged at Sanford sites.

Impact

The project team saw success across nearly every one of the goals identified through interviews with the patient, practitioner, and payer groups. The project team strove to design program activities in ways that accomplished multiple goals and met the needs of patients, practitioners, and payers (see Table 6).

Table 6. Goals and Related Activities

Goal	Related Activities
1a. Conduct a statewide patient awareness campaign	Patient awareness campaign
1b. Work to increase availability of pharmacy services	APhA trainings Analysis of clinical data from collaborators Expansion of pharmacy services and MTM model at collaborating sites
1c. Facilitate patient education on pharmacy-based services	APhA trainings Patient Stories Reporting Tool development and pilot Enrolled patient surveys and analysis Patient and practitioner testimonials Year 4 practitioner interviews Expansion of pharmacy services and MTM model at collaborating sites Development of three webinars Patient awareness campaign
1d. Measure economic, clinical, and humanistic outcomes of patients receiving MTM	Patient Stories Reporting Tool development and pilot Enrolled patient surveys and analysis Analysis of clinical data from collaborators Year 4 practitioner interviews
2a. Improve star ratings	APhA trainings Expansion of pharmacy services and MTM model at collaborating sites
2b. Increase ability to meet needs of low income patients	UIHO practitioner interviews APhA trainings Patient Stories Reporting Tool development and pilot Analysis of clinical data from collaborators Patient and practitioner testimonials Expansion of pharmacy services and MTM model at collaborating sites
2c. Expand programs and create new ones	Expansion of pharmacy services and MTM model at collaborating sites APhA trainings
2d. More square footage	
2e. Increase use of diabetes education program	Expansion of pharmacy services and MTM model at collaborating sites APhA trainings Analysis of clinical data from collaborators
2f. Increase medication adherence and completion of MTM	Expansion of pharmacy services and MTM model at collaborating sites APhA trainings Enrolled patient surveys and analysis Analysis of clinical data from collaborators Year 4 practitioner interviews

2g. Have A1Cs less than 7	Expansion of pharmacy services and MTM model at collaborating sites Analysis of clinical data from collaborators APhA Trainings
2h. Increase referrals to weight management	Patient Stories Reporting Tool development and pilot Analysis of clinical data from collaborators Expansion of pharmacy services and MTM model at collaborating sites
2i. Work to increase communication and collaboration between pharmacists and other providers	Expansion of pharmacy services and MTM model at collaborating sites Patient Stories Reporting Tool development and pilot Patient and practitioner testimonials Year 4 practitioner interviews
3a. Continue to interview payers on barriers and facilitators to implementing reimbursement models for pharmacy services	Sanford Health Plan interviews
3b. Build relationships, engage, and continue to collaborate with payer groups	Sanford Health Plan interviews Development of three webinars
3c. Determine resources and strategies needed to implement reimbursement models	Landscape analysis Sanford Health Plan interviews

Patient Group Goals and Impact

The goal to conduct a statewide patient awareness campaign (**1a**) was successfully met through the success of the "Your Pharmacist Knows" campaign. This campaign was a multimedia campaign with materials placed in newspaper, handed out in the form of flyers, brochures, and business cards, and broadcasted on South Dakota television via a 30-second commercial, all of which directed the public to the "Your Pharmacist Knows" website, where more information was available.[13] Furthermore, the impact of the awareness campaign was measured through pre- and post-surveys, which indicated an increase across all metrics related to awareness. For more information on the campaign and its impact, see page 35.

The goal to increase availability of pharmacy services (**1b**) was met through the expansion of pharmacy services and increased use of the MTM model across collaborating sites. Growth was seen at all collaborating sites, including, for example, at one Horizon Health Care site, where the project team facilitated the integration of a Lewis pharmacist into the healthcare team. Analysis of clinical data provided by providers was also key to informing expansion and growth. The completion of APhA trainings for pharmacists across the state also significantly impacted the availability of effective expanded pharmacy services, including MTM.

> "I could call her (the pharmacist) anytime I needed to ask a question about medicine or about dosages or if I were having too many highs or too many lows, because with diabetes, you're gonna have them both."
> - Patient

The facilitation of patient education on pharmacy-based services (**1c**) was also accomplished through the patient awareness campaign and the development of three webinars, which are publicly available. Perhaps most important, however, is that patient education was facilitated through pharmacists and other practitioners working directly with patients. For this reason, the work to expand pharmacy services at collaborating sites and South Dakota pharmacists receiving APhA certificate training were key. The development of the Patient Stories Reporting Tool and subsequent pilot test indicated ways that patient education can be increased by creating a platform for anecdotal and qualitative information exchange from pharmacists providing care to use in discussion with other stakeholders to inform of the important role pharmacists play in the patient's healthcare journey. Patient education was measured through enrolled patient surveys and subsequent analysis, patient and practitioner testimonials, the Year 4 practitioner interviews, and the patient awareness pre- and post-surveys. The measurement of economic, clinical, and humanistic outcomes of patients receiving MTM (**1d**) was similarly measured through the Patient Stories Reporting Tool pilot data, the analysis of enrolled patient surveys, the analysis of clinical data provided by collaborators, the Year 4 practitioner interviews, and the patient and practitioner testimonials.

> "She (the pharmacist) has been a liaison between me and the companies I am trying to work with."
> — Patient

Overall, for patients, results of the work describes indicate a statistically significant increase in the number of patients at or below the goal A1C (<9%) and at or below a blood pressure of 140/80 mmHg. By improving clinical markers such as A1C, we are decreasing the risk of disease-related complications and other long-term clinical events. For example, by intervening on medication interactions and side effects during an MTM visit, we may be able to eliminate an emergency room visit for the patient. Results also indicate that the expansion of MTM completed as a result of the project work led to an overall cost reduction for both types of patients. Economic outcomes were measured for sample groups of both diabetes and hypertension patients. For patients with diabetes, a total of $19,181 was saved for 26 patients over approximately 12 months, and for patients with hypertension, a total of $20,250 was saved for eight patients over the same period. Surveys of patients already enrolled in expanded pharmacy services, like MTM, showed strong baseline scores on humanistic outcomes including adherence, satisfaction, and quality of life, and these scores were maintained with trends toward improvement. Furthermore, 97.1% of MTM patients enrolled are from a rural area (a city/town of fewer than 20,000 people), indicating just how much of an impact pharmacists have in rural communities. Finally, the "Your Pharmacist Knows" campaign was displayed in 123 South Dakota papers, reached at least 61 of 66 South Dakota counties, and made approximately 340,000 impressions. Overall, the results showed that the campaign positively influenced health behavior regarding pharmacy services in South Dakota through knowledge, attitude, norms, and perceived control constructs.

> "I have learned through this project how important it is to be able to talk to somebody who knows about the drugs you are taking and can help you through dosages and side effects."
> — Patient

Practitioner Group Goals and Impact

Work to improve star ratings (**2a**) was not ultimately a focus of the project team's efforts, however work accomplished through the 1815 project, including the APhA trainings and expansion of programs, directly impacted factors that contribute to star ratings. In general, the APhA trainings had a tremendous impact on both the quality and quantity of care delivered, specifically of expanded pharmacy services, that are being provided in South Dakota. For the trainings, the project team adopted a "train the trainer" model. The project team recognized the value in having a number of practitioners from our collaborating sites receive the same training as members of the project team, and made efforts to facilitate this process during the project term to establish long-term sustainability of provision of future education offerings after the project end.

With the focus on MTM, work to increase the ability to meet the needs of low-income patients (**2b**) proved to be a consistent theme throughout most project activities. This was a key priority of the program and one major way pharmacists can be key to a patient's healthcare journey. This was made evident through the pilot test of the Patient Stories Reporting Tool, where pharmacists shared several

> "There's a nurse shortage in South Dakota right now, and we need to fill that gap somehow. And I think that (pharmacists) could really take a big load off of nurses."
> — Practitioner

stories related to finding creative ways to reduce costs for patients, improve medication regimens, and provide personalized patient education. For this reason, the APhA trainings and general expansion of pharmacy services and the MTM model directly contributed. Analysis of data, including enrolled patient data and data provided by collaborators, could be used to better inform patient care and outcomes related to cost. In addition to the PSRT's pilot test results, patient and practitioner testimonials also indicated the key ways pharmacists and the work done through this program contributed to cost reduction for patients.

The goal to expand programs and create new ones (**2c**) was a top priority of this project and was met. The 1815 project was designed around the objective of expanding pharmacy services to improve outcomes for patients with diabetes and cardiovascular disease, and the key way to accomplish that objective was to work with our collaborators across the state to expand those

> "For me, essentially getting patients to comply better and then have them know what the, what medications they're on and what they're for… [The pharmacist] helps us with that… it just makes it easier."
> — Provider

programs. The work completed alongside Haisch Pharmacy, Horizon Health Care, the CHCBH, Lewis Drug, and Avera Health speak to the success of this objective, as does the more than 250 APhA certificate trainings facilitated to pharmacists across South Dakota. In the expansion of programs, growth occurred within existing systems. While major growth occurred, including to the extent of integrating a Lewis pharmacist at a Horizon Health Care site where there had previously been no pharmacist on staff, limitations of the project did not allow for the project team to complete work related to creating more square footage (**2d**) at their practice sites.

In the landscape analysis, several specific goals were set relating to the impact that expanded pharmacy services can have. These included increasing the use of diabetes education programs (**2e**), increasing medication adherence and use of MTM (**2f**), getting A1C levels for patients below 7 (**2g**), and increasing referrals to weight management (**2h**). Since the primary focus of this project was to collect information and grow programs

"It takes a lot of time out of the day for a provider to sit down and teach somebody how to check the blood sugars, plus start them on the medications and do all the lab work in that short amount of time. So having (the pharmacist) here and just like immediately being able to provide that education has been huge."   -Provider

related to the expansion of pharmacy services to improve health outcomes for patients with diabetes or CVD, nearly all project activities contributed toward growth related to one or more of these goals. The expansion of pharmacy services and increased use of the MTM model at collaborating practice sites made major steps toward increasing the amount of pharmacy services, including MTM, that are being provided. APhA trainings similarly facilitate more informed provision of pharmacy services, as do utilization of tools like the PSRT. Patient and practitioner testimonials also showed ways the impact on these goals can be measured, as do the data from enrolled patient surveys and clinical data provided by collaborators, which show several examples of patients lowering A1C levels as a result of MTM enrollment. Results showed eight patients whose A1C levels reduced by 4.1%. Even a reduction of 1% corresponds to significant clinical, humanistic, and economic outcomes for patients, which speaks to the impact the expanded pharmacy services can have for patients.

Finally, the project team's work also contributed to the goal identified through practitioner interviews for increased communication and collaboration between pharmacists and other providers (**2i**). The expansion of pharmacy services across all collaborating sites, particularly at sites which provide non-pharmacy services like Horizon and Avera locations, actively work to establish collaborative relationships between pharmacists and other practitioners at those sites. In general, the work of integrating pharmacists into the healthcare team was positively received by

practitioners at collaborating sites. The Year 4 interviews with practitioners from Horizon and Avera showed that the integration of a pharmacist into the healthcare team at those sites improved workflow processes for staff, improved patient education, improved patient understanding and compliance, and improved provider support for medication prescribing and side effect concerns (see page 52). Tools like the PSRT, which share stories of

"It makes me happier. It makes my nurses happier."

                    - Provider

patient interventions provided by pharmacists, can be used to educate non-pharmacists practitioners on the services they can provide for patients, as can the three webinars developed by the project team. Additionally, both the patient and practitioner testimonials speak to the progress made on increasing collaboration and communication between pharmacists and other practitioners.

Overall, for practitioners, the project team successfully facilitated 259 APhA training certifications for South Dakota pharmacists covering MTM, diabetes, and CVD over the project period. As a result of these trainings, 633 MTMs were completed for training and an overall increase in the number of MTM interventions was correlated with pharmacists receiving the APhA training. Collaboration with our Lewis and Avera collaborators led to overall expansion of clinical pharmacist hours dedicated to clinical pharmacy throughout the project, and the development of Lewis's Operation's Center ensures consistency and guidance for the MTMs being delivered at Lewis sites. Likely resulting from this is the significant increase in SmartPack enrollment at both rural and urban Lewis sites, as well as at Haisch Pharmacy, with targeted approaches. Improved medication adherence was reported with several patients enrolling in Smart Pack/Smart Sync with MTM components. Improvement was seen in patients feeling "much more confident" they are taking their medications correctly and more patients stating that using the Smartpack service was "very easy" compared to baseline. At Horizon, the addition of the pharmacist to the Horizon Health Home team resulted in improved workflows and a significant increase in the number of patients at or below goal A1C (<9%) and kept patients with hypertension at or below blood pressure goals (<140/80 mmHg) over time. Finally, a number of site-specific APhA MTM trainings were offered specifically to Avera and Lewis pharmacists, facilitated in part by Avera and Lewis leadership. These were successful in providing specified workflows and tools when training pharmacists. As a result of the success of the trainings, both Avera and Lewis are working with the project team to offer the APhA MTM trainings as part of their onboarding and expansion of services processes.

