



Digital Diabetes Self-Management Education and Support (DSME-S)

Jan 2019
Atlanta, GA
Tri-Cities Report

Rimidi is a cloud-based software solution that enables personalized management of chronic cardiometabolic conditions across populations, with specific platforms for diabetes, heart failure, and fatty liver disease.¹

Created by doctors, Rimidi connects patient-generated health data with EHR systems to drive patient-specific clinical insights and actions. The net effect is a better health system with optimized clinical workflows that enable better decisions, better relationships, better outcomes, and ultimately a better healthcare system. It's time for better.



Atlanta Regional Collaborative for Health Improvement (Coordination Partner)

Atlanta Regional Collaborative for Health Improvement (ARCHI) is a growing coalition of public, private and nonprofit organizations committed to improving the region's health. ARCHI was founded by individuals and organizations committed to upstream, cross-sector work. The organization uses a cutting-edge dynamic systems model that helps stakeholders determine the interventions that will create the greatest benefit at the lowest cost. ARCHI builds alignments between organizations and communities who may have never worked together before. Once residents, agencies or healthcare systems recognize that they have shared goals, ARCHI works to make it easy and seamless for them to connect, combine their resources and know-how and increase their impact.

In 2017, ARCHI Stakeholders gathered to analyze data about the health systems in Fulton and DeKalb Counties and consider the disparate health status of residents. The research revealed diabetes as an area of focus for the ARCHI partnerships. By addressing diabetes, the partnerships had the potential to positively impact many people residing in medically underserved areas of metro-Atlanta. A technological solution was identified as the ideal catalyst to address the diabetes epidemic. Rimidi having generated promising data with respect to the usage and impact of a commercial digital health platform for diabetes management was selected to lead the collaborative efforts.



Diabetes—What to Know

(Content Partner)

A simple way to learn how to be healthy with diabetes. Diabetes- What to Know (DWTk) has short videos that make learning about Type 2 diabetes simple. DWTk focused on making diabetes education for people with type 2 simple, engaging and transformative. DWTk's mission is to help people with type 2 learn the basics of managing diabetes, while also changing attitudes about health through short, engaging videos.

THE PERRY FOUNDATION

The Tyler Perry Foundation

(Funding Partner)

Since 2006, The Tyler Perry Foundation's aim has been to transform tragedy into triumph by seeding individual potential, supporting communities, and harvesting real change. Areas of focus are: Education, Clean Water, Health, Agriculture, Girls and Women's Rights, Technology, Arts, and Culture and Globally-Sustainable Economic Development.

There's a tremendous opportunity to leverage technology to bring healthcare to people where they need it: in their community, on their own device, and at their convenience. There's an equal burden to make that experience both simple and relevant for the individual. Lastly, new digital programs need to be tightly integrated with existing healthcare resources and systems to support individuals through their health journey, driving access to the next appropriate level of care at each step of the way. Rimidi developed and implemented a Diabetes Self-Management Education and Support (DSME-S) program to bring diabetes education to individuals at-risk and in need of better solutions for their diabetes care.

DSME-S is an important component of successful diabetes care; yet, low DSME-S utilization rates have been observed in medically underserved populations in the US due to high cost and poor accessibility of these services.² Only 4% of Medicaid recipients currently receive DSME-S.³ Typical barriers such as cost, availability, and accessibility are factors in these low participation rates.

Technological solutions have been shown to successfully address health disparities in vulnerable populations.⁽⁴⁻⁶⁾ Web-based learning and mobile health applications have been shown to improve diabetes self-management behaviors and outcomes.⁽⁷⁻¹⁰⁾ By leveraging existing smartphone and web-based technologies, the deployment of a Digital DSME-S course promotes patient accessibility, engagement, and education. This has the potential to be a cost-effective and scalable model for diabetes management at a time when the burden of chronic disease continues to grow in terms of morbidity, mortality and cost.

The deployment of Rimidi's DSME-S addresses health literacy and healthcare access constraints that often prevent medically underserved populations from accessing or benefiting from health information technologies. Based on proven DSME-S models,⁷⁻¹⁰ Rimidi has developed an 8-lesson, video-based DSME-S digital course accessible via smartphone and web browser. The course is tailored to reflect community demographics and resources in order to be most relevant for participants.

Rimidi’s Digital DSME-S platform is an 8-lesson, digital, self-paced, interactive course consistent with best practices in adult learning and compatible with American Diabetes Association (ADA)¹³ and American Association for Diabetes Educators (AADE)¹⁴ standards. The course offers educational modules using 1-2 minute videos focused on empowering patients by equipping them with the knowledge, skills, and resources they need to self-manage their disease. This short video format is based on current research on adult learning modalities.

The content of educational sessions is outlined in Table 1. The content is delivered by healthcare professionals as well as peers who represent the target audience. Rimidi’s Digital DSME-S allows for video, audio, and text content as well as administration of quizzes to test user comprehension. The platform also allows course administrators (client personnel) to monitor usage and moderate the conversation of a community of users as well as for peer interaction.

