



Consulting Report

For Michigan Collaborative from Team Big Mpathy

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	1
Executive Summary	2
Introduction	3
Client's Problem	3
Our Approach & Objective	3
Methodological overview	4
Background Research	4
Interviews and Data Collection	4
Interpretation	5
Recommendation Formation	5
Finding	7
Finding 1	7
Finding 2	8
Finding 3	8
Finding 4	10
Recommendations	12
Messaging Platform	12
Patient Profile	13
Q&A Forum	13
Informal Meeting	15
Conclusion	16
References	17
Appendix.1	18

Executive Summary

The Michigan Collaborative for Type 2 Diabetes' overarching mission is to connect physicians state-wide to improve Diabetes care and treatment. They hope to do this by creating a platform to foster collaborative learning between clinicians treating Type 2 Diabetes to facilitate the exchange of new ideas and treatment methods to ensure patients are receiving the best care.

This is in response to a few key problems: (1) the traditional approach to the treatment of diabetes is flawed, (2) health care teams find it very challenging to stay up to date with new treatments and methods emerging, and (3) diabetes requires a lot of collaboration which is not always easy. To work towards the solution of these problems, independent background research was conducted. Various diabetes care members like the program director, endocrinologists, pharmacists, diabetes educators were interviewed to understand the patterns, work processes, pros, cons, and issues in the current process of handling treatment of diabetes. The interpretation was done through an affinity wall on data collected from the 6 interviews consisting of 4 different job roles which resulted in over 250 affinity notes to process.

In summary, the four key findings were:

1. Collaboration is important but it comes along with significant challenges.
2. Patients have to deal with both financial and emotional burdens.
3. Physicians do their best to catch up with new practices by formal/informal learning methods.
4. Physicians need to adapt to the unique needs of patients and also ensure that they are well educated.

By brainstorming with consideration of various criteria, the four key recommendations are:

1. An Instant Messaging platform for healthcare professionals to have easy, quick, and asynchronous communication
2. A universal patient profile system so the transfer of details across different EMR systems is not an issue.
3. An online Q&A Forum where doctors can ask medical questions and help resolve each other's problems.
4. Regular, informal meetings to allow the exchange of learnings, ideas, and opinions.

Introduction

Client's Problem

The traditional approach to treating Type 2 Diabetes is not as effective or simplified as it could be and evaluating and adopting new clinical processes can be a cumbersome process for physicians who may have hesitancy changing their current approach. This collaborative learning tool seeks to overcome those hurdles by creating a reliable knowledge-sharing network of clinicians state-wide.

Our Approach & Objective

In this project, the team is working on understanding how our target users—health care providers in the Type 2 Diabetes ecosystem (i.e. endocrinologists, diabetes educators, and Pharmacist)—evaluate and adopt new clinical practices, what resources would be most useful in their everyday work, and how an information system could be designed to meet their needs as they navigate caring for patients with complex diabetes.

In this project report, we will be addressing the following:

- The findings of our background research report and interview study with 6 health care providers with roles instrumental to diabetes treatment.
- Potential design recommendations based on our research findings that can better address the needs of health care providers to provide better treatment to their patients.

Methodological overview

In order to collect the information necessary to formulate recommendations for our client, the team used a process called contextual inquiry, which involves uncovering obstacles and issues in a workflow or environment by interviewing those involved in that space. Our process can be broken down into the following phases: background research, interviews, and data collection, interpretation, and recommendation formation.

Background Research

In this stage, we individually explored different aspects of the problem space to get a better grasp on the issue at hand and to better construct our interview protocols for endocrinologists, diabetes educators, pharmacists, and the Collaborative Director. Our individual research gave us knowledge on:

- Existing collaborative learning platforms in medicine
- Preventional attempts for diabetes
- Current challenges on how physicians treat diabetes
- The role of the American Diabetes Association
- The constraints and requirements of online communities

We shared our individual background reports in a shared Google folder so all team members would have access to the breadth and depth of knowledge we had uncovered. With this background of the problem space, we were well equipped to formulate questions for our interviewees.