Payer Group Goals and Impact

In Years 1 and 2, the project team met with representatives from three payer organizations: Avera Health Plans, DakotaCare, and Sanford Health Plan. Elicitation interviews were completed in Year 1 (see page 12) and in Year 2 (see page 32), and results were compiled into two briefs (**3a**). Prior to and during the initial landscape analysis, the project team worked with the South Dakota Department of Health to utilize South Dakota Health Link as a tool to measure outcomes of expanded pharmacy services to show payer groups and incentivize them to work with the project team to develop reimbursement models. The project team would complete these efforts to complete this project work in a similar manner to past successful programs like the Asheville Project or the work completed in Lucas County, OH.

Unfortunately, results of the landscape analysis and conversations with payers showed that South Dakota was far behind other states when it came to the quality and quantity of expanded pharmacy service programs that were being implemented in the state, leaving much work left to be done. For this reason, while the payers interviewed expressed enthusiasm for MTM and expanded pharmacy services and the ways they can benefit patients, there was a lack of confidence as to whether reimbursement for pharmacy services would yet be a viable option in

> "What would be most challenging for us is arranging reimbursement for a pharmacy provider, because right now pharmacies are not widely accepted as a provider."
>
> - Sanford Health Plan Representative

South Dakota. Rather than following the pattern of past examples like the Asheville Project, where payer groups tested a reimbursement model throughout project implementation, payers in South Dakota needed to be convinced that reimbursement models for expanded pharmacy services were a feasible and worthwhile venture in South Dakota. Compounding this pushback were additional external barriers, like the COVID-19 pandemic, which potentially redirected payer focus from investing in pharmacy services.

Ultimately, the project team utilized the elicitation interviews and conversations with payer groups to determine that to effectively convince payer groups in South Dakota to implement reimbursement models for expanded pharmacy services, the project team would need to prove that these services are not only viable and can result in effective humanistic, clinical, and economic outcomes, including ROI, but that this would need to be proven within the state of South Dakota. The focus for the project team then shifted to 1. Developing webinars to further educate payers and other interest groups on the viability and positive outcomes related to expanded pharmacy services, and 2. Working with practitioners, patients, and collaborators to implement expanded pharmacy services throughout the state and work on collecting data, including those related to cost reduction, A1C level reduction, and blood pressure management, that can be used to prove the viability and positive outcomes of expanded pharmacy services in South Dakota.

> "A lot of people just sign up for a plan, and I think they don't even know what's covered. I think making people more aware of their benefits is important."
>
> - Sanford Health Plan Representative

While work in the latter years of the project focused on working with practitioners, patients, and collaborators on implementation of the expanded pharmacy service and MTM model, the project team did maintain relationships and engagement with payers (**3b**). Following the end of the project period the project team is optimistic that the project work, including those findings related to A1C levels and cost reduction, can be effectively utilized in working with payer groups to begin developing and implementing models for reimbursement of expanded pharmacy services (**3c**). Lastly, while payment for services through various PartD payers was available, due to a lack of training or resources, the services weren't being performed and reimbursed at the beginning of the project period. The project team's work resulted in more delivery of services and thereby reimbursement for these MTM services through these Medicare PartD payers.
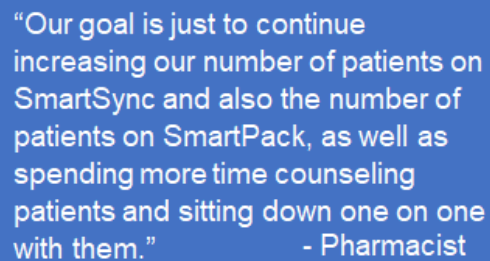
Discussion/Conclusion

Since 2018, when the CDC released a call to action to address health disparities for Americans with diabetes, heart disease, and stroke, the project team has been working diligently to create programs and resources to expand the role of community pharmacists to increase the amount of expanded pharmacy services, including MTM, that are available in South Dakota. To complete this work, the project team partnered with five health service organizations in South Dakota including Haisch Pharmacy, the Community Health Center of the Black Hills (CHCBH), Horizon Health Care, Lewis Drug, and Avera Health, and three payer organizations including

Avera Health Plans, DakotaCare, and Sanford Health Plan. Over the past five years, the project team has worked closely with each of these organizations on facilitating the implementation of an MTM-focused model of care which integrates pharmacists into healthcare teams, for the purpose of providing more accessible and comprehensive standards of care for patients with diabetes and heart disease across the rural state of South Dakota.

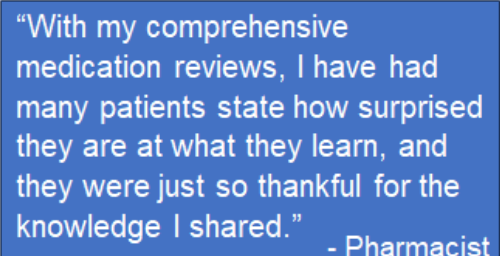The model for providing MTM services that we have implemented has shown to be effective in a variety of settings, irrespective of size. Additionally, the model has been expanded from initial sites in health systems to several sites with continued conversation on how to reach more patients, new communities, and eventually new target populations. Collaborators continue to evaluate and implement expansions to new populations. This can be newly qualified patients, different targeted patient characteristics, or new geographic locations within the collaborator's reach. The ability for the model to continue to demonstrate success in a variety of targeted patients and various locations supports the effectiveness and stability of the model, as well as sustainability of the model across various environments. The tools and processes developed by sites in collaboration with the SDSU team during the project support the ability for this

continued expansion of MTM services. This adaptable model that can be utilized across various practice types can enable other sites to mimic the implementation and provide services more efficiently. Our model continues to be effective across sites and patient groups. Pharmacists are able to use proven models that work in various types of pharmacy practice

"Our goal is just to continue increasing our number of patients on SmartSync and also the number of patients on SmartPack, as well as spending more time counseling patients and sitting down one on one with them."   - Pharmacist

settings and see success in the model, making it feasible for them to expand service offerings. Examples of this include Avera and Lewis's expansion of services to additional sites and intent to continue expansion after the end of the project period.

The positive impact of the model has been both facilitated by and has led to changes in process at these collaborating sites. For example, integrating a pharmacist into health care teams has been well-received by patients, providers, and other stakeholders. Providers with pharmacists

embedded on-site at ambulatory care clinics continue to utilize their pharmacists as a resource they previously didn't have access to, as demonstrated by the cumulative information collected on services provided on-site at Horizon Home Health, which demonstrate that just over half of services provided were done so by the nurse or prescriber stopping by to work with the pharmacist unscheduled. Tools developed during the project

"With my comprehensive medication reviews, I have had many patients state how surprised they are at what they learn, and they were just so thankful for the knowledge I shared."   - Pharmacist

such as the PSRT, documentation tools for documenting MTM services, and educational materials were built into systems and processes throughout the project to help improve consistency and efficiency of pharmacist-provided services. Education has been incorporated into the onboarding process and APhA trainings have been utilized to help support consistency of training and support pharmacists in the provision of MTM services. Furthermore, multiple
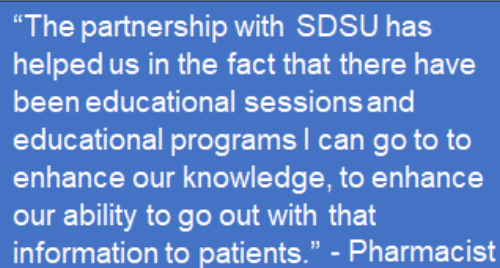
collaborators have expanded upon the project work to further facilitate growth of both the number of and resources for pharmacy services, resulting in success that stretched beyond project expectations. The CHCBH is receiving remarkable provider support and referrals, improving the reach of pharmacy-provided services to patients that previously did not have the opportunity to receive services. And Lewis established an Operations Center which is led by one full-time pharmacist who provides oversight on MTM and service delivery across all Lewis sites. Lewis data shows us that this model of including a central pharmacist for support of sites combined with MTM training for pharmacists has increased the number of MTMs performed and the number of interventions per MTM, as compared to control sites.

Looking beyond the end of the project period, the impact of the work completed shows signs of continuing. A number of APhA trainings were completed for student pharmacists in Year 5. This is expected to lead to continued expansion of reach across the state with the hope of MTM services being provided at more sites across the state as students enter the pharmacist workforce both in South Dakota and beyond its borders. Additionally, Lewis is working to expand the Patient Stories Reporting Tool to enable further sharing of stories between pharmacists and other practitioners, leading to improved knowledge and provision of care. Indeed, all collaborating sites report continued support from their organizations and leadership teams, as well as other stakeholders, which is key to sustainability of programs. This support will also be key in the continued work to set up reimbursement for expanded pharmacy services.

Overall, this five-year program was successful in its goals to increase awareness of, availability of, and access to expanded pharmacy services, particularly for patients with diabetes and CVD in South Dakota. As can be seen in previous projects with similar objectives, like the Asheville Project or the work completed in Lucas County, OH, the positive impacts of increasing the quality and

> "The partnership with SDSU has helped us in the fact that there have been educational sessions and educational programs I can go to to enhance our knowledge, to enhance our ability to go out with that information to patients." - Pharmacist

quantity of expanded pharmacy services, like MTM, are diverse and far-reaching. Increasing the knowledge and awareness of pharmacy services, as we have done, can improve access to care and utilization of pharmacy services in the community, resulting the health of the members in the community that engage in MTM services being improved and the total cost of care being reduced.[8,12]

Upon receiving those services, and in addition to easily observable impacts like cost reduction or A1C reduction, the overall health, behavior, and environment for patients and community members has and will continue to be improved through the project work. Expanded pharmacy services help patients by not only reviewing current medications to ensure they are receiving the appropriate medications for their disease states, but also gives the patient an opportunity to engage with the pharmacist on their particular needs and struggles with their existing regimen or uncontrolled health conditions. This engagement enables patients to receive care to triage issues between their clinic appointments or encourage a patient to be seen more quickly when necessary. In addition to having patients on optimized medication regimens that improve their health and long-term outcomes, patients can work with their pharmacist to improve their quality

of life through regimen changes, medication synchronization programs, or other strategies to improve adherence that prioritize improving medication use behaviors in ways that meet the patient's overall health goals. Other services that aid the patient include motivational interviewing techniques that help guide the patient through behavior change processes. In addition to improving a patient's health and encouraging positive health behaviors, patients become more aware of the accessibility of the pharmacist and the expanded services they can offer when engaging in MTM services. Patient/pharmacist interactions expand the patient's perception of the pharmacist role and how they can help with their needs in ways previously unknown to them. By improving the health, behavior, and environment for patients and community members, pharmacist-provided MTM services can improve the health of and reduce the cost for targeted populations including patients with cardiovascular disease and diabetes, thus decreasing the disease burden of the population, as we have seen here in South Dakota.

Impact Statements

A.3. Increase engagement of pharmacists in the provision of medication management or DSMES for people with diabetes

Problem: Community pharmacies represent an underutilized setting for patients to receive health services, especially in areas where traditional healthcare facilities are not available. It is estimated that 64% of SD residents live within a 15-minute drive to a pharmacy, and 81% are within a 30-minute drive, making them far more accessible than many other practitioners. Given their expertise in medication knowledge and appropriate use, pharmacists can improve patient access to healthcare through provision of clinical services such as immunization administration, Medication Therapy Management (MTM) services, disease state management, diabetes education, and point-of-care testing. The project team identified that increasing the accessibility and subsequent use of pharmacy services, like MTM, would be key to improving the state of care in South Dakota.

