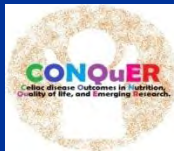




Does the gluten free diet influence quality of life and nutritional intake in children and adolescents with Celiac Disease?

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Celiac Disease and the Gluten Free Diet

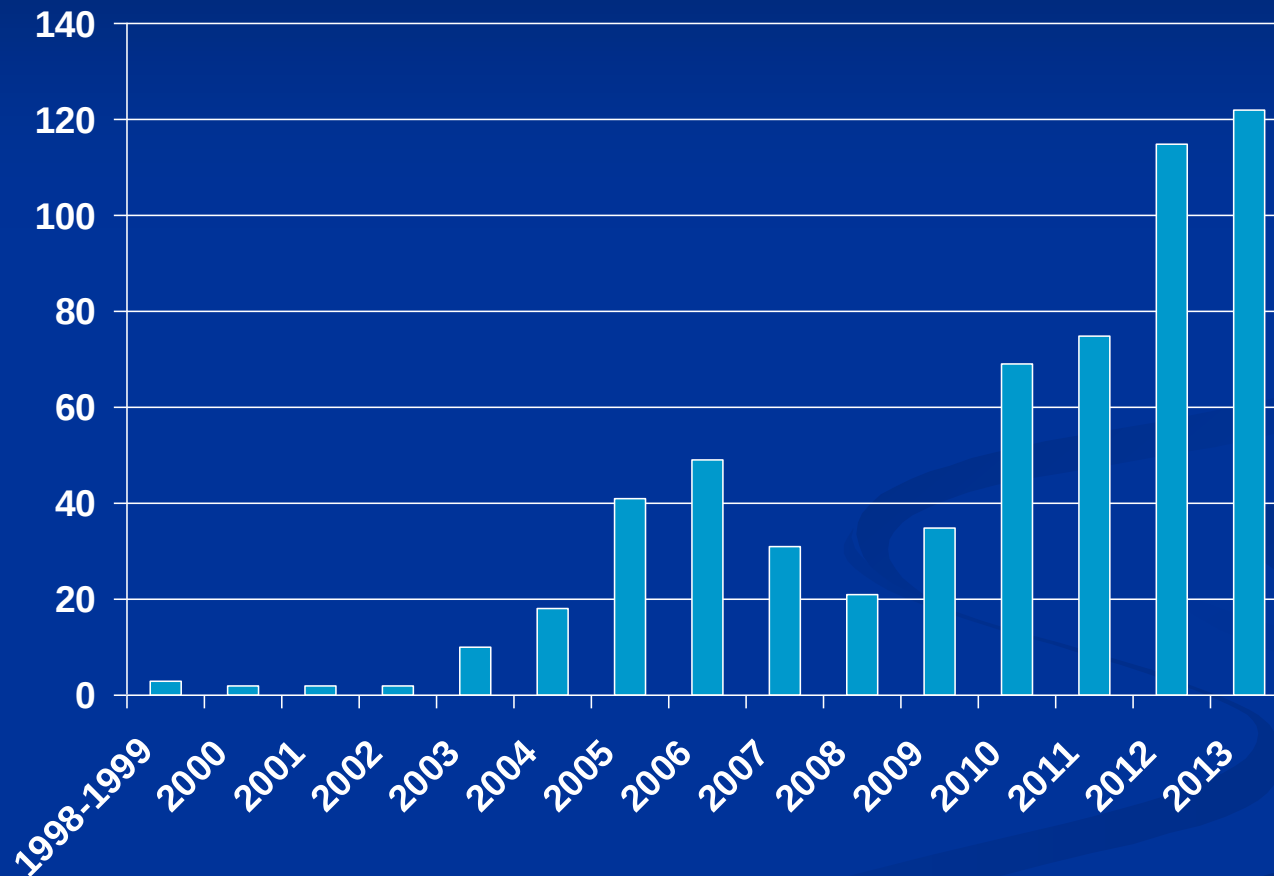
- Autoimmune Disease
- 1 in 100-200 people ; Genetic predisposition
- Inflammatory response damages absorptive mucosa
- **Malabsorption of nutrients and dietary intake:
Gluten Free Diet (GFD): Nutritional Status**
- GFD: Determinants and Factors influencing adherence and food intake (socio-demographic, economic factors, food selection and availability and cultural variables).
- Outcomes; Determinants of Health: Metabolic Bone Disease



