I, Nicole M Sheanon M.D., hereby submit this original work as part of the requirements for the degree of Master of Science in Clinical and Translational Research.

It is entitled:
The effect of the diabetes camp environment on depression screening scores

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The effect of the diabetes camp environment on depression screening scores

A thesis submitted to the
Graduate School
of the University of Cincinnati
in partial fulfillment of the
requirements for the degree of

Master of Science
in Clinical & Translational Research

In the Department of Environmental Health
Division of Epidemiology & Biostatistics
of the College of Medicine
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By

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ABSTRACT

Purpose: Adolescents with type 1 diabetes are at high risk for depression and anxiety which can directly impact their ability to manage their diabetes. Attendance at a diabetes camp has been shown to improve glycemic control and improve knowledge of diabetes and diabetes self-management. The aim of this study is to evaluate if attendance at a diabetes camp is associated with improvement of depressive symptoms.

Methods: Demographic data, Children’s Depression Inventory scores, and lab data including hemoglobin A1c were collected in 40 adolescents with type 1 diabetes who attended camp and 80 adolescents with type 1 diabetes who did not attend camp (average age 14.5 years, 65% female). The groups were frequency matched for sex, age, and duration of diabetes.

Results: Adolescents with type 1 diabetes who attended camp had lower hemoglobin A1c values at baseline (8.4% vs 9.2%, p <0.05) and 6 months (7.8% vs 9.2%, p< 0.05). There was no difference in Children’s Depression inventory scores between the groups.

Conclusion: Attendance at diabetes camp is associated with a significantly lower hemoglobin A1c both at baseline and 6 months later, but we were not able to demonstrate a significant difference in depression screening scores. In the future, distress and resilience may be better measures to show the benefit of the camp environment on diabetes care and self-management.

Keywords: pediatrics, diabetes, depression, camp, adolescents
ACKNOWLEDGEMENTS

This work was supported by NIH T32 Grants #5T32DK063929-10, Principal Investigator Scott Powers and #ES010957-14, Principal Investigator Ranjan Deka. I would also like to thank the American Diabetes Association and Camp Korelitz for allowing us to recruit patients during camp registration.
# TABLE OF CONTENTS

Abstract...........................................................................................................ii
Acknowledgements.......................................................................................iv
Table of Contents ..........................................................................................v
List of Tables and Figures .............................................................................vi
Background.....................................................................................................1

Materials and Methods
- Participants.................................................................2
- Study Design ...............................................................3
- Study Procedures ........................................................5
- Statistical Analysis..........................................................6

Results
- Demographics all............................................................7
- CDI Scores all.....................................................................8
- Camp Associated with lower HbA1c..............................9
- Demographics 2013 only.........................................10
- HbA1c over time 2013 data...................................11
- Why adolescents go to camp..................................11

Discussion.................................................................................................12

Bibliography..............................................................................................14

Appendix A ...............................................................................................15
Appendix B ...............................................................................................17
LIST OF TABLES AND FIGURES

Table 1 Descriptive data on all participants
Table 2 CDI and HbA1c at baseline on all participants
Table 3 Descriptive data on Camp 2013 and Controls
Table 4 CDI and HbA1c over time in Camp 2013 and Controls
Table 5 Why do adolescents attend diabetes camp?

Figure 1 Comparison of Pre-camp CDI Score, all participants
Figure 2 Comparison of Pre-camp Hemoglobin A1c%, all participants
Figure 3 HbA1c over time in Camp 2013 and Controls
BACKGROUND

The first summer camp for children with type 1 diabetes was in 1925. Summer camps now serve more than 20,000 children per year worldwide.[1] The American Diabetes Association (ADA) Position Statement states that the goal of the diabetes camp is “to facilitate a traditional camping experience in a medically safe environment. An equally important goal is to enable children with diabetes to meet and share their experiences with one another while they learn to be more responsible for their condition.”[1] Multiple studies have shown improved glycemic control in adolescents who attended diabetes camp.[2-5] Karaguzel showed significant improvements in knowledge about diabetes and self-management at the end of camp and which was sustained at 6 and 12 months after camp.[3] This study also showed that camp assisted education has a positive effect on disease related education level and self-management.[3]

It is well known that adolescents with type 1 diabetes are at increased risk of anxiety and depression.[6] Several studies have shown psychological symptoms complicate diabetes management and detract from regular blood glucose monitoring leading to suboptimal diabetes control. [6-8] To date, there have not been any studies evaluating the effect of the diabetes camp environment on depressive symptoms in adolescents.