Intervention: To increase engagement we had to first increase awareness among patients of these services, then train pharmacists on the delivery of these services , and work with health care administrators and teams to develop services or facilitate workflow for integrating the pharmacist on the team. The project team selected strategy A.3, with the goal to increase pharmacist engagement of MTM by expanding the amount of, the quality of, and the resources for expanded pharmacy services, including medication therapy management, in South Dakota. To begin the five-year project, we conducted a landscape analysis performed at three levels: patient, practitioner, and payer, to identify facilitators and barriers according to these three interest groups. Results of the landscape analysis informed all project activities, which included working with nine different healthcare and health insurance providers in South Dakota on the expansion of pharmacy services using a MTM model that sees the pharmacist working as a member of the healthcare team. Specific activities included facilitating American Pharmacist Association (APhA) certficate trainings for pharmacists, developing educational and informational tools for patients, practitioners, and payers including a statewide patient awareness campaign, working with sites on the integration of pharmacists into their healthcare teams, collecting and analyzing data to assess impact, and continued communication and interviews with practitioners and payers to assess ongoing needs.

Impact: Work to increase patient awareness of pharmacy services was successful. Advertisements were displayed in 123 South Dakota papers, reached at least 61 of 66 South Dakota counties, and made approximately 340,000 impressions. Results from pre- and post-campaign surveys showed that the patient awareness campaign positively influenced health behavior regarding pharmacy services through knowledge, attitude, norms, and perceived control constructs. Additionally, over the course of the project period, an increased engagement of pharmacists in expanded pharmacy services, including MTM, was seen, leading to a positive impact on clinical markers for patients. The project team successfully facilitated 259 APhA training certifications for South Dakota pharmacists over the project period, thereby equipping pharmacists with training available to provide MTM. There were increases among MTM services delivered across trained pharmacists when compared to those who had not received training. Additionally, partnership with Lewis and Avera collaborators led to overall expansion of clinical pharmacist hours, and the development of Lewis's Operation's Center that ensures consistency and guidance for the MTMs being delivered at Lewis sites. There was a significant increase in SmartPack enrollment at both rural and urban sites with targeted approaches and improved medication adherence was reported with several patients enrolling in Smart Pack/Smart Sync with MTM components. Due to this success, education has been incorporated into onboarding process at some collaborating sites and APhA trainings have been utilized to help support consistency of training and support pharmacists in the provision of MTM services. Furthermore, multiple collaborators have expanded upon the project work to further facilitate growth of both the number of and resources for pharmacy services, resulting in success that stretched beyond project expectations. As a result of these interventions, clinical, humanistic, and economic outcomes were impacted. Clinical markers indicated a positive impact in the increased provision of MTM and expanded pharmacy services for patients with diabetes. Results from analysis of data of enrolled patients indicated a statistically significant increase in the number of patients at or below the goal A1C (<9%). By improving clinical markers such as Hgb A1C, we decreased the risk of long-term clinical events. Results also indicate that the expansion of MTM completed led to an overall cost reduction for patients. For example, in total, $19,181 was saved for 26 patients with diabetes over approximately 12 months.

B.4. Promote the adoption of MTM between pharmacists and physicians for the purpose of managing high blood pressure, high blood cholesterol, and lifestyle modification

Problem: Pharmacists are often an underutilized resource, both when it comes to patients and other healthcare providers. Given their expertise in medication knowledge and appropriate use, pharmacists can improve access to healthcare through provision of clinical services such as immunization administration, Medication Therapy Management (MTM) services, disease state management, education of patients' disease states and lifestyle modification, and point-of-care testing. This work minimizes the burden on other members of the healthcare team, specifically physicians in states such as South Dakota where there is a stark workforce shortage and limited access. Community pharmacies represent an underutilized setting for patients to receive health services, especially in areas where traditional healthcare facilities are not available. It is estimated that 64% of SD residents live within a 15-minute drive to a pharmacy, and 81% are within a 30-minute drive. Given their expertise in medication knowledge and appropriate use, pharmacists can improve patient access to healthcare through provision of clinical services such as immunization administration, Medication Therapy Management (MTM) services, disease state management, education of patients' disease states and lifestyle modification, and point-of-care testing. The project team identified that increasing the accessibility and subsequent use of pharmacy services, like MTM, would be key to improving the state of care in South Dakota.

Intervention: The project team selected strategy B.4, with the goal to promote the adoption of MTM between pharmacists and other practitioners by expanding the amount of, the quality of, and the resources for expanded pharmacy services, including medication therapy management, in South Dakota. To begin the five-year project, we conducted a landscape analysis performed at three levels – patient, practitioner, and payer – to identify facilitators and barriers according to these three interest groups. Results of the landscape analysis informed all project activities, which included working with nine different healthcare and health insurance providers in South Dakota on the expansion of pharmacy services utilizing a MTM model that sees the pharmacist working as a member of the healthcare team. Specific activities included working with sites on the integration of pharmacists into their healthcare teams, developing educational and informational tools for practitioners, and payers.

Impact: Over the course of the project period, the model for providing MTM services and integrating pharmacists into healthcare teams that we have implemented has shown to be effective and well-received. Providers with pharmacists embedded on-site at ambulatory care sites continue to utilize their pharmacists as a resource they previously didn't have access to. This has been demonstrated by the cumulative information collected on services provided on-site at partner sites like Horizon Health Care, which demonstrate that just over half of services provided were done so by the nurse or prescriber stopping by to work with the pharmacist unscheduled. At Horizon, the addition of the pharmacist to the Horizon Health Home team resulted in improved workflows and a significant increase in the number of patients at or below goal A1C and blood pressure levels. The ability for the model to continue to demonstrate success in a variety of targeted patients and various locations supports its effectiveness, stability, and sustainability across various environments. Additionally, tools developed during the project such as the PSRT, documentation tools for documenting MTM services, and educational materials were built into systems and processes throughout the project to help improve consistency and efficiency of pharmacist-provided services and assist with more meaningful interactions between patients and practitioners. The impact of this work was validated by practitioners, reporting that through project development, workflow processes were improved for all staff, patient education improved, patient understanding and compliance improved, and provider support for medication prescribing and side effects concern improved. Impact of these interventions were seen on patient outcomes, as well. Economic outcomes were positively impacted: the expansion of MTM completed as a result of the project work led to an overall cost reduction for patients: in total, $20,250 was saved for 8 patients with hypertension over approximately 12 months. Clinical outcomes were positively impacted for patients with hypertension: results indicated a statistically significant increase in the number of patients at or below a blood pressure of 140/80 mmHg. By improving clinical markers such as high blood pressure, we are decreasing the risk of long-term clinical events. Lastly, patients already enrolled in expanded pharmacy services showed strong baseline scores on humanistic outcomes including adherence, satisfaction with services provided, and quality of life, with trends toward improvement. Overall, the project and its impact on patients was significant in saving costs and improving outcomes and well-being for patients.

Year 2-5 Activities

Sanford Health Plan Interviews

Results of the Year 1 landscape analysis showed that involving and working with payer groups would be key to increasing access to pharmacy services. The Year 1 landscape analysis focus groups and elicitation interviews were limited to representatives from two health plans, Avera Health Plans and Dakotacare, as well as representatives from South Dakota Health Link. Following the success of the landscape analysis, representatives from Sanford Health Plan expressed interest in participating in similar interviews.

A key component to increase access to pharmacy services, such as MTM, is insurance coverage, billing and reimbursement provided by payers in the state. To evaluate the barriers and facilitators, research staff reached out to administrators and other key personnel at third-party payers and self-insured employers to participate in interviews. Five administrators from the Sanford Health Plan participated and provided valuable information. Sanford has 183 locations in South Dakota and between 60,000-70,000 individuals enrolled in their health plan. When approximately 50% of adults have at least one chronic disease, the project team estimated that by setting up reimbursement, pharmacist services could reach approximately 30,000 people.

Through the interviews, a number of strengths, challenges, and needs were identified in three different categories: Expansion of Pharmacy Services, Development of Reimbursement Policies, and Engagement of Beneficiaries. Each of these strengths, challenges, and needs are organized in Table 7.

Table 7. Strengths, Challenges, and Needs Identified by Sanford Health Plan Representatives			
	Expansion of Pharmacy Services	**Development of Reimbursement Policies**	**Engagement of Beneficiaries**
Strengths	- Manage North Dakota MTM Program Expanding partnership with pharmacies - Potential approach to address provider shortages and chronic disease management	- Experience from ND MTM Program - Services align with HEDIS and star ratings - Prepare for future regulation changes	- Potential to integrate with existing chronic disease management programs - Ability to utilize email, text messaging, and patient portal to engage patients
Challenges	- ND MTM program has not been evaluated - Patients unaware of available services - Limited in-state data on ROI available	- Projections often based on soft-cost avoidance - Pharmacists must be credentialled or utilize CPA - Need to develop eligibility and coding procedures	- Phone and mail recruitment inefficient - Lack of data sharing between pharmacy, providers, health plan - Lack of incentives for patients to participate
Needs	- Assessment of health and economic outcomes among ND MTM program - Assessment of current programs with Lewis - Development of pilot programs to evaluate effectiveness	- Credentialing pharmacists as providers - Tie reimbursement to clinical outcomes - Pilot test a program in SD	- Improve outreach through utilization of phone, text message, email, and patient portal - Patient and provider education on available services - Inclusion of incentives for participation

From these strengths, challenges, and needs, a number of key recommendations were identified. The first of these included the importance of linking the reimbursement of expanded pharmacy

services to measurable clinical and quality outcomes, in order to provide additional evidence of the value of reimbursing pharmacy services. Engaging members was a major barrier that was identified. More reliable enrollment strategies were also recommended, including email, integration with electronic health record portals, or participation incentives. Other barriers included data sharing and collection to measure the impact of reimbursed pharmacy services. Overall, lack of reimbursement remains a key limitation of expanded pharmacy services, and interviews with payers provided more information on steps that can be taken to bring payer groups on board.

UIHO Practitioner Interviews

American Indians (AI/AN) experience lower health status and disproportionate health burden due to social determinants of health including inadequate education, poverty, and other quality of life issues rooted in economic adversity and poor social conditions. These unique factors were not accounted for and this population not surveyed during the Year 1 landscape, so the project team began work to identify and understand the perspectives of practitioners who serve specifically AI/AN populations.

The objective of this analysis was to identify practitioner perceptions of facilitators and barriers to provision of chronic care

Table 8. Facilitators and Barriers Identified by UIHO Practitioners			
Facilitators to Care			
Diabetes programs	Nutrition education	Transportation services	Integrated care model
Barriers to Care			
Gaps in Services	Barriers to Healthcare Access		Challenges Adhering to Treatment Plan
Missed appointments	Transportation		Education level
Limited access to specialists or no on-site pharmacist	Childcare and family obligations		Health literacy
COVID-related delays	Cost		Physical environment
No access to telehealth	Housing		Food insecurity
Limited cardiac services; no EKG	Time		Cost of medications

management to patients of Urban Indian Health Centers (UIHOs). South Dakota has two UIHOs, in Pierre and in Sioux Falls. Practitioners at the two clinic sites were invited to participate in 1- to 1.5-hour elicitation interviews via video-call with co-investigators and members of the project team. Practitioners (n=7) from a variety of roles were recruited. The results from the elicitation interviews are shown in Table 8.

Facilitators to care included existing resources such as diabetes programs, nutrition education opportunities, available transportation services, and the use of an integrated care model. Barriers to care included gaps in services, barriers to accessing healthcare, and challenges adhering to treatment plans. Challenges regarding adherence to treatment plans stood out as a prominent issue, and factors contributing to challenges included the patient's education level, their degree of health literacy, their physical environment, food insecurity, and the general cost of medications.

In addition to these facilitators and barriers, three major themes stood out. The first is that patients have multiple challenges accessing healthcare services, so finding solutions to these challenges can be multilayered. The second is that patients struggle to acquire and afford the medications, providing a major barrier for many different patients. Finally, patients' living conditions and other social determinants of health impact their ability to adhere to treatment plans. Practitioner quotations providing insight into these themes can be found in Table 9.

Table 9. Key Themes and Quotations from UIHO Practitioners

Patients have multiple challenges accessing health care services	*"When we have homeless people, they're not thinking about how they're going to get to their doctor's appointment. They're more worried about where they're going to sleep and how they're going to eat."*
	"We have a lot of patients that walk to their appointments. We have a lot of patients that ride the bus. So transportation is definitely a huge barrier to them."
Patients struggle to acquire and afford medications	*"Even $4 sometimes is tough for our patients to get a med on the $4 list. You know if they have to choose to feed their kids or buy meds, they're going to feed their kids."*
	"We provide rides to the reservation because they can get their meds through the IHS pharmacy at no cost."
Patient's living conditions and other social determinants of health impact adherence	*"They worry about getting food and having housing and how they're going to get places, like we're just not, and it's unfortunate, but that's just something we have to understand and meet them where they're at and try and help them figure it out."*

Overall, findings from this project and other research highlights the impact that social determinants of health have on the ability of AI/AN, First Nations, and other Indigenous peoples to access health care services. The main themes identified through practitioner interviews were barriers to accessing health care, challenges adhering to treatment plans, and challenges related to technological connectivity. These barriers also impact AI/AN individuals' success in managing chronic health conditions. The community pharmacist, as a member of the health care team that is more accessible to rural AI/AN patients than other health care professionals and can provide services including MTM, is uniquely positioned to help increase access and affordability of care for AI/AN patients in rural South Dakota. Furthermore, several UIHO practitioners noted a desire to have an onsite pharmacy at their UIHO, indicating the impact that integrating a pharmacist into the healthcare team at UIHOs may have on patient and practitioner outcomes.