Pediatric Celiac Clinic

- Started in 2007
- First of its kind in Canada, and serves all of Northern Alberta
- Multidisciplinary team: a physician, a nurse and dietitian all with extensive knowledge of CD
- Aim: To provide support and education for families and patients and to promote adherence to a GFD throughout adolescence

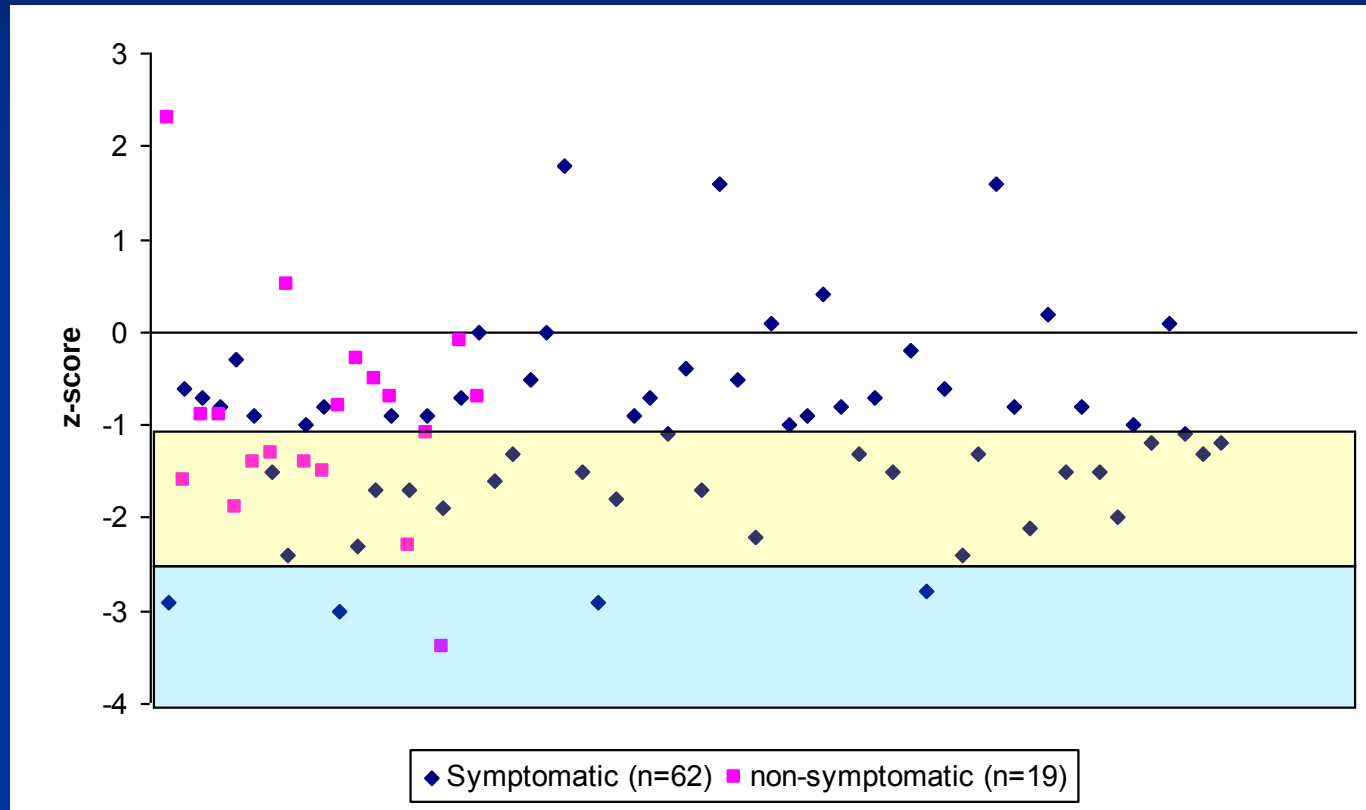
Celiac Disease: GI Clinics at the Celiac Stollery Children's Hospital



Celiac disease and bone health

- A high prevalence of poor bone health exists in adults (70%) and children (23%-65%) with CD.
- CD is associated with anomalous bone metabolism.
- Low bone mass and BMD are significantly recovered through gluten-free diet treatment.

