

Supplementary Data

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Table S1 Groups Where Survey Was Highlighted

Name of group	Type	Primary media
About Celiac Disease Hawaii	Celiac	Facebook
Arizona East Valley Celiac Support Group	Celiac	Facebook
Baltimore Gluten Free	Gluten free	Facebook
Beyond Celiac	National organization	Facebook
Celiac / NCGS Kids KC	Celiac kids	Facebook
Celiac and Me - Living Gluten Free Due to Celiac	Celiac	Facebook
Celiac and the Beast-ies Celiac Support Group	Celiac	Facebook
Celiac Awareness	Celiac	Facebook
Celiac children; Healthy Gluten Free Living	Celiac kids	Facebook
Celiac Disease Support for NY NJ CT PA	Celiac	Facebook
Celiac Disease Support Group	Celiac	Facebook
Celiac Disease, Gluten Free Group - Recipes, Talk and More	Celiac	Facebook
Celiac Disease-Gluten Free Support Group	Celiac	Facebook
Celiac Families Cedar Park TX	Celiac kids	Facebook
Celiac in California	Celiac	Facebook
Celiac Kids Meal Planning	Celiac kids	Facebook
Celiac Kids of Grand Rapids, MI	Celiac kids	Facebook
Celiac Moms & Dads, USA and Canada	Celiac	Facebook

Celiac Parents and Parents of Celiacs	Celiac kids	Facebook
Celiac Project	Celiac	Facebook
Celiac Recipe Group	Celiac	Facebook
Celiac Sprue Association of Tulsa	Celiac	Facebook
Celiac Support and Awareness-WI	Celiac	Facebook
Celiac Support Group for Nebraska and Iowa	Celiac	Facebook
Celiac Support Group of Madison County	Celiac	Facebook
Celiacs of Philadelphia PA and Tri-State Area	Celiac	Facebook
Celiac-Safe Eats – Seattle	Celiac	Facebook
Center for Celiac Research and Treatment	Celiac research center	Facebook
CNY Celiac Support	Celiac	Website
Coeliac Disease for Beginners	Celiac	Facebook
Cycle - Celiac Youth of Carolinas Life Enrichment	Celiac kids	Facebook
Delaware Celiac - G Free	Celiac	Facebook
Denver Celiac	Celiac	Facebook
Diary of a Celiac Kid	Celiac kids	Facebook
Downriver Gluten Free Kids	Gluten free kids	Facebook
East Valley Celiac Parents	Celiac kids	Facebook
Eating Gluten Free in Dallas	Gluten free	Facebook
Families of Children with Celiac Disease	Celiac kids	Facebook
Families with Celiac Disease in the Hudson Valley	Celiac	Facebook
Free From Gluten	Gluten free	Facebook
Gluten Free / Celiac Disease	Celiac	Facebook
Gluten Free / Celiac Mom's on the South Shore	Gluten free	Facebook
Gluten Free and Me	Gluten free	Facebook
Gluten Free Baton Rouge	Gluten free	Facebook
Gluten Free Boston	Gluten free	Facebook
Gluten Free Charlotte	Gluten free	Facebook
Gluten Free Des Moines	Gluten free	Facebook
Gluten Free Disney	Gluten free	Facebook
Gluten Free Disney!	Gluten free	Facebook
Gluten Free Families	Gluten free	Facebook
Gluten Free Families of Massachusetts	Gluten free	Facebook
Gluten Free Groove	Gluten free	Facebook
Gluten Free in North Phoenix	Gluten free	Facebook
Gluten Free in the East Valley	Gluten free	Facebook
Gluten Free in Utah County	Gluten free	Facebook
Gluten free is for you and me	Gluten free	Facebook
Gluten Free Kids	Gluten free kids	Facebook
Gluten Free Kids on Long Island	Gluten free kids	Facebook
Gluten Free Living and Recipe Share	Gluten free	Facebook
Gluten Free Low Sugar Living	Gluten free	Facebook
Gluten Free Massachusetts	Gluten free	Facebook