Patient Awareness Campaign

Beginning in year three and continuing through year four a campaign to increase awareness of pharmacy services and MTM was completed. The

Table 10. Patient Awareness Campaign Key Items		
Materials	**Campaign Periods**	**Results**
30-second television commercial; Posters; Brochures; Business cards; Advertisements in 123 South Dakota Newspapers; Website: https://www.sdstate.edu/your-pharmacist-knows	September 21, 2021–December 31, 2020	SD Counties Reached 61 (out of 66) Number of Impressions Made: ≈340,000
	March 8, 2020 – April 19, 2020	
	October 18, 2021 – December 6, 2021	
	November 1 – December 13, 2021.	

campaign, titled "Your Pharmacist Knows," sought to educate the public on the services that pharmacists have to offer, and encourage them to learn more about the pharmacist servicing their communities. The campaign was statewide, utilized a variety of distribution methods including posters, brochures, business cards, newspaper advertisements, and a 30-second television commercial, all of which directed individuals to the Your Pharmacist Knows website, where they could learn more. Some campaign materials, including the television commercial and newspaper advertisements, were disseminated over four phases, while other materials were distributed by the project team and at collaborating sites throughout the project period.

Awareness Campaign Data

A patient awareness survey was conducted in Years three and four. In total, 172 pre-campaign and 43 post-campaign surveys were completed. This project used a convenience sample of participants to evaluate patients' knowledge and

Table 11. Awareness, Attitude, Norms, and Perceived Control Data					
	Pre-Survey		**Post Survey**		
Variables	mean (SD)[a]	range	mean (SD)[a]	range	p value
Awareness of pharmacy service (full score = 16)	4.5 (2.9)	0-11	9.0 (3.6)	1-16	<.001
Attitude of function of pharmacy service (full score = 70)	45.3 (5.1)	36-63	52.5 (7.4)	34-70	<.001
Norms of benefit from pharmacy service (full score = 70)	43.2 (4.5)	35-57	49.5 (7.2)	33-68	<.001
Perceived control of the use of pharmacy service (full score = 70)	43.1 (3.8)	36-55	49.3 (7.9)	25-67	<.001

awareness of expanded pharmacy services in their area using a pre- and post- design with 172 participants. The conceptual model for this project was related to the theory of planned behavior (TPB) which is comprised of constructs related to attitudes, norms, and perceived control.

This campaign was successful and resulted in an increase across all metrics related to awareness, attitudes, benefits, and perceived control of services (see Table 11). Participants use of services and future intentions to utilize expanded pharmacy services also increased post campaign (see Table 12)

Multiple linear regression on baseline scores, using demographic characteristics as independent variables, yielded valuable information useful for follow-up awareness campaigns. By identifying those that did or did not have a high level of initial awareness, more targeted and efficient interventions can be conducted. Multiple regressions were conducted using four models to predict scores for Attitude, Subjective Norms, Perceived Control and Knowledge using demographic variables to include age, gender, race, college education, geographic population density, and insurance status. Female gender and college education (p < .001) contributed significantly to a

Table 12. Use of Pharmacy Services: Experience and Intent			
Variables	**172 (100 %) Pre-Survey**	**43 (100%) Post- Survey**	**p value**
Experiences of using pharmacy service over the past three months			
Medication therapy management	0 (0.0)	4 (9.3)	< .001
Medication therapy review	1 (0.6)	6 (14.0)	< .001
Medication synchronization program	9 (5.2)	9 (20.9)	.003
Diabetes education classes provided by pharmacists	1 (0.6)	3 (7.0)	.026
Heart disease education classes provided by pharmacists	4 (2.3)	2 (4.7)	.345
Intention to use pharmacy services in the next three months			
Medication therapy management	3 (1.7)	11 (25.6)	< .001
Medication therapy review	4 (2.3)	9 (20.9)	< .001
Medication synchronization program	9 (5.2)	15 (34.9)	< .001
Diabetes education classes provided by pharmacists	5 (2.9)	10 (23.3)	< .001
Heart disease education classes provided by pharmacists	3 (1.7)	10 (23.3)	< .001

positive change in Attitude score, $F(6, 157)=6.5$, $p < .001$, $R^2=.21$. Variables that predicted a change in score for Subjective Norms include female gender, non-white, and college education $(p < .001)$, $F(6, 171)=6.6$, $p < .001$, $R^2=.19$. Only college education was a significant predictor for a change in Perceived Control, $(p < .001)$ with both female gender and having insurance borderline significant $(p =.06)$, $F(6, 171)=4.0$, $p < .001$, $R^2=.13$. Lower age, female gender, and college education (all $p < .001$) significantly predicted change in Knowledge score, $F(6, 171)=9.5$, $p < .001$, $R^2=.25$. The most consistent predictor through all four models was college education followed by female gender when adjusting for age, race, geographic density, and insurance status.

Impact of Awareness Campaign
Data from these surveys were evaluated and provided results measuring Attitude, Subjective Norms, Perceived Control, and Knowledge using demographic variables including age, gender, race, college education, geographic population density, and insurance status. The most consistent predictor for positive change in attitude through all four models was college education followed by female gender when adjusting for age, race, geographic density, and insurance status. These findings bode well for continued increase of awareness. For example, women in general are considered caregivers for the family and often take the lead in identifying resources for themselves or family members living with chronic conditions. They can also set an excellent example for their family using resources and services offered through pharmacies across the state. Overall, the results showed that the campaign can positively influence health behavior regarding pharmacy services in South Dakota through knowledge, attitude, norms, and perceived control constructs. [14]

APhA Trainings

An objective of the project was to provide American Pharmacists Association (APhA) MTM certification training to at least 50 pharmacists in South Dakota.[15] The APhA is accredited by the American Council for Pharmacy Education as a provider for continuing pharmacy education. According to the APhA, the "Delivering Medication Therapy

Table 13. APhA Trainings	
	Completed
General MTM Training	116
CVD Training	18
Diabetes Training	82
Total Trainings	259
MTMs completed for training	633

Management Services training presents a systematic approach for developing, implementing, delivering, and sustaining MTM services." Throughout the project period, the project team facilitated the APhA's MTM training, Diabetes training, and CVD training. In summer of 2022, the APhA discontinued the CVD training, and the project team continued to facilitate the MTM and Diabetes trainings.

To facilitate the training three project team members (SDSU College of Pharmacy and Allied Health Professions faculty) and 12 South Dakota pharmacists from collaborating organizations attended "train-the-trainer" trainings from the APhA, where they were certified to administer the three APhA trainings. Having both SDSU faculty and collaborating pharmacists lead the APhA trainings was an intentional design of the project team, with the intent that each APhA training session offered over the course of the project period was led by at least one SDSU faculty and one South Dakota pharmacist. The "train-the-trainer" model was also key for ensuring sustainability, so the APhA certification trainings could be integrated into collaborating organizations onboarding and other training processes following the end of the project period. Trainings were completed in person and the project team offered to cover travel expenses for participants.

Training sessions were delivered specifically to Lewis and Avera pharmacists, respectfully, which were made possible through collaborations with Lewis and Avera leadership teams. Both Lewis and Avera have since expressed desire to continue these trainings beyond the project period, and are currently working on establishing the trainings as part of onboarding processes. Two training sessions were also delivered specifically for SDSU College of Pharmacy and Allied Health Professions students. These trainings were offered to students within one or two years of graduation, as these students were soon to be joining the pharmacy workforce in and beyond South Dakota, positively impacting their own pharmacy practice as well as the practice of the organizations and professionals they will work with.

In total, over the course of the project period, 14 training sessions were held. Overall, 116 individuals received the MTM training, 18 individuals received the CVD training, and 82 individuals received the Diabetes training, for a total of 259 trainings delivered (see Table 13).

Patient Stories Reporting Tool Development and Pilot

Project staff developed an online Patient Stories Reporting Tool (PSRT) using Google Forms. The tool is designed to help pharmacists capture highlights of successful clinical impacts or interventions which greatly improve patient outcomes and quality of life that can be shared with pharmacy staff to implement into routine care. Currently, there are existing systematic ways to collect quantitative data, but no platform for collecting qualitative data related to pharmacist/patient interactions and interventions. Qualitative data can be more effective for capturing key information regarding a patient's healthcare journey, impacts on their quality of life, and the various ways expanded pharmacy services can be key to improving patient health outcomes.

During a testing period from October of 2021 to March of 2023, the PSRT was distributed to pharmacists employed by a rural chain pharmacy working at different practice sites including ambulatory care and community pharmacies. Submissions were organized into a spreadsheet and responses to each PSRT question were reviewed monthly to identify key adherence themes, best practices, and lessons learned, especially for patients with complex treatment plans. During the pilot test, 47 stories were reported. Eight categories of clinical impact were reported, including patient education, formulary/cost effective alternative/therapeutic interchange, synchronization program/medication packaging/medication adherence, disease state improvements, prescriber discussion, MTM, and education interaction/safety. Pilot data from this small group was collected to test the effectiveness of the tool. Data was then distributed to more locations for further data collection.

Three themes emerged from the stories that were reported. These themes highlighted three of the key services that are provided to patients and include general patient education, medication optimization, and cost reduction.

Story 1: General Patient Education

> "This patient has been struggling mostly with her diabetes for several years. She wanted to have bariatric surgery but was told she couldn't have surgery until her A1c was under control. She had been to the emergency room and admitted to the hospital on multiple occasions for high blood sugars, but still couldn't get her diabetes controlled. I worked with her endocrinologist, and we started her on a continuous glucose monitor. I also spent an entire appointment talking about diet. Before this appointment, she didn't understand what a carbohydrate was and how it affected her blood sugars. After working with her for several months, her A1c has gone from 12.8% to 8.1% and she now qualifies for bariatric surgery. She is very excited about the progress she has made and is very motivated to continue working on her health."

Story 2: Medication Optimization

> "The patient had presented to the clinic with an A1c of 13.8% (previously was 14.6% in October of 2020). I provided a recommendation to the doctor to place the patient on empagliflozin/metformin ER 25-1000 mg with directions of "1 tablet by mouth daily". I provided education on diet and lifestyle modifications. I also educated the patient on how

to use a glucometer. I had set him up to share his blood sugars with the clinic using One Touch Reveal. I provided him with a copay card for empagliflozin/metformin which brough this copay down to $10 for a 3-month supply. I followed up periodically with him until his next appointment 3 months later. At his three-month appointment his A1c was 10.3%. I provided the doctor with another recommendation of increasing the patient's empagliflozin/metformin to 25-2000 mg daily and starting semaglutide 3 mg by mouth daily for 1 month then 7 mg by mouth daily. I provided medication education and assisted the patient with a copay card which brought copay down to $10 a month. I followed up with the patient again until his next 3-month appointment. The patient's A1c came back on 09/25/21 at 6.8% (A1c reduction over 6 months of 7%!)"

Story 3: Cost Reduction

"A dad presented 5 min before closing time for an antibiotic just prescribed for his 1-year-old. We processed the prescription for amoxicillin/clavulanate 250mg/62.5mg/5mL suspension and found the copay was going to be $168. After a discussion with the dad, he was willing to pay for this, but I explained that with a phone call to the doctor, we could definitely find something cheaper. By this time, the clinic was closed, but we were able get ahold of the provider by going through the hospital nurse's station. The provider gave us the okay to convert to different strength of amoxicillin/clavulanate with a co-pay of $11. By taking the time to do our due diligence for the patient, we were able to save them over $150 and still provide quality care for the child."