Bone Mineral Density in Symptomatic and Non-Symptomatic Children with Celiac Disease



WHO BMD Z-score Classification	
	z-score > -1
	Normal range
	z-score ≤ -1 to > -2.5
	osteopenia
	z-score ≤ -2.5
	osteoporosis

Bone Mineral Density: Pre-and-Post GFD

Table 2 Bone age, BMD and BMC at time of diagnosis and after 1 year on GFD

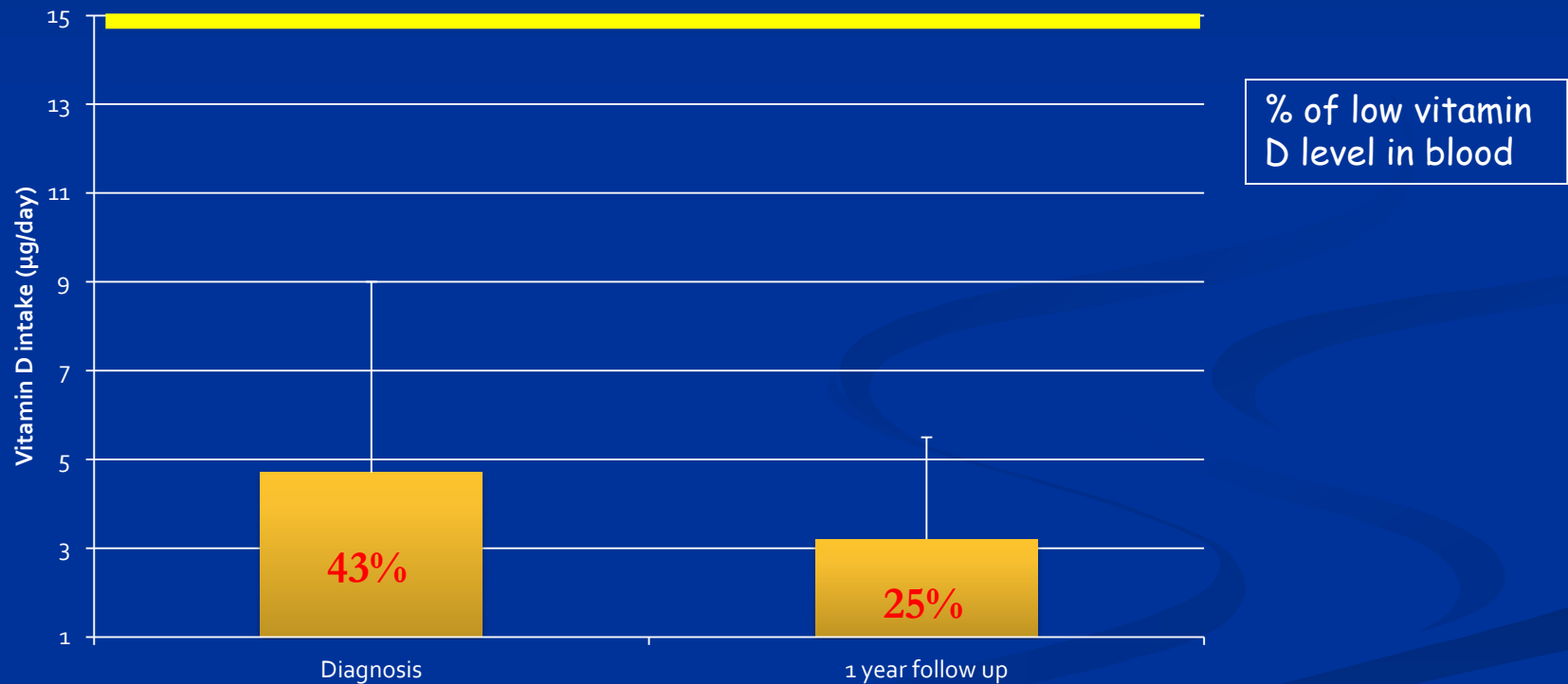
Variable	Diagnosis ^a	% Of low BMD ($z < -1$)	Follow-up ^a	% Of low BMD ($z < -1$)
Bone age	10.1 ± 4.9 (n = 31)		11.1 ± 5.0 (n = 25)	
Whole-body BMD z-score	0.14 ± 1.24 (n = 28)	10.7%	0.25 ± 1.52 (n = 24)	20.8%
Whole-body BMD (g/cm ²)	0.84 ± 0.15 (n = 28)		0.88 ± 0.14 (n = 24)	
Whole-body BMC (g)	1130 ± 659 (n = 28)		1249 ± 648 (n = 24)	
Lumbar-spinal BMD z-score	-0.37 ± 1.10 (n = 31)	32.3%	-0.34 ± 1.06 (n = 25)	32.0%
Lumbar-spinal BMD (g/cm ²)	0.67 ± 0.21 (n = 31)		0.71 ± 0.21 (n = 25)	
Lumbar-spine BMC (g)	30.9 ± 19.2 (n = 31)		33.4 ± 20.2 (n = 25)	

