CareProfile: A Diabetes Health Indicator Tool for Pharmacists

By

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Endorsement and Acknowledgement

This report has been written by me and has not received any previous academic credit at this or any other institution.

I would like to thank Dr. Neil MacKinnon and our partners at Lawton’s for giving me the opportunity to develop this tool.

Aman Verma

Table of Contents

1. Introduction

This report details the work done by the author during his internship with the College of Pharmacy. The work was done as part of a research project headed by Dr. Neil MacKinnon, who is a professor at the College of Pharmacy. The research project deals with developing a set of health indicators for diabetes, and then having pharmacists use these indicators to assess and make recommendations to customers about their health risks. A major project partner was Lawton's pharmacy who provided a pilot site for the project at one of their pharmacies in Halifax, Nova Scotia.

The tool developed by the author, called CareProfile, allows pharmacists to enter data about the patient in relation to the health indicators developed in the research. The tool will then return any 'alerts' on the patient's health status, based on the indicators. This allows pharmacists to advise diabetes patients who may not be seeing their general physician regularly.

The author drew heavily on the experience he received in the Health Informatics program in this tool. Decision Support Systems, IT Project Management and statistics were particularly useful in the development of this tool.

One of the major problems encountered during the development of this tool was that there the information that the physician collects on diabetes patients was not available to the tool. By extending the usage of the tool to physicians, a greater amount of information will be collected, which can be leveraged by researchers, the pharmacists, and the doctors themselves to produce better patient outcomes.

2. Description of the Organization

The College of Pharmacy teaches future pharmacists as well as conducting pharmaceutical research, and is wholly part of Dalhousie University. The mission statement of the College of Pharmacy is "Enhancing health through pharmaceutical education, community service, and research". [1]

In particular, the author worked for Dr. Neil MacKinnon, who is an active researcher at the College of Pharmacy. Dr. MacKinnon has worked on several research projects before, and is well-known for his work in the field.

The Lawton's Pharmacy group was a major partner in the research project that Dr. MacKinnon is leading. Lawton's Pharmacy is now actually part of the Sobey's group, which is a major grocery chain. Lawton's has pharmacies all over Canada, but this "pilot project" involved the Lawton's pharmacy on Spring Garden Road.

3. Description of the Work Performed

The author worked to build a tool to aid Dr. Neil MacKinnon's research on Diabetes Health Indicators.

During the author's internship, Dr. MacKinnon developed a set of health indicators for type II diabetes. These indicators were not developed by Dr. MacKinnon himself, but by a group of diabetes experts. The list of indicators developed can be found in Appendix A, and a list of the experts along with their credentials can be found in Appendix B.

From the outset, the primary goal for the tool to be developed was to alert a pharmacist that a customer with diabetes was at risk for some complication listed in one of the indicators. It was originally thought that it would be possible to integrate such an 'alert' system into the current computer system at Lawton's. After the customer was alerted to their current risk status, it would be recorded that the customer was alerted within the tool. If the customer came back, then we could see if any change has occurred in their risk status. After a given period of time, all of the data would be sorted and analyzed to see what effect this tool and the indicators had on the population.

Dr. Neil MacKinnon had made arrangements with Lawton's Pharmacy to run these indicators in one of their pharmacies as a pilot project. Lawton's Pharmacy was already in the process of running a diabetes program called 'Diabetes Care In Action', which is designed as an educational program for their customers. They saw this pilot research project as a way of extending their current diabetes program to further improve the health of their customers.

After some preliminary meetings with the technical lead at Lawton's Pharmacy, it was decided that it would be impossible to integrate the new tool with the computer system currently used at Lawton's for sales. The current system at Lawton's was developed in the early eighties, and the company responsible for development has since gone bankrupt. The product is considered 'end of life' by Lawton's, and a new system is being considered for rollout in the next couple of years.

Fortunately, it has recently been mandated by the Nova Scotia government that all community pharmacies must have internet access. [2] Thus, a web-based tool would be the best solution given that we could not integrate the tool into the current system.

Lawton's pharmacies collect data about customers and uploads and this information every night to a central database. It was thought that this data could be used to figure out if the customer was at risk for one of the indicators listed in Appendix A. Thus, we thought that it would be best for the central database to upload "de-identified" data to the web tool every night, so that the tool could send alerts to at risk customers.

Since the tool was no longer being integrated into the system, the pharmacists would have to access the web tool every time a customer came. However, since pharmacists can

easily recognize diabetes medication, they would only have to access the web tool if a diabetes patient came in.

In summary, at this point the tool was supposed to work as follows: When a customer comes in, to refill/order medication, the pharmacists make a cursory check on the currently existing system to see what medications are already being prescribed. If the person is suspected to be diabetic, then the web tool is accessed to check if the patient is at risk for any of the indicators listed in Appendix A. If the patient is at risk, then the pharmacist informs the patient of this risk, and inputs that the patient has been informed into the tool. The tool would know which patient to 'alert' because it would be getting nightly feeds of data from the central Lawton's database.