Interviews and Data Collection

We conducted 6 interviews over a period of 5 weeks with users from 4 different job roles: endocrinologists, diabetes educators, pharmacists, and the Director of MCT2D. We considered diabetes educators and pharmacists to fall into the same category of “Members of the Diabetes Care Team” and created a single protocol to work for both of them, so we created 3 interview protocols in total. The key themes the interview questions centered around were (1) treatment of Type 2 Diabetes, (2) collaboration in medicine, and (3) learning methods.

During the interviews, one member of the team was the primary interviewer and the other was the note taker. Notetakers in the interview also ask questions in the interviews as they can notice points that primary interviewers couldn’t. All team members rotated roles so we each had the opportunity to lead an interview and to note-take. Interviews lasted around 20-30 minutes.

Interpretation

After each interview, 2 members of the team who had not been conducting the interview listened to the audio recording of the interview and took affinity notes in the appropriate Google Sheet.

After the affinity notes had been transcribed onto the Google sheet for all interviews, we transferred these notes into sticky notes on Miro. We had 250+ notes. Once they were in Miro the team held an Affinity Wall Mapping session to cluster notes with similar points or ideas into subgroups to see what overarching themes were emerging. We continued hierarchically clustering until we had an affinity wall with 5 levels and 4 key insights at the topmost level.

Those insights were:

- Collaboration in diabetes care teams is at once essential and complicated
- Patients go through a significant emotional and financial burden when dealing with their diabetes care
- Type 2 Diabetes is in a transitional time where new treatment methods are emerging, and doctors are doing their best to keep up through formal and informal learning methods
- Physicians need to adapt their treatment methods to suit the needs of their patient

Recommendation Formation

Once these insights had arrived at we were able to begin brainstorming recommendations. We brainstormed solutions around the challenges above that had been identified and then we took the solutions we had come up with and used a decision-making process to help us narrow down on a few. This process involved identifying key criteria, giving those criteria weights based on importance, and then judging each solution against those criteria. Key criteria used in the procedures are:

- Easy to implement
- Easy to maintain
- Easy to use
- Improves diabetes care state-wide
- Help physicians to treat their patients
- Help patients in their treatment for diabetes
- Improves knowledge sharing
- Doesn't need too much time commitment from a physician's perspective
- Physicians desire to use
- Improves collaboration in care teams
- Cost for management
- Can be converted into a virtual solution

Solution	Easy to implement	Easy to maintain	Easy to use	Improves diabetes care state-wide	Help physicians to treat their patients	Improves knowledge sharing
Name of the rater (NOTE: 1 is bad, 3 is good)	Pratiksha	Shaivi	Jiyeon	Leo	Yipeng	Leo
Weight	5	5	10	20	15	15
Quora for PCP	3	2	3	3	2	3
Tool to transfer records between different EMR systems	1	1	2	3	3	2
A comprehensive patient profile system that include cultural						

Fig 1. A snippet of the decision-making process with criteria on the X-axis and solutions on the Y-axis.

At the end of this process, we converged on 4 key recommendations.

Finding

After our research, the team is able to identify 4 major problems.

Finding 1

Collaboration in the field of medicine is important and necessary for treatment's success, and there are a lot of different methods through which this collaboration takes place, but there are also significant challenges that exist with collaborating

The current trend in treating diabetes is a multidisciplinary collaboration between professionals, rather than treating alone. Type 2 Diabetes patients receiving treatment from multidisciplinary teams achieved better outcomes than those that did not, demonstrating improvements in HbA1c, low-density lipoprotein cholesterol, and increased use of statins, as well as progress in statin and antiplatelet therapy (Borgermans et al, 2009).

The organization and composition of a treatment team can be an influential factor in patient evolution, as well as in the coordination between the different disciplines. Evidence suggests that the most successful interventions in relation to chronic diseases include certain key functions being carried out by nonphysicians, and interventions by well-integrated teams have been linked to greater patient satisfaction (Rothman & Wagner, 2003). In the particular case of Chile, there is a significant shortage of physicians in primary health care according to OECD's Health Policy Overview (2016). Understanding how to organize multidisciplinary collaboration can facilitate the design of more efficient and effective treatment protocols (Conca et al, 2018).