Abbreviations: BMC, bone mineral content; BMD, bone mineral density; GFD, gluten-free diet.

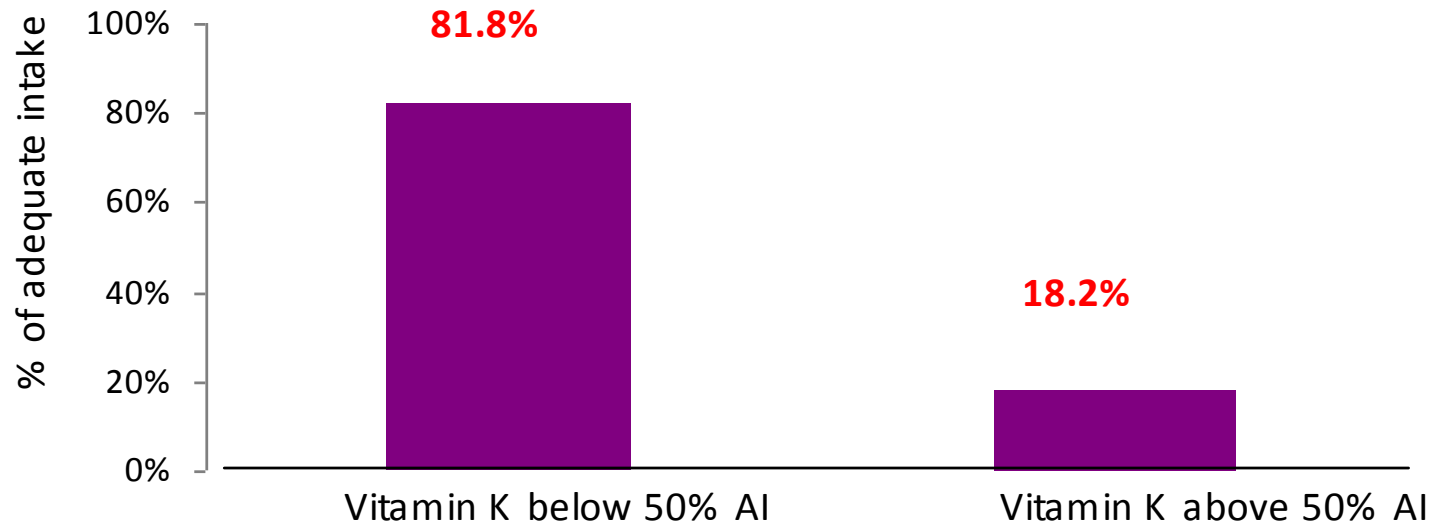
^aValues are shown as mean ± s.d.

No major changes in bone health after 1 year on the GFD:
? Due to composition of dietary intake