The objective of this study is to determine if attendance at a week-long diabetes camp affects symptoms of depression as measured using the Clinical Depression Inventory (CDI) in adolescents with type 1 diabetes.
MATERIALS and METHODS

Participants
Participants were enrolled and all data were collected (retrospective and prospective) under approved protocols (Institutional Review Board, Cincinnati Children’s Hospital and University of Cincinnati). Forty adolescents age 13-17 years with type 1 diabetes who are patients of Cincinnati Children’s Hospital Medical Center (CCHMC) and attended a week long diabetes camp at Camp Korelitz (an American Diabetes Association sponsored residential camp) were enrolled. Participants were excluded if they had a co-existing diagnosis of cognitive impairment, autism spectrum disorder, acute psychiatric needs, or suicidality.

Camp Korelitz is held at Camp Joy in Clarksville, Ohio, USA. It draws campers from Ohio and surrounding states. Approximately 130 children and adolescents attend camp each year (age 8-15 years). The camp offers a single one week session each summer. All patients with diabetes from CCHMC are encouraged to attend and the camp is filled on a first come first-serve basis. The cost per session is $550, but scholarships are offered for those with financial need. The camp provides outdoor activities for the campers as well as educational experiences including medical and dietary education. The activities include but are not limited to: swimming, dancing, team sports, zip line, ropes courses, hiking, and bike riding. Blood glucose for each camper is checked at least five times a day. Insulin is adjusted by a physician as needed before each meal and snack. All insulin administration is supervised. The meals and snacks for the entire camp are organized under the supervision of a registered dietician. During the week
long camp there are at least 2 attending physicians, 5 fellows, 5-10 residents, 2 psychologists, and 3-5 nurses caring for the camper’s medical and psychological needs.

The control participants were drawn from an existing IRB approved registry that contains 500 participants with type 1 diabetes who completed the Children’s Depression Inventory (CDI) and are patients of CCHMC. Control subjects were those between 13 and 17 years of age who did not attend diabetes camp with at least 2 CDI scores within an 18 month period. These subjects were grouped by sex, age, and duration of diabetes. A random number was assigned to each control participant and they were frequency matched for sex, age (within 2 years), and duration of diabetes (within 2 years) to the adolescents attending camp. This was done by year of camp. Thus a total of eighty adolescents, age 13-17 years of age with type 1 diabetes were selected as controls. SAS was used to generate the matched controls, using those with the lower random number where ties existed.

Study Design
We designed a mixed prospective/retrospective cohort study of adolescents with type 1 diabetes; those attending diabetes camp were prospectively identified and recruited, those not attending diabetes camp were retrospectively identified from the registry. All camp attendees in 2013 and 2014 who were eligible for the study were recruited during the check-in process on the first day of camp. Sex, current age, age at diagnosis of diabetes, and race/ethnicity were obtained from a demographic form (Appendix A) filled out by the parent after consent was obtained. In addition we obtained yearly income and insurance type as surrogate measures of socioeconomic status from the demographic form. Additional questions on the demographic form solicited other medical conditions,
psychiatric medication use, marital status, parental occupation, who lives at the primary residence and others in the home with a chronic medical condition. In addition to the self-report questionnaire, each participant’s medical record was reviewed from 6 months prior to camp to 12 months after camp to obtain hemoglobin A1c (HbA1c) levels, duration of diabetes, co-morbid medical conditions, psychiatric medication use, and Children’s Depression Inventory (CDI) scores. HbA1c levels are obtained at each clinic visit at CCHMC, approximately every 3 months. These values were also collected from the medical record for each subject. The initial HbA1c was the most recent value within the 6 months prior to camp and the follow up HbA1c levels were from the visits after camp, occurring about 6 months after camp and 12 months after camp.