As stated above, collaboration among physicians from diverse fields is essential and important. However, collaborative treatment can cause some challenges, such as uncertainty and disagreement. Given the increased number of patients managed in primary care, specialists can play an important guiding role, although communication is not always optimal: "I generally tell people that once they have been to see a specialist that they come back and see me afterward and tell me what happened, that's my way of finding out. And we obviously get letters which are quite often not actually of sufficient depth to be of much use to us." (Physician) (Pooley et al, 2001)

Nurses' and physicians' roles have evolved as diabetes care has become integrated into primary care, with nurses playing a central role (Jeavons, Hungin & Cornford, 2006). However, both physicians and nurses express uncertainty or disagreement over who is responsible for various elements of patient care across both primary and secondary care:

‘... ambiguity about who was responsible for managing diabetes care contributed to difficulty coordinating care with other providers such as pharmacists, diabetes educators, and endocrinologists.’ (Physicians) (Crosson et al, 2010)

‘The fact that insulin conversion involves setting dosage levels seemed to be at the root of [nurses’] concern [about accountability], and this was perceived as a major shift in responsibility ... “I think we’ve got to recognize the level of responsibility and the GPs have got to recognize that and pay us appropriately”.’ (Nurse) (Greaves, 2003)

Finding 2

Throughout the diabetes treatment, patients go through both a financial burden and an emotional transition.

The American Diabetes Association (ADA) released new research on March 22, 2018, estimating the total costs of diagnosed diabetes have risen to \$327 billion in 2017 from \$245 billion in 2012 when the cost was last examined. This figure represents a 26% increase over a five-year period.

The largest components of medical expenditures are:

- Hospital inpatient care (30% of the total medical cost)
- Prescription medications to treat complications of diabetes (30%)
- Anti-diabetic agents and diabetes supplies (15%)
- Physician office visits (13%)

People with diagnosed diabetes incur average medical expenditures of \$16,752 per year, of which about \$9,601 is attributed to diabetes. On average, people with diagnosed diabetes have medical expenditures approximately 2.3 times higher than what expenditures would be in the absence of diabetes (ADA, 2017).

Diabetes patients undergo an emotional transition as well as economic burdens. A diabetes diagnosis can feel like not just a threat to health, it can also seem like a threat to a person’s way of life because managing diabetes means making changes to your day-to-day routine. The doctor might instruct patients to change their diet by eating certain kinds of foods, avoiding sugary beverages, or restricting alcohol intake which can be difficult for anyone regardless of a diabetes diagnosis. Added responsibilities like tracking blood glucose and insulin can be hard to remember at first, doctors’ appointments can cause time away from work, and the costs of appropriate care may be burdensome. These changes can be emotionally draining, and the patient might start to notice that they are feeling a bit off or have very little energy left to carry out important tasks to manage their condition (MHA).

Finding 3

T2D is in a transitional period of time with new treatment methods and different views emerging, and physicians are doing their best to catch up with them through formal and informal learning methods.

Previously, diabetes was understood more as a treatment-focused disease. Physicians are working reactively to treat patients with such conditions. However, the situation has changed rapidly. In America, 34.2 million people across all different age groups have some type of diabetes, roughly 1 in every 10 Americans (CDC, 2020). Among those cases, Type 2 diabetes makes up approximately 90 to 95 percent of the American diabetes population (CDC, 2020). Physicians are easily outnumbered and overrun by the excessive number of cases they have. Against such adversaries, a shift of treatment and approach for T2D is rising in the last ~10-12 years.

Although T2D is commonly thought of as a well-studied disease, the treatment and approach physicians have with diabetes have shifted dramatically in recent years. Most notably remarked by participant DI1, “T2D should not be considered as a treatment-focused disease, but mostly a prevention-focused disease.” This also calls attention to the current treatment methods. Participant DI1 remarked: “Current suggested diet for diabetes is high-carb, low-fat, but this is not effective for patients with metabolic issues.” The current treatment method and recommendation is lacking consideration for patients with a high metabolic condition which commonly have several T2D as well. The other huge part of the current diabetes treatment method, insulin, also faced a lot of criticism. While it can be seen as a “last resort” expressed by participant E2, insulin is a sensitive medication for patients. Participant E1 added that they “need to constantly monitor and adjust and educate patients.” While patients are on insulin, they are on it for a long time. Patients need to use it to constantly chase down the target blood sugar number and increase dosage along, which can be really problematic. This reactive approach has shown its shortcomings and physicians are working their way out for new treatment methods to change the landscape.