Vitamin D intake from food in Children with CD



Vitamin K Intake: Adequate Intake

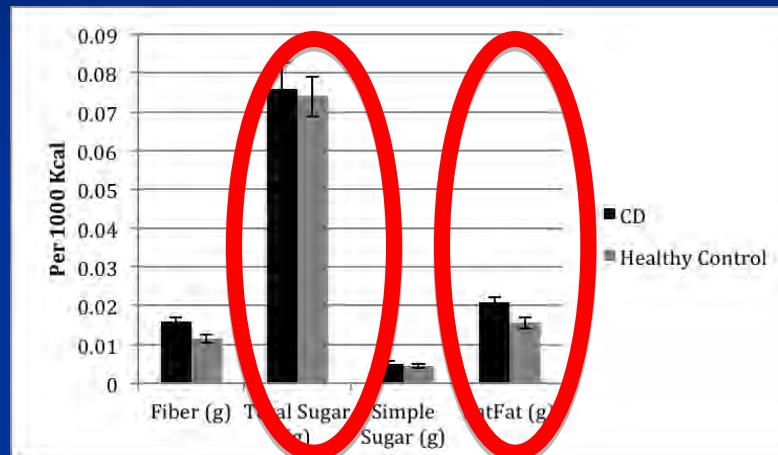


Study Objectives; Ongoing Research Studies

- 1) To determine if parental and child perceptions about how the QOL of the child with CD on a GFD is influenced by adherence to the GFD and the presence of GI symptoms.
- 2) To determine if parental and child perceptions about the QOL of the child with CD on a GFD influences nutritional intake in ethnically diverse populations.
- 3) To assess the interrelationships between food costs of the GFD with dietary intake, quality of life (child and parent) and adherence to the GFD in ethnically diverse populations of children and adolescents with CD.

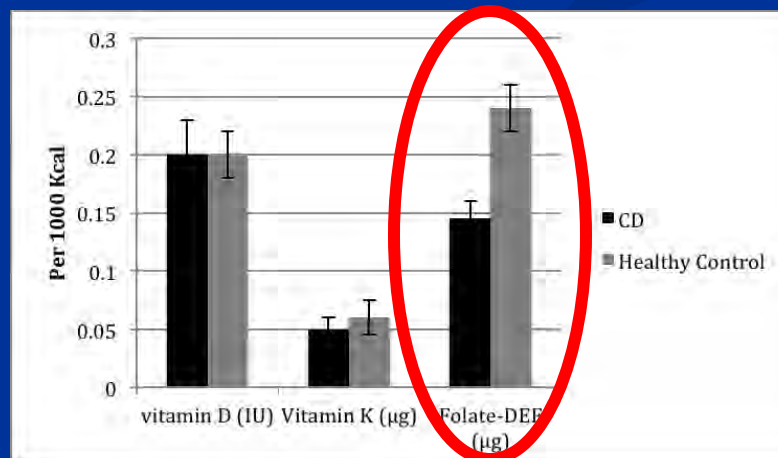


The Gluten Free Diet



Macronutrient Concerns

- ✓ Higher saturated fat
- ✓ Total Sugar Intake
- ✓ Low Fiber Intake



Micronutrients at Risk

- ✓ Vitamin K
- ✓ Vitamin D
- ✓ Folate



Gluten Free Sources of Folate



Food	Serving size	Folate (µg)
Soybeans, cooked	0.5 cup	106-255
Okra, cooked	0.5 cup	142
Spinach, cooked	0.5 cup	121-139
Peas, cooked	0.75 cup	138-263
Beans, cooked	0.75 cup	157-238
Liver, cooked	2.5 oz	262-518

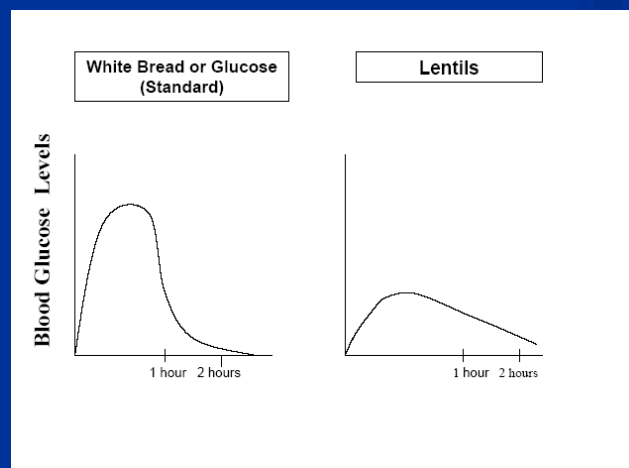
Folate Content in GF food

Grain (1 cup)	Folate (µg)
Amaranth	96
Brown Rice	37
White Rice (enriched, parboiled)	481
Wild Rice	152
Buckwheat	37
Groats	69
Millet	170
Oat Groats (gluten Free)	87
Quinoa	83
Teff	135