Gluten Free New York City	Gluten free	Facebook
Gluten Free on Long Island	Gluten free	Facebook
Gluten Free People Of Bergen County	Gluten free	Facebook
Gluten Free Planet	Gluten free	Facebook
Gluten Free Recipes / Gastronomic Rebel	Gluten free	Facebook
Gluten Free Respect	Gluten free	Facebook
Gluten Free Seattle	Gluten free	Facebook
Gluten Free The Desi Way	Gluten free	Facebook
Gluten Free Utah	Gluten free	Facebook
Gluten Intolerance Group of Central Arkansas	Gluten free	Facebook
Gluten-Free Around DC	Gluten free	Facebook
Gluten-free Disney Travel	Gluten free	Facebook
Gluten-Free Families of Richmond, VA	Gluten free	Facebook
Gluten-Free Foodies of The Woodlands, Conroe...	Gluten free	Facebook
Gluten-Free Seattle	Gluten free	Facebook
Greater Grand Rapids Gluten-free Lifestyle Support	Gluten free	Facebook
Grub Without Gluten (and Other Matters Gluten Free)	Gluten free	Facebook
Highlands Ranch Celiac	Celiac	Facebook
Honestly Gluten Free	Gluten free	Facebook
I Love Gluten Free	Gluten free	Facebook
Kids Living Gluten Free in Oceanside NY	Gluten free kids	Facebook
Kids with Celiac Disease	Celiac kids	Facebook
Kids with Celiac Disease in the Suburbs of Chicago	Celiac kids	Facebook
Kids with Celiac Support Group	Celiac kids	Facebook
Kosher Me & Gluten Free	Gluten free	Facebook
Lancaster Area Celiac Support Group	Celiac	Facebook
Living Gluten Free in San Diego	Gluten free	Facebook
Lunchbox Gluten Free and More	Gluten free kids	Facebook
Madison Area Gluten Intolerance Chapter	Gluten free	Facebook
Menifee Child / Teen Celiac Disease Support Group	Celiac kids	Facebook
Menu Planning for Gluten Free People!	Gluten free	Facebook
Moms of celiac children in Wayne County	Celiac kids	Facebook
My Celiac kids	Celiac	Facebook
National Celiac Association	National organization	Electronic newsletter
Pacific Northwest Celiac kids	Celiac kids	Facebook
Parents of Gluten Free and Celiac Kids	Celiac kids	Facebook
Parents of Gluten Free Kids – Milwaukee	Gluten free kids	Facebook
Pikes Peak Celiac Group	Celiac	Facebook
Raising Our Celiac Kids Long Island	Celiac kids	Facebook
Rockin' Celiac Disease (Child's Support Group)	Celiac kids	Facebook
San Diego Gluten-Free Kids	Gluten free kids	Facebook
Southern Utah Celiac Support Group	Celiac	Facebook
St Louis Celiac Support Group for Kids	Celiac kids	Facebook

Stay Gluten Free Community	Gluten free	Facebook
Support Celiac Disease Awareness & Become Gluten Free	Celiac	Facebook
The Gluten Free Blogger Group	Gluten free	Facebook
The Gluten Free Life	Gluten free	Facebook
Utah Celiacs / Gluten Free	Celiac	Facebook
WNY Gluten Free Diet Support Group	Gluten free	Facebook
Zen Lion Gluten Free	Gluten free	Facebook