A plan was developed based on these ideas, and it is given in Appendix C. This plan outlines the timeline that the project should have been completed in. However, due to unforeseen complications, the plan needed to be completely overhauled in the middle of the process.

One of the major complications was that while it was originally felt that the data in Lawton's central database would be sufficient to assess patient's risk for the indicators given in Appendix A, it turned out that it was totally insufficient. Lawton's collected data mostly on patient purchases and on a variety of biographical data such a date of birth. Unfortunately, they had no information on such things as whether or not the patient has congestive heart failure, which is important for the first indicator.

It was felt that the only other way to collect this important data is by asking the customer's general physician, or by asking the customer. Since it would be quite difficult and time-consuming to contact each customer's general physician, it was thought that the only option was to directly ask the customer about their health status when they came to refill their prescription.

To this end, a set of guidelines was developed by Lawton's. This guide was intended to educate the pharmacists on what kind of questions to ask, and how to ask them.

Unfortunately, after a visit to the pharmacy it was found that the computers that had access to the internet were quite a distance away from where the pharmacists interacted with the customer. This was quite problematic because it meant that the pharmacist could not enter the data directly into the tool when they were talking to the customer. It was also thought that it would make customers uncomfortable to shout answers to health questions in a public setting. Thus, it was decided that in the end a form would be used to collect the health data, which would then be entered into the tool at the end of each day.

However, not entering the data into the tool directly gave rise to the problem that the 'alert' generated by the tool if the customer is at risk for some indicator could not be given directly to the customer when they were in the store. The solution to this was to call the patient at home if an alert was generated. While this was not the ideal solution, it was considered to be the best option.

While 21 indicators were developed, it was felt that it would require too much information to be asked if we used all of them. The tool was to be built with enough flexibility so that indicators could easily be added or removed.

It was decided at an early date that the tool (which came to be known as "CareProfile") would be built as a PHP web application with a mySQL database running as its backend. Due to the fact that Lawton's used PHP / mySQL on their intranet, it was thought that this would be a good design decision in case they decided to expand or implement the tool on a permanent basis. Also, both PHP and mySQL are free and well-supported on the internet.

The web server was housed on the sevenof9.cs.dal.ca server at Dalhousie University. The web server will be moved if the pilot is successful and they want to expand the amount of pharmacies that are using the tool, but the university server was deemed to be satisfactory for the purposes of the pilot study. The website of the tool was (and is) https://sevenof9.cs.dal.ca/~verma/login.php.

The tool was implemented with SSL security so that none of the sensitive data would be exposed to others on the internet. Another security feature is that you must login to the tool, and each user can be given different "rights". If a user is an administrative user, for example, they can download a summary of all the data in the database, or add / delete new users and reset their passwords. However, "normal" users can only enter data and view data about patients at their location.

Screenshots of the tool are provided in Appendix D. The main function of the tool was to accept data about customers concerning the indicators. The tool includes a number of interesting and useful features. For example, some of the indicators have similar "Patterns of Care". If a question is answered for one indicator, then it is automatically filled in for another. As well, when the pharmacist enters new data about the patient, old data about the patient is conveniently displayed alongside for reference. The pharmacist can also see at a glance from the list of indicators how well the patient is doing because there are "smiley faces" beside each indicator, which turn to "frowning faces" when the patient is at risk for an indicator.

The tool also allows for direct download of the data to Microsoft Excel format. This was originally intended to be only used by the researchers, but was later decided to be extended to the pharmacists so that they could view the status of their diabetes patients "at-a-glance".

By the end of the internship, a tool had been produced and was ready for implementation. However, it turned out that there may be some problems with ethics of having patient data being transmitted over the internet. It was decided that the tool should be implemented on one of Lawton's servers.

Unfortunately, it was still necessary to get ethics approval before the pilot started, which is a 2-month process. At the end of this process it will be decided how to proceed with the project.

4. Discussion on the Relationship to Health Informatics

One of the major issues that Health Informatics deals with is the Electronic Health Record (EHR). While implementation of EHR's in Canada may be a very complicated task, their usefulness can be seen everywhere, especially in this project.

For example, if the customer's general physician had all of their data implemented into an EHR, then the tool that was built could be much more effective. The tool could download data from the customer's EHR, and produce 'alerts' in this fashion. This way, the tool wouldn't have to be a separate information repository but simply an extension of the EHR.

The relationship of the answers to the indicator questions to the 'alert' sent is reminiscent of Decision Support Systems. It would probably be possible to build a much more complicated alerting system based on the way DSS works, but the paradigm of how the tool works would have to shift dramatically.

The management course that was included in the Health Informatics program, IT Project Management, was particularly useful during this internship. Since the project was mainly self-directed, I needed to develop a professional plan for the project to guide myself. Appendix C includes my original project plan, which was completely based on course work done in IT Project Management.

The statistics course was also useful in this internship. It gave me an idea of what kind of information was important for research, which was important so that I knew what kind of data the tool should be collecting.

