# University of Alberta

A Pilot Study on the Health Related Quality of life of Symptomatic Pediatric Patients with Celiac Disease

by

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Dedication

I would like to dedicate this thesis to all of my family and friends who have supported me through this journey. To my husband, Brian, I thank you for all of your love, support and encouragement. You bring great peace and balance to my life, I could not have done this without you. To my beautiful daughter, Abigail, may this inspire you to reach for the stars and know that you can achieve your dreams! Always know that you can do anything with hard work, and dedication. The sky is the limit.

I would also like to acknowledge Dr Colleen Norris who has inspired me since the first statistics course I took. You are a wealth of knowledge and I cannot thank you enough for supervising me and for your guidance through this research project. To my committee members, Dr Gwen Rempel and Dr Justine Turner, thank you for your commitment to making this research the best that it could be.

Abstract

Background:

Celiac disease affects 1% of the population and the only treatment for CD is life-long adherence to a gluten-free diet, this affects every aspect of life including emotional, social, physical and psychological which in turn has an effect on patient quality of life.

Objective:

This pilot study is an effort in understanding the quality of life in the pediatric CD population and is a guide for a future, large sample research study.

Design & Methods:

Thirteen children diagnosed with CD by intestinal biopsy (mean 6 months) and their parent pair were asked to complete a generic QoL questionnaire (EQ-5D-CY) and a disease-specific questionnaire (TACQoL-CD).

Results:

The overall QoL was higher on the generic questionnaire, while the effects of CD and the GFD resulted in a lower quality of life as determined by the TACQoL-CD. Future research with a large sample at multiple timepoints is imperative.

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| ATTG | Anti-tissue transglutaminase |
| CD | Celiac disease |
| EMA | Anti-Endomesium antibody |
| FAP | Functional abdominal pain |
| GERD | Gastroesophageal reflux disease |
| GFD | Gluten-free diet |
| GI | Gastrointestinal |
| GSRS | Gastrointestinal Symptoms Rating Scale |
| HRQoL | Health related quality of life |
| IBD | Inflammatory bowel disease |
| PedsQL | Pediatric Quality of Life Inventory |
| PGWB | Psychological Well-Being Scale |
| SF-36 | Short Form Health Survey |
| TACQoL-CD | TACQoL-Coe-Diet |
| VAS | Visual Analogue Scale |

# CHAPTER ONE

## Introduction

Celiac disease (CD) affects 1 out of every 111 people in North America (Fasano & Catassi, 2001). A recent increase in CD diagnosis can be attributed to a growing recognition that there is a wide spectrum of symptom presentation. Research has provided new knowledge of the disease, and with that knowledge new and easier screening tests for diagnosis have become readily available. For instance, bloodwork screening has identified a previously undiagnosed population that do not have symptoms. If an initial bloodwork screening is positive, a small bowel biopsy is performed to confirm the diagnosis. Whether symptomatic or asymptomatic, all patients are prescribed to follow a strict gluten-free diet (GFD), currently the sole treatment for celiac disease. Having symptoms or being diagnosed incidentally may affect patient adherence to the GFD, and this will affect long term health outcomes. Celiac disease and the accompanying dietary restrictions have effects on emotional, social, physical, and psychological aspects of life, that is, the quality of life (QoL). Research has been conducted in adult populations examining the QoL in symptomatic and asymptomatic patients with CD but there is limited research in the pediatric celiac population. For this reason, only one pediatric CD QoL study is included in the literature review. The purpose of this study is to measure the health related QoL of symptomatic and asymptomatic pediatric celiac patients at the time of diagnosis.

## Background

Celiac disease was first described by the Greek physician Areteus in the first century A.D. (Zawahir, Safta, &Fasano, 2009). In 1887, an English physician, Dr. Samuel Gee, recognized the need for lifelong dietary treatment for what he called “celiac affection”(Guandalini, 2008). In 1950, a Dutch pediatrician, Dr. Willem Dicke, introduced the GFD as a treatment for CD. He demonstrated that removal of wheat from the diet resulted in the disappearance of CD symptoms in children (Catassi&Fasano, 2008).

CD prevalence varies throughout the world, the highest (5.6%) being in the Saharawi people in Western Sahara. Scandinavia, India, the Middle East, and North Africa also have high CD rates (Zawahir,Safta, &Fasano, 2009). In contrast, the CD prevalence in North America and the general European population is estimated to be 1%. The likelihood that a patient has a first degree relative with celiac disease ranges from 3 to 10%.

Celiac disease is a chronic autoimmune mediated gastrointestinal disorder occurring when genetically susceptible people are exposed to gluten. Gluten ingestion causes damage to small intestine mucosa; this damage occurs over time, eventually causing total villous atrophy. Celiac disease can be diagnosed at any age; it is classically found in children between the ages of six and 24 months following introduction of gluten to the diet, though individuals may present at any point in their life including the elderly. Common symptoms include malabsorption and weight loss, diarrhea or constipation, nausea and vomiting, abdominal pain and bloating. There are also extraintestinal manifestations which may be seen in up to 50%

of patients (Guandalini, 2005). These include dermatitis herpetiformis, dental enamel hypoplasia, iron deficiency anemia, short stature, delayed puberty, chronic hepatitis, arthritis, osteopenia/osteoporosis, epilepsy, ataxia, psychiatric disorders, and infertility in women. Not all CD patients present with typical symptoms symptoms. Some are detected by screening as children or siblings of celiacs; following a diagnosis with another autoimmune disorder such as type 1 diabetes mellitus. Ten percent of patients with type 1 diabetes mellitus (Guandalini, 2005) have CD. In addition to type I diabetes mellitus, there are a number of other autoimmune disorders associated with celiac disease. They include autoimmune hepatitis, autoimmune thyroiditis, Addison's disease, and primary biliary cirrhosis. Disorders associated with CD include Down Syndrome, Turner syndrome, and William's syndrome. Screen detected patients are often asymptomatic, but once diagnosis is made, they are advised to begin on a the gluten-free diet immediately.

Screening for CD involves performing serology on patient blood samples. There are two tests for CD, both based on the presence of IgA mediated antibodies. Antiendomysium antibodies (EMA) and anti-tissue transglutaminase (ATTG) require normal IgA levels to prevent false negative screens. EMA is detected by exposing serum to monkey esophageal or human umbilical cord smooth muscle and assessing immunoflourescence,a costly test with a sensitivity of 90% and a specificity of 99% (Guandalini, 2005).The presence of ATTG is highly sensitive (99–100%) and specific (98%) in the diagnosis of celiac disease, though, occasionally, individuals who have positive results are not celiacs. ATTG is detected with an ELISA test that

originally used guinea pig antigen; the use of human antigen has increased the sensitivity and specificity of the test (Guandalini, 2005). As neither test is 100% sensitive or specific, positive results are followed by a small bowel biopsy to confirm the diagnosis.

## Referral to the Stollery Children's Hospital

Children are referred to the pediatric gastroenterologists at the Stollery Children's Hospital for diagnosis of CD following positive blood screening results. Screening is usually done by the pediatrician or family physician as a result of the child having CD symptoms, following a diagnosis of type 1 diabetes, or if the patient is a child or sibling of a celiac (first degree relative). In some cases screening bloodwork is ordered if the physician is suspicious that CD is present, though the child may be asymptomatic or exhibit an atypical presentation. From 1998 to 2007 nearly 50% of all new referrals to the Stollery Children's Hospital clinic were asymptomatic or had an atypical presentation (Rajani,Huynh, & Turner, 2010). Children may be referred to a gastroenterologist because of constipation, failure to thrive, or other concerns; in these cases the gastroenterologist screens the patient. Usually within 2 months of a positive screen, the child is booked for a gastroscopy with biopsies at the Stollery Children's Hospital. If the biopsy results are positive, the family is informed and the pediatric gastroenterology dietician is notified. The dietician schedules an appointment for a family teaching session. The child and parent(s) attend the one hour session together, usually within one week of the diagnosis. After the teaching session the child sees their gastroenterologist after six months to monitor the effects

of diet on the disease follow up and will attend the Pediatric Celiac Disease Clinic, for yearly follow ups until he or she reaches adulthood.

## Treatment is a Life-long Dietary Change

CD requires a permanent, lifelong avoidance of ingested gluten, that is, a gluten-free diet must be established. The diet is restrictive and more expensive than a diet that includes gluten. The GFD is restrictive of wheat, barley, and rye. Although oats do not contain gluten they are often cross-contaminated with gluten and are therefore avoided as well. Though it has yet to be determined what a "safe" amount of gluten may be, Catassi et al. (2007) suggests that more than 50mg of gluten per day over three months may induce mucosal damage. Previously, Laurin et al. (2002) reported that even a small amount of gluten (mean 0.1g/kg per day, mean 1.7g/day) resulted in relapse of clinical symptoms after a mean of 20 ± 27days (median 8 days, range 0–105 days). Gluten can also be found in medications and cosmetics. Cross-contamination can include a small crumb of regular bread contacting anything that may be used by the celiac patient. This can result in ill effects on the patient, including abdominal discomfort, diarrhea, bloating, fatigue, headache, and constipation (Rashid et al., 2005). Adherence to the diet is difficult for many people as the food is more expensive and is not available in all grocery stores and restaurants. The disease is not well understood by society. Adherence can be difficult for the symptomatic patient, but for an asymptomatic patient, Adherence can be especially difficult for asymptomatic patients as they are feeling well and the diet does not palpably improve their condition. Untreated celiac disease can lead to

intestinal lymphoma (Catassi, Bearzi, & Holmes, 2005). Asymptomatic patients and symptomatic patients are equally at risk of developing lymphoma and osteoporosis.

## Health Related Quality of Life

Health-related quality of life (HRQoL) is a multidimensional construct that relies on a patient's subjective appraisal of well-being. HRQoL, often measured with a questionnaire, is an important indicator in evaluating intervention and treatment, in understanding the burden of illness, in allocating resources, and in health surveys (Solans et al., 2007). HRQoL questionnaires can (1) identify and prioritize an individual's health problems, (2) facilitate patient and health care staff communication, (3) identify unexpected or hidden health problems, and (4) aid in monitoring a change in a patient's health (Higginson & Carr, 2001).

Assessing pediatric QoL is more complex than assessing adult QoL. Children do not have the same views as adults about causes and treatments of illness, and they may interpret questions differently than adults. Their age and cognitive development affect their ability to understand language and affect their use of rating scales in a questionnaire (Eiser& Morse, 2001). Pediatric QoL includes cognitive functioning, body image, autonomy, and family relationships in addition to physical, social, and psychological domains (Eiser and Morse, 2001). Ravens-Sieberer at al, (2006) proposed that pediatric QoL domains should include aspects of self-perception, parent relations, and school functioning. Adult questionnaires need to be modified for the pediatric population as they are often too long for children to

complete and rating scales may be too difficult. Adult domains of QoL are not necessarily appropriate for children. For an adult, physical functioning may mean being able to climb stairs whereas for a child it may mean being able to play with peers (Eiser& Morse, 2001). It is of central importance to a child to participate in age appropriate activities. Central issues for the younger child that are important to assess are issues of attachment to the family and siblings, development of cognitive competence and relationships with peers (Gerharz, Eiser, & Woodhouse, 2003). Critical issues to assess in the adolescent include issues of body image, aspirations for the future, and autonomy (Gerharz et al., 2003). The multiple stages of development in the pediatric population make it difficult to assess the QoL across all pediatric age groups by simply changing the wording of an adult questionnaire.

There are two approaches to constructing a HRQoL questionnaire: generic and disease specific. Generic measures are broad and can apply across conditions and levels of health. They are used to collect information on healthy and unhealthy children, allowing comparison across different conditions and between healthy children and children with disease (Solans et al., 2007). They are not designed to detect small changes in QoL due to the effects of specific diseases. Disease specific questionnaires are designed to collect data on disease symptoms or on effects of treatment within a single disease. For example, TACQoL-CD is a disease specific questionnaire that assesses the effect of treatment, in this case the GFD, on the QoL of the pediatric CD patient. Where possible, it is valuable to employ both generic and disease specific questionnaires in a QoL study.

This study provides new information on the impact of a diagnosis of CD and adherence to a gluten-free diet on the quality of life in the pediatric celiac population. In addition, I will examine the difference in the quality of life in symptomatic versus asymptomatic celiac children. Knowing how CD affects a child emotionally, socially, physically, and psychologically will help to improve patient education and support programs. It is hoped that the findings of this research will increase community and government understanding of the disease. The ultimate goal is to increase CD patient adherence to the only viable treatment so that complications can be avoided.

This research will serve as a pilot for a larger study examining the QOL of pediatric CD patients within 6 months and two years after diagnosis and the introduction of the GFD.

## Purpose of the Study

The primary aim of this prospective cohort research study is to evaluate the impact of CD on the pediatric patient's QoL within six months of diagnosis.

The secondary aim is to conduct a pilot investigation guiding the design of a larger study that will examine the QOL of pediatric CD patients six months, 12 months, and two years after diagnosis and the introduction of a GFD.

