

COMMUNITY PHARMACY FOUNDATION GRANT REPORT
**A collaboration of community pharmacists and school nurses to improve the care of
students with diabetes**

Introduction and Background

Historically, diabetes mellitus has been classified as Adult Onset and Juvenile Onset types, indicating not only the usual age at initial presentation but also representing a difference in pathophysiology, treatment options, and disease course. In recent years, however, accepted terminology has changed so that these two disorders are now known as diabetes type 1 and type 2, respectively. A major reason for this change is the blurring of the age of onset of type 2 diabetes. Whereas it was typically seen after the age of 40 just 20 years ago, the American Diabetes Association (ADA) recognizes that it is now frequently diagnosed in children and adolescents. Unfortunately no reliable national epidemiological data are available. As a result we are unsure of the exact incidence of this disease. Typically reporting on diabetes with no differentiation between type 1 and type 2, a number of studies have reported prevalence rates of 0.22%¹ to 0.4%². One study, however, reporting on a survey of 102,353 children found an overall incidence of 0.32% in all age groups, but in the 12-17 age group 0.56% was found to have the disease³. The most recent data published by the American Diabetes Association indicates that the prevalence of diabetes among those under the age of 20 is 0.22%⁴. Regardless of the exact numbers, most clinicians and researchers agree that this growing trend in the diagnosis of diabetes in our youth is directly related to changes in lifestyle we have observed over the last two decades. Instead of playing basketball or baseball, riding bicycles or jogging, children today are more likely to be playing video games or surfing the internet while eating a “Supersized” fast-food dinner. As a result our children are gaining weight as never before. There is no doubt that the rising incidence of diabetes in youth is directly tied to this rising incidence of overweight and obese children. It has been reported that the prevalence of obesity in children, defined as a Body Mass Index (BMI) > 95th percentile for age and sex, has risen from 6% in the 1970s to 16% in the year 2000². Children who fall into this category are twice as likely to have diabetes as those below the 85th percentile, designated as normal weight. Reporting on the risk factors for diabetes in children, the STOPP-T2D Prevention Study Group conducted fasting blood glucose tests on 1740 eighth-grade students. They found that 49% of these students had a BMI>85th percentile. Of these, 40.5% had a fasting glucose greater than 100mg/dl, falling into the category we would now designate as increased risk for diabetes². The significance of this designation is that, statistically, 50% will go on to a diagnosis of diabetes, usually within 10 years. Although the absolute numbers may still be small, there is a need to develop programs to identify and care for this growing number of adolescents with diabetes.

It has been established that diabetes self-management programs conducted in a variety of clinical situations can successfully lower the incidence of chronic complications from diabetes. These programs have generally used a decreased hemoglobin A1c level (A1c) as a surrogate marker for this. Two classic studies, the Diabetes Control and Complications Trial (DCCT)⁵ and the United Kingdom Prospective Diabetes Study (UKPDS)⁶, have demonstrated that control of the A1c will greatly reduce the incidence of chronic complications involving the eyes, kidneys, nerves, and major blood vessels. In pharmacy, there is no better example of this success than the Asheville Project. This program, which utilizes community pharmacists to coach patients in self-management of their disease, has resulted in a decrease of the average A1c to less than 7% and the average annual expenditure for health care by about a third for those patients enrolled^{7,8,9}. The APhA Foundation, attempting to widen the scope of this project, has replicated it, providing the same services to the employees of employer groups nationwide¹⁰. To date, all such programs have dealt with adult patients.

The principal investigator of this proposal had been a pharmacist-provider in one of these APhA Foundation projects for several years. Also, two of the investigators have designed and implemented another replication of the Asheville Project at Campbell University. In both situations, similar results to those reported nationally have been observed. But again, these programs enrolled only adult patients.

Through a gift from Dr. Joseph Baggett, a local physician, the Campbell University College of Pharmacy & Health Sciences took a giant step in addressing health awareness in our region of North Carolina establishing the Campbell University Wellness Institute. The Wellness Institute Middle School program was started in 2000 because Dr. Baggett wanted to make sure that students were informed of their responsibility in disease prevention. He understood that during the middle school age, 11-14, students are forming their health habits for a lifetime. The middle school program has several components including presentations on diabetes prevention education. It was our experiences in the schools along with our involvement in the Asheville Project-like programs that led us to envision the SNAP program. Because we could not find a similar program for school age patients described in the literature, and because of the perceived need to provide self-management education to this growing population of patients, we devised a project which brought together a team of health professionals for the benefit of this group of patients. School nurses are available to these student-patients several times each week. Community pharmacies are visited by, and provide services to, such patients and their families more frequently than any other health provider. Bringing the student's family into the process, as is advocated in the literature, provides a unique aspect to this project. By bringing together the school nurse, the community pharmacist, the patient and his or her family, while maintaining regular communication with the patient's primary care provider, we felt that we could affect a positive impact on each student's self-management outcomes. We defined this as adherence to ADA Standards of Care, A1c normalization, and weight reduction. This should reduce the potential for chronic complications of the disease.

