

Don't Sugar Coat It Johnson County

Senior Division

Team

Single Year

Part I: Project Overview

A. Area of Concern

According to the American Diabetes Association, diabetes was ranked the 7th leading cause of death in the United States in 2010. The well-being of our community suffers as a whole because of this uncontrollable illness. “The prevalence of Diabetes has increased from 6.5% of Kentucky adults (240,000) in 2000 to 10.6% (359,000 adults) in 2013.” (2015 Kentucky Diabetes Report). “Among the 225,681 adults covered by the Kentucky Employees’ Health Plan (KEHP) in 2013, 11% (24,722) have been diagnosed with Diabetes based on claims data.” (2015 Kentucky Diabetes Report).

Diabetes has many symptoms that can be treated, but many people don't see the main problem. According to Kentucky Diabetes Fact Sheet, Kentucky has the 12th highest diabetes mortality rate in the nation. 2 In Kentucky, diabetes is the 7th leading cause of death by disease overall. Diabetes is associated with complications that threaten both length and quality of life such as blindness, kidney failure, lower-limb amputation, heart disease, stroke and ketoacidosis. Over 40% of hospital visits for cardiovascular disease listed diabetes as a secondary diagnosis. In 2013, Kentucky hospitals had 8,610 inpatient hospital discharges with a principal diagnosis of diabetes. Kentucky 2013 inpatient hospital discharge data shows the most frequent reasons for hospitalization with diabetes as the principal diagnosis were diabetic ketoacidosis or DKA and hypoglycemic manifestations. In other words, dangerously high or dangerously low blood sugar levels. Diabetics are often forced to manage what you choose to eat, how much you eat, and when you eat. Nutrition and physical activity are important parts of a healthy lifestyle when you have diabetes. Along with other benefits, following a healthy meal plan and being active can help you keep your blood glucose level, also called blood sugar, in your target range. To manage your blood glucose, you need to balance what you eat and drink with physical activity and diabetes medicine, if you take any.

In Johnson County, there is a lack of education for diabetes, as well as a lack of taking this disease serious. The lack of knowledge results in an increase of illness and deaths, with the most illness and death being male and children. Surprisingly, with children, a total of 472 or 67% have a diagnosis of Diabetes on claim. Of these youth, 45% are aged 14 or younger, while 55% are 15 or older. Children who don't have the right safety with their diabetes tend to end up with illnesses such as heart disease/problems, kidney diseases, eye blindness, etc... Additionally, the need for an effective meter will better the health of people with diabetes. Even Apple has recognized the need for the development of such a device, and is currently working on a prototype.

B. Challenges Identified

1. Because worldwide, the prevalence of chronic, noncommunicable diseases is increasing at an alarming rate, this may cause death from cardiovascular disease, kidney disease, and other illnesses that diabetes bring.
2. Since many children and adults are overweight or obese the body is unable to take in the normal amount of insulin it takes to help the body function properly.
3. Because of its chronic nature, the severity of its complications and the means required to control them, diabetes is a costly disease, not only for affected individuals and their families, but also for the health systems.

4. Diabetes is most common among the poorest communities. For low and middle-income countries, economic advancement can lead to alterations to the living environment that result in changes in diet and physical activity within a generation or two. Causing people to develop Diabetes despite relatively low gains in weight. A lack of sanitation drive families to low cost-per-calorie foods and packaged drinks, type 2 diabetes thrives.
5. Complications from Diabetes, such as coronary artery and peripheral vascular disease, stroke, diabetic neuropathy, amputations, renal failure and blindness are resulting in increasing disability, reduced life expectancy and enormous health costs for virtually every society.
6. Type 1 diabetes can affect major organs in your body, including heart, blood vessels, nerves, eyes and kidneys, leading to major illness or death.
7. Because of diabetes, nerve damage in the feet or poor blood flow to the feet increases the risk of various foot complications. Left untreated, cuts and blisters can become serious infections, which often heal poorly and may ultimately require toe, foot or leg amputation.
8. High blood sugar levels can be dangerous for both the mother and the baby. The risk of miscarriage, stillbirth and birth defects are increased when diabetes isn't well-controlled. For the mother, diabetes increases the risk of diabetic ketoacidosis, diabetic eye problems (retinopathy), pregnancy-induced high blood pressure and preeclampsia.
9. Due to having a medical card and not knowing how many test strips that will be use, the medical card only pays for so many for so long, if you was to run out and low on money could cause someone not to be able to get the test strips they need.
10. Due to a hand meter being too long to get together in a case of emergency a diabetic may not have time to check his/her sugar.
11. Since education about the complications of diabetes is scarce in public schools the community lacks knowledge about the risks and harmful ways diabetes has on people with this disease.