## Hypothesis

1. Children with CD will have a decreased QoL following diagnosis of Celiac Disease. The decrease in QoL will be related to symptoms of CD, to being diagnosed with a lifelong disease, and to the introduction of dietary change.

## Significance of the Study

Celiac disease is a permanent disease requiring a lifelong adherence to a restrictive GFD, currently the only treatment available. The diagnosis brings an abrupt, dramatic lifestyle adjustment. Though an exact period of time has not been determined, one expects that after starting the GFD the QoL of a symptomatic child will improve. Similarly, it might be assumed, but it is as yet unproven, that the asymptomatic child might report his or her QoL to be worse after diagnosis; the child felt well before the diagnosis but is now forced to follow a GFD, so food is not as enjoyable as it used to be. For the asymptomatic patient it may be worse to know that one has CD than not to know. There is much debate about the benefits of screening asymptomatic patients. However, the morbidity and mortality associated with celiac disease does not discriminate between symptomatic and asymptomatic patients, so it is hard to see why there is any question about screening.

Most celiac patients are diagnosed early in life, soon after the introduction of gluten to the diet. While the research on QoL in CD that has been done is not definitive and there are conflicting results it behooves the clinician caring for patients with CD able to assess and understand the impact the disease has on QoL, particularly since symptomatic and asymptomatic

patients may experience different and opposite QoL impacts. Understanding the impact on QoL may help the clinician to assist patients to adhere to treatment, and to teach and support children with CD and their families. It is anticipated that this pilot study will set the stage for a large cohort study with the objective of providing evidenced based care to patients with CD and increase social and government awareness about a disease that is frequently misunderstood and minimized.

This study will help to fill a gap in the literature related to QoL of pediatric CD patients.

# CHAPTER TW0

## Literature Review

A literature review was completed to find articles on quality of life in pediatric celiac disease. Search terms were “quality of life” and “celiac disease” then limited to “child.” Due to a lack of pediatric studies, other gastrointestinal disorders that affect quality of life were also examined. As there is a lack of literature on the subject, quality adult studies were utilized, with two pediatric papers. An additional literature review was completed to find articles on quality of life in children with other gastrointestinal diseases in children. Search terms were “quality of life” and “gastrointestinal” and “child.” A systematic review and additional papers were obtained. Databases that were searched include CINAHL, EBM Reviews - Cochrane Database of Systematic Reviews, EMBASE, Health Source: Nursing Academic Edition, Ovid Medline In Process and other Non-Indexed Citations, PubMed, PsycINFO, SCOPUS and Web of Science.

## Quality of Life in Celiac Disease

The majority of QoL research that has been done to date in celiac patients is based on adult patients. This is surprising when it is considered that the majority of new diagnoses occur in childhood. These studies have conflicting results and questionable relevance to QoL after CD diagnosis in childhood. With the exception of Kolsteren, Koopman, Schalekamp, and Mearin (2001), all of the studies presented adult literature. In 2003, Ciacci et al. (2003) administered a standardized self-administered questionnaire in a cohort of 581 Italian patients with CD who had maintained a GFD for at least

one year. The authors found that patients diagnosed before age 20 had significantly higher (p=.0122) happiness scores than those diagnosed after age 20;83.6% of the patients were rated “very well” or “well” regarding overall well-being. The study did not specify which questionnaire was used; also, there was no control group and the proportion of asymptomatic versus symptomatic patients was not reported. It does not appear that the introduction of a GFD had an impact on the patients, this is interesting as gluten is a staple in the Italian diet. Lee and Newman (2003) found that 90% of 254 adult questionnaire respondents thought of themselves as healthy and that having CD had little impact on their overall QoL. This perception of overall well-being was in contrast to specific QoL questions where respondents reported that maintaining a GFD impacts them while dining out (86%), traveling (82%), and had a negative impact on family life (67%).There was no comparison group and the pediatric population was not investigated.

Both Johnston, Rogers, and Watson (2004) and Nachman et al. (2008) used the Short Form Health Survey (SF-36) questionnaire and both concluded that, at the end of one year, the QoL was significantly improved for the symptomatic (typical) celiac patient but there was no increase in QoL for asymptomatic patients. In addition to this, Nachman et al. also used the Beck Depression Index to measure psychosocial domains as well as the Gastrointestinal Symptoms Rating Scale(GSRS) questionnaire that focuses on gastrointestinal symptoms, most of which are observed in CD. Mustalahti et al. (2002) used the GSRS together with the Psychological General Well-Being Scale (PGWB) to show a significant increase in QoL in both symptomatic and

asymptomatic patients. Healthy control groups were used by Johnston et al. and Nachman et al., but not Mustalahti et al.

HRQOL literature emphasises that use of both generic and disease specific measures of QOL provide a more comprehensive assessment and may provide insight to specific areas of concern for the patient. Kolsteren et al. (2001) studied a pediatric population with a large sample size. The researchers used three instruments—two generic and one disease specific—and concluded there was no difference in QoL between children diagnosed with CD and the healthy control group. Unfortunately, scores were not given for all results of the questionnaires and the authors commented only on statistically significant aspects. There was also no mention of how long the children had been living with CD. It was not possible to determine if the conclusions were limited by sample used, or if the tools chosen were poorly matched to the population.

A qualitative study by Sverker, Hensing, and Hallert (2005) was useful in providing an emotional response from CD patients. Sverker et al interviewed 43 CD patients aged 20-40 years utilizing the Critical Incident Technique, which captures the qualities of perceived dilemmas and experiences. For the purpose of this study, the dilemma was defined as a "perplexing or awkward situation perceived by a patient to cause disturbances in the performance of his/her everyday life". The focus of the interviews was on situations leading to confusion or discomfort in as it related to CD. Three main categories that were identified as dilemmas were emotions, relationships and management of daily life. Emotions that were

reported included isolation, shame, fear of gluten contamination and worries of being a bother or burden. Relationship dilemmas included unwanted visibility, neglect, being forgotten, disclosure avoidance and risk taking. Dilemmas associated with management of daily life included restricted product choice, double work and constantly being on call. These dilemmas indicate how vital it is to assess and understand the psychological and social impact of CD on the individual. This was not a pediatric study but it would be beneficial to explore these dilemmas with parents.

A recent retrospective study (Rajani et al., 2010), completed at the Stollery Children's Hospital in Edmonton, AB, examined the frequency of CD diagnosis. From January 1998–December 2001, nine children were diagnosed with CD. In contrast, from January 2003–2007, of the 149 children diagnosed with CD only 54% presented with typical symptoms. Patients were followed up and the results were compelling. Ninety-six percent of the patients reported improved symptoms after implementing a GFD; more importantly 53% of those patients were asymptomatic prior to diagnosis. In light of this information, it is critical to include asymptomatic patients in a QOL study noting that in this small study 46% of the diagnosed population were in fact asymptomatic; in addition, 53% of patients who reported improved symptoms on follow up were asymptomatic prior to diagnosis.

## Pediatric Quality of life in Other Gastrointestinal Disorders

Santanu and Thomas (2007) conducted a systematic review (70 studies) of QoL in pediatric gastrointestinal (GI) and liver disease. Here I discuss three chronic GI conditions included in the Santanu and Thomas

review: inflammatory bowel disease (IBD), chronic constipation, and gastroesophageal reflux disease (GERD).In the two studies on GERD, one showed that children who received an endoluminal gastroplication for severe GERD had improved QoL scores six weeks after surgery and the improved scores were sustained for 12 months. In the second GERD study, a pediatric asthma instrument revealed that QoL did not improve with acid suppression for children with coexisting asthma and GERD.

Santanu and Thomas (2007) reviewed 17 IBD studies. A study done with 83 IBD children in the Netherlands showed that children ages eight to 12 years had better cognitive function and similar QoL to a control population. However, adolescents had significantly impaired QoL in the body complaints ($p=.02$), motor functioning ($p=.006$), autonomy ($p=.002$) and negative emotions ($p=.03$) domains (Loonen, Grootenhuis, Last, Koopman, & Derkx, 2002). Adolescents with a close social support network had higher QoL scores than those who did not; and those with recent onset of IBD relied more heavily on family than on peers for social support. In a second study by Loonen, Grootenhuis, Last, deHaan, Bouquet & Derkx (2002) the authors discussed the measurement of QoL using the instrument IMPACT-II in the Dutch population. The original IMPACT was developed in Canada and is used internationally. The mean total score was significantly higher in children with mild disease activity versus those with moderate disease activity. Children with mild disease had significantly higher scores ($p<.001$) in IBD symptoms, systemic symptoms, emotional functioning and social functioning, body image ($p<.05$), and treatment/intervention related concerns ($p<.01$).

Also included in Santanu and Thomas (2007) is a QoL study by Youssef, Langseder, Verga, Mones, and Rosh (2005) on chronic constipation in children. Children aged five to 18 years with chronic constipation of nonorganic etiology and lasting more than three months were included in the study. The children and their parents completed the Pediatric Quality of Life Inventory (PedsQL) questionnaire. The children were compared to a healthy control group and to children with IBD and GERD. The results showed that children with chronic constipation had a lower quality of life ($p<.05$) compared with children with IBD, children with GERD, or healthy children. Participants also had lower scores on the physical domain than the IBD children ($p<.02$), GERD children ($p<.05$),or healthy children ($p<.05$). Children with chronic constipation (43.8 months) reported a longer duration of symptoms than children with IBD or GERD (14.2 months) ($p<.002$). It is interesting that children with a nonorganic GI condition have a poorer quality of life than children with organic disease.

Though not part of the Santanu and Thomas (2007) review, a study by Youssef et al., (2006) used the the PedsQL to investigate functional abdominal pain (FAP) in children between five and 18 years of age. Parents (209) also completed the questionnaire. Functional abdominal pain is a nonorganic functional gastrointestinal disorder. Children may present with chronic abdominal pain, school absence, anxiety, or depression; their lives and the lives of their families are greatly disrupted. Responses of 65 children with FAP and their parents were compared to responses of healthy controls (n=46) and also compared with children with organic causes of abdominal

pain: inflammatory bowel disease (IBD) (n=42) and gastroesophageal reflux disease (GERD) (n=56).The QoL scores of the children with FAP were similar to the scores of children with GERD (mean 78 vs. 80) and IBD (p=.07). The healthy controls had higher QoL scores than the children with FAP (p<.05). Scores for the physical domain were lower in the FAP group than in the healthy controls (p<.05) and in children with GERD (p=.05) and were similar to scores of the children with IBD (not significant). Finally, the healthy controls scored higher in the emotional domain than the FAP children (p<.05). The parents of children with FAP had lower QoL scores than their children (p<.05). Parents of children with FAP reported lower QoL scores than parents of children with IBD (p=.07), parents of children with GERD (p<.05), and parents of healthy children (p<.001). Parents of children with FAP also reported lower social domain scores than parents of children with IBD (p<.05), GERD (p<.05), and healthy children (p<.001).

# CHAPTER THREE

## Methods

### Design

A prospective cohort observational study was done in the pediatric CD population, with parent proxy reports. Two quality of life questionnaires were used: EQ-5D-CY, a generic quality of life instrument, and TACQoL-CD, a CD and GFD specific QoL questionnaire.

### Sample

The population consists of pediatric patients aged 6–17 years who were diagnosed with CD in the Stollery Children's Hospital following a small intestine biopsy. The sample included both symptomatic and asymptomatic patients. Parents were asked to proxy for all children. As this is was a pilot study, the intended sample size was 20 children, though, due to recruitment difficulties, the sample size was 13 children and their parent proxy.

Inclusion criteria is all children aged 6–17 years of age who had undergone small bowel biopsy for the diagnosis of CD within 11 months at the Stollery Children's Hospital. Children were excluded from the study if they (1) had been diagnosed with CD for one year or more,(2) had been diagnosed with type 1 diabetes mellitus, and (3) were members of non-English speaking families.

### Data Collection

The gastroenterologist completed the demographic and clinical characteristics form on the day of the child's small intestine biopsy. This form

was used to determine clinical data such as presenting symptoms, family history, medical history, and demographic data such as ethnicity.

The questionnaires were self-administered by the parent and/or the child; they took less than 15 minutes to complete. Parents and children were first informed of the study on the day of the small intestine biopsy. At this first meeting, a gastroenterologist performing the biopsy completed the demographics and clinical characteristics form, informed the child and parents of the study, and provided the family with the study information sheet. Following the biopsy, one of the pediatric gastroenterology nurses contacted the family with the biopsy result. If the result was positive, the child was booked for an initial appointment with a dietician in the Pediatric Celiac Clinic; at that time, the nurse reminded the family of the study and their eligibility to participate. The initial appointment occurred within three weeks of the biopsy procedure. Patients were informed that they could withdraw their participation at any time and that there were no obligations to participating in the study. If the family and child agreed to participate in the study, then an additional copy of the study information sheet, consent, assent for children over age 7, and questionnaires were given to the family and child. Once consent and assent were obtained, the child was asked to complete the EQ-5D-CY and TACQoL-CD, and parents were asked to complete the parent proxy questionnaire. After a period of six weeks of recruitment to the study, it was determined that the design of the study and collection of data at the initial appointment was not appropriate. Ten families had been informed of the study and chose not to participate. Families chose not to

participate for different reasons. Some families took the questionnaires home to review stating they would call if they chose to participate, and did not call back. Most families were overwhelmed by the diagnosis and did not feel they could complete the forms. The children were seen in the clinic by the dietician within two weeks of having their intestinal biopsy, and had not started the gluten free diet, thus the TACQoL-CD was not relevant at the time. For these reasons, recruitment was not successful at the initial appointment.