The CDI is given routinely in diabetes clinic to all patients 13-17 years of age every 6 months and the result is recorded in the electronic medical record. The CDI is on an electronic tablet that is linked to the electronic medical record. The patient is given the tablet at the time of check-in and asked to complete the survey. Patients can refuse to complete the CDI. An algorithm has been established for clinical care: a score of 4-5 (moderate risk) results in an assessment by the social worker in clinic that day, and a score of 6 or higher (high risk) results in a same day assessment by the social worker and referral to a psychologist. Of note, prior to March 18, 2013 the CDI long form was used in our Diabetes Clinic at CCHMC. After March 18, 2013 the short form (CDI: S) has been used. The ten questions on the CDI: S are on the CDI long and those questions were extracted and scored in order to compare the results from all participants.
For non-camp attendees (controls) the demographic data, HbA1c levels, and CDI levels were all obtained from the IRB approved database.

For both groups, because of missed appointments and other factors the time between visits on average was 6 months (+/-3 months). The time between the pre-camp visit and the last visit on average was 10 months (+/-4 months).

**Study Procedures**

The Children’s Depression Inventory (CDI) is a 27-item self-report measure of depressive symptoms that is widely used in children ages 7 to 17 years.[9] The CDI is written at a third grade level and can be completed in 15 minutes or less. Adolescents choose one of three statements that describe how they have been feeling over the last 2 weeks for each item. The CDI: S (short form) is a 10 item self-report measure that specifically is aimed to identify symptoms of depressed mood. The CDI: S has comparable sensitivity to the CDI and therefore is considered a good screening tool. Each item is rated on a scale of 0 (no symptoms) to 2 (distinct symptoms). A total score >4 is considered at risk and a score of 6 or higher is suggestive of clinically significant symptoms of depression warranting further evaluation. [10] The CDI scores for camp and non-camp attendees were obtained from the electronic medical record data extraction.

Each camp-attendee also filled out a questionnaire to ascertain why they come to camp, if they keep in contact with people from camp, other diabetes related activities they participate in, and who supports them with their diabetes. This questionnaire was developed for the purpose of this study. The questionnaire is included in Appendix B.
Statistical Analysis

Data were analyzed using SAS version 9.3 (SAS Institute. Cary, NC). Descriptive and frequency statistics were used to provide summary information about participant characteristics at each time point. T-test or Wilcoxon rank sum test was used to compare continuous variables between the camp versus no camp groups. Chi-square or Fisher’s exact test was used to compare categorical variables between the camp and no camp groups, as appropriate. The Wilcoxon Rank Sum test was used to evaluate the CDI scores at each time point because the data was not normally distributed. General linear models invoking Generalized Estimating Equations (GEE) were used to examine the CDI scores longitudinally. A logit link was used when examining the categorized scores. General linear models were also used to generate a model for prediction of change in CDI score over time.

RESULTS

Table 1 presents the descriptive data (age, sex, race, duration of diabetes, attendance at camp, type of health insurance, marital status, type of insulin delivery, and presence of other medical conditions including depression) of all participants. There were no statistically significant differences between the two groups.
Table 1 Descriptive data on all participants