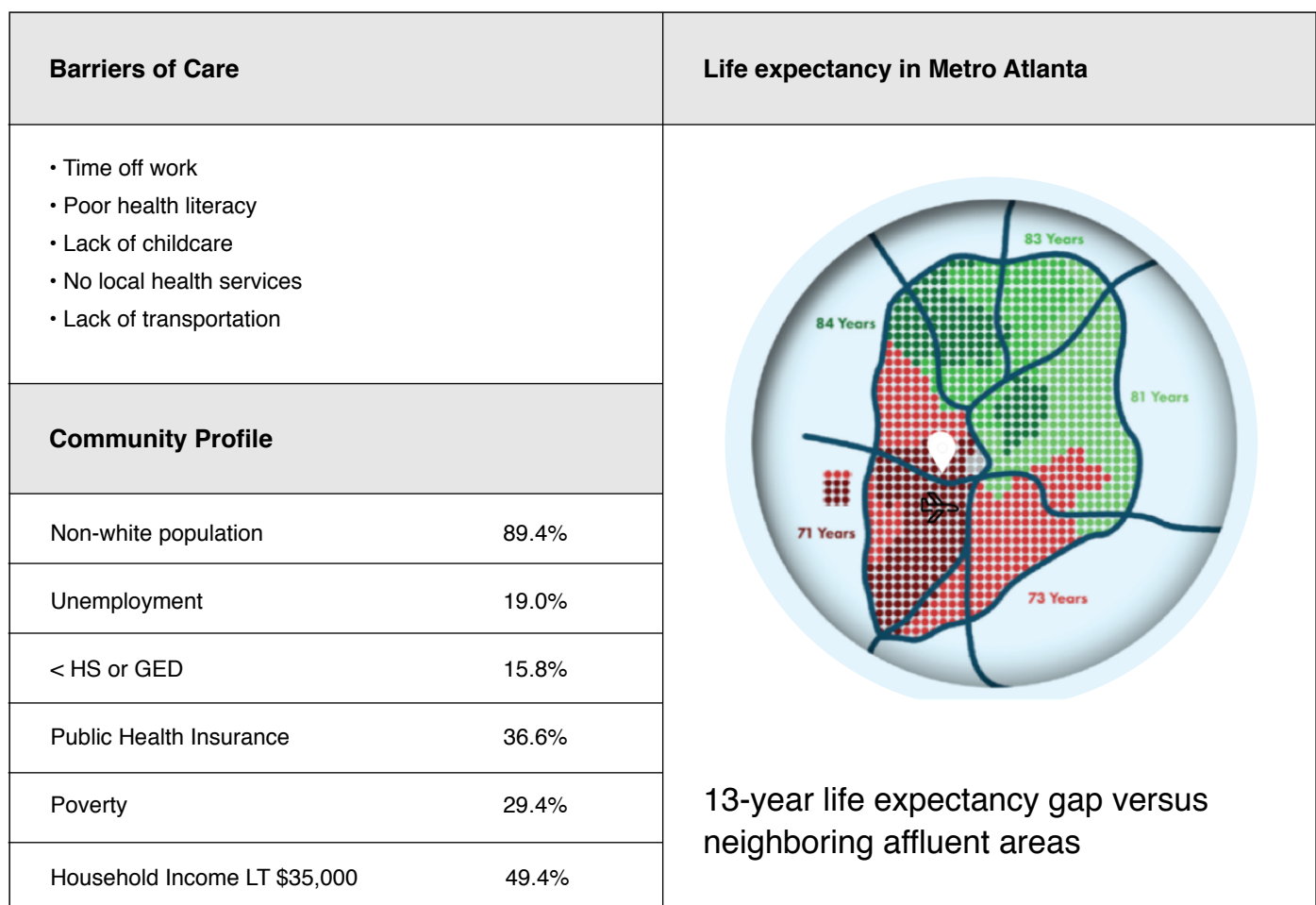
Table 1.
DSME-S course content

Overview of T2D and Monitoring	Nutrition	Know Your Numbers
<ul style="list-style-type: none">• How to test blood glucose• Targets for healthy glucose• Testing in pairs• What is hypoglycemia• What is hyperglycemia	<ul style="list-style-type: none">• Guidelines for a healthy food plan• Reading food labels• Portion control/Plate Method• Eating out• Grocery store tour	<ul style="list-style-type: none">• Blood glucose goals• Hemoglobin A1C• Blood pressure and lipids• How to get the most out of your doctor’s visit
Getting Active	Medication and Complications of Diabetes	Everyday Tips for Staying Healthy
<ul style="list-style-type: none">• Why exercise is important for people with T2D• Easy ways to get more active• Safety tips for starting to exercise	<ul style="list-style-type: none">• Disease progression• Types of medications• Side effects• Complications	<ul style="list-style-type: none">• Foot care• Dental care• Finding a support system• Staying motivated

As a result of a community needs assessment led by ARCHI, the Tri-Cities area of metro-Atlanta was identified as the target community for a diabetes intervention program. Tri-Cities is composed of three cities: College Park, East Point, and Hapeville.

Census information revealed Tri-Cities has 13-year life expectancy gap compared to more affluent areas of Atlanta.^(15,16) Figure 1 displays a map of the life expectancy distribution across Atlanta, provides demographic information on Tri-Cities, and lists some of the barriers to care present in the community. Tri-Cities is marked on the map.