For a period of four weeks, recruitment was attempted by the gastroenterologist in endoscopy before the child's gastroscopy, with copies of the questionnaires being provided to complete at home after the diagnosis was confirmed. The child and parent were asked to complete the forms at home and return them to the dietician at their initial teaching session. Six patients took the questionnaires home and elected not to participate. Over a period of three weeks, the gastroenterologist and the research nurse were in endoscopy a spoke to the parents and children about the study. They were provided with the questionnaires and instructed to complete them when the nurses called with a confirmed diagnosis and return them when they met with the dietician. Eight patients were eligible, but no questionnaires were returned. Concurrently, a new approach was undertaken: clinics were created for children and families who were due for the six month follow up to diagnosis. At the clinic, parents and children were approached to participate in the study. This provided a structured clinical approach to recruitment and an attempt to capture more participants in a concentrated timeframe, and

proved to be successful. Assessing patients at the six month follow up to diagnosis allows time for the child and family to become comfortable with the diagnosis, the GFD, and its impact on the child and family QoL.

## Data Analysis

Data Analysis was conducted using descriptive statistics in the form of tables, charts, and bar graphs to summarize the demographic data and clinical characteristics (Appendix A).Independent sample t-tests were initially used to compare the mean scores of child and parent responses to the EQ-5D-CY and the TACQoL-CD. A Kruskal-Wallis statistical test was then used to analyze the difference between the mean ranks of parent and child responses for both the EQ-5D-CY and for the TACQoL-CD. Summary scores were calculated for the child and the parent TACQoL-CD. Additionally, scatterplots assessed the correlation between parent and child pair responses for each of the TACQoL-CD questions and for the TACQoL-CD parent sum score, as well as the values of the parent and child pair EQ VAS.

The current version of SPSS was used in the analysis.

## Instruments

Quality of life is affected in all domains; as such, a comprehensive analysis of QoL was conducted, including general well-being, psychosocial variables, and disease specific effects (Appendix A). Two instruments were used to measure QoL: a generic questionnaire EQ-5D-CY and a disease specific questionnaire TACQoL-CD.

The EuroQoL EQ-5D-CY is a generic QoL assessment tool that consists of a descriptive questionnaire and a visual analogue scale (Stolk,

Busschenbach, &Vogels, 2000). It measures five domains: mobility; self-care; usual activities; pain or discomfort; and feeling worried, sad, or unhappy. The child rates his/her health by checking off the level of severity in each of the domains. Domains are coded 1 for ”no problems,” 2 for “some problems,” and 3 for “severe problems” (Roset, Badia, & Mayo, 1999). Overall health is shown as a 5 digit number, where 11111 represents the absence of health dysfunction. When each of the three dimensions are put together, 243 unique health states can be defined (Cieza & Stucki, 2005). The visual analogue scale is a self-rating of health on a visual measure, similar to a thermometer, of 0 (worst health imaginable) to 100 (best health imaginable) (Casellas et al, 2008).In addition, there is a parent proxy form which also has a visual scale. It has been adapted by the EQ-5D research group for pediatrics and is in the process of being validated in children over age 8 years with various illnesses. Population norms do not exist yet, and weights are not available at this time. This instrument is currently being used in the pediatric rheumatology and inflammatory bowel disease populations at the Stollery Children’s Hospital.

The TACQoL-CD is a pediatric QoL instrument that has been adapted from the TACQoL generic QoL questionnaire to capture the impact of CD and the GFD on QoL. It consists of six questions asking: “During the last few weeks, did you have 1) Problems with your diet? 2) Did you dislike your diet-food? 3) Problems because of not being allowed to eat gluten containing candies? 4) Problems because other children were allowed to eat anything and you were not? 5) Problems because you always have to eat something

different? 6) Problems with missing the sweet things that everyone is eating?" Kolsteren et al. (2001) utilized the instrument in the Dutch population and demonstrated instrument reliability for both children and their parents. It was adapted for use in this study as unsuccessful attempts were made to obtain the original TACQoL-CD. The format was created to mirror the CDDUX, which was created by members of the group that developed the TACQoL-CD. It is scored as a 5 point Likert scale; where "none/never"=100, "rarely"=75, "some/sometimes"=50, "frequently"=25, and "lots/always"=0. A total score of 0–20 is considered very bad, 21–40 is bad, 41–60 is neutral, 61–80 is good, and 81–100 is very good (van Doorn, Winkler, Zwinderman, Mearin, &Koopman, 2008).

## Ethical Considerations

This study proposal was approved by the Health Ethics Research Board at the University of Alberta. Operational and administrative approvals were granted by the director of the Stollery Children's Hospital and by patient care managers of the Day Ward and the Pediatric Ambulatory Clinic at the Stollery Children's Hospital. Patients were given an identification number and personal identifiers were not added to the database.

Once patients were deemed eligible for participation, the study was explained to them, consent was obtained, and assent was obtained for children of seven years and older. The child and parent were encouraged to ask questions, and to call if there were questions or concerns in the future. The child and parent were informed that participation in the study is voluntary and they may withdraw from the study at any time without

consequence to their care. They were informed that information from their chart and the questionnaires is confidential and only the study team will have access to this information. They were assured that once completed, all information will remain in a secure locked cabinet.

# CHAPTER FOUR

## Presentation of Findings

The purpose of this study was to evaluate the impact of CD on the pediatric patient's QoL within 11 months of diagnosis and to determine if there is a difference in the health related QoL between symptomatic and asymptomatic pediatric CD patients. Descriptive statistics for patient demographics and clinical characteristics are reported. Independent sample t-tests were initially used to compare the mean scores of the child and parent responses for the EQ-5D-CY and the TACQoL-CD. A Kruskal-Wallis analysis was then used to analyze the difference between the mean ranks of the parent and child responses for both the EQ-5D-CY and for the TACQoL-CD.

## Description of Sample

### Demographics and clinical characteristics

Between the period of November 2010 and March 2011, 13 of 48 eligible patients agreed to participate in the study. The patients who declined participation had been diagnosed with CD in the past three weeks and were in the clinic for their GFD teaching. They were stressed at the time of enrolment and did not wish to participate. One newly diagnosed child agreed to participate. Demographic and clinical characteristics were obtained from the form completed by the gastroenterologist on the day of the gastroscopy. The sample consists of 7 (53.8%) males and 6 (46.2%) females, ranging in age from 5.8–15 years (mean 9.77, median 10, mode 5) (Figure1). Eleven (84.6%) children were Caucasian and 2 (15.4%) children were Indian, all were born in Canada. One of the 13 children was diagnosed within the previous three

weeks, with the remaining 12 children having been diagnosed between four and 11 months (mean 6.15, median 7, mode 7). All of the children were on a gluten containing diet at the time of diagnosis (Table 1). Family history was positive for 7 (53.9%) of the children, with 3 (23.1%) of these children having a second family member diagnosed with CD. One (7.7%) response was missing. Four (30.8%) children had a mother with CD, 2 (15.4%) had an aunt with CD, 2 (15.4%) had an uncle with CD, and 2 (15.4%) had a sibling with CD.

**Figure 1. Age at Diagnosis**

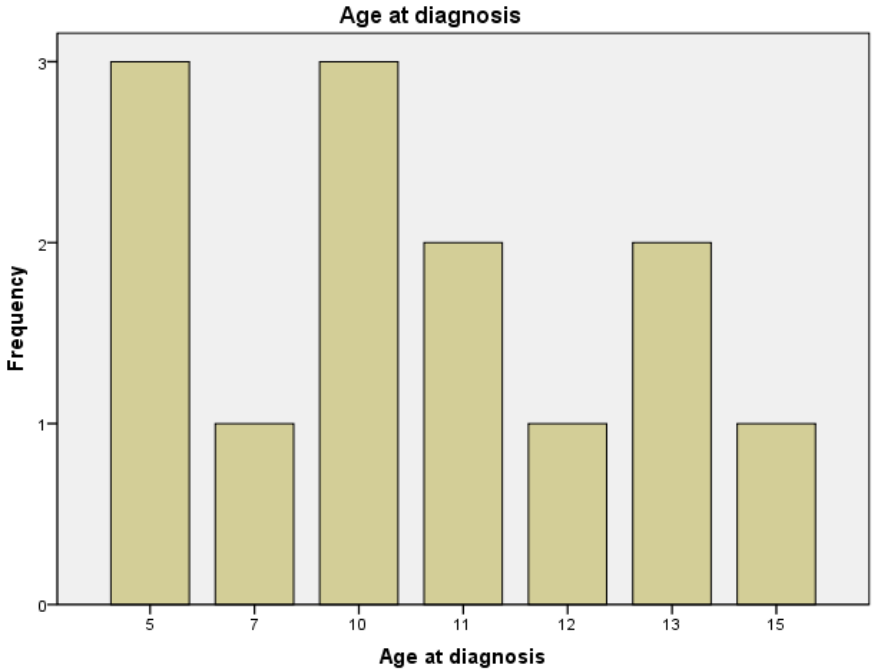



Table 1 describes the demographics and presenting symptoms of 13 child participants in the study. The reasons for referral were: gastrointestinal symptoms (9, 69.2%); growth concerns (3, 23.1%); and development of a rash (1, 7.7%). In addition to the primary presenting symptom, 3 (23.1%) children had anemia, goiter, or growth concern. Nausea was experienced by 4(30.8%) children, vomiting by 3 (23.1%) children, and weight loss by 2 (15.4%)

children. There was one missing response for each of these three symptoms. Fatigue was reported by 7 (58.3%) children, irritability by 6 (46.2%) children. One (7.7%) child reported joint pain in his fingers. Iron deficiency was reported in 2 (15.4%) children, though responses were missing in over half (53.8%) of the cases.

**Table 1. Sample Characteristics**

| Variable | n (%) |
|---|---|
| **Sex:** Males | 7 (53.8) |
| **Ethnicity:** | |
| Caucasian | 11 (84.6) |
| Indian | 2 (15.4) |
| **Family History:** | |
| None | 5 (38.5) |
| Mother | 4 (30.8) |
| Sibling | 2 (15.4) |
| Aunt | 2 (15.4) |
| Uncle | 2 (15.4) |
| >1 Family Member | 3 (23.1) |
| **Presenting Symptom:** | |
| Gastrointestinal symptoms | 9 (69.2) |
| Growth concerns | 3 (23.1) |
| Rash | 1 (7.7) |
| **Additional Presenting Symptom:** | |
| Anemia | 1 (7.7) |
| Goiter | 1 (7.7) |
| Growth concerns | 1 (7.7) |
| **Other Symptoms:** | |
| Nausea | 4 (30.8) |
| Vomiting | 3 (23.1) |
| Weight loss | 2 (15.4) |
| Fatigue | 7 (53.8) |
| Joint Pain | 1 (7.7) |
| Irritability | 6 (46.2) |
| Iron deficiency | 2 (15.4) |
| **Diet History:** | |
| Currently on gluten diet-Yes | 13 (100) |
| Trial off gluten-Yes | 2 (15.4%) |

Table 2 presents responses to the questions in the form regarding the current state of wellness and GI symptoms experienced. Possible responses were: 0 (normal), 1 (reduced), 2 (poor),3 (very poor), and 4 (terrible).

Regarding current feelings of wellness, 6 (46.2 %) children felt normal, 3 (23.1%) had reduced wellness, and 1 (7.7 %) felt terrible. Current activity levels were 6 (46.2%) normal, 3 (23.1%) reduced, and 1 (7.7%) terrible. Regarding patient appetite, 6 (46.2%) were normal, 4 (30.8%) were reduced, and 1 (7.7%) was poor. Three (23.1%) responses were missing to current wellness, activity, and appetite.

Possible responses regarding GI symptoms experienced by patients were: 0 (none), 2(mild/infrequent), 3 (moderate/weekly), 4 (severe/daily). One (7.7%) response was missing for the sections abdominal pain, bloating, and diarrhea. There was an equal distribution of responses for abdominal pain. Three (23.1%) denied having abdominal pain, 3 (23.1%) had mild/infrequent pain, 3 (23.1%) had moderate/weekly pain, and 3 (23.1%) had severe/daily abdominal pain. Ten(76.9%) children denied having bloating,1 (7.7%) experienced mild/infrequent bloating, and 1 (7.7%) reported severe/daily bloating. Nine (69.2%) children reported no diarrhea, 2 (15.4%) reported severe/daily diarrhea, and 1 (7.7%) had moderate/weekly diarrhea. Ten (76.9%) children had no problems with constipation, 1 (7.7%) had mild/infrequent constipation, and 2 (15.4%) had moderate/weekly constipation. The number of stools per day reported were: zero (3 children, 23.1%), one (6 children, 46.2%), two (2 children, 15.4%), and four (1 child, 7.7%).One response was missing. One (7.7%) child had been experiencing nocturnal diarrhea for two weeks.