The stories reported via the PSRT highlighted some of the more unique ways pharmacists and MTM can benefit patients. These include several examples of pharmacists working with patients and doing some creative problem solving to provide patient education, find ways for patients to access the best medications for their condition, and finding ways to reduce medication costs for patients. In Story 1, the pharmacist was working with a patient who was struggling to manage her A1C levels despite past recommendations she had received. Working closely with the patient and some creative problem solving allowed the pharmacist determined the patient needed education on what a carbohydrate was in order to make necessary changes to diet. Story 2 provides a useful example of a pharmacist working closely with a patient over many steps, adjusting treatment and providing continuous patient education in order to successfully get the patient's A1C to target levels. And Story 3 provides an example of a pharmacist going out of their way to help reduce costs for a patient. In this example, it may have been the easier option for the pharmacist to use the more expensive treatment option, particularly since the interaction happened at the end of the pharmacist's work day. Despite the patient being willing to pay the greater cost, the pharmacist did the extra work to result in a significant cost savings for this father who was trying to acquire the medications for his young child.

While the patient in this third story has a condition other than diabetes or CVD, this story is a powerful example of the impact the personalized care provided by community pharmacists can have for any type of patient. Community pharmacists provide necessary and important services for patients, and do so by working closely with them, understanding their needs, and using their knowledge, expertise, and genuine care for the patient's well-being, as these stories indicate. Examples of pharmacists working closely with patients with diabetes and CVD to reduce costs

were extremely common in the stories collected with the PSRT. The PSRT is a valuable tool because it provides a platform for these stories to be shared, so that non-pharmacists might understand the impact these pharmacist practitioners have in a patient's healthcare journey.

These patient stories may be particularly impactful in helping payers to understand the value of these pharmacy services. Currently, existing MTM services are structured as a fee-for-service, leading to a quantitative focus on MTM where the primary factors are whether the MTM services were completed. When qualitative information is collected and shared, however, more detailed information on the impact of MTM services is collected, which can lead to greater understanding of the important role MTM can play in a patient's journey. For example, for the patient in Story 1, from a quantitative perspective the patient may have previously received education on necessary diet changes. But without an MTM intervention where the pharmacist identified that the patient needed additional education on what a carbohydrate was, the patient may not have received the education they need to make the changes in diet that led to improved outcomes even though, on paper, the patient had received education. For reasons like this, collecting qualitative information is key to improve understanding of the valuable service pharmacists and MTM can provide, leading to improved patient outcomes. Furthermore, the PSRT also provides a platform for these stories to be shared between pharmacists, so that they might learn from other pharmacists' experiences, leading to a continuous improvement in knowledge and consequently the quality of patient care.

Analysis of Clinical Data from Collaborators

Several provider level metrics that have been collected. Consortium members including Avera Health, Horizon Health Care, and Lewis Drug provided data such as number of providers receiving MTM training, number of MTM's that providers conducted, and reasons the patients are using the

Table 17. Avera Health MTM Patient Data				
Variable	**M, SD**		**Variable**	**N=408; N(%)**
Age	63(14.6)		Female	211(52.1)
No. of MTMs	5.2(6.3)		Male	194(47.9)
2020 Spend	11855(19072)		**BMI>30**	282(69.6)
2022 Spend	21174(37485)		**Diabetes**	329(81.2)
CMSS Risk Score	1.3(1.3)		**COPD**	42(10.4)
Est number of conditions	3.0(3.8)		**Hypertension**	316(78.0)
			CAD	79(19.5)
			CHF	34(8.4)

services. Medication therapy management (MTM) is a distinct service provided by pharmacists that optimize therapeutic outcomes for individual patients. Services often include a comprehensive medication review (CMR), targeted medication review (TMR), and other interventions. Several studies indicate that MTM services provided by community pharmacists improve patient outcomes for chronic conditions, improve adherence, and reduce costs. Despite

the effectiveness, MTM services have not been adequately utilized due to lack of training, inadequate reimbursement, time constraints, and several other factors.

Avera Health

A consortium member, Avera Health System provided us with a dataset of 405 (N=405) unique individuals who received MTM's who were eligible for enrollment in our project. This dataset included basic demographics, MTM visits, payer information, comorbidities related to CVD and diabetes and yearly cost data from 2020 and 2022. The patient population in this dataset is predominantly older with a mean age of 63 and is fairly evenly distributed between males and females with no significant difference in gender (p=.427). Primary payers for patients were Medicare A and B (42%), BCBS South Dakota (10.1%), Avera Health Employees (5.2%), and Avera My Plan (4.7%). The majority in this population are overweight with a large percentage having diabetes and hypertension (See Table 17.).

Figure 3. Comorbidities

Congestive Heart Failure

X^2 (df=1, 122) = 8.86, p=.003

CAD

X^2 (df=1, 122) = 10.46, p=.001

COPD

X^2 (df=1, 122) = 4.42, p=.041

Diabetes

X^2 (df=1, 122) = 4.438, p=.036
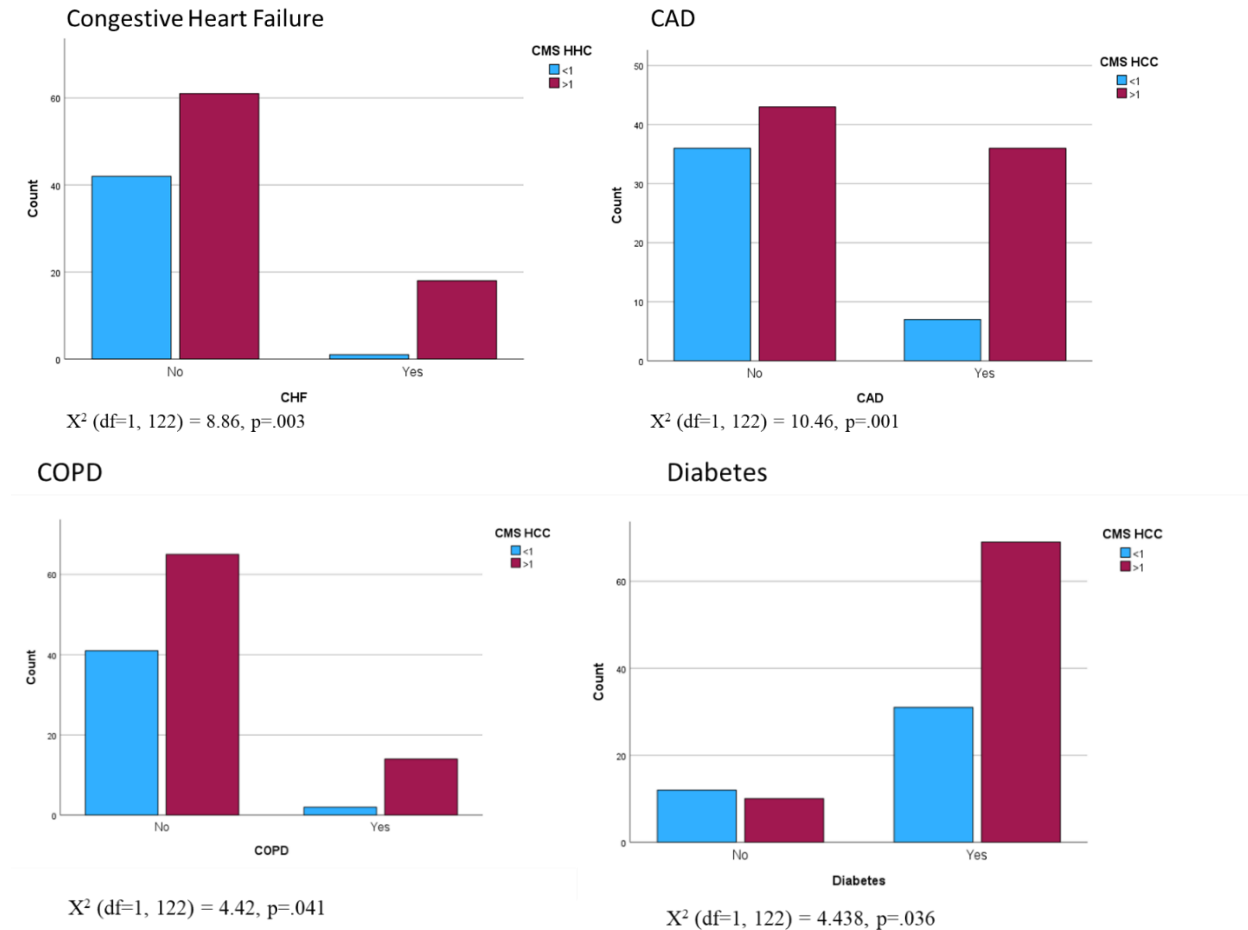
When controlling for extreme outliers in the spend data the number of MTM's an individual had is significantly correlated with a reduction in spending (r= -.133, p<.05) while the participants CMS HHC Risk Score is the most positively correlated with spending (r= .406, p<.01). Within regression models the CMS HHC Risk Score is the most significant predictor of a higher spending, while the only significant comorbidity for increased spending is congestive heart

failure (p<.001) and it is also the rarest comorbidity in the dataset. By adjusting the risk score to a binary variable based on current guidelines of less than 1.0 (healthy) or greater than 1.0 (at risk), the significant impact on risk by comorbidities can be visualized. The significant comorbidities are shown in Figure 3.

While the CMS HHC Risk Analysis is composed of several non-modifiable factors the above graphs show the relationship between comorbidity and risk and the importance that MTM's can play in reducing these comorbidities that ultimately drive the higher risk score and spending, thereby indicating the impact that MTM's can have on improving patient health and experience.

Horizon Health Services

Another consortium member, Horizon Health Services employed a clinical pharmacist, partially funded by the CDC 1815 Grant. This position was created in May of 2021 and clinic performance data was collected through December 2022. This data tracked metrics related to diabetes and cardiovascular disease management. Relevant metrics included BMI screening and follow-up, tobacco screening and cessation intervention, statin therapy for those with cardiovascular disease and concomitant diabetes mellitus, diabetes control (HbA1C <9), and hypertension control (<140/80). Data was collected over 18 months and reported as a mean percentage over time. BMI screening and follow-ups were conducted in 99.6% of visits over time, tobacco screenings were conducted 99.3% of the time, statin use by patients with CVD and DM was reported 89.4% of the time, A1C control at less than 9 was reported almost 60% of the time (59.1%), and 62.4% were identified as maintaining controlled blood pressure throughout 18 months. Data was examined longitudinally using a one-way analysis of variance (ANOVA) with a Tukey's-b correction. BMI screenings were consistent over time with no significant drop in screenings over time (p=.391), tobacco screenings remained consistent over time with a statistically significant

Table 18. Horizon Health System Data Over Time				
Variable	**2019**	**2020**	**2021**	**P Value**
Gender				0.782
Female	47.9(63.7%)	501(63.0%)		
Male	273(36.3%)	294(37.0%)		
HbA1c(M, SD)	7.9(1.9)	8.1(2.0)		0.450
BMI (M, SD)	29.9(9.9)	29.8(9.8)	30.3(9.6)	0.585
Systolic (M, SD)	131.3(16.9)	133.8(18.9)	131.2(16.2)	0.228
Diastolic (M, SD)	76.8(8.7)	77.5(8.8)	77.6(8.9)	0.577
BP >140/88	82)48.2%)	94(53.7%)	154(53.1%)	0.519

decline in screenings noted (p<.001), however the lowest percentage recorded was 95%, meaning this likely represents a non-clinically significant result. There was a 25% reduction from baseline to final follow-up for those patients on statins, however this difference did not reach statistical significance (p=.097). There was a statistically significant increase in the number of patients with controlled A1C<9 (p<.001) with a change of 39.8%. Patients with controlled hypertension remained consistent across time with no significant decline noted (p=.784).

Horizon Health Care provided three years of data from 2019-2021 compiled from 21 different counties related to diabetes and hypertension trends over time to better understand this

comorbidity distribution. There were 2368 (N=2368) unique participants in the dataset over three years however there is limited data available for 2021. Data collected included gender, diabetes status, A1c, systolic and diastolic measurements, and BMI (see Table 18)

There were no significant differences noted among comorbidities over time even amidst the pandemic period.

