

FINAL REPORT:

“Improving Diabetes Care Through Implementation of Health Information Technology in Solo and Small Family Practice Offices”

This project was supported by a grant from the Physicians Foundation to the Texas Academy of Family Physicians Foundation
Project Period: January 2007 to March 2009

EXECUTIVE SUMMARY

BACKGROUND

The management of chronic illness is one of the most significant issues facing American medicine, and diabetes management plays a major role in this challenge. Improvements in Type 2 diabetes management using Health Information Technology (HIT) have demonstrated the potential to achieve significant positive impacts on diabetes mortality and other clinical outcomes of this disease. Among the approaches demonstrated effective in large vertically integrated health care systems is successful implementation of a diabetes registry within the context of a Chronic Care Model.

The Chronic Illness Care model identifies six structural elements of a system that encourage high-quality chronic disease management: leadership and organizational support, linkages to community resources, self-management support for patients, improved delivery system design, clinical decision support and supportive clinical information systems. Two of those elements, decision support and clinical information systems have the potential, when combined into a disease registry, to enable the primary care team to be more prepared and pro-active in the care of their patients with a complex chronic illness like type 2 diabetes.

PURPOSE

The purpose of this study was to implement and evaluate a diabetes registry as a means of improving medical care to type 2 diabetics in small family practice offices located in rural and underserved areas of Texas. The specific aims are to:

1. Assess the effectiveness and sustainability of the implementation of a diabetes registry on the quality of care delivered to patients with type 2 diabetes.
2. Evaluate the effect of a diabetes registry intervention on the care delivery system in each practice.

METHODS

CRITERIA FOR SUBJECT SELECTION

The subjects of this study were the physicians and office staff in small family practice offices/clinics in Texas. Participating offices/clinics in the study must have met three criteria: 1) they must have six or fewer physicians; 2) they must be located in either a rural county or an medically underserved area; 3) they must have a PC computer with Windows XP and a broadband internet connection and they must indicate a willingness for us to install the diabetes registry.

REGISTRY IMPLEMENTATION

TAFP office staff visited each practice for an initial Welcome Visit. At this visit the following was done:

1. Physicians and office staff were introduced to the project, and informed consent was obtained.
2. Staff and physicians completed a baseline survey
3. The office/practice was entered as a site in DocSite registry
4. Staff and physicians were instructed and trained in use of the DocSite registry program
5. In each clinic, charts of 50 patients with type 2 diabetes were audited for the most recent values of:
 - a. A1c
 - b. Blood Pressure
 - c. LDL Cholesterol
6. TAFP Staff then entered each of these patients into the DocSite registry along with the above values so that each office had a baseline cohort of patients with type 2 diabetes entered for updating.

Following the Welcome Visit, Dr. Parchman made an in-person follow-up site visit to each office approximately one month later to identify barriers to use and brainstorm solutions, and to demonstrate functional capabilities of the registry program that physicians and staff may find useful. Examples discussed and demonstrated during this visit included reports of patients with A1c over 8% who have not been seen in 6 months or more, or patients with systolic blood pressures above 140 not seen in the past 6 months. The Visit Planner note was also demonstrated and discussed. This printable note from the registry provides both physician and patient with a one page summary of diabetes control and diabetes services that are due. After the second site visit all offices/sites were mailed a monthly report of their performance using the DocSite reporting system. Follow-up calls were made to contact personnel in each site as well to discuss these reports.

DATA COLLECTION/MEASUREMENTS:

1. DocSite Usage

Physician use of the DocSite Registry was tracked quarterly. We tracked frequency of log-in, number of new patients added to the registry, and entry of new clinical data on patients. From this data, clinics were divided into 3 groups:

- a. Those who added neither new patients or new data on patients entered by TAFP staff into the registry.
- b. Those who added data on patients entered by TAFP staff into the registry
- c. Those who added new patients and new data to the registry