Figure 1.
Tri-Cities Area of Metro-Atlanta



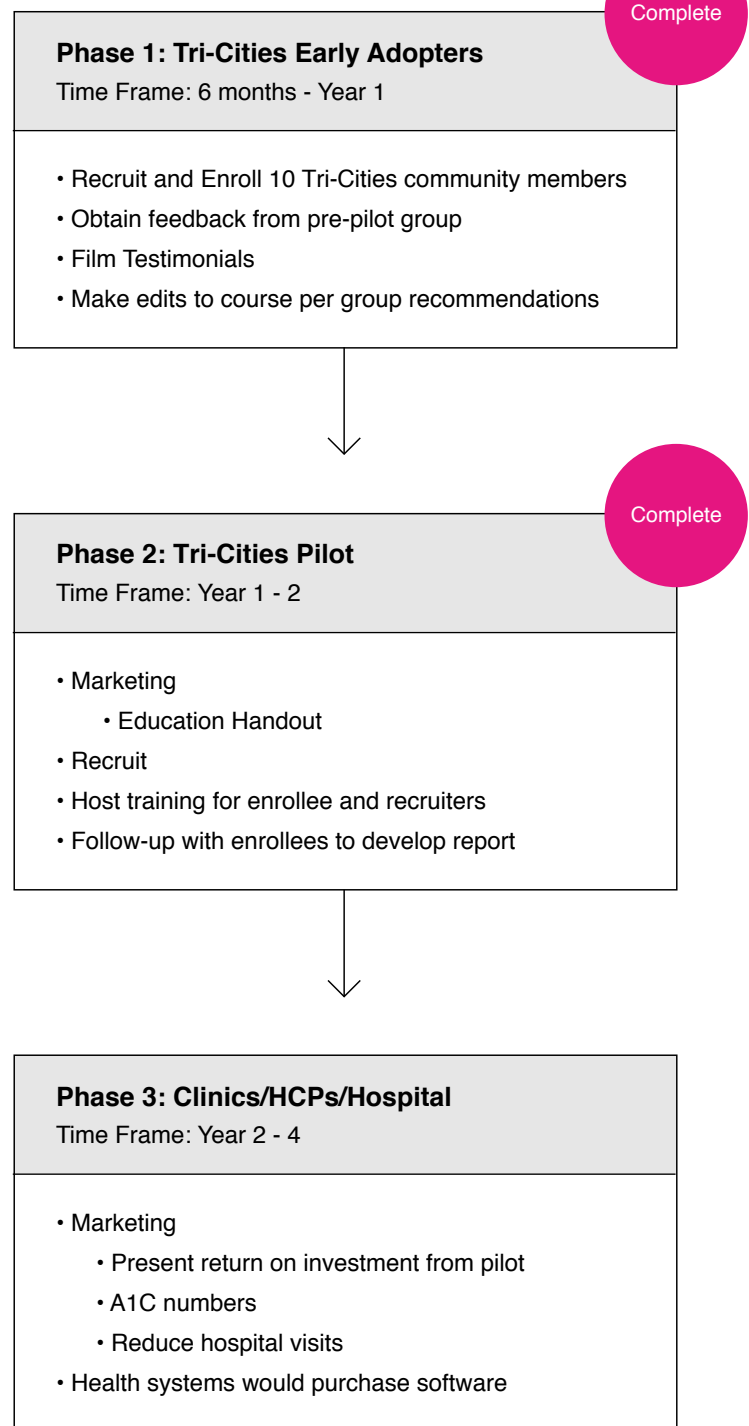
Recruitment

Rimidi and ARCHI developed a timeline for comprehensive management, recruitment efforts, and objectives (Figure 2). Over a 3-month period, participants were recruited for participation via several community resources. The community resources included a senior citizen center, local church, and recreation centers. Recruitment strategies included distributing flyers, displaying instructional sheets and in-person recruitment at organization events (see Appendix A for list of locations). Rimidi hosted an hour long DSME-S training session for eligible participants at two recreation centers. Participants were instructed to share word-of-mouth the opportunity for other diabetics and people with pre-diabetes to enroll in Rimidi's DSME-S platform.

An essential component to the recruitment process was the launch of the Community Health Ambassadors (CHAs) program at Tri-Cities High School. 15 high school students were selected and trained to use Rimidi DSME-S platform. The students were responsible for recruiting participants with pre-diabetes and Type 2 diabetes. Rimidi held 5 information sessions with the CHAs to help refine effective recruitment strategies and to promote education and awareness. Topics covered during meetings included: training on Rimidi DSME-S platform, understanding diabetes, and recruitment strategies.

Figure 2.

ARCHI & Rimidi Timeline



Eligibility

Eligibility criteria for enrollment in Rimidi's DSME-S included age 18 years or older, self-reported history of type 2 diabetes or pre-diabetes, and verbal fluency in English or Spanish. Participants were also required to have access to computer, tablet, and/or smartphone and an affiliation with the Tri-Cities community.

Design

From July 2018 through November 2018, participants were enrolled and given access to Rimidi DSME-S platform. Participants had access to course materials and a health educator via the group chat feature of the course (Comments Section). Upon completion of the course, a questionnaire was provided to obtain feedback regarding participant experience. Participants were considered to have completed the course if they completed the feedback survey. Participants received a \$25 Wal-Mart gift card upon completion.

Surveys and Quizzes

Participants were tested on knowledge via 4 to 5 question quizzes at the end of each lesson. Participants also completed surveys providing demographic information and self-reported health information.

Of the 111 participants enrolled, 75 (68%) completed Rimidi's DSME-S course. All surveys and survey questions were optional. All data collected was deidentified and unmatched. The deidentified, optional nature of the pilot resulted in differences in the total number of participants reporting across each survey. Demographic and DSME-S related variables are summarized in Table 1. Most participants were African American (79%) and 35 years or older (93%). 73% of the sample population were women. A majority of the participants had never participated in a DSME-S course (76%). All participants were required to have an affiliation to the Tri-Cities community. A Tri-Cities community member is defined as a person that resides in a Tri-Cities zip code. A Tri-Cities affiliate is a person that visits Tri-Cities for a variety of reasons (i.e. for employment, church, recreation centers). Figure 3 displays participant affiliation to the Tri-Cities community. The recruitment model was far reaching resulting in the population spanning 22 zip-codes across the metro-Atlanta area (Figure 4). The nodes in Figure 4 represent the size of the population from that region. Most participants resided in zip-code 30344 which is East Point, GA. Majority of the zip codes were within Fulton County the metro-Atlanta area. However there were also residents from Gwinnett, Douglas, and Dekalb counties. Table 2 displays self-reported health related statistics. 67% of participants were Type 2 diabetics and 33% were pre-diabetic. Most had tested their A1c in the past year (48%) and self-reported an A1c less than or equal to 5.6 (69%).

Table 1.

Demographic Information

Ethnicity	%	Total 39
Black or African American	79%	31
White	3%	1
Hispanic or Latino	10%	4
Asian	5%	2
Other	3%	1
Gender	%	Total 108
Male	27%	29
Female	73%	79
Age	%	Total 97
18 - 34	6%	6
35 - 54	49%	48
55+	44%	43
Education	%	Total 111
Less than High School Grad	12%	13
High School Graduate/GED	36%	40
Associates Degree	15%	17
Bachelors Degree	28%	31
Graduate School	9%	10
Ever Participated in DSME-S	%	Total 111
Yes	24%	27
No	76%	84