5. Discussion of a Health Informatics Problem

As mentioned earlier, one of the main problems encountered during this project was the fact that there was no Electronic Health Record, or anything similar to that where we could glean the data needed to tell if a patient was at risk or not. The only way that we had to get this information was to ask the patient directly.

An obvious but immensely complicated and costly solution to this problem would be to implement a sophisticated EHR with a centralized database. That way, the tool could simply download the appropriate information from the database to see whether a customer is at risk or not, and record the results in the database when completed.

However, while this would be a very effective way of doing things, the reality is that we do not have such sophisticated systems in place. In the mean time, it may be more effective to use a "cheap" solution, just to get the job done. As well, once we have this solution in place, it could be used as a "stepping stone" to other projects (such as a sophisticated EHR).

The tool that was created during this internship could be expanded so that the general physicians of diabetes patients could also use it, instead of just pharmacists. Because the tool is web-based, it could be accessed from any site with internet access, which a lot of doctor's offices currently have.

Another benefit of this solution is that it could help doctors reach patients with diabetes who don't regularly come for appointments. Although diabetes patients might not go to the doctor, they are forced to go to the pharmacy for drugs, which gives the pharmacist a unique position to influence their health outcomes. For example, the pharmacist might notice that a doctor has not made an entry for a particular high-risk customer in several months. Additional pressure from the pharmacist to go to the doctor or just information from them about their health risks might lead to better outcomes for the patient.

As well, researchers could use this information to glean information about the state of diabetes in the area, and identify trends in treatment and care (if that information was entered into the tool). This is only possible if doctors are entering the information as well.

Unfortunately, there are a few obstacles to the implementation of this approach. First of all, you have to educate every doctor's office in the area about this new tool, as well as convince them to use it. The tool, while offering them the benefit of some decision support, may be seen as just "extra paperwork". Also, it is possible that a doctor's office does not have internet access and thus no access to the tool.

6. Conclusions

While the tool, CareProfile, was successfully developed, it was never implemented because of ethics concerns. Hopefully, when the ethics review process is completed, the tool can be implemented on Lawton's intranet and the pilot can get underway.

The author was helped by his experience he received in the Master's of Health Informatics program. Many of the subjects including Decision Support Systems, IT Project Management, and Statistics were a valuable tool in this project.

The use of the tool could be vastly improved if its usage were extended to include physicians in the area. This tool would not be nearly as cumbersome and costly as an EHR, so it might be much easier to implement. Although not nearly as function as an EHR, using the tool in this way could act as a "stepping stone" to get to an EHR.

References

[1] College of Pharmacy, http://pharmacy.dal.ca/index.html

[2] National Association of Pharmacy Regulatory Authorities, Professional Library Requirements for Community Pharmacies in Nova Scotia, http://napra.ca/pdfs/provinces/ns/Professional%20Library%20Requirements%20May%202005.pdf

Appendix A - Final List of Indicators

Preventable Drug-Related Morbidity and Preventable Care-Related Morbidity for Type 2 Diabetes

1. This **outcome** has occurred after the pattern of care below:
   Exacerbation of congestive heart failure (fluid retention/SOB)
   This is the **pattern of care**:
   1. Patient has congestive heart failure
   2. Use of a thiazolidinedione (TZD) (or use of a TZD in combo with insulin)
   3. No follow up within four weeks of starting medication(s)

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2. This **outcome** has occurred after the pattern of care below:
   Foot Ulceration/Amputation
   This is the **pattern of care**:
   1. Inadequate glycemic control (A1c >7%)
   2. Annual foot assessments not performed by qualified healthcare professional (including monofilament test)
   3. Daily foot assessments not performed by the patient
   4. Patient not educated about foot care

****

3. This **outcome** has occurred after the pattern of care below:
   Blindness
   This is the **pattern of care**:
   1. Inadequate glycemic control (A1c >7%)
   2. Screening by an ophthalmologist not done annually
   3. Inadequate blood pressure control (target <130/80 mmHg)

****

4. This **outcome** has occurred after the pattern of care below:
   Hospitalization due to non-fatal myocardial infarction/transient ischemic attack
   This is the **pattern of care**:
   1. Inadequate glycemic control (Hemoglobin A1c >7%)
   2. Inadequate blood pressure control (target <130/80 mmHg)
   3. Statin therapy not initiated (ex. simvastatin)
   4. Not on ASA therapy
   5. A fasting lipid profile was not carried out upon diagnosis and/or was not repeated every 1-3 years as indicated

****

5. This **outcome** has occurred after the pattern of care below:
   Physician visit/ER visit/hospitalization for flu and associated complications
   This is the **pattern of care**:
   1. Did not receive flu vaccine in last year

2. Has never received pneumococcus vaccine

****

6. This **outcome** has occurred after the pattern of care below:
   Patient has reduced kidney function
   This is the **pattern of care**:
   1. has not seen physician in last three months
   2. has not had serum creatinine checked in last year
   3. has not had urine checked for protein and microalbumin ration in last year
   4. not taking an ACE inhibitor or an Angiotensin II Receptor Blocker

