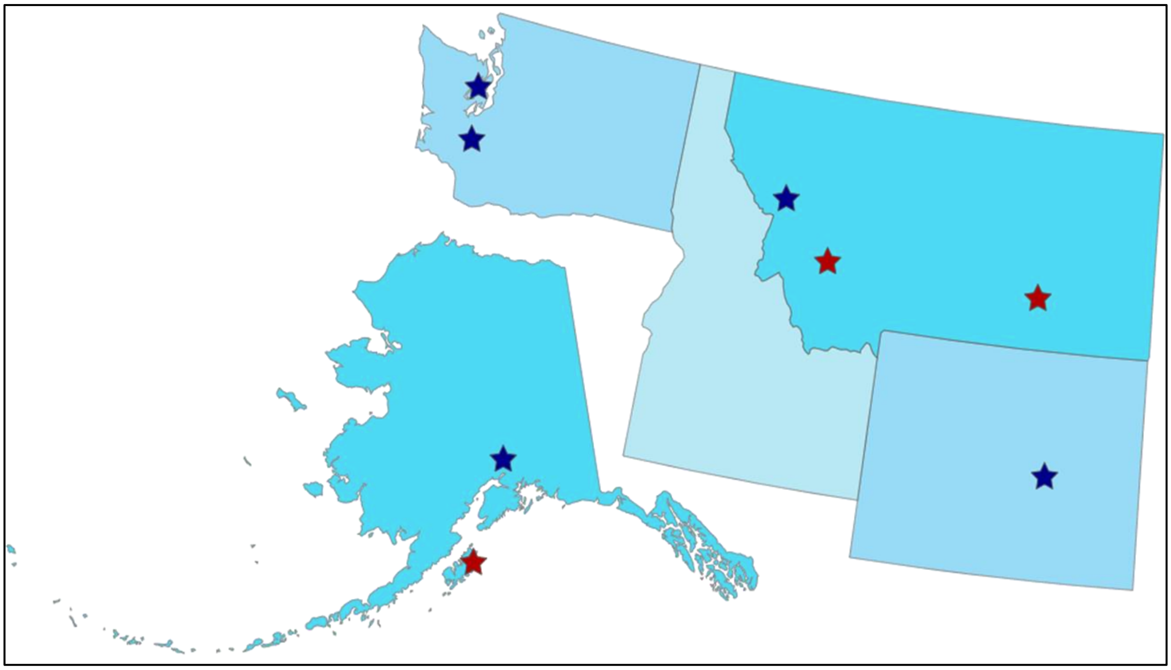
FINAL REPORT - Amended



Social Innovation Fund
Healthy Futures / IMPACT Expansion

Subgrantee Evaluation

June 2013 – June 2017

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Grantee Name
John A. Hartford Foundation (JAHF)

Subgrantee Name(s)
Cohort I (Awarded May 2013)
Mat-Su Health Services, Wasilla, AK
Partnership Health Center, Missoula, MT
Community Health Center of Central Wyoming (CHCCW), Casper, WY
Peninsula Community Health Services, Port Orchard, WA
Valley View Health Center, Chehalis, WA
Cohort 2 (Awarded May 2014)
Kodiak Area Native Assoc (KANA), Kodiak, AK
Bighorn Valley Health Center (BVHC), Hardin, MT
Southwest Montana Community Health Center (SWMCHC), Butte, MT

Evaluation Contractor
University of Washington AIMS (Advancing Integrated Mental Health Solutions) Center

Program Name
Healthy Futures/IMPACT Expansion

Program Synopsis

Through the Social Innovation Fund (SIF) initiative, the John A. Hartford Foundation (JAHF) is promoting expansion of the IMPACT model of depression treatment to improve care in medically underserved rural communities in the Washington, Wyoming, Alaska, Montana and Idaho (WWAMI) region. ***IMPACT*** is the name of the largest research trial demonstrating effectiveness of the ***Collaborative Care*** model and these two ***terms are used interchangeably***. Collaborative Care is an approach to treating depression in primary care settings that is based on the Wagner Chronic Care model. Collaborative Care supports primary care providers (PCP) treating depression with a clinic-based care manager and a designated psychiatric consultant who use a measurement-based, treat-to-target approach for the population of patients needing care. The long-term effects for participating subgrantee clinics implementing IMPACT will be increased access to effective, evidence-based depression treatment and improved social and economic functioning among participating patients. The AIMS (Advancing Integrated Mental Health Solutions) Center at the University of Washington (http://aims.uw.edu/) provided the training and support to participating clinics to help them plan, launch and sustain IMPACT, in addition to evaluating effectiveness of the program.

Prior Research

More than 80 randomized controlled research trials have established a robust evidence base for Collaborative Care.[1-5] The IMPACT study was one of these trials.[6] Patients receiving Collaborative Care were more than twice as likely as those in usual care to experience a substantial improvement in their depression over 12 months. They also had less physical pain,[7] better social and physical functioning,[8] and better overall quality of life[9] than patients in care as usual. The IMPACT trial, which included more than 1,800 patients from 18 primary care clinics in five states, generated over 50 peer-reviewed research publications. The target population of the IMPACT trial was older adults while this implementation initiative served adults of all ages and a small number of teens.

Level of Evidence

Collaborative Care has an extensive existing evidence base[1-9] with diverse populations[10-12] and settings.[13] Therefore, the SIF expansion of IMPACT to low-income rural communities does not focus on establishing the efficacy of IMPACT compared to care as usual. The evaluation seeks to identify whether implementation in non-profit rural community health clinics participating in SIF will result in depression improvements that are similar to benchmarks established in published studies.[14-15] It also examines variations in the quality and effectiveness of clinic-level implementation and explores effects on use of health care services and social and economic functioning among participating patients. This evidence is important since it addresses key factors in scaling the program to new populations, especially low-income and underserved communities, and adds to the substantial body of research on Collaborative Care. This SIF evaluation targets a preliminary level of evidence.

Implementation and Evaluation Design

The John A. Hartford Foundation contracted with the AIMS Center to provide training and support to participating subgrantee clinics to help them plan, launch and sustain Collaborative Care. Implementation support was provided through a variety of means, including onsite coaching, in-person training, webinars, conference calls, and a website designed specifically for this initiative (http://uwaims.org/sif). The AIMS Center also conducted an evaluation of the IMPACT implementation in subgrantee organizations, including clinical processes of care, patient outcomes and economic effects of the program. The AIMS Center's training and implementation support team was a different group of faculty and staff than those who led evaluation of the program. Training was led by Dr. Anna Ratzliff, MD, PhD, in her role as the AIMS Center's Associate Director for Education. Implementation support and technical assistance was led by Diane Powers, MA, MBA in her role as the AIMS Center's Associate Director for Translation & Implementation. Evaluation was led by Dr. Jürgen Unützer, MD, MPH, MA, an internationally recognized mental health services researcher Director of the AIMS Center, in partnership with Melinda Vredevoogd, MS who was the AIMS Center's Assistant Director for Research and Evaluation. These three units functioned independently but cooperatively to achieve the initiative's goals. (*Note: Listed roles reflect the positions these people occupied during the SIF expansion of IMPACT not their current roles.*)

Evaluation Questions

This evaluation seeks to answer five confirmatory questions on program impact and one exploratory question. In addition, the evaluation examines implementation process questions. The primary outcome is the effect of IMPACT implementation on patient-level depression response and remission among enrolled patients, how this compares with published research trials and real-world implementations, and predictors of depression improvement. Secondary outcomes include patient-level effects on social functioning, occupational functioning, use of depression care, and satisfaction with depression care. Exploratory outcomes include effects on patient's healthcare utilization. Clinic-level implementation outcomes include how well clinics implement practice change, the effect of this on evidence-based processes of care, and provider satisfaction with Collaborative Care.

Measures and Instruments

The AIMS Center used a variety of measures to evaluate program effectiveness. These included data captured from a web-based patient registry used by providers as part of routine clinical care delivery, quantitative and qualitative surveys with clinic leadership, a quantitative survey of clinicians, quantitative surveys with a subset of patients receiving depression treatment at participating clinics, and data from clinic administrative data systems. The Subgrantee Evaluation Plan (SEP) was revised in January 2015 to include the Stages of Implementation Completion (SIC) measure to describe variation and key components of the implementation process amongst the subgrantee clinics, and, in turn, how these variations might affect evidence-based processes of care[16-17] and/or clinical outcomes (depression response and remission).[18] In February 2016, a revised Subgrantee Evaluation Plan was submitted to add a final quantitative survey and phone interview for clinic leadership. The survey was designed to capture feedback from care teams regarding their experience with AIMS Center implementation coaching and support so as to identify and characterize critical components related to clinic-level implementation.

Analysis Approach

The Care Management Tracking System[19] patient registry served as the primary data source. This was supplemented by patient, provider, and organizational leadership surveys as well as clinic administrative data. Observational analyses examined clinic-level implementation and adherence to evidence-based processes of care as well as patient-level intervention outcomes on depression symptom severity. We compared the number of patients enrolled across participating clinics, the proportion of patients receiving proactive follow-up, the proportion of patients whose care was discussed with the psychiatric consultant, improvement in patients' depression symptoms, changes in social and occupational functioning, medical care and depression care utilization, as well as patient and provider satisfaction. A logistic regression model that adjusted for clinic site and all patient demographic variables examined variation in the odds of depression response ($\geq$50% reduction in depressive symptoms) and depression remission (virtual absence of symptoms) among participating subgrantee clinics. Comparisons are made across participating sites and are compared with existing benchmarks in the published literature from depression care programs implemented in similar populations[13] and practice settings.[12, 14]

Key Findings

- Rural clinics serving low-income communities can implement Collaborative Care, increasing access in to depression treatment in underserved areas.
- These clinics can achieve clinic-level processes of care and patient-level clinical outcomes comparable to research trials and large implementations.
- Large variation exists among clinics in processes of care and clinical outcomes despite consistency in training and implementation support.
- Primary care providers and patients are satisfied with Collaborative Care.

INTRODUCTION

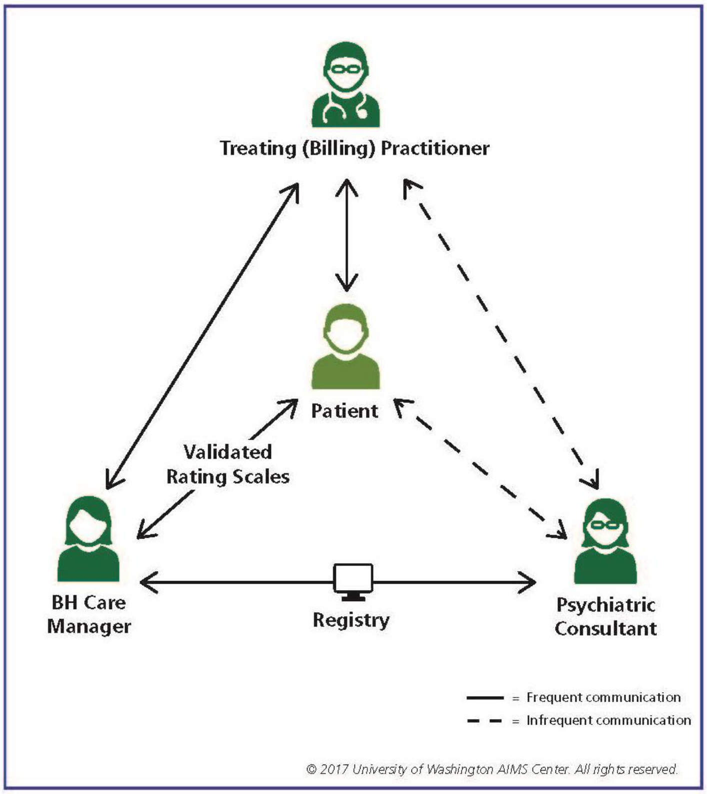
Implementation Study Context

Program Synopsis and Delivery Timeline

Through this Social Innovation Fund (SIF) initiative, The John A. Hartford Foundation promoted dissemination of Collaborative Care (IMPACT) to improve care in non-profit community health clinics in the Washington, Wyoming, Alaska, Montana and Idaho (WWAMI) region serving low-income, uninsured and underinsured patients. Much of this region is medically underserved and/or a healthcare provider shortage area.[20-21] Collaborative Care is a team-based model of treatment in which the primary care provider (PCP) is supported by a care manager and a psychiatric consultant to treat patients with depression in the primary care clinic using existing evidence-based treatments and established principles of chronic illness care.[6] **Figure 1** shows a graphical representation of Collaborative Care. The AIMS Center provided training, implementation support, and evaluation for this initiative. A detailed timeline of implementation and evaluation activities is provided in **Appendix A**.

> "Every provider, whether it be the primary care provider, behavioral health provider, or care manager is an important piece to the puzzle."
> *– Care Manager at Clinic H*

Figure 1. Collaborative Care Team



Program Beneficiaries

The goal of the IMPACT Expansion initiative was to disseminate evidence-based Collaborative Care for depression to patients of community primary care clinics in the WWAMI region, a largely rural and underserved area that comprises 27% of the land-mass of the United States but contains only 3.3% of the population. While the overall poverty rate for the WWAMI region was 12% in 2011 and 13% in 2014,[22] in each of these states the proportion of residents living in poverty is significantly higher in rural counties. Prior to 2014, Medicaid participation ranged from 13% of the state's population in Montana to 18% in Washington and the prevalence of uninsured residents was similar across all five WWAMI states at about 16% of the population.[23] In all of these states the proportion of residents living in poverty, the proportion of older adults, and the proportion of ethnic minorities is greatest in non-metropolitan areas.[24] With only a few exceptions representing the largest metropolitan areas, the vast majority of the WWAMI region is identified by HRSA as medically underserved and/or a health professional shortage area and community primary care clinics in this region primarily serve low-income, uninsured, underinsured and Medicaid patients.[25]

The target population for this initiative was adults (age>=18) living in rural WWAMI communities. The eight subgrantees had to meet the following requirements for funding to meet the initiative's target population:

a. Non-profit community primary care organization
b. Located in a rural WWAMI county or serving a significant proportion of rural dwelling patients
c. Service area designated by the federal government as medically underserved and/or a health professional shortage area
d. Serve at least 1,500 unique patients each year
e. Patient population at least 50% uninsured or Medicaid or other proxy for low socio-economic status

Subgrantees either replicated or expanded Collaborative Care. Expansion subgrantees were those that already had a collaborative care program in place for a subset of their patients prior to the Social Innovative Fund (SIF) award wanted to expand these services to the remainder of their patient population. Replication subgrantees did not have an existing collaborative care program at the time of their SIF award. The two **Expansion subgrantees** (Clinics D and E) implemented collaborative care about five years earlier as part of the Washington State Mental Health Integration Program (MHIP)[14] but were only able to offer Collaborative Care to a small proportion of their patients due to eligibility requirements for that program which was offered by one managed Medicaid plan but no others. MHIP clinics also implemented Collaborative Care with minimal training and implementation assistance from the AIMS Center. The managed Medicaid plan sponsoring MHIP received implementation support and guidance from the AIMS Center and deployed their own practice coaches to the clinics. The AIMS Center offered one-time training, periodic webinars, and a psychiatric consultant support call. Clinics in the other sites were all **Replication subgrantees**.