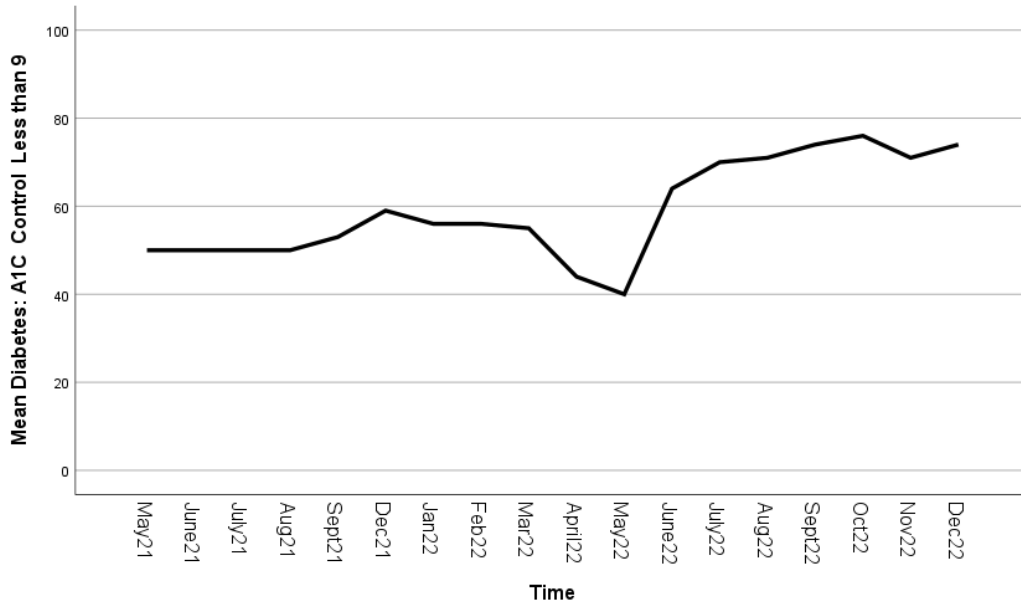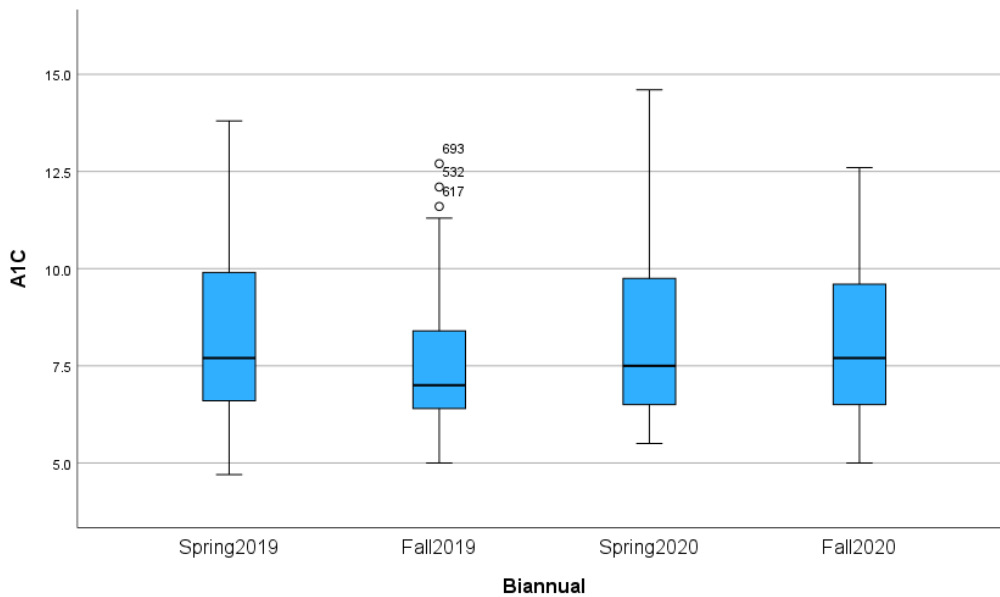**Figure 4. A1C Control Over Time**

Figure 5. HbA1c Over Time

Mean A1c is stable over time however when used as a binary variable of < or > than 8.0, 41.5% of participants have an A1c greater than 8.0.

For BMI if a binary variable is used with a healthy cut-off of <25 than 67.5% of participants have a BMI of overweight or worse. The small sample drawn from these 21 counties exhibited fairly stable measures within comorbidities over time, even throughout the pandemic; however, numbers for A1c, BMI, and those with hypertension were quite high and shows the need for additional interventions related to diabetes or CVD throughout South Dakota.

Figure 6. BMI Over Time
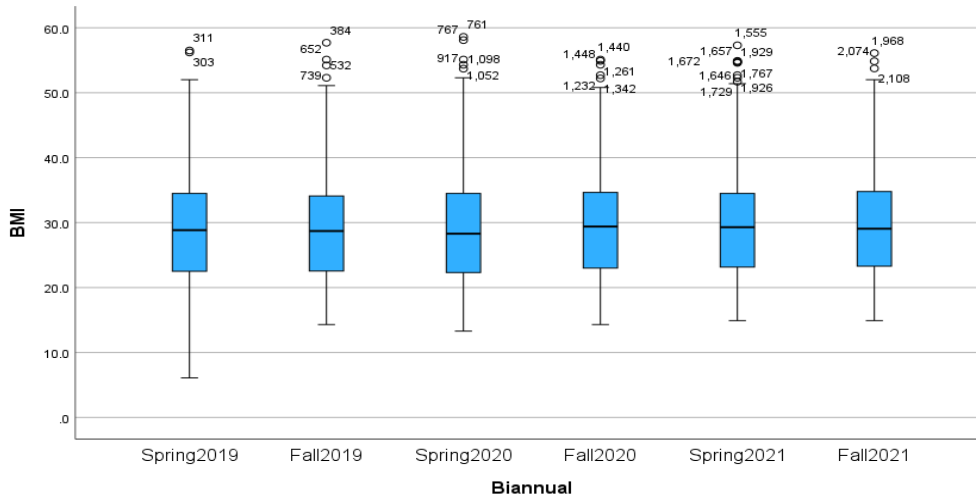
Lewis Drug

APhA Training Impact

One consortium institution involved in this project, Lewis Drug, a community pharmacy chain with 59 stores, partnered with CPIC researchers to train pharmacists through the American Pharmacists Association's (APhA) Delivering Medication Therapy Management Services program. Additionally, they developed an "Operations Center" managed by one fulltime pharmacist with broad oversight across all pharmacy locations who provided MTM education and support to local pharmacists.

The central pharmacist reviewed and assigned high priority tasks from the OutcomesMTM system, which identifies targeted intervention program opportunities (TIPs) to store pharmacists to improve workflow. We compared key OutcomesMTM indicators between pharmacists completing the APhA MTM training to untrained pharmacists over a three-year period. Deidentified data were collected between June 1, 2019 and May, 31, 2022. The data provided information for each intervention completed by each individual pharmacist, which was then compared based on training status. Continuous variables were compared by t-test and categorical variables were compared using Pearson's chi-square test or Fisher's exact test. Descriptive statistics were assessed using 0.05 serving as the a priori significance level.

Overall, 21 of the 127 (19.6%) pharmacists completed the APhA MTM training. During this timeframe, trained pharmacists completed an average of 205.5 interventions compared to 137.6 interventions for untrained pharmacists, which was significantly different ($p < .001$).

Additionally, 67% of the trained pharmacists completed 100 or more interventions compared to only 41% of untrained pharmacists which was significantly higher (p = 0.029). The central pharmacist completed 940 interventions during the timeframe, which was the most of any pharmacist. When comparing the interventions by type, there were no significant differences between groups with patient consultation being the most common (71.7% vs. 72.7%). When comparing CMR completion rates by year for all pharmacists, 2019 had the highest rate with 33.08% compared to 22.94% in 2020 which increased to 30.54% in 2022 through May 31. Overall, between June 2019 and May 2022 there were 18,926 unique interventions completed with patient consultations comprising 72.5% of the visits, followed by patient education (11%), and comprehensive medical review at 9.5%, with 47.6% of consultations being adherence check-ins.

The use of a central pharmacist and APhA MTM training showed potential to increase the number of completed interventions and effectiveness of delivering MTM services. This may have resulted from increased confidence and improved knowledge, skills, and abilities pharmacists gained through the APhA training. Additionally, the central pharmacist enhanced workflow through the coordination and support offered to local pharmacists. This model could be modified for a variety of practice settings. The CMR completion rate was low and may have been impacted by the COVID-19 pandemic or other factors. Future research should focus on identifying approaches to increase completion rates.

Medication Synchronization and Medication Adherence Packaging Programs
Project collaborator Lewis Drug provided contact information for 275 (N=275) patients that were eligible for MTM services across 31 pharmacy locations. Within the 31 locations there were eight Lewis stores that were considered intervention sites with these eight equally split between urban and rural locations. Intervention sites used increased awareness and other targeted approaches to increase MTM usage. Of the 275 patients eligible for services, 160 were successfully contacted, with 73 agreeing to enroll in MTM services and 87 declining services. Of the 73 patients recruited, 45 were from rural pharmacies and 28 from urban pharmacies.

The primary objective for the patient level data was to evaluate patient adherence over time using the PDC ACE/ARB measure as well as changes in the Pioneer Risk Score. Patients at baseline had an initial high level of adherence and this was successfully maintained over twelve months with no significant reduction noted in adherence metrics. The Pioneer Risk Score was successfully reduced by over four points from baseline to twelve months (p=.035). Overall, of the 73 patients initially recruited there was an 82.2% retention rate in MTM services at twelve months (see Table 19).

Table 19. pDC ACE/ARB and Pioneer Risk Score Over Time						
	Baseline	3 Months	6 Months	9 Months	12 Months	P Value BL-12M
PDC ACE/ARB	93.6	93.3	91.4	92.9	93.1	0.943
Pioneer Risk Score	82.62				78.5	**0.035**

In addition to patient level metrics for MTM utilization, statewide data was obtained from collaborator Lewis Drug for 31 locations with eight Lewis stores considered intervention sites,

evenly split between urban and rural locations. Intervention sites used increased awareness and other targeted approaches to increase MTM services throughout the state. This data was longitudinal in nature and spanned December 2018 to July 2022 (see Figure 7).

Figure 7. Differences in Urban and Rural Intervention or Non-Intervention Sites

Differences in Urban and Rural Intervention or Non-Intervention Sites

No significant difference between urban or rural intervention sites over time p=.115 Significant difference over time between Intervention and Non-Intervention sites p<.001

Intervention Sites
- Rural Non-Intervention
- Rural Intervention
- Urban Non-Intervention
- Urban Intervention
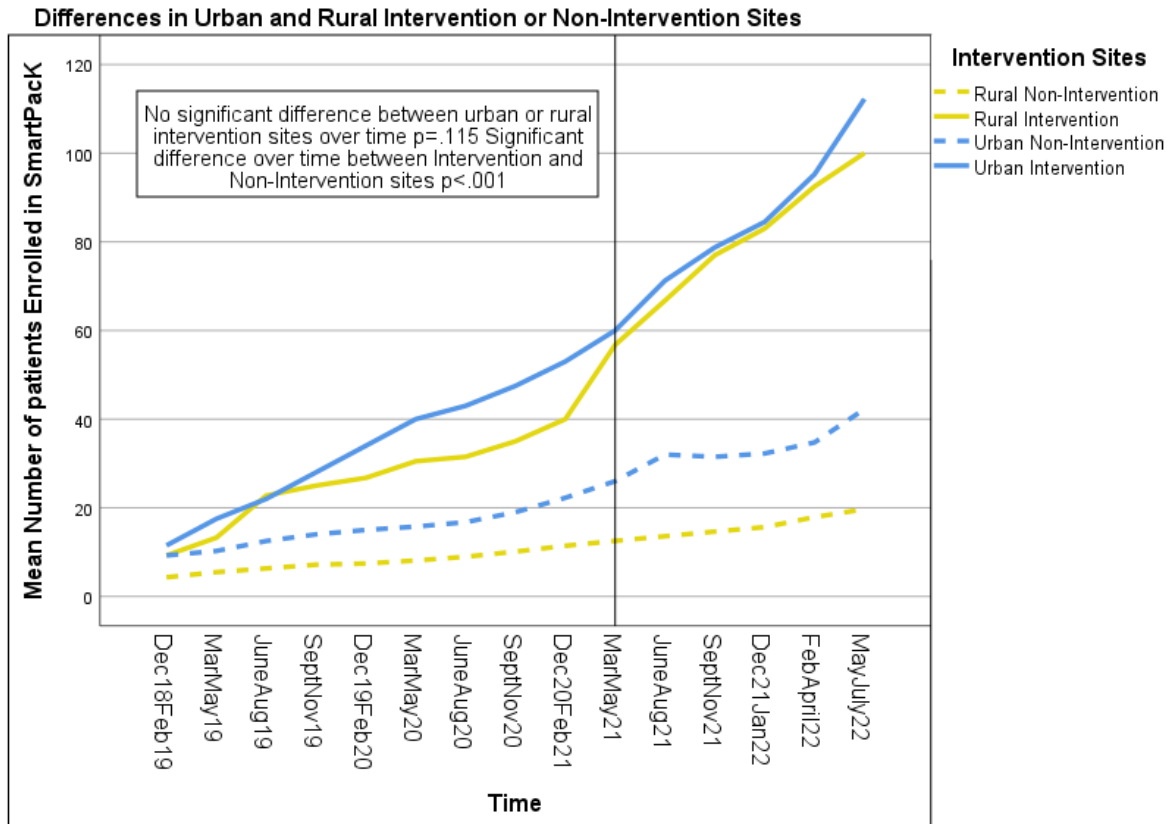
There was a significant change noted in MTM enrollments after the intervention in March 2021 (p<.001). This change was independent of rural/urban status.