****

7. This **outcome** has occurred after the pattern of care below:
   Patient has shortness of breath/heart disease/peripheral vascular disease exacerbated by smoking
   This is the **pattern of care**:
   1. patient smokes cigarettes
   2. patient never referred to a smoking cessation program

****

8. This **outcome** has occurred after the pattern of care below:
   ER visit/hospitalization due to hypoglycemia
   This is the **pattern of care**:
   1. Use of insulin or an insulin secretagogue
   2. Self blood glucose monitoring not done at recommended intervals
   3. Patient has not been educated about prevention/treatment of hypoglycemia

****

9. This **outcome** has occurred after the pattern of care below:
   ER visit/hospitalization due to hyperglycemia
   This is the **pattern of care**:
   1. Self blood glucose monitoring not done at recommended intervals
   2. A1c level not tested every 3 months
   3. This **outcome** has occurred after the pattern of care below:
      Depression (major episode)

****

10. This **outcome** has occurred after the pattern of care below:
    Depression (major episode)
    This is the **pattern of care**:
    1. Presence of one or more complications due to diabetes
    2. Does not see physician regularly
    3. No informal assessment done by healthcare providers on a continuing basis

****

11. This **outcome** has occurred after the pattern of care below:
    Poor maternal/fetal outcome of pregnancy with pre-existing disease
    This is the **pattern of care**:
    1. No preconception counseling
    2. Poor glycemic control during pregnancy
    3. Poor control of hypertension during pregnancy

****

12. This **outcome** has occurred after the pattern of care below:
    Stroke
    This is the **pattern of care**:
    1. Poor glycemic/blood pressure/lipid control

****

13. This **outcome** has occurred after the pattern of care below:
    Hypoglycemic event during bouts of flu
    This is the **pattern of care**:
    1. Frequent blood glucose monitoring not done
    2. Continue sulfonylurea without recognizing glucose (food) intake diminished
    3. Lack of education regarding prevention and treatment of hypoglycemic events

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14. This **outcome** has occurred after the pattern of care below:
    Obesity increases risk for insulin resistance and progression to type 2 diabetes
    This is the **pattern of care**:
    1. Weight management not implemented (e.g. lifestyle modifications with regular physical activity and calorie reduction)
    2. Pharmacologic therapy not implemented
    3. No height/weight/BMI documented on chart each visit

****

15 This **outcome** has occurred after the pattern of care below:
    Gum Disease
    This is the **pattern of care**:
    1. A1c > 7%
    2. No annual dental exam (X-ray)
    3. No 6 month – 1 year cleaning

****

16. This **outcome** has occurred after the pattern of care below:
    Persistent hypoglycemic event
    This is the **pattern of care**:
    1. Patient treated with an insulin secretagogue or insulin
    2. "Patient taking Acarbose in combination with an insulin secretagogue and are not told that if a hypoglycemic event occurs, it should be treated with glucose (not sucrose).
    3. Lack of education regarding prevention and treatment of hypoglycemic events

****

17. This **outcome** has occurred after the pattern of care below:
    Nocturnal hypoglycemia
    This is the **pattern of care**:
    1. Patient is on insulin therapy and prescribed evening NPH taken with 5-6 pm meal
    2. "Lack of follow-up to reassess insulin regimen"

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18. This **outcome** has occurred after the pattern of care below:
    Hypoglycemic event to emergency room
    This is the **pattern of care**:
    1. Providing and elderly patient with a prescription for glyburide

****

19. This **outcome** has occurred after the pattern of care below:
    Poor glycemic control (A1c >7%)
    This is the **pattern of care**:
    1. Despite multiple medications (i.e. metformin, glyburide, TZD)
    2. Doctor/patient is not willing to start insulin although targets are not reached in a timely manner.

****

20. This **outcome** has occurred after the pattern of care below:
    Hypo or hyperglycemic event
    This is the **pattern of care**:
    1. Providing a patient with a prescription for insulin or handing them a pen with cartridge of insulin with no instructions on how to administer or not asking the patient to demonstrate use of an insulin pen.

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21. This **outcome** has occurred after the pattern of care below:
    Patient is suffering from erectile dysfunction
    This is the **pattern of care**:
    1. A1c levels >7%
    2. Patient has not been assessed for sexual dysfunction
    3. Patient has not been prescribed treatment
    4. Not screened for medication induced erectile dysfunction

Appendix B – Study Participants

Irene-Higgins Bowser (Dietician and Team Leader)
Dietician/Nutritionist
Bachelor's degree, CDE

Dr. Alun Edwards
Endocrinologist
Mixed DEC and tertiary hospital

Mary Ann Hopkins (Pharmacist)
Pharmacist
Ambulatory care hospital (teaching) with diabetes education center
Bachelor's degree CDE