Learning has been embedded in a specialist physician’s career. Many physicians are researchers in their field of medicine and learning new knowledge about the disease is part of their responsibility. Participant E1 expressed that “it is 50% seeing patients and 50% on research” and they “have to relearn things every year.” Although each physician may have a different approach, the individual study is still a huge part of a physician’s learning. Reliable sources such as A.D.A. academic journal articles, organization websites, conferences, or subscription of emails are all ways our endocrinologist participants expressed self-learning methods they have been used. However, there is a limitation on how much of a collaboration element can exist in those learning processes. Some of the participants express that “[I] don’t need to actively seek out new diabetes info” (E2) and “I am learning every time with new info coming in all time” (E3). So there is resistance for those physicians to learn collaboratively as they appear satisfied with the information they are getting. The second part of the lack of collaboration in learning is from the organization. Participant CT2 expressed that their “organization doesn’t provide many opportunities for clinicians to learn together,” and there are “not many resources provided by the organizations’ end,” forcing physicians to learn individually.

Although a change in treatment method and approach in diabetes is deemed necessary, the process of changing still takes time to complete. Participant E2 expressed that it “takes a year for protocol changes to be implemented.” With many moving parts in the current medical system, a change of treatment will impact a large chain of command. Nurses, nurse practitioners, and even unions can be involved, which makes a push for newer methods much harder than anticipated.

Finding 4

Physicians need to adapt their treatment methods to fit the unique needs of different patients and ensure that patients are well educated on their treatment plans.

Diabetes treatment is a two-way effort. Physicians are essential to providing the diagnosis and treatment plan, but it is equally as important for the patients to follow the plan and make the treatment happen. So it is necessary for physicians to accommodate patients’ needs to create the best treatment plan possible for that patient: the patient’s priority is the physician’s priority. Participant E2 expressed the treatment process started with “ask[ing] for the patient’s primary concern, basing [treatment] around the patient’s concerns.” Different patients will have different concerns that may conflict with their treatment plan. Participant E1 remarked that “It varies by age, younger patients may have other priorities, healthcare may fall by the way.” Being cognizant of all those concerns requires physicians to have a greater understanding of the patients, so background information about the patient is critical for physicians to make the plan. Participants E2, E3, and CT1 all expressed that “knowing a patient’s background and history” is mandatory for physicians to move forward with their treatment recommendations. Additionally, even when patients already have a treatment plan in place, changes can still occur based on the patients’ response to treatment. One notable example is patients’ reactions to the medication. Participant E2 said: “Patients may not tolerate the medication or not respond with the medication, [I] change [the] medication in those cases.” Finally, physicians need to believe in patients to complete the plan. “Clinicians’ success is patients’ success,” said participant CT2, which summarizes the relationship between physician and patient. “Physicians can give patients resources, but if the patient doesn’t want to accept and change, there is less success.” It is up to the patients to make the plan happen, physicians are there to provide guidance on which direction and resource patients need to succeed.

The other aspect that physicians need to maintain with their patients is education on the disease. Many patients may have a wrongful perception of the treatment or the disease they are working through, and it is the physicians or the treatment team that provides the right education for the patients to adjust those perceptions. Many clinics have provided the resources for that education to happen, such as education hangouts in the clinic or diabetes educators. The Internet can be a great resource too; some physicians recommend patients watch Youtube videos or go to the A.D.A website to learn more about T2D. However, the internet can be a “double-edged sword for patient information”, described by participant E2, as a lot of misinformation can be delivered to patients without any filter. Participant CT1 remarks that “when the patient searches the drug on the internet, they can get scared of a single word like ‘cancer’ so that they will not take a

drug,” demonstrating how certain information without guidance can hugely impact the patient’s perception. It is the tendency of patients that participant E2 describes as “overreaction to negative perceptions of an existing medication,” which is not the fault of the patient but makes it all the more important for the physicians to provide that educational information maintain the treatment plan.