Participant Engagement and Satisfaction

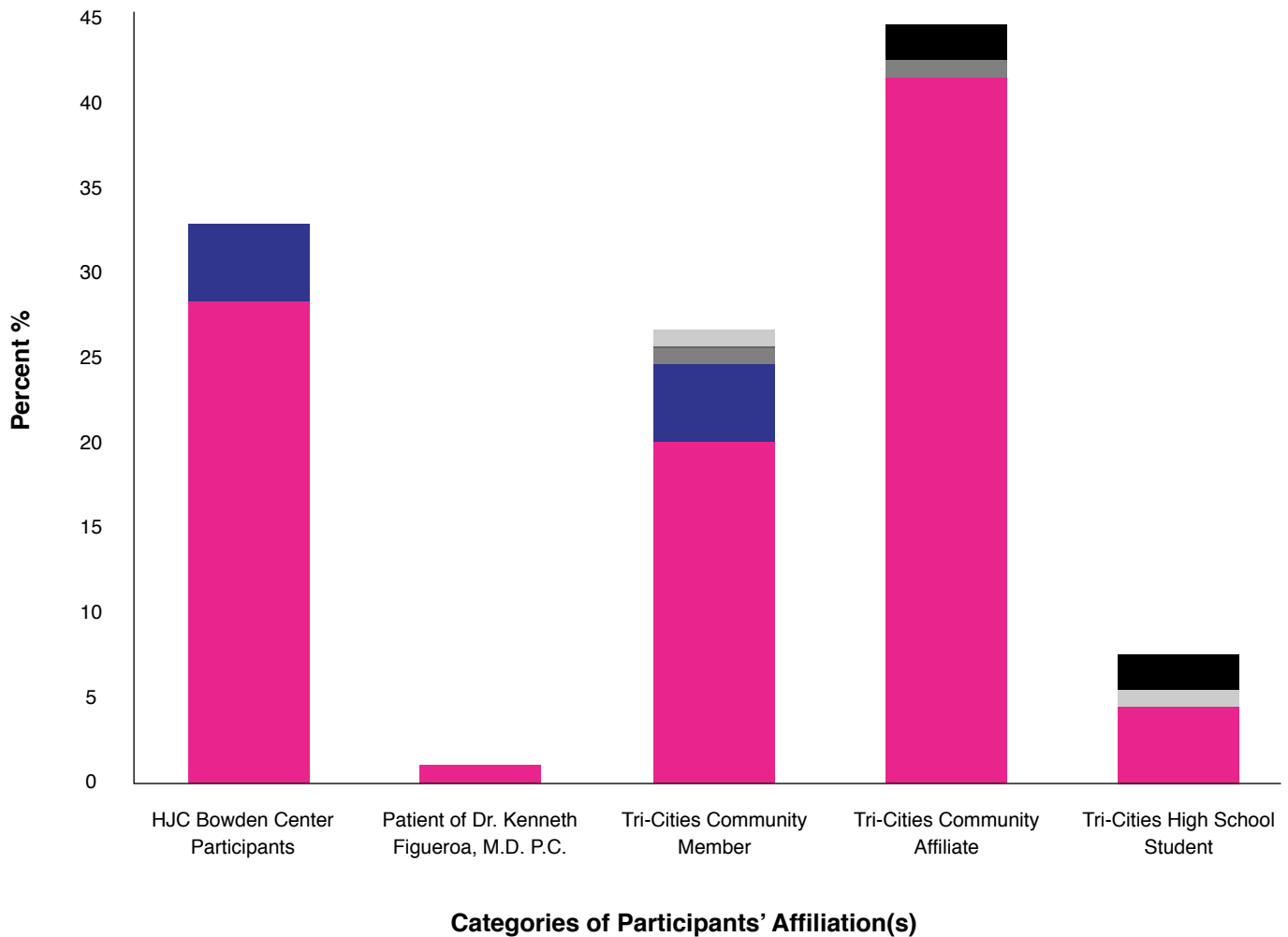
The primary outcome for the pilot is participant engagement. Overall participants were satisfied with the course materials and found the program helpful and engaging (Figure 5 and Table 3). Participants also shared the areas where they gained knowledge (Table 3). How to Improve Diabetes Management was the topic participants reported gaining the most knowledge followed by Monitoring and Testing.

Participant engagement was measured by the number of comments per lesson. Participants utilized the comments section for every lesson. Lesson 1 received the most comments (Figure 6). Enrollment for the pilot began in July however there was a decrease in engagement in September, but the number of those enrolled increased after the CHAs recruitment efforts began (Figure 7).

Participant knowledge was assessed at the end of each lesson via 4 to 5 question quiz. The quiz content was based on the diabetes related information shared via the videos. Table 4 displays the average quiz score by each lesson and the number of participants that completed the quizzes. Overall, students passed the all quizzes.

A concern for a population facing barriers to improving health is access to technology. All participants were required to have access to technology. 41% of participants completed the DSME-S course via laptop/tablet and 27% used smart phones (Figure 8). Most participants completed the course in their homes (Figure 9). The average time to complete the DSME-S course was 5 days (Table 5).

Figure 3.

Affiliation(s) of Participants

- Primary Affiliation
- HJC Bowden Center Participant & Tri-Cities Community Member
- Tri-Cities Community Member, Tri-Cities High School Affiliate
- Tri-Cities Community Member, Tri-Cities High School Student
- Tri-Cities Community Affiliate, Tri-Cities High School Student

Figure 4.

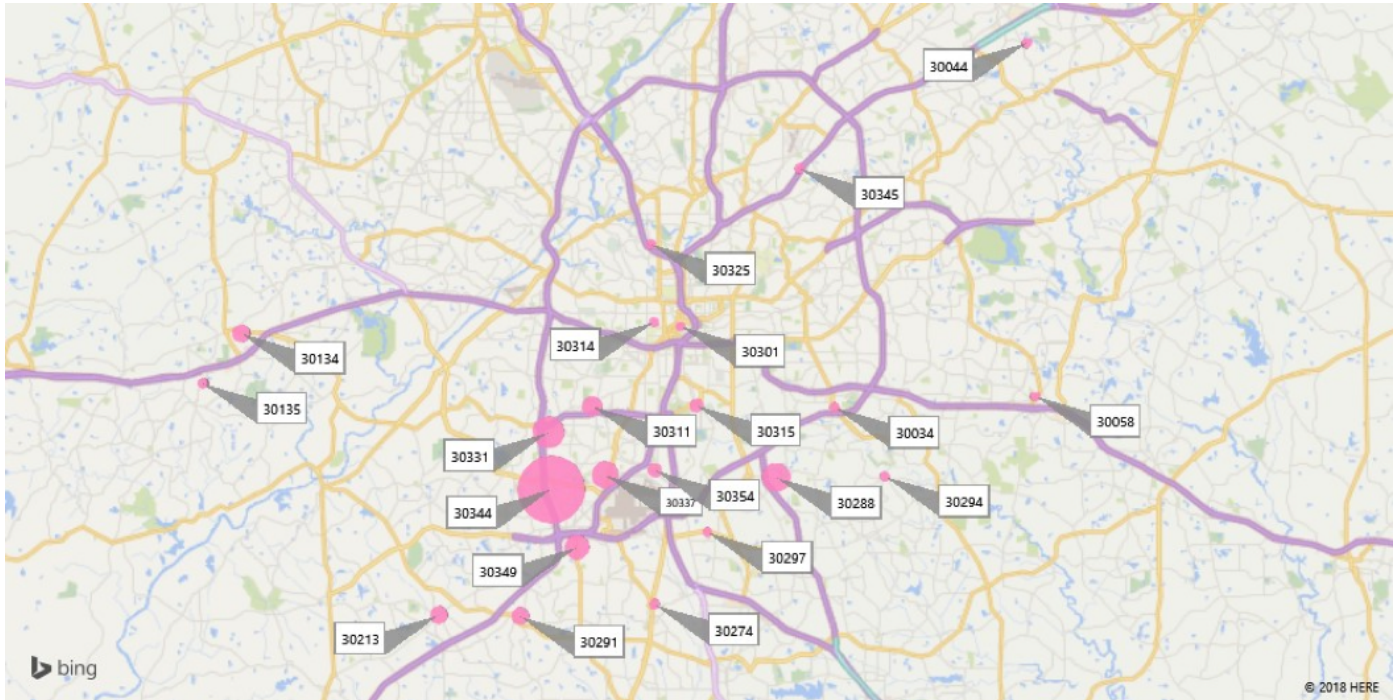
Map of Downtown Metro Atlanta Area Mapping Participants by Zip Code

Table 2.