**Table 2. Current and GI Symptoms**

| Current Symptom | Normal n (%) | Reduced n (%) | Poor n (%) | Very Poor n (%) | Terrible n (%) |
|---|---|---|---|---|---|
| Wellness | 6 (46.2) | 3 (23.1) | 0 (0) | 0 (0) | 1 (7.7) |
| Activity | 6 (46.2) | 4 (30.8) | 0 (0) | 0 (0) | 0 (0) |
| Appetite | 5 (38.5) | 4 (30.8) | 1 (7.7) | 0 (0) | 0 (0) |
| **GI Symptom** | **None** n (%) | **Mild/ Infrequent** n (%) | **Moderate /Weekly** n (%) | **Severe/ Daily** n (%) | |
| Abdominal Pain | 3 (23.1) | 3 (23.1) | 3 (23.1) | 3 (23.1) | |
| Bloating/Gas | 10 (76.9) | 1 (7.7) | 1 (7.7) | 0 (0) | |
| Diarrhea | 9 (69.2) | 0 (0) | 1 (7.7) | 2 (15.4) | |
| Constipation | 10 (76.9) | 1 (7.7) | 2 (15.4) | 0 (0) | |

A number of variables had missing responses due to respondents failing to answer the question. For the variables with missing data, missing responses ranged from four (30.8%) to nine (69.2%) The questions with missing responses included: age at gluten introduction, whether the child was breastfed, if the child had food allergy, gestation at birth, and colic as an infant. Age at gluten introduction had nine nonresponders; of the responders, 1 (7.7%) child was introduced to gluten at five months of age, 2 (15.4%) were introduced at six months of age, and 1 (7.7%) was introduced at seven months of age. Seven (53.8%) children were breastfed, while 4 (30.8%) did not respond to the question. Food allergies had 4 (30.8%) nonresponders;1 (7.7%)child reported an allergy to nuts.

The last questions of the clinical characteristics form were period of gestation and whether the infant had colic. The period of gestation ranged from 37 to 42 weeks (mean 39.3, median 39.25); the mode was not calculated as there were six different responses for six respondents, and seven missing responses. Six (46.2%) children did not have colic as infants, 2 (15.4%) had colic, and the remaining 5 (38.5%) did not respond. Table 3 presents the child-parent pair and the length of time from CD diagnosis. The time from diagnosis ranged from one to 11 months (mean 6.15, median 7, mode 7).

**Table 3. Case number and Time from Diagnosis**

| Child-Parent Pair ID # | Time from Diagnosis | Child-Parent PairID # | Time from Diagnosis |
|---|---|---|---|
| 1 | 9 months | 8 | 11 months |
| 2 | 1 months | 9 | 7 months |
| 3 | 4 months | 10 | 4 months |
| 4 | 5 months | 11 | 7 months |
| 5 | 7 months | 12 | 5 months |
| 6 | 8 months | 13 | 5 months |
| 7 | 7 months | | |

## Quality of Life

### The EQ-5D-CY

All 13 children and their parents (12 mothers, one father) completed the EQ-5D-CY and parent proxy, respectively. The EQ-5D-CY collects data on

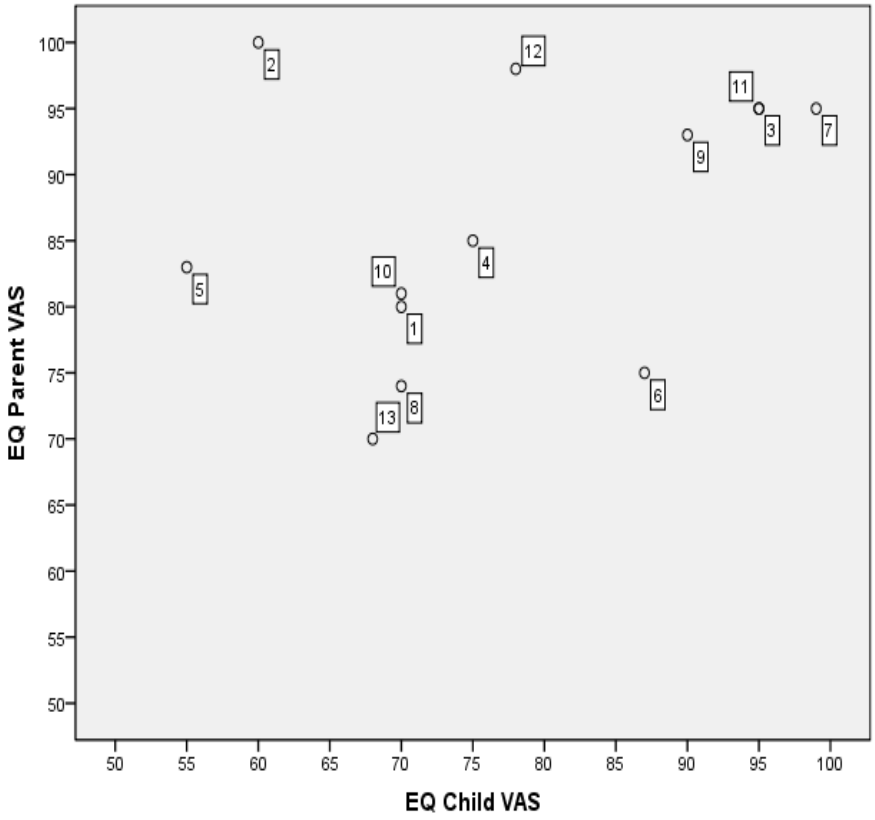
five dimensions (mobility; looking after myself; doing usual activities; having pain or discomfort; feeling worried, sad, or unhappy).There are three levels of response to each dimension: “no problems,” “some problems,“ and “a lot of problems.” The means of the sum of the ranked scores are summarized in Table 4. While there were no statistically significant differences between parent and child mean ranks, there were differences between the child and parent responses that may be clinically relevant. The VAS whereby the respondent selects a score between 0 (worst health imaginable) and 100 (best health imaginable) demonstrated that the children ranked their overall QOL lower (mean 77.85) than the parents (mean 86.46). The child and parent pairs reported identical responses for “mobility” and “looking after myself” domains. While the parents ranked the domains “doing usual activities” and “feeling worried, sad or unhappy” higher than the children, the children ranked “having pain or discomfort” higher than the parents.

**Table 4. EQ-5D**

| | Child (1) Parent (2) | N | Mean Rank | Sig |
|---|---|---|---|---|
| EQMobility | 1.00 | 13 | 13.50 | |
| | 2.00 | 13 | 13.50 | 1.0 |
| | Total | 26 | | |
| EQLooking after myself | 1.00 | 13 | 13.50 | |
| | 2.00 | 13 | 13.50 | 1.0 |
| | Total | 26 | | |
| EQDoing usual activities | 1.00 | 13 | 12.50 | |
| | 2.00 | 13 | 14.50 | .286 |
| | Total | 26 | | |
| EQHaving Pain or discomfort | 1.00 | 13 | 14.19 | |
| | 2.00 | 13 | 12.81 | .601 |
| | Total | 26 | | |
| EQFeeling worried, sad, orunhappy | 1.00 | 13 | 12.77 | |
| | 2.00 | 13 | 14.23 | .579 |
| | Total | 26 | | |
| EQ VAS | 1.00 | 13 | 11.00 | |
| | 2.00 | 13 | 16.00 | .094 |
| | Total | 26 | | |

Figure 2 presents a scatterplot of the VAS scores with the children along the x-axis and the parents along the y-axis. There was agreement in the overall VAS scores by two child-parent pairs. Eight parents reported better health scores for their children than did their children, and the difference ranged from two to 40 points. Two children reported higher health scores than their parents, the difference in scores ranged from four to 12 points.

**Figure 2. EQ-5D-CY Parent Child VAS Scores**




The TACQoL-CD

All of the TACQoL-CD questionnaires were completed in full by all 13 parent-child pairs. The developersof the questionnaire (Kolsteren et al., 2001) did not provide scoring for the TACQoL-CD in their article, but indicated. In email communication with one of the authors/developers, it was scored as a five point Likert scale. For each question, the lowest possible score (lowest QoL )is 0,indicating that the child “always” has a problem. The scores increase in increments of 25 where 25 represents “frequently,” 50 represents “sometimes,” 75 represents “rarely,” and 100 is the highest score (highest QoL), indicating that the child “never” has a problem. A total score of 0–20 is

considered very bad, 21–40 is bad, 41–60 is neutral, 61–80 is good, and 81–100 is very good (van Doorn et al., 2008).

The means of the sum of the ranked scores are summarized in Table 5. While there are no statistically significant differences between parent and child mean ranks, there were differences between the child and parent responses that may be clinically relevant in four of the six questions. The parent mean ranks were higher for the following five questions (problems with diet, dislike your diet food, problems not eating gluten containing candy, problems with other children being allowed to eat anything and child is not and, problems missing sweet things everyone else is eating) and the sum scores, while the child mean rank was higher on only one question, “problems always having to eat something different.”

**Table 5. Parent/Child TACQoL-CD**

| | Child (1) Parent (2) | N | Mean Rank | Sig. |
|---|---|---|---|---|
| TACQOL Problems with your diet | 1.00 | 13 | 12.65 | |
| | 2.00 | 13 | 14.35 | .551 |
| | Total | 26 | | |
| TACQOL Dislike your diet food | 1.00 | 13 | 12.73 | |
| | 2.00 | 13 | 14.27 | .577 |
| | Total | 26 | | |
| TACQOL Problems because of notbeign allowed to eat gluten containing candy | 1.00 | 13 | 12.42 | |
| | 2.00 | 13 | 14.58 | .455 |
| | Total | 26 | | |
| TACQOL Problems because other children were allowed to eat anything and you were not | 1.00 | 13 | 13.31 | |
| | 2.00 | 13 | 13.69 | .892 |
| | Total | 26 | | |
| TACQOL Problems because you always have to eat something different | 1.00 | 13 | 14.77 | |
| | 2.00 | 13 | 12.23 | .371 |
| | Total | 26 | | |
| TACQOL Problems with missing the sweet things everyone is eating | 1.00 | 13 | 13.15 | |
| | 2.00 | 13 | 13.85 | .807 |
| | Total | 26 | | |
| TACQoLSum Scores | 1.00 | 13 | 13.08 | |
| | 2.00 | 13 | 13.92 | .776 |
| | Total | 26 | | |

Figures 3–9 are scatterplots presentingthe TACQoL-CD responses of the child-parent pairs. The child scores are along the x-axis and the parent scores are along the y-axis. The first question on the TACQoL-CD asks the child and parent pairs if the child has had problems with their diet during the last few weeks. Figure 3 presents the scatterplot showing there is agreement in scores by 6 child-parent pairs:“sometimes” (2 pairs),“rarely” (2 pairs),and “never” (2 pairs).Five parents reported that their child had fewer problems

with the diet than the child reported. Two children reported having fewer problems with their diet than their parent pair indicated.

**Figure 3. Parent/Child TACQoL-CD Problems with Diet**

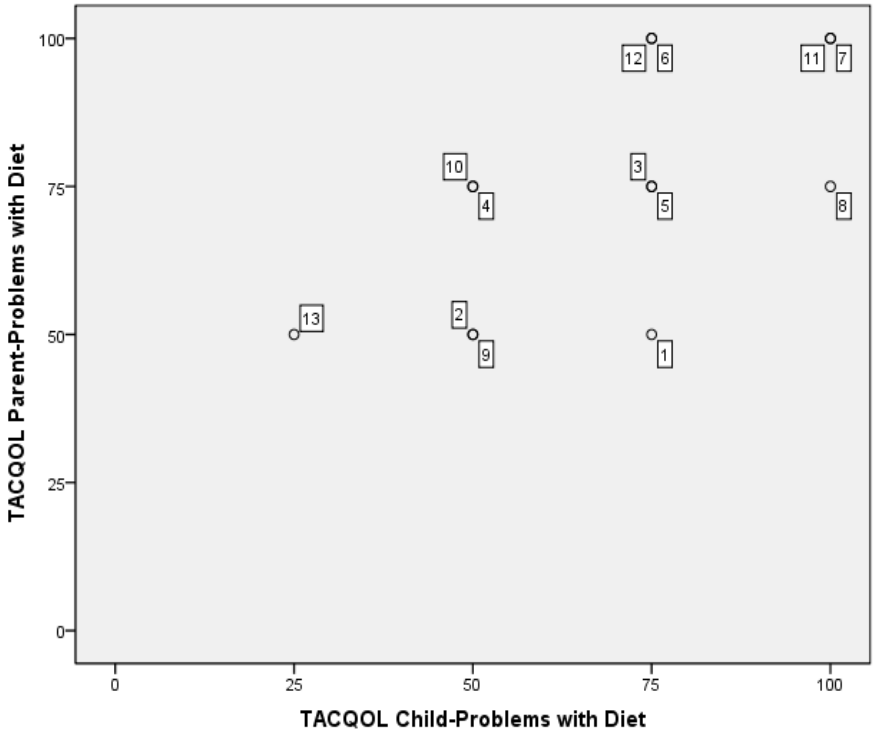



Figure 4 presents a scatterplot for the second question: “during the last few weeks, did you (your child) dislike your (their) diet food?” There was agreement between8 out of 13 child-parent pairs; 4 pairs reported the child “sometimes” disliked the food, 3 pairs reported the child “rarely” disliked the food, and 1 pair reportedthe child “never” disliked the diet food. Three parents reported that their child had fewer problems with their diet food than their child pair self-reported. That is, the parents reported the child “rarely” had problems, while the children self-reported they “sometimes” disliked their diet food. Two children self-reported having fewer problems than their parents reported pair. One child self-reported “never” disliking the

diet food while the parent reported the child “rarely” disliked his diet food. One child self-reported “sometimes” disliking the food, while the parent pair reported the child “frequently” disliked the diet food.