Table S2 Encoding of Exposure Variables

Variable	Answer	Value
Celiac	Yes	1
	No	0
Ear infection	None	0
	1	1
	2 to 3	2
	4 or more, or persistent ear infections	4
	I'm not sure	NA
Antibiotic	None	0
	1	1
	2 to 3	2
	4 to 7	4
	8 or more	8
	I'm not sure	NA
Breastfeed	This child was never breastfed	0
	3 months or less	3
	More than 3 months and up to 6 months	6
	More than 6 months and up to 12 months	12
	More than 12 months	18
	I'm not sure	NA
Vit D drop	This child never received vitamin D drops as a baby	0
	3 months or less	0
	More than 3 months and up to 6 months	1
	More than 6 months and up to 12 months	1
	More than 12 months	1
	I'm not sure	NA
Age gluten	This child has never had gluten	0
	3 months or younger	3
	Older than 3 months and up to 6 months	6
	Older than 6 months and up to 12 months	12
	Older than 12 months	18
	I'm not sure	NA

Skim milk	This child did not consume cow's milk during this time	0
	Skim milk	1
	Low fat milk	0
	2% milk	0
	Whole milk	0
	I'm not sure	NA
Milk quantity	This child did not consume cow's milk during this time	0
	1/2 cup or less	0.5
	More than 1/2 cup and up to 1 cup	1
	More than 1 cup and up to 2 cups	2
	More than 2 cups and up to 3 cups	3
	More than 3 cups	4
Vit D supplement	No	0
	Yes, occasionally or only for part of that year	1
	Yes, regularly or fairly regularly for that entire year	2
	I'm not sure	NA
RO water	Any other type of bottled water	0
	Distilled or reverse-osmosis bottled water	1
	Distilled or reverse-osmosis water from a home unit	1
	Filtered water from a home unit or a Brita-like water filter	0
	Plain tap water (unfiltered)	0
	Softened water from a home unit	0
	Well water	0
	Other	0
	I'm not sure	NA

Abbreviations: Vit, vitamin; RO, reverse osmosis.

Table S3 Encoding of Demographic Variables

Variable	Answer	Value
Age child	Scaled numeric variable	-
Education	Grade school or some high school	0
	High school	0
	Some college	1
	Bachelor's or associate's degree	2
	Graduate or professional degree	3
Ethnicity	White (non-Hispanic)	0
	African American / Black	1
	Asian	1
	Hawaiian / Pacific Islander	1

	Hispanic / Latino	1
	Native American	1
	Multiethnic	1
	Other	1
Maternal age	Scaled numeric variable	-
Northeast	Midwest	0
	Northeast	1
	Southeast	0
	Southwest	0
	West	0
Southeast	Midwest	0
	Northeast	0
	Southeast	1
	Southwest	0
	West	0
Relationship	Biological father	1
	Biological mother	0
Sex	Male	1
	Female	0

Table S4 Demographics for Expanded Sample Including CD Parents

Variable	Cases	Controls
n	457	378
Age of child (mean, SD)	8.6 (2.6)	6.1 (2.8)
Age of diagnosis (mean, SD)	6.2 (2.4)	-
CD Parent	124 (27.1)	137 (36.2)
Sex of child - male (n , %)	170 (37.2)	186 (49.2)
Maternal age at birth of child (mean, SD)	30.5 (31.2)	4.6 (4.6)
Ethnicity of child (n, %)		
White (non-Hispanic)	413 (90.4)	332 (87.8)
African American / Black	1 (0.2)	-
Asian	-	3 (0.8)
Hawaiian / Pacific Islander	-	1 (0.3)
Hispanic / Latino	7 (1.5)	10 (2.6)
Native American	4 (0.9)	-
Multiethnic	21 (4.6)	21 (5.6)
Other	11 (2.4)	11 (2.9)
Regions of the USA (n, %)		
Midwest	134 (29.3)	101 (26.7)
Northeast	120 (26.3)	98 (25.9)
Southeast	67 (14.7)	70 (18.5)