Health Statistics

Diagnosis	%	Total 103
Diabetes	67%	69
Pre-Diabetes	33%	34
Time w/ Diabetes	%	Total 69
< 1 year	19%	13
1 to 5 years	39%	27
> 5 years	42%	29
A1C Tested in Past Year	%	Total 108
Yes	48%	52
No	30%	32
I Don't Know	22%	24
Self-Reported A1C	%	Total 111
≤ 5.6	69%	77
5.7 to 6.4	5%	5
6.5 to 7.9	21%	23
8.0 to 8.9	3%	3
≥ 9.0	3%	3

How often check blood sugar at home	%	Total 106
Never	30%	32
Less than once	9%	10
A few times per week	26%	28
Once a day	19%	20
Twice per day or more	15%	16
Overall Health	%	Total 99
Poor	6%	6
Fair	45%	45
Good	45%	45
Very Good	0%	0
Excellent	3%	3
Diabetes Control	%	Total 92
Poor	8%	7
Fair	51%	47
Good	38%	35
Very Good	0%	0
Excellent	3%	3
Do you have a diabetes care provider?	%	Total 106
Yes	67%	78
No	33%	28

Figure 5.
Satisfaction with Course Materials

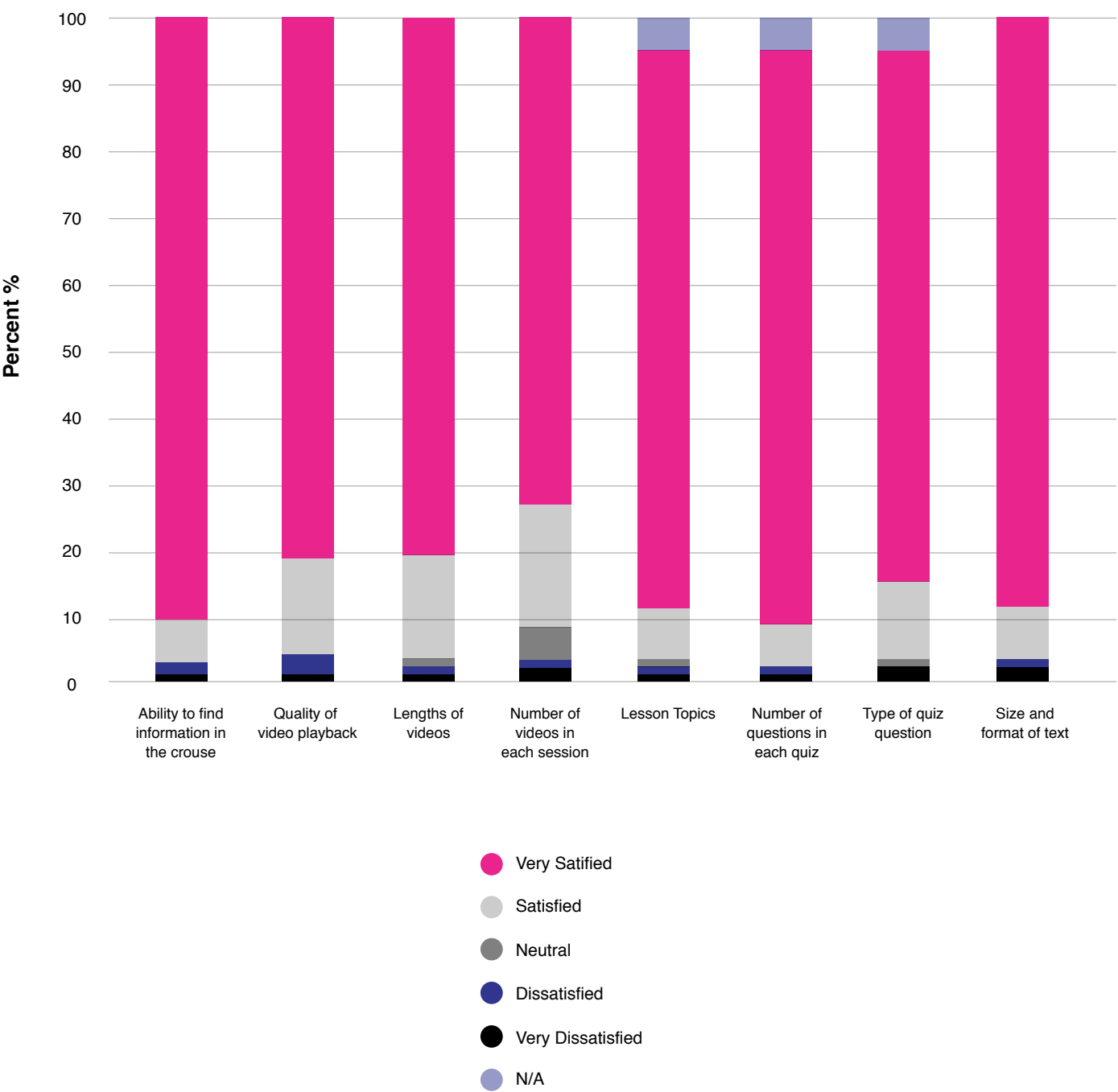


Table 3.

Satisfaction with Overall Course

How satisfied were you with the course?	%	Total 75
Not very	1%	1
2	0%	0
3	1%	1
4	15%	11
Very much	83%	62
How relevant and helpful for diabetes management?	%	Total 75
Not very	1%	1
2	0%	0
3	1%	1
4	11%	8
Very much	87%	65
Were people in videos knowledgeable?	%	Total 75
Yes	100%	75
No	0%	0
Were you able to relate to the people in the videos?	%	Total 75
Yes	97%	73
No	3%	2

What participants learned from course	%	Total 106
Community resources	6%	3
Healthy coping	13%	7
Healthy food options	11%	6
How to improve diabetes mgmt	19%	10
Importance of exercise	11%	6
Increase diabetes awareness	11%	6
Medications	2%	1
Mental Health and Diabetes	4%	2
Monitoring and Testing	17%	9
Problem Solving	7%	4