Although limited to the schools and community pharmacies in Harnett County North Carolina, it was hoped that completion of the project would provide a system for any interested pharmacy to implement it in their own community. We set out to produce a tool kit consisting of DVD modules, accompanying written educational material, and a project guide which would outline the process of implementation. The DVD modules cover the essentials of diabetes self-management: medications, self-monitoring of blood glucose, nutrition, exercise, complications, emergency management, and routine maintenance issues. These modules, supplemented by the written material, can be used during monthly visits to the community pharmacy in conjunction with the interaction between the pharmacist, patient and family. In addition, we provide templates for all forms needed: registration, intervention monitoring, and results documentation. Essentially, we intended to provide a turn key system which could be adapted by any community pharmacy.

OBJECTIVES AND METHODS

Objective 1: Develop a collaboration between trained community pharmacists and school nurses for care of students with diabetes

Diabetes is a disease that is best managed by a team approach. At the center of the team, of course, is the patient who should be the controller of all care decisions. Adolescent patients, however, usually do not have sufficient knowledge or maturity to make these decisions independently. The team, therefore, is essential to providing the support needed for these patients and their parents. To facilitate this, we set out to develop a collaboration that would benefit the young patient not only in the medical office but also at home, at school, and in the pharmacy where much of diabetes therapy is tendered.

North Carolina law mandates that students with diabetes have an advocate at their school that is aware of that student's diagnosis and management plan and is available to that student to provide support and care in emergency situations. In most cases, the person responsible for being this advocate is the school nurse. It was logical, then, to include the nurse in our management team. Because much of the therapy used to treat diabetes is provided by pharmacists, and because of the success of pharmacist diabetes management programs mentioned above, specially trained community pharmacists were included as well. Family support is essential for the young person with diabetes. Encouragement and understanding by parents and siblings can be the difference between disease acceptance or denial, and adherence to or neglect of care. Family involvement and discussion, therefore, were integral components of this program.

Our initial plan was to recruit students from three middle schools in Harnett County after receipt of information provided by parents at the start of the school year. Forms are submitted which identify specific student needs, including medical requirements for those with diabetes. However, submission of these documents is voluntary on the part of the parents and proved to be unreliable as a means of identifying all students with the diabetes. As a result we were faced with a very small number of potential participants for this program. To overcome this, we approached one of the largest pediatric practices in the area, ABC Pediatrics in Dunn. After presenting our plan to these medical providers, they agreed to refer their patients to us. However, this required us to expand the program to include students enrolled at any of the five middle schools in the county as well as a number of elementary and high schools. We agreed to accept students who were not only in middle school but those who were one year away from entering middle school or who were in their first year of high school. The providers at the pediatric practice also wanted us to accept students who were at risk of developing diabetes but not yet diagnosed. All of these changes resulted in a more reasonable number of participants.

All professional team members were informed of program objectives and procedures during several meetings held for this purpose. Since the school nurses were well-versed in the care of students with diabetes, no further training was necessary for them. The participating community pharmacists, on the other hand, had a variety of educational and practice experiences. It was felt that program objectives required a baseline of knowledge by these pharmacists, so each completed a diabetes certificate program offered by the Greensboro AHEC. This internet-centered program entails approximately 50 hours of home/on-line study, followed by two on-site sessions: one to practice and demonstrate proficiency in glucose meter education and the other to present and discuss a number of diabetes cases from their individual practices.

Objective 2: Enhance the self-management proficiency of students

As stated earlier, diabetes affects all areas of a patient's life. Because an adolescent's life revolves around school, recreation and family life, our program was designed to emphasize to our participants how diabetes recognition and care can be woven into their daily routine. While at school, a student is not only sitting at his or her desk, but will also be eating lunch and snacks, going to PE, and confronting many academic and emotional "crises". To help the student deal with these events in the context of diabetes, each was to meet with the school nurse on a weekly basis. At these 5-10 minute sessions, the nurse was to observe the student doing a blood glucose meter test, discuss the results of this test and any immediate concerns of the student. It was hoped that this would provide a mechanism for the students to relate their daily activities to blood glucose control. Results of each intervention were to be recorded on a Nurse Encounter Sheet (Appendix A). Students were instructed to discuss their weekly nurse meeting with their parents.

Most people with chronic diseases such as diabetes visit their pharmacy on a monthly basis to refill their prescriptions. Our program, therefore, required eight monthly visits to one of our community pharmacists. At these sessions, the student accompanied by parents and siblings, would watch a 10-15 minute video dealing with one of eight particular aspects of diabetes care.