Michele Lycett (Pharmacist and CDE)
Pharmacist
Bachelor's degree

Brendan McGinn (Pharmacist)
Pharmacist
Bachelor's degree

Dr. Scot Simpson (Pharmacist)
Pharmacist
Academia
Pharm D

Dr. Ehud Ur (Endocrinologist)
Endocrinologist
Tertiary Hospital

Dr. Joanne Wilson (Pharmacist)
Pharmacist
Academia
Pharm D

Lisa Woodill (Pharmacist)
Pharmacist
Bachelor's degree

Dr. Seena Zierler-Brown (Pharmacist)
Pharmacist
Pharm D

Appendix C – Project Plan

Introduction

This document is intended to provide a plan for the design and implementation of the software being designed for a research project being conducted by Dr. Neil MacKinnon. The project is to be primarily completed by Aman Verma over the course of a summer internship. Aman Verma is a candidate for the Master's of Health Informatics degree at Dalhousie University. The course of the internship is from May 15th – August 26th of 2005.

Objectives

The objective of this project is to create a software tool which will allow two Lawton's pharmacies to enter data about customers in the Diabetes Care in Action program into a database. The data will cover whether or not the customer fills any of the 9 'patterns of care' descriptions as described in the NSHRF Diabetes Indicator document. Some of this data will come from direct questions to the customer at the point of sale, and other data will come from the Lawton's corporate database. If a customer fills a description, then an alert will be shown to the pharmacist, who will convey this message to the customer. The software will be able to generate reports outlining what customers have been asked what questions, and what alerts have been generated.

Scope Limitations

The software tool will not be able to determine whether or not the customer has changed their behaviour identified in the alert, nor will it be able to accept data concerning behaviour changes. Maintenance of the software can only be guaranteed up to the end of the term of the internship. Security of the data transfers will be very high for corporate database transfers, but security on alerts, which are likely to be sent by email, will be significantly lower.

Project Tasks and Timeline

Phase 1: Requirements and Initial Design

Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
1. Clarify the requirements	- Determine the exact nature of what the tool will produce - Make up some 'mock tables' to show what data the tool will produce - Clarify what things the tool will not be able to do - Outline the objectives of the project clearly - Verify the suitability of the project plan, tasks, and allotted schedule - Clear up outstanding questions about the project	4	6	**May 27**
2. Initial visit to pharmacy	- Get permission to visit pharmacies - Collect information on workflow - Collect information on status of hardware, software and network connection - Determine how pharmacists check email (for alerts) - Determine how / if DCIA program clients are identified to the pharmacist - Assess the mood of the pharmacist toward the research - Establish a 'point of contact' for further discussion with pharmacists in the field.	8	12	**June 3**

Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
3. Get permission to view corporate data structure	- Determine who is to be contacted to get use of corporate data - Sign necessary agreements	6	10	**June 3**
4. Determine appropriate site for website	- Attempt to get permission for usage of university website - Get contact information for site controller in case of outages - Determine whether decided upon technology is usable at site (Apache, PHP, opening a secure SSH port)	6	10	**June 3**
5. Develop 'Pattern of Care' Question Text	- What question should be asked in relation to each point in 'Pattern of Care'? - For most it may be obvious, but for some not: 'Self blood glucose monitoring not done at recommended intervals': What is recommended? - Medical expert will have to come up with this	5	7	**May 27**
6. Develop 'Alert Text'	- What should the program say for each alert? - Medical expert will have to come up with this	2	3	**May 27**
7. Drug Identification	- For all the drugs identified in the question text strictly define the classes of drugs (What constitutes a 'statin'?) - Produce a document on the definitions of the classes of drugs	8	10	**May 27**

Phase 2: Software Design

Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
1. Analyze corporate data structure	- Determine what data is available, and what data is relevant to the questions in the 'Pattern of Care' Question Text - Identify how drugs are identified in the database - Identify how patients in the DCIA program are identified in the database	10	20	**June 10**
2. Define corporate data structure to 'patterns of care' mapping	- Discuss with medical expert whether the relevant data points can be used to answer the questions in the 'points' for the 'patterns of care' - Identify exactly which points in the 'pattern of care' can be answered via this data - Determine the exact logic by which the 'pattern of care' points identified are to be answered by this data i.e. If data point A=true and B=false then 'pattern of care' point is 'true' - Produce a document outlining this mapping, and include the minimum data set required from the corporate database	10	20	**June 17**
3. Get permission for the uploading of corporate data	- Get permission to get an upload of exactly the necessary data from the corporate database - Sign agreements as necessary	6	10	**June 24**

Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
4. Database design	- Outline of tables, fields, and relationships - Produce document laying out database design	30	40	**June 24**
5. Web Interface requirements gathering	- Identify exactly what functionality the web interface will require	10	20	**June 10**
6. Web Interface design	- Draw up “mock” designs for the layout of the website - Outline logical scenarios for the interface (if data is entered here, then this button is pushed, what happens)	30	40	**June 24**