Subgrantees (Cohort 1): received awards in June 2013

- **Community Health Center of Central Wyoming** (CHCCW) in Casper, Wyoming
- **Mat-Su Health Services** in Wasilla, Alaska
- **Partnership Health Center** in Missoula, Montana
- **Peninsula Community Health Services** in Kitsap County, Washington
- **Valley View Health Center** in Lewis County, Washington

Subgrantees (Cohort 2): received awards in May 2014

- **Kodiak Area Native Association** (KANA), Kodiak, AK
- **Bighorn Valley Health Center** (BVHC), Hardin, MT
- **Southwest Montana Community Health Center** (SWMCHC), Butte, MT

> "The effects have been much more widespread than simply improving care of our behavioral health patients. I feel like it's benefitted the entire organization, made us more effective in teams, more focused on measurement, more interested in improving quality."
> *– Primary Care Provider at Clinic F*

Program Components / Activities

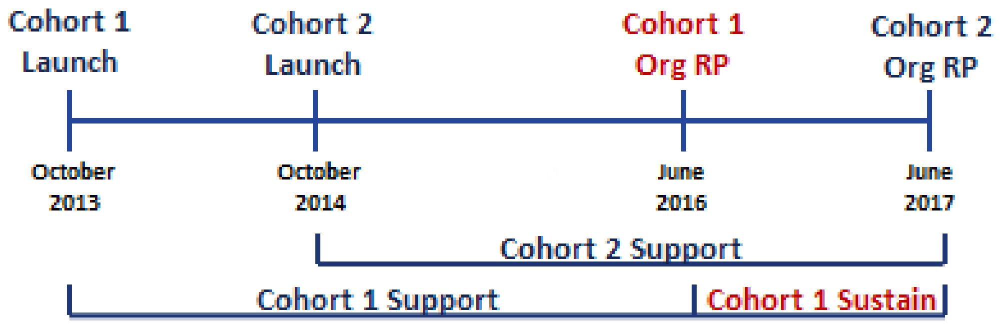
The AIMS Center provided training and implementation coaching/support to participating subgrantees. IMPACT adapts principles of effective chronic illness care[26] for treatment of common mental health conditions in primary care. These principles include measured-based care and treatment to target.[27] Systematic measurement of clinical outcomes using brief, patient rating scales such as the nine item Patient Health Questionnaire (PHQ-9) for depression[28] helps clinicians track whether patients are improving as expected or if treatment needs to be adjusted. Research has shown that certain scores on the PHQ-9 are strongly correlated with a subsequent major depression diagnosis, with PHQ-9 ≥10 indicating a moderate or greater level of depression. Adjusting the treatment plan based on symptom measures is one of the most important components of Collaborative Care which requires a change in treatment every 10-12 weeks if the patient has not had at least a 50% improvement in symptoms as measured with a validated instrument like the PHQ-9. Such systematic treatment to target can overcome the clinical inertia often responsible for ineffective treatment of depression in primary care.[29]

Figure 2. Implementation Support Phases

> "IMPACT has grown my skills at using brief therapy, solution-focused and problem-solving skills to help clients learn how to problem solve and to become more independent in their healing, taking more control of their outcomes, and enabling us to provide services to more people."
> *– Psychiatric Consultant at Clinic B*

Figure 2 shows the implementation process the AIMS Center used to work with subgrantees, both individually and collectively, to provide training and implementation support. Support activities included implementation coaching, webinars, clinic-level trainings delivered onsite (at each participating clinic), group in-person training (in Seattle), webinars, and a variety of implementation support conference calls. Each subgrantee clinic spent 2-3 months completing a guided pre-launch implementation planning phase. Then, subgrantees gathered together in-person in Seattle for a 2-day pre-launch training meeting. This training occurred in September 2013 for Cohort 1. Cohort 2 met in September 2014 for their 2-day pre-launch training. Cohort 1 attended the second day of the 2014 training for post-launch booster training. Within 2 weeks of the 2-day pre-launch training, each subgrantee launched their IMPACT expansion or replication program. Post-launch support included intensive skills-based training (certification in Problem-Solving Treatment for care managers and psychotherapists offering psychotherapy as part of treatment), webinars and case calls on various clinical topics, as well as group and individual implementation support conference calls. The timeline presented in **Appendix A** shows pre-launch and post-launch training and support activities was well as implementation coaching activities. Cohort 1 completed the post-launch implementation support phase at the end of June 2016 and all but one of these subgrantee clinics moved into sustainment. Cohort 2 clinics completed the post-launch implementation support phase at the end of June 2017. See **Figure 3** for a graphical representation of these implementation and sustainment phases.

Figure 3. Social Innovation Fund Implementation Timeline



The original award from The John A. Hartford Foundation to the AIMS Center for training, implementation support and evaluation was awarded through 12/31/2015, based on the original award timeframe from CNCS. In September 2014, the award from CNCS to The John A. Hartford Foundation was extended through August 2017 to accommodate three years of funding for the second cohort of clinics. In June 2015, The John A. Hartford Foundation approved an augmentation/extension of the AIMS Center award to extend the timeframe for training, implementation assistance and evaluation activities through June 2017 with the final Subgrantee Evaluation Report due December 31, 2017 after completing data analysis. The extended timeline is shown in **Appendix A**. This extension allowed post-launch training, implementation support and evaluation data collection to extend through June 2016 for Cohort 1 and June 2017 for Cohort 2.

Program Outputs

Table 1 lists the actions (**Outputs**) subgrantees completed as part of IMPACT implementation. In brief, these included:

- Pre-launch development of a detailed implementation plan outlining personnel needs and organizational and workflow changes required to align with Collaborative Care.
- Post-launch IMPACT patient enrollment and treatment, including:
    - 1) assessing patients for depression,
    - 2) patient engagement and education,
    - 3) evidence-based treatments such as medications and/or brief, structured counseling using established evidence-based techniques such as Behavioral Activation and Problem-Solving Treatment in Primary Care,
    - 4) proactive follow-up focusing on treatment adherence, treatment effectiveness, and treatment side effects,
    - 5) team communication about processes of care and treatment outcomes, and
    - 6) regular, systematic review of the entire population of patients engaged in care with a psychiatric specialist and adjustment of treatment plans for patients not improving after 10-12 weeks with the current treatment.

Program Outcomes and Impacts

As outlined in **Table 1**, the key anticipated primary outcome for patients treated with IMPACT in participating subgrantee clinics is decreased depression symptoms characterized as response and remission. Response is a ≥50% reduction in symptoms while remission is a near elimination of symptoms.[18] A single item from the PHQ-9, shown to predict suicide attempts[30] was used to assess suicidal ideation. Process of care outcomes related to 1) psychiatric consultation and 2) receiving at least one contact within the first four weeks of treatment were measured using the record of contacts documented in the CC registry. We used CMTS patient registry data to measure this for all patients enrolled in Collaborative Care. Registry data was also used to analyze secondary outcomes including: 1) initial clinical assessment, 2) patient follow-up, 3) patients engaged in treatment for at least 12 months, and 4) patients with at a least one psychiatric consultation. Registry data was supplemented by additional data sources including: 1) patient surveys with a subsample of treated patients at each clinic, 2) administrative data from each of the clinics, 3) surveys and interviews with leadership from each subgrantee clinic, 4) surveys with clinical providers (primary care providers, care managers, psychotherapists, psychiatric consultants) at each clinic, 5) completion of the Stages of Implementation Completion (SIC)[31-33] measure for each subgrantee clinic, and 6) end of study survey and interview with clinic leadership. These supplemental data sources served as the basis for four secondary outcomes: 1) changes in social functioning, 2) changes in occupational functioning, 3) use of depression care, and 4) satisfaction with Collaborative Care. Combining clinical registry data with quantitative surveys and semi-structured qualitative interviews will help us understand and interpret observed variations in implementations and outcomes. This approach has been used successfully in the original evaluation of the IMPACT program and several subsequent real-world implementations.[6,13,15] The SIC measure describes variation in implementation process and whether/how these may affect processes of care and/or clinical outcomes.

In addition to measuring key outcomes for treated patients, we explored outcome trends in health care utilization specifically examining whether treated patients used health care services differently before and after receiving Collaborative Care. In the original IMPACT study, patients receiving Collaborative Care were more than twice as likely as those in usual care to experience a substantial improvement in their depression over 12 months.[6] They also had less physical pain,[7] better social and physical functioning,[8] and better overall quality of life[9] than patients in care as usual. IMPACT was strongly endorsed by patients and primary care providers.[34] The data source for examining health care utilization and economic impact is baseline and six-month surveys collected with a subsample of patients enrolled in Collaborative Care at participating subgrantee clinics (n=351 paired surveys). The patient survey included questions on healthcare utilization and economic outcomes.

The implementation and effectiveness of Collaborative Care in rural, low-income, underserved areas is an important question. Rural communities face the “twin burden” of higher need and lower resources.[35] As a result, residents of rural and frontier areas experience a variety of disparities as compared with urban and suburban counterparts. Rural residents are more likely to be poor, in part because they have less access to education, jobs, and community services and facilities like broadband internet.[36] People who grow up in rural areas are more likely to experience Adverse Childhood Experiences (ACEs) like abuse, neglect, and family challenges like food insecurity and unstable housing.[37] People living in rural areas have less access to health and mental health providers and are less likely to receive evidence-based treatments.[38] They are more likely to have chronic health conditions, demonstrate high-risk health behaviors, and live shorter lives.[39] It is perhaps no coincidence that population density per square mile correlates with the highest rates of completed suicide and, according to the American Foundation for Suicide Prevention, Wyoming, Montana and Alaska have the highest suicides rates in the United States. While the annual age-adjusted suicide rate was 13.26 per 100,000 individuals for the overall US, the rates in these three states were more than twice as high – ranging from 26.83 to 28.24 per 100,000.[40]

> “I like the availability of meaningful treatment interventions and recommendations on the part of behavioral health staff, as well as the methodical identification of patient who may benefit, many of whom were previously overlooked.”
> *– Primary Care Provider at Clinic F*

Table 1. IMPACT Implementation Initiative Care Logic Model

Inputs	Activities	Outputs	Outcomes	Impacts
• **CNCS** • **John A. Hartford Foundation** • **University of Washington AIMS Center** • **Care Management Registry** • **Subgrantee community health clinics; serving low-income patients in rural communities that are medically underserved**	• **Pre-launch Kickoff Webinar**: Subgrantees participate in kick-off webinar. • **Pre-launch Technical Assistance:** Subgrantees attend Introduction to IMPACT and Creating the Collaborative Care Team webinars; individual onsite pre-launch TA visit; ad hoc technical assistance during planning. • **Pre-launch Training:** Subgrantees attend 2-day IMPACT training; PCPs and psychiatric consultants unable to participate in training attend webinars geared to their role. • **Post-launch Training**: Care managers providing psychotherapy complete training and certification in PST-PC; Bi-monthly topic webinars and case discussions; subgrantees participate in an in-person training convening one year following implementation. • **Post-launch Technical Assistance:** Monthly implementation conference call with each subgrantee site; Quarterly conference call with psychiatric consultants at all subgrantee sites.	• Subgrantees assemble primary care based teams, including primary care providers, care manager(s) and psychiatric consultant(s). • Subgrantees adapt clinical workflows to incorporate key components of collaborative care model. • Care manager(s) work closely with the primary care provider to deliver and coordinate patient care. • Care manager(s) delivers IMPACT care to patient, including: 1. screening for depression; 2. patient education; 3. pro-active follow-up; 4. brief counseling using evidence-based techniques; 5. facilitation of communication between PCP and psychiatric consultant; and 6. referrals to and coordination with outside agencies. • Care manager and psychiatric consultant engage in regular review of patients whose depression symptoms are not improving, facilitated by care management registry. • Psychiatric consultant provides treatment recommendations to the primary care team, focused on development and modification of treatment plans.	**Primary Outcome for participating patients**: • Decreased depression **Secondary Outcomes for Participating Patients:** • Improved social functioning • Improved occupational functioning • Increased use of depression care • Increased satisfaction with depression care **Additional Exploratory Outcome**: • Identify trends in health care utilization, health care costs, and other economic outcomes for patients.	• Increased access to effective evidence- based depression treatment for low-income patients in rural areas that are medically underserved. • Improved economic well-being among participating patients and their families.

This evaluation seeks to answer five confirmatory questions on program impact and one exploratory question. In addition, the evaluation examines implementation process questions. The primary outcome is the effect of IMPACT implementation on patient-level depression response and remission among enrolled patients, how this compares with published research trials and real-world implementations, and predictors of depression improvement. Secondary outcomes include patient-level effects on social functioning, occupational functioning, use of depression care, and satisfaction with depression care. Exploratory outcomes include effects on patient's healthcare utilization. Clinic-level implementation outcomes include how well clinics implement practice change, the effect of this on evidence-based processes of care, and provider satisfaction with Collaborative Care.

Impact Evaluation

Study Design Overview

Observational analyses examined clinic-level implementation and adherence to evidence-based processes of care as well as patient-level intervention outcomes on depression symptom severity. We compared the number of patients enrolled across participating clinics, the proportion of patients receiving proactive follow-up, the proportion of patients whose care was discussed with the psychiatric consultant, improvement in patients' depression symptoms, changes in social and occupational functioning, medical care and depression care utilization, as well as patient and provider satisfaction. A logistic regression model adjusting for clinic site and patient demographic variables examined variation in the odds of depression response and depression remission among participating subgrantee clinics. Comparisons are made across participating sites and are compared with existing benchmarks in the published literature from depression care programs implemented in similar populations[13] and practice settings.[12, 14]

Description of Design

The evaluation of clinical, social and economic effects of the program on patients is an observational design using clinical registry data supplemented by self-reported survey data collected from a subsample of patients. The **primary outcome**, depression severity, was assessed at treatment initiation (baseline) and compared to the last observed measurement. **Secondary outcomes** that focused on clinical processes of care, shown in previous research to predict better and faster patient improvement, were also assessed with registry data. Supplementary patient survey data was used to measure four other secondary outcomes: 1) social functioning, 2) occupational functioning, 3) healthcare and depression care utilization, and 4) satisfaction with depression care.

Provider satisfaction and organizational factors that may influence implementation were measured with quantitative and qualitative data collected from clinic leadership (pre-launch and 18 months post-launch) and clinicians (18 months post-launch). .

The **Stages of Implementation Completion (SIC)** measure was completed for each subgrantee clinic. This measure of variation in implementation process has been shown in previous studies to effectively predict organizations that will launch an innovation, maintain competence in that innovation, and sustain it over time.[31-33] This measure allows characterization of variation in implementation process and describe fidelity to key components of IMPACT amongst the subgrantee clinics and whether/how these affect processes of care and/or clinical outcomes.