Table 4.
Post-Course Assessment

Lessons	Average Score	Total Participants Completed
Lesson 1: Introduction to Diabetes	93%	99
Lesson 2: All About Testing	85%	94
Lesson 3: Food	87%	92
Lesson 4: Exercise	85%	89
Lesson 5: Medications	91%	82
Lesson 6: Reducing Risks	91%	81
Lesson 7: Healthy Coping	98%	84
Lesson 8: Problem Solving	88%	84

Table 5.
Days to Course Completion

Days to course completion	Days
Minimum	1
Maximum	35
Average	5

Figure 6.
Participant Engagement by Lesson

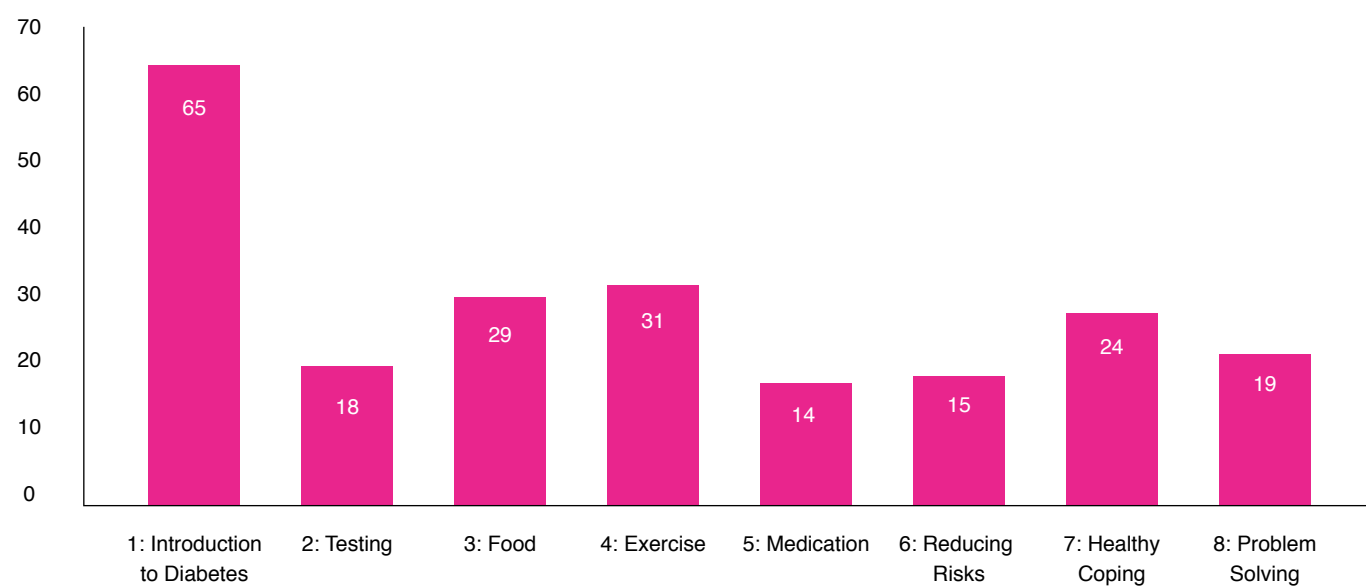


Figure 7.
Participant Engagement by Month

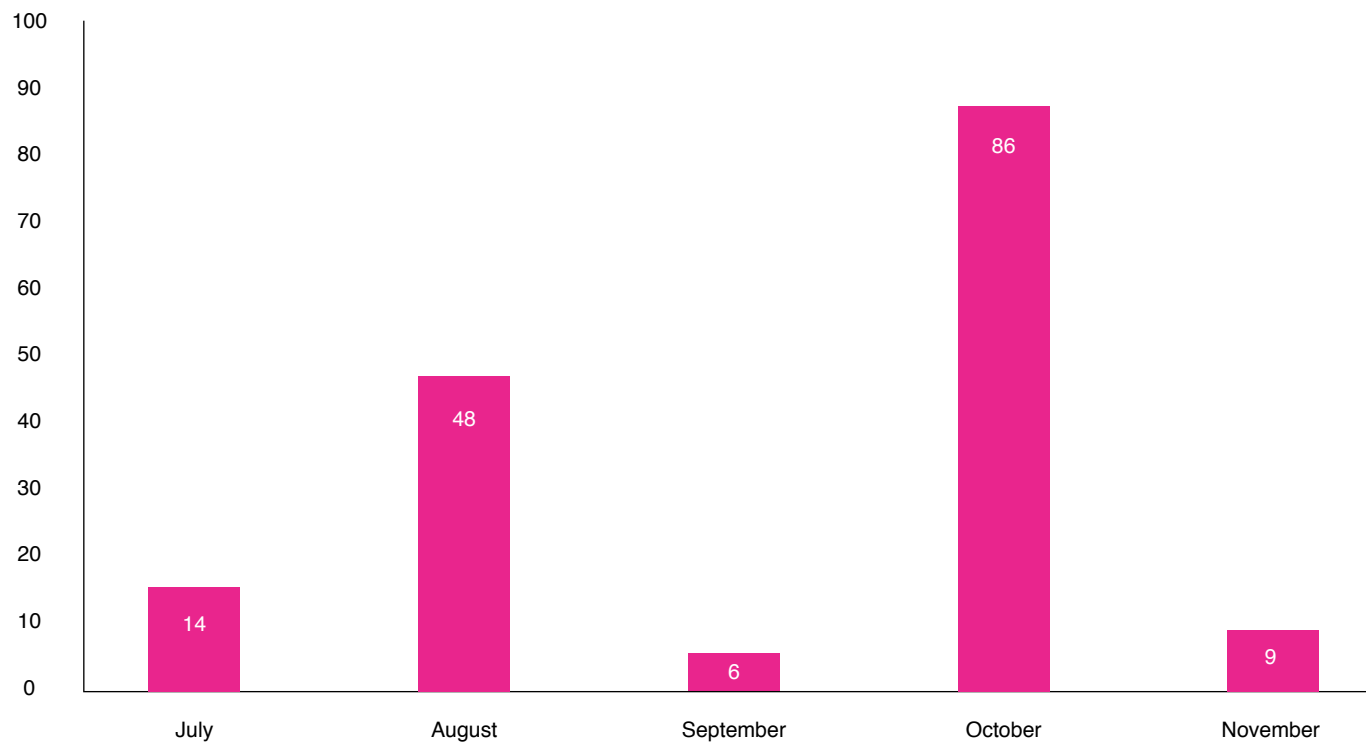


Figure 8.
Location of Participant during Course Completion

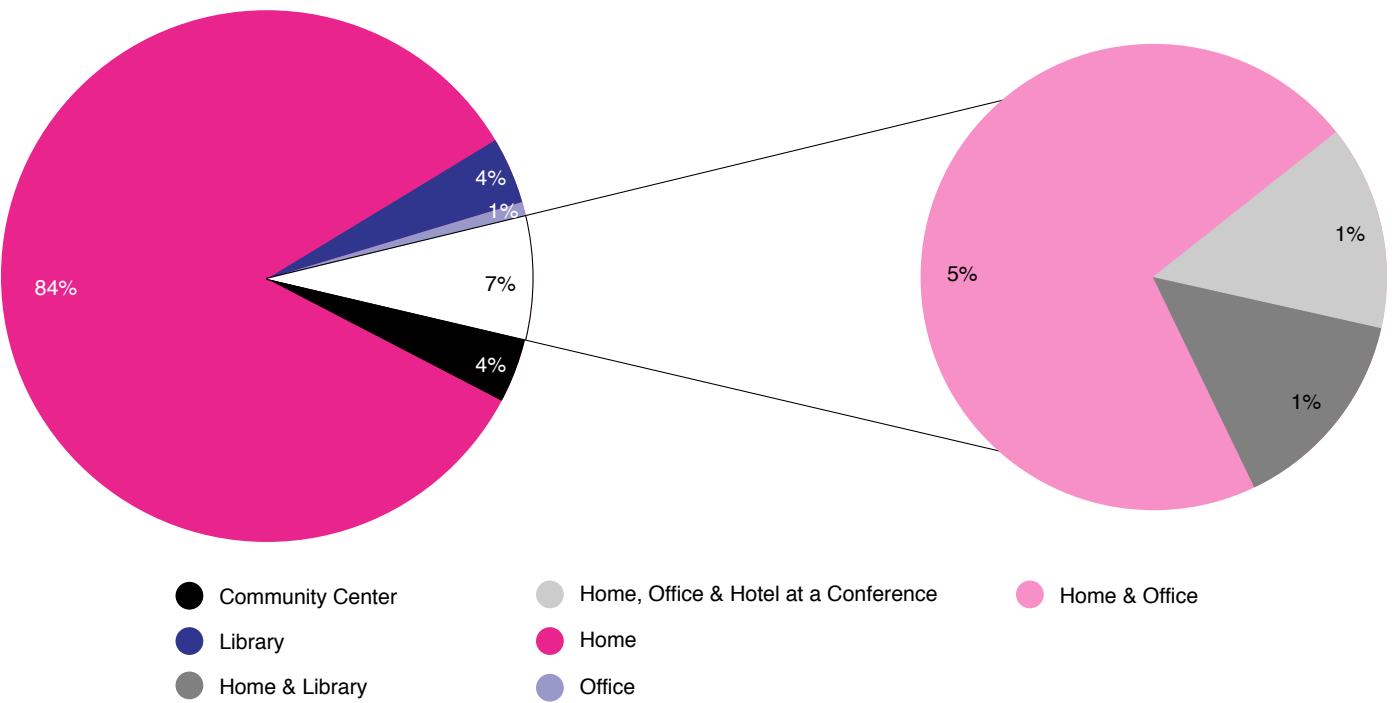
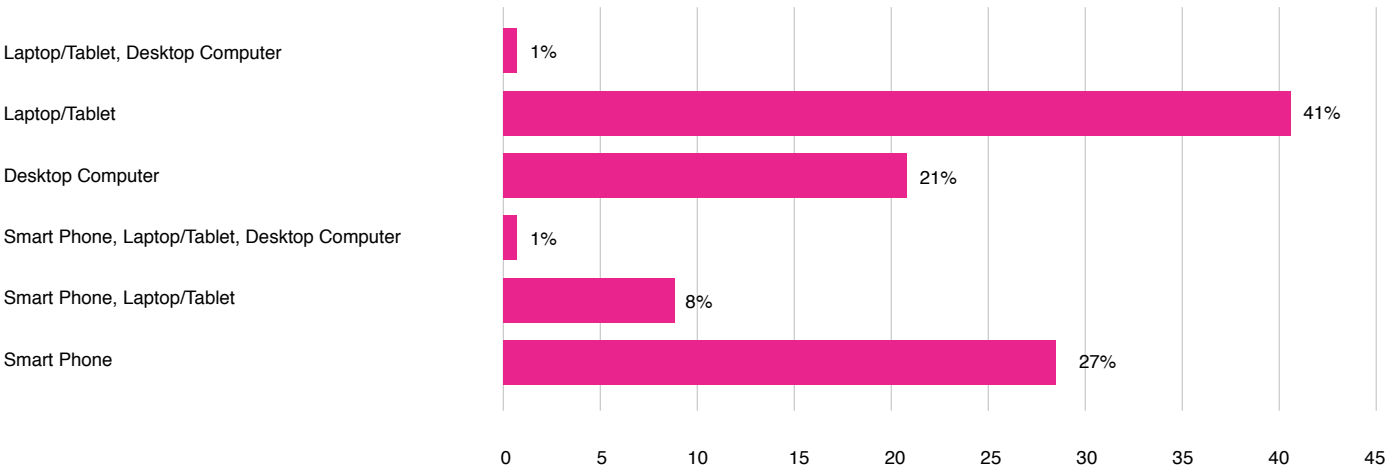


Figure 9.
Device(s) Used to Complete Course



Rimidi's DSME-S was successfully implemented in the Tri-Cities community and resulted in an increase in the number of people exposed to DSME-S. Participants reported high satisfaction with course materials and course content. Several methods supported the successful deployment of the program. First, the word-of-mouth recruitment resulted in over 100 enrollees and reached people in many zip codes outside of the Tri-Cities area. Second, the technological solution proved to be easily accessible for this medically underserved area. Thirdly, the use of high school students as virtual support provided an increase in the number of enrollees and kept participants engaged through course completion. The high school students in collaboration with the certified health educator prompted instructions and repetition for participants which were key factors to engagement.

There are several features of Rimidi's DSME-S program which positively impacted user engagement. A prominent feature of the program includes video recorded participant testimonials from an early-adopters group of Tri-Cities community members. The testimonials highlight the accessibility and effectiveness of Rimidi's DSME-S program. Realistic role models may encourage vicarious learning through imitation. An additional feature is the comments section which provides on-demand interactive communication between participants and a certified health educator. The use of constant feedback may increase self-efficacy. Rimidi's DSME-S program also encourages skill building of glucose monitoring and lifestyle modifications.