After watching the video, the pharmacist would engage the student and family in a discussion of that module's content in the context of that patient's life. Following is a list of the eight modules:

1. Overview
2. Introduction to basic nutrition
3. Nutrition and you
4. Physical activity
5. Medications
6. Monitoring
7. Management of acute problems
8. Prevention of long-term complications

Each video contained a short description of the principles involved in the module by an "expert". What was intended as the "take home" message, though, was provided by a panel of teens with diabetes who discussed how the content of that module affects their lives. It was felt that our participants would relate best to others near their age. Each session was to be documented on the Pharmacist Encounter sheet (Appendix B).

Although not a part of our original proposal, we realized prior to implementation that an essential part of diabetes care, exercise, was missing. As a result, we contracted with an on-line exercise and nutrition program, www.GoTrybe.com, which would allow for group and individual sessions, recording the participation of each individual. The content of this program was developed for three different age groups, one of which coincided with our target age. All participants were enrolled in GoTrybe and encouraged to access it at home whenever possible. In addition, we schedule two group sessions each week, one in the early evening on Wednesday and the other on Saturday morning. Attendance at these sessions was voluntary.

Each of these activities was meant to emphasize to the students the importance and necessity of self-care. Adherence to a care plan and attention to the major components of care, nutrition, medication and exercise, were encouraged. Patient weight and A1C levels were intended to serve as monitoring parameters.

Objective 3: Develop a tool kit which can be used to replicate this program by other community pharmacists

It was our intention to develop a turn-key tool kit which could be used by other community pharmacists who had an interest in providing a similar program in their local area. Two major parts of this tool kit were the video (DVD) presentations and the coinciding, supplemental written materials. The videos were produced by the Distance Education staff of the Campbell University College of Pharmacy and Health Sciences. This production combines the presentations of the professional expert, a teen panel and background "B-roll" demonstrating various nutritional, exercise and medical care scenes. The written material was meant to act as reference material for the participant and his or her family. Each participant, pharmacist, and nurse was given a copy of the tool kit. The content of the kit can be found as an email attachment accompanying this report. The final component of the tool kit was meant to be a procedures manual or implementation guide which could be used by other pharmacists interested in implementing SNAP in their locale.

Objective 4: Develop or strengthen the bond between the students' families and the community pharmacy

We were hopeful to demonstrate that a pharmacy providing this program would develop or strengthen the bond with the patient. It was felt this could be accomplished by using a survey that sought to determine when and how often a family went to the participating pharmacy at the

start of the program and then again at the conclusion of the program. These surveys are available in the Toolkit.

RESULTS

The SNAP Diabetes program was conducted between March 2009 and April 2010. Following distribution of an informational brochure (Email attachment: **SNAP Brochure**) by school nurses and the providers at ABC Pediatrics in Dunn, NC, the parents of 41 students expressed an interest in the SNAP Diabetes program. At least four attempts were made to contact these parents. After a thorough explanation of program objectives and requirements to those parents who were successfully contacted, 20 students were enrolled. Table 1 provides pertinent data on all enrollees.

Table 1: SNAP Diabetes Program enrollees

Student	DOB	Age	DM Type	Educ. Level	Nurse Visits	Pharm. Visits	% A1c Change	Referral Source
1			Pre	MS	1	3	-0.4	ABC
2	11/21/97	11		MS	2	0		ABC
3	8/11/98	10	Pre	ES	5	0	0	ABC
4	8/11/98	10	Pre	ES	4	0	0.1	ABC
5	9/25/95	13	2	MS	2	2		School
6	10/13/94	14	1	HS	0	1		School
7	6/9/93	15	Pre	HS	1	1	0	ABC
8	2/17/97	12	2	MS	0	5		School
9	10/25/94	14	2	MS	0	8	-0.2	ABC
10	2/21/96	13		MS				School
11	5/9/95	13	Pre	MS	0	1	-0.1	ABC
12	5/9/95	13	2	MS	0	1	0	ABC
13	11/11/97	11	At risk	ES	1	4	0.4	ABC
14			Pre	ES	0	0	-0.1	ABC
15	8/9/94	14		HS	0	0	0.1	ABC
16	2/2/96	13	At risk	MS	0	0	0	ABC
17	3/6/97	12		ES	1	0	-0.2	ABC
18	3/16/95	14	2	MS	0	2	0.3	ABC
19	10/3/97	11	Pre	MS	4	0	0	ABC
10	9/20/96	12	Pre	MS	0	0	-0.1	ABC

Key: **DM Type:** as of January 2010, those previously known to be “Pre-diabetic” are now said to be at “Increased Risk for Diabetes” (ADA)

Educ. Level: ES=elementary school; MS=middle school; HS=high school

Referral Source: ABC=ABC Pediatrics; School=school nurse

Due to clerical errors, birthdates are unavailable for two students (1,14). One student (10) withdrew from the program within one week of enrolling and never attended any sessions; no data is available for this student. Hemoglobin A1c data was not available on four additional students (2,5,6,8).