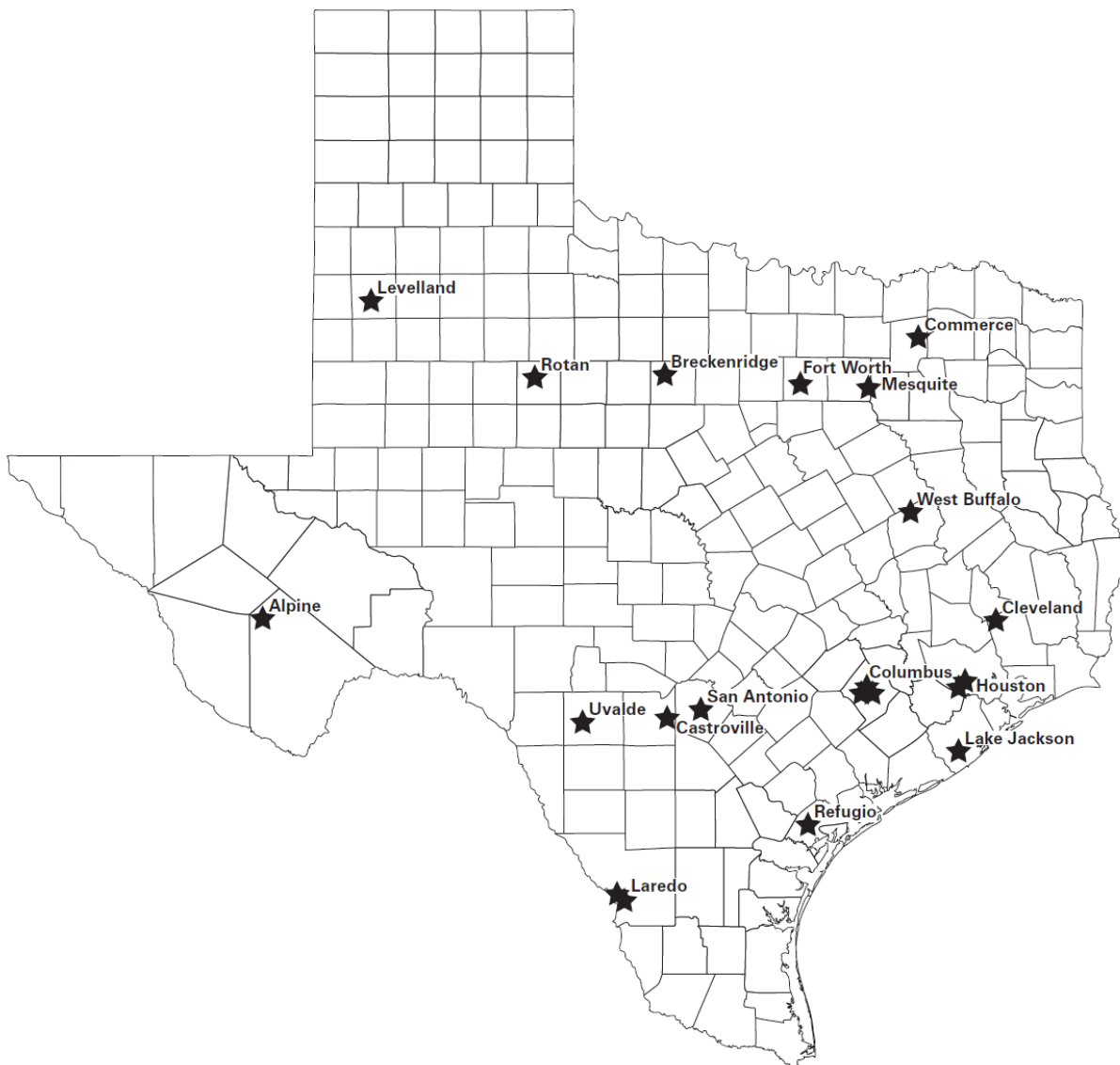
2. A baseline survey of physicians and office staff was conducted during the Welcome Visit. Details of the content of this survey are found below in the Results, "Section F."
 - a. Mindfulness
 - b. Teamwork Climate
 - c. Communication
3. Site visit notes based on observation and discussions with physicians and staff in each clinic by Dr. Parchman were kept for analysis.
4. Semi-structured interviews with a subset of participating physicians. Based on usage data, we selected two physicians from each of the following 4 groups, intended to represent increasing levels of DocSite adoption: no activity; logged in but did not add new data; added new data to baseline patient entries; added new patients and new data. Interviews included the following questions:
 - a. Why did you volunteer to participate? What did you expect to get out of the program?
 - b. What did you use DocSite for, if anything? That is, what tasks or goals did you try to accomplish with it?
 - c. What aspects of DocSite did you find helpful?
 - d. What aspects of DocSite did you find troublesome?
 - e. If you could change one aspect of DocSite to make it easier to use, what would it be?
 - f. If you could change one thing about your practice to enable you to use DocSite more effectively, what would it be?