**Figure 4. Parent/Child TACQoL Dislike Diet Food**

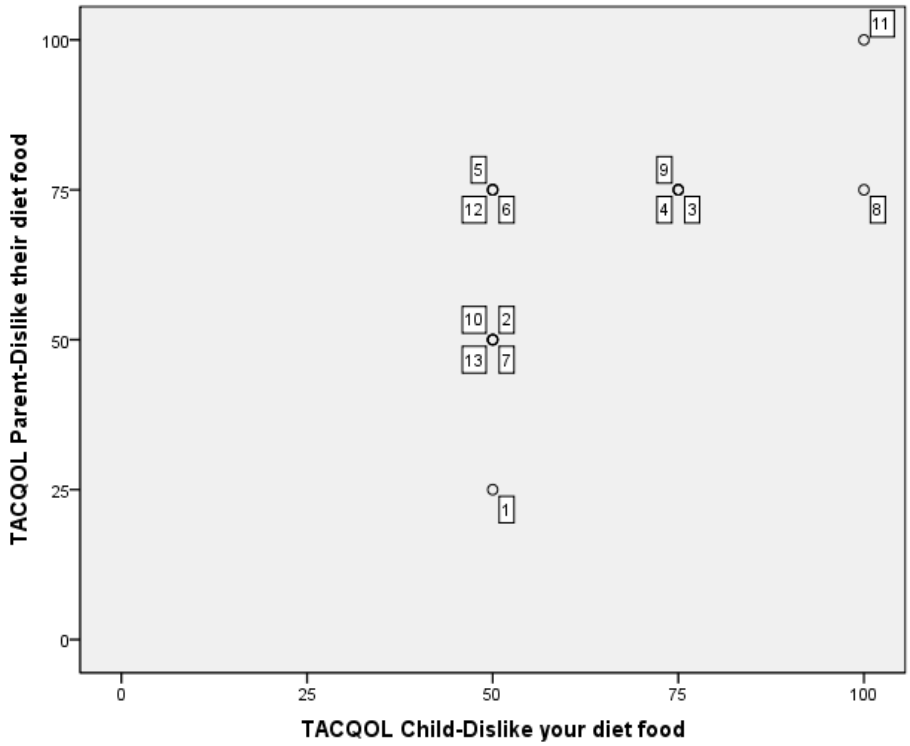



Figure 5 is a scatterplot representing the responses of the child and parent pairs to the third question: “during the last few weeks, did you (your child) have problems because of not being allowed to eat gluten-containing candy?” There was agreement between only 3 of the 13 child-parent pairs.Possible responses were “sometimes,” “rarely,” and “never.” Eight of the parents reported their child had fewer problems than the child pair self-reported. The remaining two children self-reported fewer problems than their parents pair reported.

**Figure 5. Parent/Child TACQoL-CD Not Being Allowed to Eat Gluten-Containing Candies**

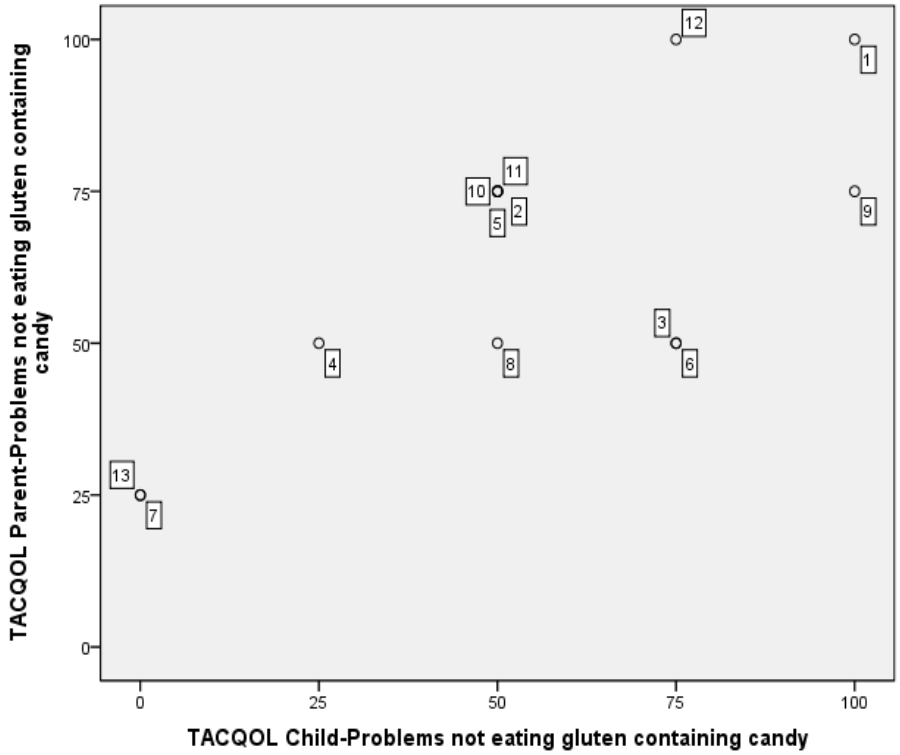



Figure 6 presents a scatterplot of the responses to the fourth question: “during the last few weeks, did you have problems because other children were allowed to eat anything and you (your child) were (was) not?” There was agreement in 6 of the 13 pairs, 1 pair reported that the child always had problems, 3 pairs reported the child “sometimes” had problems, and 2 pairs reported the child “rarely” had problems. Four parents reported their child had fewer problems than the child self-reported. One parent reported the child had problems “frequently” while the child reported “always” having a problem. Three children self-reported having fewer problems than their parents reported pair. Two of the children self- reported

"never" having a problem, while their parent pairs reported they "sometimes" and "frequently" had problems.

**Figure 6. Parent/Child TACQoL-CD Other Children Were Allowed to Eat Anything and You Were Not**

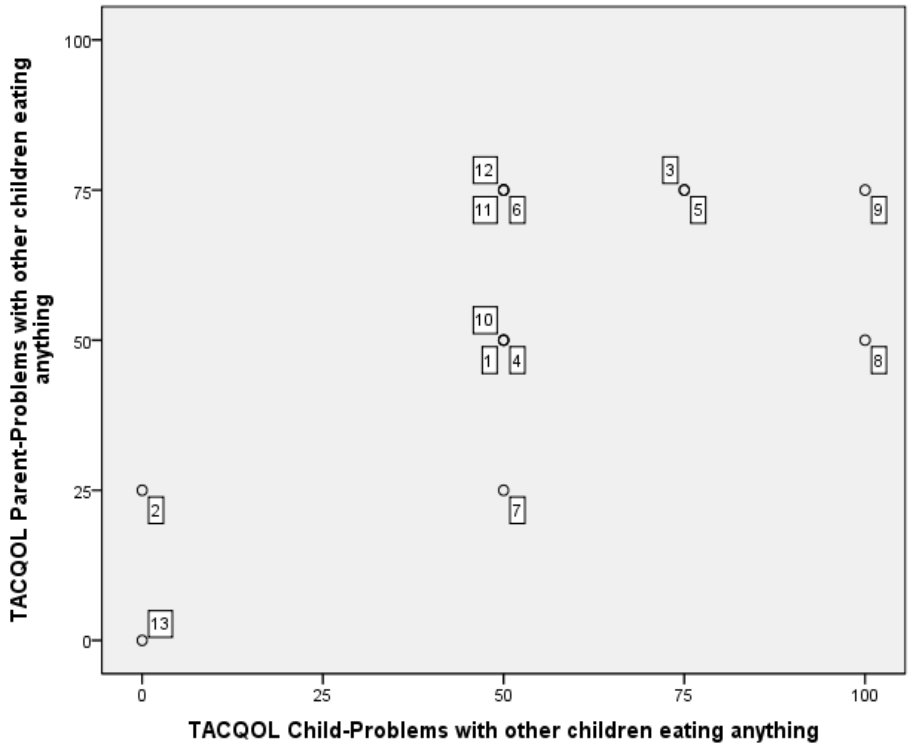



Figure 7 presents a scatterplot of the responses to the fifth question: "during the last few weeks, did you have problems because you always have to eat something different?" There was agreement in 5 of the 13 child-parent pairs. Three pairs agreed that "sometimes" they have problems and two pairs agreed that the child "rarely" has problems. Three parents reported their child pair had fewer problems than the child self-reported. One child self-reported "never" having a problem, while the parent pair reported the child "always" had a problem.

**Figure 7. Parent/Child TACQoL-CD Always have to Eat Something Different**

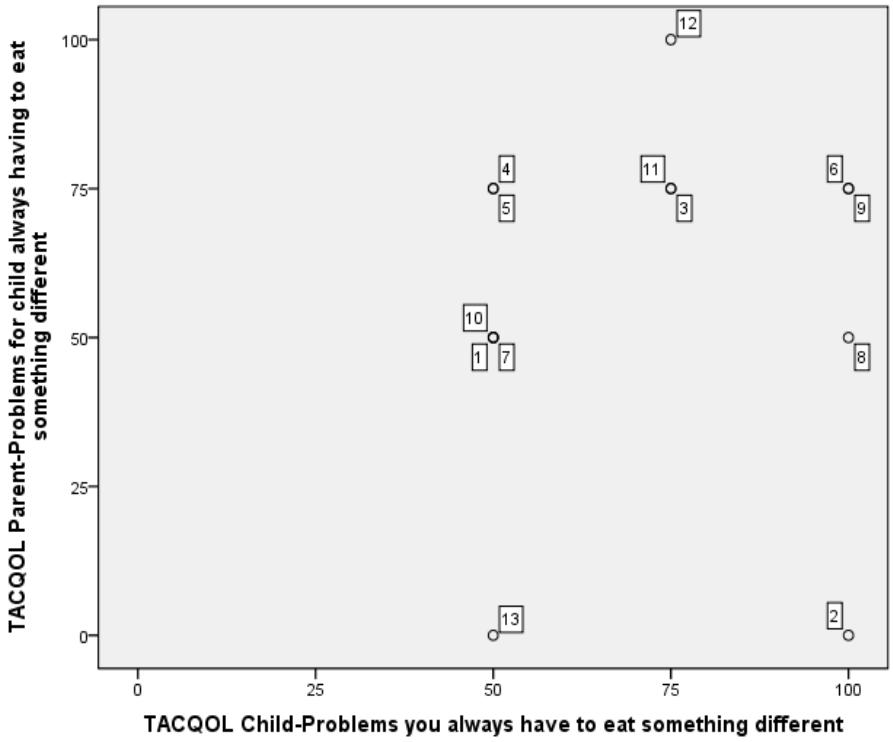
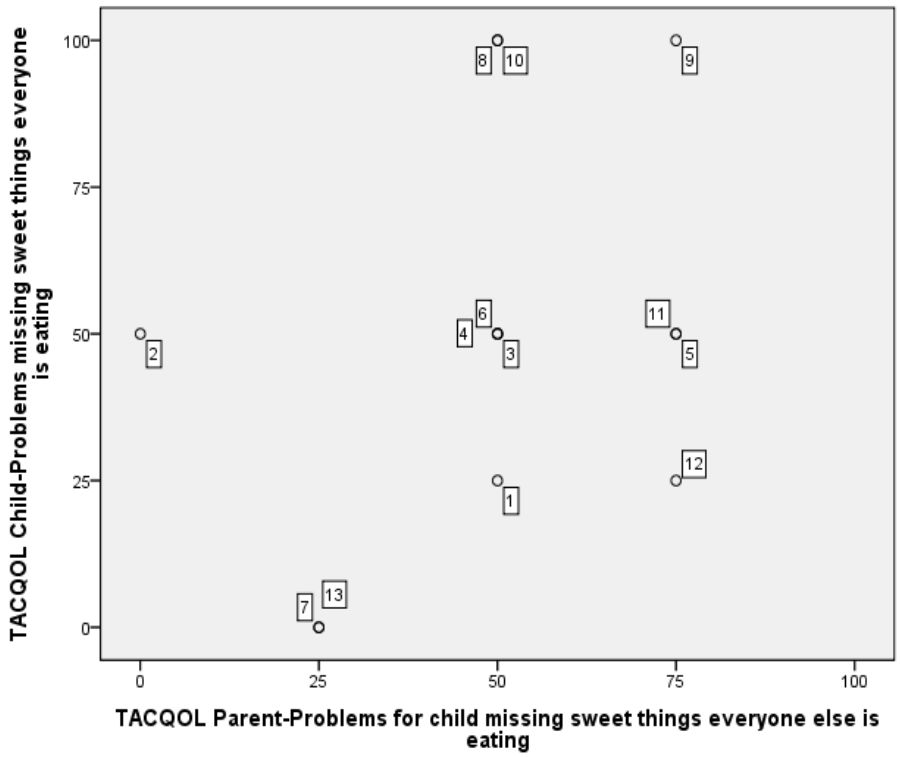