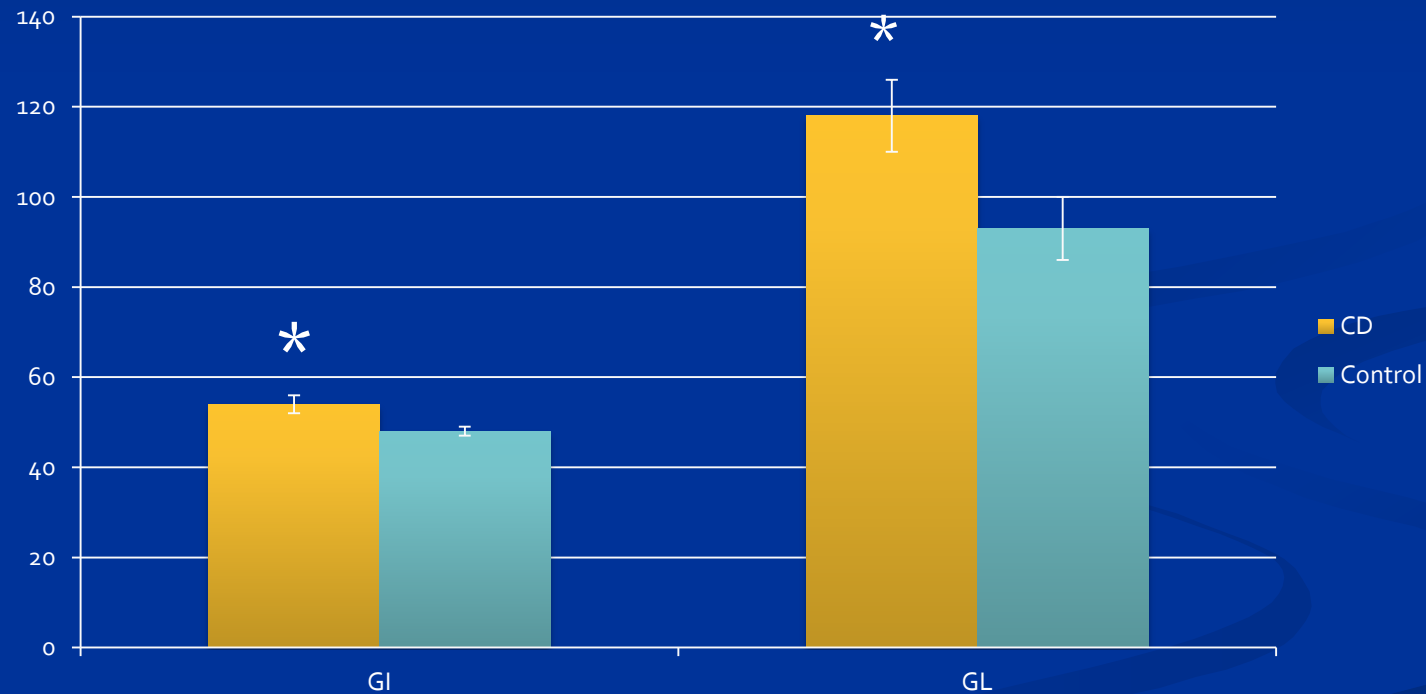


Glycemic Index and Glycemic Load

- Glycemic index measures how quickly a specific **type** of carbohydrate increases blood glucose.
- Glycemic Load measures how quickly a specific **type and amount** of carbohydrate increases blood glucose.