Recommendations

Based on the four main findings, multiple recommendations are made to solve the pain points found in interviews. Four of them stand out from the others with the decision-making process.

1) Messaging Platform

An Instant Messaging platform can be set up for healthcare professionals to have easy, quick, and asynchronous communication. The messaging platform can be used for healthcare professionals to share new information and insights and ask others for their opinions on treatments.

Currently, healthcare professionals use mostly email to communicate, sometimes they use the chat function in EMR systems for quick conversation among the same healthcare team. However, they have complaints about the current situation. One of our interviewees says, “I know who to ask but it takes time to craft an email with good information.” Another interviewee mentions, “Asking other physicians can be a burden for them.” Emails sent for official communication usually need to be crafted with carefulness and formality, which can take up time. EMR system chatting is quick, but it can only be done within the same healthcare team as different clinics and hospitals use different EMR systems. This can result in a reduced amount of healthcare professional collaboration. The pain point here is not only on the side of the person requesting information but also on the side of the person being asked for this information. An instant messaging platform could quickly establish rapport and enable quicker, shorter, and more frequent exchanges of information, allowing both requesters and requestees of some information to digest smaller bits at a time and at least get a conversation going without paralyzing the other person with a wall of text when healthcare professionals are already so overwhelmed with all the things they have to do in a day.

Apart from the communication method issue, healthcare professionals also face the problem of lack of connection with other professionals. One interviewee says, “PCPs want to talk to endocrinologists but sometimes there are no endocrinologists around, so access is a problem.” The remote element of a messaging platform would address this concern as endocrinologists and PCPs from different hospitals would be able to communicate. Another user commented, “Doctors feel like you have to know a person before asking questions.” This restrains the network of people doctors feel comfortable reaching out to. Ideally, with a less formal messaging platform these barriers can be overcome and freer communication can be encouraged.

However, one of the constraints that come along with this solution is patient privacy and confidentiality. This platform would need to be HIPAA-compliant to ensure patients’ medical data is protected through these communications. Another potential constraint is competitors offering similar services, such as EMR chat, Dexterity, and Sermo. Those platforms are not concentrated on the unique needs of the diabetes care team in functions like connecting to other healthcare professionals so there is still room in the market for this type of solution to exist.

To encourage healthcare professionals to have shorter and quicker chats while allowing them to have deeper and more complicated chats from time to time to talk about patients' situations, the user interface can be designed to fit in both modes. A short text box can be set up to visually limit users' input length. A pop-up text input window opened with another button can help users organize more detailed chat content.

2) Patient Profile

Different clinics and hospitals use different EMR systems, which leads to difficulty in transferring and sharing patients' records across these systems. By having a transfer or sharing system to connect those separated ones or exchanging those for diagnosis purposes, doctors can have more easy and quick collaborations without exchanging patients' background information.

From our interviews, three of the interviewees mentioned the importance of knowing patients' history or background information so that they can adjust the treatment to fit patients' situations. The record in the EMR system provides access to that background information and is useful for doctors to have when diagnosing. However, one interviewee mentioned the difference in EMR systems used across the country. For patients, if they are moving to a new location or having their doctors changed, they might need to ask their doctor to print or copy the record to flash drives and input the record into another system, which is a very complicated process. With the existence of a transfer system, these procedures can be saved. For doctors, if they need to collaborate on the same patients, they need to exchange their opinions on treatment frequently. The record transfer system can help doctors organize patients' information and speed up the diagnosis procedure if they share the same patients' previous records.

However, there are constraints to think about for this transfer system. Firstly, confidentiality. Patients' records need to be taken great care of as they are of high privacy. Therefore, the transfer system should be used with the identification of the sender and the receiver, and should either only be sent with permission from the original sender or be read by identified users. Secondly, compatibility. Since there are many kinds of EMR systems on the market and the encrypt method they use is different, it will be hard to make the transfer system compatible with all of them. The solution to this could be to fit the most commonly used ones. If the transfer is not applicable, a sharing system can also help address the issue. For doctors in collaboration, the sharing function can help them get synchronized in treating the same patient across different EMR systems.