RESULTS:

A. Clinics Enrolled

20 clinics were enrolled in the project. The location of these clinics can be found on the map in Figure 1.

FIGURE 1: Clinic Locations



B. Recruitment: Lessons Learned

Physicians and practices were recruited using advertisements in the monthly Texas Family Physician journal received by all TAFP members, faxes to membership and targeted emails to physicians in rural areas. The barriers in recruitment were partially a

result of our target audience – small and solo practice family physicians. Many of these physicians are overextended and feel they and their staff cannot take on any new responsibilities. We worked to ease that burden by using project staff to enter patient data into the registry during the first site visit.

The first question we often got from practices during recruitment is, “who will be entering the data?” The clinic staff tell us they don’t have enough time to add another responsibility. We addressed this by helping them brainstorm ways to integrate the registry into their practice. This includes looking at their workflow to identify the best place to insert this step. We also suggested that the data entry of blood pressure and lab results be entered in batches once a week or twice a month to save time.

C. Welcome Visits: Lessons Learned

A challenge that we did not foresee at the initial Welcome Visit was a lack of interoffice communication. Physicians were committing to the project but not informing their staff. Often the TAFP staff would arrive at the appointed time only to find that office staff were totally unaware of the project. The office staff often expressed a reluctance to get involved because they did not understand the purpose of the project or why the physician agreed to participate in the project. This was a challenge for successful implementation. Without office staff commitment it was difficult to initiate the project.

D. Follow-Up Site Visits: Lessons Learned

For the most part, offices were expecting the follow-up visit by Dr. Parchman. During these visits, common themes surrounding implementation of the registry uncovered by Dr. Parchman during the visit included:

- a. Some physicians agreed to the projects as a way to “get their feet wet” with electronic patient data systems before they committed to a full fledged EHR. As such, they were not committed to sustained use of the DocSite registry, but merely intended to use it for a few weeks to get some experience.
- b. There were significant technical difficulties with logging into the site initially in several offices due to problems at DocSite. After one or two failed attempts, staff and physicians quickly gave up on the program and moved on to more pressing issues. They often failed to ever attempt to use the program again, even after a follow-up visit to resolve the problems. Dr. Parchman often had difficulty logging in to the website as well on his site visit and often had to call the TAFP staff to reset the login and passwords. For some reason, initial setup and initial passwords failed after a week or two in many of these early offices, causing them to give up quickly and never return to try the registry again during the project.
- c. Several physicians committed to the project because of their political commitment to the TAFP, but did not intend on devoting any of their own personal time or effort. They assumed that the TAFP would do all of the work as that has been their experience in working with the TAFP in the past. They

were surprised and some were dismayed to find that they would have to devote office staff time to entering data into the registry on an on-going basis. One physician asked who was paying for the salary of the staff member to do this.

- d. The physicians often expressed a desire for the staff to do the work, but the staff were unsure as to why they were asked to do this, and often perceived the benefit of the registry to the patients and the practice as low compared to the perceived amount of work it would require.
- e. Clinics often exist with high levels of chaos that competed with use of the registry. For example, in one clinic the billing system went down for a month, precluding any attention to use of the registry. In another clinic there was significant turnover in office staff between site visits and during the initial year of the project so that new office staff were unaware of the DocSite project.
- f. Clinics that were consistent users of the registry often had a compelling perceived benefit to using the registry. For example, one clinic was a new non-profit community clinic and used the data and reports for their own Board of Directors and as preliminary data for grants they were preparing to obtain more funding.