<table>
<thead>
<tr>
<th></th>
<th>Total N = 120</th>
<th>Camp N=40</th>
<th>No Camp N=80</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>14.6 (1.04)</td>
<td>14.5 (0.91)</td>
<td>14.6 (1.11)</td>
<td>.73</td>
</tr>
<tr>
<td></td>
<td>[13.1,17.3]</td>
<td>[13.2, 17.0]</td>
<td>[13.1, 17.3]</td>
<td></td>
</tr>
<tr>
<td>Sex (female)</td>
<td>78 (56%)</td>
<td>26 (65.0%)</td>
<td>52 (65.0%)</td>
<td>--</td>
</tr>
<tr>
<td>Race (white)</td>
<td>114 (95%)</td>
<td>40 (100%)</td>
<td>74 (92.5%)</td>
<td>0.18</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1 (0.008)</td>
<td>0 (0%)</td>
<td>1 (1.2%)</td>
<td>--</td>
</tr>
<tr>
<td>Years since dx</td>
<td>6.69 (3.90)</td>
<td>6.72 (4.19)</td>
<td>6.68 (3.77)</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>[0.5, 15]</td>
<td>[0.5, 15.0]</td>
<td>[0.5, 14.0]</td>
<td></td>
</tr>
<tr>
<td>Health Insurance (private / HMO)</td>
<td>77 (64%)</td>
<td>35 (87.5%)</td>
<td>42 (52%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Marital status (married/remarried)</td>
<td>96 (80%)</td>
<td>33 (82.5%)</td>
<td>63 (78.8%)</td>
<td>0.63</td>
</tr>
<tr>
<td>Ever pump</td>
<td>70 (58.3%)</td>
<td>29 (72.5%)</td>
<td>41 (51.2%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Any other medical conditions</td>
<td>48 (40.0%)</td>
<td>16 (40.0%)</td>
<td>32 (40.0%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Depression</td>
<td>12 (10.0%)</td>
<td>5 (12.5%)</td>
<td>67 (8.8%)</td>
<td>0.53</td>
</tr>
<tr>
<td>On depression medication</td>
<td>21 (17.5%)</td>
<td>7 (17.5%)</td>
<td>14 (17.5%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Celiac</td>
<td>10 (8.3%)</td>
<td>2 (5.0%)</td>
<td>8 (10.0%)</td>
<td>0.49</td>
</tr>
<tr>
<td>Hypothyroid</td>
<td>14 (11.7%)</td>
<td>7 (17.5%)</td>
<td>7 (8.8%)</td>
<td>0.23</td>
</tr>
<tr>
<td>Asthma</td>
<td>5 (4.2%)</td>
<td>2 (5.0%)</td>
<td>3 (3.8%)</td>
<td></td>
</tr>
<tr>
<td>ADHD</td>
<td>4 (3.3%)</td>
<td>2 (5.0%)</td>
<td>2 (2.5%)</td>
<td>0.60</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>2 (1.7%)</td>
<td>1 (2.5%)</td>
<td>1 (1.2%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Other</td>
<td>5 (4.2%)</td>
<td>0 (0%)</td>
<td>5 (6.2%)</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Data presented as mean (SD) [min, max], median (25th, 75th percentile) [min, max], or n (%)

*Camp – ADHD(2), kidney(1); Controls - ADHD(2), adjustment disorder(1), anxiety(1), CKD(1), hyperthyroid(1) and migraine(1)

Table 2 presents the baseline CDI scores and HbA1c for all of the participants. This data is also represented graphically in Figures 1 and 2. There is no significant difference in the CDI scores at baseline between the camp and the no camp groups. It is worth noting that 72.5% (29/40) of those that attended camp have been to the same camp before. The group that attended camp had a significantly lower HbA1c at baseline (8.4% vs 9.2%, p< 0.05). This difference may be due to the fact that many of those who attended camp have attended in the past and this may be a residual affect from camp the previous year.
Table 2 CDI and HbA1c at baseline on all participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Camp N=40</th>
<th>No Camp N=80</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI baseline</td>
<td>1 (0, 2.5) [0, 15]</td>
<td>0.5 (0, 2) [0, 13]</td>
<td>0.54</td>
</tr>
<tr>
<td>CDI Baseline&gt;0</td>
<td>22 (55.0%)</td>
<td>40 (50.0%)</td>
<td>0.61</td>
</tr>
<tr>
<td>HbA1c baseline</td>
<td>8.4 (1.6) [5.3, 12.5]</td>
<td>9.2 (2.0) [5.3, 14.0]</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Data presented as mean (SD) [min, max], median (25th, 75th percentile) [min, max], or n (%)