This transfer function can come along with the previous instant messaging system so that healthcare professionals can view patients' documents synchronously when they are communicating online.

3) Q&A Forum

Apart from the one-to-one instant chatting for quick conversation between healthcare

professionals, a Q&A forum where doctors can ask medical questions will also help resolve some problems. It can be an online Q&A platform much like Quora or Reddit, but with extra healthcare-related features like viewing patients' records after verification. This Q&A forum can help healthcare professionals to share their knowledge easily and quickly and receive support from other healthcare professionals. It can also be a good way to meet and connect to other healthcare professionals.

Currently, there is no proper platform for healthcare professionals to ask about the diabetes treatment methods and get help from other healthcare professionals apart from private communication with some known professionals or having meetings or lectures among clinics or hospitals. One of our interviewees says, "I hope there is a supportive community where PCP can ask questions." The pain point here is that it is difficult to ask questions and get answers about medical questions from the perspective of medical experts. Another interviewee mentions that the most common way now for healthcare professionals to discuss the treatment and ask questions is participating in a healthcare professional group on Facebook. However, this can lead to serious patient privacy problems. These professionals realize that issue, but still, continue to discuss it in the group chat with great care. One interviewee says: "Patient information is very sensitive, so doctors must be very careful when they post on Facebook." This results in a limited conversation in the Facebook group and leads to reduced collaboration and communication efficiency. This problem can be solved with a professional Q&A forum designed for medical professionals.

There are many challenges that need to be overcome to implement such a platform. One of the most significant ones is how to recruit and maintain users on this platform. Healthcare professionals usually have tight schedules and a serious platform like this can hardly trigger their willingness to visit it in their spare time.

There are two kinds of users in the online community, (1) posters, users that post a lot of content, and (2) lurkers, users who just obtain content from web pages (Nonnecke et al., 2006). Amy Jo concluded from users' involvement in the online community the theory of membership lifecycle. Amy Jo claimed that a user will go through a life cycle of a lurker, novice, regulars, leader, and elder, with a barrier separating every two characters, which are hard to break through (Kim, 2006).

The community should stimulate users to break through the barrier between lurker and novice. Patrik proposed three possible ways, making signing up simple, making all content reachable, keeping problem users out (Groome, 2015). Apart from these, Andrew also considers making strong rules, encouraging personal relationships, and building a reputation system within the online community (Cohen, 2008). Users like to feel connected to other people. With a more personal relationship with other community members, users tend to consider themselves a part of the community.

In this case, the Q&A forum can be set up to include the professionals as part of their

organizations. The professionals can view the status of others in their organization or someone they are familiar with. It can have some kind of timeline view for questions to be presented and professionals can do likes and comments on others' posts. With seeing those who they know about posting, they might feel more comfortable spending some time helping other professionals.

4) Informal Meeting

Another approach to enhance the collaboration between healthcare professionals will be holding regular meetings. Different from those formal group meetings, we suggest having informal meetings to exchange opinions and knowledge between group members. These meetings can be held among the same healthcare team or in the format of drop-in discussion for any healthcare professionals. Break up room should be set if many people are joining. Healthcare professionals can be guided to share their experiences, learnings, knowledge, etc, in the form of chatting. This can lead to more collaboration and knowledge sharing in the field of healthcare.

During interviews, one of the endocrinologists mentioned that “Educating PCPs would have the highest yield in treatment improvement”, and, “different doctors have different practices”. Such comments stress upon pain points of care team members in terms of how they lack informal conversations and exchange of information. Even though there are regular meetings within the healthcare group and academic meetings in the field, what they need is a kind of platform to exchange information informally in a broader range.

To achieve this kind of meeting, a few things need to be overcome, confidentiality, efficiency, and the willingness for professionals to attend this meeting. Healthcare professionals are usually very busy, but they still from time to time socialize with other healthcare professionals. One of the interviewees mentions that he does chat with other doctors about patients when they are hanging out. The informal meeting held regularly needs to be guided to have such a kind chatting format to attract healthcare professionals and make them not feel like an extension of work.