Important Note: Although the SIF-CC initiative was originally intended for adult patients only, some clinics requested permission to treat adolescents. In recognition of the fact that many of these rural primary care clinics have no other treatment option for adolescents and Collaborative Care has been demonstrated to be effective for adolescents,[41] they were granted permission to provide care to them with SIF-CC resources. However, for purposes of evaluation, all patients under the age of 18 were excluded from analysis to allow for comparison to the Collaborative Care published literature which does not intermix adult and adolescent patient populations. Overall, 3% of enrolled patients were under the age of 18 with a range of 0% to 4% at all clinics, except Clinic G where 10% of enrolled patients were under the age of 18.

Previous Research/Literature

Program outcomes are compared to national benchmarks established by the original IMPACT trial[6], other RCTs of Collaborative Care,[1-6] replications of the IMPACT trial in diverse populations[10-12] and settings[13-14], as well as more recent implementation studies of Collaborative Care in non-experimental, real-world health care settings.[15]

Rationale for Design

More than 80 randomized controlled trials (RCTs) have established the effectiveness of Collaborative Care for depression.[1-6] Given the strong existing evidence and the SIF program's purpose in disseminating this model to low-income, underserved populations in under-resourced rural community health care clinics, we felt it is not necessary, and perhaps not even ethically justifiable, to repeat an RCT trial involving a usual care control group, or to use an interrupted time-series approach to create a lag in time for conducting repeated measurements before allowing underserved patients to obtain needed depression care. Instead, we chose an observational design.

Targeted Level of Evidence

Since Collaborative Care has a strong existing evidence base, the SIF expansion to low-income, rural communities does not focus on providing further causal evidence for the overall approach of Collaborative Care. Rather, this evaluation examines whether similar changes in patient-level outcomes to the original studies are seen in the target population of low-SES patients served in rural community health centers, examines variations in implementation and outcomes across participating rural clinics, and explores effects of Collaborative Care on health care utilization and other economic outcomes among rural, low-income patients. The targeted level of evidence is preliminary.

METHOD

Descriptive Participation and Program Delivery

Number of Program Units/Outputs

The AIMS Center worked with subgrantees both individually and collectively to provide training and implementation support. Support activities included coaching, webinars, trainings, and conference calls delivered onsite (at each participating clinic), in-person (in Seattle), or via the internet (webinars, website) or telephone (conference calls). Program units/outputs included training and implementation activities targeted to subgrantee organizations, and clinical delivery activities targeted to enrolled patients.

Table 2. Adult (age 18+) Patient Enrollment

	Target	Total Enrolled	Variance
Clinic A	450	728	+62%
Clinic B	375	405	+8%
Clinic C	600	1,542	+257%
Clinic D	350	890	+254%
Clinic E	450	633	+40%
Clinic F	300	207	-31%
Clinic G	375	262	-30%
Clinic H	350	538	+54%
TOTAL	**3,250**	**5,187**	**+63%**

Date Program Delivery Began/Ended

The five Cohort 1 subgrantees were awarded funding in May 2013, began pre-launch training in July 2013 and launched IMPACT clinical services in September/October 2013. The three Cohort 2 subgrantees were awarded funding in May 2014, began pre-launch planning and training in July 2014, and launched IMPACT clinical services in October 2014. Details regarding program delivery are provided in **Appendix A.**

Number of Program Patients / Participation Rate

Table 2 shows the number of patients enrolled in IMPACT depression treatment at each of the participating clinics. All but two sites exceeded targeted enrollment, some of them significantly exceeding anticipated program reach. Together, the eight subgrantee clinics enrolled over 5,000 patients, exceeding targeted reach by 63%.

> "I think they did such a good job, they got me right into IMPACT. It was amazing because I didn't realize how sick I was." – *Patient at Clinic A*

Clinics varied substantially in the unique number of patients treated annually prior to SIF with an average of 11,537 (range 1,356 – 22,934; data unavailable for Clinic G). Over the 2.75 years clinics participated in SIF they enrolled 1,886 patients per year, representing 16% of the total annual patient population. According to the Centers for Disease Control and Prevention, during the period 2013 – 2016 "8.1% of American adults aged 20 and over had depression in a given 2 week period" while "15.8% of adults from families living below the federal poverty level had depression."[42] The SIF-CC clinics engaged patients in treatment at the level of anticipated prevalence. This is no small feat in rural, under-resourced community clinics and achieves the goal of **increasing access** to depression treatment in these high need – low resource communities.

Table 3. Demographic Profile of Enrolled Patients

	Clinic A	Clinic B	Clinic C	Clinic D	Clinic E	Clinic F	Clinic G	Clinic H	All
	n=728	n=405	n=1524	n=890	n=633	n=207	n=262	n=538	n=5187
Gender	# %	# %	# %	# %	# %	# %	# %	# %	# %
Women	510 (70.1)	273 (67.4)	973 (63.8)	525 (59.0)	426 (67.3)	139 (67.1)	174 (66.4)	385 (71.6)	3405 (65.6)
Age									
18-24	119 (16.3)	63 (15.6)	215 (14.2)	134 (15.1)	73 (11.5)	22 (10.7)	52 (19.8)	97 (18.3)	775 (15.0)
25-45	387 (53.2)	172 (42.6)	729 (48.1)	493 (55.4)	305 (48.2)	99 (48.1)	122 (46.6)	240 (45.2)	2,547 (49.3)
46-64	187 (25.7)	140 (34.7)	495 (32.7)	261 (29.3)	220 (34.8)	69 (33.5)	72 (27.5)	152 (28.6)	1,596 (30.9)
≥ 65	35 (4.8)	29 (7.2)	69 (4.6)	2 (0.2)	35 (5.5)	16 (7.8)	16 (6.1)	42 (7.9)	244 (4.7)
Unknown	-	-	8 (0.5)	-	-	-	-	-	8 (0.5)
Race / Ethnicity									
American Indian or Alaska Native	7 (1.0)	5 (1.2)	51 (3.3)	9 (1.0)	15 (2.4)	106 (51.2)	188 (71.8)	14 (2.6)	395 (7.6)
Asian	4 (0.5)	3 (0.7)	3 (0.2)	17 (1.9)	4 (0.6)	0 (0.0)	5 (1.9)	0 (0.0)	36 (0.7)
African American	15 (2.1)	7 (1.7)	6 (0.4)	32 (3.6)	4 (0.6)	-	2 (0.8)	4 (0.7)	70 (1.3)
Pacific Islander	0 (0.0)	0 (0.0)	6 (0.4)	14 (1.6)	6 (0.9)	2 (1.0)	1 (0.4)	1 (0.2)	30 (0.6)
White	657 (90.2)	363 (89.6)	1334 (87.5)	773 (86.9)	489 (77.3)	88 (42.5)	51 (19.5)	514 (95.5)	4269 (82.3)
Mixed	18 2.5)	1 (0.2)	11 (0.7)	24 (2.7)	13 (2.1)	3 (1.4)	10 (3.8)	2 (0.4)	82 (1.6)
Hispanic	-	-	-	-	77 (12.2)	-	5 (1.9)	-	82 (1.6)
Other / Unknown	27 (3.7)	26 (6.4)	113 (7.4)	21 (2.4)	25 (3.9)	8 (3.9)	-	3 (0.6)	223 (4.3)

Demographic Characteristics of Adult Patients Enrolled in Collaborative Care

Table 3 shows demographic characteristics for adult (age 18+) patients. Despite using three different data sources (CMTS clinical registry, clinic administrative data, patient survey) to insure demographic data was as complete as possible, this is a real-world implementation and it was not possible to collect demographic data on every patient. As expected, two thirds of treated patients were women and one third men. This is consistent with both research studies and implementation projects focused on depression treatment and there was no significant variation among the participating subgrantee clinics. Patient mean age was 39.8 (SD 14.5) and only 5% of patients were age 65 or older.

Overall, 82% of patients reported their race/ethnicity as White. According to Census data,[43] the combined population of the four participating states is 75% White. The most likely reason this initiative treated a higher proportion of White patients as compared with statewide statistics is that racial groups are not evenly distributed throughout these states. The two states that treated a smaller proportion of White patients as compared with their statewide prevalence are Alaska (67% of statewide population; 54% treated in SIF initiative) and Montana (89% of statewide population, 75% treated in SIF initiative). These are the two states participating in the SIF initiative with the largest proportion of American Indian/Alaska Native patients and each state had only one clinic treating a large percentage of indigenous patients as compared with statewide averages.

In fact, the second largest ethnic minority group treated in this initiative was American Indian / Alaska Native (8%). This is particularly notable because of the dearth of published data regarding effective depression treatment interventions for this underserved patient population and the small sample sizes associated with published data.

Demographic and Other Characteristics of Participating Providers

Table 4 shows demographic characteristics for treatment providers (care managers, primary care providers, psychiatric consultants, psychotherapists) who completed the survey 18 months following launch of Collaborative Care. Totals in the bottom row of the table use the entire sample as the denominator for that column whereas the rows represent each clinic and use the total number of responding providers from that clinic as the denominator.

Table 4. Demographic Characteristics of Providers

Organization	# of Providers in Survey	Percent	Provider Mean Age (SD)	Female Providers	Provider Racial Ethnicity (Percent)*				
					White	Asian/ Pacific Islander	Hispanic	Native American / Alaska Native	African American
Clinic A	11	11%	40.6 (9.4)	60%	91%	0%	0%	0%	9%
Clinic B	7	7%	45.4 (9.8)	86%	71%	0%	29%	0%	0%
Clinic C	32	31%	36.3 (9.5)	56%	84%	9%	0%	3%	0%
Clinic D	19	18%	42.2 (10.8)	60%	53%	21%	16%	0%	0%
Clinic E	11	111%	48.2 (12.6)	80%	91%	9%	0%	0%	0%
Clinic F	5	5%	45.2 (9.9)	60%	40%	20%	0%	40%	0%
Clinic G	8	8%	43.3 (9.4)	86%	88%	0%	0%	13%	0%
Clinic H	10	10%	46.6 (12.3)	90%	90%	0%	0%	0%	10%
Total	**103**	**100%**	**41.7 (10.9)**	**68%**	**78%**	**9%**	**5%**	**4%**	**2%**

* 3 providers did not provide Race data

There are significant differences in the mean ages of the providers between the organizations (p < .03). Clinic C had the youngest age on average (36 years) in comparison to Clinic E, which had on average the oldest age (48 years). Two thirds of the providers are women. Although the differences in percentages of woman as providers in the organizations was not significantly different (p = .35), the organizations had a significant range from a high of 90% (Clinic H) to a low of 56% (Clinic C). The racial ethnicity of the providers differed significantly among the organizations (p < .004): Seventy-eight percent of the providers reported their race/ethnicity as white, 9% reported Asian / Pacific Islander, 5% Hispanic, 4% Native American / Alaska Native, and 2% African American.

Table 5 reveals that the majority of providers had worked in the clinic for at least a year and differences among the clinics were not statistically significant. In terms of months working at the clinic, the entire provider sample worked 3 years (36 months) on average, with provider groups varying from less than 2 years at Clinic A to over 4 years for Clinic G and Clinic D. The percentage of providers employed in various roles relevant to Collaborative Care was similar across the organizations (p = .85). In total, PCPs comprised about 60% of the survey sample, while about 20% are Care Managers and the other 20% are split between Psychiatric Consultants, Behavioral Health Providers and other. Of the 65 Primary Care Providers, 45% (n=30) were physicians and the remaining 55% were mid-level providers, including physician assistants (n=12), nurse practitioners (n=18), medical residents (n=6).

Table 5. Training / Employment Characteristics of Providers

Organization	Worked in the Clinic ≥ 1 year	Total Months Working at Clinic Mean (SD)	Professional Practice < 5 years*	Provider Role Percentage (N)				
				Care Manager	PCP	Psychiatric Consultant	Beh Health Provider	Other
Clinic A	82%	19.5 (10.9)	54%	27%	55%	9%	0%	9%
Clinic B	100%	34.0 (25.6)	29%	14%	43%	14%	29%	0%
Clinic C	67%	25.6 (32.0)	57%	13%	63%	6%	16%	3%
Clinic D	88%	53.6 (43.9)	44%	16%	79%	5%	0%	0%
Clinic E	100%	36.0 (30.8)	73%	27%	73%	0%	0%	0%
Clinic F	60%	30.4 (24.2)	20%	20%	80%	0%	0%	0%
Clinic G	67%	49.0 (71.6)	57%	29%	57%	0%	14%	0%
Clinic H	67%	44.0 (43.3)	50%	20%	50%	10%	10%	10%
Total	**78.5%**	**35.7 (37.6)**	**52%**	**19%** (19)	**64%** (65)	**6%** (6)	**9%** (9)	**3%** (3)

*Not including residency and training

Implementation Data Collection and Measurement

Measures Used for Each Dimension

Outcome measures for each dimension are described in **Appendix B.**

Description of Data Collection Methods / Amount of Data Collected

Data was collected from a variety of sources, including clinic leadership, clinicians, administrative data systems and patients. Additional detail regarding measures, sources, timing, and data collection methods is provided in **Appendix B** and **Appendix C.**

- **Care Management Tracking Registry (CMTS) – Primary Data Source**
  The primary purpose of the CMTS clinical registry is to assist clinicians with delivery of high quality evidence-based Collaborative Care. All patients enrolled in Collaborative Care are entered into the registry. In addition, the CMTS patient registry data served as the primary data source for the primary outcomes, depression response and depression remission. The primary outcome was calculated using data from the care management registry at baseline and last recorded measurement. The CMTS collects data on all patients enrolled in care. CMTS tracks clinical outcomes (depression symptoms) and processes of care (e.g. number and type of follow-up contacts, proportion reviewed with psychiatric consultant). Process of care data was used internally at each subgrantee clinic and during monthly implementation support calls between each clinic and the AIMS Center to help them identify and resolve implementation challenges.

> "I really like the registry and being able to track the people with depression." – *Care Manager at Clinic H*

- **Leadership Surveys – Secondary Data Source**
  Organizational leaders provided quantitative and qualitative information about the organization and their efforts to implement Collaborative Care immediately prior to program launch, 18 months post-implementation, and immediately prior to completing implementation support with the AIMS Center. Organizational leaders varied from site to site but could include the CEO, CFO, Medical Director, Behavioral Health Director and similar members of the leadership team at subgrantee clinics.

- **Patient Surveys – Secondary Data Source**

  Supplemental surveys were collected with a subsample of patients, representing 441 patients across the 8 subgrantee clinics. The goal was to collect at least 325 paired surveys (baseline and follow-up surveys), reflecting a max attrition rate of 30%. The survey was collected shortly after patients enrolled in treatment and again 6 months after program enrollment. The general eligibility requirements for survey participation were: age ≥18, English-speaking, have a telephone for contact, and agreement to participate in surveys. After completing the second survey, each survey participant received a $40 gift card incentive for participating in the two surveys as a method of insuring a max attrition rate of 30%. The gift cards were from local gasoline merchants in each respective clinic neighborhood.

  The collection of baseline patient surveys was completed in May 2015 for both cohorts. A total of 1,138 patients were approached to participate in the evaluation surveys. This number is lower than the total enrolled in IMPACT since it does not include ineligible or deferred patients (*ineligibility includes: enrolled before survey start date, enrolled after survey enrollment ended, age ≤18yrs, non-English speaking, and no telephone*). Of the 837 (74%) patients that agreed to participate in the survey, we completed 441 (53% of agreed) baseline surveys (see **Table 6** below).