Figure 1 Comparison of Pre-camp CDI Score, all participants
Table 3 presents the demographic data from the participants who attended camp in 2013 and their controls. Table 4 presents the CDI scores and HbA1c data from this same group. There was no significant difference in change in CDI scores or HbA1c by group over time. However, there was a trend of a decrease in HbA1c at the 6 month time point in the participants who attended camp and the HbA1c at 12 months was lower than baseline in the camp group. This is shown in figure 3 below. In addition to the descriptive statistics we also used general linear models to look at the association of the different variables (pump therapy, other medical conditions, insurance type, HbA1c) and the CDI scores over time, only the presence of other medical conditions was statistically significant in the model ($\beta=1.32$ (se 0.44), $p=0.004$). There was no association between those variables and the HbA1c over time. Evaluation of CDI over
time between the camp and no camp group revealed no significant difference even when we used different cutoff scores for the CDI (CDI > 0 and CDI > 1).

**Table 3 Descriptive data on Camp 2013 and Controls**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Camp N=19</th>
<th>No Camp N=38</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>14.8 (1.04) [13.3, 17.0]</td>
<td>15.1 (1.17) [13.2, 17.3]</td>
<td>0.46</td>
</tr>
<tr>
<td>Sex (female)</td>
<td>11 (57.9%)</td>
<td>22 (57.9%)</td>
<td>--</td>
</tr>
<tr>
<td>Race (white)</td>
<td>19 (100%)</td>
<td>33 (86.8%)</td>
<td>0.16</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0 (0%)</td>
<td>1 (2.6%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Years since dx</td>
<td>6.7 (4.48) [0.5, 15.0]</td>
<td>6.8 (3.48) [0.7, 14.0]</td>
<td>0.80</td>
</tr>
<tr>
<td>Attended camp before</td>
<td>15 (79.0%)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Years at camp</td>
<td>3 [2, 6] [0, 10]</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Health Insurance (private / HMO)</td>
<td>16 (84.2%)</td>
<td>20 (52.6%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Marital status (married/ remarried)</td>
<td>17 (89.5%)</td>
<td>31 (81.6%)</td>
<td>0.44</td>
</tr>
<tr>
<td>Ever pump</td>
<td>12 (63.2%)</td>
<td>18 (47.4%)</td>
<td>0.26</td>
</tr>
<tr>
<td>Any other medical conditions</td>
<td>10 (52.6%)</td>
<td>10 (26.3%)</td>
<td>0.05</td>
</tr>
<tr>
<td>Depression</td>
<td>4 (21.0%)</td>
<td>3 (7.9%)</td>
<td>0.21</td>
</tr>
<tr>
<td>On depression medication</td>
<td>5 (26.3%)</td>
<td>4 (10.5%)</td>
<td>0.12</td>
</tr>
<tr>
<td>Celiac</td>
<td>1 (5.3%)</td>
<td>1 (2.6%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Hypothyroid</td>
<td>4 (21.0%)</td>
<td>3 (7.9%)</td>
<td>0.21</td>
</tr>
<tr>
<td>Asthma</td>
<td>2 (10.5%)</td>
<td>1 (2.6%)</td>
<td>0.26</td>
</tr>
<tr>
<td>ADHD</td>
<td>1 (5.3%)</td>
<td>0 (0%)</td>
<td>0.33</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>1 (5.3%)</td>
<td>1 (2.6%)</td>
<td>1.00</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0 (0%)</td>
<td>1 (2.6%)</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Data presented as mean (standard deviation) [minimum, maximum], median (25th, 75th percentile) [minimum, maximum], or n (%)