Phase 3: Software Implementation and Testing

Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
1. Database implementation	- Write the code / setup the database according to database design	35	45	**July 22**
2. Web Interface implementation	- Code the web interface	50	60	**July 22**
3. Implement 'Corporate Data Drop-off'	- Verify that the secure SSH port is open on the website - Verify that the data is dropped off at appropriate time - Verify that data is what is needed - Verify that data matches what exists in corporate database	30	45	**July 22**
4. Web Interface + Database "Sanity" testing	- Develop Sanity test plan (in accordance with requirements) - Rigorously test the database on a test environment (my computer)	20	30	**July 27**
5. Test 'Corporate Data Pickup' Function	- Use 'mock' data to see if data can be integrated on a nightly basis	5	10	**July 27**
6. 'Live' Test	- Put the website on the university hosted server - Perform Sanity testing on the live website - Test the 'Corporate Data Pickup' Function	5	10	**July 29**

Phase 4: Staff Training / Project Goes Live

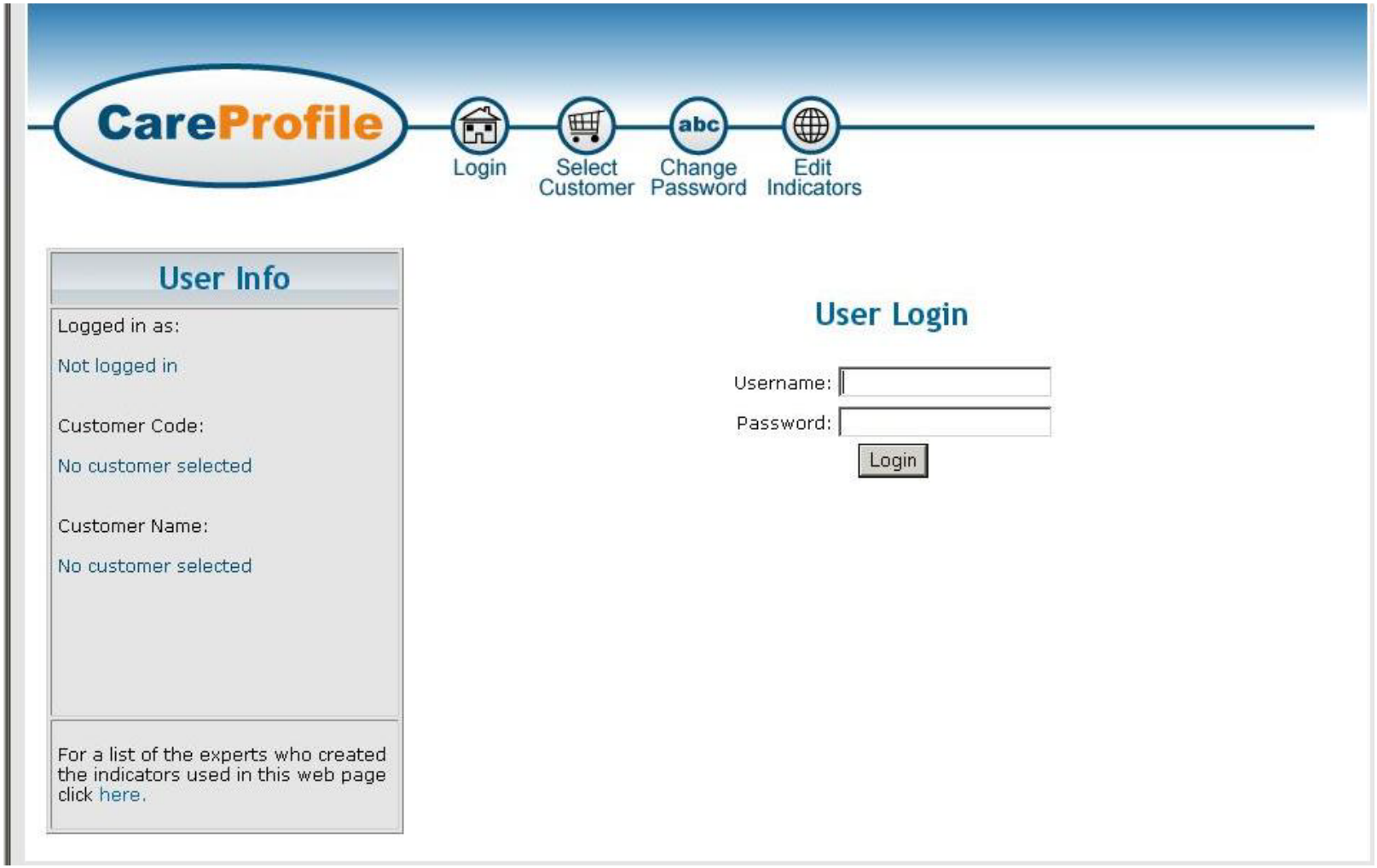
Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
1. Staff Training Plan Development	- Develop plan of objectives for staff training	5	10	**August 4**
2. Train Staff	- Go to site: Train staff in usage of the web interface	6	8	**August 5**
3. 'Go Live'	- Data collection of 'real' customers begins. - Alerts are generated	-	-	**August 8**
4. Supervision / Troubleshooting Stage	- Troubleshoot issues - Supervise any data collection issues	40	50	**August 12**