C. Underlying Problem

Because the majority of the community doesn't take the dangers of diabetes seriously and lacks the knowledge of how dangerous this disease is, our question is how might we approach with the general community (including doctors) to become more aware of the challenges faced by those living with diabetes? We want to raise awareness so that those living with diabetes may have a more normal lifestyle in the year 2017 and beyond.

D. Alternative Solution Ideas

1. The Johnson CmPS Team ("CmPST") will contact local doctors and diabetes associations to learn about the best ways to help those with diabetes.
2. CmPST will meet with those local diabetics to learn their stories and create a journal, Diabetic Living of Johnson County (DLJC), to highlight diabetic's lifestyle. This journal will share the stories of individuals so that the community can see the life that diabetics have to live.
3. CmPST will interview advocates and the diabetic population in order to find out the needs of diabetics. This will help us get a better understanding of what lifestyle they have to live.
4. Once the team understands the needs of diabetics, CmPST will reach out to pharmacies and doctors to see the total number of diabetics they see.
5. CmPST will collaborate with an engineering teacher to develop a model of what the meter will look like. This will give us an idea of how the meter will fit on the body.
6. CmPST will meet with local pharmacies to get their intake on the marketing of current blood sugar meters on the market. With this information, CmPST will be able to compare the meters to see what is the safest.

7. CmpST will meet with the Diabetes Education Program (DEP) in Prestonsburg, Kentucky to get information about the safety of current diabetics in our community. With this information CmpST will be able to bring the safest meter.
8. CmpST will meet with pharmacies and doctors to see whether they will advertise this meter and to collect opinions from diabetics we have not got to talk to.
9. CmpST will volunteer in Diabetes Education Program (DEP) to display our meter and collect personal opinions on current meters. This will provide the team with a look into the world of diabetics and give us an opportunity to help the youth with diabetes.
10. CmpST will meet with Diabetes Education Program to discuss the needs of the children with diabetes. This will allow the team to get an idea of how safe our youth is with diabetes currently.
11. CmpST will meet with diabetic experts and create a website to highlight the dangers in meters on the market currently and how diabetics could be in danger. The website will include links to local organizations fighting against diabetes, and diabetic expert contacts.
12. CmpST will visit with local diabetics to interact with diabetics. This will give the team a firsthand look into Johnson's diabetic community.
13. CmpST will host a Diabetic event at Johnson Central high school on a Saturday to get the community interacting with diabetics.
14. CmpST will host another Diabetic event during school hours to get the school interacting with diabetics and to help get the word out about diabetes.
15. CmpST will go to local elementary schools to talk with children about diabetes and to interact with them.
16. CmpST will compete in other competitions such as SkillsUSA, LGEC, and Startup challenge to bring this device to the public eye in order to manufacture for the future.

E. Plan of Action

CmpST met in June to discuss the concerns of individuals who suffers from diabetes. Diabetes is a subject we kept hearing of when one of our team members got diagnosed with this horrible disease. We determined that we will target anyone with blood sugar problems and the local community by directly engaging with the diabetic population and experts in the field so that we can determine what would be the best ways to make the product the safest.

During July, we will contact the diabetic programs in our county and find the experts who can help us understand more about diabetes. We will contact diabetics to get their experience and to gain further insight into the challenges of being diabetic. We have also created a diabetic meter the "Lite Patch Meter" to improve the monitoring of diabetes. Our meter offers a more reliable, faster, and safe way for diabetics to check their blood sugar levels.

In August, we will talk to doctors about how diabetes work and what would be the safest type of meter that could be created. Then, we will meet with a business teacher from Johnson Central and from Pikeville University to get a closer look at the business aspect of creating this product. In September, we will talk to diabetics to get their experience with diabetes and their opinion on the product. Once the stories are documented and business aspect of the product is completed, we will submit the current work completed to the University of Pikeville Startup Challenge Competition to get opinions back. We will also contact pharmacies and doctors to get their opinion on the product and if they would advise patients to get it.

In October, we will work with business teachers from both Johnson Central and University of Pikeville to complete the current product PowerPoint and finances. Once the PowerPoint and finances are completed we will submit it to Pikeville and compete at our local school. We will also meet with

engineering teacher to create a model of what the product will look like. In November, we will then compete at the University of Pikeville against other high schools from Kentucky. Once we have done that we will get opinions from judges and experts on ways we can better the product. We will talk to Lieutenant Governor about the product and FDA approval.

In December, we will talk to diabetics outside of Kentucky to get their opinion on the product and to hear their experiences with current meters on the market. With this information we will then better our product and make it as safest as possible. In January, we will have members join to divide the finances and marketing aspects. We will then get ready prepare the product to compete in Louisville in two different competitions and one in Pikeville. We will then create a journal to promote the stories about the diabetics we have met and share their experiences with the community. Through all the activities and meeting with diabetics and experts, we feel our product will address the safety needs of diabetics while involving our community.