E. Learning Session

All offices were invited to attend a Learning Session at the Spring TAFP meeting in 2008. Invitations were sent by mail, fax, and a personal phone call made to each office. Only 2 offices attended the learning session. Both were active users of the DocSite registry, one was a non-profit community clinic.

F. Registry Use

1,228 patients had data entered into the registry during the project. 214 of those patients were added to the registry by the office staff or physician. These 214 new patients were added by 6 of the 20 office sites. However 114 of these new patients were added by one physician after hours at home rather than asking his office staff to enter new patients. 63 of the new patients were added by the non-profit community health center.

We defined “sustained use” of the registry as those clinics who consistently logged into the registry at least once each month for 7 months or more. Only 5 of the 20 clinics fell into this category. (see Table 1) Of the 6 offices who added additional patients to the registry, 5 of them were sustained users.

Table 1: Registry Use

Time of Registry Usage	
2 offices never used the registry	10%
5 offices used the registry for less than 1 month	25%
8 offices used the registry between 1 and 6 months	40%
5 offices used the registry for 7 months and more	25%
Number of Patients:	
6 offices added more than the 50 baseline Patients	30%
14 offices didn't add any patients	70%
Break down of the 14 offices that didn't add patients:	
2 offices never used the registry	14%
5 offices used the registry for less than 1 month	36%
5 offices used the registry between 1 and 6 months	36%
2 offices used the registry for 7 months or more	14%

G. Clinic Member Survey

The clinic member surveys were administered at the Welcome Visit. We were primarily interested in examining 3 properties of the clinic to see if any of them were predictive of sustained use of the registry: mindfulness, teamwork climate and communication. (See Appendix for a copy of the survey)

Mindfulness

What is “Mindfulness” and why are we interested in measuring this? Karl Weick introduced the term mindfulness into the organizational and safety literatures in the article *Organizing for high reliability: Processes of collective mindfulness* (1999). Weick develops the term “mindfulness” from Ellen Langer's (1989) work, who uses it to describe individual cognition. Weick's innovation was transferring this concept into the organizational literature as “collective mindfulness.” The effective adoption of collective mindfulness characteristics by an organization appears to cultivate safer cultures that exhibit improved system outcomes. Highly mindful organizations characteristically exhibit: a) Preoccupation with failure, b) Reluctance to simplify c) Sensitivity to operations, d) Commitment to Resilience, and e) Deference to Expertise.

Teamwork Climate

What is “Teamwork Climate” and why measure it in clinics before implementing a registry? Teamwork climate is a concept that captures the degree to which people are talking with each other, working well with each other when there are shared tasks, and are interacting in a manner where they coordinate their activities with those of others on their team.

Communication

Why measure Communication as a separate variable from Mindfulness and Teamwork? We used the Shortell Communication in Health Care Settings survey instrument. This previously validated instrument captures three aspects of organizational communication: openness, timeliness and accuracy. These aspects as measured by this specific instrument have been shown to influence the ability or willingness of health care workers to develop relationships that increase the number and quality of interconnections and information flow, contributing to better self-organization and outcomes. The instrument's reliability and validity in measuring the communication among staff and clinicians has been demonstrated in prior research in nursing homes, and ICU settings.

SURVEY RESULTS:

We compared the results of the 5 clinics with sustained use of the registry for 7 months or more with those who did not. (see Table 2) This analysis revealed that the mindfulness score was significantly higher in clinics with sustained use of the registry. There was no difference in scores for teamwork climate or communication between these two groups of clinics.