Phase 5: Project Finalization / Documentation

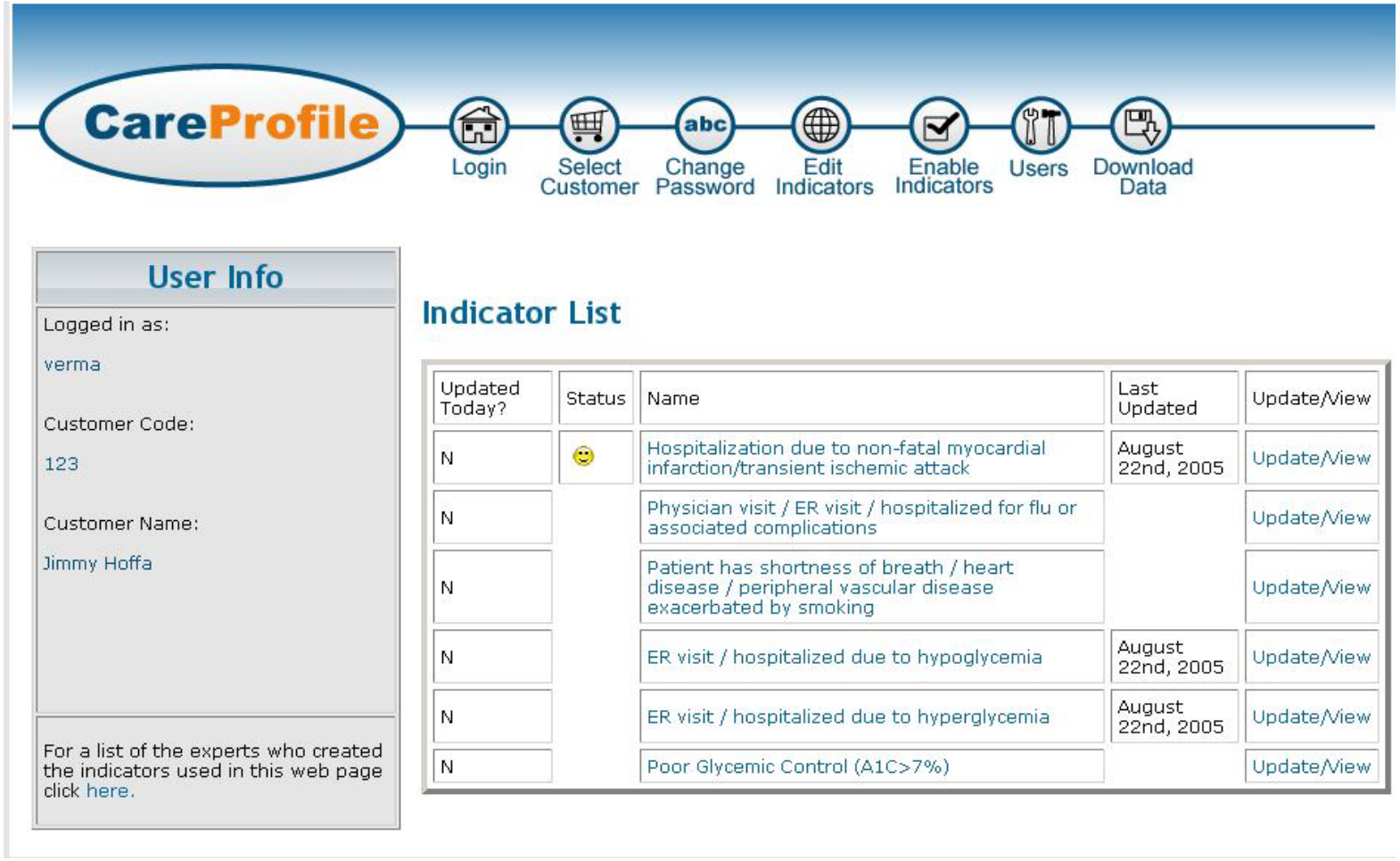
Task Title	Task Description	Minimum Time (hours)	Maximum Time (hours)	Estimated Date of Completion
1. Produce Reports	- Produce reports on what data was collected, about whom, when, and what alerts were sent	20	30	**August 19**
2. Document Tool	- Create a document that outlines the structure of the tool - Identify contact points for website, corporate database, and pharmacy - Outline an installation procedure if everything needs to be done again	20	30	**August 26**
3. Finalize Project	- Determine how much longer project will continue for - Hand off documents to appropriate parties - Train others in usage as necessary	10	20	**August 26**