Table 6. Patient Survey Data Collection

	CHCCW	Mat-Su	Partnership	Peninsula	Valley View	Bighorn	KANA	SWMCHC	All Clinics	
Total patients approached	234	86	355	224	128	42	46	23	1138	
Refused at clinic	60	24	140	24	19	14	20	0	301	26%
Agreed to participate	174	62	215	200	109	28	26	23	837	74%
Completed Baseline Surveys	97	33	94	102	70	16	12	17	441	39%
Completed Follow-up Survey	74	26	76	77	59	12	11	16	351	31%

The six month follow-up survey collection began in July 2014 for Cohort 1 and April 2015 for Cohort 2. Collection of follow-up surveys concluded for both cohorts in February 2016. A total of 351 follow-up surveys were collected, representing 80% of completed baseline surveys, exceeding our goal of ≥70% retention.

On February 2, 2015, the incentive component of the patient survey was launched. This provided a $40 gas card to survey participants following completion of the 6 month follow-up survey as an incentive to complete both surveys. **Figure 4** illustrates the follow-up survey completion trends before and after the incentive. It shows a sharp steepening of the curve following implementation of the incentives. The trend flattens out in September 2015 as the number of open follow-up surveys dropped.

Figure 4. Follow-up **Survey Completion Trends** before and after incentive *(dashed red line represents launch of incentive, February 2015)*

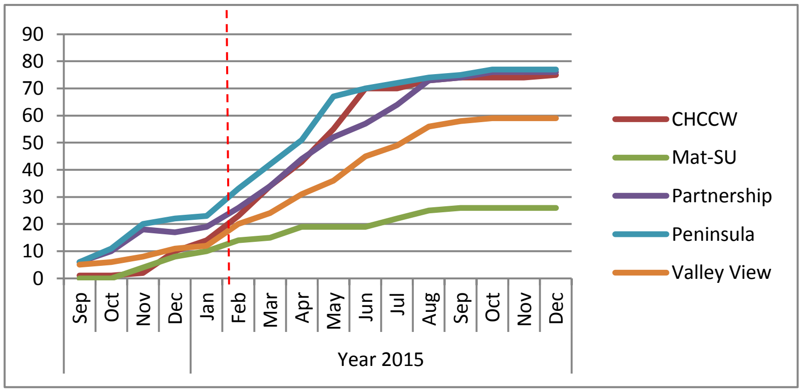


Figure 5a. Patient Survey Completion Timeframes

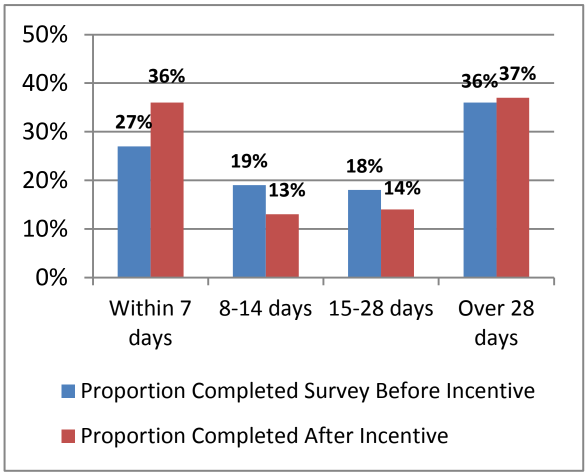
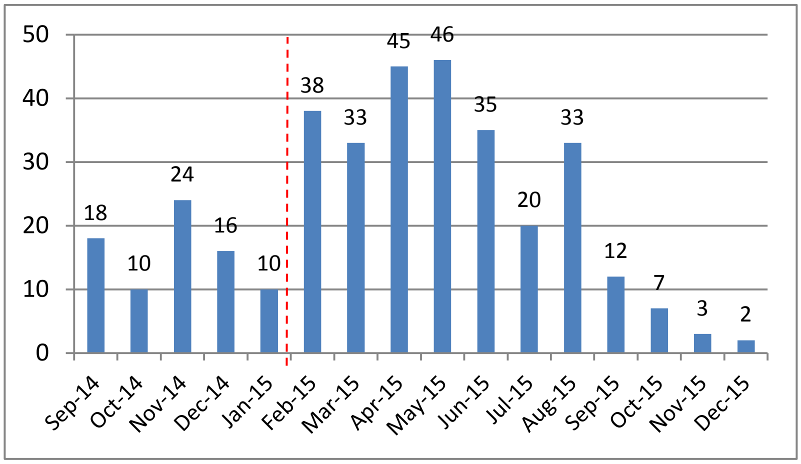


Figure 5b. Patient Survey Completion by Month



Figures 5a and 5b provide additional details regarding impact of the patient survey incentive. **Figure 5a** shows the proportion of patients who completed the follow-up survey before and after the incentive (as of December 1, 2015), aggregated by time to completion of the survey. Most notably, before the incentive 27% of patients completed the follow-up survey within 7 days and this jumped to 36% after the incentive was introduced. **Figure 5b** details the frequency of patients completing the follow-up survey starting in September 2014 through December 2015. The monthly completes range from 2 to 46 completed surveys. The dotted red line shows when the incentive was introduced. The average before the incentive was 15.6 completes per month. After the incentive, the average completes rose to 36 per month. By September 2015, the number of completes dropped due to fewer open surveys.

Clinician Surveys

- Clinicians (primary care providers, care managers, psychiatric consultants) at each of the subgrantee clinics participated in an online survey regarding their experience with clinical practice change 18 months following program launch. Collection of the clinician survey is complete for both Cohort 1 and Cohort 2, with a total of 103 collected of the 124 requested (See **Table 7**). We achieved an average response rate of 83% across the 8 clinics, with rates ranging from 67% to 100%.

> "I appreciate how the IMPACT model is thorough and produces improved outcomes."
> *– Psychiatric Consultant at Clinic D*

Table 7. Clinician Survey Collection

Clinic	Approached	Completed	%
CHCCW	11	11	100%
Mat-Su	8	7	88%
Partnership	39	32	82%
Peninsula	21	19	90%
Valley View	12	11	92%
Bighorn	7	5	71%
KANA	11	8	73%
SWMCHC	15	10	67%
Totals	**124**	**103**	**83%**

- **Administrative Data**
  All subgrantee clinics provided administrative data for patients enrolled in IMPACT treatment. This data supplemented demographic information captured in the CMTS registry.

- **Stages of Implementation Completion (SIC)**
  The Stages of Implementation Completion (SIC) was adapted for Collaborative Care as part of the SIF initiative. This measure allows us to describe variation in the implementation process among subgrantee clinics and whether/how these affect processes of care and/or clinical outcomes. The SIC data was collected from the AIMS Center and entered into a web portal located at the Oregon Social Learning Center. See Appendix E for the Collaborative Care SIC.

Impact Evaluation Questions

Implementation and Impact

This evaluation seeks to answer five confirmatory questions on program impact and one exploratory question. In addition, the evaluation examines implementation process questions.

Confirmatory (Impact)

The primary question is:

1. Do patients in participating clinics treated with IMPACT achieve depression remission and response at levels comparable with published research trials and real-world implementations and which factors predict likelihood of remission and response?

In addition, the evaluation will seek to answer: Do patients in participating clinics treated using IMPACT experience the following at 6-months post-baseline:

2. Improved social functioning?
3. Improved occupational functioning?
4. Increased use of depression care?
5. Increased satisfaction with depression care?

Exploratory (Impact)

As an exploratory question, the evaluation explores:

6. How will IMPACT treatment in rural clinics affect participating patients' health care utilization?

Implementation

The final research questions deal with program implementation and variation across sites:

7. Do participating clinics implement IMPACT Collaborative Care?
8. How does implementation vary across subgrantee clinics and which factors account for variation in implementation across clinics?

The implementation and effectiveness of Collaborative Care in rural, low-income, underserved areas is an important question. For this project, we expected to replicate results of prior studies and implementation initiatives targeted to patients treated in community health clinics. The primary goals are to increase access and quality of depression care delivered to patients at these rural clinics.

Counterfactual Condition

Baseline equivalence analysis

We used an observational design to compare program outcomes to benchmarks published by the original IMPACT trial,[6] other RCTs of Collaborative Care,[1-5] replications of the IMPACT trial in diverse populations[10-12] and settings,[13-14] as well as more recent implementation studies of Collaborative Care in non-experimental, real-world health care settings.[15] Because we did not use an RCT design and all patients received Collaborative Care care, there was no control group. Instead, patients and clinics served as their own controls. This natural experiment design explored the effect of Collaborative Care care experienced across the participating subgrantees and allowed for an initial evaluation on whether similar benchmark results can be achieved in community health clinics in the WWAMI region that serve low-income patients in medically underserved rural communities.

> "Some people feel that the care manager calls are too frequent and get annoyed."
> *– Care Manager at Clinic H*

ANALYSIS

Implementation

Types of Analysis

We evaluated the following clinical process of care measures captured in the CMTS registry for all enrolled IMPACT patients at the time of report:

- # of patients enrolled in treatment (completed initial assessment/PHQ-9)
- % of patients receiving follow- up within ≤ 4 weeks and # of follow-ups over the course of treatment
- % of patients staying in contact for at least 12 weks
- % of patients engaged >40 weeks
- % of patients having at least one psychiatric consultant review during treatment
- Demographic characteristics of enrolled patients

Frequency distributions for these outcomes and processes of care were calculated and examined across the program as a whole and for individual participating subgrantee clinics.

Analysis Procedures/steps

The AIMS Center extracted registry data from the SQL data tables contained within the CMTS registry. This data was imported into SAS for data cleaning and analysis. Where necessary, calculated variables were created, and analytic outputs were checked for accuracy.

Impact Evaluation

Types of Analysis

We examined unadjusted baseline depression severity as measured by the PHQ-9 across the eight participating clinics and compared this to mean PHQ-9 score at last measurement. Frequencies for the PHQ-9 were calculated two ways, one continuous and one categorical. This measure has a continuous range of 0-27 but can also be categorized as mild (<10), moderate (10-14), moderately severe (15-19), and severe (20-27).[28] Suicidal ideation, a single item on the PHQ-9 with a response scale of 0-3 was dichotomized as "yes" (any score above zero) and “no” (a score of zero). For the logistic regression model we calculated maximum PHQ-9 score during treatment as a proxy for “baseline” severity; the initial PHQ-9 was not used since it is part of the calculation of depression response. If the patient had only one depression treatment contact, the baseline value was carried forward using an “intent to treat” approach. Depression response is defined as a 50% reduction in symptoms and depression remission is defined as a final PHQ-9 score less than 5.

Analysis Procedures / Steps

Patient survey data was collected electronically in a REDCap system. REDCap, a web-based application for Electronic Data Capture (EDC) developed by a consortium of institutional partners, is currently free to all researchers in the five-state WWAMI region. At the conclusion of patient survey data collection, survey data was exported from REDCap to Excel and uploaded into SPSS v.23 (Statistical Package for the Social Sciences) for analysis. Data was prepared for analysis by running range checks and other data cleaning steps. Qualitative interviews were transcribed immediately after data collection and analyzed for themes relevant to primary and secondary outcomes. Data was analyzed with SPSS and Microsoft Excel.®

To examine potential sources of variation depression response and remission we examined CMTS clinical registry data frequencies for outliers and none was found. We used paired-t tests to determine if statistically significant changes existed in depression severity over time in the entire patient sample. We created a logistic regression model to examine variation in the odds of our outcomes: response and remission. Our model adjusted for clinic site, using the largest clinic as the reference group. We added all patient demographic variables (i.e., age, gender, and race/ethnicity) to the model. To represent patient’s depression severity level we tested the maximum PHQ-9 score during treatment in the model as a proxy for “baseline” severity. The initial PHQ-9 was not used since it is part of the calculation of depression response. Lastly, we fit all the process of care variables and retained only those in the model that explained a statistically significant amount of variance. These process of care variables included time in treatment from first to last contact, prior depression treatment episode at the clinic, number of follow-ups during treatment (exposure) and whether a follow-up occurred within 31 days of enrollment. We present the adjusted odds ratios (ORs) and their 95% confidence intervals as well as the unadjusted percentage of depression response and remission for the categorical strata within the model. The R^2 maximum was calculated for the model.

Missing Data Analysis

The patient registry was used as the data source for the main outcome (impact evaluation) and, because it captures clinical care as it is delivered, there was no missing data in the comparison of depression symptoms at baseline and final measurement. Only surveys for which both a baseline and follow-up were collected were included in the subsample analysis of secondary outcomes.

FINDINGS

The AIMS Center has 13 years’ experience supporting 1,000’s of organizations implementing Collaborative Care programs. This experience has yielded many lessons about effective implementation of a complex healthcare innovation in a wide range of clinical settings and patient populations.

Successful implementation of Collaborative Care balances increased access for the entire population of patients needing mental health treatment and a proactive, stepped care approach to treatment intensification if patient

Figure 7. Principles of Collaborative Care

Principles of Collaborative Care

Patient-Centered Collaboration. Primary care and mental health providers collaborate effectively using shared care plans.

Population-Based Care. A defined group of clients is tracked in a registry so that no one falls through the cracks.

Treatment to Target. Progress is measured regularly and treatments are actively changed until clinical goals are achieved.

Evidence-Based Care. Providers use treatments that have research evidence for effectiveness.

Accountable Care. Providers are accountable and reimbursed for quality of care and clinical outcomes, not just volume of care.

symptoms are not substantially reduced within 10-12 weeks. **Figure 7** shows the 4 key principles of Collaborative Care along with an environmental intervention (accountable care) that facilitates faster and more effective adoption of these principles. Evaluation of a pay-for-performance intervention with community health clinics (mostly FQHCs) implementing Collaborative Care demonstrated that putting as little as 25% of reimbursement at risk based on quality metrics dramatically changes clinician behavior and cuts the time from treatment initiation to response in half.[44] Clinics that implement Collaborative Care successfully meet minimum standards for the four key principles.

1. Patient-Centered Collaboration

The minimum expectation is that the primary care provider, care manager (+/- behavioral health provider), and psychiatric consultant collaborate on development and implementation of the treatment plan. The primary care provider remains the locus of care, rather than referring patients to behavioral health specialists who deliver parallel treatment. **Figure 1** (page 6) shows the Collaborative Care team and how an effective team functions. Treatment plans are individualized for each patient and may include medication, psychotherapy, or both.

2. Population Based Care

The minimum expectation is that all patients being treated for depression are tracked in a registry that allows all of the members of the treatment team to quickly and easily see which patients are not improving and need a change in treatment and which patients are sufficiently improved to be moved out of active care management. The latter action is critically important in expanding access to behavioral health services in primary care. Each clinic had a minimum caseload target based on care manager FTE and care manager model (all-in-one or shared; see page 35 for more details). The registry also identifies patients who have stopped contact with the Collaborative Care team. Isolation and avoidance of interpersonal contact are symptoms of depression that can impede a patient's effective engagement with the treatment team. The treatment team is expected to proactively reach out to all patients with active symptoms rather than simply responding to the patients who show up at the clinic.