Table 2: Clinic Member Survey Results and Sustained Use of Registry

	Sustained Use	Not Sustained	p-value
Mindfulness Score	3.5	3.3	0.05
Teamwork Score	3.6	3.6	Not significant
Communication Score	3.7	3.8	Not significant

H. Physician Semi-Structured Interviews

- a. Many physicians reflected that one of their main hopes/desires was to use the system to track their quality of care and performance measures as they prepared for “pay-for-performance” initiatives.
- b. Successful use of the registry was often dependent upon the physicians assigning a dedicated staff member to the task and that staff member receiving frequent support from project staff and the physician.
- c. When asked what could have been done to improve the project, all physicians interviewed said that more hands-on support from project staff on a more frequent basis throughout the project would have been helpful.
- d. Several mentioned that initial technical difficulties with log-in to the site was a big “wet blanket” that dampened their enthusiasm for the project.
- e. High levels of competing demands prevented successful use. One physician said:

“The forms are in the charts, but we just can’t find any staff time to get the data entered, I am not sure how long we can keep participating in this project. Patients come first and their paperwork demands: prescriptions, pre-authorizations, consults, lab work, etc. take precedence over the diabetes forms. The hospital monitors our staff FTE fairly closely and they are not willing to provide any extra staff support to enter the data.”

I. Clinical Outcomes

Overall control of A1c, blood pressure and lipids during the project period is shown in Table 3. When evaluated by current evidence-based guidelines for recommended level of control, 52% of patients had an A1c less than 7.0%, 45% had a systolic BP below 130 mmHg, and 55% had an LDL-cholesterol less than 100 mg/dl.

Table 3: Mean Values Across All Clinics during the entire project:

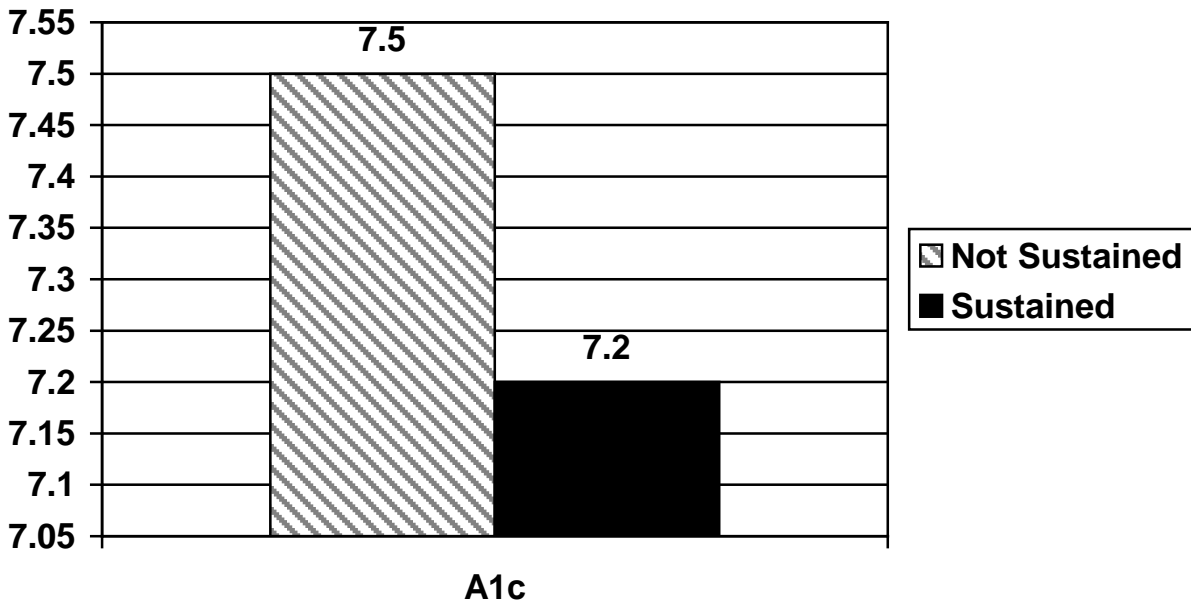
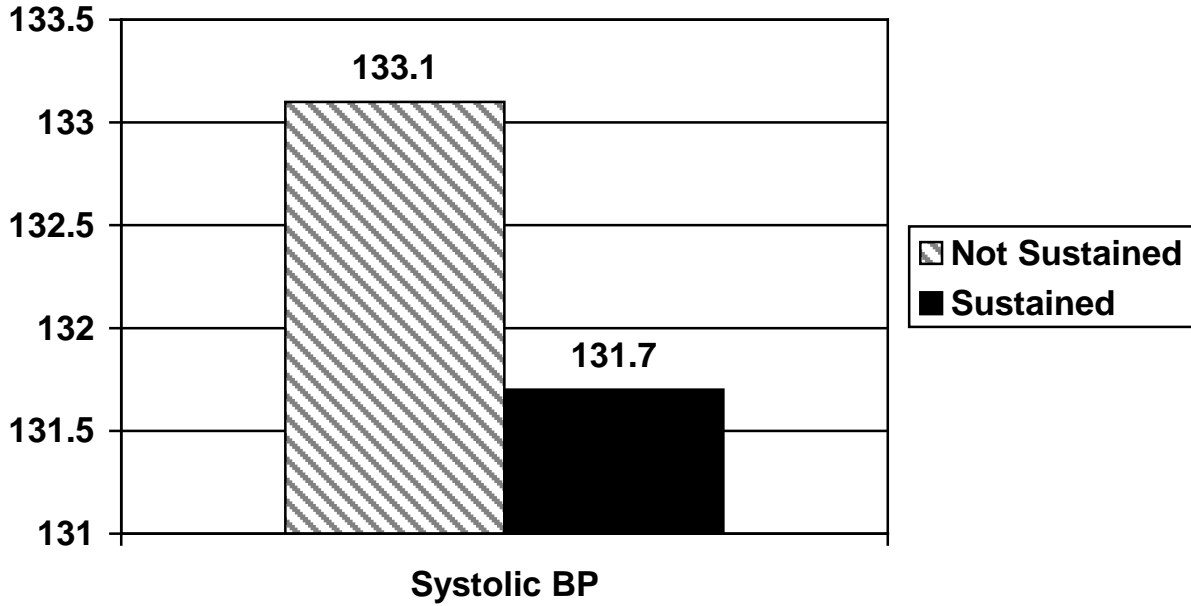
	N	Minimum	Maximum	Mean	Std. Deviation
HbA1c	1643	4.4	16.7	7.403	1.7552
BP SBP	2322	78	216	132.61	17.952
BP DBP	2321	40	143	76.67	10.743
LDL	1247	14	251	97.87	34.904