School nurse visits

Only eight students made any visits to one of four school nurses as shown in Table 2.

Table 2: Number of visits to school nurses

Nurse	Student 13	Student 2	Student 5	Student 7	Student 1	Student 3	Student 4	Student 19
1	1	2	2					
2				1				
3					1			
4						5	4	4

Although blood glucose meters were offered to all students who did not already have one, only one student (5) had a meter available at school and tested in the presence of the school nurse. No conclusions, then, can be drawn concerning our students' proficiency in performing self-monitoring of blood glucose.

Weight was recorded on one visit only for patients 5, 7, and 1. Multiple weights were recorded for the three students seen by Nurse 4. Because weight in itself is not a parameter that accurately reflects trends in these growing adolescents, body mass index (BMI) was calculated also. One student (3) saw a decrease in BMI from 28.6 to 27.5, and one student's BMI (14) decreased from 37.5 to 36.5 during the course of the program. The BMI of one student (4) increased from 23.5 to 26. No weights were recorded for the two students seen by Nurse 1.

Reports by the students of lifestyle activities were somewhat disheartening. Only about one-half of the students indicated regular exercise as a part of their routine. Then, too, an indication of lack of adherence to good nutrition principles was indicated by responses regarding breakfast. Of the 20 student visits, breakfast was eaten on the day of the visit only six times. Of these, four would not be considered "nutritionally adequate" consisting of either fast-food sausage biscuits or cinnamon sticks.

At the conclusion of the program, the nurses were asked to complete an exit survey (Appendix C). Three nurses returned the survey. The surveys indicated that most visits took about 10-15 minutes. Two of the nurses would call the students out of class at random times. One of them commented that the students were not "thrilled" with this procedure since they did not think they had a problem and did not like attention being drawn to themselves even though their classmates were not aware of the reason why they were called out of class. One nurse indicated that interfering with the academic day may not be appropriate, even though education on diabetes was cited as the main strength of the SNAP program. Another nurse attempted to notify parents of the need to speak with students but found it difficult to get the parents involved. In fact, the inability to get these parents involved was cited several times as the primary weakness with the SNAP program. In general, the students did not actively participate in discussions with the nurse, mostly listening or briefly answering a particular question.

Pharmacy visits

One student completed all eight modules at the community pharmacy as indicated in Table 3. On the other hand, 10 students did not make even one visit to their assigned pharmacy. The pharmacist called the parents to make appointments convenient to both parties. Many times appointments were made but not kept by the family. Although the pharmacists made numerous attempts to contact the families, most messages were not returned resulting in the dismal pharmacy module completion rate.

Table 3: Number of visits (modules completed) to pharmacies

Student	Pharmacy 1	Pharmacy 2
17	0	
2	0	
7	1	
19	0	
11	1	
12	1	
15	0	
18		2
1		3
5		2
6		2
16		0
8		5
3		0
4		0
13		4
9		8
14		0
10		0
20		0

Because so few participants made significant progress through the program it is not possible to draw any conclusions as to its effectiveness. Several interesting observations, however, can be made. Although we had intended that each student's entire family be involved in these pharmacy discussions, only one parent accompanied their child to every session, and it was always the same parent. There were only two exceptions to this rule: two siblings who were both participants accompanied each other with no parent to their one and only session. Then, too, no definitive effect of the program on weight can be stated, but it is interesting to note that consistent, sustained weight loss was seen in only the two patients who completed the most modules: student 8 completed five modules and lost six pounds (4%) whereas student 9, the only student to complete all eight modules, lost 22 pounds (11%).

At the start of SNAP Diabetes program, three community pharmacies agreed to participate. One pharmacist at both Angier Discount Drug and Coats Pharmacy completed the diabetes certificate course described earlier, whereas three pharmacists at

Thomas Drug did so. Shortly afterward, however, the owner of Angier Discount drug sold the store and dropped out of the program. Because three pharmacists were trained at Thomas Drug, more students were assigned to this store than to Coats Pharmacy with only one participating pharmacist. As it turned out, however, one pharmacist at Thomas Drug conducted all of the student visits. Both of the pharmacists who actually saw patients were sent an exit survey; one was returned. This survey can be found in Appendix D, but several comments by the respondent are particularly instructive:

- Regarding the results of phone calls to set up appointments:

Response	Approximate response rate
No answer/answer machine	60%
Parent/guardian not available	10%
Appointments made and filled	20%
Appointments made and not kept	80%

- Although a couple of students had a good attitude, most did not pay attention to the discussion and were there because the parents forced them.
- Likewise, some parents were interested, but the majority was not. Most of the parents had diabetes and were unwilling to make lifestyle changes themselves. Most parents were uneducated about their disease and did not make it an important factor in their daily lives.
- Major strengths of the SNAP Diabetes program were the education modules and the toolkit, especially the DVD.
- In addition to the poor parental support, lack of communication with other participating physicians, nurses, and pharmacists was seen as a weakness of the program.