> "I feel like there is less chance for these patients to fall between the cracks."
> *– Primary Care Provider at Clinic A*

3. Treatment to Target

The minimum expectation is that the treatment team regularly measures depression symptom severity with a quantitative tool like the PHQ-9. Most important, these measurements are used to drive the course of treatment. If the patient's symptoms have not reduced by at least 50% from baseline within 10-12 weeks the treatment plan is changed and the clock resets for another 10-12 weeks. The individual items on the PHQ-9 are used to inform changes in treatment so that interventions best suited to addressing the unresponsive treatments are used. The Collaborative Care team persistently adjusts the treatment plan. Prior research has shown that each change in the treatment plan results in achievement of response for 20% of patients who are unresponsive to treatment up to that point.

4. Evidence-based Care

The minimum expectation is that patients are offered treatments that are evidence-based and appropriate for the primary care setting. All care managers were trained in behavioral activation and licensed care managers were also trained and required to demonstrate minimum proficiency in Problem-Solving Treatment (PST), a brief, structured psychotherapy delivered in six to eight 30 minute sessions in which the patient is taught a technique to use on their own. PST has a very strong evidence base for treating depression.[45]

Fidelity to program design

Every organization, however highly functioning and however well prepared, experiences implementation challenges following program launch. The key to implementation success is the ability to honestly and accurately identify these challenges, brainstorm potential solutions and implement successive adaptations designed to address these challenges until the implementation is achieving its goals. In short, it's the ability of the organization to be resilient that is most likely to determine whether the implementation will succeed.

All five of the clinics in Cohort 1 launched Collaborative Care in late September or early October 2013. The three Cohort 2 clinics launched IMPACT in October of 2014. See **Appendix A** for a graphical representation of the program timeline. Fidelity to program design is best examined by evaluating processes of care and how well these clinical processes match expectations based on the implementation experience of the AIMS Center. Goals and expectations for processes of care based on implementation experience with other community primary care clinics serving low-income, underserved patients[14] are provided in **Table 8**.

Table 8. Processes of Care: Expectations / Goals	
Mean number of contacts	5 - 8
In-clinic contacts typically	65-80%
Phone contacts typically	20-35%
% of patients completing ≥1 follow-up ≤4 weeks of treatment start	≥50%
% of patients engaged in follow up	≥80%
% of patients engaged in treatment ≥ 12 weeks	≥40%
% of patients engaged in treatment > 40 weeks	<20%
% of patients with at least 1 psychiatric consultation	≥75%

As part of post-launch support and coaching (**Appendix A**), the AIMS Center reviewed process of care reports from the CMTS registry as part of a monthly implementation coaching call with each subgrantee clinic. These real-time reports included metrics for all patients currently "active" in the CMTS registry and allowed clinics to see their performance in comparison with the other clinics in the initiative (**Appendix F**). included the following metrics (among others): number of active patients, average baseline and most recent PHQ-9 score, proportion of patients engaged in follow-up, length of time in treatment, mean number of follow-up contacts, proportion of follow-up contacts conducted in-person and by phone, proportion of patients reviewed with the psychiatric consultant, proportion of patients experiencing a five point or greater reduction in symptoms as measured by the PHQ-9, and proportion of patients with 50% or greater improvement on the PHQ-9 after at least ten weeks in treatment.

The AIMS Center used these program monitoring reports to help clinics identify implementation challenges and brainstorm solutions. For the first year of clinical implementation, the AIMS Center led the monthly calls using these reports and modeled how to read and interpret them. Thereafter, clinics were expected to review and interpret the reports in advance of the call and to lead the call. The goal of this approach is to teach clinics self-sufficiency with program monitoring and to prepare them for sustainment.

Collaborative Care includes the ability to provide brief, evidence-based psychotherapy in the primary care clinic when that is a part of the patient's treatment plan (typically 30-50% of patients have psychotherapy as part of the treatment plan). During pre-launch training in Seattle, care managers and other clinicians who offer psychotherapy as part of treatment participated in training in an evidence-based psychotherapy called Problem Solving Treatment (PST) in Primary Care. The training consisted of didactic learning, case-based learning and audio-recording sessions with actual patients. Trainees who completed all three steps and demonstrated minimum proficiency in the technique received certification as a PST practitioner. Every participating clinic had at least one staff member trained in PST.

Program Exposure / Dosage

> "I love that we are regularly following up with depressed patients. I have heard from several of the patients on my caseload that it helps them 'stay on their toes' when they know they have someone regularly checking in with them."
> *– Care Manager at Clinic H*

Table 9 shows program exposure/dosage data for the first episode of care for each patient. Some patients had only one episode of care during the evaluation timeframe while other patients had up to 6 separate episodes of care. Prior analysis of Collaborative Care implementation data focuses on the first episode of care because that represents the majority of patients.

Overall, clinics had 4.5 contacts per patient (range 8.0 to 1.5). Across an entire patient population in a community health center setting, the average range is 5-8 contacts. There is not a goal per se but the range helps to identify when a clinic may be struggling with engagement (below 5 average contacts) and when a clinic may be keeping patients in treatment longer than is typically warranted in a primary care setting (more than 8 average contacts). Essentially, there is a "sweet spot" that balances access to services and intensity/duration of services for the large proportion of primary care patients who need mental health care. Collaborative Care is not simply co-locating specialty care, which is often open-ended and provides high intensity care to a small number of patients, into a primary care clinic. It is a fundamental shift in the philosophy and approach to mental health services that considers the entire population needing care and attempts to meet the needs of a larger proportion of that population than would be possible with a more traditional approach. Primary care patients, especially those who might not otherwise engage in care, are more likely to accept mental health services that take their cues from the primary care culture; that is, they are timely/immediate, focused on urgent symptom remission, and time-limited.

> "I like that the IMPACT model treats the whole patient in a manner that is less stressful to the patient. The collaboration between the PCPs and care managers ensures holistic care."
> *– Care Manager at Clinic A*

Table 9. Processes of Care: Program Exposure and Quality of Program Delivery

	Clinic A	Clinic B	Clinic C	Clinic D	Clinic E	Clinic F	Clinic G	Clinic H	All Clinics
Total number of contacts	4,107	1,453	5,928	3,791	5,061	928	1,453	2,162	**24,883**
Mean (SD) Contacts per Patient	5.5 (5.3)	1.5 (2.3)	3.7 (4.9)	4.1 (4.5)	8 (7.1)	4.4 (4.5)	4.8 (5.4)	3.9 (5.3)	**4.5 (5.4)**
In Clinic %	56%	84%	89%	99%	84%	95%	86%	91%	**86%**
Phone %	44%	16%	11%	1%	16%	5%	14%	9%	**15%**
≥1 follow-up w/in < 4 weeks	69%	9%	55%	57%	82%	56%	58%	54%	**55%**
% completing follow-up (2+ contacts)	83%	32%	59%	73%	95%	68%	70%	61%	**68%**
% engaged in treatment ≥ 12 weeks	38%	40%	27%	34%	42%	36%	30%	36%	**35%**
% engaged in treatment > 40 weeks	7%	9%	4%	5%	11%	5%	4%	5%	**6%**
% at least 1 psych consult	91%	71%	81%	88%	94%	87%	76%	98%	**86%**

The proportion of in-clinic vs. telephone contacts is observed as a potential indicator of using a more traditional co-located psychotherapy approach, which often shows a high proportion of in-person contacts (over 85%) and a low proportion of phone contacts (under 15%). As shown in Table 8 the typical range for phone contacts is 20-35%. Seven of the eight clinics were under this average and one clinic was above this average. As part of monthly implementation support Clinic A leadership were asked about the very high proportion of phone contacts. They responded that a significant subset of their patients are long-haul truckers who travel through Casper, Wyoming on their way across the country. The clinic used phone contacts to keep these patients engaged in treatment until the next time they came through on their way to another destination. Variation in this metric is normal and there is not a target goal per se. What is shown in the target metrics is the typical range for community primary care clinics. The fact that the two clinics with the lowest proportion of phone contacts (Clinic D and Clinic F)

–

also have the highest proportion of patients receiving follow-up shows that this metric can serve as a general indicator of program fidelity but does not predict quality of program delivery.

Quality of Program Delivery

> “I think they did a really good job because there was follow-up and I was active in my treatment plan.”
> *– Patient at Clinic C*

Table 9 also shows metrics that indicate quality of program delivery, including the proportion of patients receiving follow-up within 31 days of treatment initiation, the proportion of patients remaining in treatment for at least 12 weeks, the proportion of patients in treatment for more than 40 weeks and the proportion of enrolled patients being reviewed by the psychiatric consultant. One of the key differences between Collaborative Care and usual care is proactive engagement with patients and ongoing measurement of symptoms to inform proactive treatment changes. Proactive engagement is reflected in the percentage of patients receiving follow-up. The goal is for 80% of patients enrolled in treatment to receive at least 2 follow-up contacts. Only two of the clinics met or exceeded this goal – Clinic A and Clinic E. Clinic E was also the clinic with the largest proportion of patients engaged in treatment for more than 40 weeks, which makes it easier to hit this target but for the wrong reason. The clinic that missed the mark by the greatest margin, at about half the rate of the next best clinic, was Clinic B at only 32%.

Based on the published literature,[16-17] two key components of Collaborative Care predict better patient outcomes: Two processes of care emerged from this analysis: 1) the proportion of patients receiving at least one follow-up within the first four weeks following enrollment in treatment, and 2) the proportion of patients discussed with the psychiatric consultant at least once.

All of the participating subgrantees except Clinic B exceeded the goal for engaging patients during the first month of treatment and Clinic E far surpassed the goal at 82%. Clinic B achieved this this key component of effective patient engagement with only 9% of their enrolled patients. Similarly, all of the clinics except Clinic B exceeded the target goal for proportion of patients discussed at least once with the psychiatric consultant, though they missed the mark by a narrower margin.

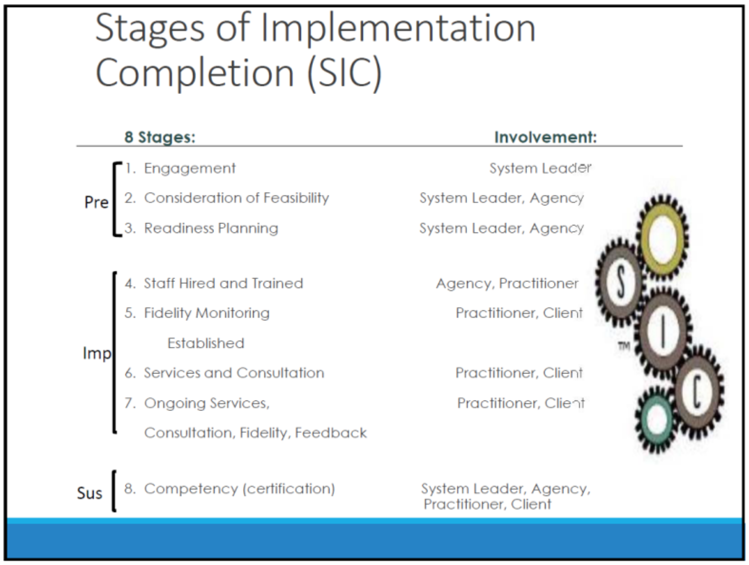
> “I feel like they’re involving me in the treatment instead of just treating me.”
> *– Patient at Clinic C*

The percentage of patients actively engaged in treatment for at least 12 weeks is one measure of the quality of program delivery because it indicates how well the clinic engages and retains patients in treatment. While it is possible for some depressed patients to complete active treatment within 12 weeks, this is not common because the symptoms of depression often require at least this amount of time to respond to treatment, regardless of the treatment plan. Plus, clinics are expected to monitor patients for at least 1 month (and often 2-4 months) following successful completion of active treatment to ensure that improvement is not temporary. Low-income patients have a large number of psychosocial factors affecting their ability and willingness to remain engaged in active treatment, especially once their symptoms begin to significantly improve. The goal (≥40%) is based on experience with community primary care settings serving low-income patients similar to those enrolled in this initiative. Clinic E (42%), and Clinic B (40%) are the only clinics that met this goal. Most of the other clinics were close, with the exception of Clinic C at 27%.

While it is important to retain patients in treatment long enough to implement at least one treatment plan and measure its success in reducing patient symptoms, it is equally important to move patients through care and close active care management when symptoms are adequately improved and/or the care team has determined the patient’s needs cannot be met in primary care. This increases access. In short, there is a “sweet spot” when it comes to primary care behavioral health. This is a significant culture shift for many behavioral health providers who are accustomed to open-ended treatment that may keep a patient in active treatment for years. Long-term treatment creates access barriers for the typically large volume of primary care patients who need behavioral health services. To assist clinics in evaluating how well they are moving patients through treatment, the AIMS Center reported to clinics the proportion of actively enrolled patients engaged in treatment for more than 24 weeks. Based on the AIMS

Center's experience with diverse community primary care clinics, the goal for the metric is less than 20% of patients. All of the clinics achieved this goal.

Figure 8. Stages of Implementation Completion



Stages of Implementation Completion (SIC)

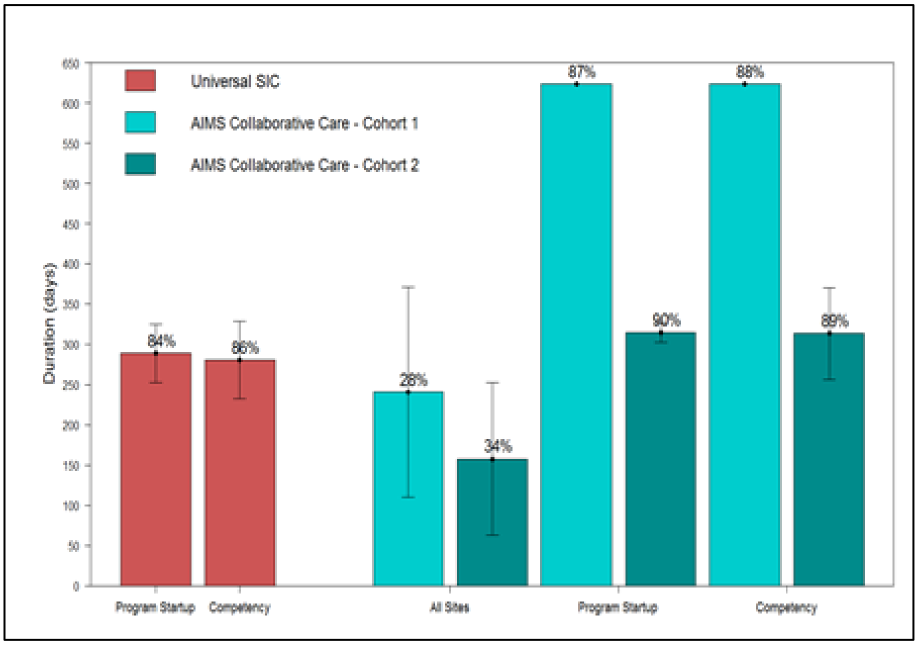
	8 Stages:	Involvement:
Pre	1. Engagement	System Leader
	2. Consideration of Feasibility	System Leader, Agency
	3. Readiness Planning	System Leader, Agency
Imp	4. Staff Hired and Trained	Agency, Practitioner
	5. Fidelity Monitoring Established	Practitioner, Client
	6. Services and Consultation	Practitioner, Client
	7. Ongoing Services, Consultation, Fidelity, Feedback	Practitioner, Client
Sus	8. Competency (certification)	System Leader, Agency, Practitioner, Client

Stages of Implementation Completion (SIC)

Although many evidence-based practices (EBPs) have been developed, large knowledge gaps remain regarding how to routinely move EBPs into usual care. The lack of understanding of what it takes to install EBPs has costly public health consequences including a lack of availability of the most beneficial services, wasted efforts and resources on failed implementation attempts, and the potential for engendering reluctance to try implementing new EBPs after failed attempts.