**Table 4 CDI and HbA1c over time in Camp 2013 and Controls**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Camp 2013 N=19</th>
<th>No Camp N=38</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDI baseline</td>
<td>1 [0, 5] [0, 13]</td>
<td>0.5 (0, 3) [0, 9]</td>
<td>.25</td>
</tr>
<tr>
<td>CDI Baseline&gt;0</td>
<td>12 (63.2%)</td>
<td>19 (50.0%)</td>
<td>.35</td>
</tr>
<tr>
<td>HbA1c baseline</td>
<td>8.9 (1.7) [6.3, 12.5]</td>
<td>9.2 (2.3) [5.3, 14.0]</td>
<td>.43</td>
</tr>
<tr>
<td>CDI 6 months</td>
<td>0 [0, 0] [0, 7]</td>
<td>0 [0, 1] [0, 7] (n=35)</td>
<td>.98</td>
</tr>
<tr>
<td>CDI 6 months&gt;0</td>
<td>8 (42.1%)</td>
<td>14 (40.0%)</td>
<td>.88</td>
</tr>
<tr>
<td>HbA1c 6 months</td>
<td>7.8 (1.5) [6.1, 12.7]</td>
<td>9.2 (2.5) [5.6, 14.0]</td>
<td>.70</td>
</tr>
<tr>
<td>CDI 12 months</td>
<td>0.5 [0, 4] [0, 10] (n=14)</td>
<td>1 [0, 2] [0, 5] (n=23)</td>
<td>.24</td>
</tr>
<tr>
<td>CDI 12 months&gt;0</td>
<td>7 (50.0%)</td>
<td>9 (39.1%)</td>
<td>.52</td>
</tr>
<tr>
<td>HbA1c 12 months</td>
<td>8.3 (1.4) [6.3, 10.5]</td>
<td>8.6 (1.6) [6.0, 11.5]</td>
<td>.66</td>
</tr>
</tbody>
</table>

Data presented as mean (standard deviation) [minimum, maximum] or, median (25th, 75th percentile) [minimum, maximum]
The qualitative questions on the camp forms (N = 39) provided information on why adolescents attended camp. The major themes are listed below in Table 5. The major themes were determined by a consensus from each investigator reviewing the answers and placing them into 5 or 6 topic areas.

Table 5 Why do adolescents attend diabetes camp?

<table>
<thead>
<tr>
<th>Theme</th>
<th>Proportion of Responses</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support from other people with diabetes</td>
<td>26/39</td>
<td>“To see how other people deal with diabetes.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“To not feel alone”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“I wanted to meet others like me”</td>
</tr>
<tr>
<td>Learn more about diabetes management</td>
<td>15/39</td>
<td>“Have a better understanding of my diabetes.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Learn new things about diabetes care”</td>
</tr>
<tr>
<td>Fun activities/experiences</td>
<td>33/39</td>
<td>“New experiences”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>“It was fun last year” “I love coming”</td>
</tr>
<tr>
<td>Break from diabetes and worry (able to relax)</td>
<td>10/39</td>
<td>“Vacation from diabetes”</td>
</tr>
<tr>
<td>Being active</td>
<td>10/39</td>
<td>“To be active”</td>
</tr>
<tr>
<td>Others told me to come</td>
<td>5/39</td>
<td>“My friend went last year and enjoyed it”</td>
</tr>
</tbody>
</table>
We also asked who supports the participants with diabetes and 36/40 stated that their mother supported them, 18/40 stated their father supported them, 16/40 said both parents supported them, and 5/40 stated their doctor or therapist supported them. Of the forty adolescent who attended camp 23 attend another diabetes associated event during the year (e.g. a walk, support group, other camp, or convention/expo).

**DISCUSSION**

Diabetes camp has been shown to be beneficial to improve knowledge of self-management of diabetes and to improve HbA1c levels in children and adolescents. [2, 3, 5] There have been very few studies about the effects of diabetes camp on psychosocial outcomes. Diabetes camp provides a unique setting in which adolescents are no longer “different” because they have diabetes. For example, the camper does not have to explain what it means or why they have to test their blood glucose. Anecdotally, families and campers report that diabetes camp provides a “vacation from diabetes” for the week because the medical and social support that is available at camp allows the children and adolescents to have a fun camp experience while safe.