Enrolled Patient Survey Data

Table 14. Enrolled Patient Demographics	
Variable	N=73 (100 %)

Starting in May of 2021 patients that were enrolled in and receiving MTM services were invited to participate in a longitudinal study designed to assess patient satisfaction with services, medication adherence, and quality of life. Patients completed a comprehensive 46-item survey that also collected data related to demographics such as age, gender, race, income, insurance status, urban vs rural status, and health related factors such as smoking and exercise. Patients completed a baseline questionnaire either by mail or online and then would receive the same follow-up questionnaire at six months.

The primary outcomes evaluated in these surveys include the Adherence to Refills and Medication Scales (ARMS), a modified Patient Satisfaction with Medication Management Program (MMP) scale, and the SF-12 quality of life scale. The ARMS survey is a reliable and validated 12-item scale typically used within a patient population with chronic disease. Scores on the ARMS can range from 12-48 with a higher score indicating stronger medication adherence. The modified MMP scale is a 9-item scale with a possible score from 9-36 with a higher score indicating a higher level of patient satisfaction. The SF-12 is a reliable and validated instrument designed to assess eight domains of physical and mental health with scores divided into physical component summary scores (PCS) and mental component summary scores (MCS). The SF-12 is a 12-item survey with a possible score ranging from 0-100 with a higher score indicating a higher level of physical function and mental/emotional stability.

Age M(SD)	59.1 (11.3)	Smoking	
Gender		No	57 (82.6)
Male	36 (49.3)	Yes	12 (17.4)
Female	34 (46.6)	Alcohol Intake	
Race		None	24 (33.8)
White	36 (49.3)	1 or 2	19 (26.8)
Other	34 (46.6)	3 or 4	10 (14.1)
Education Level*		> 5 drinks	18 (25.4)
Did not graduate HS	3 (8.8)	Caffeine	
HS graduate or GED	21 (61.8)	Never	4 (5.7)
2-year degree	3 (8.8)	Monthly or less	4 (5.7)
4-year degree	4 (11.8)	2-4 times per month	7 (10.0)
Graduate degree	3 (8.8)	2-3 times per week	9 (12.9)
Household Income		4 or more times per week	46 (65.7)
< 20,000 per year	8 (11.4)	Days of physical activity/week	
> 20,000 per year	62 (88.6)	< 3 days	43 (61.4)
Population of city/town		> 3 days	27 (38.6)
< 20,000 people	67 (97.1)	Specific targeted exercise/week	
> 20,000 people	2 (2.9)	< 3 days	54 (77.1)
Insurance		> 3 days	16 (22.9)
Private insurance	25 (41.7)	*Early respondents did not receive this question	
Other/Govt	35 (58.3)		

The primary evaluation of the three major outcomes consisted of either Student's T-test or Mann-Whitney U test for non-parametric variables. Demographic variables are displayed in Table 14.

Participants in this survey displayed high baseline scores in all three measures to include the ARMS, MMP, and SF-12. Patients at the six-month follow-up continued to maintain strong scores in all metrics with improvement noted in both the ARMS, MMP, and SF-12 MCS scores, however the improvements were non-significant. Six-month results indicate despite some clinical comorbidity that patients have a strong satisfaction with their pharmacy care and service and have a positive outlook for both their physical and mental health within one standard deviation of the population norm (see Table 15).

Table 15. ARMS, MMP, and SF-12 Data

Variable	Baseline (N=73)	6 months (N=26)	P Value
ARMS	43.3 (3.8)	43.7 (3.3)	0.620
MMP	29.6 (4.5)	30.8 (3.9)	0.236
SF-12			
PCS	41.6 (10.7)	40.6 (9.8)	0.670
MCS	46.7 (10.40	46.9 (10.3)	0.908

A subset of patients (n=35) from one consortium institution were also asked about their experiences with the SmartPack/SmartSync program. When asked about confidence related to correctly taking medications following enrollment in the SmartPack program, 11 respondents at the 6-month time frame rated their confidence as 'much more confident' versus only 4 at baseline (p=.010). Those indicating 'more confident' or 'no change' remained consistent with no difference noted or worse outcomes reported.

When asked about enrollment in the SmartPack program reducing the need for additional services, long-term care, or hospitalization 6 respondents at 6 months answered 'strongly agree' vs. 3 at baseline, however this was not a statistically significant difference.

When asked how easy it was to utilize the SmartPack service there was a significant improvement in patient responses. At 6 months 78% of respondents indicated using the SmartPack service was 'very easy' compared to only 45% at baseline $X^2(2,45) =7.17$, p=.028, v=.339 indicating patients became more comfortable with SmartPack use.

Enrolled Patient Clinical Data

Collaboration with partners including Avera Health System, Lewis Drug, Haisch Pharmacy, and Horizon Health Home offered patients the opportunity to enroll in a longitudinal project that collected specific clinical markers to include HbA1c, blood pressure readings, cholesterol, BMI, and glucose. There were a total of 71 participants that were tracked from baseline enrollment date to approximately 12 months post-enrollment (mean time 12.2 months, SD=2.5). Results are included in Table 16. Data included is from collaborators including Avera Health, Horizon Healthcare, and Lewis Drug.

TABLE 16. CLINICAL DATA OVER TIME (N=71)

VARIABLE	Demographics	Pre-Baseline (M=10.9M, SD=3.0)	Baseline	6 Months	12 Months (M=12.2M, SD=2.5)	P Value Baseline-12M's
AGE AT BASELINE (M, SD)	61.2(7.9)					
GENDER						
MALE	33(46.5%)					
FEMALE	38(53.5)					
RACE						
WHITE	59(83.1%)					
OTHER/ UNKNOWN	12 (16.9)					
HBA1C		7.0(SD=1.1)	7.4(SD=2.5)	7.0(SD=.89)	7.1(SD=1.3)	0.482
HBA1C < OR >8.0						
<8.0		52(82.5%)	42(67.7%)	53(82.1%)	50(80.6%)	0.045
>8.0		11(17.5%)	20(32.3%)	10(17.9%)	12(19.4%)	
SYSTOLIC BP		127.6(SD=16.9)	122.9(SD=26.7)	129.2(21.2)	129.7(SD=14.4)	0.176
DIOSTOLIC BP		76.2(SD=11.9)	74.9(SD=10.9)	77.4(SD=10.6)	77.3(SD=10.3)	0.148
BLOOD PRESSURE 140						
<140/88		33(52.4%)	32(53.3%)	39(68.4%)	44(70.9%)	0.014
>140/88		30(47.6%)	28(46.9%)	18(31.6%)	18(29.1%)	
BMI		35.2(SD=8.4)	33.1(SD=12.3)	36.8(SD=12.8)	35.6(SD=11.3)	0.388
CHOLESTEROL		169.7(SD=65.7)	142.3(SD=22.2)	153.1(SD=11.4)	156.2(SD=16.2)	0.001
GLUCOSE		127.9(SD=49.7)	135.6(SD=69.5)	145.2(SD=44.0)	125.5(SD=5.0)	0.585

There was not a statistically significant difference between baseline and 12-month A1c values using the non-parametric Mann-Whitney U test for paired samples (p=.482). When stratifying mean A1c values by those having an A1c higher or lower than a cutoff of 8.0 there is a significant difference between baseline and 12 months post enrollment X^2(1, N = 61) = 4.24, p = .045, with participants more likely to have an A1C <8.0 versus those at baseline. Between baseline and 12 months post-enrollment 8 patients improved their A1c below the 8.0 threshold (OR=3.87). There was no statistically significant difference between clinical factors systolic or diastolic blood pressure, BMI, or Glucose. When stratifying participants as having a blood pressure greater or less than 140/80 there was a significant difference between baseline and 12 months X^2 (1, N = 55) = 5.78, p = .014, with participants more likely to have a blood pressure

value below 140/88 at 12 months (OR=4.40). There was a statistically significant difference between cholesterol levels from baseline to 12 months, however, at 12 months post-enrollment the levels are still within the normal range for both males and females 20 years and older (125 to 200).

Economic impact of improving HbA1c and Hypertension

With just this small sample size it is evident the value that can be achieved by utilizing tools available such as medication therapy management (MTM) on patient outcomes. In addition to the clinical benefit for patients, there are economic benefits as well. In this sample we saw that eight patients were able to lower their HbA1c by approximately 4.1% which is a greater improvement than we noted with the preliminary data at 6 months (3.7%). With a 4.1% decrease in A1c patients can realize a significant cost savings: studies have indicated that a change of just 1% in A1c was associated with a 2% reduction in all-cause total health care costs and a 13% reduction in diabetes-related total healthcare costs. These reductions resulted in annual cost savings of $429 and $736, respectively. For patients with an index A1c ≥7%, a 1% reduction in A1c was associated with a 1.7% reduction in all-cause total healthcare costs and a 6.9% reduction in diabetes-related healthcare costs, with associated annual cost savings of $545 and $555, respectively. The analyses also found that having an index HbA1c <7% compared to HbA1c ≥7% or having an index HbA1c ≥7% and subsequently reducing HbA1c to below 7%, was associated with significant cost reductions.[16] In a similar study using two unique, but similar economic models, the investigators calculated that for patients with just a 1% reduction from A1c's >10% to 9% would realize a cost saving of $1374.00, 9% to 8% at 1303.00, 8% to 7% at 373.00.[17] Within our sample, from baseline to follow-up, we had six patients that reduced to 9% with a potential cost savings of $8,244.00, three patients reduced from 9% to 8% with one patient reducing 2.5% for an overall cost savings of $4,596.00, and 17 participants reduced to 7% for a total of $6,341.00 for a total potential healthcare savings of $19,181.00. While patients enrolled in this longitudinal project are at a minimum maintaining if not improving in all metrics there is insufficient data at the current time points for more intensive evaluation such as quality of life years adjusted (QALY's) or incremental cost-effectiveness ratios (ICER's).

The prevalence of hypertension in the United States has reached almost 35% of adults with medical expenditures for those with hypertension estimated at $2,565.00 and almost double that if there is a concomitant diabetes diagnosis ($4,434.00). Within this project sample, 25.4% were hypertensive at the conclusion of the study. However, we saw a positive reduction for those that fell below the 140/80 threshold with 8 patients who had been hypertensive at baseline. For these eight patients there is the potential to reduce hypertensive related medical costs for a total of $20,250.00.

Development of Three Webinars

During the landscape analysis, a consistent theme across all three interest groups was a desire for more education on the services that pharmacists can offer. In response to this desire, the project team began work on a variety of projects to increase knowledge and awareness regarding

expanded pharmacy services in South Dakota. The "Your Pharmacist Knows" campaign was key to this, as was the work completed directly with collaborating practitioners and payers. In addition to these efforts, the project team, working closely with a panel of experts, developed three webinars to provide more education and information on expanded pharmacy services. These webinars were titled "The Role of the Pharmacist in the Healthcare Team," "Health Home and Pharmacists: A Discussion," and "Medication Therapy Management Services – Opportunities to Collaborate."

The first webinar, "The Role of the Pharmacist in the Healthcare Team," was led by project team members Dr. Alex Middendorf, Dr. Deidra Van Gilder, and Dr. Erin Miller. The first goal of the webinar was to explain the type of training that pharmacists undergo to increase understanding of the qualifications and capabilities pharmacists have and the key role that they can play in patient care. The second goal was to describe previous examples of collaborations between pharmacists and other healthcare professionals. The target audience for the webinar was South Dakota practitioners, though anyone was welcome to attend.

