Type 1 Diabetes and Use Of A Web-Based Telemedicine Application
Felicia Kimbrough, FNP-BC, DNP
Southern Illinois University Edwardsville

PROBLEM INTRODUCTION
High school students diagnosed with type 1 diabetes (T1D) repeatedly reported dissatisfaction with the protocol used to share information regarding their diabetes. CCHS currently has five students diagnosed with T1D, and those students have vocalized displeasure with the current methods to monitor their diabetes and communicate carbohydrate levels and insulin dosages. They dislike walking past the cafeteria and into the clinic to manage their disease.

This project sought to allow high school students diagnosed with type 1 diabetes autonomy and control over their chronic illness, using BlueLoop®. BlueLoop® is a web-based application that enabled students to communicate their blood sugar, carbohydrate intake, and insulin doses with the school nurse, nurse practitioner, parents, endocrinologist, and pediatrician without presenting to the school nurse or school-based health clinic. BlueLoop® also allowed the communication between all parties. This project allowed for discreet and more comprehensive care of the patient and improve accessibility for all parties.

LITERATURE REVIEW
- T1D is the most common chronic metabolic disease diagnosed in children and adolescents (Krzewaska & Ben-Skowronek, 2016).
- The number of children diagnosed with T1D continues to increase in the U.S. with an estimated prevalence of up to 3 million children, and approximately 18,000 are newly diagnosed each year (Chiang, Kirkman, Laffel, & Peters, 2014).
- The prevalence of the disease led the United Nations to list it as an epidemic of the 21st century, and to date, it is the only non contagious disease on the epidemic list (Krzewaska & Ben-Skowronek, 2016).
- T1D has a substantial economic impact in this country, with cost estimates of $245 billion in 2012 (Pettitt et al., 2014).
- The increased incidence of T1D demands an increased need for resources and patient care experts.
- Telemedicine has been found to lead to significant improvement in the hemoglobin A1C of adults and children (Guljas, Ahmed, Chang, & Whitlock, 2013). New technologies allow easier and more efficient use of telemedicine and can have a profound impact on the lives of youth with T1D (Shalitin & Phillip, 2007).

PROJECT METHODS
The project began with the implementation of a web-based application, BlueLoop®, to facilitate communication between students with T1D, their parents/guardians, school nurse, and designated persons chosen by the user.

Three students elected to participate in the project: one male and two females who were Caucasian, mixed ancestry and Hispanic. October 23, 2017 was the first day of initial input of data into BlueLoop®, and data input ended with the conclusion of the semester on December 19, 2017. Individual interviews to discuss the use and satisfaction of BlueLoop® were held in January 2018 at the convenience of the project participants. Those interviews were recorded, transcribed, and analyzed.

EVALUATION
The outcome measures included a student and parent and/or legal guardian report on usability, accessibility, and desire to continue use of the web-based application, BlueLoop®.

Qualitative data, which was obtained from participants and their parents/legal guardians, was gathered in an interview format and transcribed.

Identified Themes:
- Positivity with use
- Desire to continue use
- Increased social time

IMPACT ON PRACTICE
This project allowed high school students diagnosed with T1D autonomy and control over their chronic illness, improved accessibility of information, and uninterrupted social time for the adolescents.

Students were able to communicate their blood sugar, carbohydrate intake, and insulin doses with the school nurse, NP, parents, endocrinologist, and pediatrician. This project also allowed for discreet and more comprehensive care of the patient and improve accessibility for all parties.

CONCLUSIONS
- All of the students reported a desire to continue using BlueLoop®.
- All of the parents reported an overall positive experience with the use of BlueLoop®.
- All of the students reported increased social time with the use of BlueLoop®.
- One negative report was that BlueLoop® removed a portion of texted communication.

QUOTES FROM INTERVIEWS
- “I liked it because I got her lunch numbers and it was easier for me to keep track of that. Most days I would be like what are your numbers but having that then I could just go look back at it.”- Parent
- “It’s really nice because I don’t have to come down here, I can go and sit down with my friends and do it. I can eat and like sit with my friends.”- Student
- “I am glad it is easier for him. I know I was very stressed out about him having to come down here and do it and go back there and what if they were out of something. Now he has it all there. He can send it all in. It’s really nice because I don’t have to come down here and do it and go back there and what if they were out of something. Now he has it all there. He can send it all in. He doesn’t have to worry about it so that’s nice.”- Parent
- “I like this way better because the previous way she did something has changed. This cuts that out. She gets her meal first and now knows what she’s eating on the tray and sending it to you guys and calculating.”- Parent
- “BlueLoop is better.”- Student