Minimum Time Estimated: 381 hours
Maximum Time Estimated: 556 hours

Appendix D – Screenshots of the CareProfile Web Tool



* For patients on existing lipid therapy, consider dosage adjustment if targets not being met. Consider combination ther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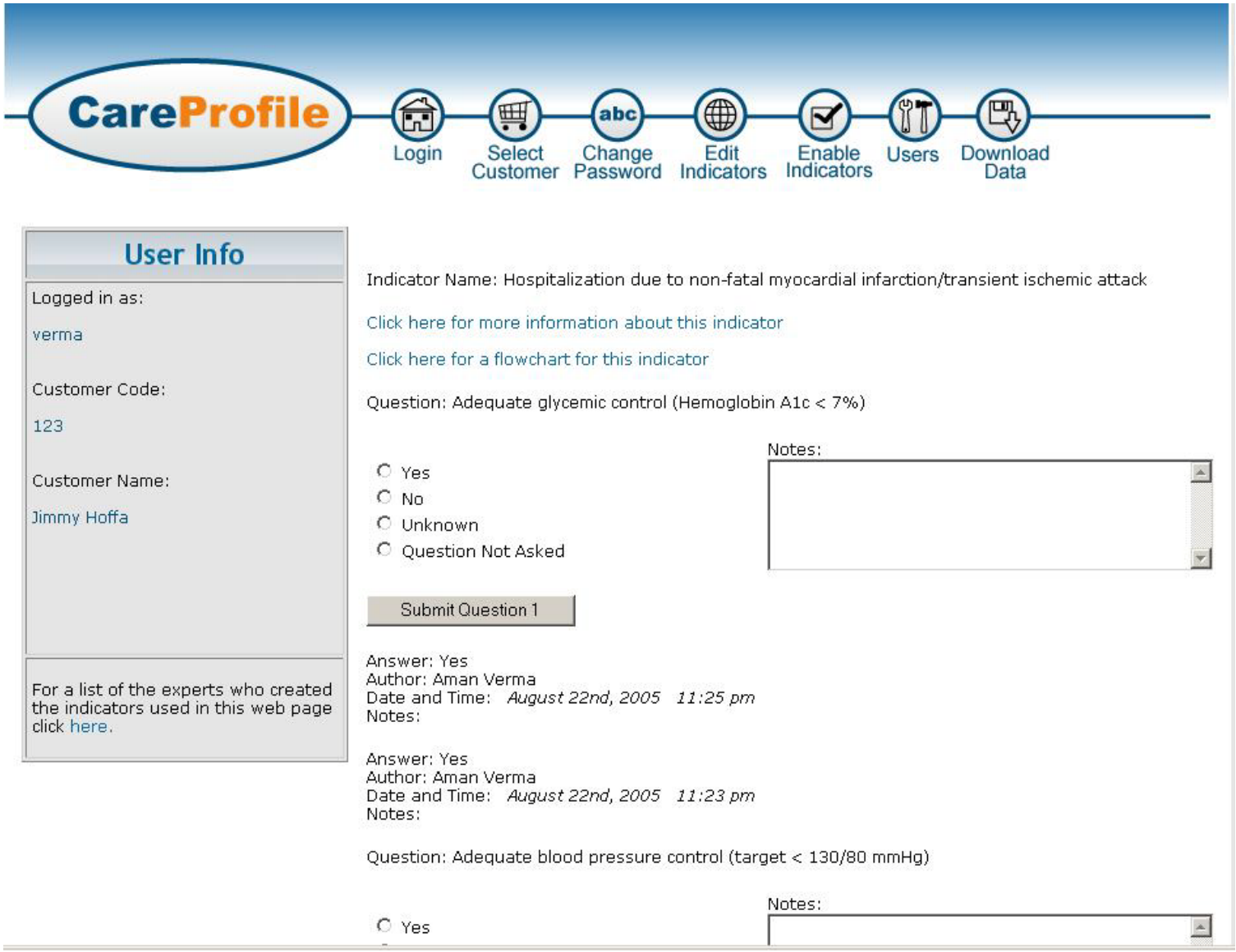
Indicator List
Updated Today?
Status
Name
Last Updated
Update/View
N
Hospitalization due to non-fatal myocardial infarction/transient ischemic attack
August 22nd, 2005
Update/View
N
Physician visit / ER visit / hospitalized for flu or associated complications
Update/View
N
Patient has shortness of breath / heart disease / peripheral vascular disease exacerbated by smoking
Update/View
N
ER visit / hospitalized due to hypoglycemia
August 22nd, 2005
Update/View
N
ER visit / hospitalized due to hyperglycemia
August 22nd, 2005
Update/View
N
Poor Glycemic Control (A1C>7%)
Update/View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Customer Code:
123
Customer Name:
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Indicator Name: Hospitalization due to non-fatal myocardial infarction/transient ischemic attack
Click here for more information about this indicator
Click here for a flowchart for this indicator
Question: Adequate glycemic control (Hemoglobin A1c < 7%)
Notes:
Yes
No
Unknown
Question Not Asked
Submit Question 1
Answer: Yes
Author: Aman Verma
Date and Time: August 22nd, 2005 11:25 pm
Notes:
Answer: Yes
Author: Aman Verma
Date and Time: August 22nd, 2005 11:23 pm
Notes:
Question: Adequate blood pressure control (target < 130/80 mmHg)
Notes:
Yes