In February, we will host a diabetic event on a Saturday to get the local community interacting with diabetics and to raise money for the local diabetic programs. We will also be hosting a event during school hours to get the high school interacting with diabetic and to help them learn about this horrible disease. Later on that month we will go to the local elementary schools to interact with the children there and to help them learn about diabetes.

Part II: Implementation of the Plan

A. Action and Outcome to Date

In July, team members contacted various diabetic programs in our county to gain a better understanding of the scope of the project, current sources of assistance, challenges diabetic face, and the best way we can make this product the safest. After gathering this information, we designed an action plan to address the safety of diabetics. And in August, we talked to doctors about what they thought was the biggest safety problem for diabetics. We talked will six different diabetic experts, each told us that the current meters on the market was not the safest for diabetic due to time. Once we got the start of our data, we met with business teachers from Johnson Central and from Pikeville University to get a closer look at the business aspect of creating this product.

In September, we interviewed diabetics to get their experience with diabetes. We interviewed a total of 7 diabetics from Johnson County alone. Once the interviews was done we documented the stories in a journal. After documenting the stories we met again with business teachers, Jarred Gibson from Johnson Central, and Dr. Snow from the University of Pikeville. We worked on the business aspect of the product such as materials cost, financing cost, and manufacturing cost. Once we completed the business aspect we submitted the current work completed to the University of Pikeville Startup Challenge Competition to get feedback. We later contacted local pharmacies and doctors to get their opinion on the product and to interview about the situation that diabetics have to face from a nondiabetic view. We also talked to them about the risk that they feel diabetes has on people. Not just diabetics but their families also. We also interviewed Ferrara Alan, Louisa Pediatrician, to learn about the current situation that children diabetics face when they come into his office.

In October, we worked with business teachers Jarred Gibson and Dr. Snow to complete the current product PowerPoint and finances. Once the PowerPoint and finances was completed we will submit it to Pikeville and compete at our local school. We met with an engineering teacher from Johnson Central to discuss the materials to create a 3D model of the product. Near the end of October, we competed at the local school competition, placing first and going on to the Regionals. In November, we then competed at the University of Pikeville against other high schools from Kentucky, and met Lieutenant Governor and once we done that

we will get opinions from judges and experts on ways we can better the product. We then talk to Lieutenant Governor about the product and FDA approval.

In December, we talk to diabetics outside of Kentucky. We got opinions from diabetics in Kentucky, West Virginia, Virginia and Tennessee. We talked to over a total of 106 different diabetics, all from the ages 20-55. We interviews them to get their opinion on what they thought was the biggest safety problem with the current blood sugar meters on the market. They all agreed that the biggest problem would be timing. After the information was collected we then gathered together to discuss the best ways we can make this product the safest for those who are diabetic. Later that month, we met with a diabetic support group to get a closer look on how diabetes work and the causes and illness you can get from having diabetes.

In January, our team met to divide the finances and marketing aspects. We're getting prepared to compete in Louisville in two different competitions, SkillsUSA and Lieutenant Governors. Then finish creating the journal to promote the stories about the diabetics we have met and share their experiences with the community. We will finish working with Jarred Gibson and Dr. Snow. Through all the activities and meeting with diabetics and experts, we feel our product will address the safety needs of diabetics while involving our community.

In February, we hosted a diabetes walk on the second Saturday. We got donations from Cash Advance, Fazolis, Smart Style, and a lot other. We then hosted another diabetes walk on a Friday for the local high school. Later on that month we went to local elementary schools to interact with the children about diabetes.

B. Organization

Our team consists of four students from Johnson Central High School. We hold our meetings during school sixth period and after school. After each member contacted a diabetic, we went to a diabetic program. We all took part of interviewing diabetics at these programs and learning what the experts had to say. One team member is in charge of leading each event. That person is responsible for organizing event, from the outside groups to our team members, sending all communications. That person also markets the events to our community. Bethannie, Cassondra, and Danyelle talked with local diabetic programs to get advice. Bethannie is responsible for the finances of the Lite Patch Meter. Danyelle, Cassondra, and Bethannie are responsible for interviewing local diabetics. Bethannie went to the Pikeville Startup challenge. Danyelle, Bethannie, Cassondra, and another Skills member Makaylla went to compete at SkillsUSA regional and state competitions. Danyelle, Bethannie, and Cassondra competed in the LGEC. Bethannie is responsible for interviewing doctors, she is also the one who is diabetic and is living with the experience of a diabetic. Bethannie is responsible with talking to the Lieutenant Governor. The responsibility for the PowerPoint for the other competitions is Danyelle , Bethannie, and Cassondra. Bethannie is responsible for creating the 3D model of the created meter, interviewing experts, and for writing the journal. Cassondra, Danyelle, and Bethannie created fliers and hosted the diabetic walks. Facebook page was created by Cassondra.