Conclusion

Michigan Collaborative for Type 2 Diabetes plans to create a collaborative learning tool for members of the diabetes care team to communicate about emerging new treatment methods and approaches. This will be highly effective in addressing major roadblocks in the current diabetes treatment workflow, namely, improving collaboration among physicians, learning and adopting new treatment methods, minimizing the financial and emotional burden on patients, and designing care plans suited to a particular patient's needs.

To work towards the solution of these problems, our team conducted independent background research, and interviewed various health care professionals like the program director, endocrinologists, pharmacist, and diabetes educator. The interpretation and analysis of these interviews led us to the following recommendations:

1. An Instant Messaging platform for healthcare professionals to have easy, quick, and asynchronous communication
2. A universal patient profile system so the transfer of details across different EMR systems is not an issue.
3. An online Q&A Forum where doctors can ask medical questions and help resolve each other's problems.
4. Regular, informal meetings to allow the exchange of learnings, ideas, and opinions.

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Appendix.1

501 Team Big MPathy Interview Protocol

Interview Schedule

3 job roles [[see diagram here](#)]: [Collaboration Director](#), Primary Care [Physician](#) or Clinician, Non-primary care Diabetes Care Team.

Common Intro:

*****Before your intro, I'll be on the call to introduce you and provide an in-person handoff from MCT2D to your group. This should last 2-3 minutes of your hour. This way, if they have administrative questions (e.g. Who should I submit my revised VBR measures to? Did you video record our last training session so I can send it to colleagues?), they can be deflected to me, rather than you :)**

Hello, Thank you for agreeing to speak with us today. My name is (my name), and I will be leading this interview today along with (other researcher's name). We are Masters students at the University of Michigan School of Information specializing in user experience design and research.

We are currently working with the Michigan Collaborative Quality Initiative for Type 2 Diabetes. They are in the process of building an online learning environment where clinicians like you can go to seek support, training, and resources to improve diabetes practice.

Today, we'll be asking a series of questions to understand your needs as a clinician and how a tool like an online learning collaborative might fit into your practice.

Your participation in this interview is completely voluntary. You can discontinue your participation at any time, and you can choose not to answer any question we might ask. If there is any content or data mentioned that you don't want to be recorded, please let us know. Anything you share that may be identifiable will be anonymized and we will take your comments to be confidential. You can also decide to make comments "off the record" which will be redacted during the data analysis process. We will aggregate all the comments from the interviews we're conducting so that your comments are not easily traced to you.

Do you have any questions for us before we get started?

If they ask specific questions about the CQI or MCT2D (e.g. I tried to log into your system to update our clinical champion contact email...I won't be able to attend the next meeting...): I'm sorry, we don't work directly for MCT2D but if you could email ccteam@mct2d.org, Jackie Rau, the program manager and her team, will be able answer that for you.

For data collecting and research reference, may I ask permission to begin audio recording this interview? (if yes, start the recorder).

Before we started, Can you tell us who you are, and what is your professional background and experience?

Common Outro:

Finally, are there any other aspects of the topic that you think might be helpful to add to our conversation?

If not, thank you for participating. If anything else occurs to you after I leave, please don't hesitate to let me know by email at bigmpathy@umich.edu. We may be in touch with you again to ask a few follow-up questions.

If they ask specific questions about the CQI or MCT2D (e.g. I tried to log into your system to update our clinical champion contact email...I won't be able to attend the next meeting...): I'm sorry, we don't work directly for MCT2D but if you could email ccteam@mct2d.org, Jackie Rau, the program manager and her team, will be able answer that for you.

And, in about 6-8 weeks, after we've concluded all the interviews and our analysis, we will have a final report, which will be provided to the Michigan Collaborative for Type 2 Diabetes. We're also scheduled to do a presentation to the MCT2D team. Please let them know if you would like to access the report or attend the presentation. Thanks again!

Protocol for: Collaborative Director

Overarching Question: Why would the “Learning collaborative” be the solution for the current situation?