As shown in **Figure 8**, the Stages of Implementation Completion (SIC) is an 8-stage tool of implementation process and milestones, with stages spanning three implementation phases (pre-implementation, implementation, sustainability). One of the most attractive features of this measure is that it is agnostic to the specific intervention being implemented. The measure was originally developed to measure implementation of youth social service interventions in the foster care system but has since been adapted for implementation of many other social service and healthcare EBPs. Comparison of these multiple versions of the SIC has yielded the Universal SIC, which is a measure of items that are common across all implementation initiatives regardless of the topic.

Items delineate the date that a site completes implementation activities, yielding an assessment of **duration** (time to complete a stage), **proportion** (of stage activities completed), and a general measure of how far a site moved in the implementation process (**stage score**).[31-33] The SIC categorizes missing data into four categories: 1) truly not completed, 2) not necessary because clinic is an expansion site (e.g. Clinic E and Clinic D), 3) not applicable, and 4) completed but date of completion unknown.



The SIC was adapted through an iterative process for Collaborative Care and piloted with the SIF clinics. Through the use of retrospective and prospective data collection, this pilot of the Collaborative Care SIC will inform the need for potential modifications to the measure. This is an important step in the validation process. Second, the use of retrospective and prospective data collection may detect meaningful patterns in implementation behavior of SIF subgrantee sites. Identification of such patterns has real world implications for informing the level of training and implementation coaching that is recommended for new sites adopting Collaborative Care.

The eight SIF clinics were compared to the Universal SIC and preliminary results are shown in **Figure 9**. The graph at right shows the average duration for program start-up and achievement of competency as measured across implementations with the universal SIC (red bars) as compared with Cohort 1 SIF clinics (light teal) and Cohort 2 (dark teal). Although Cohort 1 is significantly longer in duration that both the Universal SIC and Cohort 2, the results for Cohort 2 are very similar to the Universal SIC. This indicates that the AIMS Center learned from their implementation experience with the Cohort 1 sites and used these insights to make adjustments to the training and coaching they provided to Cohort 2, reducing both program start-up time and time to competency.

Despite the small sample (8 clinics), the SIC disentangled implementation of a complex intervention and successfully predicted discontinuation of the Clinic B clinic. This outcome was predicted by the fact that they did not select an appropriate implementation leader, declined to participate in recommended remedial onsite coaching and implementation assistance, never achieved the recommended minimum caseload of patients, and participated minimally in long-term sustainability planning.

> “This emphasized ongoing difficulties related to integrated care at our agency. I believe most of the difficulty is our agency and the ongoing struggles with leadership and direction.”
> *– Care Manager at Clinic B*

Responsiveness

All of the subgrantees met minimum requirements for participation and engagement with the exception of Clinic B. Clinics were required to designate an IMPACT implementation leader who was responsible for insuring compliance with participation requirements, monitoring metrics and making adjustments as needed to achieve improved access and quality. All clinics except Clinic B appointed a person with the authority to make decisions and garner necessary resources to achieve implementation goals. Clinic B appointed an administrative assistant with no clinical training or experience and no authority within the clinic. Key leadership, including the Medical Director of the primary care clinic and the Behavioral Health Director, were openly hostile to the idea of Collaborative Care and obstructed implementation despite the efforts of the care manager and psychiatric consultant who supported implementation. They dropped out of sustainability planning earlier than any of the other subgrantees and openly admitted they had no intention of continuing Collaborative Care after the end of the grant.

> “They should make the psychiatric consultant the primary person in charge of the program and allow them to choose the program staff to run the program because this is their specialty.”
> *– Care Manager at Clinic B*

Program Differentiation

Many of the metrics shown in **Tables 10-20** are based on the existing Collaborative Care literature and what is known from both research[1-6] and real-world implementations[13-15] regarding the critical components that are essential for producing positive outcomes.[16-17]

Satisfaction - Patient

Patient satisfaction was measured on a 5 point Likert scale where 1 = very satisfied and 5 = very dissatisfied. **Table 10** shows results from the patient survey regarding satisfaction with care. The only two clinics for which the difference was significant (Clinic B and Clinic E) both showed reductions in satisfaction. The decrease in satisfaction at Clinic B is not surprising given their poor implementation of the treatment model, including proactive

> “I needed them to listen and they did.”
> *- Patient at Clinic E*
>
> “I just want to thank you and everyone who takes the time to care about me.”
> *- Patient at Clinic H*

engagement within the first month of treatment with only 9% of patients. The decrease in satisfaction at Clinic E is unexplained by any of the other data, including processes of care, and is not supported by clinical outcomes reported below.

Table 10. Patient Satisfaction with Depression Treatment

	Clinic A	Clinic B	Clinic C	Clinic D	Clinic E	Clinic F	Clinic G	Clinic H	All Clinics
	n= 73	n= 28	n= 76	n= 76	n= 58	n= 13	n= 11	n= 15	n= 350
Mean (SD) baseline	1.81 (0.70)	1.54 (0.56)	1.80 (0.63)	1.93 (0.71)	1.81 (0.75)	1.84 (3.5)	2.35 (3.5)	1.68 (4.2)	1.83 (3.6)
Mean (SD) six month follow-up	1.88 (0.90)	1.87 (0.82)	1.87 (0.82)	1.86 (0.60)	2.06 (0.85)	1.71 (3.1)	1.67 (3.7)	1.62 (3.7)	1.87 (3.6)
Difference	-4.4%	-21.4%*	-3.3%	4.1%	-13.9%**	7.1%	28.9%	3.6%	2.2%

*p <0.05

**p <0.001

Satisfaction - Providers

Provider satisfaction was measured with four questions that were part of a survey 18 months after the clinic launched Collaborative Care. All of the clinic providers were approached for participation, including care managers, primary care providers, psychiatric consultants, and behavioral health providers. See Tables 4 and 5 for demographic, training and employment characteristics of providers who responded to the survey.

Table 11. Provider Satisfaction with Patient Outcomes, Support from Clinic

Organization	**Do you believe that the IMPACT program improved clinical outcomes for your patients?**			**Did you receive adequate support from the clinic to provide depression care to your IMPACT patients?**		
	None	Moderate Improvement	Definite Improvement	Not enough support	Adequate support	More than adequate support
Clinic A	0%	0%	100%	9%	18%	73%
Clinic B	0%	29%	71%	29%	71%	0%
Clinic C	0%	38%	62%	7%	59%	34%
Clinic D	0%	12%	88%	6%	56%	38%
Clinic E	0%	11%	89%	0%	67%	33%
Clinic F	0%	40%	60%	0%	60%	40%
Clinic G	14%	29%	57%	14%	71%	14%
Clinic H	10%	50%	40%	11%	79%	11%
Total	**2%**	**27%**	**71%**	**9%**	**58%**	**33%**

Across the eight participating clinics, nearly three quarters of providers believe the IMPACT program resulted in "definite improvement" for their patients. Only two clinics (Clinic B and Clinic H) had providers who responded there was no improvement in clinical outcomes for their patients. Not surprisingly, Clinic B is the only clinic where none of the providers surveyed said they received "more than adequate support" to provide depression treatment to their patients and more than twice as many providers as any other clinic responded they received "not enough support."

> "The PCPs at this clinic have not embraced the model and after two years (and education) they still have not grasped simple concepts."
> *- Primary Care Provider at Clinic B*

Table 12. Provider Satisfaction with Quality of Work Life, Level of Burnout

Organization	Has IMPACT improved the quality of your work life?*			How would you rate your level of burnout?		
	None	Moderate Improvement	Definite Improvement	None	Some	A Lot
Clinic A	18%	0%	82%	27%	55%	18%
Clinic B	43%	57%	0%	0%	57%	43%
Clinic C	11%	36%	53%	11%	43%	46%
Clinic D	19%	44%	37%	18%	41%	41%
Clinic E	0%	56%	44%	11%	67%	22%
Clinic F	0%	40%	60%	40%	60%	0%
Clinic G	14%	14%	72%	14%	71%	14%
Clinic H	20%	70%	10%	0%	60%	40%
Total	**15%**	**39%**	**46%**	**14%**	**52%**	**34%**

**Clinics differ significantly (p = .02)*

At seven of the eight clinics, at least 80% of providers reported that IMPACT improved the quality of their work like at least moderately. The only clinic at which none of the providers reported "definite improvement" in work life was Clinic B. These differences are statistically significant. Providers at Clinic F reported the lowest levels of burnout while providers at Clinic B reported the highest levels and providers at Clinic H were second highest.

> "In our rural setting, the ability to provide better mental health care has made a big impact for my patients and has definitely improved my job satisfaction."
> *– Primary Care Provider at Clinic E*

Impact Evaluation

Baseline Depression Severity

Table 13 shows baseline depression severity by clinic. Baseline PHQ-9 is the measure of symptoms at treatment initiation. Maximum PHQ-9 shows the highest PHQ-9 score during the first (if more than one) episode of care. Baseline suicidal ideation is based on a single item from the PHQ-9.

Table 13. Baseline Depression Symptom Severity

	Clinic A	**Clinic B**	**Clinic C**	**Clinic D**	**Clinic E**	**Clinic F**	**Clinic G**	**Clinic H**	**All**
	n=728	n=405	n=1524	n=890	n=633	n=207	n=262	n=538	n=5187
Baseline PHQ-9	# %	# %	# %	# %	# %	# %	# %	# %	# %
Mild < 10	62 (8.5)	53 (13.1)	203 (13.3)	64 (7.2)	85 (13.4)	44 (21.3)	62 (23.7)	33 (6.1)	606 (11.7)
Moderate 10-14	226 (31.0)	105 (25.9)	386 (25.3)	242 (27.2)	144 (22.7)	76 (36.7)	94 (35.9)	138 (25.7)	1411 (27.2)
Mod / Severe 15-19	238 (32.7)	122 (30.1)	449 (29.5)	295 (33.1)	194 (30.6)	49 (23.7)	72 (27.5)	186 (34.6)	1605 (30.9)
Severe 20-27	202 (27.7)	125 (30.9)	486 (31.9)	289 (32.5)	210 (33.2)	38 (18.4)	34 (13.0)	181 (33.6)	1565 (30.2)
Mean (Std Dev)	16.1 (5.2)	16.0 (5.6)	16.1 (6.1)	16.4 (5.3)	16.5 (5.9)	13.9 (5.8)	13.1 (5.8)	17.1 (5.2)	16.1 (5.7)
Maximum PHQ-9									
Mild / Moderate 0-14	229 (31.5)	127 (31.4)	490 (32.2)	243 (27.3)	183 (28.9)	100 (48.3)	139 (53.1)	126 (23.4)	1637 (31.6)
Mod / Severe 15-19	249 (34.2)	126 (31.1)	460 (30.2)	292 (32.8)	191 (30.2)	55 (26.6)	75 (28.6)	177 (32.9)	1625 (31.3)
Severe 20-27	250 (34.3)	152 (37.5)	574 (37.7)	355 (39.9)	259 (40.9)	52 (25.1)	48 (18.3)	235 (43.7)	1925 (37.1)
Baseline suicidal ideation									
Yes (Q9>0)	226 (31.0)	144 (35.6)	458 (30.1)	359 (40.3)	247 (39.0)	79 (38.2)	59 (22.5)	90 (16.7)	1662 (32.0)

Primary Outcomes – Decrease in Depression Symptoms

Table 14. Depression Outcomes: Initial to Last Measurement

	Mean	95% CI	Standard Deviation
Depression severity *(range 0-27)*			
PHQ-9 at baseline	16.1	15.9, 16.2	5.7
PHQ-9 at last measurement	10.9	10.8, 11.1	7.2
Change from baseline to last	5.1[a,b]	4.9, 5.3	6.7
Suicidal ideation *(range 0-3)*			
Baseline	0.59	0.57, 0.62	0.90
Last measurement	0.35	0.33, 0.37	0.73
Change from baseline to last	0.25[a,b]	0.22, 0.27	0.77

[a] P-value<0.0001 [b] Paired t-test

The unadjusted change in depression severity and suicidal ideation from baseline to last measurement is shown in **Table 14**. Unadjusted baseline depression severity as measured by the PHQ-9 (range 0-27) averaged 16.1, with a standard deviation (SD) of 5.7 (95% confidence interval 13.1, 17.1) across the eight participating clinics. Mean PHQ-9 score at last measurement was 10.9 (SD 7.2; 95% CI 10.8, 11.1). The mean change in PHQ-9 score from first to last measurement was 5.1 points (SD 6.7; 95% CI 4.9, 5.3), a drop in depression severity which is both statistically and clinically significant.[46] Suicidal ideation, a single item on the PHQ-9, was reported (at any severity level) by 32% of patients at baseline and by 20% of patients at the last follow-up with the mean severity of suicidal ideation decreasing from 0.60 to 0.35 on a scale from 0-3. The mean change from first to last measurement was 0.25, which is both statistically and clinically significant (p<0.0001).

Table 15. Depression Response and Remission Rates by Baseline PHQ-9 Category

	Overall	Response	Remission
Baseline PHQ-9 (range 0-27)	N (%)	N (%)	N (%)
Mild (< 10)	606 (11.7)	538 (88.8)	307 (50.7)
Moderate (10-14)	1411 (27.2)	723 (51.2)	398 (28.2)
Moderately Severe (15-19)	1605 (30.9)	658 (41.0)	330 (20.6)
Severe (20-27)	1565 (30.2)	531 (33.9)	203 (13.0)

Table 15 shows PHQ-9 scores at baseline categorized into four groups: mild, moderate, moderately severe, and severe with the corresponding proportion of patients achieving depression response or remission. Both outcomes show a linear relationship between PHQ-9 score and likelihood of response or remission with the likelihood of each outcome decreasing as the baseline PHQ-9 score increases.

Primary Outcomes –Depression Response and Remission

Odds ratios, their 95% CIs, Ns, and unadjusted percentages for the logistic regression model are shown for depression response (**Table 16**) and remission (**Table 17**). The models accounted for 26% and 21% of the variance in response and remission, respectively. Clinic explained a significant amount of variance, with depression response ranging from 42% to 66% across the eight participating clinics and depression remission ranging from 19% to 34%. There were no differences in the main outcomes between racial/ethnic groups or genders. Age was significantly related to depression remission with younger patients (< 66 years) experiencing a significantly lower rate of remission than patients over sixty-five (27% - 38%).