GoTrybe Exercise Participation

In the hope of developing future markets, GoTrybe (www.GoTrybe.com) graciously offered their on-line exercise and nutrition program (usual & customary annual fee = \$29.95) to the SNAP Diabetes program at no cost. Each participant was registered and had an individual account. This allowed the student to log-on at home or school to engage in exercise along with the on-line instructor and a group of students of the same age group as the participant. Dozens of 3-5 minute exercise modules, categorized for warm-up, cardiovascular, strength, and flexibility, can be grouped into a 20-30 minute session. All sessions by the student are documented for time spent. Points earned based on accrued time can then be redeemed by the student for on-line rewards that have no monetary value but can be a badge of accomplishment and pride for them. In addition to any time spent at home or school, SNAP arranged for two weekly group sessions. One of these was held early in the evening on Wednesdays at Campbell University and the other was held Saturday morning at our partnering pediatric practice. After three months, however, it became apparent that the Wednesday evening sessions were not convenient for the students and parents and so this session was dropped from

the schedule. The Saturday sessions were more successful at the start, attracting 6-10 students to each session. Gradually, however, participation and interest waned. In the last three months of the program, attendance was spotty at best, with no one in attendance on many occasions.

Table 4 shows participation by each student.

Table 4: Student participation in group GoTrybe sessions

Student	Number of Sessions	Total Exercise minutes
2	13	514
1	16	620
5	8	315
6	14	534
7	4	173
16	8	298
8	19	730
17	7	243
13	10	386
14	15	575
9	16	632
14	6	211
20	10	376
11	3	163
12	3	163

Toolkit

Due primarily to the excellent work and guidance from the Director of Distance Education and his audio-visual production staff in the Department of Clinical Research of the Campbell University College of Pharmacy and Health Sciences, and Campbell's PhotoGraphics Department, we were able to meld the first two components of the tool kit into one professionally produced binder that was distributed to all participants. This binder contains two DVDs on which appear the eight modules described above. Each vignette seemed to accomplish what we had intended as a means to provide our student participants with the "facts" about diabetes self-management care as well as relevant thoughts and suggestions from a peer-group of teens who also face the challenges of the disease.

The printed portion of the tool kit contains program description, consent forms, pre- and post-program questionnaires, and module-specific information. Each module is composed of a self-assessment regarding that topic and reference material for the information discussed in the videos. The number of documents varies by module. This reference section is then followed by a brief, one-page evaluation of the module for the student to complete, and a similar one for the parents. These assessments were to be completed immediately at the conclusion of the session while the family was still in the pharmacy. Since they were meant to be anonymous, though, the pharmacist would leave the room while they were being completed. The questionnaires would then be sealed in a

postage-paid envelope to be mailed directly to the principal investigator. The last three questions of the Student Evaluation asked whether the student will be able to implement some of the principles or changes discussed in that session, how he or she felt about those changes, and whether the information was presented in a way that was easy to understand. Almost unanimously, the responses to these three questions were, ‘yes’, ‘ok’, and ‘yes’. The first two questions, though, which asked what was learned in that module, showed that the students did take something away from most sessions. Some examples of these responses (in their own words) follow:

- Insulin by itself does not help
- Diabetes is progressive
- How to change my eating plan
- I learn (sic) today how to controle (sic) my body!
- That white foods are sugarey (sic)
- That you should always check your sugar and your carbodrates (sic)
- That exercise is important to lose calories
- I learn (sic) the plate method
- To check the label to see how many carbs are in the food
- When your blood sugar is high you can exercise to bring it down
- I learned that there is no best exercise
- If you are under 18 you are not supposed to take aspirin
- That the medicine I take affects your kidney
- If your sugar is below 70 you are heading toward hypoglycemic (sic)
- How the sugar go’s (sic) to low you can go into a coma
- Never put lotion (between your toes)

In completing the Parent Evaluation, the value of the information presented was rated as Valuable or Very Valuable on every survey. The parents also listed some key piece of information that they learned in each module. Many recognized that there would be challenges to implementing some suggestions made, but most were willing to try to make those changes. Several parents indicated that they would have to make the changes along with their child (especially in regard to diet!) so they both could be healthier. Like their children, all parents indicated that the material was presented in an easily understood manner.