New Protocol: (Due to the meeting time with the Collaborative Director being split with other 501 team, this interview will only be 30 minutes)

Questions:

[Warm-up/the role of the collaborative]

1. Can you tell us what events contributed to this collaborative coming about?
2. Have you had experience working with learning collaborative platforms in the past?
 - a. If so, can you describe that experience?
 - b. In that case, what was effective and what wasn't?
3. What is the value of this form of learning in the treatment of Type 2 diabetes?

[Designing a Learning Collaborative for the CQI]

4. Who do you envision being the users of this learning collaborative system?
5. What do you want them to get out of the experience?
6. What would a successful learning collaborative look like?
7. What do you envision as the end goal of this project?
 - a. What are some major roadblocks to achieving those goals?
8. In the contextual inquiry process, we are interviewing clinician users from the CQI accelerated sites. What questions would you hope to see answered from this process
 - a. Can you see this learning platform expanding to other fields of medicine as well?

Protocol for: Primary Care Physician or primary care clinician

Overarching question: What are the major challenges in treating type 2 diabetes and learning new methods?

Questions:

[Treatment for type 2 diabetes]

1. Can you walk us through the last time you treated a Type 2 Diabetes case?
 - a. Were there any challenges? If so, what were they?
 - b. Is there anything you wish had gone differently?
 - c. Is there anything you would do differently if you had a second chance to treat the case?
2. What are the most recent new treatments or methods for treating type 2 diabetes you have heard about?
 - a. How did you hear about these new methods?
 - b. Would you feel comfortable implementing them?

[Collaboration]

3. We understand that as a primary care doctor, you are central to diabetes care. What other health care professionals do you see as critical to delivering care to patients with diabetes?
 - a. Can you describe your last experience collaborating with [one of the professions they list or pharmacist, dietitian, or endocrinologist]?
4. What was your last experience collaborating with other doctors on a diabetes treatment case?
 - a. How did this treatment plan come out in the end?
 - b. How was this experience different from your regular working experience?
5. Can you tell me one of your experiences working with
 - a. What do you think they did well in improving the field? And what could they do better?

[Learning]

6. Can you tell me about the last time you learned new knowledge in your field?
 - a. What was the platform/way you learnt that knowledge?
 - b. Does it affect your current approach to forming a treatment plan?
 - c. If there is an online learning community, what would you like to see in it?
7. Tell me about a time when it was challenging for you to learn or implement new treatments.
 - a. How did you overcome those difficulties?

Protocol for: Non-primary care Diabetes Care Team including Endocrinologists

Overarching question: What are the major challenges in treating type 2 diabetes and learning new methods?

Questions:

[Treatment for type 2 diabetes]

1. Describe the last challenge you came across when dealing with a Type 2 diabetes case.
 - a. How did you resolve this?
2. Tell me about the last time you were dealing with a particularly difficult diabetes case.
 - a. Were there any websites or online communities you consulted?
 - b. Are these websites / communities commonly used in your field or are they particular to you?
3. When was the last time you were unable to succeed with your first approach at treatment? Can you walk us through the issue and how it was resolved?
4. Think about the last diabetes case you treated. Is there anything you would do differently?

[Collaboration]

5. Can you walk us through the last time you collaborated with other healthcare professionals on a diabetes case (primary care doctors, dieticians, pharmacist, nurses)?
6. When was the last time a primary care team sought advice / knowledge from you on diabetes care? What was the situation and how did you communicate ?
 - a. What would have made that situation easier for you? Or is there anything you wish had gone differently?
7. **How are you most often consulted on complex T2D cases?**
8. **Would you be willing to give advice to a primary care physician on how to interpret a specific patient's CGM readings?**
 - a. **How would you approach it?**

[Learning]

9. When was the last time you needed advice on treating Type 2 diabetes?
 - a. Who or what did you turn to for that advice?
10. When was the last time you did a refresh on the latest and best treatment methods?
 - a. How did you go about learning those new methods?
 - b. What resources does your hospital provide to ensure all are up to date on the best courses of treatment for Type 2 diabetes?