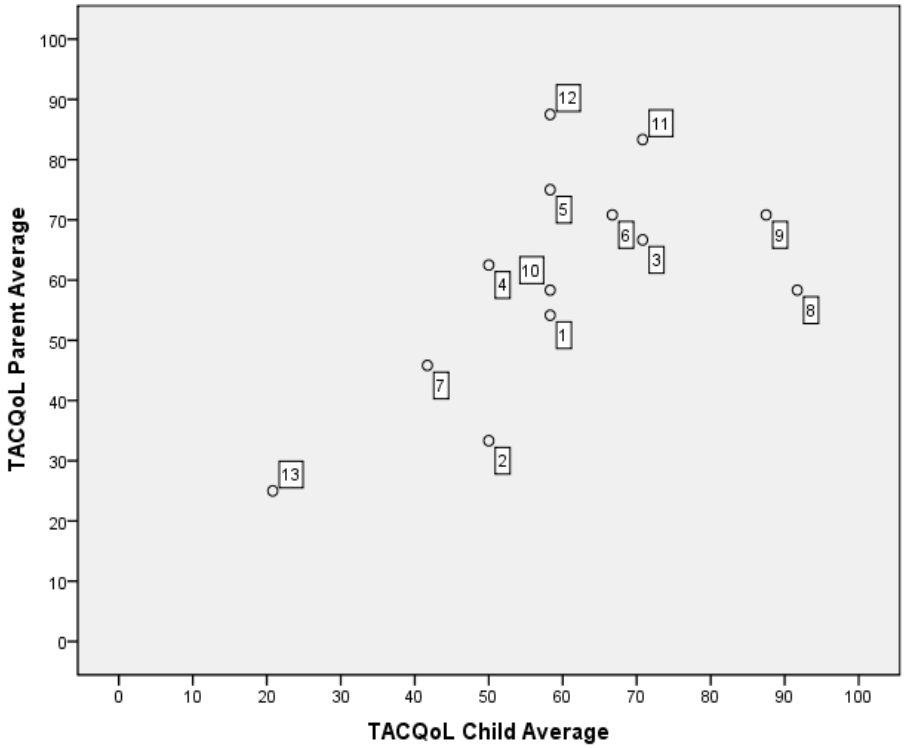

Figure 8presents a scatterplot of the responses to the last question on the TACQoL-CD: “during the last few weeks, did you have problems missing the sweet things everyone is eating?” There was agreement between 3 of the child-parent pairs: all responded that “sometimes” the child had problems missing sweets. Interestingly, 6 children self-reported having fewer problems with missing sweets than their parent pair. The remaining 4 parents reported their children had fewer problems than their children self-reported. One parent reported the child “sometimes” had problems missing sweet things while the child reported “always” missing sweet things.

**Figure 8. Parent/Child TACQoL-CD Missing the Sweet Things Everyone is Eating**




The final scatterplot (Figure 9) presents the average total scores for the parent and child pair sums. The parent-child pairs had very similar mean scores. The mean score for the children was 60.25, where 100 is the best QoL and zero is the worst QoL. Scores ranged from 21 to 92 (median 58.3, mode 58). The mean score for the parents was 60.9; their average scores ranged from 25 to 88 (median 62.5, mode 58). There was agreement in1 parent-child pair, who's scores were slightly above average (58 out of 100). Seven parents scored their child's QoL higher than the child self-reported, their paired scores differed by 2 to 30 points. The remaining 5 children reported higher scores than their parent pair, their paired scores differed by 4 to 34 points.

**Figure 9. Parent/Child TACQoL-CD Sum Scores**




Field Notes

Three questions were asked of 12 of the 13 families who agreed to participate in the study. The only child-parent pair who were not asked, had completed the questionnaires when the research nurse was unable to be present. I did not explore further questions beyond the three questions that were asked. Two open-ended questions and one closed-ended question were asked. Interestingly, the parent primarily answered the questions, while occasionally one of the children responded as well.

The first question was, “How long has your child had symptoms of celiac disease?” One family reported having symptoms for “three years, though she had a biopsy last year and it said no celiac disease.” The mom of the newly diagnosed child reported her son had “no symptoms previously but

was referred for growth concerns and was diagnosed, he never had tummy pain." One mom answered, "probably close to six months then he lost 17 pounds in three months." Another mom replied, "about a year, growing was a problem, then the tummy pain and diarrhea started." Other responses included, "…she hadn't been growing, then she had some abdominal pain and then she got a rash that wasn't getting better" and "…four or six months of having pain weekly then the doctor did the bloodwork about three months before the scope." The remaining families recalled the onset of symptoms ranged from six months to one year before the child was diagnosed, but did not expand on their answer.

The second question was, "Can you share any thoughts on the questionnaires?" Some of the families asked for further clarification of the question. I then asked if they thought they were easy to understand, if the questions had any problems filling them in, if they ask enough about the diet. All 12 children and families reported the questions were "easy" to complete and "easy" to understand, one child thought the TACQoL-CD wording was a "bit confusing." The parent of the newly diagnosed child said "…we haven't really tried the food, we just found out last week"; they were in the clinic for their celiac teaching with the dietician. All of the children and parents who were completing the TACQoL-CD at their follow up appointment reported that it was a good questionnaire, specifically about their diet. "…it asks a lot about how we are doing with the diet"; other shared responses were "short," "easy." One of the children noted, "it doesn't ask what we like." The EQ-5D-CY was also "easy" to complete, and the youngest child, 5y, 11mos, did not

have problems completing it. Four of the parents asked why there was a question about “mobility.” Seven of the child-parent pairs specifically mentioned liking the VAS; one mom said, “you don’t often think about your health that way.”

The last question was closed-ended: “Do you feel the questions captured how celiac disease has affected their (your) quality of life?” As it is a closed-ended question, it was possible to group the responses. The 5 grouped responses were “yes” (8 responses), “I think so” (8 responses), “I guess” (3 responses), and “not really” (2 responses). One of the adolescent’s parents said “no” and went on to explain that the questionnaires do not ask about how the child deals with “friends, school, and social things.”

# Chapter Five

## Discussion of Findings

A prospective cohort observational study was done at the Stollery Children's Hospital in the pediatric celiac disease population, with parent proxy reports. Two quality of life questionnaires were used: EQ-5D-CY, a generic quality of life instrument and TACQoL-CD, a celiac disease and gluten-free diet specific quality of life questionnaire. Thirteen children aged 5 years 11 months to 15 years had undergone intestinal biopsy for the diagnosis of celiac disease within the last three weeks to 11 months and agreed to participate in the study. Data were collected over a five month period at the Stollery Children's Hospital. Data analysis was conducted using descriptive statistics for all patient demographics, clinical characteristics, and responses to each of the questionnaires. Independent sample t-tests were initially used to compare the mean scores of the child and parent pair responses for the EQ-5D-CY and for the TACQoL-CD. A Kruskal-Wallis statistical analysis was then used to analyze the difference between the means of the sum of the ranked scores of the parent and child pair responses for the EQ-5D-CY and for the TACQoL-CD.

## Patient Sample

Thirteen children, each with one parent, took part in the study. The children's ages ranged from 5 years 11 months to 16 years (at the time of recruitment). This sample population was typical of the overall CD patient demographic. Nine of the children (69%) were referred to the gastroenterologist for gastrointestinal symptoms, while three (23%) of the

children had growth concerns and the remaining child had been screened for CD as a result of persistent rash. Three of the children had more than one typical symptom of CD, including a child with a goiter. Symptoms experienced by the children included abdominal pain, bloating, diarrhea, constipation, nausea, vomiting, fatigue, iron deficiency, irritability, and joint pain. These are all well described symptoms of CD. Diagnosis in this age group is very normal and the symptoms that were experienced by the children prior to diagnosis are typical symptoms experienced by the CD population prior to being diagnosed.

It is estimated that the prevalence among first-degree relatives ranges from 3 to 10% (Catassi & Fasano, 2008); interestingly, this study revealed nearly 50% (48.7%) of the children had a mother or sibling diagnosed with CD. This number may be higher than the reported prevalence as a result of the low number of patients enrolled in the study. Of note, four of the parent responders were mothers with CD. Their participation in the study may be influenced by their own QoL concerns, which creates a potential source bias in the study. Of note, none of the children were screened as a result of the family member's diagnosis; they were all screened as a result of their symptoms.

The secondary aim was to determine if there was a difference in the health related quality of life between symptomatic and asymptomatic pediatric celiac disease patients. Due to the low number of subjects enrolled, none of the 13 children were asymptomatic, so this was not accomplished.

## Missing Data

There were a number of variables missing responses from the demographics and clinical characteristics document. This form is completed on the day of the gastroscopy by the gastroenterologist who will be doing the scope. This form is designed to collect consistent demographic information and medical history on all of the children undergoing gastroscopy for the purpose of CD diagnosis. The number of missing responses in this small sample ranged from four (30%) to nine (70%). Variables missing a large percentage of data included the child's age when gluten was introduced (which had the most missing responses), the diet history—whether the child was breastfed and had food allergies, period of gestation, and colic in infancy. It is difficult to interpret why the information was missing. It is not clear if the responses remained blank because of a negative answer or if the physician who posed the question elected to bypass the question. It would be beneficial to review the form in order to determine if these variables are essential, as they are not being completed on a routine basis at the present time. Additionally, it would be reasonable to review the forms with all of the pediatric gastroenterologists at the Stollery Children's Hospital with the goal of increasing completion.

## Quality of Life

Both of the questionnaires were completed by the 13 child and their parent (12 mothers, 1 father) pairs. There is great value in having a parent proxy; in this study, the parent was not the surrogate reporter but rather a complementary reporter. This allowed greater exploration of QoL,

particularly as there were differences noted between child and parent responses. The child and parent relationship may influence how the parent responds. There are a number of parent variables which may influence agreement between the child and parent reports. These variables include parent health, education, culture, ethnicity, socioeconomic status, and physical and psychological wellbeing (Sherifali & Pinelli, 2007). Considering that 4 of the 13 parent respondents were mothers with CD, their own burden of illness compounded with the child's diagnosis likely influenced their responses. Parents may also be influenced by their hopes and expectations for the child, external life stresses, and their own mental well-being (Gerharz et al., 2003).

## EQ-5D-CY

The EQ-5D is an instrument created to assess QoL in an adult population. It has been adapted for use in the pediatric population (EQ-5D-CY). The EQ-5D-CY is still undergoing validation in children older than 8 years of age. The questions are answered based on the child's health "today." As the population sample was small (13 children), all children were asked to complete the questionnaire and the VAS and did so without reported difficulty or missed responses. Currently, norms and weighting are not available for the EQ-5D-CY, so an alternate method of analysis was required. Independent sample t-tests were initially used to compare the mean scores of child and parent responses in the EQ-5D-CY to determine if any differences were statistically significant. A Kruskal-Wallis statistical test was then used to analyze the difference between the mean ranks of parent and child

responses in the EQ-5D-CY. Additionally, a scatterplot was done to assess the correlation between parent and child pair responses for the values of the parent and child pair EQ VAS.

Though none of the differences between child and parent pairs were statistically significant, there were differences observed between the two groups that may be clinically relevant. Overall, parents reported a better quality of life for their child than the child self-reported; the mean VAS score reported by the parents was 86/100 while the mean score of the children was almost 10 points lower 77/100. Conversely, in the five dimensions, (mobility;, looking after self, doing usual activities;, having pain and discomfort; and feeling of worried, sad, or unhappy) the parents reported their child pair had more problems “doing usual activities” and had more “worried, sad, or unhappy” feelings than their child self-reported; the children ranked having “pain or discomfort” higher than their parent pair. Though there were no reports of concern or difficulty in completing the questionnaire for the four children under age 8, it is possible that misinterpretation or misunderstanding may have contributed to the discrepancy between the VAS and the questions. Children reported more “pain and discomfort” than their parents; perhaps the children were not sharing some of the pain and discomfort with their parents pair. The parent could also underestimate the extent and degree of pain experienced by the child or be influenced by one of the previously discussed variables affecting parent proxy reports. The value of parent-proxy in this study is that it complements the responses of the child, as both child and parent complete

the questionnaire. Child and parent pair responses may be best explored using a qualitative approach in order to understand the differences being reported.