Parental Program Assessment

The last objective of this program was meant to demonstrate a strengthened or new bond between the participating families and the community pharmacies providing the SNAP Diabetes program. This was to be done by comparing the results of a pre- and post-program survey that asked where prescription and other diabetes supplies are purchased. Unfortunately only two post-program surveys were returned and they were from parents of children who completed too few modules to identify any effect. Because so few of these were returned, and to get a better sense of why so few students actually continued with the program, another telephone survey was created. This is found in Appendix E. Three attempts were made to contact each

parent. Six surveys were thus completed, representing two students who finished 3 pharmacy modules, two who finished one, and one student each who finished four and five modules respectively.

Parental expectations upon entering the program were identified in the first question of this survey. All six parents said they had expected their child to learn better eating habits. Four of the six thought that their child would lose weight and learn how to prevent long-term complications, whereas three of the six expected their child's blood sugar levels to drop as a result of SNAP.

Although no parent identified anything confusing about the program, it is doubtful that they understood the need to encourage their children to review the materials in the tool kit. Not including the time spent at the pharmacy, students rarely referred to it. In fact, two of six and three of six parents surveyed claimed that their child never looked at the written materials or DVDs, respectively. The others thought that their child may have looked at one or the other "maybe" once a month.

Three of the six parents said that they were most interested in their children's visits to the nurse or pharmacist, while the remainder, and all of the students, thought the exercise sessions were most important. The two who valued the pharmacy visits most indicated that both parents and children benefitted from the education provided. The need for exercise was valued most by the others.

Even though most parents knew when their child visited the school nurse, in only one instance did they discuss that visit. As a result most could not identify what their child's reaction was to the nurse visits. On the other hand, all of the parents had discussions with their child after visits to the pharmacy. Only two children, though, seemed to enjoy these sessions, the others being "bored". The parents did, however, try to implement some action as a result of suggestions made by either the nurse or pharmacist. Most parents did try to implement some lifestyle change as a result of these meetings. Improved eating habits and attention to exercise were stressed by the parents. This reflects the content of the first several modules. Even though none of the respondents completed the modules on complications of diabetes, all similarly thought that diet and exercise issues are the key to reducing these complications.

When asked what we could have done to make SNAP better for the parents or more interesting for the students, most did not have any specific suggestions. One did call for "better videos" and two asked for more exercise sessions at different times. One mother did admit, though, that "you just can't make him (her child) do it".

Scheduling and transportation problems were cited most often as the reasons for not completing the program. In most cases, this involved work issues, but one parent said that it was impossible to coordinate her schedule with those of her two participating children. One mother indicated that she had some health problems, too, which limited her participation.

DISCUSSION

Because of the growing incidence of diabetes among people under the age of 20, it is essential that systems be developed to adequately teach and develop self-management techniques specifically designed for this age group. The SNAP (School Nurse and Pharmacist) Diabetes Program is one such attempt. In an attempt to create

a program that teaches the need for self-management in all areas of life, we developed a collaboration of family and health professionals that would foster this message at home, school, and during medical care appointments. Unfortunately, because of less than expected enrollment and poor attendance we were unable to demonstrate complete accomplishment of our four objectives.

Initially, our plan was to identify students with diabetes from forms submitted to the school nurse at the start of the school year (2008-2009). After these students were identified, their parents would get a brochure which briefly explained the SNAP Diabetes program. If they thought their child could benefit from the program, they were asked to complete an interest form and return it to the nurse. The principal investigator would then contact the parents to explain the program in detail and, after getting their consent, enroll the student in the program. It was estimated by the nurses that this should result in about 30 students at the three original middle schools who would be eligible for the program. Because submission of these forms is voluntary, however, far fewer than expected were returned. In fact, after two months, only seven brochure interest forms were returned. Recognizing that this was an inadequate number, alternative methods of identifying and contacting students and parents were considered. It was decided to seek referrals from ABC Pediatrics in Dunn, NC. This is the largest pediatric practice in Harnett County serving a large population of low socioeconomic people, especially minorities. After making a presentation to the medical staff, eight of their providers agreed to refer patients to our program. They did, in fact, refer 35 patients to the SNAP program. However, this necessitated altering our inclusion criteria. Originally, we planned to offer this program to middle school students at one of three middle schools in Harnett County who were already diagnosed with diabetes. Under our new protocol, though, we were asked to take students who were also considered to be "Pre-diabetic" (increased risk for diabetes), and those who were at risk for diabetes based on family history and weight. We were asked also, to include students who were enrolled at any of the five middle schools, and several elementary and high schools. As a result, we enrolled one student with type 1 diabetes and five with type 2. We also included eight who met the ADA criteria for increased risk of diabetes and two who were added because of provider concern that they were at risk for diabetes. Four of the patients referred by ABC Pediatrics did not have a diagnosis or risk assigned to them. Because so many of our students did not have a diagnosis of diabetes, it is possible that these students and their parents did not take their condition seriously. If that were the case, they may have not had the commitment to following through on the program.