The second webinar, "Health Home and Pharmacists: A Discussion," was led by both members of the project team and an expert panel, including Dr. Erin Miller, Dr. Deidra Van Gilder, Dr. Joshua Ohrtman, Dr. Jeremy Daniel, and Ms. Kelsey Raml. The goal of the webinar was to provide education on the key role pharmacists and expanded pharmacy services can have on patient care outcomes in the setting of a Medicaid Health Home. Topics covered included medication therapy management (MTM), collaborative practice agreements (CPAs). A second goal of the webinar was for a conversation to take place. Questions were asked to panel members, then questions were also asked to webinar attendees. Examples of questions asked include "In your profession, how do you interact with pharmacists?" "What do you feel the role of the pharmacist is in providing patient care?" and "How do you think you could incorporate pharmacists into patient care?" The target audience for the webinar was South Dakota practitioner, particular ones who work at or alongside Medicaid health homes, though anyone was welcome to attend.

The third webinar, "Medication Therapy Management – Opportunities to Collaborate," was led by project team members Dr. Alex Middendorf, Dr. Deidra Van Gilder, and Dr. Erin Miller. This webinar covered similar topics to the first webinar, but engaged in more details. The first goal of this webinar was to describe key considerations for pharmacist provision of MTM at a practice site. The second goal was to compare and contrast the existing MTM opportunities available for pharmacists in South Dakota. Topics covered included a more detailed discussion of MTM, the different stakeholders in MTM, comprehensive medication reviews (CMRs) and targeted medication reviews (TMRs), drug therapy problems, among others. The target audience for the webinar was South Dakota practitioners, though anyone was welcome to attend.

Each of the webinars were advertised via email, flyers, and other outreach efforts between pharmacists and with collaborators. Attendance for each webinar was strong. For the first webinar, 71 individuals registered and 51 attended, and represented a variety of professions including pharmacy, medical center leadership, nursing, social work, dentistry, diabetes care, and research, among others. The second webinar was attended by 21 individuals (demographics including profession were not collected as this webinar was hosted by a health home). The third

and final webinar had 41 registrants and 19 attendees, representing professions including pharmacy, health center leadership, nursing, nutrition, and diabetes care, among others. For those who registered but were unable to attend, recordings from the webinars and the presentation slides were made publicly available on the South Dakota Department of Health website. Both the recordings and the slides remain publicly available on the DOH website and via the TRAIN platform, free for anyone to access:
https://doh.sd.gov/diseases/chronic/heartdisease/MTM.aspx

Year 4 Interviews with Practitioners from Horizon Health Care and Avera Health Results

Two focus groups were conducted during the course of the project: one with practitioners from Horizon Health Care and one with practitioners from Avera Health. The goal of these focus groups was to ask collaborating South Dakota practitioners about the benefits of the added MTM services to their work processes and to understand how these services aligned with the overall goals project. Participants were recruited utilizing existing connections established through collaboration throughout the project period. The findings of these focus groups included five main themes: improved workflow processes for staff, improved patient education, improved patient compliance, improved provider support for medication prescribing, and improved provider support for side effect concerns.

Improved workflow processes for staff: In general, participant responses indicated that the integration of a pharmacist within the healthcare team led to work getting done faster and more smoothly. One participant stated that, "If a patient didn't know their med list, a lot of times the nurse would have to call the pharmacy to get the med list, and now the nurse can just ask the pharmacist… we don't have to wait for a fax, you know, with the med list. So it seems like we can get things done a little faster." Another participant explained that the pharmacist's presence not only saves them time, but that the feeling of being less rushed led to improved patient education: "I did have one patient that needed, that she (the pharmacist) did a CGM for, and it just really saved me a lot of time, because I could see the next while she probably did a more thorough job explaining it, because she wasn't worried about being late for her next patient." In addition to saving time, the integration of pharmacists into the healthcare team also led to new gaps being filled: "there's a nurse shortage in South Dakota right now, and we need to fill that gap somehow. And I think that could really take a big load off of nurses."

Improved patient education: More participants spoke to how having a pharmacist as part of the healthcare team leads to improved patient education. Time saving was one major reason noted for this. As one participant noted: "it takes a lot of time out of the day for a provider to sit down and teach somebody how to check the blood sugars, plus start them on the medications and do all the lab work in that short amount of time. So having her (the pharmacists) here and just like immediately being able to provide that education has been huge." The pharmacist's more focused knowledge-base expertise was another reason participants noted that patient education had improved: "it's very nice to have all these specialty providers come in, pharmacy obviously being one of them now." Participants also noted that improved patient education through the

pharmacist's more integrated involvement has positively impacted patients in a number of ways: "My patients are happier because they get more attention. They get more education. They have a better relationship at the pharmacy."

Improved patient understanding and compliance: Improved patient education consequently results in improved patient understanding and compliance, which was another theme identified through practitioner interviews. "For me, essentially getting patients to comply better and then have them know what the, what medications they're on and what they're for… [The pharmacist] helps us with that… it just makes it easier." Participants also noted a general increase in compliance, which they attributed to expanded pharmacy services. One participant recognized that, for one patient in particular, working with a healthcare team that included a pharmacist resulted in the patient having more confidence in managing their health: "I almost feel like it's almost just her confidence in herself. Like she knows she can get the answers from here or the pharmacy, so she's not so quick to run to the ER." As a result of working with pharmacists, practitioners observed an increase in patients understanding their conditions and the types of care that they need.

Improved provider support for medication prescribing and improved provider support for side effect concerns: The expertise that pharmacists bring when integrated into the healthcare team was one key benefit observed by participants. Participants explained an increase in confidence when it came to prescribing medication as they could more easily consult the pharmacists on-staff. One participant gave the example of needing to prescribe a patient antibiotics for an abnormal condition that was outside their realm of expertise: "I don't really feel comfortable prescribing this medicine." In this scenario, the participant explained they could consult their pharmacist's knowledge of medications to prescribe the patient the right medication. Similarly, participants also noted that the integration of a pharmacist in the healthcare team led to feeling more supported when working with medications and patient's side effect concerns. In general, participants observed an overall positive impact of having a pharmacist as part of the healthcare team as they bring an expertise that reduces knowledge burden and makes other practitioners more confident in recommending care, particularly medications, to patients.

Patient and Practitioner Testimonials

Following up on the awareness campaign, three patient and practitioner testimonials were completed to assess whether themes to tackle from our awareness campaign could be identified. These testimonials were completed as patient and pharmacist pair sit-down interviews. Key quotations from the interviews are included in Table 20.

Table 20. Patient and Practitioner Testimonials	
Patients	
Medication Therapy Management & Medication Therapy Review	"I have learned through this project how important it is to be able to talk to somebody who knows about the drugs you are taking and can help you through dosages and side effects…"

Immunizations	"I take my flu shots here. My boosters were the COVID boosters. I've taken the year to. Both of us have. My wife and I also have done that."
Patient Care and Education	"I could call her anytime I needed to ask a question about medicine or about dosages or if I were having too many highs or too many lows, because with diabetes, you're gonna have them both. And it's really hard to get everything regulated at about the time you think you do, you don't. So it's really nice to have somebody that I can call and talk to and she can help me through that."
Cost Lowering Measures	"She has been a liaison between me and the companies I am trying to work with through Dexcom or Omnipod" when asked how the phone conversations with her (the patient) and the pharmacist went in relation to trying to lower her cost of insulin
Adherence tools	And so the pharmacist here recommended that I go on a bubble pack and it was organized and I did. That made a huge difference in how I managed the medicines that I take each time. So I really appreciate it and what they what they did there.
	Practitioners
Medication Therapy Management & Medication Therapy Review	"With my comprehensive medication reviews, I have had many patients state how surprised they are at what they learn, and they were just so thankful for the knowledge I shared."
Immunizations	"And then there's thing like people come in a they're still surprised that we can give vaccines. They had no idea, you known, that I can just walk in and ask for a flu vaccine from a pharmacist, and that's okay. And now we're providing vaccines for pretty much anything you can imagine, and I think that's really important. It just makes it easier for people to get vaccinated and stay up to date and stay healthy."
Patient Care and Education	"The partnership with SDSU has helped us in the fact that there have been educational sessions and educational programs I can go to to enhance our knowledge, to enhance our ability to go out with that information to patients"
Adherence tools	"Our goal is just to continue increasing our number of patients on smart sync and also the number of patients on smart pack, as well as spending more time counseling patients and sitting down one on one with them."

Dissemination of Work

Title	Type	Link
Impact of a public health awareness campaign on patients' perceptions of expanded pharmacy services in South Dakota using the Theory of Planned Behavior	Abstract	Link

The Role of the Pharmacist in the Healthcare Team	Webinar	Link
Pharmacists and Health Home: A Discussion	Webinar	Link
Medication Therapy Management Services: Opportunities to Collaborate	Webinar	Link
The Role of Pharmacists in Cardiovascular Disease Prevention and Management at the 2022 Cardiovascular Collaborative Mid-Year Meeting	Webinar	Available upon Request
Impact of a Targeted Approach to Recruiting Patients into Medication Synchronization and Medication Adherence Packaging Programs	Poster	Link
Comparing Practitioner Perspectives in Rural versus Urban Settings, Encore Presentation	Poster	Link
Pharmacists: The most Accessible, yet Underutilized Healthcare Practitioners in South Dakota	Poster	Available upon Request
Improving the Health of South Dakotans through the Prevention and Management of Diabetes and Cardiovascular Disease: Practitioners' Perceptions of Barriers to Care of American Indians	Poster	Link
Development and Evaluation of a Qualitative Documentation Tool to Share High Impact Patient Interventions Through the Lens of Community Pharmacists in South Dakota	Poster	Link
Accessing the Impact of an Educational Campaign on Patient Awareness and Perceptions of Expanded Pharmacy Services in South Dakota, Encore Presentation	Poster	Available upon Request
Improving the Health of South Dakotans through the Prevention and Management of Diabetes & Cardiovascular Disease (CVD): A Landscape Analysis-The Patient Journey	Poster	Link
Improving Health Care for South Dakotans with Diabetes and Cardiovascular Diseases: Practitioner's Outlook	Poster	Link
Improving Awareness of Enhanced Pharmacy Services Among South Dakotans with Diabetes and Cardiovascular Disease: A Quality Improvement Innovation Project	Poster	Link
Improving the Health of South Dakotans through the Prevention and Management of Diabetes and Cardiovascular Disease: A Landscape Analysis - The Payer Perspective	Poster	Link
Why Rural Health? The Need for Pharmacy Transformation and Innovation in Rural America	Poster	Link

Assessing the Impact of a Central Pharmacist Coordinator and Medication Therapy Management Training on Patient Interventions Across a Midwest Community Pharmacy Chain	Poster	Link
Development and Evaluation of a Qualitative Documentation Tool to Share High Impact Patient Interventions Through the Lens of Community Pharmacists in South Dakota	Paper[2]	N/A
Practitioners' Perceptions of Barriers to Care of American Indians with Chronic Conditions	Paper[1]	N/A
Improving the Health of South Dakotans through the Prevention and Management of Diabetes and Cardiovascular Disease: A Landscape Analysis – The Payer Perspective	Paper[2]	N/A
Impact of a Public Health Awareness Campaign on Patients' Perceptions of Expanded Pharmacy Services in South Dakota Using the Theory of Planned Behavior	Paper	Link
Improving Health Care for South Dakotans with Diabetes and Cardiovascular Disease: Provider's Outlook	Paper[2]	N/A
Comparing Pharmacist Perspectives of Pharmacy Services in Rural versus Urban Settings	Paper[2]	N/A
Lessons Learned from The 1815 Project	Paper[1]	N/A
Qualitative Analysis of Year 4 Practitioner Interviews	Paper[1]	N/A
Clinical Data from Avera Health	Paper[1]	N/A
Clinical Data from Horizon Health Care	Paper[1]	N/A
Clinical Data from Lewis Drug	Paper[1]	N/A
Patient Satisfaction and Relationship to Medication Adherence	Paper[1]	N/A
South Dakota State University Investigators Look to Expand the Role of Community Pharmacists	Newsletter Article	Link
Identifying Needs to Improve the Care of South Dakotans with Diabetes, Heart Disease, and Stroke through CDC-1815: Year One	News Article	Link
Identifying Needs to Improve the Care of South Dakotans with Diabetes, Heart Disease, and Stroke through CDC-1815: Year Two	News Article	Link
Identifying Needs to Improve the Care of South Dakotans with Diabetes, Heart Disease, and Stroke through CDC-1815: Year Three	News Article	Link
Identifying Needs to Improve the Care of South Dakotans with Diabetes, Heart Disease, and Stroke through CDC-1815: Year Four	News Article	Link
Community Practice Innovation Center Team's Manuscript Featured in Pharmacy Times	News Article	Link
Improving Management of Chronic Diseases in Rural Areas Begins with Maximizing Community Pharmacy Services	News Article	Link

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