Southwest	41 (9)	33 (8.7)
West	95 (20.8)	76 (20.1)
Maternal education (n, %)		
Grade school or some high school	2 (0.4)	3 (0.8)
High school	26 (5.7)	21 (5.6)
Some college	66 (14.4)	60 (15.9)
Bachelor's or associate's degree	215 (47)	172 (45.5)
Graduate or professional degree	148 (32.4)	122 (32.3)
Relationship to child (n, %)		
Biological mother	447 (97.8)	374 (98.9)
Biological father	10 (2.2)	4 (1.1)
Other conditions in child (n, %)		
None	280 (61.3)	277 (73.3)
Attention deficit / hyperactivity disorder	62 (13.6)	36 (9.5)
Autism spectrum disorder	9 (2)	20 (5.3)
Down syndrome	2 (0.4)	1 (0.3)
Lactose intolerance	55 (12)	21 (5.6)
Peanut allergy	18 (3.9)	13 (3.4)
Other food allergy	36 (7.9)	23 (6.1)
Other	93 (20.4)	39 (10.3)
How did (respondent) hear about survey? (n, %)		
Beyond Celiac	92 (20.1)	33 (8.7)
National Celiac Association or Chapter	17 (3.7)	7 (1.9)
Other CD or gluten related group	248 (54.3)	106 (28)
General interest parents group	53 (11.6)	59 (15.6)
Advertisement	2 (0.4)	48 (12.7)
Friend	31 (6.8)	110 (29.1)
Other	14 (3.1)	15 (4)
Respondent provided an email address (n, %)	435 (95.2)	339 (89.7)

Abbreviations: CD, celiac disease; SD, standard deviation; %, percentage of cases or controls.

Table S5 Categorical Variables and ORs for Expanded Sample Including CD Parents

Question ^a /variable	Cases n (%)	Controls n (%)	OR	95% CI	p-value
Ear infections up to second birthday?					
None	141 (30.9)	126 (33.3)	0.930	0.693 - 1.249	0.630
1	78 (17.1)	86 (22.8)	0.722	0.512 - 1.019	0.063
2-3	101 (22.1)	88 (23.3)	0.970	0.700 - 1.346	0.857
>4 or persistent	111 (24.3)	67 (17.7)	1.553	1.104 - 2.186	0.011*
I'm not sure	26 (5.7)	11 (2.9)	-	-	-
Courses of antibiotics up to second birthday?					