Lack of commitment was evident from the failure of many parents to return phone calls, schedule and keep appointments, and make sure their child attended exercise sessions. Although it is recognized that changes in schedules can occasionally interfere with plans, it is difficult to accept the consistent lack of attention to planning demonstrated so often in this project. A number of studies have indicated the importance of parental support and attitude to the self-care success of children and adolescents with diabetes^{11,12}. Future program design should put more emphasis on this to ensure that parents are in full support of program goals and objectives.

Even though these challenges limited our ability to demonstrate complete success with all four of our objectives, we are encouraged by some small accomplishments.

We were able to bring together a team of nurses and pharmacists who could reinforce self-management ideas to their patients. We were, in a limited way, able to show that diabetes is something that will affect all areas of the patient's life, and we did help a few students and their families recognize the importance of nutrition and exercise to the management of diabetes. Although we cannot make any definitive statement of success in enhancing self-management proficiency, it is evident that a few of our students and parents did recognize the need for self-care.

We feel that the SNAP Toolkit can be a valuable tool, but needs some "tweaking" to be more attractive to patients in this age group. Although having a panel of peers share their experiences on the DVD modules was helpful, this was probably overcome by too much information from the "experts". It would probably be advantageous to substitute some interactive activities for these "lectures".

Because too few participants actually completed the program and the Program Evaluation, it is not possible to make any statements about developing or strengthening the families' bond with the community pharmacy. This awaits future study.

In conclusion, because of several unanticipated challenges to a rather complex protocol, we were unable to satisfactorily meet our objectives. However, partial completion of these objectives and a number of valuable lessons learned lead us to believe that a program such as SNAP is worthy of further study.

APPENDIX A
Campbell University School of Pharmacy
SNAP Diabetes Program
SCHOOL NURSE ENCOUNTER SHEET

Student Name _____ **Date** _____

Subjective:

In past week: Hypoglycemia episodes _____ Hyperglycemia episodes _____

Sick days: Missed school _____ Unscheduled visits to provider _____

Meals today:

Breakfast:

Lunch:

Snack(s):

Exercise today:

Anxiety/Stress:

School:

Home:

Social:

Medical:

Objective:

Height _____ **Weight:** _____ **BMI** _____ **BMI Percentile** _____

BP: _____ **Pulse:** _____ **Blood Glucose:** _____ fasting / non-fasting

Assessment:

Plan:

Today's discussion points:

Changes recommended/agreed upon:

Nurse's Signature: _____ **School:** _____

APPENDIX B (2 pages)
Campbell University School of Pharmacy
SNAP Diabetes Program

PHARMACIST ENCOUNTER SHEET

Student Name _____ **Date** _____

Family in attendance: _____

Today's Module: _____ **1** ___ **2** ___ **3** ___ **4** ___ **5** ___ **6** ___ **7** ___ **8** ___

Subjective:

Medication History (include current meds and any changes):

How many times in the last month have you missed any medicine?

In past 30 days: Hypoglycemia episodes _____ Hyperglycemia episodes _____

Sick days: Missed school _____ Unscheduled visits to provider _____

Review of Module Content: current self-assessment, challenges/objections, enthusiasm

Student:

Family:

Objective:

Weight: _____ BP: _____ Pulse: _____

Blood Glucose: _____ fasting / non-fasting Foot Inspection: _____

SMBG: High _____ Low _____ Average _____

APPENDIX B (continued)

Assessment:

Please comment on both the student's and family's response to material presented along with your assessment of willingness to make changes. Comment, also, on any other aspect of therapy you think is appropriate.

Plan:

Today's discussion points:

Changes recommended/agreed upon:

Goal for next visit:

Pharmacist's Signature: _____ **Pharmacy:** _____

APPENDIX C

SNAP Diabetes Program School Nurse Exit Survey June 2010

Nurses: Please answer the following questions as completely and honestly as possible. Questions may be answered based on your thoughts on the average participant (general feelings/attitudes/etc. of participants) but comments regarding specific participants are welcomed too. Please respond via email at your earliest convenience. If you wish to remain anonymous, print and fax to Gil Steiner at (910) 893-1717. Thank you for your time in completing this survey and especially for participating in our program.

1. What was your approach for scheduling appointment times with student participants and how did they respond to your approach?
2. On average, how long (minutes) did each encounter with a SNAP DM participant take?
3. Did you set aside a specific day for calling participants out of class to visit with you or did you fit them into your daily schedule?
4. In general, did you see a change in attitude as participants progressed through the SNAP DM program?
5. Did the participant ask questions or engage in what you were doing or simply listen and do what he/she was told?
6. What recommendations do you have to improve the level of participation in the SNAP DM program?
7. In your opinion, what were the major strengths of the SNAP DM program?
8. In your opinion, what were the major weaknesses of the SNAP DM program?