The use of Rimidi's DSME-S program also addresses the presence of technology in medically underserved communities. The successful launch in the Tri-Cities community proves access to technology can effectively enable dissemination of health information. The optimal location for technology accessibility in this community is participants' homes and most participants did have access to technology in their homes. Rimidi's DSME-S program addresses the needs and

preferences of the medically underserved community by providing content participants find comprehensible and satisfactory. The video content is also offered in Spanish via closed captioning. This option is easily accessed by clicking the videos.

Future implementations of Rimidi's DSME-S should consider providing a participant ID to link participant information throughout the program. The lack of linkage in this pilot resulted in differences in the number of participants reporting across the surveys. There was also a notable number of people reporting low A1c this self-reported measure was taken prior to course completion. This may be the result of the population not Future implementations should consider asking self-reported A1c at beginning and course completion. In line with national reports,^(3,17) healthcare systems in Georgia report attendance to DSME-S programs is poor and that the model is not profitable or sustainable.^(18,19) Rimidi's Digital DSME-S provides high completion rates. The technological solution is scalable and sustainable.

Future Directions

Rimidi plans to ensure this DSME-S model is sustainable in the Tri-Cities community and can be replicated in similar communities. In partnership with CVS Pharmacy, Rimidi will launch a diabetes management program at a CVS Pharmacy centrally located in the Tri-Cities community in 2019. This model will enhance the current framework of Rimidi's DSME-S Tri-Cities pilot. The partnership with CVS will build on Rimidi's work with current partners.

Location	Target Population	Tactics
East Point Parks and Recreation Center	Age Group > 50 attending computer classes at rec	On-Site Recruitment Dates
East Point Farmers Market	Attendees on Wednesdays	ARCHI Table at Market
HJC Bowden Senior Multipurpose Facility	Age Group > 50 and employees	On-Site Recruitment Dates
IMPACT Church	Patients with Type 2 Diabetes and Pre-Diabetes	Flyers Distributed
Tracy Wyatt Recreation Center	Recreation patrons attending weekly line-dance classes	On-Site Recruitment Dates
Tri-Cities High School	Approximately 15 high school student recruiters	Contact administration to recommend students for software training

1. Rimidi. www.rimidi.com. Published 2018. Accessed.
2. Steinsbekk A, Rygg L, Lisulo M, Rise MB, Fretheim A. Group based diabetes self-management education compared to routine treatment for people with type 2 diabetes mellitus. A systematic review with meta-analysis. *BMC Health Services Research*. 2012;12(1):213.
3. Garfield SS, Xenakis JJ, Bastian A, McBride M. Experiences of People with Diabetes by Payer Type: An Analysis of the Roper Diabetes Data Set. *Diabetes Ther*. 2015;6(2):113-25. Epub 2015/05/22. doi: 10.1007/s13300-015-0109-z. PubMed PMID: 25997415; PMCID: PMC4478175.
4. Gazmararian JA, Yang B, Elon L, Graham M, Parker R. Successful enrollment in Text4Baby more likely with higher health literacy. *J Health Commun*. 2012;17 Suppl 3:303-11. doi: 10.1080/10810730.2012.712618. PubMed PMID: 23030578.
5. Whittaker R, Matoff-Stepp S, Meehan J, Kendrick J, Jordan E, Stange P, Cash A, Meyer P, Baitty J, Johnson P, Ratzan S, Rhee K. Text4baby: development and implementation of a national text messaging health information service. *Am J Public Health*. 2012;102(12):2207-13. doi: 10.2105/AJPH.2012.300736. PubMed PMID: 23078509; PMCID: PMC3519339.
6. Cui M, Wu X, Mao J, Wang X, Nie M. T2DM Self-Management via Smartphone Applications: A Systematic Review and Meta-Analysis. *PloS one*. 2016;11(11):e0166718.
7. Hunt DL, Haynes RB, Morgan D. Using old technology to implement modern computer-aided decision support for primary diabetes care. *Proc AMIA Symp*. 2001:274-8. PubMed PMID: 11825194; PMCID: PMC2243369.
8. Hunt JS, Siemenczuk J, Gillanders W, LeBlanc BH, Rozenfeld Y, Bonin K, Pape G. The impact of a physician-directed health information technology system on diabetes outcomes in primary care: a pre- and post-implementation study. *Inform Prim Care*. 2009;17(3):165-74. PubMed PMID: 20074429.
9. Hunt CW, Sanderson BK, Ellison KJ. Support for diabetes using technology: a pilot study to improve self-management. *Medsurg Nurs*. 2014;23(4):231-7. PubMed PMID: 25318336.
10. Hunt CW. Technology and diabetes self-management: An integrative review. *World J Diabetes*. 2015;6(2):225-33. doi: 10.4239/wjd.v6.i2.225. PubMed PMID: 25789104; PMCID: PMC4360416.
11. Cochran J, Conn VS. Meta-analysis of quality of life outcomes following diabetes self-management training. *The Diabetes educator*. 2008;34(5):815-823.
12. Thorpe CT, Fahey LE, Johnson H, Deshpande M, Thorpe JM, Fisher EB. Facilitating healthy coping in patients with diabetes: a systematic review. *The Diabetes educator*. 2013;39(1):33-52.
13. American Diabetes Association. Standards of Medical Care in Diabetes-2017. *Diabetes Care*. 2017;40(Supplement 1):S4-S132.
14. Haas L, Maryniuk M, Beck J, et al. National Standards for Diabetes Self-Management Education and Support. *Diabetes Care*. 2012;35(11):2393-2401.
15. Neighborhood Nexus. Georgia Cities. In:2016.
16. Center on Society Health. Atlanta, Georgia Life Expectancy Methodology and Data Table. In:2018.
17. Duncan I, Ahmed T, Li QE, et al. Assessing the value of the diabetes educator. *Diabetes Educ*. 2011;37(5):638-657.
18. Batts ML, Gary TL, Huss K, Hill MN, Bone L, Brancati FL. Patient priorities and needs for diabetes care among urban African American adults. *Diabetes Educ*. 2001;27(3):405-12. doi: 10.1177/014572170102700310. PubMed PMID: 11912801.
19. Crabtree K, Sherrer N, Rushton T, Willig A, Agne A, Shelton T, Cherrington A. Diabetes connect: African American men's preferences for a community-based diabetes management program. *Diabetes Educ*. 2015;41(1):118-26. Epub 2014/11/03. doi: 10.1177/0145721714557043. PubMed PMID: 25367259; PMCID: PMC5166559.