Maximum PHQ-9 score explained a significant amount of variance in outcomes, with positive outcomes related to lower maximum depression severity. Rates of response and remission for patients with a baseline PHQ-9 score below 15 were 68% and 51%, respectively. Patients with severe symptoms at baseline (score 20 - 27) had the lowest rates of response (33%) and remission (13%). Receiving a follow-up contact within 30 days from enrollment was the only process variable not significant in the model and, consequently, it was dropped. Each month in treatment increased a patient's odds of having a depression response 7% and of remission 3%. Patients with prior depression treatment episodes in the same clinic were slightly less likely to have a response or remission. Number of follow-up contacts during the treatment episode was strongly linearly associated with better response and remission rates. Patients with four or more visits were about 4 times more likely to improve as compared to those with only one visit.

> "It's really hard to keep in touch with patients when it's fishing season and they are at fish camp. A lot of the camps are too remote for cell phone service and they've got to fish when they can so their family has food to eat in the winter. So, quite a few of my patients fell off the radar until fishing season was over."
> *– Care Manager at Clinic G*

Table 16. Predicting Depression Response by Clinic, Age, Race, Gender, and Treatment Variables

	Depression Response (2450/5187)[a]					
	N	%	Odds Ratio	LowerCL	UpperCL	p-value
Organization						
Clinic C (Referent)	638	41.86	-	-	-	-
Clinic A	377	51.79	1.45	1.16	1.80	0.001
Clinic B	200	49.38	1.59	1.20	2.12	0.001
Clinic D	435	48.88	1.84	1.49	2.29	< 0.001
Clinic E	308	48.66	1.19	0.95	1.49	0.140
Clinic F	137	66.18	3.34	2.12	5.24	< 0.001
Clinic G	138	52.67	1.06	0.70	1.60	0.798
Clinic H	217	40.33	1.05	0.82	1.34	0.699
Age						
Age 18-24 (referent)	345	44.52	-	-	-	-
age 25-45	1185	46.53	0.98	0.80	1.21	0.867
age 46-64	762	47.74	0.90	0.72	1.13	0.366
age >=65	148	60.66	1.47	1.01	2.14	0.043
Race						
White (referent)	2004	46.94	-	-	-	-
AI/NA	207	52.41	1.14	0.80	1.63	0.475
Other	239	45.70	0.93	0.73	1.17	0.532
Gender						
Male (referent)	749	45.92	-	-	-	-
Female	1661	48.78	1.05	0.91	1.22	0.495
Severity of max PHQ-9						
None/Moderate (0-14) (referent)	1111	67.87	-	-	-	-
Moderately severe (PHQ 15-19)	708	43.57	0.24	0.20	0.29	< 0.001
Severe (PHQ 20-27)	631	32.78	0.12	0.10	0.15	< 0.001
Treatment exposure (months)						
Continuous	-	-	1.07	1.04	1.11	< 0.001
Total episodes						
1 episode (referent)	2209	47.80	-	-	-	-
Two or more episodes	241	42.58	0.69	0.56	0.86	< 0.001
Total follow-up (FU)						
1 FU (referent)	277	34.32	-	-	-	-
2-3 FU	601	52.35	2.52	2.04	3.12	< 0.001
4-7 FU	714	61.34	3.61	2.87	4.53	< 0.001
8+ FU	740	63.96	3.84	2.85	5.16	< 0.001

[a] $R2_{max}$=0.2596

Table 17. Predicting Depression Remission by Clinic, Age, Race, Gender, and Treatment Variables

	Depression Remission (1238/5187)[a]					
	N	%	Odds Ratio	LowerCL	UpperCL	p-value
Organization						
Clinic C (referent)	294	19.29	-	-	-	-
Clinic A	231	31.73	1.97	1.56	2.48	< 0.001
Clinic B	123	30.37	2.25	1.68	3.01	< 0.001
Clinic D	201	22.58	1.47	1.16	1.86	0.001
Clinic E	139	21.96	1.01	0.78	1.31	0.952
Clinic F	72	34.78	2.35	1.57	3.50	< 0.001
Clinic G	70	26.72	1.23	0.80	1.91	0.345
Clinic H	108	20.07	1.19	0.90	1.58	0.218
Age						
Age 18-24 (referent)	159	20.52	-	-	-	-
age 25-45	580	22.77	1.14	0.91	1.44	0.252
age 46-64	405	25.38	1.24	0.98	1.58	0.078
age >=65	89	36.48	1.80	1.25	2.60	0.002
Race						
White (referent)	1011	23.68	-	-	-	-
AI/NA	95	24.05	0.83	0.57	1.21	0.331
Other	132	25.24	1.22	0.95	1.56	0.124
Gender						
Male (referent)	359	22.01	-	-	-	-
Female	860	25.26	1.16	0.99	1.36	0.065
Severity of max PHQ-9						
None/Moderate (0-14) (referent)	632	38.61	-	-	-	-
Moderately severe (PHQ 15-19)	357	21.97	0.34	0.28	0.41	< 0.001
Severe (PHQ 20-27)	249	12.94	0.16	0.13	0.19	< 0.001
Treatment exposure (months)						
Continuous	-	-	1.03	1.00	1.06	0.051
Total episodes						
1 episode (referent)	1123	24.30	-	-	-	-
Two or more episodes	115	20.32	0.79	0.62	1.01	0.056
Total follow-up (FU)						
1 FU (referent)	112	13.88	-	-	-	-
2-3 FU	287	25.00	2.29	1.77	2.97	< 0.001
4-7 FU	418	35.91	3.96	3.04	5.15	< 0.001
8+ FU	381	32.93	3.84	2.77	5.32	< 0.001

[a] $R2_{max}$= 0.2087

Secondary Outcome – Effects on Social and Occupational Functioning

> "I've experienced professional satisfaction and gratitude when young patients (20s and 30s) get to redirect their life trajectory away from seeking disability to finding employment, pursuing education and improving their level of self-care and the quality of their relationships."
> *– Care Manager at Clinic E*

Effects of depression treatment on interference with social and occupational functioning was measured in the subset of patients who completed the patient survey at baseline and 6 months following treatment initiation, whether or not the patient was still engaged in depression treatment at the clinic. Occupational interference was used to measure economic well-being (see Impacts, Table 1). **Table 18** shows the effects of IMPACT depression treatment on functional interference. Reductions in interference indicate an improvement in functioning. Both social and occupational functioning improved a highly statistically significant amount.

Table 18. Effects of Collaborative Care on Social and Occupational Functioning

	Total	
Social Functioning Interference	n=	341
Mean (SD) baseline interference	4.66	(3.68)
Mean (SD) six month follow-up interference	3.69	(3.55)
Difference	20.8%*	
Occupational Functioning Interference	n=	337
Mean (SD) baseline interferenc	4.85	(3.46)
Mean (SD) six month follow-up interference	3.92	(3.37)
Difference	19.2%*	

*p< .001

Secondary Outcome – Effects on Medical Care Utilization

Effects of depression treatment on utilization of medical care services, including primary care, medical specialists, emergency room, and inpatient medical care was measured in the subset of patients who completed the patient survey at baseline and 6 months following treatment initiation, whether or not the patient was still engaged in depression treatment at the clinic. **Table 19** shows the effects of IMPACT depression treatment on medical care utilization. The only category showing a substantial difference is primary care medical visits, which dropped by almost half from baseline to the 6 month follow-up.

> "I believe IMPACT has greatly decreased patient visits to the ER, which positively benefits our patients' and our community hospital's financial stability and the hospital's ability to help patients in truly emergency situations."
> *– Care Manager at Clinic E*

Table 19. Effects of Collaborative Care on Medical Care Utilization

	All Clinics
Utilization of Medical Care at Baseline	
Mean (SD) primary care medical visits in past 6 mos	8.0 (9.9)
Mean (SD) medical specialist visits in past 6 mos	1.2 (3.8)
Mean (SD) emergency room visitsin past 6 mos	0.7 (1.3)
Mean (SD) inpatient medical nights in past 6 mos	4.1 (5.4)
Utilization of Medical Care at 6 months	
Mean (SD) primary care medical visits in past 6 mos	4.2 (4.3)
Mean (SD) medical specialist visits in past 6 mos	1.2 (3.2)
Mean (SD) emergency room visits in past 6 mos	0.6 (1.4)
Mean (SD) inpatient medical nights in past 6 mos	4.0 (5.1)

Secondary Outcome – Effects on Depression Care Utilization

Effects of depression treatment on utilization of depression care services, including primary care, mental health specialists, and inpatient psychiatric care was measured in the subset of patients who completed the patient survey at baseline and 6 months following treatment initiation, whether or not the patient was still engaged in depression treatment at the clinic. **Table 20** shows the rates of prior depression treatment among this group of patients. As expected, over three quarters of patients reported prior treatment for depression including two thirds within the past year. **Table 20** also shows effects of IMPACT depression treatment on depression care utilization. The only category showing a substantial difference is primary care depression visits, which more than doubled from baseline to the 6 month follow-up.

"She makes me feel like I have a true friend. I can really open up to her. She's a gift. I've needed her for many, many years."
– Patient at Clinic E

"This program helped me get the help I needed. It was a good program I really appreciated it. I had been taking medication but now I don't need it."
– Patient at Clinic A

Table 20. Effects of Collaborative Care on Depression Care Utilization

	All Clinics
Utilization of Depression Treatment at Baseline	
Any prior depression treatment	76.7%
Depression care within past year	67.3%
Mean (SD) primary care depression visits in past 6 mos	2.5 (3.2)
Mean (SD) mental health specialist visits in past 6 mos	2.0 (4.6)
Mean (SD) inpatient psychiatric nights w/in past 6 mos	5.0 (1.6)
Utilization of Depression Treatment at 6 month Follow-up	
Mean (SD) primary care depression visits in past 6 mos	5.1 (6.5)
Mean (SD) mental health specialist visits in past 6 mos	3.6 (6.4)
Mean (SD) inpatient psychiatric nights w/in past 6 mos	6.0 (4.7)

DISCUSSION

This SIF initiative demonstrates that rural primary care clinics serving low-income patients can achieve depression remission and response rates comparable to those published in research trials[1-6] and large-scale implementations.[13-16] About 24% of SIF-CC patients achieved remission, which is within the range found by other large implementations, which have documented remission rates between 24% and 52% among participating clinics, indicating substantial clinic variation. Variation in clinic-level processes of care and patient-level clinical outcomes is well documented in other Collaborative Care implementations.[13,15,16] Collaborative Care is multi-component, team-based treatment model requiring two new roles and substantial, sustained changes to clinic workflows and processes.[47] A growing body of implementation literature indicates it is more difficult to unlearn old habits than learn new ones,[48] which is problematic when quality improvement requires replacing old roles, workflows, and processes with new ones.

As seen in other depression studies,[49] patients with more severe baseline were less likely to experience remission. Remission of symptoms (PHQ-9 score less than 5) is a difficult target, especially with a low-income population experiencing the compound stressors associated with economic disadvantage.[50] This is particularly challenging in rural areas because there may not be options for referral to specialty care. These findings also suggest that dose and duration of Collaborative Care matters. The mean duration of treatment was 3.5 months with longer duration of treatment associated with better depression outcomes. Similarly, patients with more CM contacts had better depression outcomes, suggesting future Collaborative Care implementations in rural clinics should focus on maintaining patients in treatment longer. Older patients were more likely to experience depression remission, a finding that contradicts prior randomized controlled trials[6] but mirrors real-world Collaborative Care implementation.[15]

Primary care providers, in short supply in rural clinics, were positive about their experiences with Collaborative Care which replicates findings from other implementations.[13,34] This is important because provider burnout is associated with poorer health outcomes for patients[51] and lower retention of providers.[52]

Innovations to address the accelerating gap between the need for mental health services and the available workforce, especially in rural areas where the gap is greatest, are needed. Understanding implementation methods that effectively scale evidence-based intervention that requiring systems and providers to change roles and workflows are also necessary.[53-54]

Lessons Learned

Implementation

The AIMS Center has over 13 years' experience assisting 1,000's of organizations implement Collaborative Care. Their SIF experience mirrors lessons learned with other implementations. These include:

> "The pressure to make changes quickly was challenging. When change happens fast it isn't well thought-out and the clinic can quickly lose buy-in"
> *– Behavioral Health Provider at Clinic C*

- Collaborative Care is a complex multi-component clinical practice change that affects the entire workflow of the clinic and all clinic staff. As such, every organization experiences unexpected implementation challenges no matter how well they planned and prepared for implementation.
- Clinics and providers rarely understand the true scale of disruption to usual practice that will be required to effectively implement Collaborative Care when they embark on implementation, no matter how much they are told that this is a large-scale systemic change to clinic operations. Experience is believing.

- Some of the same principles that drive better clinical outcomes for patients in IMPACT also drive better clinical outcomes at the organizational level. Regularly reviewing data about both processes of care and clinical outcomes and using this information to make adjustments to program implementation mirrors the treat-to-target principles clinics are taught to employ at the individual patient level.

- Clinics with an existing co-located behavioral health program who intend to keep that program while simultaneously implementing IMPACT as a complementary service often experience more implementation challenges than clinics without an existing behavioral health service or clinics remaking all of their behavioral health services to align with IMPACT. This is referred to as "de-implementation" in the Implementation Science literature and is a well-recognized impediment to adoption and sustainment.[55-56]

- Patients in rural areas can be more challenging to engage and retain in depression treatment. Reasons for this include travel distances, lack of reliable/available telephone service, higher prevalence of stigma associated with mental health care, and more prevalent cultural expectations of independence and self-reliance.

- If an organization is struggling with implementation challenges it's important to recognize those as early as possible and intensify coaching and assistance. Proactive identification and intervention increase the likelihood that the clinic will be able to resolve the challenges before they derail implementation.

- Genuine buy-in and enthusiasm for practice change is necessary among key stakeholders, including clinic leadership, medical providers, support staff and behavioral health staff.

- Implementation is a process that evolves over time. Patience with this process is often one of the biggest challenges for clinics because they expect everything to change on the day they launch the program and they expect everything to be in place immediately when that is not realistic with such a complex clinical practice change.

> "I called a meeting with the CEO and the CFO and I said, "We have a decision to make. Either we fall in with this or we just let it go. We can't be half in and half out. It has to be the whole clinic bought in and meeting the requirements." I was extremely irritated…this is where they said "No, no, whatever you need." And so from then on I just had to keep reminding them - You said whatever I need."
> *– Implementation Leader at Clinic A*

- Long-term sustainability planning requires significant individual assistance and a sustained effort because the strengths and challenges faced by clinics in this topic area are highly individual and ongoing. Intensive onsite assistance after laying a foundation is particularly effective in helping organizations accomplish sustainability.

Specific lessons learned for the Social Innovation Fund IMPACT initiative:

- All of the subgrantee sites participated in planning, training, and post-launch coaching activities conducted by the AIMS Center, though for some participation has been more fully engaged and for others it has been more cursory. The clinics with more cursory participation in training and implementation support activities had poorer clinical outcomes.