APPENDIX D

SNAP Diabetes Program

Pharmacist Exit Survey

July 2010

Pharmacists: Please answer the following questions as completely and candidly as possible. Questions may be answered based on your thoughts on the average participant (general feelings/attitudes/etc. of participants) but comments regarding specific participants are welcomed too. Please respond via email at your earliest convenience. If you wish to remain anonymous, print and fax to Gil Steiner at (910) 893-1717. Thank you for your time in completing this survey and especially for participating in our program.

1. What were your thoughts about this program when you were initially approached to become involved?
2. Did you have any concerns about the way the program was set up? If so, what were they?
3. When you called to set up appointments with SNAP DM participants, what were the results of the phone calls (please indicated the approximate percentage for each response)?

Response	Approximate response rate (%)
No answer/answer machine	
Parent/guardian not available	
Appointments made and filled	
Appointments made and not kept	

4. How many attempts did you make to set up an appointment before moving on?
5. In general, did you see a change in attitude as participants progressed through the program?
6. Can you discuss the typical parent/guardian interest upon arriving at the pharmacy? What about during/after the module and discussion?
7. During the discussion, were the parent and child engaged in what you were saying? Or did it feel more like you were lecturing them on key points of the DVD?
8. Do you believe this program could help prevent future complications for children with diabetes or who are at risk for developing diabetes?
9. In your opinion, what were the major strengths of the SNAP DM program?
10. In your opinion, what were the major weaknesses of the SNAP DM program?

Do you have any recommendations for improving participation?

APPENDIX E (2 pages)

SNAP Diabetes Program Parents Exit Survey July 2010

1. What did you hope to gain for your child from completing the SNAP DM program?
 - a. Did you think your child would learn better eating habits? Yes No
 - b. Did you think your child would lose weight? Yes No
 - c. Did you expect your child's blood sugar to decrease? Yes No
 - d. Did you expect to learn about future problems (or ways to prevent future problems) that your child may have with his/her diabetes? Yes No
2. Was there anything that was confusing or unclear about the SNAP program?
 - a. When you enrolled in the program, you/your child were given a workbook to help guide you through the sections (do you have that available at this time?) How often did you/your child refer to this workbook for any reason? Never, Once a Month, Once a Week, More than Once a Week
 - b. Inside the binder of materials, there were DVDs to go along with each module. How often did you/your child watch the DVDs (besides when you met with the pharmacist)? Never, Once a Month, Once a Week, More than Once a Week
 - c. Did the 'SNAP Evaluation' at the end of each section help review what was gone over during that section? Yes No
3. Of the three parts of this program (nurse visits, pharmacist visits, and exercise sessions) which one(s) were you most interested in and why?
4. In your opinion, of the three parts of this program (nurse visits, pharmacist visits, and exercise sessions), which one(s) was your child's favorite and why?
 - a. Did your child say he/she was excited to go to one visit over another? ie did he/she want to go meet with the pharmacist more than go to the exercise?
 - b. Please rank the importance of each part (1 being the part he/she was most interested in, 3 being the one he/she was least interested in)
5. Did you and your child discuss what information was given during his/her meeting with the nurse?
 - a. Did you know that he/she visited the nurse?
 - b. What was his/her reaction? Was he/she excited? Confused? Nervous? Overwhelmed? For example
6. Did you and your child discuss what information was given during your meeting with the pharmacist?
 - a. What was his/her reaction to this meeting?
7. What kind of things have you/your child done at home that the nurses or pharmacists recommended (such as diet or exercise)?
 - a. If you have, how does your child respond to this?

APPENDIX E (continued)

8. Did you see anything in this program that might help him/her prevent long term problems?
 - a. What were the 3 most useful things you learned that are important in preventing long term complications of diabetes?
9. Was there anything about this program that was hard for you or your family to do? For example, was finding childcare for other children in the home an issue? Work commitments? Other prior meetings?
10. In the future, what could we have done differently to make the program better for you?
 - a. Is there something that would help your child be more interested in learning about diabetes?
 - b. Is there any other printed material that would have been helpful?
11. Did you and your child complete all 8 visits to the pharmacy to which you were assigned?
 - a. If not, what were the reason(s) for not finishing the program?
 - b. How many modules did you complete?
12. Have you completed the “exit survey” in the back of your binder?
 - a. Can you please complete it and send it in to the following address
Campbell University School of Pharmacy Department of Pharmacy
Practice PO Box 1090 Buies Creek NC 27506? If necessary, we can mail you a postage paid envelope.
 - b. If you do not have it, I can ask you the questions over the phone (ask questions)
 - c. If you have the Entry Survey completed, can you also mail that to me with the Exit Survey?

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students with diabetes**

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