None	70 (15.3)	74 (19.6)	0.817	0.568 - 1.175	0.276
1	68 (14.9)	81 (21.4)	0.703	0.491 - 1.008	0.054
2-3	117 (25.6)	120 (31.7)	0.824	0.606 - 1.120	0.216
4-7	95 (20.8)	67 (17.7)	1.358	0.944 - 1.929	0.087
8+	51 (11.2)	18 (4.8)	2.769	1.585 - 4.835	<0.001*
I'm not sure	56 (12.3)	18 (4.8)	-	-	-
Duration of breastfeeding?					
Never breastfed	79 (17.3)	60 (15.9)	1.108	0.767 - 1.599	0.585
3 months or less	80 (17.5)	69 (18.3)	0.950	0.666 - 1.356	0.779
>3 months and up to 6 months	57 (12.5)	43 (11.4)	1.110	0.728 - 1.692	0.627
>6 months and up to 12 months	104 (22.8)	72 (19)	1.252	0.894 - 1.754	0.191
>12 months	137 (30)	134 (35.4)	0.780	0.583 - 1.042	0.093
Duration of vitamin D drops as a baby?					
No vitamin D drops	277 (60.6)	231 (61.1)	1.036	0.772 - 1.391	0.814
3 months or less	55 (12)	63 (16.7)	0.698	0.471 - 1.034	0.072
>3 months and up to 6 months	42 (9.2)	22 (5.8)	1.679	0.982 - 2.871	0.056
>6 months and up to 12 months	39 (8.5)	30 (7.9)	1.108	0.673 - 1.823	0.688
>12 months	11 (2.4)	12 (3.2)	0.762	0.332 - 1.749	0.521
I'm not sure	33 (7.2)	20 (5.3)	-	-	-
Supplemental vitamin D between 2-3?					
No	308 (67.4)	267 (70.6)	1.015	0.744 - 1.387	0.923
Occasionally or only part of year	58 (12.7)	45 (11.9)	1.141	0.752 - 1.732	0.534
Regularly or fairly regularly for entire year	59 (12.9)	58 (15.3)	0.867	0.586 - 1.284	0.477
I'm not sure	32 (7)	8 (2.1)	-	-	-
Age at which gluten introduced?					
3 months or younger	11 (2.4)	10 (2.6)	0.905	0.380 - 2.154	0.821
>3 months and up to 6 months	157 (34.4)	119 (31.5)	1.135	0.848 - 1.519	0.396
>6 months and up to 12 months	246 (53.8)	205 (54.2)	0.976	0.741 - 1.287	0.866
>12 months	36 (7.9)	37 (9.8)	0.785	0.485 - 1.270	0.323
I'm not sure	7 (1.5)	7 (1.9)	-	-	-
Type of liquid cow's milk between 2-3?					
No cow's milk at this time	45 (9.8)	40 (10.6)	0.933	0.595 - 1.463	0.764
Skim milk	33 (7.2)	12 (3.2)	2.400	1.222 - 4.717	0.009*
Low fat milk	38 (8.3)	31 (8.2)	1.026	0.625 - 1.685	0.918
2% milk	132 (28.9)	106 (28)	1.057	0.781 - 1.431	0.718
Whole milk	202 (44.2)	187 (49.5)	0.823	0.626 - 1.083	0.165
I'm not sure	7 (1.5)	2 (0.5)	-	-	-
Daily quantity of milk between 2-3?					
No cow's milk at this time	44 (9.6)	39 (10.3)	0.973	0.617 - 1.535	0.908
1/2 cup or less	55 (12)	41 (10.8)	1.185	0.770 - 1.823	0.440
> 1/2 cup and up to 1 cup	65 (14.2)	52 (13.8)	1.096	0.739 - 1.627	0.648
> 1 cup and up to 2 cups	124 (27.1)	109 (28.8)	0.978	0.720 - 1.329	0.886
> 2 cups and up to 3 cups	102 (22.3)	90 (23.8)	0.974	0.703 - 1.350	0.876

> 3 cups	33 (7.2)	35 (9.3)	0.800	0.487 - 1.317	0.379
I'm not sure	34 (7.4)	12 (3.2)	-	-	-
Water type at age 2?					
Distilled or RO bottled water	11 (2.4)	12 (3.2)	0.764	0.333 - 1.752	0.524
Any other type of bottled water	41 (9)	42 (11.1)	0.802	0.509 - 1.262	0.339
Distilled or RO water from home unit	15 (3.3)	19 (5)	0.609	0.305 - 1.217	0.157
Softened water from home unit	13 (2.8)	7 (1.9)	1.576	0.622 - 3.991	0.333
Filtered water from home unit	176 (38.5)	140 (37)	1.091	0.823 - 1.447	0.543
Plain tap water (unfiltered)	159 (34.8)	124 (32.8)	1.119	0.838 - 1.494	0.447
Well water	26 (5.7)	27 (7.1)	0.797	0.457 - 1.391	0.423
Other	8 (1.8)	6 (1.6)	1.122	0.386 - 3.262	0.833
I'm not sure	8 (1.8)	1 (0.3)	-	-	-

Notes: ^a Questions and answers in this table were edited for brevity; * for p values < .05.

Abbreviations: CD, celiac disease; OR, Wald odds ratio; 95% CI, 95% Wald confidence interval, RO, reverse osmosis.