GI and GL in children and adolescents with-and-without Celiac Disease



Lower GI Gluten free Food

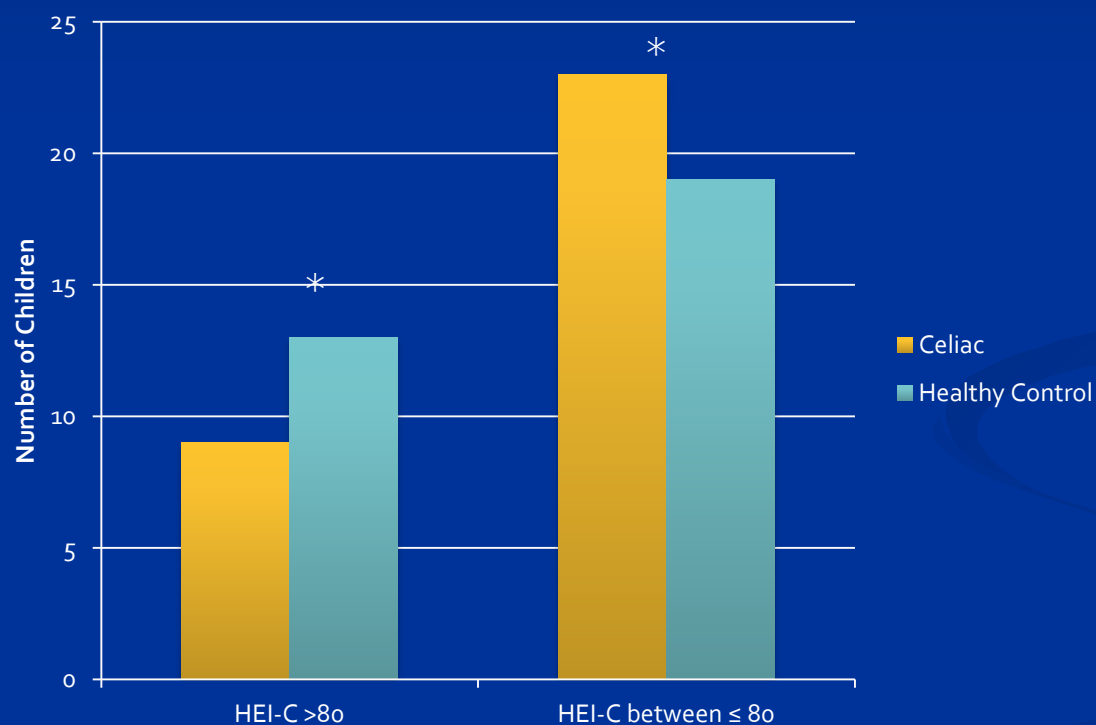
- Breakfast cereals containing psyllium
- Quinoa
- Oat (Gluten free)
- Fresh fruit and vegetables
- Gluten free Bakery with fruit and yogurt
- Chickpeas, Beans and Lentils

High Source of GI/ GL in GF food

- Bakery
- Pasta & Noodles
- Rice
- Rice cakes and rice crackers
- Potato chips



Healthy Eating Index Score



How do perceptions about Quality of Life affect Dietary Intake?

- Our preliminary result suggests that children who are more adherent to the GFD have poorer quality of life and that adherence may be related to the presence of GI symptoms
- Those who have perceptions of greater quality of life; especially those without GI symptoms in general have lower intakes of vitamin D and higher intakes of GI/GL? Is this due to lack of adherence of taking prescribed vitamin supplements? Is this due to the increased variety of food intake in the children who are adherent to the GFD?

Conclusion

- Children with CD on the GFD have diets low in folate, vitamin D and vitamin K and high in GI/GL, saturated fat.
- Quality of life is affected by the presence of GI symptoms in children with CD.
- Evaluation of the potential determinants influencing dietary intake: socio-economic costs of the diet, adherence to the GFD, food availability and cultural influences are important.

Celiac disease Outcomes in Nutrition, Quality of life, and Emerging Research

CONQuER ?



- Diet quality
- Quality of life
- Socio-economic and cultural factors influencing dietary intake in families with CD in ethnically diverse populations.
- Micronutrient status; including factors influencing adherence to supplementation



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Acknowledgements

- Michelle Hoffman MSc
- Najlaa Althobaity MSc Ingrid Rivera Iñiguez MSc

Division of Pediatric
Gastroenterology & Nutrition,
Stollery Children's Hospital

Undergraduate Students

- Simone Enns, Irene Kim, Michelle Kopperud, Stephanie Tilley

- Justine Turner MD PhD FRCPC
- Jessica Sawyer-Bennett RD
- Leanne Shirton RN
- Gail DeHaan RN
- Tarah Samuels MN NP



Collaborators

- Roseann Nasser MSc RD (RRQR Health Region, Regina)
- Jenn Chami RD (U of Regina)
- Shelley Case RD
- Peggy Marcon MD FRCPC®, Megan Carricato MSc RD, The Hospital for Sick Children

- Canadian Celiac Association
- Canadian Foundation for Dietetic Practice & Research



Questions?