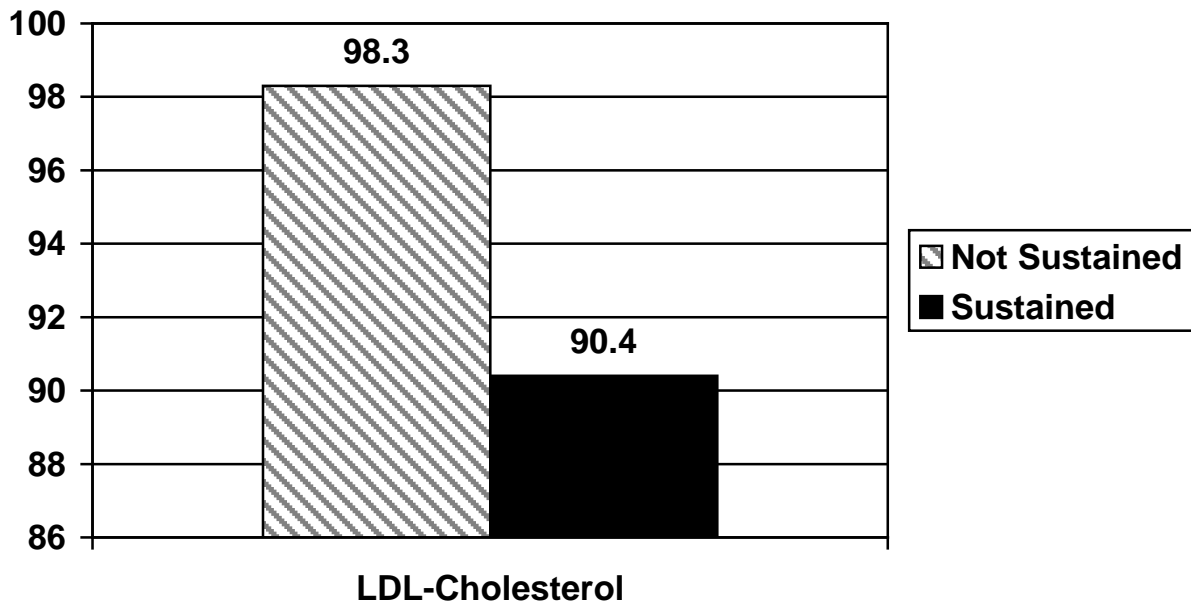
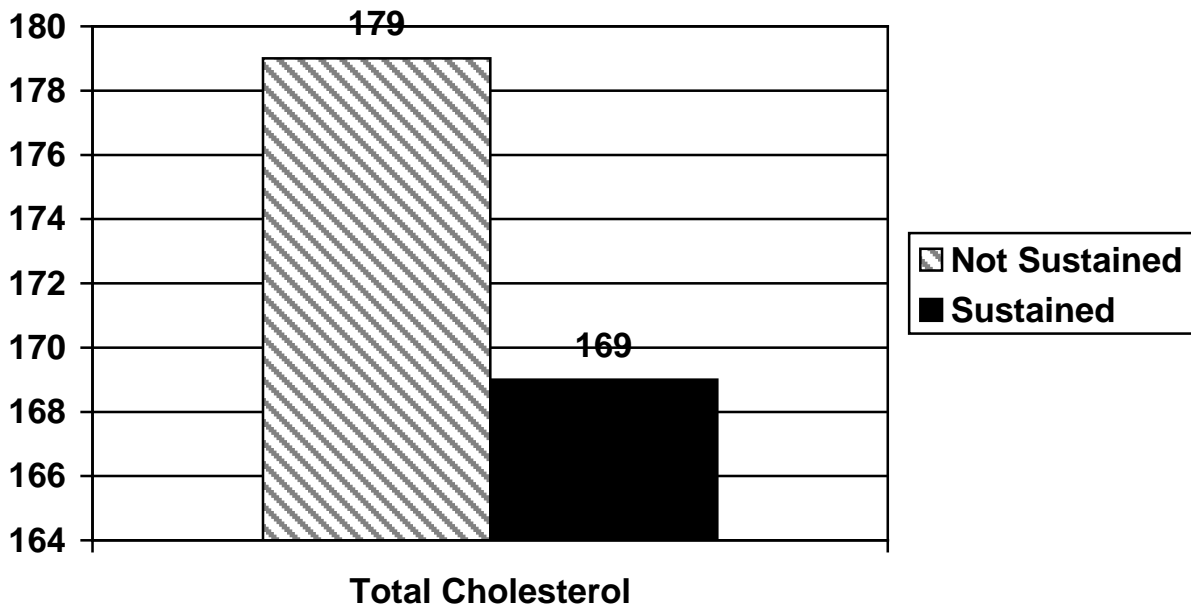
Five clinic sites had sustained use of the registry for 7 months or more. Patients who received care at these sites had significantly lower A1c, total cholesterol and LDL cholesterol levels, but no difference in blood pressure control or triglycerides. (See Table 4 & Figure 2 below)