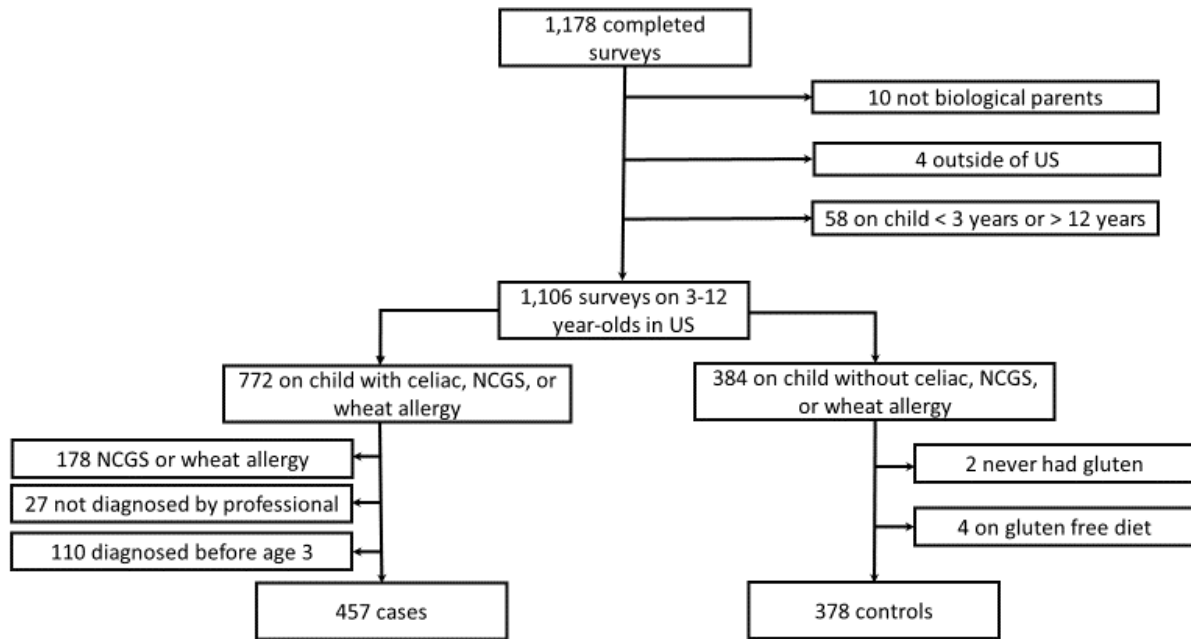
Table S6 ORs and aORs for Expanded Sample Including CD Parents

	OR	Unadjusted		aOR	Adjusted ^a	
		95% CI	p-value		95% CI	p-value
Ear infection (#)	1.111	1.012 - 1.221	0.027*	1.069	0.964 - 1.186	0.208
Antibiotic (courses)	1.156	1.081 - 1.239	<0.001*	1.105	1.026 - 1.193	0.009*
Breastfeeding (months)	0.990	0.971 - 1.009	0.307	1.003	0.982 - 1.025	0.759
Vit D drop > 3 months (binary)	1.273	0.894 - 1.822	0.183	1.630	1.100 - 2.432	0.016*
Vit D supplement (trinary)	0.962	0.796 - 1.163	0.687	1.021	0.827 - 1.261	0.848
Age gluten (months)	0.982	0.947 - 1.018	0.321	0.996	0.957 - 1.037	0.856
Skim milk (binary)	2.400	1.255 - 4.905	0.011*	2.189	1.084 - 4.686	0.035*
Milk quantity (cups / day)	0.949	0.844 - 1.068	0.387	0.885	0.776 - 1.009	0.068
RO water (binary)	0.686	0.397 - 1.176	0.172	0.577	0.314 - 1.050	0.073

Notes: ^a Covariates for the adjusted odds ratios are: age of the child, ethnicity of child, maternal education, and maternal age at birth of the child; * for p values < .05.

Abbreviations: CD, celiac disease; OR, odds ratio; aOR, adjusted odds ratio; 95% CI, 95% confidence interval, Vit, vitamin; RO, reverse osmosis.

Figure S1 Flow Chart for Participant Inclusion in Expanded Sample Including CD Parents



Abbreviations: CD, celiac disease, NCGS, non-celiac gluten sensitivity; US, United States.