The EQ-5D-CY may not be the ideal generic QoL instrument to use at this time as it is still being validated in the pediatric population, and unlike the universally used adult EQ-5D, it does not have published weights. Furthermore the EQ-5D weights were developed through large culturally based studies; that is, there are European weights and North American weights. It is not yet possible to account for cultural differences in the childhood population using theEQ-5D-CYbeing studied therefore while the VAS scale of the EQ-5D-CY may be useful, the questions are not suitable for this pediatric population. It is uncertain how the analysis may have changed if the weights were available to analyze the responses.

### TACQoL-CD

The TACQoL-CD is a CD and GFD specific questionnaire. This questionnaire requires the child and parent to recall their experiences over the last few weeks when answering the questions. Responses to the individual questions varied between children and parents, however, none of the differences between child and parent responses were statistically significant. Average scores ranged from 20/100 to 96/100; interestingly, both score extremes were reported by children, one had been diagnosed for five months while the other had been diagnosed for 11 months. The mean of the average scores for the children and the parents was 60. Overall, children and their parents report neutral to good feelings about the child's QoL and the

GFD. There was not a clear relation between length of time from diagnosis and QoL score in this sample of patients. It would be valuable to capture the QoL at the time of diagnosis for future evaluation at 6 months, 12 months, and 24 months. The structure of theTACQoL-CD questions are negative, asking about problems as opposed to asking about positive or neutral things. It is possible that negative questions may influence the responses to be more neutral to negative which may explain the lower QoL score obtained on the TACQoL-CD than on the EQ-5D-CY.

Similar to the results of the EQ-5D-CY, differences existed between the child-parent pairs whereby parents ranked more (5/6) problems higher than the children. This could be explained by the adjustments the parent has had to make; worry about the diagnosis and problems with shopping for and preparing the GFD would be expected to cause parental stress. The parent may expect that the child is having problems with the restrictions of the diet or that the child dislikes the diet food, because that is how the parent would feel having to maintain a GFD. A qualitative approach might determine the effect of parental bias or influence on the results.

The small sample size makes it difficult to generalize the research results. Since the GFD did not have an overall negative impact on the children, it is possible that after a period of adjustment the diet is not as difficult as it is perceived. An alternative explanation is that the subjects have had exposure to and pre-existing knowledge of CD and the GFD, as nearly half of the children live with a family member that has CD. Finally the retrospective nature of the questionnaire may have affected the overall

responses as it may have been difficult for respondents to recall events or feelings.

There were five child and parent pairs whose scores stood out when compared with the length of time from CD diagnosis. The newly diagnosed child and parent average scores were 50/100 and 33/100 respectively. It is not a surprise that they averaged low scores as the child had just been diagnosed with a chronic disease. This child will be very interesting to re-evaluate six months after diagnosis to observe the change in QoL over time. One parent and child pair had exact agreement on average scores of 58/100, indicating neutral feelings regarding QoL; the child in this pair was diagnosed with CD four months ago. Another child and parent pair had comparably average scores (58 and 54, respectively) nine months after CD diagnosis. This child reported "rarely" having problems with the diet. For the child diagnosed with CD 11 months ago, there was great discrepancy in average scores between child and parent. The child reported never having problems, with the exception of missing gluten-containing candies and missing sweet things. His score was 96/100 while the parent scored only 58/100. This child reported he had a very good QoL while his mother reported that she felt his QoL was neutral (neither good nor bad). Both Zarkadas et al. (2006) and Wagner et al. (2008) determined that early diagnosis of CD (before age six) leads to higher Qol. This child fits the criteria of early diagnosis as he was five years of age at the time of diagnosis.

In the most fascinating child and parent pair, the mother also has CD. The child was diagnosed five months prior to enrolment in this study and the

child reported that his QoL was “very bad” while the parent reported that the child’s QoL was “bad.” The 13 year old boy and his mother reported that the boy is experiencing problems in all of the domains, but mainly in these three: “problems because other children were allowed to eat anything and you are not”, “problems because of having to eat something different” and “problems with missing the sweet things everyone is eating.” Negative responses to these questions have significant social implications, particularly for a teenage child. School and social environments are where teenage children spend most of their time. Errichiello et al. (2010) report that the child’s degree of school integration has the greatest ($p<.001$) impact on compliance with the gluten free diet. They found that family integration does not affect compliance, though children with excellent school integration (regardless of educational achievements) adhere to their GFD better than those with “bad or insufficient” school integration. A good social relationship is significantly related to dietary compliance. In 2008, Wagner et al. assessed the influence of compliance on QoL in adolescents and reported that strict compliance to the GFD will result in a better physical, psychological, and social QoL. It would be interesting to assess this child’s GFD compliance at school and in other social environments, and to find out how the parent is managing her CD.

## Nursing Implications

This pilot study adds to the existing body of QoL evidence in pediatric CD. Despite the small sample size, the knowledge gained in the study has implications for direction of care for the children with CD and their families.

Having identified areas of concern for the child, the nursing practitioner (NP) can work with the CD team to improve the holistic care of the child and family. Understanding how discrepancies in child and parent perspectives can arise, offers the opportunity for the NP to discuss strategies to manage their concerns and work toward improving their QoL. New knowledge opens the door to further discussion and exploration of issues not directly related to CD that affect the QoL of CD patients and their families.

Knowledge dissemination is of utmost importance for the understanding and appreciation of pediatricQoL, and more specifically for pediatric CD QoL. It is the intention that the results of this study will appear in publication and conference presentations to the Canadian Celiac Association, the Canadian Society of Gastroenterology Nurses Association, as well as within Alberta Health Services, including the annual Nursing Research Day. The results will also be used to evaluate the current education received at the time of diagnosis, and provide insight to the burden of illness on pediatric patients, their parents, and families. The findings will also be used to educate the public and the government, on CD and its impact. Through education and awareness, it is hoped that the social impact of the disease will be improved, new funding and resources will be made available, and an alternate treatment will be discovered.

## Limitations of the Study

This study reported on a small sample size: 13 children who had been diagnosed with CD and 13 proxy parents. As a result of the low enrolment, it is difficult to generalize the findings. Although the sample was small, the

study was able to pilot not only the feasibility of using these employed QOL questionnaires in the CD population. Another limitation was the lack of consistency of patient data collected in the demographic and clinical characteristics collected by the gastroenterologist performing the diagnostic scope.There was a lack of consistency in the completion of the demographic and clinical characteristics form. It is anticipated that the report back to the CD clinic will serve to ensure complete data collection in the future.

## Conclusion

There is a paucity of literature on QoL in pediatric CD. This study did not fulfill the initial goals—to evaluate the impact of celiac disease on the pediatric patient's quality of life at the time of diagnosis, and to determine if there is a difference in the health related quality of life between symptomatic and asymptomatic pediatric CD patients.However, it remains a valuable study asthe findings will guide an improved study design in the future. A more comprehensive study of QoLwill include social impact and compliance. If feasible, the addition of a qualitative interview would lead to a better understanding of the complexities of the diagnosis and to explore in depth what is specifically affecting the child's QoL and what may be influencing the parent's report of the child's QoL. Many things were learned, both in process and in design.

The findings in this pilot study suggest that assessment ofQoL in children with CD within six months, 12 months, and two years after diagnosis is probably more feasible than assessment directly after diagnosis. The longer

time frame will allow the patient and family time to learn about the disease and adjust to the gluten-free diet that is the only current treatment.

Though all of the children and parents were able to complete the generic and disease/diet specific questionnaires, prior to moving forward with a large study it would be valuable to re-examine the questionnaires used and compare to others that are available and readily used in the pediatric population, such as the PedsQL which is used in many pediatricQoL studies. The PedsQL is multidimensional, it has 23 items measuring physical functioning, emotional functioning, and social and school functioning (Varni, 1998). The PedsQL would make it possible to compareQoL across diseases, both within GI diseases and across other chronic illnesses. Members of the group that created the TACQoL-CD have since created an additional pediatric questionnaire which they report is superior to the TACQoL-CD for followup assessment. The CDDUX (van Doorn et al., 2008) is comprised of 12 questions regarding “communication,” how children talk about their disease, “having CD,” what it means to children, and “diet,” how the gluten-free diet impacts children’sQoL.

My results show that children adjust to the celiac diet within a relatively short time (mean 6 months), and their overall QoL is neutral to good (60–77), depending on overall or disease specific effects. This difference may be the result of the different focus on information between the generic (EQ-5D-CY) and the disease/diet specific (TACQoL-CD)questionnaires. It is imperative to follow these children over a longer period of time in order to get a better appreciation for the impact of CD on a child’s quality of life.

## Future Research

A larger sample size is necessary to understand how symptoms impact QoL, and to determine the QoL of symptomatic and asymptomatic pediatric CD patients. A qualitative interview could be added to explore the factors that affect a pediatric CD patient's QoL and find out what influences the parent's report of the child's QoL. It would be valuable to begin enrolling the child at the time of diagnosis and then follow up at 6, 12, and 24 months following diagnosis. This would determine the effects of CD and the GFD over a longer duration and determine the change in QoL as the child and family experience CD and the GFD. New questions that have come from this pilot study are (1) how does living with a family member with CD impact QoL reports by the child and the parent? (2) What is the social impact on QoL in pediatric CD patients?

Although valuable experience was obtained in the subject recruitment process, acquiring subjects proved to be far more difficult than initially anticipated. The stress the families were experiencing at the time prevented them from agreeing to participate in the study when they were approached. A future attempt might include mailing the questionnaires with stamped return envelopes, or conducting telephone interviews.

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# Appendix A

Study number _____

## Demographics & Clinical Characteristics

Date: _____ Age: _____

Assessment completed by: _____ (print name & sign)

Referring Doctor: _____Date of referral: _____

**Presenting Symptoms:** None

Gastrointestinal

Growth concerns

Dermatitis herpetiformis

Other specify _____

| **Current Symptoms**: | Normal | Reduced | Poor | Very Poor | Terrible |
|---|---|---|---|---|---|
| Wellness | 0 | 1 | 2 | 3 | 4 |
| Activity | 0 | 1 | 2 | 3 | 4 |
| Appetite | 0 | 1 | 2 | 3 | 4 |

| **Gastrointestinal Symptoms:** | None | Mild/ Infrequent | Moderate/ Weekly | Severe/ Daily |
|---|---|---|---|---|
| Abdominal Pain | 0 | 1 | 2 | 3 |
| Bloating/Gas | 0 | 1 | 2 | 3 |
| Diarrhea | 0 | 1 | 2 | 3 |
| Constipation | 0 | 1 | 2 | 3 |

#Stools: _____ Nocturnal diarrhea: Yes No

Nausea: Yes No Vomiting: Yes No

Weight Loss: Yes No Amount: _____

Other growth concerns: _____

Fatigue: Yes No Iron Deficiency: Yes No Not checked

Irritability: Yes No

Joint Pain: Yes No Which: _____

Above symptoms are triggered by gluten exposure: Yes No

Above symptoms are improved by gluten withdrawal: Yes No

Other details:

_____

_____
____

**Screening**: Family History Diabetes Down Syndrome Other _____

Family Members Affected:
_____

Biopsy proven: Yes No Comment: _____

Other autoimmune family history: Type 1 Diabetes Hypothyroidism RA
Other:
_____

Patient screening Blood work: Date_____
ATTG_____

EMA_____

IgA_____
_____

**Ethnicity: Child** _____**Mother**_____**Father** _____

**Place of Birth: Child** _____ **Mother** _____ **Father**
_____

**Dietary History:**

On gluten currently: Yes No

Trialed off gluten: Yes No Details: _____

Age of introduction gluten: _____

Breast fed: Yes No Duration: _____

Food allergies: Yes No Details: _____

**Past Medical History:**

Gestation at delivery

Colic during infancy: Yes No Details: _____

Other
Concerns_____
_____
____

**Medications / Vitamins**: _____ Gluten Free: Yes No
_____ Gluten Free: Yes No
_____ Gluten Free: Yes No
_____ Gluten Free: Yes No

**<u>Examination</u>:**

Height _____ _____ %ile
Weight _____ _____ %ile
BMI _____ _____ %ile

Anemia Clubbing Jaundice Oedema Muscle Wasting

Tanner Stage: Breast _____ Pubic Hair_____ Male Genitalia _____

Abdomen: Distention Tenderness Masses
_____

Cardiovascular system: Normal Abnormal Comment _____

Respiratory system: Normal Abnormal Comment
_____

Neurological system: Normal Abnormal Comment
_____

Dermatological system: Normal Abnormal Comment _____

Other:
_____

**Same day case completed**: Yes No Details if no:
_____

## EQ-5D(Child/Youth)

**Describing your health**

Under each heading, mark the ONE box that best describes your health TODAY

**Mobility (walking about)**

I have no problems walking about ❑
I have some problems walking about ❑
I have a lot of problems walking about ❑