C. Resources Identification and Utilization

Due to the lack of knowledge of diabetes, we relied on the expertise, resources and connections of the diabetic population and experts. We also relied on the diabetics of our community to respond to the needs that diabetics have to have in order to have a "normal life." Ferrara Alan, Louisa Pediatrician, put us in touch with Lexington Children Endocrinologist, Evangelia Kalaitzoglou, MD. Doctor Evangelia Kalaitzoglou shared her knowledge with us in an interview during a doctor appointment for one of the team members. Business teacher, Jarred Gibson from Johnson Central, and Dr. Snow from the University of Pikeville worked with us to create the business aspect of the product. They helped us get connected to the finances of the product and the marketing. Diabetic Programs in Paintsville and Prestonsburg, allowed us to come in and interview diabetics there and get their expert knowledge. Engineering teacher Mark Shephard from Johnson Central, allowed us to use his 3D

printer to create a 3D model of the blood sugar patch. Johnson Central Nurse, Staci Meade, allowed us to interview her for an outsider view of diabetes and the struggle they go through. Justin Prater, from the University of Pikeville, came in to teach us the right ways to present a PowerPoint and the best ways to market the product.

Part III. Project Outcome

A. Accomplishments

During August we started working with business teacher Jarred Gibson, Dr. Snow, and Justin Prater to create a product that will help those with diabetes live a more normal lifestyle. Our team worked with business teacher Jarred Gibson and engineer teacher Mark Shepherd to create a 3D prototype of the Lite Patch Meter. Our team took our product to the Startup Challenge with the University of Pikeville, placing third overall, to see how our product would do with the entrepreneurship side of the business. This led us to speaking with Lieutenant Governor about the problems diabetics face and how this product could be FDA approved. We then decided to talk with local diabetics about the problems we faced to create a journal. We interviewed 56 diabetics learning the complications this horrific disease brings to them. We then decided to host Johnson Central's CmPS teams first diabetic walk, we got over 100 community members to show for our event by printing 450 flyers and posting them over the community. WYMT also hosted a live news report of the diabetic walks host, interviewing each member of the team and others who came to the walk. We donated \$210 from our walk to our local health department to help fund their free local diabetic classes. We spoke with over a thousand children in elementary schools to inform them on the dangers diabetics face every day and how to handle a situation if one ever occurred. Also, we set up an informative table with activities for JCMS students at their annual Health Rodeo. We placed first at the SkillsUSA competition winning a \$16,000 scholarship a piece for each of our members at Sullivan University. We have made T-Shirts to sell and now our community members are wearing them in public.

B. Reflection on Project Outcomes

At the beginning of this project, one our team members was diagnosed with diabetes. When she was diagnosed with diabetes she had to learn how to live the lifestyle a diabetic is forced to live. Before she was diagnosed we all looked at diabetes as a disease you only got from eating too much sweets. A major challenge for our team was getting use to the dangers that our team mate then had to face. She was dependent to us, even at times she had no idea what was happening. Once she was diagnosed, Pikeville College had a startup challenge that we decided to enter. The idea was to come up with a product to startup. The product we decided to do was a blood sugar patch. With this startup challenge our team was able to spread the awareness of diabetes. This product placed 1st at the school level, and also placed 3rd against other high schools in Kentucky. We was also able to talk to Lieutenant Governor about the awareness of diabetes and how this product could get FDA approved. We was able, at the time of the challenge, to inform others of the dangers diabetics have to live and the lifestyle they have no choice but to live. During the month of January we was able to host diabetic walks in the community to spread awareness of diabetes. WYMT hosted a live news set to help us get the word out. Many diabetics was contacted and interviewed about their story and how having diabetes has change their life. Many informed us that diabetes is a dangerous disease that no one get control. We was able to raise money for local diabetic programs for them to host classes to the community to teach others what to do if someone around them has diabetes and needs help. Over the period of time we got to work on this project, our teams perceptions of diabetes transformed. At first we believed diabetes was just a disease from sugar. Eat too much sugar and you was going to get diabetes, not true though. We first stereotyped diabetics but after one of the team members was diagnosed with diabetes and learning about diabetes, we are much more sensitive to their situation. Now, we want to inform others of our new insight. Diabetes isn't a lifestyle one chooses to have, it's a lifestyle they have to live. Why not make it as normal as it possibly can be?