Table 4: Sustained use of the DocSite Registry and A1c, Blood Pressure and Lipid Control

	Sustained Use	Not Sustained Use	p-value
A1c	7.2(1.6)	7.5(1.8)	0.05
Systolic BP	131.7(15.3)	133.1(18.6)	0.25
Total Cholesterol	169.0(40.3)	179.0(60.6)	.01
LDL-Cholesterol	90.4(33.5)	98.3(34.7)	.002
Triglycerides	162.2(96.3)	176.9(125.9)	.09

Figure 2: Control of A1c, Blood Pressure & Lipids with Sustained Use of DocSite Registry





CONCLUSIONS:

1. Implementation of IT in small practices will require far more support, time and resources than were available for this project.
2. Due to the high level of competing demands relative to resources in most small practices, the perceived benefit of implementing a disease registry must be very high for most clinics to successfully implement the registry. Clinics that were more likely to implement and sustain registry were less concerned with a “Return on Investment.”
3. Poor communication between the physician and the staff was a barrier to successful implementation.
4. Although many of the physicians and practices who volunteered for this project might be considered “early adopters” of new technology, a web-based disease registry program was difficult for them to implement because of a lack of resources and support.
5. Clinics where clinic staff reported higher levels of mindfulness were more likely to have sustained use of the registry. That is, clinics where staff were able to “make sense” of why and how a diabetes registry might be useful to them and helpful to their patients, are more likely to implement and sustain use of the registry.
6. Patients seen in clinics with sustained use of the registry had better control of their A1c, Total Cholesterol and LDL-cholesterol but not blood pressure. It is not known if this is related to use of the registry, or if clinicians in these clinics who were more aggressive about managing these clinical outcomes were also earlier adopters of the registry.

Appendix: Clinic Member Survey

Please tell us about YOU!

*Your age: _____ *How long have you worked in this practice? _____years
 _____months

*Are you a: _____Physician _____Nurse Practitioner or Physician
 Assistant
 _____Nurse or Medical Assistant _____Receptionist or Front Office Clerk
 _____Office Manager _____Other: _____

Please tell us about how you think you **interacted with patients and co-workers** in this office/clinic **over the past week**. Please rate the extent to which you agree with these statements. If you are confused by the wording of an item, have no opinion, or neither agree nor disagree, use the “No Opinion” rating.

MINDFULNESS (ITEMS #1-21):

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
1. I enjoyed investigating new things					
2. I generated very few novel or unique ideas					
3. I was always open to new ways of doing things					
4. I “got involved” in almost everything that I did					
5. I did <u>not</u> actively seek to learn new things					
6. I made many unique and novel contributions					
7. I stayed with the old tried and true ways of doing things					
8. I seldom noticed what other people were up to					
9. I avoided thought provoking conversations					
10. I was very creative					
11. I was able to behave in many different ways for a given situation					
12. I attended to the “big picture”					
13. I was very curious					
14. I tried to think of new ways of doing things					
15. I was rarely aware of changes					
16. I kept an open-mind about everything					
17. I enjoyed situations that challenged me intellectually					
18. I found it easy to create new and effective ideas					
19. I was rarely alert to new developments					
20. enjoyed figuring out how things work					
21. I was not an original thinker					

COMMUNICATION (ITEMS 22-33):

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
22. I look forward to working with the people in this practice everyday					
23. It is easy for me to talk openly with the people in this practice					
24. I can think of a number of times when I receive incorrect information form other people in this practice					
25. There is effective communication between people in this practice					
26. Communication between the people who work in this practice is very open.					
27. It is often necessary for me to go back and check the accuracy of information I have received from others who work in this practice.					
28. I find it enjoyable to talk with other people who work in this practice.					
29. People in this practice are well informed regarding events that affect the practice.					
30. When people in this practice talk with each other, there is a good deal of understanding					
31. The accuracy of information passed among the people who work in this practice leaves much to be desired.					
32. It is easy to ask advice from the people who work in this practice					
TEAMWORK CLIMATE (ITEMS 33-39):					
33. I feel that certain people in this practice don't completely understand the information that they receive.					
34. I have the support I need from other people in this clinic to do my job well					
35. It is easy for people in this clinic to ask questions when there is something that they do not understand					
36. Input from staff in this clinic is well received by physicians and administrators					
37. In this clinic, it is difficult to speak up if I perceive a problem with a patient					
38. Disagreements in this clinic are appropriately resolved (in other words, not who is right, but what is best for the patient)					
39. The physicians and office staff in this clinic work together as a well-coordinated team					