**Looking after myself**

I have no problems washing or dressing myself ❑
I have some problems washing or dressing myself ❑
I have a lot of problems washing or dressing myself ❑

**Doing usual activities** (*e.g. going to school, hobbies, sports, playing, doing things with family or friends)*

I have no problems doing my usual activities ❑
I have some problems doing my usual activities ❑
I have a lot of problems doing my usual activities ❑

**Having pain or discomfort**

I have no pain or discomfort ❑
I have some pain or discomfort ❑
I have a lot of pain or discomfort ❑

**Feeling worried, sad or unhappy**

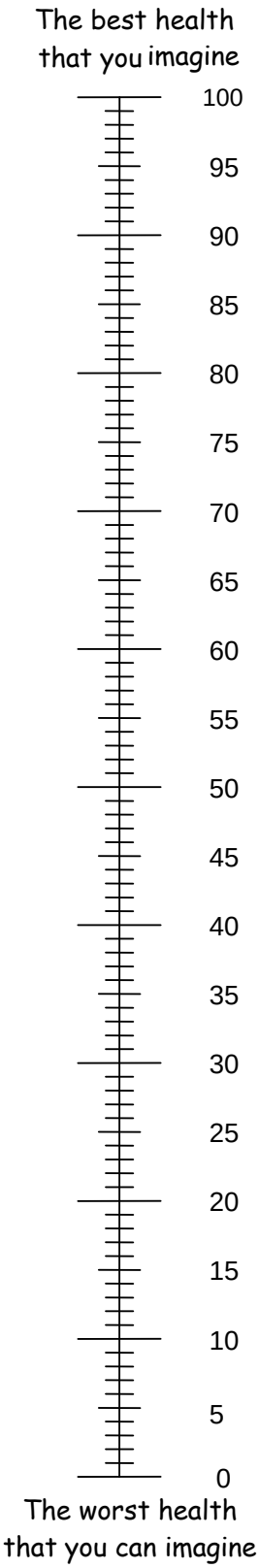
I am not worried, sad or unhappy ❑
I am a bit worried, sad or unhappy ❑
I am very worried, sad or unhappy ❑

**How good is your health TODAY**

- To help us to know how good or bad is your health TODAY, we have drawn this numbered line, like a thermometer from 0 to 100
- Consider that:

  0 represents the worst health you can imagine

  100 represents the best health you can imagine
- Please, mark the numbered line with ONE X at the point that shows how good or bad is your health TODAY



# Health Questionnaire

## Proxy Version 2b for EQ-5D(Child/Youth)

The purpose of this questionnaire is to explore how a care-giver or someone who knows the child well (proxy), thinks that the child would rate his/her own health.The proxy should answer as he or she thinks that the child would respond if he or she were able to fill in the questionnaire for him or herself

## EQ-5D(*CY*)

**Describing the child's health today**

**PLEASE ANSWER ON BEHALF OF THE CHILD:** Under each heading, mark the ONE box that you think **the child** would mark to describe his/her own health **TODAY** if **he/she** were able to do so.

**Mobility (walking about)**

He/she has no problems walking about ❑
He/she has some problems walking about ❑
He/she has a lot of problems walking about ❑

**Looking after myself**

He/she has no problems washing or dressing him/herself ❑
He/she has some problems washing or dressing him/herself ❑
He/she has a lot of problems washing or dressing him/herself ❑

**Doing usual activities** (*e.g. going to school, hobbies, sports, playing, doing things with family or friends)*

He/she has no problems doing his/her usual activities ❑
He/she has some problems doing his/her usual activities ❑
He/she has a lot of problems doing his/her usual activities ❑

**Having pain or discomfort**

He/she has no pain or discomfort ❑
He/she has some pain or discomfort ❑
He/she has a lot of pain or discomfort ❑

**Feeling worried, sad or unhappy**

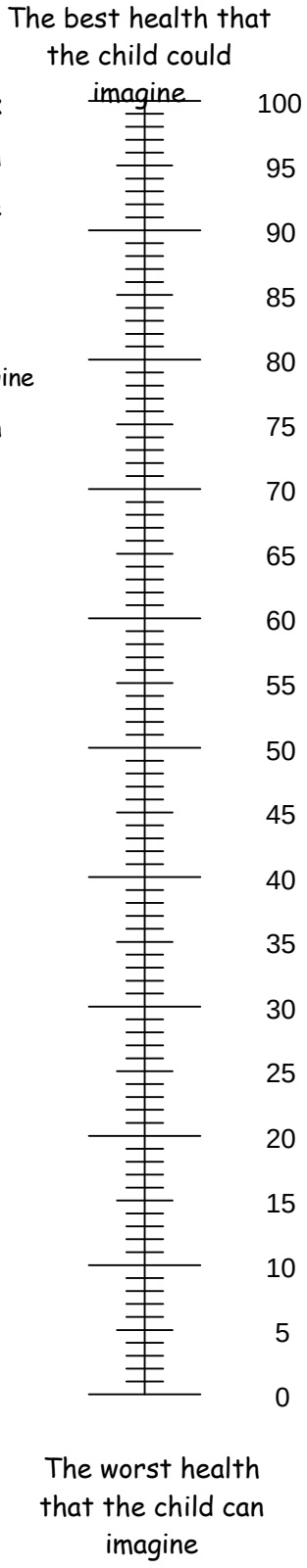
He/she is not worried, sad or unhappy ❑
He/she is a bit worried, sad or unhappy ❑
He/she is very worried, sad or unhappy ❑

## How good is the health of the child TODAY

- To help us to know how good or bad you think **the child** would rate **his/her** ownhealth **TODAY**, we have drawn this numbered line, like a thermometer from 0 to 100
- Consider that:

  0 represents the worst health **the child**can imagine

  100 represents the best health **the child** can imagine
- Please, mark the numbered line with ONE X at the point that shows how good or bad you think **the child** would rate **his/her** health **TODAY**



## TACQoL-CD

**We would like to know how the gluten free diet has affected your quality of life.**

Therefore, could you please indicate how you feel in different situations? You can do that by circling in each question one of the faces that fits your feelings best. There are no wrong answers; it's about what you think.

| | **During the last few weeks,** |
|---|---|
| 1. | Did you have problems with your diet?<br>  <br>none some lots |
| 2. | Did you dislike your diet food?<br>  <br>never sometimes always |
| 3. | Did you have problems because of not being allowed to eat gluten-containingcandies?<br>  <br>never sometimes always |
| 4. | Did you have problems because other children were allowed to eat anything and you were not?<br>  <br>never sometimes always |
| 5. | Did you have problems because you always have to eat something different?<br>  <br>never sometimes always |
| 6. | Problems with missing the sweet things everyone is eating?<br>  <br>never sometimes always |

Adapted from Kolsteren et. al. 2001

## TACQoL-CD Parent Proxy

**We would like to know how you feel the gluten free diet has affected your child's quality of life.**

Therefore, could you please indicate how you think they feel in different situations?

You can do that by circling in each question one of the faces that fits your opinion best. There are no wrong answers; it's about what you think.

| | **During the last few weeks,** |
|---|---|
| 1. | Did he/she have problems with the diet?<br>  <br>none some lots |
| 2. | Did he/she dislike the diet food?<br>  <br>never sometimes always |
| 3. | Did he/she have problems because of not being allowed to eat gluten-containing candies?<br>  <br>never sometimes always |
| 4. | Did he/she have problems because other children were allowed to eat anything and he/she was not?<br>  <br>never sometimes always |
| 5. | Did he/she have problems because of having to eat something different?<br>  <br>never sometimes always |
| 6. | Did he/she have problems with missing the sweet things everyone is eating?<br>  <br>never sometimes always |

Adapted from Kolsteren et al. (2001)

## Appendix B

## INFORMATION SHEET

Title of Research Study **A Pilot Study on the Health Related Quality of Life of Symptomatic and Asymptomatic Pediatric Patients with Celiac Disease**

Principal Investigator(s): Colleen Norris

Sub-Investigator(s): Tarah Samuel, Gwen Rempel, Dr Justine Turner

Background: Celiac disease can affect your child in different ways, not only physically, but emotionally and socially as well. We would like to know how this disease has affected your child's quality of life.

Purpose: Your child has been diagnosed with Celiac Disease by small bowel biopsy in the last 3 weeks. This disease can affect your child physically, socially and emotionally. We would like to know how you and your child is currently affected by the diagnosis of Celiac Disease.

Procedures: *Participating in this study will involve:*
Standard Care:

a) On the day of the small bowel biopsy, Dr Justine Turner will inform you of the study and provide you with this study information sheet.
b) If your child's biopsy confirms Celiac Disease, the Gastroenterology nurses will be notifying you of the diagnosis. At this time, they will arrange your first appointment in the Pediatric Celiac Disease Clinic. This will be within 3 weeks of the biopsy.
c) They will remind you of the study.

Research Procedure:

d) On the day of your appointment, Tarah Samuel will be in the clinic and will explain the study in more detail. Ask her any questions you may have regarding the study.
e) If you and your child decide to take part, a copy of 2 questionnaires will be given to you, and to your child to complete while you wait to see the doctor.
f) It is estimated to take less than 15 minutes to complete the questionnaires.
g) The demographic and clinical characteristics form completed by Dr Turner on the day of the biopsy will be extracted from your child's chart.

Possible Benefits: Neither you or your child will have a direct benefit from this study. It is hoped that by understanding how this disease affects children that education, support programs and societal understanding can be improved.

Possible Risks: There are no known risks to participating in this study.

Confidentiality: Personal health records relating to this study will be kept confidential. Any research data collected about your child during this study will not identify him/her by name, only by their initials and a coded number. Their name will not be disclosed outside the research clinic. Any report published as a result of this study will not identify him/her by name.

For this study, the study doctor may need to access your child's personal health records for health information such as past medical history and test

results. He/she may also need to contact your family physician and your other health care providers to obtain additional medical information. The health information collected as part of this study will be kept confidential unless release is required by law, and will be used only for the purpose of the research study. By signing the consent form you give permission to the study staff to access any personally identifiable health information which is under the custody of other health care professionals as deemed necessary for the conduct of the research.

In addition to the investigators(s) and the Health Research Ethics Board, may have access to your child's personal health records to monitor the research and verify the accuracy of study data.

Study data will be stored in a secure, locked cabinet in the office of Tarah Samuel for a minimum of 5 years.

Voluntary Participation: You are free to withdraw from the research study at any time, and your child's continuing medical care will not be affected in any way. If the study is not undertaken or if it is discontinued at any time, the quality of your medical care will not be affected. If any knowledge gained from this or any other study becomes available which could influence your decision to continue in the study, you will be promptly informed.

Contact Names and Telephone Numbers:
If you have concerns about your rights as a study participant, you may contact the Patient Relations Office of Alberta Health Services, at (780)342-8080 *(or "*If you have any concerns about any aspect of this study, you may contact the Covenant Health at (780) 735-7494*.")*This office has no affiliation with the study investigators*.*

*Please contact any of the individuals identified below if you have any questions or concerns:*

Colleen Norris 780-492-0644

Tarah Samuel 780-407-1558 or pager 780-445-1890

Gwen Rempel 780-492-8167

Justine Turner 780-407-3339

Thank you for your help!

**INFORMATION SHEET AND ASSENT FORM**

Title of Research Study **A Pilot Study on the Health Related Quality of Life of Symptomatic and Asymptomatic Pediatric Patients with Celiac Disease**

Principal Investigator(s): Colleen Norris
Co-Investigator(s): Tarah Samuel, Dr Justine Turner, Gwen Rempel

You have celiac disease and have to go on a special diet called a gluten free diet. This means that there are foods that you will no longer be able to eat. We would like you to answer the questions about how you are feeling and how celiac disease affects you. Twenty children with celiac disease will take part in this study.

What will you have to do? If you and your parents agree to take part, we will ask you to fill out the questionnaires when you come to your first appointment in the Pediatric Celiac Disease Clinic. While you are waiting to see the doctor, we will ask you and your parent to fill in the questionnaires, it should take less than 20 minutes to complete.

Will it help? No, answering the questions will not help your disease.

Will it hurt? No, in this study, we just ask you to answer questions, nothing else.

Can you quit? You don't have to take part in the study at all, and you can quit at any time. No one will be mad at you if you decide you don't want to do this, or if you decide to stop part way through. You should tell the doctor or nurse that you want to quit.

Who will know? No one except your parents and the doctor will know you're taking part in the study unless you want to tell them. Your name and your chart won't be seen by anyone except the doctor and nurses during the study.

Your signature: We would like you to sign this form to show that you agree to take part. Your mom or dad will be asked to sign another form agreeing for you to take part in the study.

Do you have more questions? You can ask your mom or dad about anything you don't understand. You can also talk to Dr. Turner 780-407-3339, Tarah Samuel 780-407-1558, Colleen Norris 780-492-0644 or Gwen Rempel 780-492-8167.

I agree to take part in the study.

Signature of research participant_____date:_____

Signature of witness _____date:_____

Signature of investigator _____ date:_____