- The Cohort 1 clinic that struggled most with early implementation (reported in a prior interim evaluation report) received intensive onsite coaching and training and used this assistance to turn things around and they are now one of the highest performing clinics.

- All but two clinics exceeded their enrollment goals. The two sites serve a largely American Indian / Alaska Native patient population. Their challenges identifying and engaging patients in depression treatment mirror the AIMS Center's prior experience with Alaska Native health clinics as part of an earlier implementation initiative.

- Consistent with our prior experience with low-income patients served at community primary care clinics, the eight subgrantee clinics are seeing more than half (61%) of their IMPACT patients with moderately severe or severe depression symptoms at baseline and a mean PHQ-9 of 16.1 (moderately severe). Through the SIF IMPACT initiative, the mean PHQ-9 dropped 5.1 points to 10.9 (p value <0.0001) at last measurement. This change is both statistically and clinically significant.

- Clinic explained a significant amount of variance in depression response and remission, a finding consistent with the published literature.

- Maximum PHQ-9 score explained a significant amount of variance in outcomes, with positive outcomes related to lower maximum depression severity.

- Each month in treatment increased a patient's odds of having a depression response 7% and of remission 3% and the number of follow-up contacts during the treatment episode was strongly linearly associated with better response and remission rates.

- Clinics located in rural and frontier areas face significant workforce challenges for all types of providers, including primary care and behavioral health. To accommodate this, we offered clinics the option of two different models for the **care manager role**: 1) **all-in-one**, which is a licensed behavioral health provider capable of the full range of care manager responsibilities including treatment planning and delivering psychotherapy, and 2) **shared** care manager, in which all of the tasks that don't require a license are performed by a medical assistant, community health worker, or similar paraprofessional so licensed behavioral health providers focus their limited time on the tasks that require a license.

- Similarly, the AIMS Center helped the participating clinics be creative about how to fill the psychiatric consultant role. In most Collaborative Care implementations the consultant role is performed by a psychiatrist. However, psychiatrists are exceedingly rare in rural areas. Several clinics utilized the services of a psychiatric nurse practitioner as their psychiatric consultant and several clinics had psychiatric consultants that supported them remotely via the CMTS registry and telephone.

- The culture of the rural west was another challenge the clinics grappled with. Stoic self-reliance is a strong cultural value and can be an impediment to seeking or accepting help.

- Rural areas are defined by their low population density. Isolation can trigger or exacerbate depression and it can be difficult to address this effectively with patients. Some clinics created groups for patients, in part as a way to provide them with an opportunity for social interaction.

Evaluation

Lessons learned about evaluation of this SIF initiative:

- Clinic leadership at all of the subgrantee sites participated in baseline data collection about their clinic, patient population and other organizational factors that may influence program implementation.

- Cohort 1 and cohort 2 sites completed follow-up (18 month) data collection about organizational factors that may influence program implementation.

- Baseline patient survey data collection was completed after the evaluation team, in consultation with CNCS and JAHF, decided to make the patient registry the data source for the primary outcome.

- Implementing a patient incentive ($40 gas card) positively affected completion rates for the follow-up survey.

- We can accomplish an 80% retention rate for the patient survey, collecting a total of 354 paired surveys (baseline and follow-up surveys), beating our goal of a 30% max attrition rate.

- However, recruiting rural, low-income patients to participate in a baseline and 6 month survey was difficult. When it became clear we could not recruit a sufficiently representative sample of patients we requested and received permission to revise the SEP to make the CMTS registry the primary data source.

- We can achieve an average response rate higher than 80% for clinician surveys.

RECOMMENDATIONS

Program Recommendations

- Recognize that implementation in rural and frontier communities requires additional time and support than typically necessary for urban and suburban clinics. However, rural communities also have strengths that can facilitate effective implementation if these are recognized and leveraged. Consider using the "Rural Implementation Formula"[55] which recommends:
    1. "Leverage rural communities' strengths by investing in relationships as an implementation asset.
    2. Fund and build creative individual and organizational capacity in rural communities.
    3. Partner with rural communities to translate research-based programs and practices to the rural context.
    4. Support extended implementation timelines."

- Further develop and test the efficacy and effectiveness of the Organizational Relapse Prevention process. Identify opportunities to test this process with other evidence-based clinical innovations, either Collaborative Care or other interventions, to increase understanding of the predictors of sustainment.

Evaluation Recommendations

- Further analyze data from the Collaborative Care version of the Stages of Implementation Completion (SIC) and identify a future opportunity in which to use this tool prospectively as a real-time feedback mechanism for organizations implementing Collaborative Care and evaluate effects on implementation success.

- Analyze clinical outcomes and processes of care for American Indian / Alaska Native patients to better understand effective delivery of depression treatment to this marginalized and underserved population which has the highest completed suicide rate of any ethnic group.

- Analyze clinical outcomes and processes of care for clinics that continue to use the CMTS registry after conclusion of funding to observe sustainment.

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APPENDIX

A. **Implementation and Evaluation Timeline**

B. **Outcome measures, sources, timing, fidelity**

C. **Evaluation Data Collection Procedures**

APPENDIX A

Implementation and Evaluation Timeline

SIF 2014-2017 ACTIVITIES	Original Timeframe																																										Aumentation Timeframe																							
	Yr 2012						Year 2013												Year 2014												Year 2015												Year 2016												Year 2017											
	Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4		
IMPLEMENTATION	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
CNCS Award to JAHF	|x|																																																																
Cohort 1 Subgrantee site selection					x	x	x	x	x																																																									
Cohort 1 Subgrantee pre-launch planning and training													x	x	x																																																			
Cohort 1 Subgrantee launch IMPACT															x	x																																																		
Cohort 1 Subgrantee post-launch training																x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																		
Cohort 1 Subgrantee post-launch coaching and support																x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																		
Cohort 1 Subgrantee $ sustainability support																															x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																		
Cohort 2 Subgrantee site selection																	x	x	x	x	x	x	x																																											
Cohort 2 Subgrantee pre-launch planning and training																								x	x	x	x																																							
Cohort 2 Subgrantee launch IMPACT																												x																																						
Cohort 2 Subgrantee post-launch training																												x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
Cohort 2 Subgrantee post-launch coaching and support																												x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
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EVALUATION DEVELOPMENT																																																																		
Development of measures, evaluation materials, procedures	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																																																				
Cohort 1 subgrantees trained in patient approach procedures													x	x	x												x												x																											
Cohort 2 subgrantees trained in patient approach procedures																									x	x	x												x													x														
EVALUATION: DATA COLLECTION - COHORT 1																																																																		
Patient recruitment and consenting																			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																																
Subgrantees use Registry: patient care/implementation monitoring																x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
Patient Baseline Survey																			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																																	
6-month Patient Follow-up Survey																									x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																					
Leadership Baseline Survey/Interviews															x	x																																																		
Leadership Follow-up Survey/Interviews (collect at 18mo)																																	x																																	
Leadership End of Study survey and Phone Interview																																															x	x																		
Provider Survey/Interviews (collect at 18 mo)																																	x																																	
Subgrantees provide information from administrative data systems																																															x	x																		
Stages of Implementation (SIC) analysis																																											x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
EVALUATION: DATA COLLECTION - COHORT 2																																																																		
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Subgrantees use Registry: patient care/implementation monitoring																												x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
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6-month Patient Follow-up Survey																																		x	x	x	x	x	x	x	x	x	x	x	x																					
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Leadership Follow-up Survey/Interviews (collect at 18mo)																																													x																					
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Provider Survey/Interviews (collect at 18mo)																																													x																					
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REPORTING AND ANALYSIS																																																																		
Monthly review of Implementation Process Reports for TA																x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x						
Monthly review of Evaluation Reports																x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																					
Annual Progress Report to CNCS																									x												x											x																		
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APPENDIX B

Outcome measures, sources, timing, fidelity

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Outcome	Source	Timing	Implementation Fidelity
Measures for impact evaluation			
• **Depression (Patient Health Questionnaire-9)**	• **CMTS Registry (all IMPACT patients)** • Patient survey	• Baseline survey • 6 month follow-up survey • Intake assessment (registry) • Follow-up contacts (registry)	• CMTS baseline and follow-up initiated Sep/Oct 2013 • Patient survey baseline started Jan/Feb 2014 • Patient survey follow up began July/Aug 2014 • PHQ-9 is measured at baseline and most subsequent follow-up contacts
• **Social functioning (Sheehan Disability Scale)**	• Patient survey	• Baseline survey • 6 month follow-up survey	• Patient survey baseline started Jan/Feb 2014 • Patient survey follow up began July/Aug 2014
• **Occupational functioning (WHO Work Performance** • **Questionnaire, Work Productivity and** • **Activity Impairment Questionnaire, income)**	• Patient survey	• Baseline survey • 6 month follow-up survey	• Patient survey baseline started Jan/Feb 2014 • Patient survey follow up began July/Aug 2014
• **Patient satisfaction**	• Patient survey	• Baseline survey • 6 month follow-up survey	• Patient survey baseline started Jan/Feb 2014 • Patient survey follow up began July/Aug 2014
• **Patient use of depression care**	• **CMTS Registry (all IMPACT patients)** • Patient survey • End of study interview	• Baseline survey • 6 month follow-up survey • Follow-up contacts (registry)	• Patient survey baseline started Jan/Feb 2014 • Patient survey follow began July/Aug 2014 • CMTS baseline and follow-up initiated Sep/Oct 2013
• **Health service utilization (patient survey questions adapted from Cornell Service Index and Medical Expenditure Panel Survey Data questionnaire)**	• Clinic Administrative data (all IMPACT Patients) • Patient survey	• Baseline survey • 6 month follow-up survey • Six months before and 24 months following treatment initiation	• Patient survey baseline started Jan/Feb 2014 • Patient survey follow up began July/Aug 2014 • Health Utilization data collection began in the spring of 2015
Measures for implementation evaluation			
• **Initial assessment completion** • **Follow-up assessment completion** • **Patients staying in contact for at least 12 weeks** • **Patients had at least one psychiatric consultant review during treatment** • **Depression improvement**	• CMTS Registry (all IMPACT patients)	• Intake assessment (registry) • Follow-up contacts (registry)	• CMTS baseline and follow-up initiated Sep/Oct 2013 • Review of current CMTS data done at monthly Implementation calls with Subgrantees
Measures for leader and provider interview			
• **Leadership survey** • **Clinician survey**	• Quantitative survey and Qualitative Interview • Quantitative survey • End of study qualitative interview	• Baseline and 18 months after program implementation • 18 months after program implementation	• Baseline leadership survey and interviews completed Sept 2013 (Cohort 1) Sept 2014 (Cohort 2). Follow-up leadership interviews completed for Cohort 1 February 2015. • Follow up leadership survey and interviews done at 18 months post-launch • Clinician surveys done at 18 months post-launch • End of study qualitative interview done at 32 months post-launch

APPENDIX C

Evaluation Data Collection Procedures

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Leadership Surveys

Subgrantees identified members of the leadership team involved in the implementation planning to participate in data collection. One or more members of the leadership team completed an online survey with quantitative information about the organization (e.g. number of patient visits in the prior year, payer mix). Following completion of that online survey, the entire leadership team (as identified by the subgrantee) participated in a qualitative interview with 2 members of the evaluation team at the AIMS Center. The AIMS Center used an interview guide outline to help structure the conversation and insure that all of the key topics of interest were covered. This interview was conducted by telephone and was audio-recorded and subsequently transcribed. The same method was used at 18 months following clinical program launch.

Care Management Tracking Registry

Clinicians at each subgrantee clinic enter patient information as part of ongoing clinical care.

Patient Surveys

Trained interviewers at the AIMS Center complete a ~20 minute telephone interview with each patient agreeing to complete the survey (both baseline and 6 month follow-up). Interviewers make 10 call attempts during eligibility period. During the first week, there are 3 calls made distributed over day of the week (including weekends) and times of day (including evenings) to increase the likelihood of completing the baseline survey within the 8 week time frame for baseline data collection. A staff member evaluates the incomplete surveys each day to prioritize them for contact and to insure that each one has been given the appropriate amount and type of contact attempts. Each survey is audio-recorded and a randomly selected 10% of all surveys are reviewed by a data collection supervisor to insure appropriate data collection methods were used and to provide feedback to interviewers when necessary.

To ensure a high response and retention rate, the patient survey collection procedures were expanded to include the following components:

- The AIMS Center developed and launched an online version of the baseline and follow-up supplemental patient surveys to increase participation rates, especially among patients who have telephone service with limited minutes and those who will feel more comfortable completing the survey in a more anonymous manner.
- The AIMS Center sends a reminder postcard to all patients prior the follow-up survey. The postcard will also provide the online survey link for the participant to complete the survey online if they prefer.
- The AIMS Center Implemented texting as a strategy to communicate with patients, including sending the link to the online survey, which has produced immediate results for both telephone and online surveys and responses from patients otherwise out of contact.
- AIMS Center staff provided ongoing training and support to clinics regarding effective recruitment of patients for the supplemental patient survey, including a live answer line for patients to call and complete the survey immediately and setting up a computer in some clinics so patients can complete the survey online at the clinic.
- The addition of a patient incentive for completion of both the baseline and follow-up survey. Upon completion of the follow-up survey, participants will receive a $40 gas card from a gas merchant located near their respective clinic.
- For patients who complete a baseline supplemental survey, and are not reachable at the time of the 6 month follow-up (after using all means to locate), we will use the PHQ-9 score from their final clinical follow-up assessment as entered in the registry. This will allow us to include information from those patients lost at follow-up in the final analysis of the main impact question (depression severity).

Clinician Surveys

All clinic staff providing IMPACT care to patients (care managers, consulting psychiatrists, and primary care providers) will complete an online survey and a qualitative interview with AIMS Center staff. The AIMS Center will use an interview guide outline to help structure the conversation and insure that all of the key topics of interest are covered. Interview will be conducted by telephone, audio-recorded and subsequently transcribed.

Administrative/Claims Data

Subgrantees provided data from their administrative data systems regarding demographics, These data elements are already collected by the clinics for the Uniform Data System (UDS) reporting to HRSA so can be collected accurately and consistently across clinics. This data was used to enrich and validate the patient registry data and serve as a source for capturing missing registry data. The AIMS Center provided a detailed description of the desired data elements, data format, etc. and worked with staff at the subgrantee clinics to transmit the data to the AIMS Center in a HIPPA secure manner.

End of Study Survey and Qualitative Interview

To provide additional data on utilization trends, we collected an end-of-study survey and phone interview with clinic leadership and care teams. The online survey captured feedback from the care teams on their experience with AIMS center technical assistance and support to identify and characterize critical components that lead to improved implementation. The qualitative phone interview captured the care team's experience with IMPACT and the complex practice change. It also captured information on health care utilization and how the IMPACT program has changed how patients use clinic services.

Stages of Implementation Completion (SIC) and Fidelity Score

The Stages of Implementation Completion (SIC) measure allowed us to describe variation in implementation process and fidelity to key components of IMPACT amongst the subgrantee clinics and whether/how these affected processes of care and/or clinical outcomes. The measure was completed by AIMS Center evaluation staff and entered into the Oregon Social Learning Center web portal for scoring and interpretation..