Given the general positive impression of diabetes camps, it was unexpected that this study was unable to show a significant difference in CDI scores between adolescents who attend camp and those that do not. There are several possible reasons for this: 1) small sample size, 2) lack of a camp naïve group in order to assess the true impact of camp, 3) a majority of the participants scored a “0” on the CDI at all of the time points, 4) adolescents may have depressive symptoms, diabetes burnout or daily challenges/distress in dealing with their diabetes but the large majority do not qualify to
have major depressive disorder, 5) a homogenous study population of upper middle class Caucasian adolescents, and 6) the effect of seasonality and other life events could not be accounted.

This study did demonstrate a significant difference with a lower HbA1c at baseline and 6 months in those that attend camp. This is consistent with previous research and is likely the result of peer group support and the structured self-management environment at camp. The other striking feature of our study was the homogeneity of the camp group in both race (mostly white) and insurance type (mostly private) indicating that camp is attended primarily by upper middle class Caucasian teenagers.

Future studies might focus on studying a specific intervention at camp such as resilience training and or building protective skills in order to improve glycemic control and improve quality of life. In addition more studies are needed to determine barriers to attending camp and how to get more of the underserved patients to attend camp.
BIBLIOGRAPHY

APPENDIX A. DEMOGRAPHIC INFORMATION

Your child’s date of birth ____________________ (month/day/year)

Your child’s gender (please circle one):    BOY      GIRL

What year was your child diagnosed with type 1 diabetes? _________  
    If unsure of the date, how long have they had diabetes? ________ years

What was your child’s most recent HgBA1c? ______ %

Is this your child’s first year at camp?   YES  NO  
    If no, how many years has your child been coming to camp? ________ years

Does your child have any other medical conditions?    YES  NO  
    If yes, what?  
        HYPOTHYROID  CELIAC DISEASE  DEPRESSION
        KIDNESY DISEASE  ADHD  ASTHMA

Is your child on psychiatric medication (antidepressants, anti-anxiety, ADHD meds)?  
    If yes, what?  
        If yes, for how long? ______________

Your Child’s Ethnic origin (please circle one)  
    CAUCASIAN  AFRICAN AMERICAN  HISPANIC
    NATIVE AMERICAN  ASIAN  OTHER

Do you live with your child at least 50% of the time?    YES  NO  
    If no, then how much? _________

Mother’s occupation ________________________________

Mother’s Education ________________________________

Father’s occupation ________________________________

Father’s Education ________________________________

Your current marital status?  
    Married    Separated    Divorced    Never Married  
    Divorced and remarried    Other

Who lives in the primary residence of your child? ____________________________
Besides this child, is there anyone else in the home with a chronic medical condition? (Please circle)

YES  NO

If yes, what?  Diabetes  Celiac  Thyroid disease  Asthma  Other (please list) ___________

Annual household income (please circle) ?

Less than $25,000  $76,000-100,000

$26,000-50,000  more than $100,000

$51,000-75,000

Primary Health Insurance

Private  Medicaid/Medicare  HMO
APPENDIX B  QUESTIONNAIRE: TYPE 1 DIABETES ATTENDING CAMP

Why did you come to camp? (Please list in order of importance)
1. 
2. 
3. 

Have you attended this camp before? YES  NO
If Yes, How many times? _____

Do you keep in touch with people from camp after camp is over? YES  NO
If so how? (Circle all that apply)
Facebook   Texting   At Diabetes related events
Twitter   Phone Calls   In person (hanging out together)
E-mail

Who lives at home with you? _______________________________________

How long have you had diabetes (years)? _____________

How do you give your insulin? (Circle all that apply)
Syringe   Insulin pen   Insulin pump

Do you participate in any other diabetes related activities? YES  NO
What do you participate in? (Circle all that apply)
Walk   Another camp   Weekend retreat
ADA Walk   ADA Bike Ride   JDRF Expo
JDRF Walk   Other: __________________

What grades do you most often get in school (circle)?
As and Bs   Cs and Ds   Ds and Fs

Who is your main support for your diabetes?
Mother   Father   Other relative (aunt, uncle, grandparent)
Friend   Sibling   Other (please list)_________